UNIVERSITAT DE BARCELONA

Law as Knowledge: Anthropological Bases for the Regulation of the Web of Data

Pompeu Casanovas Romeu

Doctoral Thesis

LAW AS KNOWLEDGE: ANTHROPOLOGICAL BASES FOR THE REGULATION OF THE WEB OF DATA

Author:

Pompeu Casanovas

Supervisors:

Ignasi Terradas Saborit

Raúl Márquez Porras

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Author:
Pompeu Casanovas Romeu

Supervisors:
Ignasi Terradas Saborit
Raúl Márquez Porras

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Acronyms

AI4People	Artificial Intelligence for People
AR	Augmented Reality
ASCS	Artificial Socio-Cognitive Technical Systems
B-Agreements	Being in Agreement
BATNA	Best Alternative to a Negotiated Agreement
CAV	Connected Automated Vehicles
CbD	Compliance by Design
ccREL	Creative Commons Rights Expression Language
CD	Conscious Design
CDM	EurLex CELLAR Common Metadata Model
CNIL	Centre Nationale de l'Informatique et des Libertés
CPR	Common-pool Resources
CPS	Cyber-Physical Systems
CSS	Cascading Style Sheets
CSV	Comma-Separated Values
CSV-LD	Comma-Separated Values for Linked Data
CtD	Compliance through Design
DAO	Decentralised Autonomous Organisation
DER	Distributed Energy Resources
DL	Deep Learning
DPV	Data Privacy Vocabulary
Dr-Systems	Driving Systems
DT	Digital Twins
EC	Emerging Collectivities
ECLI	European Case-based Law Identifier
EI	Electronic Institutions
EIF	European Interoperability Framework
ELI	European Legislation Identifier
ELTS	European Legal Taxonomy Syllabus
En-Systems	Enabling Systems
EuroVoc	European Vocabulary (Thesaurus)
FinTech	Financial Technology (services)
GDPR	(European) General Data Protection Regulation
GDPRtEXT	GDPR Text Extensions
H-Agreements	Having an Agreement
HOSS	Hybrid Online Social Systems
HTTP	Hypertext Transfer Protocol
IAAIL	International Association for Artificial Intelligence and Law
IaaS	Infrastructure as a Service
IDP	Intelligent Document Processing
IED	Intelligent Electronic Devices
IGF	Internet Governance Forum
Industry4.0	Industry Web 4.0
IoAT	Internet of Autonomous Things
IoT	Internet of Things

IRA	Identity Resolution Algorithms
IRI	Internationalised Resource Identifier
iSWRM	Institutional Semantic Web Regulatory Models
nSWRM	Normative Semantic Web Regulatory Models
JSON	JavaScript Object Notation
JSON-LD	JSON for Linked Data
JURIX	Foundation for Legal Knowledge Based Systems
L&AI	Law and Artificial Intelligence
L&S	Law and Society
L4LOD	Licences for Linked Data
LawTech	Law and Technology (services)
LCtD	Legal Compliance through Design
LDP	Law and Development Movement
LDR	Linked Data Rights
LEA	Law Enforcement Agencies
LKG	Legal Knowledge Graphs
LKIF	Legal Knowledge Interchange Format
LOD	Linked Open Data
LOTED2	Ontology of European Public Procurement Notices
MAS	Multi-Agent Systems
ML	Machine Learning
MSG	Multi Stake-holder Governance
NIST	(USA) National Institute of Standards and Technology
NLP	Natural Language Processing
NorMAS	Normative Multi-Agent Systems
NRV	Normative Requirement Vocabulary (NRV)
OCMS	Open Mind Common Sense
ODR	Online Dispute Resolution
ODRL	Open Digital Rights Language
ODRM	Open Digital Rights Management
OI	Online Institutions
OSINT	Open-Source Intelligence
OSLO	Open Standards for Linking Governments Ontology
OWL	Web Ontology Language
PaaS	Platform as a Service
PPROC	Public Procurement Ontology
PrivOnto	Privacy Ontology
PrOnto	GDPR Ontology
R2EML	R4 Rule Mark-up Language
RDF	Resource Description Framework
RDFS	Resource Description Framework Schema
RegTech	Regulatory Technologies (services)
REL	Rights Expression Languages
RJ	Relational Justice
RL	Relational Law
SaaS	Software as a Service
SHACL	Shapes Constraint Languages
SKOS	Simple Knowledge Organization System

SMART	Smart Model for Legal Governance: Scalable, Modular, Adaptable, Reflexive, Technologically-savvy.
SME	Small and Medium Enterprise
SPARQL	SPARQL Protocol and RDF Query Language
STS	Socio-Technical Systems
SupTech	Supervisory Technologies (services)
SW	Semantic Web
SWIM	Semantic Web Institutional Models
SWRM	Semantic Web Regulatory Models
TURTLE	Terse RDF Triple Language
UFO	Unified Functional Ontology
UFO-L	Unified Foundational Ontology for Legal Relations
UNCITRAL	United Nations Commission on International Trade Law
URI	Uniform Resource Identifier
VSD	Value Sensitive Design
W3C	World Wide Web Consortium
WIT	World + Institutions + Technology Metamodel
WoD	Web of Data
WoLD	Web of Linked Data
XML	Extended Mark-up Language

Abstract (English)

Law as Knowledge. Anthropological Bases for the Regulation of the Web of Data is a Dissertation on law and regulatory models on the Web of (Linked) Open Data, the Internet of Things, and Industry 4.0. These fields are converging in a new information processing environment, and society is challenged to ensure that appropriate regulatory responses can uphold the rule of law fairly and effectively in this emerging context. The challenge extends beyond merely submitting digital processes to the law. The 20th century notion of 'legal order' *alone* will not be suitable to produce the social order that the law should bring. The Dissertation explores the concepts of *rule of law* and of *legal governance* in digital and blockchain environments. It positions law (as meaning, as data, and as sense) and legal governance (as a formal mechanism, as political form) from an empirical perspective, i.e., as explanatory and validation concepts to support the implementation of the rule of law in the new digital environments. As a novel contribution, this Dissertation (i) describes the double implosion experienced by the legal profession and the emergence of legal web services based on AI; (ii) progresses some of the work done on the *metarule* of law and the epistemic *middle-out approach* with an *inside-out approach* to digital regulatory systems and legal compliance models; (iii) sets the state-of-the-art in legal anthropology, sociolegal studies, AI & Law, and legal theory regarding this subject; (iv) identifies the way to explain and validate legal information flows and hybrid agents' behaviour through causal models; (vi) delves into the evolution of legal isomorphism and legal analytics; (vi) sets the conditions for the emergence of socio(legal) ecosystems; and (vii) sets an empirical methodology in three steps for legal compliance checking.

Resum (Catalan)

Law as Knowledge. Anthropological Bases for the Regulation of the Web of Data és una tesi sobre dret i models regulatius a la Web de les Dades (enllaçades i en obert), Internet de les coses i Indústria 4.0. Aquests camps estan convergint en un nou entorn de processament de la informació, i la societat té el repte de garantir que les respostes reguladores

adequades puguin mantenir l'estat de dret de manera justa i eficaç en aquest context emergent. El repte va més enllà del simple fet de sotmetre a la llei els processos digitals. La noció del segle XX d' 'ordre jurídic' per si sola ja no és adequada per produir l'ordre social que el dret hauria de promoure. La tesi explora els conceptes *d'estat de dret* i de *governança jurídica* en entorns digitals i *blockchain*. Posiciona el dret (com a significat, com a dades i com a sentit) i la governança jurídica (com a tècnica formal i forma política) des d'una perspectiva empírica, és a dir, com a conceptes explicatius i de validació per donar suport a la implementació de l'estat de dret en els nous entorns digitals. Com a nova aportació, aquesta Tesi (i) descriu la doble implosió experimentada per la professió jurídica i l'aparició dels serveis web jurídics basats en la IA; (ii) avança en el treball ja realitzat sobre el *metaestat de dret* i l'enfocament epistèmic *middle-out* amb un enfocament des de dins cap a fora (*inside-out*) dels sistemes normatius digitals i els models de compliment jurídic; (iii) estableix l'estat de l'art en antropologia jurídica, estudis sociojurídics, Intel.ligència Artificial & Dret, i teoria jurídica sobre aquesta matèria; (iv) identifica la manera d'explicar i validar els fluxos d'informació jurídica i el comportament híbrid dels agents (H/M) mitjançant models causals; (v) aprofundeix en l'evolució de l'*isomorfisme* jurídic i de l'*analítica* jurídica; (vi) estableix les condicions per a l'emergència d'ecosistemes jurídics, i (vii) estableix una metodologia empírica en tres passos per a la verificació del compliment jurídic en entorns digitals.

Resumen (Spanish)

Law as Knowledge versa sobre derecho y modelos regulativos en la Web de Datos (enlazados y en abierto), Internet de las cosas e Industria 4.0. Estos campos están convergiendo en un nuevo entorno de procesamiento de la información, y la sociedad se enfrenta al reto de garantizar que las respuestas reguladoras puedan mantener el estado de derecho de forma justa y eficaz en este contexto emergente. El reto va más allá del simple hecho de someter a la ley los procesos digitales. La noción del siglo XX de "orden jurídico" por sí sola ya no es adecuada para producir el orden social que el derecho debería promover. La tesis explora los conceptos de estado de derecho y de gobernanza jurídica en entornos digitales y *blockchain*. Posiciona el derecho (como significado, como datos y como sentido) y la gobernanza jurídica (como técnica formal y forma política) desde una perspectiva empírica, es decir, como conceptos explicativos y de validación para sustentar la

implementación del estado de derecho en los nuevos entornos digitales. Como nueva aportación, esta Tesis (i) describe la doble implosión experimentada por la profesión jurídica y la aparición de los servicios web jurídicos basados en la IA; (ii) avanza en el trabajo ya realizado sobre el *metaestado de derecho* y el enfoque epistémico *middle-out* con un enfoque desde dentro hacia fuera (*inside-out*) de los sistemas normativos digitales y los modelos de cumplimiento jurídico; (iii) establece el estado del arte sobre esta materia en antropología jurídica, sociología del derecho, Inteligencia Artificial y teoría jurídica; (iv) identifica la forma de explicar y validar los flujos de información jurídica y el comportamiento híbrido de los agentes (H/M) mediante modelos causales; (v) profundiza en la evolución del *isomorfismo jurídico* y de la *analítica jurídica*; (vi) establece las condiciones para la emergencia de *ecosistemas jurídicos*, y (vii) establece una metodología empírica en tres pasos para la verificación del cumplimiento jurídico en entornos digitales.

PREFACE: What It is All About

I Manifesto

At the turn of the present century, cognitive anthropologist Roy d'Andrade wrote:

> My speculation is that the despecialization of cultural anthropology is ultimately based on the loss of canons of empirical justification. (D'Andrade 2000, 228)

I have tried to create an empirically based method for providing "empirical justification", i.e. able to validate the implementation of regulatory tools—mainly the broad ones, known as *the law*—on the Internet of Things and the Web of Data.

Doing so, in dealing with data, I quickly realised that it was not possible to only operate within the knowledge acquisition methods that are the legacy of classical social anthropology and qualitative sociology. Data means *data*, symbolically numeral entities. And when we encounter expressions such as 'privacy by design' or 'data protection by design', 'by design' means *by design*, as in the specific meaning of the sciences by design pioneered more than sixty years ago by Herbert A. Simon, while he incepted Artificial Intelligence in the 1956 Dartmouth Seminar together with John McCarthy, Allen Newell, Claude Shannon, and Marvin Minsky.

Without these kinds of tools—metrics, algorithms, neural networks, coding, machine learning, and the like—it is just not possible to understand how the social interface between humans and machines is produced, i.e., how the artificial, digital world that we will live by can be produced and is emerging with the new Millennium as a new kind of civilisation. Just as a social ethnographer needs to know the language of the society he wants to describe, a digital ethnographer or, more modestly, someone who wants to untangle the interface between humans and machines, should speak their same language, even if she speaks it imperfectly. Paraphrasing the title of one of Nassim N. Taleb's books, she should have *skin in the game*.

The reader will find that I made the conceptual differentiation between *law as data*, *law as meaning*, and *law as sense*. The first notion encompasses law as a product of several representation and algorithmic languages. The second one, points out the specific cognitive and linguistic nature of the written law laid down in legal documents. The third one is more complex, as it covers languages (natural and artificial), social behaviour (individual and collective) in context, courses of action in legal settings (courts or law firms), and institutions (private or public corporations and administrations).

Making sense of regulations goes beyond the linguistic meaning, for it entails having experienced them in a way that makes for an acceptable threshold, i.e. having accommodated them as an acceptable framework for common behaviour. This is what defines a *legal ecosystem*, the new kind of regulatory reality that will occur to set stable information flows combined with sustainable human behaviour. I am thinking of the *hybrid intelligence* that the cooperation and coordination between humans and machines will bring about in the spaces of our lives—smart homes and cities, coordinated automated vehicles (CAVs), or production chains in the so-called Industry 4.0.

Is all this compatible with an ethical and political stance?

I believe so. Nothing prevents anthropologists and social scientists from adopting positions against tyranny or fighting for human rights. On the contrary, the reader will also find out that the notion of *linked democracy*—along with its sister notion of *epistemic democracy*, which requires an open, shared knowledge to ground and legitimise legal and political decisions—plays a central role in the validation process of regulatory models on the Web of Linked Data. The only condition is controlling what is required in the different research phases, from the knowledge acquisition process to the formulation of hypotheses, theories, models, tests, and simulations.

During the last twenty years in particular, legal anthropologists have been very active, and have moved from local ethnographies to the international arena, shifting from a conflictual case-based approach to a more public law-centred one. For instance, they have been the first to advance the process of hard legalisation of politics in contemporary cultures, from Myanmar to the United States, describing how corruption is being produced through and within institutions that once belonged to the rule of law.

We need these legal ethnographies to understand the deep cultural change that is taking place before our eyes. All intuitions, narratives, hints and ethnographic accounts on institutions, regulations and ontologies are welcome, as long as some type of evidence is provided through the Human/Machine interface. As have been said, entities, information, and knowledge on the web follow different conditions than non-virtual interactions and must satisfy additional requirements. Semantics and pragmatics in computer languages, digital twins, and augmented reality on the Internet of Things do not have the same kind of expressivity than natural languages. I devote Chapters 2, 5 and 6 to explain and frame this kind of research.

To facilitate the reading of this thesis, I have plotted its modules, subjects, main concepts, and Chapters onto a single simple chart (below). *Modules* consists of clusters of organised knowledge. *Concepts* represent the notions which introduce the kernels of the argumentation offered in each chapter. *Fields* mean the academic disciplines that contain and have fostered the discussion. *Chapters* reflect the distribution of subjects along the dissertation. The Introduction [0] and the Conclusions [9] are spared from this description. It is worth mentioning that I have kept analytically separated ontological, epistemic, and methodological issues. However, it should be borne in mind that they constitute an integrated unity.

Table 1. *Structure and Concepts of the Dissertation*

MODULES	CONCEPTS	FIELDS	CHAPTERS
Legal Web Services and Artificial Intelligence	Law as Data	Legal Anthropology and Sociolegal Studies	1. The Double Implosion of the Legal Profession and Web Services
	Law as Meaning		
	Law as Sense		
Law as Knowledge	Knowledge Graphs	Ontology and Semantic Web	2. Law as Knowledge: The Web of Linked Open Data
	Legal Ontologies		
Law as Dialogue	Agreement	Legal Theory, Sociolegal Studies, and Legal Anthropology	3. From Positivist to Relational Law: Law as Dialogue
	Legal Pluralisms		
	Relational Law		
	Relational Justice		

	Regulatory Model Regulatory System		
Reciprocity and Dialogue	Integration Reciprocity Legal Culture Vindicatory Systems	Legal Anthropology	4. The Legacy of Legal Anthropology
Legal Governance	Middle-out Approach Inside-out Approach	Epistemology	5. The Convergence between the Web of Data, the Internet of Things and Industry 4.0
Linked Democracy	Rule of Law Metarule of Law Legal Ecosystems Legal Isomorphism	Political Anthropology and Artificial Intelligence	6. *Legal Isomorphism* and the Emergence of Legal Ecosystems
Sociolegal Ecosystems	Institutional Design Interoperability	Social and Political Sciences and Artificial Intelligence	7. Sociolegal Ecosystems: Political Forms of Legal Governance
Metarule of Law	Compliance *by* and *through* Design Scheme Metamodel Validation Model	Methodology and Use Cases	8. From Compliance by Design to Compliance through Design: An Empirical Validation Model

II Disclosure

I will mention some previous work and publications that have served me as a starting point and can illustrate the origins of the chapters. The Dissertation has been incepted by progressively developing them in a homogeneous and systematic way.

I started working on Chapter 1, on the double implosion of legal professions and legal analytics, at R. López de Mántaras' request in 2017. A shorter version in Spanish will be published as a chapter in a book edited by O. Velarde and M. Martín at the Centro de Investigaciones Sociológicas (CIS) in 2022.

Chapter 3 recovers "Agreement and relational justice: A perspective from philosophy and sociology of law", the opening chapter of the collective volume by S. Ossowski (with 14 more editors and 135 authors) *Agreement Technologies*, one of the main outcomes of the FP7 COST Programme SINTELNET (European Network for Social Intelligence) (2011-2014). I served as technical editor of the volume that appeared in the Law, Governance and Technology Series (Springer) in 2013. I used this publication as a launching pad not just for Chapter 3 but for the whole Dissertation. I contacted Ignasi Terradas-Saborit at the time for this very reason. He had just published *Justicia Vindicatoria* (2008), and I realised that his ideas about vindicatory justice were concomitant with the ideas I was working on regarding relational justice, the future of law, and the upcoming of a digital age. I realised these ideas could be developed in parallel, and this is what I did in Chapter 3 and Chapter 4, on the legacy of legal anthropology.

The second part of the Dissertation offers a general view of the transforming effects of information processing on contemporary regulations. A previous short version of the first Subsections of Chapter 5 entitled "Law, Socio-Legal Governance, the Internet of Things, and Industry 4.0: A Middle-Out/Inside-Out Approach" appeared in January 2022, in a Special Issue about the impact of AI Intelligence on law launched by *J.Multidisciplinary Scientific Journal* (MDPI) and edited by Ugo Pagallo and Massimo Durante. They have been extended and completed to ground the theses contended in the next Chapters of the Dissertation.

The first part of Chapter 6, on "legal isomorphism", informed my contribution to the 3rd Philosophers' Seminar on the legal effect of code-driven law, organised by Mireille Hildebrandt at her EU COHUBICOL Advanced Grant Project (12 November 2021, Vrije Universiteit, Brussels). Although it has not been published yet, I expect its publication to appear in the *Journal of Cross-Disciplinary Research in Computational Law* after peer review evaluation within 2022.

Some parts of Chapter 7, entitled "Legal Linked Data Ecosystems and the Rule of Law" timbered the fifth chapter of the Open Access volume in 2019, with Marta Poblet and Victor Rodríguez-Doncel, Legal Brief 750 of Springer Nature, named *Linked Democracy. Foundations, Tools and Applications*. It has been completely remoulded.

The validation methodology presented in Chapter 8, the empirical causal approach to the quality of 'legal' (legal validity, effectiveness, thresholds…) in three steps, has been developed with Louis de Koker, Mustafa Hashmi and Guido Governatori, and some other researchers, over the course of several national, Australian, and H2020 European Projects—Data to Decisions CRC Project, with the Australian Government, EU H2020 SPIRIT, EU H2020 OPTIMAI, ONTOROPA, etc. I added a short list of the main projects as an Annex to the Introduction to this Dissertation.

The reader can find many Open Air Zenodo Deliverables and Conference papers on legal enforcement, normative systems, metarule of law, schemes, metamodels, metrics and sandboxes online. These reflect the direct results of official projects and, if they are not labelled as confidential, it is mandatory in Europe to make them public in Open Access repositories. This does not necessarily exclude them being reproduced and published later on in due form (also in Open Access). To write this Dissertation, I have only used my personal contributions and ideas, but I have acknowledged the effort of thinking alike of all my partners. Hence, they are duly quoted, with attribution of authorship, and in cases of citations of unpublished works or of sensitive issues, I asked for their permission as well.

III Acknowledgments

The examples I have chosen to illustrate the main contentions of this Dissertation are taken from our use cases, deployed in regulatory work packages, and from the research I carried out from September 2017 to December 2021 at La Trobe University Law School, Melbourne, a Commonwealth Australian University. I am most grateful to the Law School and the College of Arts, Social Sciences and Commerce that hosted me and supported my research. Patrick Keyzer, Professor in Constitutional Law and former Head of the School, strongly believed in this research and supported it. He is now fostering law, science, and technology from his new position as a Dean of the Faculty of Law in the Australian Catholic university.

I could not have written this Dissertation without the consistent and ongoing flow and exchange of ideas with the other members of La Trobe LawTech Research Group, all of them with a strong international impact. Louis de Koker, expert in financial inclusion and

regulations and lead of the Law and Policy Program of the Data to Decisions Cooperative Research Centre; Víctor Rodríguez-Doncel, from the UPM Ontological Research Group, with a keen and long vision on the web of data; John Zeleznikow, a world pioneer in Online Dispute Resolution and AI, and always disposed to generously share his experience; Guido Governatori, the former CSIRO Chief researcher for Legal Informatics and one of the creators of the REGOROUS methodology and OASIS LegalRuleML language; Mustafa Hashmi, expert in computer business languages and regulatory compliance, and working now on this subject for the Australian Government; political economists Nick and Sue Morris, experts in economic policies and regulations to foster trust. And finally, the former Privacy Commissioner of the State of Victoria and UN advisor David Watts, deeply interested in AI and Law; Andre Oboler, well-known expert on online hate speech and CEO at Online Hate Prevention Institute; and Public Health and Constitutional Law Professor Danuta Mendelson. I cannot forget to mention David Wishart nor Jianfu Chen. We have been cooperating shoulder to shoulder on the new Open Access launch of an old publication, *Law in Context: A Socio-legal Journal*. Battling on, as David Wishart likes to say.

I realise now that I have many joint publications over the last five years with all the people I just mentioned. I am deeply indebted to them for all I have learned, for their generosity, time, and talent.

Many people have also helped me out in my endeavour, with an open heart and an open mind. Friends in Catalonia, first, such as Josep Monserrat, Dean of Humanities at the University of Barcelona, and the researchers of the Institute of Law and Technology (IDT) Emma Teodoro, Jorge González-Conejero, Esther Zapater, Carles Górriz, Wendy Simon, and the PhD students Andrea Guillén Gil and Mario Macías López. I do not forget some former members, still cooperating with us throughout all these years, Pep Vallbé, Núria Casellas, Albert Meroño-Peñuela, Sílvia Gabarró. We worked in many projects as well that helped to incept, polish, and flesh out the ideas of this Dissertation. I will add the support and friendship of computer scientists of the CSIC-IIIA Institute, Carles Sierra, Ramon López de Mántaras, Pablo Noriega, Enric Plaza, Nardine Osman. Likewise, we have shared many projects and efforts to develop AI and Law so far. Experts, colleagues becoming friends over the years.

To all of them, thank you.

I spare the reader the list of friends and colleagues with whom I am cooperating in a consistent manner regarding international AI & Law networks and doctorates. They are also responsible for some of the main ideas, and they are thoroughly cited in the Dissertation. They are mainly but not exclusively the editors of the *Artificial Intelligence Approaches to the Complexity of Legal Systems* (AICOL) Workshops that we have persistently organised and published in Springer LNAI for over ten years now.

I am also glad to acknowledge the strong support I have received from my supervisor IgnasiTerradas-Saborit. His deep knowledge of legal anthropology, history of justice and legal models, and his pertinent suggestions, have inspired my writing on many occasions. And it is my pleasure to mention and warmly thank Raúl Márquez Porras, my second supervisor, consistently helping in the last push of this Dissertation.

Finally, I owe so much to Marta Poblet, my wife, that it would not be enough saying that she is the main contributor to the contents of this Dissertation.

INTRODUCTION

Law as Knowledge

To the "uncreative demon of escape from reality"

[B. Malinowski, Monday 22/2/1915, *A Diary in the Strict Sense of the Term* (1966), p. 91]

Summary. This is a Dissertation on Law as Knowledge. How legal knowledge is produced, structured, stored, managed, changed, used and eventually reused. This Chapter introduces the subjects of this Dissertation, sets the main objectives and research questions, and provides its backbone, methodology, and structure. The Dissertation is clustered into two complementary parts—grounds of the legal digital turn and digital legal governance. The first part is divided into four chapters, presenting, and grounding the background and assumptions that the development of the thesis requires. The legacy of legal anthropology, past and present, ends the second part. This second part addresses and develops the ideas of legal government, metarule of law, and sociolegal ecosystems from an empirical approach, standing on the results of some pilots and use cases. An original legal validation model is also presented. Conclusions and Annexes come in the end.

Keywords. Contents, Legal Knowledge, Rights, Legal Anthropology, Internet of Things, the Semantic Web, Web of Data

0.1. Strategies and Research Questions

0.1.1 Identity and Legal Knowledge: Rights vs. Norms

In the present study, I will put forward a perspective following the pragmatic thesis on legal culture and modelling I have already advanced in my previous works on regulatory frameworks.[1] The thesis tackles the problem of 'legal knowledge'[2] from a relational and interactive point of view, i.e. resuming ethnographic approaches in legal knowledge

[1] See especially Casanovas et al. (2007, 2008, 2011a, 2011b, 2014, 2016b, 2017a, 2017b, 2019, 2021a, 2021b, 2022); Casanovas (2010a, 2010b, 2012, 2013a, 2014, 2015a, 2015b, 2015c, 2017), Casanovas and Poblet (2008a, 2008b); Poblet et al. (2019).

[2] Quotation marks will be used to denote terms, words or concepts. Double quotation marks will be reserved for citations.

acquisition, and defining what 'counts as' *legal* (including rights) from a behavioural and cultural approach. Thus, this is a thesis on legal anthropology and the so-called Semantic Web (SW) or the Web of Data (WoD), i.e. the data machine-readable layer of the Internet that allows users to upload, download, visualise, manipulate, and organise a meaningful content on the Web. The Web, monitored and regulated by the World Wide Web Consortium (W3C)—an international community that develops open standards to ensure the long-term growth of the Web[3]—leans on the physical layers of the Internet, but it has not to be confused with it.

There are two different research strategies to be put in place. The first one is related to community building, in which rules and norms emerge from collective interactions. The second one is related to the conceptual framework that can be used to perceive, describe, and explain the functioning of rules and normative systems in the digital world. These strategies bring about two different research questions. Let's evince, first, the social one.

On the Internet, what "counts-as" *social* is produced through an interactive and multi-dimensional network of relations that constitute the *identity* matrix of the individuals and social groups that play as end-users and stakeholders of the systems. Fifteen years ago, Kim Cameron, then a Microsoft Chief engineer, called it the *identity meta-system layer* (IMSL) of the Internet.[4] It defines the relationship between data and meta-data through which the suffused subjectivity of end-users and stakeholders is embedded into computer language representations.[5] This leads to techno- and techno-cognitive systems—i.e. systems whose design, *affordances*, and *signifiers*, mirror human abilities and capacities to adapt to a specific context and to create their own perceptive and conceptual environment.[6]

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[3] https://www.w3.org/

[4] The Identity Metasystem "is an interoperable architecture for digital identity that assumes people will have several digital identities based on multiple underlying technologies, implementations, and providers" (Cameron 2006).

[5] I will deal with IMSL and Kim Cameron's proposal in Chapter 3, Section 3.5.

[6] The notion of 'affordance' denotes something that refers "to both the environment and the animal in a way that no existing term does" and "it implies the complementarity of the animal and the environment" (Gibson 1979). This notion has been widely used in robotics and Multi-Agent Systems (MAS), encompassing values, beliefs and past experiences of actors. Don Norman (2013) expanded the notion and complemented it with 'signifiers' to explain the design of mobile phones and applications. Affordances "determine what actions are possible. Signifiers communicate where the action should take place". An affordance is "a

When related to human bodies, some authors refer to these metadata-enriched contemporary subjectivities as "quantified selves".[7] Think of the millions of metadata that are daily automated, produced and sent by your smartphone, for instance, and who, how and why are managing them. The quantified self is another human-machine hybrid, and actually is an interactive outcome that constitutes a component of the individual self-regulation at the micro-level.

To carry out this specific strategy I will resume the legacy of classical legal anthropology, because stemming from this point of view, regulations, rights, and duties constitute the interactive dimension of cultural identity. Therefore, among others, I will follow at the micro-level the conflictual perspective most legal anthropologists partake, in which disputes are the path to unravel the ground for expectations about disagreements, fights and, in modern societies, lawsuits. But I will also take into account the structural or macro-level encompassing rules and generalised principles and values that have been focused as well by many legal ethnographies and theories. In the middle, I will situate the technological middle-out and inside-out approach that intermediate all exchanges, transactions, and interfaces in the digital society.[8]

For "rights" I do not only mean the anthropological vision of "human" rights[9], but the way how the distribution and allocation of expectations of behaviour ('rights') in non-western societies have been also identified, described, and eventually represented by political and legal anthropologists.[10] Hence, the first research question reads: *What is the*

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relationship between the properties of an object and the capabilities of the agent that determine just how the object could possibly be used. A chair affords ("is for") support and, therefore, affords sitting."

[7] "A key contemporary trend emerging in big data science is the quantified self (QS)–individuals engaged in the self-tracking of any kind of biological, physical, behavioral, or environmental information as n = 1 individuals or in groups." (Swan 2013, 185)

[8] The middle-out / inside-out approach will be explained in detail in Chapter 5.

[9] Human rights lawyers and anthropologists quite often reproduce the tension between anthropological and legal representations: "To summarize my argument, when human rights lawyers talk about culture, they refer to it as traditional harmful practices, old customs, and sometimes, as ancient ways. They see themselves and their project as rooted in modernity and law and envision culture as the obstacle. Their tendency to see culture as a problem is enhanced by their commitment to a model of legal rationality, an idea that is incompatible with celebrating local cultural complexity. This understanding of culture is embedded in the conventions and policy documents, the wider jurisprudence of human rights, and in the discussions that take place in human rights forums. While there is recognition of the importance of cultural diversity and of responding to difference among cultures, the transnational modernity created in these human rights institutions is generally committed to promoting a universal system of norms and values. Culture emerges as the obstacle." (Merry 2006, 71)

[10] This discussion will be addressed in Chapter 4, on the legacy of legal anthropology.

legacy of legal anthropology? Which has been its contribution to define (normative) identities at the micro-level, and social architectures at the macro-level? How have "rights" been defined, handled and eventually classified by legal anthropologists?

Modern nation-state law is but a late-form of (hierarchical) collective institution-building. There are many other ways to define what relational law and justice consist of. The tactic will be to explore the ethnographic and anthropological well-trodden path of defining rights as behavioural expectations that a given community *institutionally* creates, allocates and follows. This will lead to summarise the criticism that general theories of law received from the anthropological side in the 20th century. I.e., rights might well be not immediately related to the formulation of norms and central powers, but to tangible social collective effects. From B. Malinowski, Max Gluckman and Isaac Schapera to Paul Bohannan, J. and J. Comaroff and Simon Roberts, this inductive criticism pointed at the distant appraisal of law as a system of rules and the State as its mighty, privileged centre.

It is worth mentioning that this institutional dimension of rights at the micro-level, contributes to frame the public dimension of law at the macro-level. Elinor Ostrom's (1999) criticism of the so-called "tragedy of the commons" and her inception of social ecosystems for a sustainable economy (Ostrom 2009) lean on anthropological shoulders.[11]

It is also noticeable that there are many ways to work out this ethnographic tradition. Describing vindicatory justice, reciprocity and dialogue is one of them (Terradas, 2008). The path I chose does not necessarily require this kind of bond between justice and rules, for it is assumed that open linked data requires an intermediate level, i.e. an institutional *meso-level* that operates as a situational dimension in between individual attitudes, social networks, self-organised communities, web services, and linked data. As advanced above, I will also refer to it as a *middle-out epistemic approach*, in which the middle-ground

[11] "A major problem worldwide is the potential loss of fisheries, forests, and water resources. Understanding of the processes that lead to improvements in or deterioration of natural resources is limited, because scientific disciplines use different concepts and languages to describe and explain complex social-ecological systems (SESs). Without a common framework to organize findings, isolated knowledge does not cumulate. Until recently, accepted theory has assumed that resource users will never self-organize to maintain their resources and that governments must impose solutions. Research in multiple disciplines, however, has found that some government policies accelerate resource destruction, whereas some resource users have invested their time and energy to achieve sustainability." (Ostrom, 2009, 419).

between micro and macro-approaches is articulated by technological, semi-automated means.

Digital justice, and companies and administrations operating and managing conflicts can shape differently what is expected (the perfunctory function of rights) according to the level of satisfaction. Performing rights turns out to be a gradual non-discrete matter: contrary to the idea of full-satisfaction or rule-compliance (compliance *by* design), the meta-identity system layer allows and actually shows and fosters several degrees of rights performance. Thus, compliance will be treated as a gradual, non-discrete category.[12]

I always wondered why rights and rules (norms) were treated legally in a uniform way—a right only is deemed to exist or come to life *because of* a norm or rule. A possible reason lies on the naissance and use of writing, textuality, signs, and representative documents. So, I also envisage a problem already faced by Jack Goody (1919-2015) and Walter Ong (1912-2003)—the entangled and intertwined relationships between text, vision, imaging, and ruling. This is something that is definitively changing on the web in a way that strongly reminds the Renaissance revolution of the print, at all levels. From the grassroots of digital reading and understanding to the re-engineering process of reusing the semantic schemes called "ontologies".[13]

0.1.2 Identity and Legal Knowledge: Legal and Ethical Architectures

The second strategy will consist of aligning and merging two contemporary rich models to define legal and ethical architectures that could integrate such a perspective (Casanovas, 2017). Table 1 furnish a first general ethical comparative counterpart that can be aligned with the legal theory components of computational models of the law. The second research question will be: *Are these theoretical constructs expressive enough for a thick description of the building blocks of a meta-rule of law? Can they represent a relational perspective on law, rights, and justice?*

In recent years, rule interchange languages for the legal domain have been flourishing to make law interoperable: LegalXML, LegalRuleMarkup Language (LegalRuleML),

[12] Compliance will be addressed in many Sections and Subsections, but from the methodological point of view it will be discussed in Chapter 8.
[13] Visualisation and ontologies will be treated in Chapter 2.

Semantics of Business Vocabulary and Business Rules (SBVR), the Semantic Web Rule Language (SWRL), the Rule Interchange Format (RIF), and the Legal Knowledge Interchange Format (LKIF).[14] This is the point where legal theory comes into play, because the legal components to be formalised are expressed in the normative and deontic language shaped by jurisprudence and legal theory. T. Gordon, G. Governatori and A. Rotolo (2009) have conceptualised the main legal components as *requirements* to be complied by rule interchange languages. [15]

I will contend that this model is often structurally coupled with the ethical perspective stemming from what are known as Privacy, Data Protection, and Security by Design Principles to preserve and protect rights. They shape the identity meta-system layer (Cavoukian, 2006). Table 1 below, extends Cavoukian's additional set of principles to (i) Semantic Web Linked Open Data, (ii) Legal Information Institutes, and (iii) Online Dispute Resolution (ODR)[16]. Formulations contained in the table point at different dimensions of the intersection between Web 2.0 and Web 3.0. I will not develop it here (as I already did it elsewhere).[17] Nevertheless, I will refer to this table when necessary.[18]

Table 2. *Comparison between FIPs, Privacy by Design, Linked Open Data, Legal Information Institutes and Online Dispute Resolution Principles. Source: Casanovas and Zeleznikow (2014). Based on Cavoukian (2006, 2008)*

Privacy by Design Foundational Principles	**Fair Information Practice Principles (GPS)**	**Extended Principles**	**Semantic Web LOD Principles**	**Legal Information Institutes Principles**	**ODR Principles**
1. Proactive not reactive; Preventative not Remedia		Demonstrable commitment to set and enforce high privacy standards. Evidence that methods to recognize poor privacy designs, to anticipate poor privacy practices and outcomes, and to correct the negative impacts	URIs to denote things, HTTP **Dereferencing** Serialization formats Proactive modelling: XML, RDF, SPARQL, OWL Interconnectedness	Technological investment Ensure republication All primary legal materials, and publicly funded secondary ones	Willingness to enter into negotiation

[14] Gordon et al. (2009), Palmirani et. al. (2011, 2022), Boella et al. (2016).
[15] The authors explicitly assert that these aspects "contribute to classifying norms and *can be extended to other normative domains besides the law*".
[16] Casanovas and Zeleznikow (2014).
[17] Casanovas (2017)
[18] Basically in Chapter 5, Section 5.3 on dialogue as a source of law.

		proactively are established.			
2. Privacy as the Default Setting	3. Purpose Specification 4. Collection Limitation, Data Minimization 5. Use, Retention and Disclosure Limitation	Privacy as the default starting point for designing and operating Information Technologies and systems represent the maximum personal privacy that one can have. That is, privacy becomes the prevailing condition -without the data subject ever having to ask for it -no action required.	Dereferencing Accessibility, Secure data exchange, protection, Storage, Metadata, Ontologies, Alarm Systems, Trust	**Republication, No copyright on primary materials** No fees for provision to Republishers Use open formats and provide metadata Anonymization	**Fairness**-Enabling Discovery (Disclosure Limitation)
3. Privacy Embedded into Design		Systemic program or methodology in place to ensure that privacy is thoroughly integrated into operations. It should be standards-based and amenable to review and validation All privacy threats and risks should be identified and mitigated to the fullest extent possible in a documented action plan. **Trust**	Dereferencing Looking up data, structured data, Data protection, Storage, Metadata, Enrichment, Core Ontologies, Domain Ontologies, Rules, Principles, Trust, Validation	**Republication** Reusing Authentication (Authoritative versions) Integrity	**Fairness**-Bargaining in the shadow of the law and the use of BATNAs **Trust**
4. Full Functionality – Positive-Sum, Not Zero-Sum		All legitimate non-privacy interests and objectives are identified early, desired functions articulated, agreed metrics applied, and unnecessary trade-offs rejected in favor of achieving multi-functional solutions.	Web Science, Universality, Linked Data, Human Giant Graph, Accessibility, Data Protection, Metadata, Core Ontologies, Domain Ontologies, Rules, Principles, Trust, Validation,	Balanced interests (publisher/state/user)	Fairness-Enabling Discovery (Privacy Limitation)
5. End-to-End Security Full Lifecycle Protection	7. Security		Secure user participation, Ontology sustainability, folksonomies,	Integrity, Security, Maintenance	Secure environment
6. Visibility and Transparency – Keep It Open	2. Accountability 8. Openness 10. Compliance		**Transparency** **Accountability** Content value, tagging and semantic enrichment	Accountability, Distributed Authority of republished materials	**Developing transparency**
7. **Respect** for User Privacy – Keep it User- Centric	1. **Consent** 6. Accuracy 9. Access		**Personalization**. End user-centred systems	Consent, Integrity, Content and added value preservation	Voluntarily participation

0.1.3. Metamodels of Legal Governance

It is also my contention that these two broad frameworks—legal and ethical—should be in fact decoupled to reflect the actual behaviour of citizens and consumers, to cope with their problems and conflicts, and to protect individuals and communities on the web. Their components (constitutive rules, time, personal conditions…) are bound to a nation-state notion of rights that comes back to legal positivism and pave the path for legal argumentation theory and deontic reasoning. I.e. an inferential (non-behavioural) conception of law.

On the contrary, to maintain rights as structural units of identity building, these two views should be kept apart just to be reunited later through specific metamodels of governance and law to implement specific regulations. This is the theory of the metarule of law, which enfolds the level of intermediate, flexible, 'anchoring' institutions to regulate linked data environments and scenarios. I have summarised in Table 3 the main contrasting points between this more flexible turn compared to legal theory elements (positive jurisprudence). I should immediately add that the meaning of *meta* in my usage of the term does not mean 'over' but 'beyond'.[19] It does not refer to rules, as it is usual in computer science, where a meta-rule is a rule over another rule. It refers instead to rights, to what can be found *ahead of rules*. Rights beyond the rules that might express them. This is also a well-established point for the philosophical tradition, as exemplified by the meaning of *metaphysics*, a word coined in the first century of the C.E. to refer what it does exist beyond, in addition to, amongst, the natural world. Thus, the translation of 'metarule of law' to Latin languages is not 'metaestado de derecho' or 'metastato di diritto' but 'estado de derechos' or 'stato dei diritti'. To avoid confusions, I will not hyphenate the word, *metarule*.

Table 3. *Legal Theory Elements compared to Semantic Web and Web of Data Models*

Elements of Positive Jurisprudence (Legal Theory)	**Regulatory Institutional Models (Semantic Web/Web of Data)**	**Legal Governance Approach (Internet of Things/Web of Linked Data)**
Web 1.0	**Web 2.0/3.0**	**Web 4.0**
State	Institutions	Anchoring Institutions
Rule of law	Metarule of law	Metarule of Law

[19] A full explanation is offered in Chapter 5, Section 5.4.

Normative hierarchy	Coordination of rights	Hybrid governance models
Monocentric approach	Legal pluralism	Regulatory Approach
Legal Normative systems	Models of Rights (Open Digital Rights)	Mixed (hybrid) Regulatory Models
Enforcement (monopoly of violence)	Dialogue (Coordination of Interests)	M/M, H/M, H/M/H, H/M/M [Human / Machine] Approaches
Validity (legal validity)	Trust (Institutional Strengthening)	Ecological Validity
Hetero-regulatory approach	Self- and Co-regulatory approaches	Middle-out and Inside-out approaches
Automation (or lack of automation)	Semi-automation (technological hybrids)	Full (hybrid) and Semi-automation
Exclusion/Inclusion of Human Rights	Human Rights Management	HR and Open Digital Rights Modelling (ODR)
Exclusion/Inclusion of Ethical Principles	Data Protection and metaethical principles	Ethics through Design (EtD)
Normative systems and Legal Orders	Ecosystems Modelling and Metamodelling	Ecosystems Modelling and Metamodelling
Compliance	Compliance by Design and by default (CbD)	Compliance through Design (CtD)

Therefore, the third research question could be paraphrased as follows: *What are the main elements to be transformed and considered for the construction of the metarule of law?*

There is certainly a continuous ring between both the rule and the metarule of law. Protections, rights, are already there. But how they operate, how communities can be built and self-governed, and what does it mean for the contemporary conception of law, is something still to be found. We cannot take for granted that we know the answer. Law is being *produced*, i.e., enforced and negotiated alike, in a combinatory way in which rights and norms coexist and are computationally driven through algorithms, ontologies, and metadata management strategies. Contemporary digital ethnography has consistently shown that it is a mistake to conceive computationally driven devices as completely "autonomous", for algorithms encode the collaborative work and cultural assumptions of the engineers that build them up. Thus, "social architectures, software architectures, and physical architectures echo each other" (Seaver 2018).

Hence, Semantic Web Regulatory Models (SWRM)[20] anchor and re-create this ruling as cognitively designed artefacts. There are many ways to define them. To our purposes here saying that SWRM are models expressing patterns or regulations through Semantic Web languages would suffice. After the inception of cognitive sciences in the sixties and

[20] Cf. Casanovas (2015b, 2015c). I will deal with SWRM in Chapter 8, Subsection 8.3.7

seventies of the past century, we are facing a second cognitive revolution, for law can be conceived as a cognitive technology framing and shaping the social world. I will call this political outcome *linked democracy*, to differentiate it from the epistemic and deliberative versions of democracy that also flourished in the last third of the 20th century, and I will link this notion to social, collective *crowdintelligence* (Poblet et al. 2014).[21]

0.2 Scope and Research Questions

0.2.1 Main scope

The scope of this research is setting the *conceptual toolkit for the regulation of the public space and open rights on the Web of Data and establishing how this perspective is related to legal governance and ethical theories*. Hence, I built up a *legal validation metamodel* and an empirical *causal model* to be used and reused on dataflows in the environments and scenarios of the WoD, IoT, and Industry 4.0 (including eGovernment and eAdministration) on real time. The Dissertation will provide the anthropological bases for such a metamodel (and related models).

The World Wide Web Consortium (3WC) acknowledges and has become fully aware of the importance of rights and norms:

> More and more Web applications provide a means of accessing data. From simple visualizations to sophisticated interactive tools, there is a growing reliance on the availability of data which can be "big" or "small", of diverse origin, and in different formats; it is usually published without prior coordination with other publishers — let alone with precise modelling or common vocabularies. The Data Activity recognizes and works to overcome this diversity to facilitate potentially Web-scale data integration and processing. It does this by providing standard data exchange formats, models, tools, and guidance.[22]

Hence, there are several Working Groups that reflect and produce standards and reflect on the way of safely regulate them, focusing on collective means and ends:

> "The overall vision of the Data Activity is that people and organizations should be able to share data as far as possible using their existing tools and working practices but in a way that enables others to derive and add value, and to utilize it in ways that suit them.

[21] Linked democracy will be defined and explained in the second part of the Dissertation, esp. Chapter 5, 6 and 7.
[22] https://www.w3.org/2013/data/

> Achieving that requires a focus not just on the interoperability of data but of communities."[23]

The W3C Open Digital Rights Language Community started its activities as early as in 2002, led by Renato Iannella, and keeps still working.[24] The Permissions and Obligations Expressions Working Group, has produced governance models to be reused by human agents performing contracts and legal acts on the web (e.g., licenses).[25] This related WG lasted from 2016 until 2018.

Thus, computational schemes to manage rights, defined from semantic functors (permission / prohibition/ duty) to enact legal acts, without physical constraints, exist already. But we really do not yet know how this kind of schemes have been received, reused, and performed. Still, there is a lack of data about end-users and company behaviour. The working hypothesis is that this kind of tools, along with many others such "ontology design patterns" (ODP)[26] and Semantic Web schemes, are going to be adopted in digital markets in the immediate future. This subject is fleshed out in the thesis.[27]

This is the matter of what can be called *global law*, the way collective and individual subjects are handling a new type of identity, in which digital neighbourhood, consumer habits and reflective "quantified" selves are shaping multiple identity patterns to be assumed, transformed, and tailored by individuals and social groups. This multiple identity leans on proactive prosumers's (producers and consumers of content, alike) strategies that interact with the traditional categories of national and international law (such as the roles of 'legal subject', 'vendor', 'buyer', 'voter', 'taxpayer', etc.). Agency is assumed by computer programmes as well (robots), adding complexity to this transnational landscape.

Relational law and justice are fed by these multiple sources, which do not pertain to the traditional—documentary, textual—sources of positive law. Our challenge here is connecting the analysis of rights and the emerging rules both with the anthropological tradition and the rule of law, seeking for security, safety, and protection. So, the problem turns out to be the *redefinition of the public space*, using these elements as institutional

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[23] Ibid.
[24] https://www.w3.org/community/odrl/
[25] https://www.w3.org/2016/poe/charter
[26] http://ontologydesignpatterns.org/wiki/Main_Page
[27] Chapter 2 contains the state of the art. Chapters 6 and 7, develop the subject.

components for the new regulatory ecosystems of the Web of Data. Again, we will encounter here the identity metasystem layer, with its stack of languages shaping the web and what individuals and groups can and cannot do.

It is worth saying that there is at least one anthropological tradition that it has been very helpful at this point, furnishing grounds for a renewed relational approach. Gregory Bateson's cybernetics rose from his failure to understand a likewise confusing situation: he could not understand what *Naven* meant and what kind of rules applied among the Iatmul (New Guinea) in his doctoral dissertation (1936).

This is inspiring. Shouldn't we figure out a new social language to describe new regulatory systems? Perhaps this could be the way. Had we applied the "jural" semantic Hohfeldian (Hohfeld 1923) squares to define legal relationships, we would have not been able to comprehend the depth of the change. The understanding of robots *is not* human understanding. This should mean something, because at a deeper level, we will only be able to describe the regulatory effect that is being produced at the collective level if we down frame computer ontologies and Semantic Web languages into broader ecosystems and conceptual frameworks. And, to add complexity, only if we *make sense* of the overall system at all levels (low, middle, top) we will be able to control, to a certain extent, its social effects. I will address this issue in Chapter 1.

Back to contemporary fields, the results obtained by digital and institutional ethnographies and the ontological promises of the "new anthropology" to describe the epistemic shift that would be needed to catch up with these radical cultural changes should be carefully described and examined at this point. But this is the subject of the next Sections.

0.2.2 Research Questions: Encompassing Legal Anthropology and Semantic Web Developments

Let us summarise the research questions:

(i) What is the legacy of legal anthropology? What has been its contribution to define (normative) identities at the micro-level, and a general framework (at the macro-level)? How 'rights' have been faced and defined? What role did reciprocity and interaction play in the birth of relational law?

(ii) Are legal theory and ethical requirements as computational theoretical constructs [see Table 1] expressive enough for a thick description of the building blocks of the metarule of law? Can they represent the relational perspective on law, rights, and justice?

(iii) If the answer is no, what are the main elements of legal theory to be kept, transformed, and turned up for the construction of the metarule of law?

I can add a fourth question now:

(iv) What are the theoretical elements of legal anthropology that are deemed to furnish the foundations for the regulation of the Web of (linked) Data?

I have drawn a preliminary conceptual scheme: (i) rights, obligations, permissions, and duties can be situated on a horizontal axis to plot human behavioural expectations; (ii) while rules, norms, directives, *mores*, and guidelines—the architecture of the structural legal and ethical framework— can be situated on a vertical axis to draw the prescriptive plans to be implemented, enforced, or complied with. The link between rights and rules can be built in many ways, and actually all legal ethnographies have to sort it out with the aid of conceptual constructs and models to explain the overall functioning of the regulatory systems at stake.[28]

I should immediately add that this structure is only a heuristic scaffolding to understand how a legal system works in a human society. It can be applied to different forms of political governance—big men, chiefdoms, tribes, or states—with the important condition of avoiding reification and populating pre-defined categories. What is constitutively a "right" cannot be understood in the same way among the Cheyennes of the Great Planes, the Tiv in West Africa, Kiriwina island inhabitants, or the Iatmul of New Guinea. It links to different institutions and cultures, although the formal pervasiveness of the Western rule of law enforced by modern States raises interesting problems of assimilation and friction.

One of the main points of my work focuses on the so-called "unrule of law" (Gelman 2004, Cheesman 2015, S. Merry 2017), the emergence of global human rights and local activism (Merry, 2006), and the proliferation of "fragile" (or weak), "collapsed" and "failed" States under economic and cultural globalisation (Rotberg 2003). I will

[28] This scheme of the metarule of law will be displayed and explained in Chapter 5, Subsections 5.4.2 and 5.4.3 .

specifically mention the example of South African law in the Dissertation, with the guidelines provided by Isaac Schapera, Jane and John Comaroff, Simon Roberts, Thomas Bennett, and Martin Chanock.[29]

These are the counterparts of the formal description of rules and rights. Technology is a particularly well-fitted field to show it. I still remember my surprise at the UNO-funded Akoma Ntoso project[30] when I checked that many of the countries defining automated metadata to organise their Parliaments outcomes (mainly legislation) were countries under strong legal pluralism, and even fragile states with internal wars (such as Sierra Leone) with more urgent social and political issues to attend. This raises the problem of *technical neo-colonialism* as the dark side of the Western strategy for strengthening justice and the rule of law. There is a real risk that elites engage within this kind of initiatives to get funded and take some advantages over rivals and the general population, as assessed by several World Bank reports on Justice, the Judiciary, and Law and Development programmes (Messick 1999, Weaver 2008).

However, having said that, I agree with Monica Palmirani, Tom van Engers, Giovanni Sartor, John Zeleznikow, Ugo Pagallo, Guido Governatori, and many other colleagues and friends of the JURIX and ICAIL communities that technology, AI, is the way to set free people, communities, and societies. More than that, handling technology on their own hands is the way, *and the only way*, to enhance rights, share and enrich knowledge, and foster innovation in the digital world. From this point of view, Akoma Ntoso and similar technological projects should be seen and understood as *empowering* individuals and people to better organise and handle their own knowledge. Thus, they are also dynamic *social* and *political* empowering devices, beyond technology and Artificial Intelligence.

I invite the reader to go to Chapter 6 and share with me the story of the concept of 'legal isomorphism'. He will soon find that, in addition to logical and engineering advances, what Trevor Bench-Capon, Ronald K. Stamper, Joost Breuker and associates had in mind in the late 1980s when they worked out the pros and cons of this idea and launched the

[29] I will deal with it in Chapter 4, Subsections 4.3.1 (History and Law in troubled times) and 4.3.2 (Aftermath).
[30] http://www.akomantoso.org/

Artificial Intelligence and Law Scientific Association, was not just scientific knowledge but *shared* knowledge, to better allocate resources and social rights and to foster freedom and democracy. And they were quite radical in this regard.

0.3 Methodology

0.3.1 Three Levels of Construction

This research has been conducted from March 2017 to December 2021. This is the time frame of my official scientific leave from the Autonomous University of Barcelona (my home university in Spain) to conduct research at La Trobe Law School (my host Bundoora, Victoria, Australia). The official agreement between the two institutions established the objectives of (i) establishing a team and a hub of knowledge at La Trobe, (ii) and reediting online the journal *Law in Context: A Sociolegal Journal.*

0.3.1.1 First Level: Ethnography

This is the first layer of construction, down to earth, in which the ethnography took place around these two precise objectives. Both have been very important to collect information on the institutionalisation of legal knowledge, in a forty-year period, from 1983 up to now, in which different waves of corporatisation occurred in Australian Universities, and particularly in Melbourne. The state of Victoria is well known because tertiary education, Universities, were the fourth source of income of its Gross Domestic Product (GDP) (before the pandemic).

Thus, with some colleagues (now friends), we set a *Lawtech* team[31] that was able to compete and carry out several projects at National level, get contracts from the Federal Government, give advice to the Federal Parliament and to the Australian Human Rights Commission, and write on AI and Law at international level.[32] Likewise, with some colleagues

[31] Law and Social Sciences: Louis de Koker, Patrick Keyzer, David Watts, John Zeleznikow, Nicholas and Sue Morris, André Oboler, Mirabella Stammers. Computer Science: Guido Governatori, Mustafa Hashmi, Víctor Rodríguez-Doncel.

[32] To quote some of the last Reports: A. Oboler, P. Casanovas, L. de Koker. *La Trobe Law Tech Submission on the Online Safety Legislative Reform Discussion Paper.* 19 February 2020. Online Safety Legislative Reform Discussion Paper (2019); P. Casanovas, Louis de Koker. *Comments on Data61 discussion paper on Artificial Intelligence: Australia's Ethics Framework*. (Sent 30 May 2019). Report for the Australian Government; 2020; *Senate Select Committee on Financial Technology and Regulatory Technology*. La Trobe LawTech, La Trobe Law School 11 February 2021. Especially quoted at: The Senate Select Committee on Australia as a Technology and Financial Centre. Second interim report. Participation as Witness:

(now friends) we could turn *Law in Context: A Socio-legal Journal* (LiC) into an Open Access journal, hosted both on the Open Journal Systems Platform (OJS, Arizona, USA) and on La Trobe Library.[33] After a long preparation time, we launched LiC in September 2019 (also just before the pandemic and the bushfires that devastated a territory as large as Belgium in Gippsland and Melbourne from December 2019 to January 2020). It has been a challenging endeavour, as La Trobe Law School (as a Sociolegal Department Studies in the eighties and nineties) and mostly its Journal, holds a long research history since the inception of the Journal in 1983. Christopher Tomlins, a young lecturer in legal history at the time, now at Berkeley, recently recalled the work made in this Department:

> "Faculty were largely law-trained (wholly so until1980) but from 1977 on a significant and rising number of appointees also held graduate degrees across an ever-widening range of disciplines (anthropology, criminology, economics, history, law, political science, philosophy, psychology, sociology). At its peak in the late 1980s LaTrobe Legal Studies probably represented the largest single concentration of socio-legal scholars anywhere in the world, and as such may justifiably claim to have enjoyed considerable influence on the course of socio-legal studies not only in Australia but also internationally: through the research and scholarship of individual faculty members; through their

Senate Select Committee on Financial Technology and Regulatory Technology (Public). Thursday, 11 February 2021, Sydney; L. de Koker, P.Casanovas. "Further Submission on Rules as Code Following Evidence to the Committee", letter 26 February 2021. 2021. *The Senate. Select Committee on Australia as a Technology and Financial Centre Second interim report*. April 2021. It explicitly accepts and quotes La Trobe LawTech suggestions about setting a Rules as Code Sandbox; E. v. Vulpen, (Ed.). [P.Casanovas, P. Casanovas, L. de Koker, J. Zeleznikow, P. Keyzer co-author]. e-MOVE, Project No: 3-014. *Proposed regulatory approach to recognise Connected and Automated Vehicles in the Disability Standards for Accessible Public Transport 2002*. Consultation Paper. July 2021. Confidential (non-public); E.v. Vulpen (Ed.) [P. Casanovas, L. de Koker, J. Zeleznikow, P. Keyzer co-authors]. e-MOVE, Project No: 3-014. *Australia's Disability Standards for Accessible Public Transport and Connected and Automated Vehicle*s. Main Report, August 2021.

[33] The new inception of this classical Journal was an initiative of the then Dean of the Law School Patrick Keyzer. The Journal had been founded in 1983 by Oliver Mendelsohn (as General Editor), Martin Chanock (as Book Editor) and Ian Patterson (as Business Manager). It experienced several phases since then, reflecting the many changes in composition, staff, direction, and objectives of the Legal Studies Department, turned into a Law School in 1995.The Law School and LiC history have not been always peaceful. I was appointed General Editor in 2018, with the specific mission of turning it into an Open Access Journal. Jianfu Chen was appointed Chair of the Editorial Board; David Wishart, Executive Editor; Emma Henderson, Book Review Editor; Kerstin Steiner, Deputy General Editor; and Savitri Taylor, Deputy Executive Editor. David Wishart, Jianfu Chen and I wrote several Editorials in 2019, 2020 and 2021. We have published four Issues so far, LiC 36 (1), LiC 36 (2), LiC 37 (1) and LiC 37 (2). The fifth one, LiC 37 (3) is being completed, under preparation now. The Journal survived the severe funding cuts in 2020 and 2021, following the crisis caused by the pandemic, the dramatic drop of students, and the decreasing revenues. La Trobe Law School experienced, again, upside down changes in staff, programmes, and orientation. The new Dean, Fiona Kelly, and Simon Evans, Head of the Business, Law and Education College until December 2021, supported and upheld the continuation of the publication. LiC is available at: https://journals.latrobe.edu.au/index.php/law-in-context

> organisational efforts and initiatives, such as the Cambridge University Press monograph series *Studies in Law and Society* and through the Department's journal, *Law in Context.*"[34]

To gain some distance, I made some reflective comparative work between the features of Catalan and Australian identities (Casanovas and Poblet 2021). Also at this granular level, I decided to conduct separately several semi-structured interviews beyond the daily informal interactions on the different stages of *LiC* editions and the history of the Law School, a former Department of Legal Studies that was converted into a Law School in 1998 as a result of the new aggressive high education policy fuelled by the liberal government across the country. In addition to my field work, starting in August 2018 I could carry out seventeen face-to-face interviews with important stakeholders which had a firsthand knowledge of this local La Trobe and *LiC* history. The interviews lasted from one to three hours, and were conducted in institutional settings (offices), public places (mainly cafes), and (in one case) private homes in Melbourne and Canberra.

Interestingly, this side of the ethnographic work was disrupted by two important facts. The first one, obviously is the COVID-19 pandemic, which originated an unusual departure from the Bundoora and the City Campus from March 2019 until practically December 2021. The second one was unexpected, but quite significant as well. I asked my PhD Department at the University of Barcelona (Anthropology) for the mandatory Informed Consent document to carry out the field work in Melbourne, but the Doctorate Commission refused to provide me with it.[35] Informed consent has become a too important issue

[34] Tomlins, C., 2013. "Law and, Law in, Law as: The Definition, Rejection and Recuperation of the Socio-Legal Enterprise" (2013) 29 Law in Context: A Socio-Legal J., 137-167.

[35] Signing this document and handling it over to the interviewees is mandatory, either in Australia, USA, or Europe to ensure their privacy and to provide due credentials to the researcher (think of GDPR requirements). Credentials and informed consent were the first demand I received from my first interviewee, as we were going to talk about her private and professional life. After a while, the UB Academic Commission of the Doctorate School decided that they could not take responsibility and that "I should carry out the research by my own". This situated me in an illegal position if I wanted to resume the field research I had started conducting. Thus, I stopped doing interviews and I concentrated into the second and third levels of my field work. One of the main ethical principles either in institutional ethnography or in crisis mapping is "cause no harm". In purity I cannot use, reveal, or publish any information that I had previously obtained. In the end, it did not affect my knowledge, i.e. the central argumentation or the main theses of the Dissertation, but it prevents me to quote it directly in my writing. I list below some of the compelling documentations for H2020 research that I had to take into account when submitting, conducting and justifying the EU Projects rostered in Annex I:

1. How to complete your Ethics Self-Assessment
http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/ethics/h2020_hi_ethics-self-assess_en.pdf;

to be ignored, either in social or computer sciences. Crabtree et al. wrote in one of their books on design ethnography:

> Informed consent is not only about addressing legal and ethical requirements of data gathering but also, and importantly, of data storage and use. Research is increasingly regulated by legislation governing the gathering, storage and use of personal data. (Crabtree et al. 2012, 96)

Reflecting on this fact, but without having evidence of what really happened, I interpret it as the *risk avoidance strategy* that is usually adopted by HR Departments in corporate management. Academic decisions are entwisted with managerial ones. What it reveals—but this has yet to be tested—is *legalisation*, the pervasive law-driven influence in all dimensions of work and life patterns and regulations that started running with the digital coding of regulatory compliance at the beginning of this century.[36] The 'legalisation' way has been reported by practically all legal ethnographers both in developed and developing countries—i.e. J. Comaroff, S.E. Merry or S.F. Moore. One of its features is *creolisation*,

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2. General Model Grant Agreement
http://ec.europa.eu/research/participants/data/ref/h2020/mga/gga/h2020-mga-gga-multi_en.pdf
3. H2020 Regulation of Establishment
http://ec.europa.eu/research/participants/data/ref/h2020/legal_basis/fp/h2020-eu-establact_en.pd f
4. H2020 Rules for Participation http://www.fch.europa.eu/sites/default/files/h2020-rules-participation_en.pdf Guidance Note for Researchers and Evaluators of Social Sciences and Humanities Research:
http://ec.europa.eu/research/participants/data/ref/fp7/89867/social-sciences-humanities_en.pdf
6. Declarations of the Commission (Framework Programme)
http://ec.europa.eu/research/participants/data/ref/h2020/legal_basis/fp/h2020-eu-decl-fp_en.pdf
7. Transatlantic data transfers:
http://ec.europa.eu/justice/newsroom/data-protection/news/151106_en.htm
8. Data protection Bodies: http://ec.europa.eu/justice/data-protection/bodies/index_en.htm
9. Model Contracts for the transfer of personal data to third countries:
http://ec.europa.eu/justice/data-protection/international-transfers/transfer/index_en.htm
10. Commission decisions on the adequacy of the protection of personal data in Third Countries:
http://ec.europa.eu/justice/data-protection/document/international-transfers/adequacy/index_en.htm

[36] There is a difference between 'corporate business compliance' and 'corporate legal compliance'. Legality is broader, because relevant legal constraints can come from a myriad of sources that must be identified and selected. Legal compliance is more complex. Companies and corporations started with the internal control of policies and protocols, and they extended it to legislation a bit later, under the pressure of external audits and controls after the Enron/Arthur Andersen case (USA Sarbanes–Oxley Act of 2002). In Europe, from 1999 onwards the European Union's Financial Services Action Plan set a cluster of measures as well. Cf. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3Al24210 After the 2008 financial crisis, the General Data Protection Regulation (GDPR) extended the protections to all citizens. It should be stressed that GDPR was adopted in 2016 and finally came into force in May 2018, but it was a result of a long discussion process between 2012 and 2016, with two drafts and more than 4.000 amendments. The document in force is called *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)*, available at https://eur-lex.europa.eu/eli/reg/2016/679/oj

i.e., the accommodation process to local circumstances and procedures. Hence, local committees can make discretional decisions according to internal institutional rules and policies being unaware that they are not complying with general legislation and soft law.

On the other way around, as I will explain below, La Trobe *LawTech* research on technology and the inception and editing of the Journal allowed me to freely discuss and develop many of the ideas that I sustain in the Dissertation. It also allowed me to observe and learn (from the inside/outside, i.e. as a distant stakeholder) from conflicts that are arising in the institutionalisation processes of the digital world. I especially focused on how they can evolve and escalate ending up in suits and Court proceedings. I had two direct experiences.

The first one, in Open Access publications, made me understand that far from being an equalising or "free" publishing movement, Open Access in academia is nowadays mainly a market, with investments, turf battles, interests and monetizing processes. The second one made me reflect about the effects of the Plan-Do-Check-Act (PDCA) model that has been implemented in corporate universities.[37] Self-evaluation, institutional pressure and the ticking-boxes mindset do not always pay off and can intrude into people's lives with noxious effects. All of this is related to globalisation and digitation processes, fuelled right now by the pandemic. I will keep this part of my research confidential.

One of the results of this streamline layer of the thesis is the advancement of rule-driven institutional and social behaviour. Legalisation, and the related process of deciding whether a behaviour is or has been 'acceptable', 'correct', 'moral' (or 'ethical'), *and eventually 'legal'*, is one of the main social features that is growing and coming along within the digitation processes of organisations and institutions.

[37] This model has been wrongly attributed to W.E. Deming. Actually, in the context of his system of 'profound knowledge' and 14 management principles, he referred to a "Shewhart Cycle for Continuous Learning and Improvement", Plan-Do-Study-Act (PDSA) cycle. Deming learned from his experience in Japan, after the war. He was involved in the planning for the 1951 Japanese Census and in the reconstruction of its economy. I could discuss at length (and learn) about the use of managerial methods and strategies with one of Deming's assistants in Japan, who became in turn one of the USA advisors and drafters in security and cybersecurity. I must keep it confidential.

0.3.1.2 Second Level: Empirical and Technical Research

The second methodological layer refers to the different research projects that I carried out in Australia and Europe (H2020) from 2016 to 2022. I performed them as a member of the UAB Institute of Law and Technology, and the LawTech Research Group at La Trobe University.

In fact, these projects furnished (i) the inductive knowledge acquisition procedures and processes that allowed me to collect social data (i.e. from lawyers, LEAs—Law Enforcement Agents—, government agencies, industry, and other end-users); (ii) the technological lifecycles of the modules and components of the platforms (i.e. their results in different versions of the pilots); (iii) the testbeds and walkthroughs of platforms, modules, and web services.

The reader is gently asked to go to Annex I of this Introduction to find a list of the projects. The work packages in which I have been involved carried out the following tasks: (i) the selection, construction, and implementation of ethical and legal requirements according to EU / AUS legislation and Artificial Intelligence ethics, (ii) the embedment of privacy and data protection requirements into the systems, (iii) ontology-building; (iv) the creation of regulatory models and final recommendations; (v) the effective realisation of mid-term and final ethical and legal audits.

End-users have been incorporated from the very beginning and all along the projects, following a standard AGILE methodology[38]. This has facilitated the development of pilots and use cases that provide the examples that I am quoting in the Dissertation. The empirical knowledge acquisition process for modelling has been performed following the usual blend of methods—participant observation, interviews, focus groups (with the Delphi method), and surveys. Building conceptual models and modelling have leant on these empirical bases.

[38] AGILE is a popular method for software development, launched in 2001 and rapidly spread out in engineering. It is a way to communicate with customers' needs and keeping they in the loop all along the lifecycle of the project. We usually start working with developers in this way because they know and understand it very well. Then, we elicit information from our ethnographies and qualitative methods. Cf. http://agilemanifesto.org/principles.html

It is worth mentioning the use of sandboxes in our methodology (de Koker, Morris and Jaffer 2019). A *Regulatory Sandbox* (RS) is a framework within which participants can test innovative concepts and technologies at a smaller scale, on a time-limited basis, and with appropriate safeguards in place.[39] Focusing on Australian Projects, I should add the use of conceptual surveys and quantitative statistical methods, as I will make clear in the development of the chapters.

0.3.1.3 Third Level: Sociolegal, Anthropological, Legal, and AI & Law Theories

The third methodological layer is the theoretical one. As we have already seen, the thesis delves into jurisprudence, the contemporary general theories of law, and the way how they have been used by computer scientists in computer modelling and argumentation. The sociolegal counterpart contrasts them with alternative representations of how legal relationships, institutions, and normative systems work.

Stemming from their fieldwork and ethnographic descriptions, legal anthropologists have proposed alternative representations as well. I have embraced a conceptual analysis methodology, comparing their different proposals and results. This is explicit in some chapters of the thesis and remains implicit in some other chapters.[40] I have ordered in Annex I (at the end of Chapter 4) a comparison of the positions of the main legal anthropologists that I have considered (with the addition of some social and cultural ones, and legal historians). This is a limited comparison, a selection for the sake of comprehension. Not all works and anthropologists quoted and rostered in the references are included, only the most relevant ones for the purposes of my argumentation.

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[39] When used by regulators, they usually feature legal waivers at regulators' discretion (relaxed constraints). We set for the first time ethical sandboxes to monitor the building of critical modules on face recognition and information workflows to embed GDPR protections in the SPIRIT platform. It has been conceptualised as an instru-ment of non-binding *responsive* regulation which enables a learning space in which errors are deemed to be opportunities to correct and improve all components of the emergent digital ecosystem (including computing devices, systems, human interactions, and stakeholders' behaviour). Cf. Pompeu Casanovas (UAB, La Trobe University); Emma Teodoro (UAB), Andrea Guillén (UAB), Mustafa Hashmi (La Trobe University). Co-Authors: Marco Tiemman (Innova Integra), Christian Weigel (Fraunhofer), Eva Blomquist (Linköping University). *Legal and Ethical Framework and Risk analysis (Report) (b) (WP9).* SPIRIT. Scalable privacy preserving intelligence analysis for resolving identities. European Commission. Contract 786993. 01/08/2018-31/07/202. Public. October 7th 2021, p. 35 and ff.

[40] See specifically Chapter 4 for the anthropological concepts, and the list of lessons learned which has been taken into account in the second part of the Dissertation.

At this theoretical level, I would like to highlight the generous help of British computer scientist Trevor Bench-Capon, who read a first version of my writing on the origins of the concept of 'legal isomorphism', John Zeleznikow, who has been advising me on this technical matter, and legal historian Martin Chanock, who helped me to clarify his views on law, customary law, and South African legal culture.

Certainly, history matters. Ethnographies and theoretical positions are historically determined. Language of ethnographies is shaped by the times as well. For instance, Pospisil (1958, 832) wrote about the story of how taboo prohibitions were changed in New Guinea by a willing precedent of breaching them. What drew my attention is not the story in itself, a quite clear account, but the way how Pospisil described the characters. It would not be possible to publish it today in any scientific journal, as it would have been considered offensive.

> The protagonist of our story is Awiitigaaj, the headman of the village of Botukebo, a prosperous pig breeder, a courageous war leader, and an enthusiast about feminine beauty. *Like any connoisseur, he collected some extremely valuable specimens by marrying ten of the most attractive women in the Kamu Valley*. Unfortunately, he discovered that the incest taboo-which prohibits marrying an individual of the same sib-*would deprive his collection of at least one outstanding example of female pulchritude*. [my emphasis] Nevertheless, in 1935, he did not hesitate to break the taboo. Although he was the first man in the Kamu Valley to contract such an incestuous marriage, he knew that in the nearby Pona region some Adii men had contracted similar marriages and had succeeded in escaping social sanctions. The bride in question lived in the neighboring village of Kojogeepa and belonged to the same sib, but to another sublineage. To avoid the traditional penalty of execution, he eloped with the girl and hid in the jungle. He assumed that the girl's father would soon realize the futility of pursuit and, after his anger had cooled, might be prepared to accept a payment for his daughter. A bride price, which would ultimately be necessary in any event in order to prevent a rift within the political confederacy, would make the marriage formally valid, and this would absolve Awiitigaaj.

At theoretical level, I have assumed the following positions in the dissertation: (i) a *situated* cognitive approach to data and metadata (this includes as well *situated meaning* and most of all a *pragmatic* approach); (ii) a *theoretical* modelling approach (modelling and meta-modelling) (Assar 2015) consistent with empirical results in legal ethnography and normal results in ontology-building; (iii) an *institutional* historical approach, similar to the way Josiah Ober has addressed the study of ancient Greek societies, (iv) also an *institutional* AI and sciences of design approach (as it was incepted in the fifties and

sixties by H.A. Simon ([1969] 1996). Legal anthropology and legal theory are present in between all these positions.

0.3.2 Methodological Insights and Controversies

These three levels of building and reading the Dissertation are tightly linked. Each one of them is interrelated with the others. I will make some comments to expand a bit the last Subsection, and to be more precise about what the Dissertation contemplates and what will be put aside, as interesting as it may be.

The tension between a "jurisprudential" or "juristic" conceptualisation (legal theory) and a cultural and social perspective (legal anthropology) has been solved in two ways.

Pointing out language dimensions, first. I.e., differentiating the concepts as they are expressed in (i) a natural language, (ii) semi-technical language (legal terms such as 'power', 'property' or 'contract'), (iii) technical (or formal) languages (e.g., formulations into LegalXML, LegalRuleML, or OWL).

Second, signalling their different theoretical scope, roles, and functions. E.g., the notion of "semi-autonomous social fields" (Moore 1974, 1978) does not match Kelsen's or Hart's notion of what a 'legal system' consists of (a differentiated system of primary and secondary norms or rules). Discussions between both fields in the seventies and eighties were certainly "turbulent" (Moore 2001), but this does not obscure the fact that, at theoretical level, H. Kelsen, H.A. Hart, A. Ross (not to mention the legal realists, R. Pound, K. Llewellyn, or J. Frank) were perfectly aware of the results obtained by legal anthropologists (and from 1966 onwards, by Law and Society scholars). They read them, quoted them, and wrote about them. After all, (i) H.S. Maine (in England), L.H. Morgan (in USA) and J.J. Bachofen (in German Switzerland) were legal scholars, and (ii) Roman Law and Ancient History was a direct source to build up the positive theory of law in the 19th c. German speaking world. The distance of legal theory from history, sociology, economics, and anthropology was specifically addressed.

On the contrary, this has not been equally considered by 20th c. legal anthropologists. My intuition is that they took for granted their distance from legal theory. They tried to leave it at the door only to have it come back in through the window. All classics, from

Malinowski to Mauss, Gluckman, Pospisil and Schapera, struggled to understand what they were referring to by ‘law’. And I deem this also true for legal pluralists, comparatists, and postmodernists. Some shared understanding of its common meaning was needed. Whatever the differences, all had to characterize or predefine the object as ‘rules’, ‘norms’, ‘decisions’, ‘rights’, ‘duties’, ‘obligations’, ‘permissions’, ‘power’, ‘private’, ‘public’, ‘sanctions’, ‘punishment’, ‘contracts’, ‘transactions’, and the like. Not to talk about ‘gifts’.

As stated in the beginning of this Introduction, this makes easier the bridge that technology can build between both fields. It is worth to mention at this point that sociolegal or anthropological models tend to follow an empirical bottom-up direction, stemming from interactions, conflict resolution, and behavioural expectations to elicit or induce the institutional shape of law. On the contrary, legal theorists use to begin with the overall framework of the normative structure in mind, taking an architectural stance.

Disagreements and controversies have occurred not only between legal theorists and social scientists, but between social scientists with different backgrounds and experiences. For example, sociologist of law John Griffiths (1986) criticised in a well-known article Sally F. Moore’s theory of “semi-autonomous social fields”. According to him, Moore had exaggerated the central power of the state. As late as 2014, S.F. Moore still referred to Griffiths as “an American who was (maybe is) a law professor in the Netherlands” (Moore 2014, 9). Indeed, after teaching in Yale and NYU, Griffiths stayed at the University of Groningen since his arrival in 1976 until his death in 2017. Moore knew it perfectly. She was then ‘subtly’ making a difference between anthropologists of law, experienced in ethnography and field research, and other academics or social scientists lacking this experience.

It is a bit more difficult to reconcile, at deep level, analytical positions with hermeneutical or ‘postmodernist’ ones. E.g. Jon Elster, a respected political and social analytical philosopher has explicitly written against Bruno Latour’s “incomprehensibility”, opposing “real” social science to “fake”, dismantled or ambiguous discourses.[41] I am afraid that the

[41] According to him, Latour did not deserve the Holberg Prize. “What does it mean that birch trees and slime, for example, ‘make their own meaning’? Maybe Bruno Latour's Norwegian followers can answer?” Elster (2013).

recent "ontological" turn in anthropology, based on Husserl, Deleuze and Derrida, could receive a similar treatment.[42] However, I also think that to "deflate the ontological bubble" internal criticism is by far more productive (Pedersen 2012).

I am reversing and making sense of these positions facing them from a computational approach. In computer science, ontology building is a well-trodden path and a well-established field since the seminal work by Gruber (1992)—an ontology is a shared, formal and explicit conceptualisation into a mathematical graph to gain semantic interoperability. A systematic comparison, still missing in the literature, could shed some light about the rationality and pertinence of the anthropological approach. This would be consistent with my past work on judicial ontologies based on professional practices instead of any legal apriorism, already acknowledged in the field (Paliwala 2016).[43] The issue could be fleshed out setting apart levels, dimensions, and especially *assumptions*.

However, I will not address it in the present Dissertation. Computational, linguistic, philosophical, and now, anthropological ontologies have, in practice, a different methodology, understanding, and intention. Even the definitions are matchless. It is difficult sometimes to unveil the meaning of the narrative or metaphors used. What does it mean making "anthropology a practice of cosmic philosophical predation that may allow us to actualize a multinaturalism immanent in the bowels of multiculturalism"? (Kohn on Viveiros de Castro, 2015, 319).

Contrary to Tim Ingold's opinion, I deem ethnography a way to collect and construct data to acquire knowledge. I do not think ethnography, and especially institutional ethnography, is "an end in itself" unrelated to anthropology.[44] I have reserved a space for the state

[42] The work by Viveiros de Castro (2011), Hollbraad (2012), Strathearn (2012), Descola (2013), Viveiros de Castro and Skafish (2015), Pina-Cabral (2017), and many others is susceptible of the same kind of objections, for Quine's meta-logical views are deemed to be incompatible with the ontological turn (Heywood 2012).

[43] "Socio-legal scholars take another perspective: some legal data (and metadata) are required to compare legal systems. This is called the legal culture perspective: legal knowledge is not to be inferred (or deduced) from the construction of a legal theory, but it is abductively or inductively operated through functional or professional practices that can be described and measured." (Casanovas et al. 2011).

[44] "Ethnography aims to describe life as it is lived and experienced, by a people, somewhere, sometime. Anthropology, by contrast, is an inquiry into the conditions and possibilities of human life in the world. Anthropology and ethnography may have much to contribute to one another, but their aims and objectives are different. Ethnography is an end in itself; it is not a means to anthropological ends. Moreover, participant observation is an anthropological way of working, not a method of ethnographic data collection." (Ingold 2017, 22-23). The debate incepted by Tim Ingold (2014, 2015, 2017) could contribute to clarify the role of

of the art of computational legal ontologies because they are needed to understand the way how law is changing on the IoT.[45] I did not discuss this time their anthropological counterpart.

Having said that, I would like to point out the open possibilities for building anthropological ontologies. They could certainly capture the nuances of words whose meaning is elusive in English. Digital Humanities are doing such a work, with good results (Meroño-Peñuela et al. 2012, Meroño-Peñuela et al. 2015; Meroño-Peñuela et al. 2017, Romein et al. 2020). I.e., constructing vocabularies, lexicons, and use them to frame and structure a domain with, among others, semantic web languages. Again, the object might be difficult to grasp and model, but the result could make explicit what is implicit, tacit, at pragmatic level. Consider this account, by Uncle Paul Gordon, from an ancient Australian Aboriginal culture:

> I am a Ngemba man from north-western New South Wales, born of Gurulgilu country, meaning I belong to the stones. In our story, stones are born, stones have babies, stones grow, stones have spirit and stones die like all things do. My people are stone people. We come from the rocks. […]
>
> In my language we use the word *Ngurrampaa*. Ngurrampaa is a better way of talking about the Dreamtime. Basically, it means 'my relationship with my place and everything in my place'. So the Lore is very much about what is my connection with everything in my place and my Country. It is about how we all connect with our place and everything in our place. (Callaghan and Gordon 2022, p. 8, p. 22)

Decoding a culture entail unravelling its possible meanings, using its own criteria at morphological, syntactic, and semantic level. This is different of living, *making sense*, of and within this culture. But at least a dynamic, dialectical process can be triggered, adding more inferences and implications to the kernel of distant concepts they might be using. Of course, this ontological process of discovery can be unclenched and put in practice by

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conceptualisation in ethnography, anthropology, and philosophy. Even if I can imagine the reaction of my fellow analytical philosophers before a statement like this one: "Anthropology, as I have presented it, is fundamentally a speculative discipline. It is akin to philosophy in that sense, but differs from philosophy (at least as practiced by the majority of professional philosophers) in that it does its philosophizing in the world, in conversation with its diverse inhabitants rather than in arcane reflections on an already established literary canon. For that reason, *I think we can do philosophy better than most philosophers who, for the most part, seem chronically out of touch with life and addicted to thought experiments with little purchase on the world*." (Ingold 2017, ibid. Italics are mine).

[45] Cf. Chapter 2, Subsections 2.3.2 and 2.3.3 .

themselves. Another way of *yarning*, of enculturing and embedding science, AI and SW techniques into a different linguistic, kinetic, and cultural context.

0.3.3 Legal Ethnography

Laura Nader, at the turn of the Millennium, pointed out the changing world ethnographers had to face forty years ago:

> […] questions, methods, and theory are intertwined in the happenings of the world: an improved understanding of the impact of colonialism, the machinations of the Cold War, the competition for world resources, movements to democratize the third world by exporting or importing European and American legal education, legal codes and statutes, alongside of the globalization of tastes for consumer products and services, and renewed missionary zeal, all work to destabilize what earlier anthropologists described as "societies in equilibrium". (Nader 2002, 190-91)

Conley and O'Barr (1993, 56) summarised the questions addressed by the next generation of legal ethnographers, critically turning their "ethnographic voyeurism" to their own home society (USA):

> Among the questions that have arisen as a result of the inclusion of American society in the purview of legal anthropology are the following: (1) To what degree is it appropriate to treat law as a separate and distinct part of the social system?; (2) How well does the case method actually work as an analytic paradigm for studying the American legal system?; and (3) To what degree is it appropriate to speak of a single or unified American legal culture?

These questions, including the globalisation framework, were assumed as well by many sociolegal scholars, making clear that legal ethnography is not just focused on small-scale activities. There was a need to refer to global phenomena to understand what was happening in specific interactions at the micro-level and at the synchronic and diachronic dimensions:

> Part of the problem is a misunderstanding that some have about ethnography. Ethnography is about interpretation not causal analysis. And *ethnography also includes history*; time is an essential element. If we want to understand the complexity of lawyer-client or doctor-patient relationships, *we need to know what happens in those interactions*, we need to observe them as they unfold and play out. (Flood 2005, 46)

We may notice that Flood was implicitly quoting Aaron Cicourel's ethnometodological work on doctor-patient relationships and Rick Abel's, Yves Dezalay's, Briant Garth's and

his own work on lawyers in the global era. (Pierre Bourdieu had a huge impact in socio-legal studies). He was aware as well of the "rolling style of theorising" and the evolving research subjects and theoretical frameworks.[46]

I address these subjects in the Dissertation, together with the relationships between the two disciplines, the turning point of legal anthropology in the digitation age, and a discussion about what could be done now.[47]

0.3.4 Digital Ethnography

Digital ethnography has drawn much attention. It could be defined as the projection of the ethnographic methods and practices to Internet environments and scenarios. It is related, similar, but not exactly the same, to *digital anthropology*. Digital anthropology was proposed as a subfield of anthropology ten years ago around six foundational principles. I will quote them at length (Miller and Horst 2012, 3-4).

Digital anthropology: (i) intensifies the *dialectical nature of culture*; (ii) the digital enables us to understand and e*xposes the framed nature of analogue or predigital life as culture*; (iii) it is *committed to holism* (the foundations of anthropological perspectives on humanity); (iv) it assumes *the importance of cultural relativism* and gives voice to the "peripheralized" invisible; (v) it endorses the *essential ambiguity and ambivalence of digital culture* with regard to its increasing openness and closure; (vi) it acknowledges the *materiality of digital worlds*, which are neither more nor less material than the worlds that preceded them.[48]

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[46] "But what is indicative of the ethnographic approach is the link to inductivism and grounded theory. By this I mean that it is not always possible to set up prior theoretical frameworks in ethnography no matter how precise one tries to be, because the researcher does not always know what the outcomes will be. Ethnography is constant surprise. It gives rise to fresh theoretical insights as it evolves. This rolling style of theorising facilitates the creation of an 'organisational epistemology' that assists ideas to build on each other as the research progresses." (Flood 2005, 46)

[47] Cf. Chapter 2, Section 2.1; and Chapter 4 (especially the 'lessons learned', at the end of this Chapter).

[48] "1.The first principle is that the digital itself intensifies *the dialectical nature of culture*. The term digital will be defined as all that which can be ultimately reduced to binary code but which produces a further proliferation of particularity and difference. The dialectic refers to the relationship between this growth in universality and particularity and the intrinsic connections between their positive and negative effects. 2. Our second principle suggests that humanity is not one iota more mediated by the rise of the digital. Rather, we suggest that digital anthropology will progress to the degree that *the digital enables us to understand and exposes the framed nature of analogue or predigital life as culture* and fails when we fall victim to a broader and romanticized discourse that presupposes a greater authenticity or reality to the predigital.3. The *commitment to holism*, the foundation of anthropological perspectives on humanity, represents a third

Miller (2017, 28) in a debate with Ingold, suggested that "we as anthropologists need to regard ethnography as our ultimate goal that we should be striving for" to get started with *holistic contextualisation*: "No one lives just on social media—they live everything at once—so ethnography has to have the same integrity as everyday life, which is why most of our work is offline".

I do agree with him. "Virtual", "digital" or "electronic" ethnography embraces both sides of a single, material, world. But the intertwined relationships between ethnography as such and computer science are wider than the exploration of the digital world on the Internet (i.e., doing research on social media using adapted versions of participant observation).

Design ethnography has been running for more than forty years now in Computer Human Interaction (CHI), Computer Supported Cooperative Work (CSCW), ontology building, information systems, and other branches of computer science. Starting in the seventies of the past century, ethnographic methods were early adopted by Xerox PARC, Intelnet, IBM and Microsoft, and specifically singled out and openly discussed by Ed Feigenbaum (1977, 1984) and Bruce Buchanan (1970; et al. 1983), among many others. Anthropologist Diana E. Forsythe joined this discussion and made interesting critical contributions to expert systems and medicine, having spent a year as a postdoctoral fellow in the Knowledge Systems Laboratory at Stanford University from 1987 to 1988 (e.g., Forsythe 1995, 1999, 2001; Forsythe and Buchanan 1989).

Thus, the difficulties raised by the process of collecting (or constructing) initial data and eliciting expert information is an old problem. Developers, engineers, computer scientists, especially those working on expert systems 'mimicking' the decision-making ability of

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principle. […]. Anthropological approaches to ethnography focus upon the world constituted within the frame of a particular ethnographic project but also the still wider world that both impacts upon and transcends that frame. 4.The fourth principle reasserts *the importance of cultural relativism* and the global nature of our encounter with the digital, negating assumptions that the digital is necessarily homogenizing and also giving voice and visibility to those who are peripheralized by modernist and similar perspectives. 5.The fifth principle is concerned with the *essential ambiguity of digital culture* with regard to its increasing openness and closure, which emerge in matters ranging from politics and privacy to the authenticity of ambivalence. 6.Our final principle acknowledges the *materiality of digital worlds*, which are neither more nor less material than the worlds that preceded them. Material culture approaches have shown how materiality is also the mechanism behind our final observation, which is also our primary justification for an anthropological approach." (Miller and Horst 2012, 3-4).

humans, had the problem of acquiring, representing, and handling knowledge with which they were not familiar. The *knowledge acquisition process* (KAP) was famously called by Ed Feigenbaum (1977, 1984) the "knowledge acquisition bottleneck". Ethnographic methods were used from the beginning to overcome this problem or minimising it. Today, it is one of the common subjects in software and requirements engineering (Lamsweerde 2009, 79-80).

But, again, KAP cannot be confused with ethnography. There are many proposals to face their relationships starting from different methodologies developed in qualitative sociology and anthropology. For instance: (i) *ethnomethodology* in design ethnography (Crabtree et al. 2012), (ii) a *reflexive* stance in digital anthropology (Rode 2011), (iii) *empathy* in HCI (Wright and McCarthy 2008), (iv) *empathetic technologies* in digital video ethnography (Pink 2011, Pink et al. 2017), (v) *circular mixed methods approach* combining qualitative research from anthropology and quantitative analysis from data mining (Shrauf 2016, Pretnar and Podjed 2018).

Geerz's cultural approach has been important to explain how ethnography has been linked to technology from an anthropological perspective. For instance, Rode: "In the Geertzian sense, technology is not the object of study. Digital anthropologists are studying *in technology*, or *in the context of technology*." (Rode 2011, 124)

However, not just observing but *doing*, i.e., modelling and designing, has later been also considered an essential component of the ethnographic fieldwork, and the other way around. For instance, the *ethno-design method* in HCI "starts from design and ends in design"[49]. Brereton at al. (2014) has warned against the so-called 'rapid ethnography' in HCI and information systems. To perform "ethnographically inspired" design, reciprocity should be taken into account.

As I will mention in several points of the Dissertation, my work on regulatory systems and models is at the crossroads of institutional and legal ethnography, cognitive science,

[49] "The ethno-design method is primarily interested in design elements and how they relate with humans, rather than in humans and how they relate with their environment (be either physical, social, cultural, or technological). Its end is not to develop a deeper understanding of human nature or contribute to human transformation of social relations, but to inspire novel designs. In other words, it starts from designs and ends in designs (Rapp 2021, 796).

Artificial Intelligence, Semantic Web, and the law. Ethnographic approaches were soon a component of the so-called cognitive revolution, as acknowledged by Lucy Suchman (1987) in her book on plans and situated actions (see also Suchman and Trigg 1993) and performed regularly "on the wild" (outside white rooms) by cognitive anthropologist, surfer, sailor, and airplane pilot Ed Hutchins (1995). They have also consistently been incorporated into research projects on social intelligence, socio-technical systems, and socio-cognitive technical systems. For instance, in the normative Multi-Agent Systems Community (norMAS) there are remarkable ethnographic works focusing on legal issues and transactions prior to model market auctions (Noriega 1999) and contracts (Christiaanse and Hulstijn 2012).

My starting point has been the pragmatic iterative cycle we have been developing in our projects, i.e., the *Iterative Knowledge Acquisition Process* (IKAP) based on the five stages plotted on Figure 1— *elicitation, collection, analysis, modelling, and validation*. The scheme reflects knowledge representation and ontology building, following the evolution of the working group on knowledge acquisition in the Semantic Web area from 1988 to 2013 (Motta 2013, Gaines 2013). From 2010 onwards, compliance-based systems have fostered the discussion on legal requirements in the AI and Law community that I have been following as well. The 'rapid' ethnography issue can be addressed keeping a consistent track over time, i.e., working out in parallel the same subjects—regulatory systems and models—in a network of interrelated research projects in which results and findings can be mutually enriched.

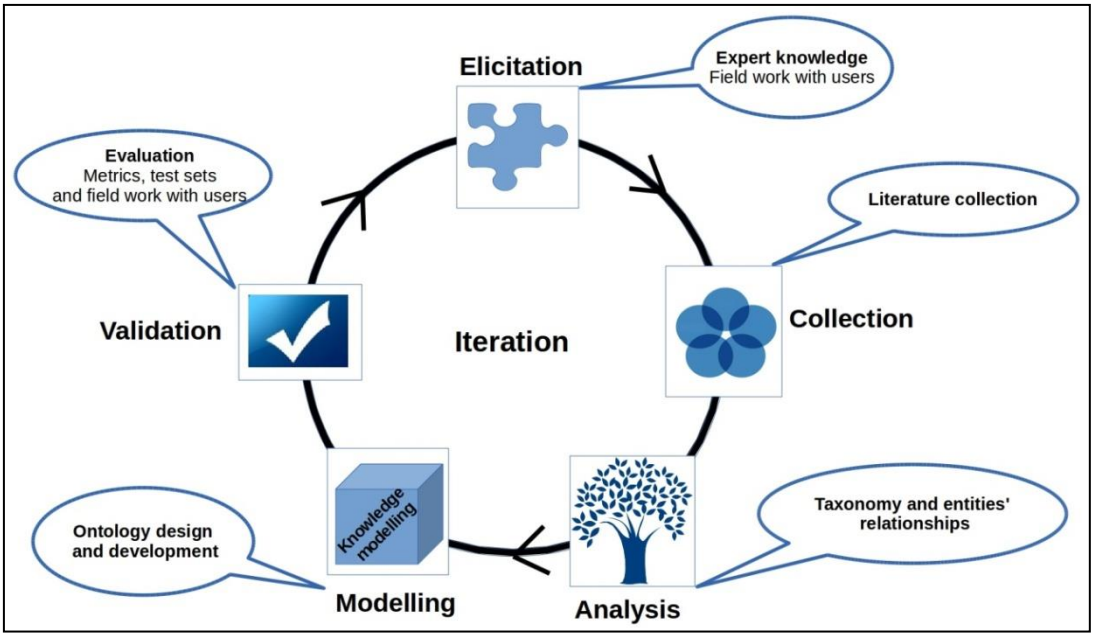

***Figure 1**. Iterative Knowledge Acquisition Process (IKAP). Source: Casanovas, González-Conejero, Rodríguez-Doncel (2017c)*

On top of the technical scheme, wrapping the iterative process, there are the new realities brought to the scene by the convergence of the Web of Data, the Internet of Things, and Industry 4.0. that I have described in Chapter 5. This new environment in which information flows should be regulated on real time and coordinated across different settings in sociolegal ecosystems has changed the way how we could access to them. In our case, we did it *shaping them*, i.e. thinking of new methods based on modelling causal relationships in law and ethics that could help to the sustainability and reliability of regulatory models.

This *proactive* ethnographic, methodological trend has not been the product of isolate abstract decisions, but it came along while new problems were raised in several areas by drafters, technical researchers, and end-users—be they administrative agencies, manufacturers or citizens. How to adapt existing mobility standards to CAVs (vehicles without human drivers) considering people with disabilities, how to monitor at the workplace the increasingly automated production chains of technology manufacturers and providers (in the widest sense), how to effectively embed privacy and data protection devices into security platforms, how to counteract the pervasive effects of identity profiling in the sensor

driven-world of cyber-physical systems, are problems that could barely have been anticipated twenty years ago. These are challenges for the next stage of digital ethnographies.

0.3.5 Algorithmic Ethnography

Finally, I will shortly mention a kind of ethnographic work that has been termed *algorithmic ethnography*. It is like 'algorithmic governance'. The word 'algorithm' has been used in many ways to point out the artificial or automated inferences and reasoning chains made through symbols or numbers. From this point of view, it is quite wide, meaning all kinds of logic, branches of mathematics, and computer languages that are used to build computer systems, platforms, adds, and all the devices and tools of the digital age. The main assumption is that software architectures have the shape of programmers making the software. Understanding how the software works means unveiling how the programmers think, design it, and make it work. Thus, "social architectures, software architectures, and physical architectures echo each other" (Seaver 2018).

I believe that this reflects the classical anthropological way of making all kinds of cultural connections among elements pertaining to a social community or culture. But in computer science nothing prevents these elements to be disparate, difficult to assemble, and actually revealing deep mathematical or logical problems that cannot be solved within natural language. Social architectures, software architectures and physical architectures often do not echo each other. This is the subject matter of the sciences of design, and the reason why it is so important to build up sustainable ecosystems on the Internet of Things.

Seaver (2017, 1) has defined

> 'algorithms' from a cultural point of view as ''multiples''—unstable objects that are enacted through the varied practices that people use to engage with them, including the practices of ''outsider'' researchers." […] I propose that critical researchers might seek to enact algorithms ethnographically, seeing them as heterogeneous and diffuse sociotechnical systems, rather than rigidly constrained and procedural formulas.

Fine, but this comprehensive, *Verstehen*, *emic* way of seeing it *as* culture does not reveal their fabric, i.e. their inner way of constructing sociotechnical or cognitive sociotechnical

systems, their *technical* fabric.[50] Making them, working with them fosters the discussion about how to build and embed them into specific environments, and creates the situations in which the formal languages in which they are written can also be discussed. This is teamwork. Sandboxes serve to this purpose, to evaluate the pros, cons, and possible effects of a particular formalisation. For instance, there are many ways to represent permissions, prohibitions, duties, and obligations. Using a formal language or another one to define them makes a difference in how the model will work. There are many decisions that must be taken. Coding it is not just developers' work. Ontologies require a knowledge-sharing effort that is complex and evolves over time. The thesis will show several examples of such discussions (for instance, in Chapter 6 and 8, about the problem of deciding thresholds for applying metrics).

0.4 Chapters and structure of the Dissertation

0.4.1 Contents

The title of the thesis is *Law as Knowledge: Anthropological Bases for Regulating the Web of Data*. The thesis is divided into three Parts: I. Grounds of the digital legal turn; II. Digital legal governance; III. Conclusions. Part I and Part II include four Chapters each. The final Section (III) is devoted to the Conclusions and References.

Part I (*Grounds of the legal digital turn*) sets out the problems and provides the grounds for their description, formalisation, and handling. The first four chapters are deemed to set the social and general analytical framework regarding LawTech Web Services, computation, and the rule of law.

Chapter 1 reviews the state of the legal profession since the last century, and the way it has been adapted to the challenges of the market and to the emergence of macro data analysis, the Web of Data, and applied Artificial Intelligence. Web Services are being

[50] "Where a computer scientist might enact algorithms as abstract procedures through mathematical analysis, an anthropologist might use ethnographic methods to enact them as rangy sociotechnical systems constituted by human practices." (Seaver 2017, 5) I cannot see this opposition. Sociotechnical systems can be built alike by computer and social scientists, and they must be *designed*, tested, and implemented through formal languages.

developed inside and outside law firms, and are changing the notion, structure, and practices that law has had so far at least since the 18th century.

Chapter 2 settles the framework of law as knowledge stemming from several related but not always intersected disciplines—legal studies and legal anthropology, legal theory, computational ontologies, and the Semantic Web. Its role is also to provide a basic technical ground on the languages that are being used for the regulation of the Web of Data, marking also the boundaries of the field.

Chapter 3 sets the foundations and history of the emerging concept of *relational law*, establishing a comparison with the notions that prevailed in the classical theories of law and introducing the main issues of the Dissertation that will be treated in Part II. It links law as knowledge with its relational, contextual, and interactive side. The use of concepts such as *legal pluralism, regulatory systems, relational justice, regulatory models,* and *dialogue as a source of law* are preliminary defined and explained.

Chapter 4 leans on the previous one and expands the analysis to the attempts to find a general structure for the law in the 21st c., retrospectively and prospectively. In the second half of the 20th c., legal anthropology was able to show the limitations of a jurisprudential approach based on legal theory to understand and explain the birth, evolving structure, and operating power of the public law of the state. From a relational perspective—i.e., taking the interactive trend—the law on the Internet appears decentralised and manly based on transactions. Blockchain, smart contracts, Online Dispute Resolution platforms, and security are finding new ways to create a sustainable balance between agreements and acceptable conditions.

This goes back to another notion of law and justice that is not grounded on the sovereignty and jurisdiction of the nation state. Economy and transactions are decentralised, platform-driven, but this does not mean that they do not have underlying regulatory schemes and patterns that emerge as collective properties of a common behaviour. We must go back to the vindicatory scheme of ancient law to find comparative patterns, with some similarities and differences with the society that is coming into being through information systems. This first Part I finishes with sixteen lessons learned, so as to base the pillars to develop the digital development and tools presented in Part II.

Part II (on Digital Legal Governance) gears and develops the substance of the thesis. As said, it is equally divided into four Chapters (4-8).

Chapter 5 builds upon the epistemic assumptions of legal governance on the Internet, the Web of Data, the Internet of Things and the so-called Industry 4.0—industrial work and business processes technically driven. The regulation of digital societies cannot be faced solely from the top-down approach of the enforcement and binding instruments of the rule of law, nor from a pure dialectical notion of dialogue among all stakeholders. Taking seriously the use of technology as an intermediate toolbox, a middle-out and inside-out approach for regulatory design will be delineated as the basis for the metarule of law that can be built through computer languages. It is worth mentioning here that technical regulatory tools are and will be even more incremental in the next future, independently of the modelling of rights. The general state of surveillance is a good example of this. What should be highlighted is that the substantive rule of law can be modelled as well as a counter-balanced design strategy.

A metamodel for the legal governance of the rule of law as general framework is the subject matter of Chapter 6. Compliance through Design (CtD), compared to business regulatory Compliance by Design, will be placed at the centre of a scheme able to bridge ethics, soft law, policies and hard law (legislative and adjudicatory) to generate trust and security. This is a toolkit for the legal governance of a hybrid society both of humans and machines. The Chapter traces and explores the notion of *legal isomorphism*, which has been one of the main points for information retrieval and argumentation modelling in AI since the very beginning. It analyses the pros and cons, and it offers several practical examples of how models of legal governance can work.

I would like to put a mark on this latter point. Machines are real stakeholders within our social interactions. Mobile phones store, handle and manage information. Dictionaries are built nowadays to be read mainly by machines, and information processing systems constitute the next landmark for regulatory patterns. Machines, not only humans, will create, draft, implement, enforce, and amend laws. To keep humans in the loop, building a metamodel (able to be instantiated in many regulatory models) to understand, elaborate, and create the conditions for legal ecosystems seem to be a reasonable way to frame the

components of the cultural and social environment in which transactions occur. Chapters 7 and 8 introduce the metamodel built for legal compliance *through* design, i.e. to *validate* from the legal point of view the transactions held through informational flows

Finally, the Conclusions. Chapter 9 will draw the anthropological bases for the regulation of digital societies both grounded on the actioning power of information systems and on human behaviour that has already become a component of this entangled environment that is being called *hybrid intelligence*, in between humans and machines.

0.3.2 Structure

Therefore, delving on the explanations offered above, the reader can manage her reading using the following scaffold. Chapters are sequentially structured in this way:

I. Grounds of the Digital Legal Turn

0. Introduction
1. The Double Implosion of the Legal Profession and Web Services in the Digital Age
2. The Web of Linked Open Data: Law as Knowledge
3. From Positivist to Relational Law: Law as Dialogue
4. The Legacy of Legal Anthropology

II. Digital Legal Governance

5. Legal Governance: The Convergence between the Web of Data, the Internet of Things and Industry 4.0
6. *Legal Isomorphism* and the Emergence of Legal Ecosystems
7. Sociolegal Ecosystems: Political Forms of Legal Governance
8. From Compliance *by* Design (CbD) to Compliance *through* Design (CtD): An Empirical Validation Model

III. Conclusions and Annexes

9. Conclusions: A Deep Cultural Change. The Anthropological Bases for Digital Legal Governance
10. References

As already advanced in the Preface, the Chapters have been organised following a modular structure. They should be understood as exposing different aspects of the same subject—the deep cultural and structural change of law and regulatory models in the digital

age. Ontology, epistemology, and methodology of the proposal have been analytically separated. These three aspects cannot properly work without social and anthropological theory as a starting point. The specificity of the socio-legal framework—what is the impact of digital tools on legal practices and concepts, what is happening and why in the legal field—will be set in Chapter 1, followed by the general introduction of Chapter 2 to ontologies and the Web of Data. Table 1 encapsulates the general concepts of the modules in a comprehensive way.

Table 1. *Structure and Concepts of the Dissertation*

MODULES	CONCEPTS	FIELDS	CHAPTERS
Legal Web Services and Artificial Intelligence	Law as Data Law as Meaning Law as Sense	Legal Anthropology and Sociolegal Studies	1. The Double Implosion of the Legal Profession and Web Services
Law as Knowledge	Knowledge Graphs Legal Ontologies	Ontology and Semantic Web	2. Law as Knowledge: The Web of Linked Open Data
Law as Dialogue	Agreement Legal Pluralisms Relational Law Relational Justice Regulatory Model Regulatory System	Legal Theory, Sociolegal Studies, and Legal Anthropology	3. From Positivist to Relational Law: Law as Dialogue
Reciprocity and Dialogue	Integration Reciprocity Legal Culture Vindicatory Systems	Legal Anthropology	4. The Legacy of Legal Anthropology
Legal Governance	Middle-out Approach Inside-out Approach	Epistemology	5. The Convergence between the Web of Data, the Internet of Things and Industry 4.0
Linked Democracy	Rule of Law Metarule of Law Legal Ecosystems	Political Anthropology and Artificial Intelligence	6. *Legal Isomorphism* and the Emergence of Legal Ecosystems

	Legal Isomorphism		
Sociolegal Ecosystems	Institutional Design	Social and Political Sciences and Artificial Intelligence	7. Sociolegal Ecosystems: Political Forms of Legal Governance
	Interoperability		
Metarule of Law	Compliance *by* and *through* Design	Methodology and Use Cases	8. From Compliance by Design to Compliance through Design: An Empirical Validation Model
	Scheme		
	Metamodel		
	Validation Model		

0.5 Annex I: List of European and Australian Research Projects.

Research Projects Acronyms (Supporting Dissertation Results)

SINTELNET	*European Network for Social Intelligence*, FP7 COST 0801 AT, EU Commission (2011-2014), Exploring the interplay of Information technologies, Philosophy, Humanities and the Social Sciences. FP7-ICT - Specific Programme "Cooperation": Information and communication technologies. FP7-ICT-2009-C. ICT-2009.8.0 - FET-Open: Challenging current thinking. Grant agreement ID: 286370. https://cordis.europa.eu/project/id/286370
CAPER	*Collaborative information, Acquisition, Processing, Exploitation and Reporting for the Prevention of Organised crime*. FP7 European Commission-Collaborative project. Large scale integrating project (2011-2014). Grant agreement ID: 261712. https://cordis.europa.eu/project/id/261712
SPIRIT	*Scalable Privacy Preserving Intelligence Analysis for Resolving Identities*. SEC-12-FCT-2016-2017 - Technologies for prevention, investigation, and mitigation in the context of fight against crime and terrorism. H2020 European Commission (2018-2021). Grant agreement ID: 786993. https://cordis.europa.eu/project/id/786993
LYNX	*Building the Legal Knowledge Graph for Smart Compliance Services in Multilingual Europe*. Topic: ICT-14-2016-2017. European Commission H2020 (2018-2021). Grant agreement ID: 780602. https://cordis.europa.eu/project/id/780602
RightsApp	*Mobile Technologies applied to protect victims of a crime within the EU Area of Justice: RightsApp for e-Justice.* JUST-JACC-EJU-AG-2017. JUST- Grant Agreement: 785854 (2017 until March 20221)
OPTIMAI	*Optimizing Manufacturing Processes through Artificial Intelligence and Virtualization.* H2020-EU.2.1.5.1. - Technologies for Factories of the Future. DT-FOF-11-2020 - Quality control in smart manufacturing (IA). Grant agreement ID: 958264. https://cordis.europa.eu/project/id/958264
ONTOROPA@ ONTOCHAIN	*Trusted, Traceable and Transparent Ontological Knowledge on Blockchain.* New Generation Internet (NGI) Ontochain call OC1 to develop a new software ecosystem for trusted, traceable, and transparent ontological knowledge management. ICT-54-2020 - Blockchain for the Next Generation Internet. Sub-project: OntoROPA: *Ontology based ecosystem for*

	trustworthy Records of Processing Activities (ROPAs) @ONTOCHAIN, Grant Agreement ID: 1481458. March 19th 2021- June 2021. https://cordis.europa.eu/project/id/957338 https://ontochain.ngi.eu/content/ontoropa
LAST-JD	*Erasmus Mundus Doctorate on Law, Science and Technology*, 520250-1-2011-1-IT-ERA MUNDUS-EMJD (2012-2017) http://www.last-jd.eu/?page_id=12
LAST-RIoE	*Rights of the Internet of Everything* EU project 814177 - LAST-JD-RIoE, H2020-MSCA-ITN-2018 (2018-20123). Marie Skłodowska-Curie Innovative Training Networks) Law, Science and Technology Joint Doctorate https://last-jd-rioe.eu/
D2D CRC	*D2D-CRC Practical perspectives on a balanced, enabling regulatory framework for data-based decision-support technologies used by law enforcement and national security in Australia*; Data to Decisions CRC, ERA (Australian Government), 2016-2017. Data to Decisions Cooperative Research Centre (D2D CRC Ltd, ABN 45 168 769 677) Project DC160051. https://www.d2dcrc.com.au/law-policy
D2D CRC- CtD	*D2D-CRC Compliance by Design (CbD) and Compliance through Design (CtD) solutions to support automated information sharing (2018-19).* Project C. Data to Decisions Cooperative Research Centre (D2D CRC Ltd, ABN 45 168 769 677) Project DC160051 https://www.d2dcrc.com.au/law-policy
iMOVE	*Australia's Public Transport Disability Standards and Connected and Automated Vehicles (i-Move CRC), with La Trobe Centre for Technology Infusion (2020-21). iMOVE CRC – IN – CONFIDENCE Project 3-014 5. With La Trobe Centre for Technology Infusion (A. Desai, E. van Vulpen). Contract: iMOVE CRC Project Agreement, iMOVE Australia Limited (Company) The Commonwealth of Australia, represented by the Department of Infrastructure, Transport, Regional Development and Communications.*
MetaIssues	*IEEE SA IC Program: Meta Issues in Cybersecurity, led by Greg Adamson (Melbourne University-IEEE member), Sri Chandra (IIIE) Robert Burnett (National Defense Uni, Washingon), Monica Whitty (UNSW), Samuli Haataja (Griffith Univ.) among others (from USA, India, Australia, NZ, Spain). Program to amend IEEE Ethical Cybersecurity Standards.* https://standards.ieee.org/industry-connections/meta-issues-cybersecurity.html

PART I. GROUNDS OF THE LEGAL DIGITAL TURN

CHAPTER 1

The Double Implosion of the Legal Profession and Web Services in the Digital Age

> "[A] word is not a crystal, transparent and unchanged, it is the skin of a living thought." Oliver W. Holmes (1918), cited in L.T. McCarty (2019)
>
> "Les paraules són les forques on, a trossos, penjo la raó." [Words are the pitchforks from which, in pieces, I hang reason] Salvador Espriu (1952)

Summary. This chapter reviews the state of the legal profession since the last century, and the way it has adapted to the challenges posed by the analysis of macro data, the Web of Data, and the emergence of Artificial Intelligence. Web Services are also being developed in the world of the law, and they offer features that will change the structure it has had at least since the Middle Ages. The double implosion produced in the legal world also produced a deep change in the public space. This most likely reflects the tensions that have already occurred in the professional market. We cannot anticipate the future regulation of society, but we should assume the polarisation that has already occurred among individual users (citizens and 'prosumers') and large organizations (including governments, corporations, and states). The design of a meta-rule of law, more flexible and user-centred, may compete with the rule of law as it was conceived in the nineteenth and twentieth centuries, but it has the benefit of modelling its substantial content, i.e. the civil and civic rights that protect individuals. I propose in this chapter three different dimensions of law in the digital age—law as *data*, law as *meaning*, and law as *sense*.

Keywords. legal professions, lawyers, legal services, Internet of Things, the Semantic Web, Web of Data

1.1. Introduction

1.1.1 The Paradox of Change

Thinking the future is always a challenging exercise. It is not an object of science, but a political exercise, an essay in advance of a time whose control measures have also

historically been subject to political decisions. The "Future of Law" is, however, a popular subject. It has been systematically addressed by jurists and specialists in various legal fields from the First World War. A cursory literature search of Westlaw, Lexis Nexis or HEINonline generates hundreds of entries with the term "future" in the title. This should not come as a surprise: each discipline recalibrates the state of the art on a regular basis. And especially legal disciplines have been very sensitive to historical changes produced by global crises and conflicts over issues of power and social reorganization in the twentieth century.

The field of law and artificial intelligence constitutes no exception. The authors of JURIX[51] and IAAIL[52]—the two most important-scientific associations—have been well aware of the transformations induced by technologies that are being developed. But the dizzying speed with which they occur can be misleading. Contemporary legal forms —on property, contracts, crimes, rights etc.—have a basis that goes back to Roman law and principles that have infused the public and private law since the Middle Ages, the Renaissance and Enlightenment. Therefore, where does there lie something new?

This depends on the level of abstraction, the definition of the object, and the scope of the discourse. The most comprehensive answer might be found in the production of knowledge, associated technological innovation, and the management of collective effects generated in the process (including the power to diagnose, segregating, teaching, disseminating, designing, constraining, and coercing). These three elements can be addressed from the perspective proposed by Josiah Ober in his study of democratic forms of the Athenian polis in the classical period. According to Ober (2008), Athens was superior to its rival states because it made better use of scattered collective knowledge, fostered innovation, and built legal institutions for the management of collective and individual rights that drove economic growth (the *efflorescence* of classical Greek society).[53]

[51] Jurix. The Foundation for Legal Knowledge Based Systems, http://jurix.nl/
[52] IAAIL: International Association for Artificial Intelligence and Law, http://www.iaail.org/
[53] J. Ober's studies are interdisciplinary. He combines results from Ancient Greek history, cultural and legal anthropology, institutional economics and political science. The notion of *efflorescence* has been used in economic history to refer to a situation of generalised and sustained economic growth and socio-cultural development. Ober uses consistently this notion to characterise the emergence and success of Athens in its

Construction and protection of rights was established at the same time as *epistemic democracy*—i.e. as epistemic knowledge—which helped to reduce transaction costs and increase the cumulative aggregation of useful knowledge. The public space was therefore not built by an authoritarian process through sanctions but depended on the gradual emergence of institutions *built from the ground up* so that would encourage an increased participation of all citizens. Legislative enactment came later, to consolidate and promote what had already been achieved through institutional building and the enabling of free citizens.

> Public rewards encouraged experimentation. Innovators responded by devising and advocating new policies and adjustments in policy making and executive institutions. As a result, Athenian policies responded more readily to unanticipated challenges, and Athenian institutions adapted more quickly to the changing environment than did those of Athens' major competitors. Evolving knowledge processes in turn helped to address endemic public-action dilemmas, for example by lowering transaction costs through lessening information asymmetries. Meanwhile, enhanced levels of social cooperation accompanied the social learning that arose from many individuals gaining political experience through "working the machine" of self-government. (Ober 2008a, 266)

This is the reason why, in Ober's version, epistemic democracy does not entail *per se* a majority rule, but knowledge, innovation, incentives, and a few institutional rules granting some property and equitable rights to individuals. It does not refer only to democratic decision-making processes but to their historical outcomes, combining individual aggregation, collective deliberation, and legal protections of symmetric relationships.

1.1.2 A Specific Answer for a Present Question

Could today's society of knowledge emulate to some extent what happened in Ancient Greece? Could we also collectively add up the dispersed knowledge network and promote collective action and democratic processes to find solutions to global social problems?

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classical age (Ober 2008a, 2008b, 2013, 2015). For a detailed explanation of Ober's usage of efflorescence see Casanovas (2017, 88-89).

We could. But this does not mean that this is what actually happens. And the signs that we now have regarding the behaviour of corporate groups and states do not point in this direction. Republicanism represents a rather open question (Sunstein 2006).

This is mainly because the depth of the change at the beginning of the XXI century has produced a functional acceleration of representation, inference and implementation in the regulatory systems that has never occurred before. In any society that we can study now, including classical Greece, there was no representation, production, dissemination, and absorption of information processing *in real time*. There was also no possibility of accumulating perceptions, adding, and transforming them on a higher scale than that of the individuals and groups of individuals participating in the process.

This is exactly what happens with the Web of Data (WoD), the Internet of Things (IoT), and the analysis of macro-data (the so-called 'Big Data' [BD]). Information theory, web languages and Natural Language Processing (NLP) techniques allow meaning to be obtained on a large scale. And we do not yet know the full impact this can have on a society that tries to control their own economic, political, and cultural developments using this type of knowledge engineering. What we perceive now is that its use is selective—being mainly co-opted by certain corporate groups and states that benefit from it—and that the population receives its effects through a growing digital market dominated by large technology companies.

Digital global change is irreversible. The change was anticipated by information theorists since the fifties and sixties of the last century but has fully materialised only with the third generation of the Internet, the Semantic Web (SW) and the possibilities offered by the massive application of Artificial Intelligence (AI).

What has happened and what may happen in the field of law? I will set out in this Chapter a comprehensive framework to situate the analysis. As I will contend all along this Dissertation, in the convergence of WoD and the IoT, epistemic democracy could be understood as *linked democracy*, i.e. "a theory of democracy dynamically linking the distributed interactions between people, data, institutions, and both organizational and local contexts" to generate legal ecosystems (Casanovas et al. 2017, Poblet et al. 2019). And I will contend as well that if, and only if, the substantial rule of law is

embedded into regulatory and legal systems—into what I will call the *metarule of law*—the protection of legal ecosystems and individual and collective rights can be guaranteed and safeguarded in digital societies. There is no single royal road to achieve this, but it can be done in a number of decentralised ways, depending on the available technologies and the political form adopted by the social collective. As we will see in the next chapters, ontologies, blockchain technologies, NLP and ML can be combined and used to create such an environment, but the tensions and contradictions among all stakeholders, including mighty corporations and nation-states, i.e. the nuances and trends of binding powers, are more alive than ever.

1.2 The Double Implosion

1.2.1 The Big Bang of Legal Professions in the 20th century

Roscoe Pound (1937, 3) wrote that "the best predictor of the future is the past". It is a formulation of Bayes' theorem from American Legal Realism. Pound had an eye on the rise of Nazism. For him, "civilization involves subjection of force to reason, and the agency of this subjection is law" (Pound 1937, 13). Order is maintained by authority, and especially by means of "a restrained exercising of authority" (ibid.). In other words, the law lies on the rational and limited exercise of power, not on the mere fact of exercising power. Just after World War II Gustav Radbruch, who was twice Minister of Justice in the Weimar Republic, wrote:

> There may be laws that are so unfair and so socially damaging that they must be denied their validity, that is, their legal character [*daß ihnen die Geltung, ja der Rechtscharakter abgesprochen werden muß*] (Radbruch 1945, 2006, 14).

Despite the procedural and cultural differences between Common law—based on argumentation and judicial decisions—and Civil continental law —based on the codification of laws and their implementation by the nation-state—the general theories of law of the second half of the 20th century encompassed these two approaches. The foundation of the law—its normative 'validity'—is at its limits: (i) subjection of power to the law (rule of law, *estado de derecho, Rechtsstaat, état de droit*) and (ii) respect of human rights and fundamental rights (generally included in constitutional texts).

The latter is not an incorrect formulation. The consecration of the Charter of Human Rights of the UN in 1945 remains a key milestone for any possible regulation to take into account. But what today does not hold is the simple linear conception of legal evolution, since digital societies are based on models whose complexity prevents the regulatory models of the past constituting a sufficient normative basis for the social models of the future. In social and political sciences, projections tend to work short-term, with sufficiently known well-defined areas and conditions.[54] However, what we are talking about here is not a simple foresight, but the collapse of a complex system, where fragments may have an independent behaviour and generate unexpected effects. This is what is known as the implosion of the elements of a system.

In contemporary law this is not new. Studies on the emergence of legal services in the nineties of the last century observed that economic globalization had been facilitated in part by the explosion—known as the 'Big Bang'—of the number of lawyers in the US and in Europe fostered by the economic conditions that took place after World War II.[55] At that time, researchers described the change as a transformation of the centralised view of the state and the right to have many regulatory power centres distributed in companies, corporations and political and social organizations.[56] Even before globalization we had the change in access to the legal profession by women.[57] We have also

[54] One example of effective prospective foresight to inform public policies is the Report that Ross Garnaut prepared for the Australian government in 2009. Garnaut, based on statistical work on the effects of climate change studied by the weather team of the CSIRO (Lucas et al. 2007) was able to predict the increase in magnitude and intensity of forest fires that would occur in Australia ten years later, in December 2019 and January 2020. Vid. For the general epistemological justification Dennet (2013), and more specifically, referring to the possibility effective predictions, Tetlock (2013).

[55] Almost all capitalist countries experienced a rapid increase in the volume of their legal professions between 1960 and 1980. As shown by Abel (1988: 31), the rate of expansion happened after a long period of stagnation. In Germany, there was virtually no change in the ratio of population of lawyers between the period after the abolition of the *numerus clausus* in 1879 and the fall in the mid-sixties. In the Netherlands, lawyers' population actually increased from 3,700 in 1850 to 7,700 in 1920, and by 1970 had fallen to 6,200. In France, there were 7,321 lawyers in 1937, but only 6,565 in 1960. The world of the common law had a similar experience: the ratio to the population of lawyers in USA was the same in 1951 than they had in 1900. In England, the number of lawyers in 1948 was almost exactly the same as in 1890 despite the substantial growth of the population. In Spain the change came somewhat later but was sudden and remarkable. The Barcelona Bar Association had 5,000 members in 1987. The data suggests that in 1995 there were more than 13,000, and in 1997 the figure rose to 15,000. As in Madrid (from 13,000 to 24,000, about 40,000 in 1997), the number of lawyers tripled in a few years.

[56] Galanter (1981), Galanter and Palay (1994), Dézalay and Garth (2002).

[57] Until 1960, women made up only a tiny fraction in the legal profession, prosecutors or judges. Women were not admitted to the French magistrature until 1945. The first woman judge was appointed in Holland in 1947, and Italian women were unable to access this position until 1963.

see the transformation of small law firms to business groups with over a thousand employees, and increased conflictual relations in the courts, especially in commercial and administrative matters. The crisis of litigation is therefore due to an unexpected increase in conflict and management on all legal fronts.

Another influent social scientist, Donald Black (1989, 19), highlighted the significance of these changes:

> What has emerged in recent years is not merely a new version of legal sociology, but a new conception of law itself. The sociological model of law differs radically from the jurisprudential—or legal—model that has widely dominated legal thought in the Western world.

What sociologists of law had before them was not effectively a stage of centralised legal evolution in the traditional organs of power and authority, but *a social implosion of traditional legal forms*, since service producers sought not only to control the supply, but also stimulate demand in line with the rapid expansion of a global economy. The major consumers of legal services were no longer individual citizens, but corporations, financial institutions, and governments, national state administrations. John Flood (1995, 193; 1996) connected it directly with the deregulatory trends fostered by UK (and USA) Administration:

> The expansion of the secondary market was brought to its present heights with the 1986 'Big Bang' in London. The drive to Big Bang was fuelled in part by the release of currency exchange rates from direct state control in 1979. This release prompted the development of futures and options markets in financial instruments and currencies. Releasing the London Stock Exchange from the cartel arrangements that had ruled it, Big Bang—*more of an implosion that an explosion* [my highlight]—sucked in potential market-makers from the US, Japan and elsewhere. It delivered the large American banks, especially, from the restrictions of the Glass-Steagall Act and made London an attractive site for investment.

This first implosion, in the long run, had devastating effects in legal education. Law schools, universities and professional bars experienced adjustment problems that have not been completely solved so far, both in common and civil law countries. The crisis in the US education system has been pervasive and persistent ever since. Brian Tamanaha, a usually self-contained author, has not hesitated in describing it as follows:

> The first decade of the twenty-first century has been a golden age of plenty for law schools. Yet law schools are failing abjectly in multiple ways. Annual tuition at over a half-dozen law schools topped at $50.000 in 2011, with a more dozen poised to follow. After adding living expenses, the out-of-pocket costs of obtaining a law degree at these schools reaches $ 200.000. Nearly 90 percent of law students borrow to finance their legal education, with the average law school debt of graduates approaching $100.000. Many law graduates cannot find jobs as lawyers, enduring the worst market for legal employment in decades. Paying no heed to the adverse job market, law schools increased their enrolment in 2009 and 2010, which will send more graduates scrambling for scarce jobs three years hence. (Tamanaha 2012, ix)

1.2.2 Lawyers in the 21st century

What is actually happening is a *double implosion* within the legal corporate market itself. The same authors, analysing the legal market twenty years later, have pointed out the changes. According to Flood (2011) "elite law firms have apparently strengthened their hold", being successful in a self-regulatory strategy at the global level. Galanter and Henderson (2008) have observed the emergence of an "elastic" system "cycle" where competitive promotion reduces the number of partners to maximize profits. So,

> For the vast majority of modern large law firms, economics rather than culture are the glue that holds the firm together. Indeed, the distinguishing feature of the elastic tournament is a constant focus on the real or imagined marginal product of each lawyer in the firm—associates, of counsel, sundry off-track attorneys, and equity and non-equity partners. Although this system is remarkably effective at maximizing the financial return on (at least some) human capital, it simultaneously undermines or hinders other values cherished by the profession. (Galanter and Henderson 2008, 1907).

This elastic cycle reflects and modulates the adaptation to larger-scale economic changes at the same time. This includes administrative bureaucratization, the global dispersion of clients, the lower cost of information processing and the erosion of the cohesion of the professional corporate culture. In other words, there is a constant pressure to increase benefits throughout the cycle and an imbalance in favour of those who pursue individual results at any cost.[58] Although a lawyer may want to negotiate to improve her conditions (i.e., more free time or volunteer work), it is impossible to do so in this context without getting out of the competition. As noted by Galanter and Henderson (ibid., 1907) "this outcome is dictated not by an absence of professional ideals

[58] Cf. On the growing pressure experienced by the profession, Ariens (2019).

but a widening and intractable collective action problem that undermines the requisite conditions for the embodiment of those ideals".

Despite some attempts to counter this argument alleging the self-interest of "relational" partners (Pearce and Wald 2013) and benefits planning in the longer term (Molot 2014), it seems that this mild interpretation is no longer possible. The legal services of the so-called *Big Four* accounting corporations [Deloitte, PricewaterhouseCoopers (PwC), Ernst & Young (EY) and KPMG] have consistently declared since 2016 a global annual revenue of over one hundred and twenty billion dollars. This means that these four companies alone have a higher turnover than the GDP of the sixtieth richest country in the world. The legal services market in the UK, for example, is the largest in Europe, and is responsible for more than a quarter of the total value of the European market (Susskind and Susskind 2015, 10; Susskind 2017).

Kirkland & Ellis, one of the largest international law firms, has invoiced in 2019 some 3.6 trillion. There are currently nineteen corporate law firms in the US with more than 10,000 lawyers distributed worldwide. The once denigrated hour billing system is more rampant than ever, with a ratio of $ 1000/1500 per hour for young lawyers seeking to be partners of the firm. Thus, the benefits of the partners have increased. But not equally. Some are more equal than others, and the differences matter (estimates point to an arc of $600.00 to $15 million a year). As it has been recently recognized by the *Wall Street Journal*, the egalitarian and professional culture that supported legal services "is almost dead" and "full-time executive directors, some with no law degree, have replaced the principal partner responsible for human resources and accounting." (Ranzazzo 2019).[59]

Fragmentation is also reproduced at the national level.[60] Since 1988, because of the rapid evolution of the market, "the contemporary legal field is fragmented everywhere

[59] Cf. Ranzazzo (2019). The most important cast of law (Law Firms) in USA, stating starting salaries and known data has just been published (dated, no author) by the *New Jersey Law Journal* 225 (46).

[60] Abel (2020, 890 and ff.) distributes the national legal professions into four categories according to their degree of growth: (i) in countries with a planned communist economy (past or present), these have experienced a very rapid growth in response to the privatisation of state-owned companies and the emergence of a domestic market (eg Czech Republic, China and Russia); (ii) some countries have deliberately expanded and diversified the legal professions for various reasons of a political nature (e.g. Venezuela, South Africa, and Egypt); (iii) some countries with few law schools have allowed the proliferation of universities and

and the meaning of the profession is questioned" (Sommerlad and Hammerslev 2020, 33). As R.L. Abel has shown in the recent renovation of his project of comparative legal professions, the expansion in the last two decades has been preceded by the increase of offer in university studies in an increasingly reduced institutional framework. When the increase in the number of attorneys far exceeds that of judges, litigation tends to rise, and this leads to speedy trials, quotas, and other corporate measures. On the other hand, there is no evidence that an increase in lawyers leads to an improved access to justice (Abel 2020, 893). The important fact is that of the relative expansion of legal professionals compared to the exponential growth of lawyers and services. This means that the public space is becoming smaller and defensive—as will be seen in the French case. Perhaps it is more accurate to speak of a *hybrid space*, in which the type of state and the type of legal market interact creating sectorial rules and patterns of conduct that vary from country to country.

1.3 Artificial Intelligence and Legal Fields of Application

1.3.1 Legal Market: The Emergence of *LawTech* Services

This is the context in which much attention has been drawn to Artificial Intelligence techniques. This is not new, and it has happened gradually, but in the last five years, with the emergence of large data analysis, there has been a massive interest from lawyers and law professionals. They often refer to AI, following the idea that innovation is linked to disruption (Christensen 1997), as a set of "disruptive technologies". These have proved more effective to counter the organizational and economic capacity of the global legal services companies than regulation through legislation.[61] Or, at the least have allowed the reorganization of small firms and individual professionals around new models of flexible business: (i) through personalized services, (ii) hosted in the cloud, (iii) customer-centric, (iv) transparent from the beginning, (v) offering concrete legal assessments, (v) and especially much cheaper (Guilot 2019).

private legal studies (e.g. Serbia, Chile, Argentina and Mexico, this is also the case in Spain); (iv) countries whose professions experienced significant expansion before 1988 have had a slower growth (c. 5% annually) or have even decreased since 2008 (Canada, France, the Netherlands, Italy, Spain, USA, Switzerland).

[61]The UK decided to re-regulate the legal market through the Legal Services Act (2007). However, global service companies managed to evade its effects through reintroducing self-regulation standards and protocols by Authorized Internal Regulation (AIR). Cf. Flood (2011).

In short, a service market is emerging which is becoming "uberized" and involves new professionals with little legal background, but with specific technical know-how as knowledge engineers, Project managers, financial experts, customer advisors, experts in product processes, documentarians, risk prevention experts, experts in data protection by design, automated compliance engineers, and AI programmers. This market has developed partly as a result of the tensions produced since the economic crisis of 2008. A 2015 survey concluded:

> Perhaps the greatest legacy of the recession and its aftermath for the legal profession is overcapacity — too many lawyers and not enough work. Despite painful cuts made during the downturn, many firms are still grappling to right-size their workforces. In over half of all law firms responding to the survey, partners are not sufficiently busy in 2015. In firms with 250 or more lawyers, the number of partners who don't have enough work jumps even higher, according to their firm leaders. Not surprisingly, 61% of firms say overcapacity is diluting firm profitability, and that's the case in 74% of firms with 250 or more lawyers. (Clay and Seeger 2015, 4-6)[62]

A more recent survey by the same authors found that the situation has been reversed in 2018, but passing on the costs to clients:

> Forty-nine percent of firms reported demand for their services was up in each of the last three years, compared to only 40% a year ago. Lawyers are busier. Firms raised their rates more aggressively than in previous years and clients paid the increases. Buoyed by positive financial results, many law firm leaders scaled back their scepticism regarding the long-term outlook for legal services.[63]

The crisis and its aftermath fuelled the adoption of technological solutions. The surveys on the use of technology made each year by the International Legal Technology Association (ILTA 2016-2021) point in the direction of increasing attention to the development of AI, despite its cost. Its first special survey on machine learning, concludes:

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[62] "Non-traditional competitors are taking the traditional business of law firms, and the threat is growing. […] The second largest 'non-traditional' threat to law firm business is clients' use of technology tools that reduce the need for lawyers and paralegals. Twenty-four percent of law firms are currently losing work to client technology solutions and another 42% see this as a potential threat to their firms' business. […] In 2015, legal service providers and quasi-legal non-business firms are taking 17% of the firms and another 38% see such suppliers as a potential competitive threat. [...]." (Clay and Seeger 2015, 4-6)

[63] "On the 362 firms participating in this year's survey [2019] more than 78% reported higher gross revenue in 2018 compared to 2017, up sharply from 68% the previous year. Similarly, 77% of firms reported gains in profit per equity partner (up from 61% the prior year). Financially, it was a good year overall for law firms and a dramatic improvement over the previously six years when the number of firms reporting revenue gains varied between 59% and 69%." (Clay and Seeger 2019, ii)

> The use of some form of legal software driven AI is inevitable for most legal organizations in the coming years. It is key to business problems that are trying to solve and identify a tool where artificial intelligence can be the right answer are contemplated. And once you have decided which direction to take, follow the discipline that makes technology and software projects succeed. (ILTA, 2019b)

What are the technologies adopted? Only a few years ago, researchers in Artificial Intelligence and law used to divide the field of Information and Communication Technologies (ICTs) into two different areas: (i) the law of ICTs (data protection, intellectual property, privacy, security, patents and domain names), (ii) and the development of instruments for legal services—IT for lawyers— (e-government, electronic courts, ODR—Online Dispute Resolution—, Multi-agent systems). The first domain would properly comprise legislation, case-based law, and forms of regulation. The second would refer to the languages, instruments and software that facilitate and improve the processes and activities of legal management.[64]

However, the development of semantics, Natural Language Processing (NLP), ontologies and techniques for storage and retrieval of information, along with Machine Learning (ML)[65] and Deep Learning (DL) have all contributed to the convergence of the two approaches in a single field of techno-regulation, *LawTech*—also referred *FinTech*[66], *RegTech*[67] and lately *Suptech*[68]—whose main functions are supervision, monitoring and

[64] I had occasion to analyse the situation a decade ago in Casanovas (2008), and Casanovas and Poblet (2008). Cf. also Fernández-Barrera et al. (2009).
[65] 'Machine learning '(ML) can be broadly referred as the study of computer algorithms that improve automatically through experience, according to Mitchell (1997). Deep learning is a subset of ML.
[66] 'Fintech' explicitly refers to platforms and services to the financial services markets. Automation provides insurance, trade, banking and risk analysis. The global market for Fintech has been recently estimated (2018) at about $ 127.66 trillion, and growth expectation is to $ 309.98 trillion, with an annual growth rate of 24.8%, by 2022. Source:https://www.prnewswire.com/news-releases/global-fintech-market-value-is-expected-to-reach-309-98-billion-at-a-cagr-of-24-8-through- 2022--300926069.html
[67] 'Regtech' has been considered until recently to be a subdomain of Fintech. However, since 2016 the reports of Deloitte and other service providers have highlighted the growing autonomy of the field, regarding services of risk analysis, compliance, monitoring and implementation of regulations (internal and external to the company) to improve quality control, reduce costs and avoid sanctions and conflicts. "Regtech is the new Fintech"https://www2.deloitte.com/content/dam/Deloitte/lu/Documents/financial-services/performancemagazine/articles/lu-how-agile-regulatory-technology-is-helping-firms-better-understand-and-manage-their-Risks-24052016.pdf
[68] "Suptech refers to the use of innovative technology such as Artificial Intelligence and Machine Learning by control agencies to support their supervision. In other words, these are the technologies for regulators themselves ":https://fintechnews.ch/regtech/what-is-suptech-an-overview/31289/

automatic compliance of regulatory systems, including smart contracts, cryptocurrencies, and ODR.

Richard and Daniel Susskind (2015) use the terms "post-professional culture" and "information infrastructure" to outline the depth of change. The two are related. The first refers to the breakdown of the digital with the analogue. The second refers to the means in which the information is produced, stored, preserved, and distributed. In the same vein as Jack Goody (1977), Walter Ong (1982) and, most recently, Luciano Floridi (2014), the authors assume that the production, expression, and communication of knowledge can be classified into four main periods: (i) orality (speech); (ii) writing (scripture), (iii) printing (reproduction), and information (digitality). From this point of view, they propose seven different models for the production and distribution of expert knowledge in law.[69] The last two are: (i) the model of *embedded knowledge*, where practical experience is incorporated and built into machines, systems, processes, practices or physical objects[70]; (ii) the model of *generation machine*, in which practical expert knowledge is completely generated automatically by intelligent agents.

Susskind and Susskind (2015) predict the gradual absorption of regulatory work by information systems and programs and, therefore, the gradual disappearance of a profession that must adapt to change. In fact, they offer two options: (i) a sustained evolution of the professions (not only the legal profession), or (ii) the radical transformation of the professions in a not too short period of time. They bet on the second, after a period in which both could coexist.

Some legal scholars have deemed this judgment disproportionate, typical of an unfounded "legal futurism" based on the undervaluation of subtlety and difference in each

[69]Together with the two profiled, indicates: (i) the traditional model (consisting of human legal service providers by personal interaction); (ii) model of expert network (human suppliers, but by virtual teams and multidisciplinary organizations able to offer online services); (iii) the model of paraprofessionals (composed of professionals with less legal training, but who are able to deliver the work programs that were previously carried out by expert human knowledge); (iv) engineering model of knowledge (knowledge in a particular area of expertise is incorporated into self-service systems); (v) and model communities experience (crowdsourcing or accumulated collective knowledge). Daniel Susskind (2020) resumes this analysis in a world with less work leading to social and economic inequality, where the distribution of income will no longer rely on the labour market. He proposes to consider a Universal Basic Income (UBI).

[70] An integrated circuit providing heating and air conditioning (HVAC) that must meet legal requirements of regulation would be an example of this model.

case that, unlike formal languages, legal language allows (Pasquale 2016, 2019).[71] Without denying that it is necessary to take into account the accumulated legal knowledge as a social hinge, what is debatable here is the converse: formal languages can have a sufficient degree of expression to cover the legal functionalities that until now were only expressible in natural language. What they cannot easily supply is the conjunction of meaning with the possibilities of human action in dynamic contexts. But there are also techniques that limit the distortion produced by an incomplete adaptation to the context. You should heed common sense, but whenever there is data involved. And when there is, it seems that it says something different from what we are used to hearing.

The sciences of design (especially when they combine algorithms and semantics) bring the discussion to another cognitive and meta-cognitive dimension, empirical and normative at the same time, with technical and institutional challenges that cannot be addressed only with external estimates. The recent delivery of GPT-3 shows that scaling up language models greatly improves performance (Brown et al. 2020). GPT-3 is an autoregressive language model with 175 billion parameters, 10x more than any previous non-sparse language model, and has been tested against legal discourses with quite surprising results.

1.3.2 A Schedule of Services Provided by AI and Law

The same companies that offer automatic compliance have made the first maps of what legal services are offered in this field. Figure 2 was drawn up by Neota Logic, one of the companies providing on demand (Mills 2016, Mills and Uebergang 2017).[72] It contains a list (still incomplete) of companies already operating in the market, along with the fields of automation: (i) expert knowledge and compliance, (ii) legal research

[71]Pasquale (2016). Susskind would base his criticism on the use of natural technical language and practices of lawyers. Professional identity, in short, is not entirely computable and has an autonomy facet of dealing with customers: “the main reason they enjoy this autonomy is because they must handle intractable conflicts of values that repeatedly require thoughtful discretion and negotiation" (Pasquale, 2016). According to Pasquale, Susskind reduces the profession simply to expert knowledge.

[72] The interested reader can find more complete maps of existing technology companies and legal services https://www.legalcomplex.com/maps/. It is especially useful as regards information technologies developed in relation to the types of services offered.

(interpretation and resolution of cases), (iii) prediction sentences and cases, (iv) electronic discovery (e-discovery), and (v) intelligent contracts (smart contracts).[73]

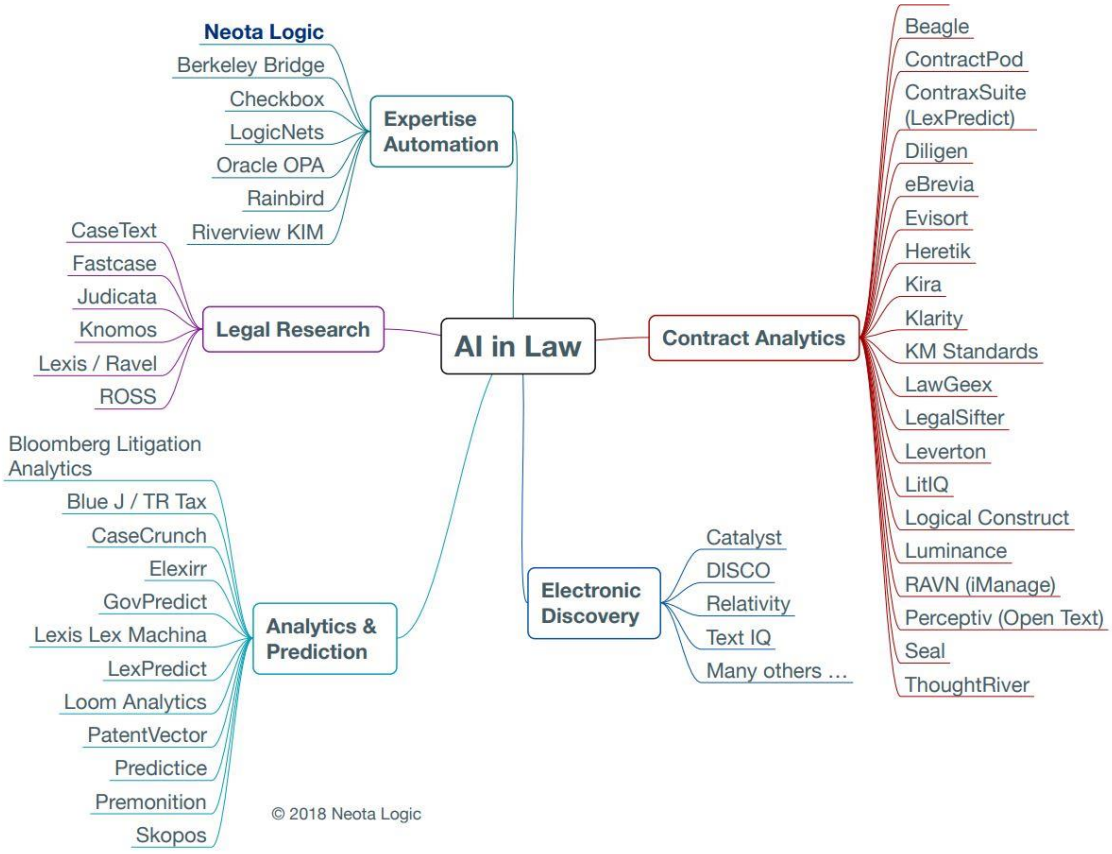

***Figure 2**. (Partially) mapping AI technology and technology services companies. Source: Mills (2017). https://www.neotalogic.com/2018/04/19/ai-in-law/*

As we will see later, in 2019 there has been a real explosion of Legal Analytics[74], with different characterizations depending on the market in which it is defined. The legal approach takes a pragmatic approach to AI, relating it as a set of cognitive technologies and tasks that machines can do better than humans, combining both approaches and, especially, considering AI not as a reflex automated operation of mental processes, but rather as an attempt to operationally improve the tasks that humans carry out, i.e. not

[73]The cast is only approximate. The directory developed by Planet Compliance contains more than five hundred Fintech service companies that offer data analysis, https://www.planetcompliance.com/the-planet-compliance-legaltech-directory/.

[74]'Legal analytics' is the term most commonly used to refer to the set of techniques used in Lawtech. A more precise and focused definition is offered by Vanderstichele (2019, 5): "supervised machine learning with case law as input".

how humans think but what humans actually *do* (Schatsky, Muraskin and Gurumurthy 2014). Tasks such as selective information access, storage and retrieval; searching for documents; drafting of contracts; or the answer to frequently asked questions (FAQs) are already the subject of cooperation between Web Services companies and users (be they individual citizens, administrations or traditional law firms).

Watson, IBM, and Deep Mind of Google have had a considerable impact on the attempts to synthesize and provide legal information in the form of arguments (Beck 2014, Mills 2016). Electronic Discovery—audit services and electronic detection—is now a billionaire market. Technology-Assisted Review (TAR, predictive coding) uses NLP and machine learning to discover not only documents but also the concepts and appropriate arguments contained in legal databases. The training and tuning of the systems and algorithms are carried out by expert lawyers who know the case and work on a small number of documents. The results obtained in the database can be refined immediately after until all *relevant* documents, concepts or arguments are identified (Cormack and Grossman 2014; Brown 2015, Cormack and Grossman 2016).

We should differentiate here between different legal cultures, since the impact of TAR has also been different. In common law countries, with adjudicative and adversarial judicial systems, finding, classifying and analysing the millions of documents that affect the case (including regulations) is a common procedure, and is accepted in court.[75] In contrast, the irruption of this type of programs and companies in the civil / continental system, especially when the analysis of big data has entered public discussion, has caused alarm and produced contrary State reactions that have come to have legal binding force in some cases. Thus, the reform of French Justice in March 2019 has banned the use of analytical techniques revealing the identity of judges and officials, under penalty of 300,000 € and imprisonment up to five years for severe cases. Moreover, art. 33 stipulates that "the identity of the data judges and members of the judiciary cannot

[75]In USA the first federal ruling that supported the use of TAR was *Da Silva Moore v. Publicis Groupe, 287 FRD 182 (SDNY 2012)*. Cfr. Cormack and Grossman (2016). In Australia, the judgment of the Supreme Court of the State of Victoria in the case *McConnell Dowell Constructors (Aust) Pty Ltd v Santam Ltd & Ors [2016] VSC 734*, has ruled that the automatic procedure for selecting the appropriate documentation among the four million considered relevant documents is a legal procedure accepted into state jurisdiction. Cfr. Mills (2016) and Mills and Uebergang, (2017).

be used to evaluate, analyse, compare, and predict their professional practices".[76] In practice it is a Court ban on the advanced statistical analysis to be performed from outside the institution itself. It does not mean that the organs of the State cannot do so for their own consumption.

Thus, the application of AI techniques to the judicial function is also being debated. Sourdin (2020) differentiates between: (i) expert systems which support judicial function, (ii) replacement technologies for routine tasks performed by humans, (iii) systems remodelling legal adjudication processes. In this third case, the question is classic, and the answer is yes. A multi-agent system with access to enough structured information could replace judges in the role of judging, something that until now was only reserved for the creative, interpretative, and heuristic ability of human beings. China has been applying automatic models in court for some time.[77] But the majority opinion (including Sourdin's) opts for the creation of hybrid models, in which the judicial function could be remodelled in accordance with better access and organisation of the legal information used and referred in the rulings.

The case of smart contracts is even more significant because it shows some counterintuitive elements that allow us to sense that a private law based on electronic transactions may not be integrated into the contractual tradition of the “voluntary agreement” whose effectiveness is distributed in the signature time, compliance and legal consequences.

A smart contract is a self-executing contract in which the terms of the buyer-seller agreement are directly written using computer language. The code and the agreement it contains exist on a distributed and decentralized blockchain. This chain features two

[76]The original reads: " Les données d'identité des magistrats et des membres du greffe ne peuvent faire l'objet d'une réutilisation ayant pour objet ou pour effet d'évaluer, d'analyser, de comparer ou de prédire leurs pratiques professionnelles réelles ou supposées. La violation de cette interdiction est punie des peines prévues aux articles 226-18,226-24 et 226-31 du code pénal, sans préjudice des mesures et sanctions prévues par la loi n° 78-17 du 6 janvier 1978 relative à l'informatique, aux fichiers et aux libertés”. *Loi n° 2019-222 du 23 mars 2019 de programmation 2018-2022 et de réforme pour la justice*.. ELI: https://www.legifrance.gouv.fr/eli/loi/2019/3/23/JUST1806695L/jo/texteAlias: https://www.legifrance.gouv.fr/eli/loi/2019/3/23/2019-222/jo/texte

[77]Cfr. Yu and Du (2019). China has implemented the principle of "Search and Related Cases Mandatory reporting mechanism" in the last judicial reform. It is a way of controlling (i) drafting and enforcement of judgments, and (ii) the creation of a uniform corpus jurisprudence. Moreover, the traditional mechanism of "relations" (guanxé), has led to extensive use of ODR in commercial circuits. Cf. Xu (2017).

innovations: the ability to track property and property transfers without the need for intermediaries, and the ability to transfer property directly between contractors, pseudonymously, securely, and without a central authority (O'Shields 2017).

It also has other possibilities, such as being able to be used to create new governance mechanisms, as a means for example of contractual dispute resolution (Allen, Lane and Poblet 2020). But a single transaction can execute seemingly incompatible things at the same time. In the case of fast cryptocurrency loans, you can execute the loan concession in Ethereum, a speculative sale transaction, and the return of the loan with the benefit obtained, simultaneously, in seven lines of coding (N / A 2020a). Until now, something like this was simply unthinkable within the structure of conventional financial law.

Professionals and legal researchers have realized the rapidity with which these alterations take place and have reacted in different ways. Noting its limitations (Grimmelmann and Narayanan 2016, Pasquale 2019); trying to make innovations compatible with conventional law (Werbach 2018); or offering new lines of semantic representation to inscribe the properties of law into the code itself (Governatori et al. 2018).

In the absence of another document, the latter authors assume that the smart contract incorporates obligations to apply them automatically and produce legal effects in distributed ledger systems. They claim that a declarative logical dimension can offer more effective results than the use of imperatives. Such a strategy grants legal validity to the smart contract to the extent that it complies with (i) the terms of the agreement, (ii) consideration (interest in its fulfillment), (iii) competence (capacity), (iv) and legality of the subject. This is not strictly necessary for the execution of the contract, but it is understood that it is for its legality. Herein lies the problem: "satisfying the requirement that both parties have to exchange something for a contract to be enforceable by a court" (Governatori et al. 2018, 399) is a property that, as we have seen, can be ignored by users, without diminishing their status as a technically (self-) executable agreement.

However, this is an indicative fact. Governatori et al. (2018) resort to the public dimension of law to frame the development of a technology that can do without this dimension—and in fact does. How this public dimension is constructed, how it emerges, in the field of digital societies is one of the keys to understanding the change. Users tend

to act in an economic and social framework that goes beyond the normative limits of traditional law. However, until now it has been precisely these that have guided the application of intermediate dogmatic models and concepts that have been considered as expert legal knowledge (on property, obligations, 'legal affairs'…).

Here the authors have not made an exception: they support a knowledge of contractual theory to be applied to smart contracts based on preserving or adding "legality" to them. But distributed ledger systems only need the trust that a decentralized crypto infrastructure provides. They do not require anything else, and therefore they are becoming more frequent in a cryptocurrency market that is growing exponentially.

What is interesting is the pattern of using the conception of law based on recourse to a central authority as a risk prevention, since indeed "when smart contracts are linked, some kind of techno-social structures can emerge", incontrollable and hardly reversible (ibid., 387).

1.3.3 Artificial Intelligence for the Legal Professions

Strictly speaking, this assumption of internalized control of regulatory systems from a model that is considered legal is not new. It is traceable in almost all perspectives on AI and law, including those based on neural networks and machine learning. It is understandable: the authors seek a realistic, balanced result that takes into account the conditions imposed by the different jurisdictions and rules. This is how classic authors like Kevin Ashley (2017, 2019) and Thorne McCarty (2019) have operated. Conditions become requirements—technical requirements in the sense of van Lamsweerde (2009); and these, in line with service-oriented computing, finally in operable code. The basic questions assume this perspective:

> AI is now a huge and heterogeneous subject: Which of its many component technologies can be adapted to legal tasks? The law itself is a complex subject: Which legal tasks are amenable to automation? (McCarty 2019, 57)

McCarty roughly identifies three stages in applying AI techniques to law. In the first one, researchers tried to understand and model the (not deductive) reasoning processes of legal professionals, beyond the implementation of rules. It is important to point this out, because from the beginning the AI and Law community has been oriented (i)

towards the concepts elaborated by case law and dogmatics (jurisprudence), (ii) towards legal reasoning. The elaboration of legal concepts (or prototypes) and the modelling of arguments (TAXMAN, CATO, HYPO ...) were part of this stage: they could not scale in large databases.[78] In contrast, the programs of the second stage do not raise this problem: they are based on machine learning models, i.e. in statistical data analysis. And McCarty advocates for supervised systems training and the use of NLP techniques and knowledge representation (semantics). Judicata developers, for example, one of the companies outlined in the Neota Logic chart (Fig. 16), have deployed a "legal genome map" that covers the different jurisdictions of the state of California:

> The user sees this map primarily as a set of filters that can be applied to an initial search: some filters are straightforward, such as court, judge, disposition; others are more complex, such as cause of action, procedural posture, role of the parties at trial. Behind the scenes, the map is playing a role in guaranteeing the precision and relevance of the search results. For example, Judicata's system can draw fine distinctions about how a judge's opinion is making use of prior decisions: as a citation for a general legal principle, as good law that is binding on the facts of the present case, as a decision whose precedential value is being disputed, etc. The map of the legal genome is the computational device that makes these fine distinctions possible. (McCarty 2019)

The political element should be noted: This type of service would be moot in Europe after the enactment of the General Data Protection Regulation (GDPR 2018) and is already criminalized in France. But it serves to illustrate what would be the third stage of development. What comes next is the integration of deep learning techniques, linguistic analysis (morphological, syntactic, and semantic), and contextual data analytics.[79]

McCarty is thinking of a language capable of expressing the open texture of legal language, i.e. of legal reasoning, systematically applicable to scale to large databases of legislative and jurisprudential data. This would be the NL/KR /ML[80] paradigm for the computational analysis of legal texts. But it is worth noting that even if the "right balance" had been achieved, it would be necessary to annotate expert knowledge by hand

[78] I described this stage of AI & Law, including these early programs in Casanovas (2015).
[79] McCarty (2019) proposes a theory that is a learnable language semantic representation based on perceptual prototypes (differential similarity theory).
[80] For 'Natural Language Processing', 'Knowledge Representation', and 'Machine Learning'.

as metadata into the system to analyse legislation (using "semi-supervised machine learning techniques").

Kevin Ashley's work has moved in the same direction, focusing on the needs of legal professionals (especially lawyers and judges) and on legal education to train legal professionals.[81] Ashley proposes *cognitive computing*, in which collaboration between humans and AI (models, applications, programs and platforms) occurs for the legal analysis of contracts, judgments, legislation and cases. As we have already pointed out, the increase in this type of services has been notable in the last five years, in the USA—with the advantage of having taken off earlier)—Europe[82], and Asia—with Singapore, Hong Kong and China at the top.

1.3.4 Trends in Visual Legal Analytics

If there is a hot topic today in LawTech or Legal Analytics, it is the visualisation of data. Indeed, the application of programs based on all kinds of graphics, diagrams and maps help to condense large amounts of information to be consumed quickly and efficiently *visually*, sometimes in the procedural act itself. It can be said that they help to locate the information so that it can be used effectively by companies and by legal professionals.

Let's call it *visual legal analytics*, meaning how legal data can be displayed and assimilated (Lettieri and Malandrino 2018; Guarino et al. 2019). This is the contemporary version of a very old tradition in human civilisation. The need to summarise and

[81] Cf. Ashley (2019) for a complete presentation of the syllabus of courses and training offered at the Learning Research and Developed Centre of the University of Pittsburgh. He features his own interests as follows: "(i) Develop computational models of case-based reasoning (CBR) in domains like law and practical ethics as an intellectual methodology for better understanding comparative evaluation with cases and principles and as a basis for intelligent computer systems to educate students and assist practitioners; (ii) develop case-based and analogical reasoning as alternative techniques for representing and acquiring knowledge in Artificial Intelligence (AI) programs; and (iii) identify and analyze special legal problems posed by computer technology in such areas as intellectual property, commercial law, product liability, technology licensing, computer crime and privacy." https://www.lrdc.pitt.edu/people/researcher-detail.cshtml?id=32 I had the opportunity to discuss it with him thoroughly before publishing "A Brief History of the Changing Roles of Case Prediction in AI and Law" in *Law in Context. A Socio-legal Journal*, 36 (1): 93-112.

[82] A recent comparative analysis of the Law Society (2019) indicates that 758 British companies AI (645 main venues in the area), London has a base that doubles the combination of Paris and Berlin. The increase in new AI companies in the city is 42% per year (nearly twice as fast as the total of 24% for the rest of the world).

visualise legal content goes all the way back to the Hammurabi Code. Stemming from the Roman Law, Mediaeval parchments contain much evidence of what we call today *metadata*, i.e. the cognitive jump that allows to encode in images, hypertext and signals the internal pragmatics of the document to ease and enhance learning and the reader's cognitive tasks. Methods were developed to not waste any time, money or space, i.e. to condense as much information as possible in one single page. Figure 3 shows the synoptic method used by Accursius in his *Glossa Ordinaria*, based on John Bassian's classification of civil actions according to a methodology of distinction (*distinctio*) that he called *arbor actionum* (Errera 1995).

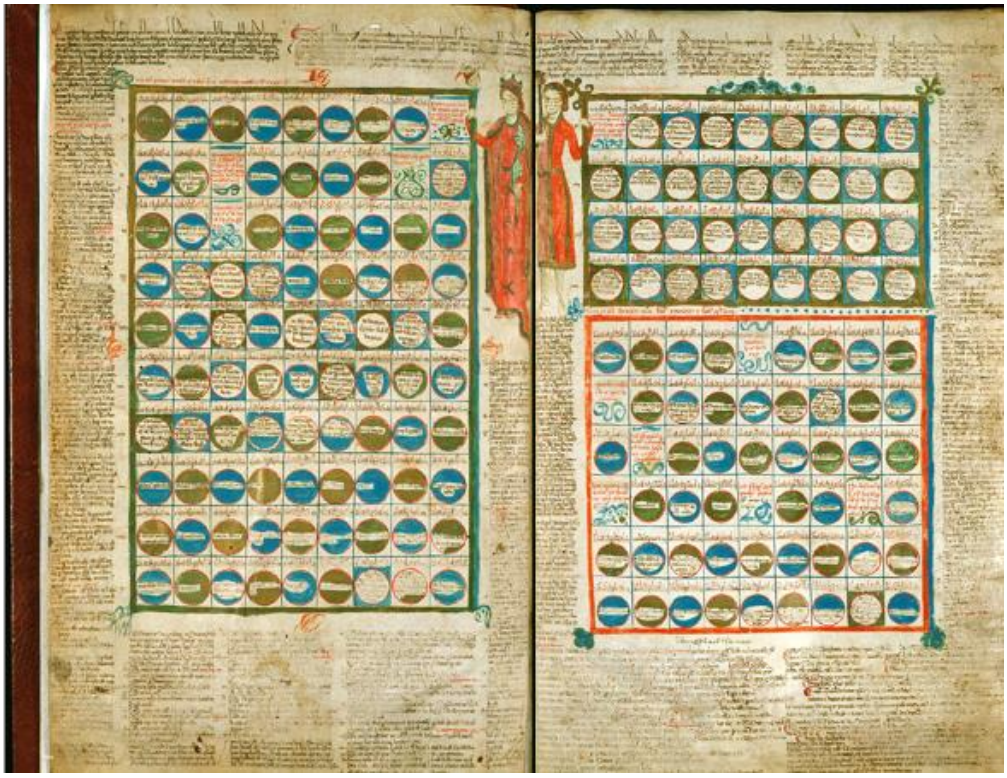

Figure 3. *Actions' tree (Arbor Actionum), Justinian, volumen parvum. Accursius Glossa Ordinaria, Italia, c. 1300, Johannes Bassianus.* Source: Fitzwilliam Museum, MS McClean 139, fols. iv-iir.

We should distinguish *legal analytics* from *visual law*. The latter notion is broader, and it also refers to the rhetorical means to depict legal concepts graphically, i.e. to convey the law itself using pictures, drawings, images, signs, diagrams and graphics—again, a way of communication present in all human scriptured cultures (Goody 1973). Sara

Frug's recent account reminds that "visual law artifacts increase access to information for those with perfect vision". She refers to Universal Design and Inclusive Design movements to make her point:

> The explosion in visual representations of legal concepts and processes is a thrilling innovation which can expand open access to law. By and large, however, visual representations of the law have not adequately fulfilled the promise of access. No matter how unintentionally, implementations of visual access to law frequently overlook people with visual disabilities. This neglect is not necessary, and inclusion is not futile. The synthesis, summarization, simplification, and interpretation required to produce visual representations of law have the potential to support understanding for everyone by making legal information more discoverable and reusable. This paper distinguishes between features of visual law that require vision and features of visual law that can be made accessible to all. It argues that inclusive design deserves greater attention in order to avoid increasing inequality in access to law. (Frug 2019,1)

Visual analytics aims at offering visually complex results and processes. Sometimes, for the sake of simplicity, it is also referred as 'visual law' or even 'legal design'. This is the case of the current Stanford Legal Design Lab (Hagan 2020)[83], centred on legal education, access to justice, and participation (Hagan 2019).[84]

Visual analytics is an innovative topic for patent generation (e.g. Ebert et al. 2014). It holds the capacity to collect and analyse data at a scale that may reveal patterns of individual and group behaviours. In this sense, it is following the general trends in social sciences, but adapted to the legal field. It can be granular. It is worth noting that this kind of techniques can also be applied *on the individual* to chart her attributes, positions, and roles over time. Fig. 4 plots at individual level the criminal record of a justiciable from the Italian *CrimeMiner* project.

[83] Cf. https://law.stanford.edu/organizations/pages/legal-design-lab/ , and https://www.openlawlab.com/project-topics/illustrated-law-visualizations/

[84] Cf. "Legal design is a particular application of a broader human-centred design approach to innovation in which innovation is powered by a thorough understanding, through direct observation, of what people want and need in their lives and what they like or dislike about the way particularly products are made, packed, marketed, sold and supported. Legal design applies the principles and methodologies from a broad approach to the particularities of the legal system. Its driving principles is that the legal system should be more human-centred, that is to say, more accessible, effective, affordable, comprehensible, and empowering." (Hagan 2020, 110)

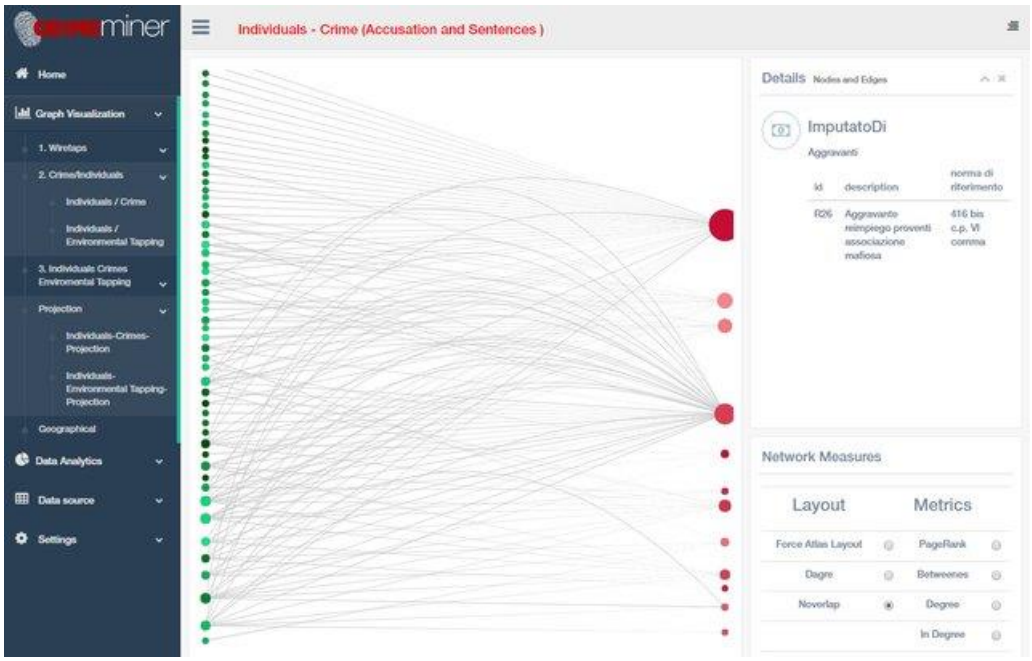

***Figure 4**. CrimeMiner: Bipartite graph of an individual's crimes. Source: Lettieri et al. (2018).*

1.3.5 Legal Web Services Companies

Service companies compete for the presentation of the legal data offered in a way that is usable. Again, they are focusing granularly on the detail, on a particular Court and a specific judge. As an example, Lex Machina offers on its website, with explicit mention of the individual judge (vid Fig. 5):

> *timing analytics* will help you find answers to these questions: "How long will take my case about corporate brands to reach the hearing with Judge Collins?" This can help you adjust your budget litigation.

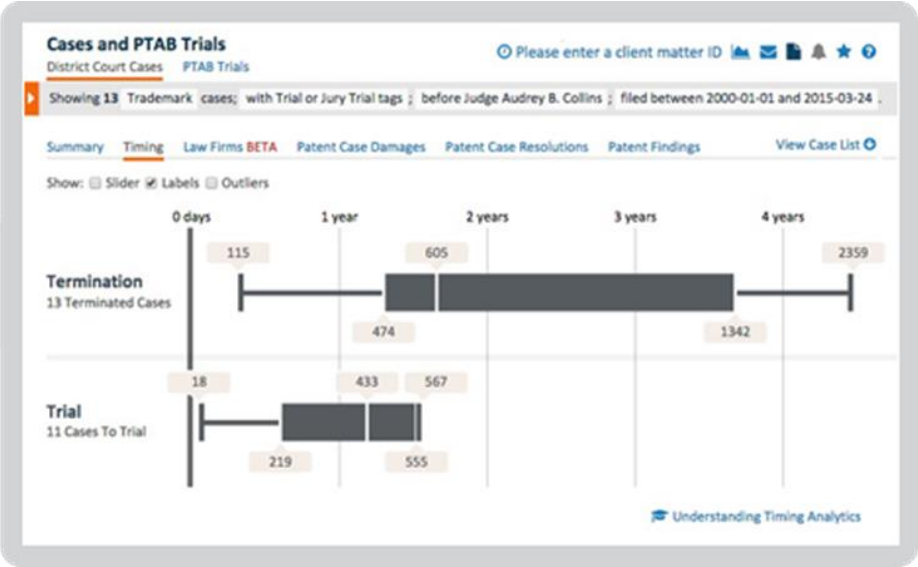

Figure 5. *Lex Machina timing analytics visualisation. Source: https://lexmachina.com/legal-analytics/*

This is a relatively simple display, but effective. Others also reflect the argumentative process to be followed, the evolution of precedents in similar cases, and the probability of success depending on the scenario and the composition of the court which will handle the case. Predictions are also made based on the training and annotation of a small amount of data from expert knowledge in a process of 'Argument Retrieval' (AR) and not just information, terms, or concepts (Ashley 2017, 313 and ff.).

LawTech companies have been very attentive to these developments, initially only reserved for academic research. RAVEL, a project developed by Codex (Stanford) and the Harvard Law Library, allows judicial analysis focused on following the arguments of individual judges (and also of expert witnesses): *how judges think, write and rule*. Both Lex Machina and RAVEL have recently been acquired by LEXIS NEXIS. ROSS is a cloud-based Question / Answer system based on IBM Watson, to which questions are asked in natural language and returns answers according to legislation, jurisprudence, and dogmatics.

All in all, a certain distance is necessary. The sudden birth and disappearance of techno-legal service companies has also been a constant. From 2015 to October 2019, 992 Law-tech portals disappeared, but many others were created at the rate of 2.4 new start-ups

per day. Blijd (2019) reports 4,298, with a support of $ 22.7 billion of venture capital. Fishing in troubled waters seems to increase your chances of success.

We should also pay attention to the emergence of so-called regulatory intelligence from major publishing companies since the 2008 crisis. As we will see later, publishing on the data network no longer means publishing a document (decrees, acts or case law). Rather, it means providing services to increase the customer base. Thomson Reuters, which acquired Westlaw in 1996, has created various services to exploit the large databases at its disposal. Thus, Thomson Reuters Regulatory Intelligence has successfully offered the information, management, and advice necessary for regulatory and legal compliance of corporations and companies. At first it was an extension of Fintech, but currently the service covers all types of compliance, including legal, since it has the necessary databases for this. Ten years (since 2009) after its Report on the cost of compliance, the list of functions of directors of regulatory compliance has not stopped growing, since it is no longer an internal vigilance process to avoid risks or unnecessary costs but a true global monitoring service for all executive processes (Inglés and Hammond 2019).

1.3.6 Examples of Visual Legal Analytics for Lawyers and Legal Enforcement Agencies

Visual legal analytics is particularly adapted to end-users and the kind of work they have to display daily. LawTech companies are tunning general solutions for specific customers' needs. Sometimes, innovation is offered from the outside. In other occasions, the technology is developed at request, from the inside.

If this is the case, there is a lesson to learn from the construction and implementation of computer systems in legal practice. Basically, to be effective, visual legal analytics should be adapted to the users' needs. Functional requirements cannot be set without end users' participation from the beginning up to the end, with one important consequence. This is common practice in system building, but what this means is that users are also developers not just of the technology they intend to use on demand but of the social conditions and institutional environments that are required to build it in. In a situation of rapid change, this entails a particular intertwining kind of behaviour

between computer engineers and professional worlds. The interfaces that are constructed to carry out the final tasks both reveal and reproduce these inner patterns and institutional environments. Let's put a couple of examples. The first one is taken from digital forensics. The second one, from legal practice.

SPIRIT is a recent H2020 Project for fighting organised crime.[85] SPIRIT is taking up a holistic approach to identity resolution and develops semantic capabilities to facilitate cognitive tasks in the resolution of identity for Law Enforcement Agencies (LEA). It provides Open Source Intelligence (OSINT) to initiate complex associative searches over all sources relevant to current criminal investigations. Thus, police investigative behaviour and strategies are at the centre of the system, and they are represented and reproduced into it in three steps: (i) an initial graph raises the question whether two different representations (names, images, information) refer to the same individual; (ii) the identity resolution algorithms (IDR) make a suggestion; (iii) a face matching service confirms (or not) the IDR's suggestion.

Visual analytics works (i) on LEA's existing databases (with the features of such databases, including biases) (ii) to enrich the investigator's cognitive appraisal of the case she is working in. Figure 6 plots the system interface from an investigator perspective, after having had access to and working on a case. This is a visualisation of the social graph obtained by the investigator after refining the search, adding the information, and testing her hypothesis on identity matching (working on entity manipulation).

[85] A summary of EU Projects is listed at the beginning of the Dissertation (Introduction Annex I). Cf. https://cordis.europa.eu/project/id/786993

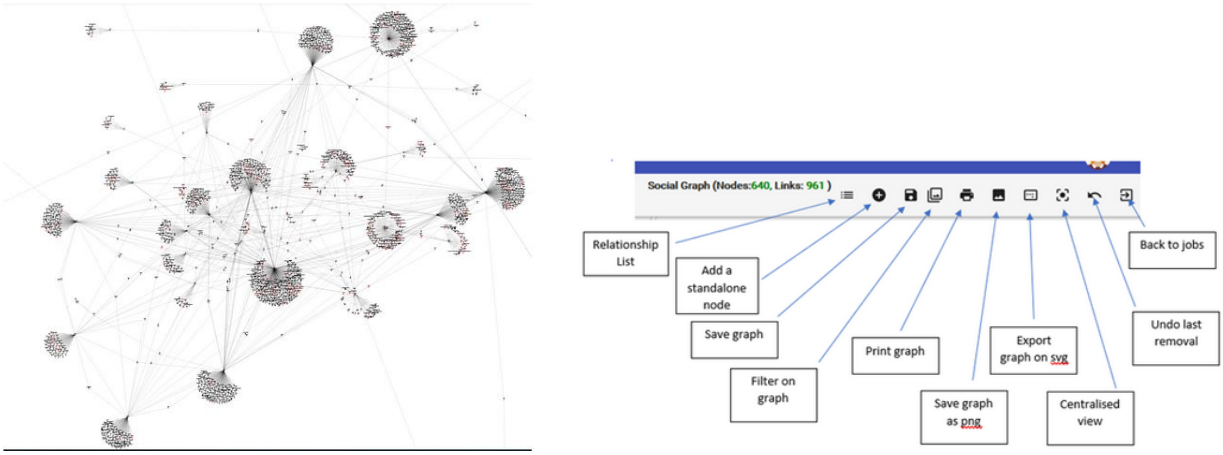

Figure 6. *SPIRIT Social Graph and Entity Manipulation. Source: Davarakis (2021).*

I will delve on legal graphs in Chapter 2. What I would like to highlight here is the entangled nature of legal computer building, and the final user's main contributions. Building and using these kinds of tools is a creative process, (i) *focusing on the abductive (associative) reasoning of the user;* (ii) and *situating her in an intermediate epistemological position, in which she can perform the common cognitive tasks of her everyday life in a more complex way.*

Some prudence is needed here as well. Outcomes are not efficient *per se*. Time, efficiency, relevance, salience, and depth of the results must be tested, and the whole investigative process should be audited and evaluated against the applicable policies and regulations. This is the reason why previous prototypes evolve over time. Nevertheless, technological innovation is not reached only technically but through the social processes and patterns fostered by its inception, creation, and final use. A 'thick description' of the knowledge acquisition, representation and testing phases of computer systems reveals their social nature. But in this sense, a collective social change at the supra-level, i.e. beyond the micro-level of their inception and development, *emerges* according the variables that constitute their institutional and social context. It does not follow causally in a linear way.

The second example of the use of a legal knowledge graph shows these boundaries. It is worth noticing that the human/machine interaction can be quite complex, depending

on the specific information which is stored, handled, enriched, and eventually used and reused in real settings. LYNX is another H2020 project aimed at settling a European legal knowledge graph to foster a reusable legal information retrieval and case management.[86] Since the enactment of the 2019 Directive on Open Data and the Reuse of Public Sector Information (the Open Data Directive), many national administrations and institutions have been following standards and best practices to enable easy data access and data reuse. Accessing to this information is crucial for SMEs. The LYNX platform has been built

> to assist companies in researching and successfully addressing compliance issues in a multilingual and multi-jurisdictional scenario. The Lynx Service Platform (LynxSP) relies on a data model to structure and link documents and entities in a Legal Knowledge Graph (LKG), and on document and workflow managers that enables the flexible orchestration of a set of Natural Language Processing (NLP) and Information Retrieval (IR) services that process legal documents. (Schneider et al. 2021, 2)

Three use cases were carried out in LYNX—on geothermal energy, contracts, and labour law. The latter was led by Cuatrecasas, a major Spanish law firm. The objective of the third pilot was to provide access to aggregate and interlinked relevant legal information in the law labour sector across multiple legal orders, jurisdictions, and languages, linking multilingual data and enabling the integration of disparate legislation, administrative acts, case law, and doctrine.

This proposed solution was carried out by (i) enriching the legal knowledge graph with legal sources, (ii) creating semantic annotation, extraction and linking services between legal provisions, case law, administrative resolutions and expert across different jurisdictions; (iii) offering a tailored service, i,e, a recommender and alert service, for lawyers that effectively identify the relevant documents that may affect the case they are handling in a more efficient way, (iv) creating alerts, through the life cycle of the case, of news and relevant changes to any of the legal provisions or documents that the lawyer working the case has identified as applicable or of interest for the case. The pilot covers the different jurisdictions (EU, DE, AT, IT, ES).

[86] https://cordis.europa.eu/project/id/780602 See Annex I and the summary of EU Projects (Index).

The main problem non-local lawyers usually face is accessing and understanding foreign local laws and regulations, which are not often available in other languages.

The prototype intended to improve the existing systems at the law firm in the following regards: (i) legal provisions in terms of employment in order to give informed advice to the client on the viability of the country; (ii) a better-informed strategy definition for the internationalisation of companies (enabling the fast identification and comparison of all the relevant legislation and case-law to handle the labour aspects).

Again, to be applied in specific domains, with a specific client portfolio, the LYNX law web service requires a continuous updating and working with clients, adding a third layer of customers to the tasks (ontologies and system engineers, lawyers, and final clients). Pascual Boil, the technical Director of Cuatrecasas working in the project, put it in the following way:

> We were very optimistic … Answering true legal questions is very difficult, a lot of contextual information is needed from Q&A to Semantic Search, there are many different combinations and strategies for different types of questions. The final design works better with a small number of [corpus] documents.[87]

We will come back to these two projects in the next chapters (esp. Chapter 2 and 8), but these cases can show the intensive preparatory work that is needed to create *situated knowledge* able to be used, reused, updated and eventually amended if necessary, i.e. intermediate knowledge regulatory models. A cognitive meta-layer is required to implement the modules, and this should be highlighted since the very beginning because it can affect over time the evolution of the architecture of the system as well. Figure 7 traces the path followed through the knowledge graph to answer a legal question, as it has been formulated in the pilot.

[87] Pascual Boil [Cuatrecasas, at LYNX Final Review, LYNX Labour Law Use Case, 20th May 2021]. Pascual is Consultancy, Innovation and Applications Director at the law firm. I am grateful to him for pointing out that he was referring to the problem of scalability.

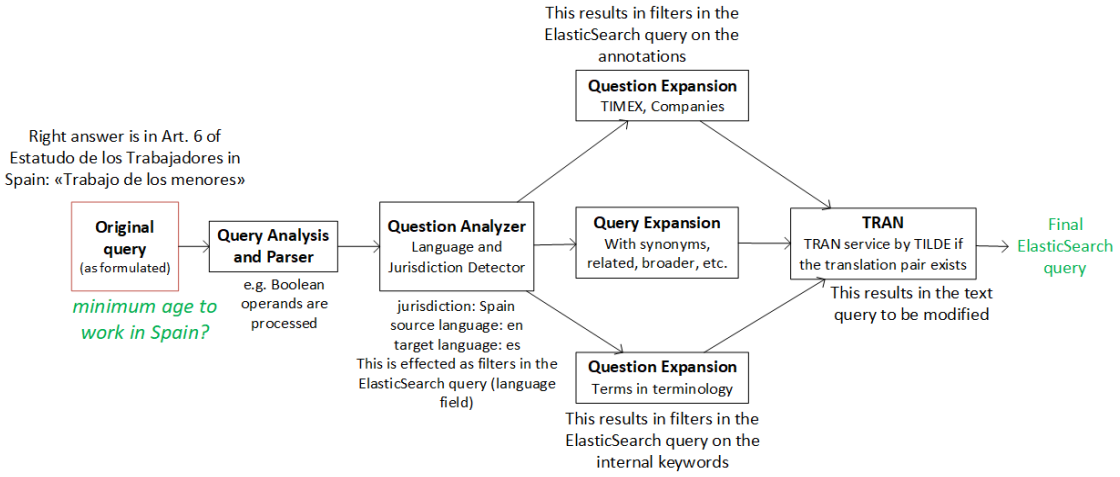

Figure 7. *LYNX path for queries in labour law. Source: LYNX Final Review WP 5 (2021).*

One of the main results of these works point at the intermediate models that should be built to 'anchor' legal knowledge into real settings. This is also an interactive relational way of understanding what 'legal knowledge' means. As said, I will develop this point on the practical side of knowledge (regulatory implementation) in the next chapter.

1.4 Ethics, Rights, and Artificial Intelligence

1.4.1 Ethics

The obverse side of the coin in the application of Artificial Intelligence to law is that the interest in ethical problems has increased with the inception of regulation by algorithms.[88] There is at present a broad formal consensus on the need to implement ethical principles in the development of Artificial Intelligence. Year 2019 has seen the birth of a multitude of manifestos and declarations in this regard, along the lines adopted by the standards of the Council of the Organization for Economic Co-operation and Development (OECD)[89] and the Institute of Electrical and Electronics Engineers (IEEE).[90] This has occurred simultaneously in Europe,[91] United States and Australia[92]. Even the Catholic Pontifical Academy for Life, Microsoft, IBM, the Food and Agriculture

[88] Vid. a representative list of the more than fifty manifestos and ethical codes concerning existing AI and ethics at: https://algorithmwatch.org/en/project/ai-ethics-guidelines-global-inventory/
[89] https://www.oecd.org/going-digital/ai/principles/
[90] https://standards.ieee.org/industry-connections/ec/autonomous-systems.html
[91] https://publications.jrc.ec.europa.eu/repository/bitstream/JRC113826/ai-flagship-report-online.pdf
[92] https://www.industry.gov.au/data-and-publications/building-australias-artificial-intelligence-capability/ai-ethics-framework/ai-ethics-principles

Organization of the United Nations (FAO) and the Italian Government have recently signed the *Call for an AI Ethics*, a document created for supporting the ethical approach to Artificial Intelligence, within the framework of the Plenary Assembly of the Academy held in the Vatican from February 26th to 28th, 2020.[93]

Tech giants had been betting on this global strategy a little while ago,[94] under the influence of discussions on the General Data Protection Regulations (GDPR) that started in Europe in 2012 and sparked a huge debate around due protections until its approval by the European Parliament on April 4th 2016, and the definitive entry into force of its Regulation on May 24th 2018. In July 2019, the Gartner Hype Cycle placed digital ethics at the top of these expectations, while AI governance is still at the start of the launch pad. Similarly, Gartner estimates a five to ten-year development for this ethical and regulatory technology, by which time it would have acquired sufficient maturity for an industrial application.[95]

The appeal to ethics is extremely important since it is the only way to achieve global consensus on fundamental values. I.e. in the absence of a universal rule of law, it is *transnational*, i.e. the broader jurisdictional umbrella for international, national and regional jurisdictions. However, it also can be used as a record just for noncompliance with regulations, as the recent ethical MIT lab scandal has revealed. Former members of the laboratory have explicitly claimed that "the discourse of an 'ethic IA' was strategically aligned with Silicon Valley's efforts to prevent the execution of legal sanctions to limit questionable technologies" (Ochigane 2019). We must be aware of the tendency of corporations to avoid economic losses at any cost and to lobby governments and research institutions to achieve this. As we will see later there is a "cascade pressure" because the (democratic) states themselves tend to shift the pressure onto citizens, experts and researchers. But the trend toward ethical regulation embedded in systems responds to a genuine concern of companies, governments, philosophers, and computer scientists themselves.

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[93] http://www.academyforlife.va/content/pav/en/events/intelligenza-artificiale.html

[94] See, for example, *Everyday Ethics for Artificial Intelligence* (IBM, 2014), and the results of *FATE*: Fairness, Accountability, Transparency, and Ethics in AI, the working group created by Microsoft with the same scope.

[95] Cf. the recent reports by Gartner analysts Judah (2019a), Judah (2018b), Judah and O'Kane (2019).

1.4.2 Responsible Artificial Intelligence

Researchers are heading now towards an Artificial Intelligence that is responsible (*Responsible* AI), reliable (*Trustworthy* AI), and able to render accounts to the public (*Accountable* AI). The *OnLife Manifesto* (Floridi et al. 2015) or the *Manifesto for a conscious design of hybrid online social systems* (Noriega et al. 2016) constitute good evidence of this trend. There are three aspects that I would like to highlight.[96]

First, the importance of *explainability* (Floridi et al. 2018). The use of artificial languages can result in opaque decisions, difficult to understand and explain. This is a feature of machine learning (especially in the use of deep learning). Computational inferences from large data correspond to a numerical ratio different from that of human decisions. For example, in legal analytics, machine learning algorithms classify, search, and come to their own requirements and specifications. The result is different information being extracted from the original cases which were used as input. As noted by Vanderstichele (2019, 47-48) the process of creating algorithms "each step in the algorithm-making process uses a methodology that is at least partially different from the methodology used in adjudication, distinguishing existing legal dispute resolution practices from supervised machine learning". It cannot be classified either as a precedent (legally valid) nor as fact. And yet the results (outcome of Legal Analytics, CALP) have normative value. This should be subject to detailed explanation in each case.

Second, the application of ethical principles cannot be done in a vacuum. There are always stakes affecting the transparency of public actions and vulnerability of researchers. The most recent case (as I write this) is that of Vanessa Teague. It will not be the last one. Vanessa, along with a team from the University of Melbourne, only took eight hours to deanonymise a database of medical records that the Health Department had made publicly available in Australia, believing them to be secure. Two and a half million medical records were thus left bare. The researchers reported promptly in good faith to the relevant department of the federal government (Culnane et al. 2016, Culnane

[96] Researchers have pointed out various aspects of the algorithms that can be problematic as: (i) no conclusive evidence, (ii) inscrutable test (effects of 'black box'), (iii) test misdirected, (iv) unfair results, (v) transforming effects, (vi) traceability (Morley et al. 2019).

and Leins, 2020). It was an ethical act that turned out to be risky—after having been pressured by the university from the Department of Health, the researcher has just given up her position (N / A The Guardian, March 2020b).[97]

Thirdly, acting based on ethical principles always has a public dimension, i.e. policy, and needs an intermediate level which defines the pragmatic conditions (procedural and content) of the proceedings. There is a considerable gap between the principles and their possible implementation in the design and programming (Morley et al. 2019). And this also affects the exercise of rights and how the various administrations quickly incorporated artificial intelligence techniques for knowledge management.

Intellectual positionings on ethics have had an impact on EU provisions after the GDPR enactment. In April 2019, the High-Level Expert Group on Artificial Intelligence released the *Ethics Guidelines for Trustworthy AI*, a document piloted by 350 organisations and explicitly considered in the European Parliament resolution of 20 October 2020 on a framework of ethical aspects of artificial intelligence, robotics and related technologies (2020/2012 INL). The recent EU proposal of May 2021 for a new AI Regulation—known as *Artificial Intelligence Act*— that complements GDPR protections and requirements for privacy and data protection is particularly interesting, as it explicitly assesses the relevance of standards and protocols as fostering new regulatory agreements with industry and providers, which will hold co-regulatory and self-regulatory powers (EU AIA Proposal 2021, 14):

> The precise technical solutions to achieve compliance with those requirements may be provided by standards or by other technical specifications or otherwise be developed in accordance with general engineering or scientific knowledge at the discretion of the provider of the AI system. This flexibility is particularly important, because it allows providers of AI systems to choose the way to meet their requirements, taking into account the state-of-the-art and technological and scientific progress in this field.[98]

[97] I asked Culnane and Teague to write about their work at *Law in Context*. They did it three times. First, to explain how encryption works and how to decrypt it (Culnane 2019, Culnane and Leins 2020). Second, I asked Vanessa to cooperate with Patrick Keyzer on an article about constitutional rights, electronic Australian elections, verifiability, and accuracy (Teague and Keyzer 2020).

[98] After the mandatory Impact Assessment, five policy options were defined to implement the AIA Proposal. Option 3+ was eventually chosen, "a regulatory framework for high-risk AI systems only, with the possibility for all providers of non-high-risk AI systems to follow a code of conduct". Thus, a "horizontal EU legislative instrument following a *proportionate risk-based approach* + codes of conduct for non-high-risk AI systems." (EU AIA Proposal 2021, 11). Requirements concern data, documentation and traceability,

Notwithstanding that, penalties will apply in case of infringement (non-compliance with the prohibitions set in art. 5 and art. 10, i.e, targeting individual behaviours or limiting privacy rights[99]). Aet. 71 foresees administrative fines of up to 30 000 000 EUR or, if the offender is a company, up to 6 % of its total worldwide annual turnover for the preceding financial year. Costs have also been reckoned for Administrations, business, and SMEs.[100]

1.5 Law as Data, Law as Meaning, Law as Sense

1.5.1 Law as Data

The creation of meaning—the basic problem of phenomenology and hermeneutics—is not a problem that can be tackled analytically without recourse to cognitive forms. Gangemi (2020) has recently rephrased the question as follows: What, if any, are the basic components of meaning for a viable computational representation? How to make them converge (or diverge) according to the needs so that they can be effective locally and interoperate globally?

These are sound questions, focused on the bricks, modules, blocks, that can be computable. From the anthropological point of view, the study of the representation and transmission of knowledge has produced some surprises. Researchers have discovered that some Aboriginal peoples in Australia have been able to faithfully reflect and transmit in oral tradition symbols (yarns and folklore) the coast map as it was seven thousand years ago, now under the sea (Nunn and Reid 2016; Pascoe 2018). So, 'yarning', the

provision of information and transparency, human oversight, robustness, and accuracy. It will be mandatory for high-risk AI systems. Companies that introduced codes of conduct for other AI systems would do so on voluntarily bases. This option is deemed to include several provisions to support their compliance and reduce their costs, including creation of *regulatory sandboxes*. See Annex I on Methodology to check the link of regulatory sandboxes with SPIRIT and the AI4people proposal for AI Governance presented to the EU parliament on November 6th 2019.

[99] For instance, art. 5: "the placing on the market, putting into service or use of an AI system that deploys subliminal techniques beyond a person's consciousness in order to materially distort a person's behaviour in a manner that causes or is likely to cause thatperson or another person physical or psychological harm".

[100] "Businesses or public authorities that develop or use AI applications that constitute a high risk for the safety or fundamental rights of citizens wouldhave to comply with specific requirements and obligations. Compliance with these requirements would imply costs amounting to approximately EUR €6000 to EUR € 7000 for the supply of an average high-risk AI system ofaround EUR € 170000 by 2025. For AI users, there would also be the annualcost for the time spent on ensuring human oversight where this is appropriate,depending on the use case. Those have been estimated at approximately EUR€ 5000 to EUR € 8000 per year. Verification costs could amount to anotherEUR € 3000 to EUR € 7500 for suppliers of high-risk AI." (Ibid. 12).

process to construct effective symbolic relationships and narratives (Yunkaporta 2019), ancient cultural metaphors loaded with cognitive value, and the recently incepted "Indigenous Standpoint Theory" (IST) can be adopted as a relational way of ethical and legal commitment:

> An Aboriginal standpoint is not a performance or display of identity nor a platform for presenting unexamined self-narratives as research, but a complex lived reality in a framework of Law, relations, knowledge and practice. In relationally responsive standpoints, our relationships to people, Law and place shape our obligations, ethics and boundaries regarding what and how we investigate in the world. These relational protocols determine what we know, how we know it and what we do with that knowledge. (Yunkaporta and Shillingsworth 2020)

We do not yet know either if our technology will be as effective. But storing, saving, and structuring billions of data, and being able to manage it, is a worthy challenge. Law as data refers to the process of formally structuring all documents that may be legally relevant to facilitate their management and reusability (Fig. 8). We just saw an example taken from the LYNX platform (Section 1.3.6). It is a process that has already begun to be carried out for the legislation and case law of almost all countries, through the creation of a unique *identifier* that allows the singularization, access and retrieval of documents. [101] The Beta version of the European Portal of Justice is now available in all the languages of the Union, and will be operational in the immediate future for citizens.[102] It also contains the metadata necessary to classify and guide searches. It is designed to be interoperable and easy to access and use. It is expressed in RDF.

[101] The *European Legislation Identifier* (ELI) is available and is based on three pillars: (i) URI (universal resource identifier), (ii) a description of metadata, (iii) sharing of metadata in a format reading machine (XML, RDF, OWL). The *European Case Law Identifier* (ECLI) for court judgments is also available in the European e-Justice Portal:https://e-justice.europa.eu/home.do?action=home&plang=es

[102] https://beta.e-justice.europa.eu/?action=home&plang=es

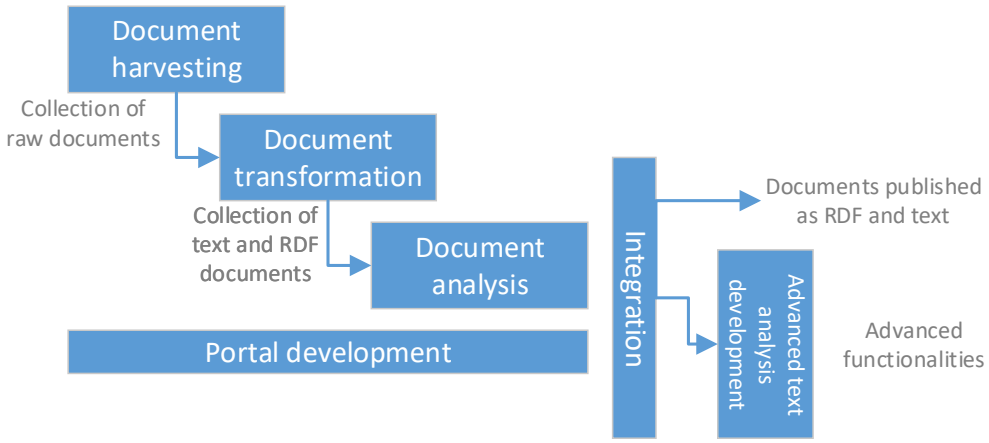


***Figure 8**. Law as data. Source: Rodriguez-Doncel (2019).*

1.5.2 Law as Meaning

Law as meaning is closely related to the conception of open data in the W3C perspective and to Tim Berners-Lee's original vision (see Section 2.2.1 and ff.). The identified documents are not opaque, and it is possible to relate their content on the linked data website. It is possible to develop modulated ontologies that allow a high level of granularity and that represent certain aspects (or dimensions) of legal knowledge. Currently, ontologies can be built in a specialized way with different levels of abstraction and depth (Corcho 2015). They may therefore have levels of interoperability. They are not neutral, nor have they ever been (Bench-Capon 2001): they have a purpose and contain an implicit usability plan. On the other hand, ontological construction still has problems with access controls and with the identity of the user (Kirrane 2017). Digital identity is one of the hot topics, object of standardization by NIST, which foresees different degrees of control over it (Grassi, Garcia and Fenton 2017).

It is also possible to build legal graphs for specific users, linking laws, jurisprudence, standards, and the needs of law operators. OntoLex-Lemon[103] allows to represent lexicons (linguistic ontologies) with a greater degree of expressiveness than the

[103]Ontolex has formed a working community in W3C, with several results. The latest: The OntoLex Lemon Lexicography Module. Community Group Final Report 17 September 2019,https://www.w3.org/2019/09/lexicog/

representation of terms in SKOS[104] or OWL[105] (two of the classic languages of the Semantic Web).[106] This perspective allows the creation of multiple services (e.g. information retrieval and recommendation services) according to the type and area of the law covered. I will develop it in detail in Chapter 2 (Section 2.3).

1.5.3 Law as Sense

Finally, *law as sense* refers to the practical, contextual decantation of the two previous notions (data and meaning). It is no longer about the semantic representation of law, in natural or formal language, as an object of knowledge, as information for professional use, but rather about the hybrid construction (virtual and natural) of acceptable, sustainable, and evolutionary regulatory ecosystems. This is the collective, social, public dimension of regulation, where the collective affordances or properties of the environment of regulatory systems are not added or imposed, but emerge from the scenarios and interactions themselves, creating social ties, patterns that can be learned, amended, or reproduced. It should be noticed that this is the space of an interactive, relational interface in which the existential side of the human subject has a place, because abductive or association processes do not just follow a deductive path, but an inductive one. In due course I will set off the concept of *emergence* against the metalogical notion of *supervenience*. This latter notion refers to levels of existence, i.e. the way how lower and upper ontological layers of the world are connected. In philosophy, this can also be expressed with truth values of propositions. I prefer using the inductive notion of emergence to express empirical relations.

In a recent study, we showed the distribution of legal concepts in corporate Compliance by Design (CbD). The concepts related to public law—including ethics, constitutional rights and human rights— have not been mentioned in the specialized literature on

[104] SKOS (Simple Knowledge Organization System) is a W3C recommendation for the representation of a controlled vocabulary structured (thesauri, classification schemes, taxonomies etc.). https://www.w3.org/2004/02/skos/

[105] OWL (Web Ontology Language) is a general representation language knowledge for building ontologies, "designed to represent complex and deep knowledge of things, groups of things and relations between things".

[106] It is possible to (i) automatically scan documents, (ii) extracting the relevant information according to the initial search, (iii) relating it in other documents, (iv) formulating it in different natural languages, (v) to store it in a graph organized knowledge to ensure the conformity of its content with the law, (vi) and contain metadata and a general legal knowledge as "controlled vocabularies".

compliance for the last ten years (Hashmi et al. 2018). Until recently, only the aspects of the market and especially of labour, financial, insurance and possibility of sanction by the agencies, counted. Since 2019 this is changing, when the entry into force of the European Data Protection Regulation (GDPR) in 2018 has been followed by a new wave of studies on "compliance with legal requirements" (legal compliance).

But the results of the application of different metrics (Sørensen, Jaccard and Pearson correlation coefficients)[107] are clear: until now, regulatory compliance technology, as a methodology and policy, has focused on the market, on company governance, on workers' control, not on rights or in concepts pertaining to public space. And likewise, technical studies for legal services have captured concepts such as 'contract', 'obligation', or ´consumption´ but not those related to voting space, representativeness, or constitutional rights. Figure 9 reproduces the coefficients obtained and the distribution of concepts. I will extend on this aspect in the last Chapter of this Dissertation, as this is relevant for establishing a validation process for legal compliance.

[107] The Pearson correlation coefficient is a statistic that measures linear correlation between two variables. The Jaccard coefficient is a statistic used for gauging the similarity and diversity of finite sample sets. The Sørensen coefficient is a statistic used for comparing the similarity of two samples, it is a similarity index indicator on the number of elements common to two communities. We used these indexes to compare the different analysis on compliance carried out by legal and technological communities.

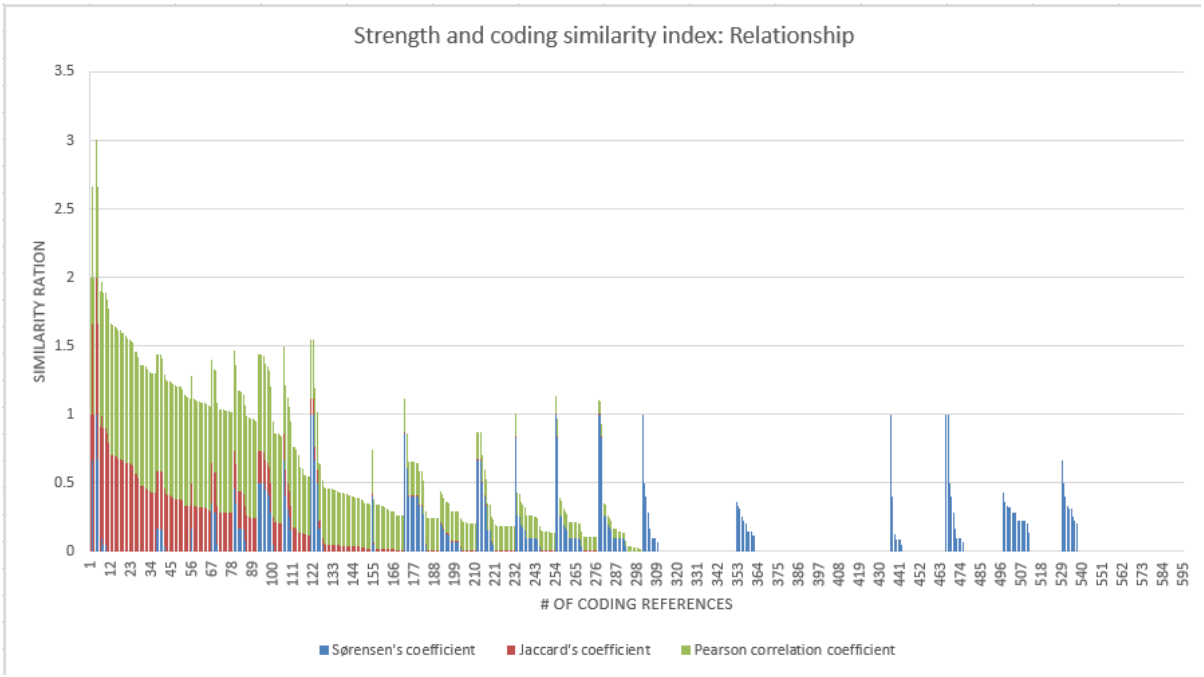


***Figure 9**. Metrics on 504 concepts in compliance studies. Source: Hashmi, Casanovas and de Koker (2019). The graphic shows half of the basic legal concepts has not been taken into account so far in studies on corporate regulatory or legal compliance.*

I have already shown how large publishers offer regulatory services, including legal compliance. I reckon the trend will continue, with the absorption of the law in a general regulatory environment but retaining its umbrella of legitimisation of the regulatory behaviours of employees, consumers, or citizens. The common question in business compliance surveys "What is the most important change that you anticipate in the field of Compliance and Facilitation in the next ten years?" has an answer that was there from the beginning: *the convergence of regulatory compliance and legal compliance from design, Compliance by Design (CbD)*. Our position is that this trend can only be counteracted with *Compliance through Design* (CtD), *through* and not only *by* design, i.e. from the transformation of the public space into a hybrid, semi-automatic space of "anchoring" of rights (*anchoring institutions*) that could be controlled and managed by citizens' own actions. This is what might differentiate digital legal compliance from the business regulatory compliance developed for corporate governance.

1.6 Conclusions: Rule of Law and Metarule of Law

I have presented in this chapter some of the subjects to be further developed in the next ones. To sum up: (i) First, I have described as a double implosion the so-called big-bang of lawyers in the third part of the 20th c. and the irruption of technology and legal analytics at the beginning of the 21st ; (ii) second, I described the emergence of legal web services and some of their analytical tools (e.g. visual analytics); (iii) third, I set up the general regulatory framework brought by the web of data; (iv) fourth, I introduced the topic of the transformation of the public space, (v) fifth, I distinguished between law as data, meaning and sense; (vi) finally, I introduced the important topic of legal compliance through design. I deemed all these elements as components of the *law as knowledge*, the main subject of this writing.

The Covid-19 pandemic declared in March 2020 urges me to make a final reflection (on open innovation see Nesh-Nash 2020, and also Poblet et al. 2021). Against the longing for security that dominated the birth of modern public law in the second half of the 19th century and that was in fact prevalent in the 20th century, even after the two great wars, it seems that we are faced with uncertainty again. It is an immediate time, where the order created by late capitalism and the permanence of nation-states reveals its fragility. I think this is going to speed up the polarization that I was talking about at the beginning of this Chapter. On the one hand, the divide between citizens / prosumers / users and corporations / states; on the other, the separation between a horizontal and vertical perspective on rights. It is the continuation of the latent conflict in the 21st century between the rule of law and the metarule of law. Israel has already authorized digital cameras tracking and detecting patients in public spaces. [108] Other states will follow. The means of control and surveillance are going to increase.

I presume that a global crisis (also economic) is not going to change the trends that I have described. It will speed them up. The double implosion of the professional legal world will manifest itself more emphatically. Legal operators are going to change their skin again, definitively leaving out the few aspects of the profession that cannot be

[108] https://www.timesofisrael.com/liveblog_entry/ag-said-to-approve-use-of-electronic-surveillance-to-track-infected/

automated. The aspect of negotiation, relationship and customer loyalty can also be performed virtually.

What is yet to be determined is the level of self-organization that the citizens are going to have, and what is going to happen to the myriad of free radicals that are going to operate in an uberized legal profession. As I have shown, large firms are already organizing their sections directly based on a technocratic model. Capital is going to invest even more in legal analytics, with new start-ups for web services for firms, businesses, and citizens. Law education—at least in large universities—offers parallel LawTech courses already, projecting technological innovation to the traditional fields of law (not the other way around). Courts will have to adapt to the changes, just as they have adopted video as evidence in the early millennium.

Note that what this implies is a defence and maintenance of the formal rule of law, also encouraged by those who offer analytical management and need the development of hetero- and co-regulatory areas, i.e. service, education, publishing and legal analysis companies. That is, *the global commodification of the rule of law*.

Predictions for compliance officers in 2020 insist on the generalization of automated mechanisms and on changes in regulation, in cultural, organizational (including personal liability) and technological risk analyses, and in the sanctions derived from the breach.[109] But this does not entail a better implementation and management of rights, i.e. a metarule of law developed by the users themselves. Rather, it follows the strengthening of the rule of law and the acceptance of the multilevel governance of actors that are considered relevant (stakeholder multilevel governance), since compliance with negative sanctions is also subject to negotiation and calibration between companies and state agencies. And, even more importantly, the general framework (especially in the financial field) is the subject of discussion and agreement between the different regulators and the banking entities.[110] The FBS Annual Report (G20) acknowledges that "the

[109] The five predictions from the Thomson Reuters survey are: 1. Automation of compliance activities, 2. Continuous regulatory change, 3. Increased role of compliance in business. 4. Culture and conduct risks, 5. Technology and risk (Hammond 2020). It is noteworthy that 28% of companies outsource the costs of compliance tasks to specialized consultancies or legal services companies.

[110] See the 5th Report of the Financial Stability Board (FSB) of the G20. According to the FSB, the Basel III reforms should be implemented through the creation of cross-border cooperation frameworks between

level of compliance with the BCBS [Basel Committee on Banking Supervision] principles on the risk of data aggregation and reporting on risk still needs to be improved" (FBS 2019, 8).

It does not seem that the different state and supra-state administrations depart from the described technocratic model of public services. On the contrary, the trend will continue, with the correlative increase in population access and control measures—basically identity, digital profile, and the level of security intervention by organizations and companies.

The recommendations of March 2020 for the creation of a specific layer of security at the national level to achieve a "deterrent effect" in the USA (layered cyber deterrence, CSC 2020), situates international politics in scenarios of the cold war again. With the obligatory cooperation of good citizens, this time. China has already implemented the so-called "social credit system", the personal card that reflects good (or bad) citizen behaviour, with positive (e.g., the possibility of traveling) and negative (advertising of individual actions) sanctions associated with it (Peck 2018). Several countries in Africa — Rwanda, Ghana, Uganda, and Zimbabwe — are also following this path (Kayser-Bril, 2020).

All this is happening while Thomson Reuters recognizes that banking and financial legislative lobbying practices continue at work (Hammond 2019,12). The Report by Igan and Lambert (2019) for the International Monetary Fund leaves no room for doubt. They refer to the term *regulatory capture* as the banking practice of negotiating the framework with states and parties, directly influencing legislation for the benefit of private interests.

> Regulatory capture arises when banks exert excessive influence on the regulators such that regulators act primarily in the interest of the industry they regulate rather than in the public interest. In this context, regulators are not only the agencies establishing and enforcing the final rules by which banks need to abide but also the legislature whose actions form the basis for these rules. Hence, we use the term "regulatory capture"[2] to

national authorities and supervision and transparency of OTC derivatives markets (OTC, Over-the-counter) (FSB 2020). Hammond (2020, 4) states that financial services firms should "be prepared to enter into discussions with regulatory authorities to determine how to implement in practice the recommendations and expectations of the BSF".

> encompass “legislative capture” whereby elected representatives are also motivated by pursuing private interests of the regulated industry instead of the public interest. (Igan and Lambert 2019, 5)

The use of lobbying companies is a normal (and legal) practice in the USA. But the data provided by the authors show that “regulatory capture lessens the support for tighter rules and enforcement” (ibid., 21). Igan and Lambert suggest two possible actions: (i) improve the transparency of regulatory decisions by *ex post* disclosure of how they have been made; (ii) place control and balance measures in the decision-making process of the regulators, i.e. establishing control agencies capable of coping with the disproportionate influence of financial and banking entities as interest groups. Igan and Lambert suggest a realistic measure. Because influence is asymmetric with respect to group interests and normative power is more diffuse, interactions between regulators and regulators should be endowed with procedures that ensure the inclusion of dissenting positions (of consumers, minor financial entities, and unions). Has any of this happened? Rather, no, and I do not think it will happen as long as non-coercive measures are wagered, and public opinion is fragmented and disorganized.

However, there would be a possible way out in the management of citizen actions (also political). On the other side of the scale, the technical surveys (surveys) and maturity tests of crowdsourcing platforms show that citizen self-organization is activated to face collective problems without the intervention of the administrations and states, or with the cooperation of organizations. international aid agencies (Poblet, García Cuesta, Casanovas, 2018). This is the case of Ushaidi in Africa, for example, to monitor elections or face natural disasters and crisis situations. The so-called *agreement technologies* have been present for more than ten years to try to provide a solution to the needs for coordination between human groups and autonomous or semi-autonomous intelligent agents (Ossowski 2013, Noriega et al. 2016). From 2010 onwards, the so-called *civic technologies* (*CivicTech*) to enhance the relationship between the people and government have also exponentially grown (Poblet et al. 2021).

Social and political self-organization through technological tools (including AI) will be a constant in the 21st century, as the citizens of Hong Kong have recently demonstrated.

But this is only a small piece of the puzzle. The question of how the new public space will be organized in the 21st century has yet to be cleared up.

This is the new field of law in the digital society. There is a new 'jurisdification' or 'legalisation' of the social space, differing from what we had known in the 19th and 20th centuries: (i) structured through the representation languages of the Web of Data, (ii) articulated and managed through the techniques of Artificial Intelligence, (iii) located at the crossroads between the horizontal and vertical dimensions of law, (iv) and flexed in the tension between civic self-organization and pressure from political and financial elites.

I will develop these theses in the next chapters, especially in Chapter 3 on the emergence of relational law in the digital age, and Chapter 5, fleshing out the convergence between IoT, WoD and Industry 4.0. I will introduce in Chapter 2 some of the AI, semantic web languages, knowledge graphs, and legal ontologies that I deem necessary to understand and define law as knowledge. The table already introduced in the Preface and the Introduction relates its content with the remaining chapters.

MODULES	CONCEPTS	FIELDS	CHAPTERS
Legal Web Services and Artificial Intelligence	Law as Data	Legal Anthropology and Sociolegal Studies	1. The Double Implosion of the Legal Profession and Web Services
	Law as Meaning		
	Law as Sense		
Law as Knowledge	Knowledge Graphs	Ontology and Semantic Web	2. Law as Knowledge: The Web of Linked Open Data
	Legal Ontologies		
Law as Dialogue	Agreement	Legal Theory, Sociolegal Studies, and Legal Anthropology	3. From Positivist to Relational Law: Law as Dialogue
	Legal Pluralisms		
	Relational Law		
	Relational Justice		
	Regulatory Model		
	Regulatory System		
Reciprocity and Dialogue	Integration	Legal Anthropology	4. The Legacy of Legal Anthropology
	Reciprocity		
	Legal Culture		

	Vindicatory Systems		
Legal Governance	Middle-out Approach	Epistemology	5. The Convergence between the Web of Data, the Internet of Things and Industry 4.0
	Inside-out Approach		
Linked Democracy	Rule of Law	Political Anthropology and Artificial Intelligence	6. *Legal Isomorphism* and the Emergence of Legal Ecosystems
	Metarule of Law		
	Legal Ecosystems		
	Legal Isomorphism		
Sociolegal Ecosystems	Institutional Design	Social and Political Sciences and Artificial Intelligence	7. Sociolegal Ecosystems: Political Forms of Legal Governance
	Interoperability		
Metarule of Law	Compliance *by* and *through* Design	Methodology and Use Cases	8. From Compliance by Design to Compliance through Design: An Empirical Validation Model
	Scheme		
	Metamodel		
	Validation Model		

CHAPTER 2

Law as Knowledge

Summary. This chapter sets the premises for the analysis. It depicts a broad framework, stemming from legal anthropology and presenting the state of the art in law and technology, the web of data, legal semantic graphs, and legal ontologies. Section I introduces Law and Society and Legal Anthropology, reporting some of the tensions that actually shaped the field in the past century. Section 2 shifts from the social to the technical field with a description of the Semantic Web and the Web of Linked Data. Section 3 delves into the so-called Legal Semantic Web, describing some results in the building of legal ontologies and the recent construction of legal knowledge graphs. At the end of the chapter, I show some limitations of the Web on the Internet, and I set the boundaries for the analysis. It is worth noting that I am contending for a middle ground not only for the different trends within legal anthropology, but for the convergence of the anthropological approach with the opposing legal one. *Law as knowledge* also means that, at this stage and level of abstraction, the social changes introduced by information technologies should be addressed from the integration of both fields to really understand the transformation experienced by the legal field in the digital age.

Keywords. Legal knowledge, Internet, Internet of Things, Semantic Web, Legal Anthropology, Law and Society

2. 1 Law as Knowledge

2.1.1 Introduction: Legal Anthropology

It is generally deemed that the web fosters personalisation and democratisation. This can be contested: Let's assume that the web *might* foster personalisation and democratisation. There is evidence now that the web is also a perfect place for hatred and exploitation (Oboler and Casanovas 2021). To turn it into a safe and democratic place, something else must be done. I will refer in the next chapters to the legal forms that lead to this objective as *relational justice*. From a theoretical point of view, let's assume broadly that relational justice intersects with *relational law*—the social and economic bonds among the parties in business, companies, corporations, or other organizations. User-centred strategies of the present Semantic Web generation—the so-called Web of Data—fit well into this perspective, in which rights and duties belong to a new regulatory framework because the

networked information environment is transforming the marketplace and the relations with the state.

Cloud computing, cooperation, multiple use of mobile phones, chatbots, crowdsourcing, and Web Services orientation constitute the next step for the World Wide Web[111]. But embedded into the new scenarios raised by the Internet of Things, in which information flows, augmented reality and digital twins will be the rule. We will have the opportunity to describe this fit, in which semantic technologies are adopted for multiple tasks (from decision-making to controlling, monitoring, and regulating). This is the social environment of the relational justice field, where scenarios and contexts are shaped from a hybrid use of different technologies by a multitude of different users (including normative Multi-agent systems, norMAS).[112] This dovetail fit will not be displayed now but in the central chapters of the thesis. As said, in this chapter, I will concentrate on the social perspective of legal anthropology, law, and the semantic web.

In the conclusions of *Sub Lege Pugnamus* (2017), I drew a full research programme to develop relational justice, relational law, and what I called *metarule of law*, i.e., the legal framework to sustain safely the protections of the rule of law in the conflicting scenarios of the Web of Data. To be precise, these are the main steps for such a programme: a) identify and clarify the so-called *identity meta-system layer* operating on the web; b) represent the rules according to the de-referentiation[113] levels introduced by the stack of web languages; c) build regulatory intelligent agents that are able to regulate and manage the systems of rights; (d) build a diverse and flexible legal architecture respecting the institutional aspect of self-regulation and fostering the customization and personalisation of rights, e) *develop a global ethics and meta-ethics for the current rule of law, at present as non-existent on the web as in national and international laws* (Casanovas 2017, 168).

In the present chapter I will focus specifically on the latter: the general conditions and assumptions for the construction of a metarule of law for the Web of Data. Besides, I will

[111] D'Aquin et al. (2008), Casanovas and Poblet (2009), Paliwala (2016).
[112] See Casanovas and Poblet (2008a,b; 2009), and the Catalan White Book of Mediation (2010).
[113] In computer science, reference is a value that enables a program to access a specific datum (a variable or a record). Accessing the datum is called de-referencing the reference. I am using this term in its linguistic original sense: pointing to the reference of a statement. Hence, there are different levels of reference, and thus, of de-reference.

show that such an objective is not entirely new. It has been anticipated by some legal anthropologists and sociologists in the 20th and early 21st century, and besides this, it is aligned with the topics and ways of thinking of the last generation of socio-legal scholars. I will face, then, the anthropological micro and macro-foundations for the regulation of the Web of Data. I will entitle this endeavour, *law as knowledge*, because I must figure out and work out at the same time (i) the subject-matter—how 'law' can be defined in the digital age—, (ii) the *representation* of this subject— both into natural and into several formal representation languages; (iii) and the transactional interactions inside and outside the web that communicate and convey this knowledge to enhance rights, fulfill duties, and comply with regulatory provisions. Regulatory instruments are key on the web. One of these regulatory instruments is the law, an essential element, a key component, a main-mast, an essential brick, but not the overarching ceiling leaning on a down-to-earth centring nation-state as it was drawn by the leading legal theories of the 20th century.

'Law as knowledge' means law into, through and on the web. And being on the web is no longer an option but the normal way of living our everyday life. Digitality constitutes the kind of environment that has been set up to frame all kind of social bonds and relationships, including the intimate relationship with our personal self. Digitality pervades *everything*. And everything can be turned into a representable object on the web.

2.1.2 Trends in Legal Anthropology and Law and Society Developments

This regulatory approach can be supported by the perspectives on legal anthropology drawn by well-known anthropologists within the discipline. For instance, twenty years ago, wrapping up fifty years of legal ethnography and anthropology, Sally Falk Moore (2001) highlighted the new role of anthropology studies for international law developments in a globalised technological world. She emphasised that:

> Not only does legal anthropology now study industrial countries, but it has expanded from the local to national and transnational legal matters. Its scope includes international treaties, the legal underpinnings of transnational commerce, the field of human rights, diasporas and migrants, refugees and prisoners, and other situations not easily captured in the earlier community-grounded conception of anthropology, though the rich tradition of local studies continues along a separate and parallel track. (ibid. 2001, 95)

Moore distinguished between three alleys in legal anthropology: (i) law as culture, (ii) law as domination, (iii) law as problem-solver. She noticed that the expansion involved a shift in methodology and theoretical emphasis, in which dispute-processing was being displaced from the centre of the field: "(…) the ultimate objects of study are immense fields of action not amenable to direct observation". The nature of the state, and the transnational and supra-local economic and political fields that intersect with states, were deemed to be "the intellectually captivating entities." Thus, anthropologists were "not just talking about what is going on. They also are talking *about what could go on [...] They are treating their own critical commentary as a form of social action* [emphasis added]" (Moore 2001, 111).

This occurred in parallel to what was called the second wave of legal realism in *Law and Society* studies, in which statistical methods and a new moral sense coexisted with the extension of the ethnographic scope to the international and transnational rule of law. Values and principles matter, and the notion of "law in context" was also enlarged to embrace them. As stated by Selznik (2003, 179), "we cannot separate positive law from debatable principles of fairness, truth-finding, and morality". Normative engagement, the endorsement of some type of beliefs on the "right" direction, was assumed by legal scholars as a pre-condition to carry out their research.

In the *Handbook of Law and Society*, Morrill and Mayo (2015, 18 and ff.) identify three stages on the field: (i) the *law-in-context era* (1960s–1970s) "in which the most visible socio-legal research focused on how social, cultural and economic contexts influence the operation of formal legal institutions, especially courts and police in the United States"; (ii) the *decentring era* (1980s–1990s) "marked by highly visible works identifying the interplay of legality and other normative systems as lived practices and cultural consciousness apart from or in the margins of formal legal institutions"; and (iii) the *global era* (1990s–present) "in which highly visible works reimagined law in transnational perspective, outside its traditional moorings to nation states". Likewise, Susan M. Sterett (2015) opens the same volume referring to the "hope to transform politics with rights and legal accountability" and the "new practices enabled by interactions on electronic media" that reshape governance, making "law and society's decentred approach and inquiry" crucial to the understanding of social and legal transformations.

But the question now is how to carry out such a programme focused on technology and lately, Artificial Intelligence, the Internet of Things (IoT) and the Web of Data (WoD). At present, we should add some more dimensions to Moore's distinctions. At least: (iv) law as data (mainly *linked* data and ontologies), (v) law as modelling (including computational models, rules, and inferences), and (vi) law as algorithmic governance (including machine learning and the connection between algorithms and data).

Noteworthy, this technological turn requires a bit more than a decentring perspective. Adopting the point of view of a prescriptive, normative or value approach raises the issue of building up a conceptual architecture which may be closer to the concepts of legal theory. Then, at the micro-level, this architecture deals with some other problems, such as the implementation, enforcement, and adjustment of the systems at hand. As we will show later, these are the conditions for building regulatory (and legal) ecosystems, and this kind of ecosystems are *hybrid*, socio-legal in nature, halfway between formal and natural languages on one hand, and artificial and human behaviour, on the other one.

I would like to add that the nature of the tasks to be accomplished for fulfilling these objectives require a specific attention to empirical and cognitive anthropological epistemology. We can embrace the moral stance and the Human Rights public international turn that Selznick and Falk Moore noticed at the beginning of the 21st century. But these can be deemed pre-conditions, *political* assumptions of the research. To face privacy, compliance, and security *by design* not only a technological but a scientific turn is needed to provide a theoretical ground to the implementation of formal languages and methodologies.

2.1.3 The Problem of Scientific Evidence

It is worth addressing this point directly because it has been also controversial in the evolution of cultural anthropology. At the time that Moore wrote "Fifty Turbulent Years of Legal Anthropology" (2001), Roy d'Andrade published "The Sad Story of Anthropology 1950-1999" (2000) claiming for statistics and fundamental sciences in cultural anthropology. D'Andrade was not mentioned in Moore's paper, but he had already encouraged a

discussion on moral and political trends in anthropology. He was quite clear about the "moral turn" of the discipline in 1995.[114] Some years later, he wrote:

> The field of cultural anthropology has undergone radical despecialization. […]. My speculation is that the despecialization of cultural anthropology is ultimately based on *the loss of canons of empirical justification* [my emphasis]. Specialists have no cachet if their empirical evidence is not taken seriously. To be taken seriously in main line cultural anthropology today, one must have a project that enters the conversation with moral implications. The lack of good ways to decide if someone has a real finding has resulted in a *general implosion* [my emphasis] toward the same few issues that everyone is talking about. The plight of graduate students is especially heart rending because they must figure out how to do something that is in, but not so far in it will soon be out. This has a further effect of putting a great deal of power in the hands of elite universities, because that is where what is in and what is out gets decided. Today, a young Ph.D. from a university in the sticks will have a hard time succeeding in cultural anthropology.

The arguments develop in a logical way: the difficulty in getting reliable identifications for basic terms, the tendency "towards all-or-none thinking" (black and white morality), the tendency towards mono-causality (instead of accepting a multiplicity of causes), and the difficulty of changing a moral model. To me, the kernel of his message was that the production of anthropological theory was being abandoned in favour of a non-explicit and unexplained induction from the ethnographic records. Doing so, the epistemology is also affected because the abandonment of the scientific mindset causes the replacement

[114] D'Andrade (1995b, 399) criticised the trend in anthropology "towards the development of a moral discipline with models of the world that contain explicit moral judgment" as "any moral authority that anthropologists may hold depends upon an objective understanding of the world and to that end moral and objective models should be kept distinct." I will contend that d'Andrade held an epistemological and methodological position that is not in fact contradictory with the main claim made by Scheper-Hugues (1995, 441) in the debate published by *Current Anthropology*: "What makes anthropology and anthropologists exempt from the human responsibility to take an ethical (and even a political) stand on the working out of historical events as we are privileged to witness them?". It is indeed not only possible but recommended taking a moral and political stance. On the contrary, I deem wise being influenced by the writings of Martin Buber, Emmanuel Lévinas or Michel de Certeau, and I deem wise as well an ethical positioning before, during, and after the research lifecycle. What is not methodologically sound, as advanced by D'Andrade, is mixing up normative (moral) judgements with validation methods and conducting knowledge acquisition processes without cleaning up or at least minimising the researcher's biases, including the ideological (or academic) one. In his reply to Scheper-Hughes, in the same volume, he asserts: "I like Scheper-Hugues's indignation, and on many issues I am on her side. My complaint is that she does not keep her indignation separate from her observations and mixes them together in her stories and in her theoretical model of 'oppression.'" (D'Andrade, 1995c, 433) Scheper-Hugues had written assessments such the following one: "Anthropology, it seems to me, must be there to provide the kind of deeply textured, fine-tuned narratives describing the specificity of lives lived in small and isolated places in distant homelands} in the 'native yards' of sprawling townships or in the Afrikaner farm com munities of the Stellenbosch and the Boland. And we need, more than ever} to locate and train indigenous local anthropologists and organic intellectuals to work with us and help us redefine and transform ourselves to and our vexed craft" (Scheper-Hugues 1995, 417).

of controlled tools (such as statistics, data mining or comparative analysis) with narratives, essays, personal experiences, or exploratory writing. This leads to an increased difficulty to share projects and results with other fields of research *within the same anthropological field* (for instance, linguistic, biological, or psychological anthropology).

One may argue that this position entails a step backwards, a reversion to functional or structural-functional positions. As a matter of fact, D'Andrade had worked in his youth with the material of Human Relations Area Fields. A possible answer to this argument would be that there is situated, local and vernacular cultural knowledge but no local epistemology for social sciences. At empirical and logical level, the same type of abstraction applies to sociology, cultural anthropology, or economy. This is not at all saying that human beings use formal logic and a kind of simple statistics to reason in his everyday life. There is much evidence against these hypotheses coming from cognitive sciences.[115] But logic, statistics and engineering are indispensable in the analysis of collected data and are key in the construction of empirical theories. The assembly of causality chains to check and test social hypothesis constitute a real challenge, and especially in digital environments, it is a requirement to validate what is being said about the social settings and effects of data and metadata.

D'Andrade was not alone criticising the politics of academia and claiming for a more scientific turn. Naomi Quinn's account of feminist anthropology (Quinn 2000) and the analytical philosopher Susan Haack's *Manifesto of a Passionate Moderate: Unfashionable Essays* (Haack 2000) contain similar assertions in favour of the compatibility of empirical and formal methodologies with the moral and political trends present in the debates on relativism, multiculturalism, feminism, and affirmative action. J.R. Llobera shared Andrade's claim in his *Manual d'Antropologia Social* (1999).

Llobera held a taste for history and displayed several studies on European nationalisms, and specifically, on Catalan identity (Llobera 2004). I mention it here because identity, cultural memory, and history, are intertwined sources of local, *vernacular* (popular or indigenous) knowledge that should be also considered in technological analyses from a

[115] Cf. Johnson-Laird (1983) on mental models; Johnson-Laird (1999) on mental models applied to law and causation; Gigerenzer and Engel (2006) on heuristics and the law.

cognitive and a structural approach. In the Australian case, the "complex lived reality in a framework of law, relations, knowledge and practice" constitutive of the aboriginal or indigenous standpoint theory (IST) determine some relational protocols to start with:

- What we can know is determined by our obligations and relationships to people, ancestors, land, Law and Creation.
- What we know is that the role of custodial species is to sustain creation, which is formed from patterns of complexity and connectedness.
- The way we know this is through our cultural metaphors.
- The way we work with this knowledge is by positioning, sharing and adapting our cultural metaphors. (Yunkaporta and Shillingsworth 2020)

This is not incompatible with adopting a scientific stance. On the contrary, denying this kind of choice can lead to the implicit assumption of academic or ideological biases, with not only political but theoretical consequences.[116]

I will recover in the next chapters some of these elements—for instance, the quest for theory and the need of rigorous inductive statistical validation at methodological level. What should be clear by now is that a minimal knowledge about computer, AI and web languages is a functional requirement to understand and analyse the digital world and, using the current metaphor at hand, to avoid turning the *black box* of algorithms into a *Pandora's box* as well. There are too many demons on the web already, and not only on the dark web. This is a most pressing need in legal anthropology because law and politics have traditionally been faced alike and, to put it crudely, computation, what we are talking about, is an unavoidable issue to be considered and eventually clarified. I will start exposing it in Sections 2 and 3 of this Chapter. But let's consider first what happened with jurisprudence and legal theory in the past century and in the first twenty years of the present one.

[116] Paradoxically, this is what happened with the rude accusation of "epistemological nativism" and "covert racism" explicitly addressed to Llobera and Moreno by Herzhfeld (1997). See Narotzky (2005) for a reply. Biases are unavoidable in modelling, but they should be counterbalanced with minimising risk policies. Denying differences is not a sound way of modelling.

2.1.4 Conceptual Tensions between the Legal and the Anthropological Fields

Francis Snyder (1981) wrote forty years ago an elaborated account of the relationships between social (or cultural) anthropologists and lawyers or legal theorists. He clustered the development of anthropology of law as follows:

> […] one may roughly distinguish three separate, yet overlapping periods in the development of the field: the publication of the major empirical monographs, mainly in English, before the early 1960s; a shift, especially in the United States after 1965, towards the study of dispute settlement and of law as a process; and, since the mid-1970s, the gradual elaboration of a plurality of approaches, all marked by more explicit concern with theory and greater attention to the role of the state. In each period, of course, diverse strands and traditions co-existed, and scholars drew selectively on earlier work, often including their own, for elaboration and special emphasis. (Snyder 1981, 144)

The first were "mainly ahistorical, ethnographic descriptions, based on inductive empiricism and using some form of the case method" (ibid. 143). The second period, led by anthropologists such as Laura Nader, "aim at empirical and explanatory generalisation", but based on processes, transactions, and personal choices (ibid.). *À la lettre*, "disputing displaces law as the subject of study" (ibid. 145).[117] The third period pointed at internationalisation, access to justice, and informal alternatives to courts (since the mid-1970s). This was fuelled by the fiscal and legitimisation crisis of the state in advanced capitalist countries, and "the loss of anthropology's protected status in newly independent former colonies and its apparent irrelevance to the demands of emerging post-colonial and neo-colonial states" (ibid., 149).

Snyder also made clear that, according to this evolution, the object and methods of social anthropology and classical doctrinal analysis, either jurisprudential or not, were set apart. Indeed, a brief oversight of the classical work on the construction of cultural regulatory frameworks leads to the conclusion that legal theory and cultural anthropology have been at odds, if not plainly at loggerheads so far.[118] Legal anthropologists set a *relational*

[117] "Within this framework, definitions of law are often considered to be unnecessary, not only because such definitions are frequently thought to be inevitably ethnocentric but also because this definitional exercise itself is deemed theoretically pointless and sterile.[52] Similarly, the study of substantive concepts and rules is of secondary importance[53], subordinated to the analysis of procedures, strategies and processes, which obviously are not limited to bureaucratic institutions such as courts." (Snyder 1981, 145)

[118] This is more than a metaphor: "In the late 1960's and early 1970's the faculty of Yale Law School fired six professors [Richard Abel, Lee Albert, John Griffiths, Robert Hudec, Larry Simon, and David Trubeck].

perspective to interpret the regulatory framework which put aside the normative content of nation-state's notion of "official law". I.e., they adopted a theoretical and explanatory stance that was not assuming the main conceptual distinctions shaped by jurisprudence and legal scholars. They have contested both "the splendid isolation of law, which has reduced it to a technique", in the words of Rouland (1991, 15), and its discrete evolutionary categorisations, as:

> […] l'anthropologie politique actuelle montre suffisamment qu'au lieu de distinguer entre sociétés *with and without* État, mieux vaut scruter un vaste spectre qui part des sociétés segmentaires dont la régulation provient d'un équilibre plus o moins stable entre les groupes qui les constituent, jusqu'aux sociétés modernes dotées d'un appareil gouvernemental spécialisé et centralisé. (Rouland 1990, 14)[119]

I should also mention that legal anthropology, at that time, followed national patterns of communication, according to the language and history of the host and the country of origin of the anthropologist. This caused some miscommunication between French and Belgian (and to some extent Canadian) legal anthropologists and their British and American pairs. They also stemmed from different cultural traditions in anthropology and social sciences. Vardelinden, Luc de Heusch, Étienne le Roy, Jacques Verdier, were writing mainly in French on Centre and North-African societies. Thus, "anthropologists give the impression that there seem to be 'national' perceptions of a science that is universal in principle." (Vanderlinden 1993, 15-16)

In 1969, a quite important year for legal anthropology (Nader, 1969), Klaus Friedrich-Kock wrote in a Note for *Law & Society Review* (1969,12):

> Perhaps it is wise to eliminate from discussion one question that has proven to be a very unprofitable ground for debate, although it might appear to some to be central to any talk about law. (If so, I should like to disqualify myself for such debate.) The question is:

The Official Story is that the faculty had decided to raise the standard for granting tenure. The real story is somewhat different" Tushnet (1991, 1530). Substantial epistemic, social, and political disagreements about law occurred and blown up at the time, both in USA and Europe.

[119] Likewise, the late Étienne Le Roy also shared this tension that summarised his experience as scientist and ruler: "[…] le droit dit positif, celui proposé ou reconnu par l'État, ne répond pas à l'exigence d'universalité que ses zélateurs juristes lui ont attribué. On postule donc que les membres de nos sociétés, comme de toutes les sociétés à des degrés divers, peuvent vivre sous des régimes de juridicités originaux, combinant les régulations étatiques et celles que ces peuples ont héritées d'un passé plus ou moins lointain et glorieux ou qui sont le produit de leurs adaptations, bricolages ou « bidouillages » les plus contemporains. Les « communs », comme domaine original de la vie juridique, permettent d'en vérifier les opportunités." (Le Roy 2019, 12).

> "What is law?". It is true, when I say I do research on the law of a people, I should know what it is that I study. But for me this requires only a very rough delineation of a particular focus on some fields of social relations and the ideology connected therewith. If this were not so, it might indeed be awkward to speak of the law of an illiterate tribe where no courts, lawyers and police exist. Definitional discussions have usually proven to be very sterile exercises, especially if they are pursued with minimal reference to empirical data and do not result in a categorization of variables and a conceptualization of pertinent research strategies.

This was what Nader's book—*Law in Culture and Society* (1969)—deeply embraced, i.e., a rejection of the officially established rule and case-driven concept of law in favour of a more empirical, conflictual, stance based on the interrelationship among individuals and social groups. As Lloyd Fallers (1969, 324) put it crudely in his review: "The hoary and fruitless argument about the definition of law seems largely to have been avoided."

Thus, lawyers and legal scholars—such as Alf Ross (1959), Hans Kelsen (1960), Herbert L. Hart (1961), who had already delivered their main theories at the time—would have been diverting and begging the question: they would have been *assuming* a theoretical object that in fact was a ready-to-use technique, an already linguistic normative interpretation not necessarily related with the acting cultural and social regulatory framework and the social forces at stake. This observation was probably true at the descriptive level. In short, lawyers and legal scholars focused on rules; anthropologists, on cultural identities, including interactions, values, practices, discourses, symbols, outcomes, and processes.

However, it bypassed the focus of legal theorists on understanding the formal and specialised normative side of law and jurisprudence. A ruler, a judge, a lawyer, can have an interest on the explanatory social dimension, as the realists had, but when they are drafting a contract, a lawsuit, legislation, sentences… they are more interested in the shared and accepted use of the legal language, concepts, and tools and their intended and non-intended legal effects and consequences. They *must* be, as they are *making* contracts, lawsuits, laws, and case-based decisions that make sense at the most pragmatic level.

Anyway, this *relational* trend was explicitly assumed in the seventies and eighties by the legal movement called *Critical Legal Studies*, which had an American side and a British side in legal academia. For instance, Alan Hunt, one of the founders of CLS in UK, put it in the following way:

> A *relational theory of law* sets out to generate a reconceptualisation field of inquiry of legal studies. It proposes an analysis which existence of a number of different forms of legal relations which varying ways with other forms of social relations. Its project is 'law' as its object of inquiry, but which pursues it by means of of the interaction between legal relations and other forms of rather than treating law as an autonomous field of inquiry external relations to the rest of society. *Relational theory approach which is both functional and critical. It poses the part, if any, do legal relations play within any selected area of and under what conditions can that role be transformed?* [emphasis is mine] The draws upon a sociological model of analysis but it differs conventional approach epitomised by the sociology of law since upon the variety of forms of legal relations captures the significance diversity of legal phenomena (legal pluralism) by insisting that of the internal interconnections between different forms of legal provide important insights into the role of law. (Hunt 1987, 16)

This is a holistic approach "that insists that law as an object of enquiry can be approached upon the interaction between legal and other forms of social relations" (ibid.). Another prominent CLS scholar, Peter Fitzpatrick (1941-2020), a former corporate lawyer of Baker and Mackenzie and a pillar for the CLS movement, deepened his interest in anthropology and spent almost all the 1970ties working in Papua New Guinea (PNG) to promote economic and state change. He had a substantial grant from the Commonwealth Foundation to support research into communal economic organisations to facilitate their legal recognition in their own (communal) terms. He later delved into his experience in *Law and State in PNG* (1980) in which he developed his "articulation theory" (another form of relational law stemming from the Marxian notion of mode of production).[120] The stark opposition with which anthropological, sociolegal and CLS approaches saw the classic theories of law was mainly formulated in political terms, against post-colonialism and ideologies of power, supporting 'resistance' and anti-capitalistic activism.

However, on closer inspection, fifty years later, this (and the sharp difference between monism and legal pluralism) is no longer tenable in a world with an upgraded linguistic turn at the institutional level. The reason does not lie on the social sciences side, but on the meaning that law has turned out to acquire in the technological era. *Identity*, and

[120] Articulation theory "maintains that economic systems involve more than one mode of production, and this articulation of modes is particularly pronounced in peripheral social formations, as in the Third World. LSPNG argued that imperialism subordinated and transformed the diverse pre-colonial means of production yet conserved the pre-existing modes of production and forms of law in articulation with the capitalistic." (Sugarman 2020, 7).

specifically the relation between *data* and *meta-data*[121] to define it, has become crucial to boost and foster any regulatory system, for what language and specifically rule-languages have entered a new phase. The notion of *relational law* aims at bringing together these two antagonistic perspectives.

It is worth mentioning here that this approach is compatible with a new trend in social anthropology that has recently emerged at the crossroads of history, legal theory, and anthropology. Fernanda Pirie and Paul Dresch, experts in Tibetan and Yemen culture respectively, have narrowed down the field around an approach to law from what they call *legalism*, i.e. a perspective that focuses on law as a set of structural social forms, symbols, and categories rather than as a set of functions. Doing so, they underscore the role of rules and rule-making over customised and (often) politically constructed 'legal customs'. The colonial and political construction of native 'customs' as 'legally binding' was already observed by Martin Chanock in Zambia and Malawi (Chanock1985) and in pre-apartheid South-Africa (Chanock 2001), as he has also latterly explained (Chanock 2019).[122] Pirie (2013, Conclusions) distinguishes clearly between *legal anthropology* and *anthropology of law* in her conclusive account of her *Introduction* to the field:

> Why should anthropologists ask about the nature of law? How does this add to our understanding of the world, and what does it contribute to the wider field of anthropology? […] [W]e should take law seriously as a *class of social phenomena, one that is defined by its form, rather than its functions* [my emphasis]. This is law delineated more narrowly

[121] Data and Metadata are defined in many ISO documents according to the field. Data ISO/IEC 11179 Standard describes the metadata and activities needed to manage data elements in a registry to create a common understanding of data across organizational elements and between organizations. Data refers to entities or units of information on the web; metadata refers to data *about* data and is usually divided into *descriptive* metadata (about a resource: name, title, author, abstract, keywords…), and *structural* metadata (about how the data is created, stored, and managed). The Merriam-Webster dictionary defines 'data' as 'data that provides information about other data': "It's easy to find data on the source of 'metadata': the word was formed by combining 'data' with 'meta-,' which means 'transcending' and is often used to describe a new but related discipline designed to deal critically with the original one. 'Meta-' was first used in that way in 'metaphysics' and has been extended to a number of other disciplines, giving us such words as 'metapsychology' and 'metamathematics.' 'Metadata' takes the 'transcending' aspect a step further, applying it to the concept of pure information instead of a discipline. 'Metadata' is a fairly new word (it appeared in the latter half of the 20th century), whereas "data" can be traced back to the middle of the 17th century." Cf. https://www.merriam-webster.com/dictionary/metadata

[122] Personal communication as well. I had the opportunity to discuss this approach with him several times in occasion to the relaunch of *Law in Context: A Socio-legal Journal* as an Open Access Journal in 2019. Martin Chanock was one of his first general editors in the eighties of the past century. I will go back to this historical approach in Chapter 4.

> than the broad range of social norms, processes of government, conflict resolution, and power relations, which fall within the eclectic field.

Anthropology of law belongs to social anthropology. Legal anthropology embraces legalism, what law 'promises', its concepts, and arguments and not only what it does. What is meant by 'legalism', then? Dresch (2013, Introduction), answers succinctly to this question:

> […] we need a non-pretentious word for themes that recur both in societies that conceptualize law discretely (hence 'law and society') and in others that decline to do so. These themes include an appeal to rules that are distinct from practice, the explicit use of generalizing concepts, and a disposition to address in such terms the conduct of human life.

Both anthropologists are settled in Oxford, and they show a good command of the linguistic turn and concepts of Hart's, Raz's and Twining's theories of law. I.e., they try to describe the intellectual artifacts that have been shaped to deal with the legal professional and political fields from a comparative stance.

This certainly shows the intellectual differences between American, French, and UK schools of legal anthropology (in its regular sense, they are synonymous to anthropology of law). But what is essentially at stake is a shift from an epistemic and methodological approach based on the description of functions, conflicts, courts, cases, and the creation of social order to another one in which the elaborated cognitive level of specialised knowledge, *expert* knowledge, is taken into account, classified and reorganised. They also focus on legal knowledge and in the specific nuances and interpretations elicited in their fieldwork. For instance, Pirie ethnographic approach shows that "in eastern Tibet the ideology of the party-state and its ability to guarantee a harmonious society is little more than a thin veneer over a series of complex local dynamics." (Pirie 2013b, 86). Thus,

> To understand the Chinese state in all its complexity, we must transcend the easy dichotomy of domination and resistance suggested by quasi-colonial models and also look beyond the state's own edifice of sovereignty. The state, as an ideological entity, maintains an ideal of unitary sovereignty, but that edifice is undermined, not so much by the resistance of its Tibetan populations as by local government officials, its own agents. It is they who can be credited with negotiating a limited, but important, measure of order and consent amongst the Tibetan populations; but in order to do so they also have to subvert the state's own ideals,

> recognizing and coopting the power and authority of the Tibetans' tribal leaders and reincarnate lamas. (Pirie 2013b, ibid.)

What matters here is their joint interest in conflating a social and a legal view, bringing together all relevant components of what is culturally understood by 'law'. As we will show in the next chapters, this holds as well for the meaning of 'rights', 'norms', and all categories that are used in everyday life and professional exchanges. We will benefit from this new turn in anthropology when we come back to the analysis of the legal architecture and the rule of law, but we will keep our distance from a conceptual approach as well.

Following Lloyd Fallers' ethnography on the Basoda (Uganda) (Fallers, 1969), as already mentioned, Dresch and Pirie delve into *legalism,* i.e. the processes and outcomes of classifying concepts and categories into technical (non-common sensical) constructs that can be handled out, manipulated, transformed and implemented in specific legal settings (such as the courts), in jurisprudence (legal doctrine), or in open social and political spaces. "[…] if law suggests transcendent values in terms of which conduct is judged, legalism spells out the terms employed, and it directs us towards classification more than towards power." (Dresch 2012, 1)

Thus, legalism is meant to be "a way of thinking and acting; it is what could be said to be distinctive about legal, as compared to other schemes of meaning." (Pirie 2018, 1) We will have the opportunity in the upcoming chapters to briefly compare this approach to the "legal culture" one sustained in Law & Society by Erhard Blankenburg, Lawrence Friedman, and David Nelken, among many others. But in doing so, we will show the rapprochement as well to legal ethnography and anthropology, as Sally E. Merry thoroughly acknowledged in her definition of the notion of "legal culture", encompassing some distinctions proposed by socio-legal scholars in the nineties (Merry 2006). Actually, not long ago, Pirie has written on comparative qualitative analysis along with Nelken and other sociolegal scholars (Creutzfeldt et al. 2016).

It is also worth noticing that the missing link both in legal anthropology and anthropology of law—to use Pirie's distinction—*is the social and computer analysis of the technological dimension and the different usages and composition of formal languages*. Artificial Intelligence, big data analytics, the Web of Data, and the intermediate technical layer that

shapes the basic toolkit of legal web services are out of scope, as they have not yet been considered. This will be our contribution (starting with Chapter 1). It should not be confused with the existing trend on multi-species ethnography; posthumanism; the Anthropocene; and non-human perspectives, animal, cell, object or thing-centred in legal anthropology.[123]

We are not following either the suggestion of comparative legal anthropology, according to which, "fieldworkers attempt to bracket their own categories and presumptions to some degree, so as to generate a more accurate picture of their informants' lived experiences" (Mertz and Goodale 2012), although I do accept the reflective approach also described in their work. The idea is to understand automated or semi-automated knowledge acquisition procedures, coding, deployments, and implementation, first. Languages are crucial.

Machines, robots, do not understand human language. They decodify algorithms, which is a quite different task. We could summarise the problem as follows: the notion of language is not the same. From a linguistic point of view, programs, machines, and robots do not think, do not talk, do not behave within natural languages, even if they are able to behave in interfaces which include natural languages. They are information processors, carrying out all sorts of operations, including learning and reproductive ones. The way how they relate between each other and with humans is the subject of this Dissertation, because coding the law does not solve the problem of how the law is created, implemented, and changed through complex algorithmic and social systems, and what kind of effects are (and will) be produced in a digitised society. We will introduce in the next sections the notion of Open Digital Rights (ODR), the Semantic Web (SW), the Web of Data, and their relationship with the layers of the Internet and the Internet of Things (IoT). This is a necessary step to situate in a more precise manner the approach that will be displayed in the upcoming chapters. Nevertheless, the reader should bear in mind that the next Sections do not contain a full-fledged approach to the Web of Data and the IoT but an introductory sketch of the basic knowledge which is needed to understand the changes. A deeper 'thick' description of information processes and systems on the IoT, LOD and Industry 4.0 will be offered later, in Chapter 5.

[123] For a useful recent summary of the present trends, see Smart (2021).

2.2 The Semantic Web

2.2.1 Definition

One simple but effective definition is this one: "The phrase 'Semantic Web' denotes an HTTP network (e.g., World Wide Web) where the meaning of Hyperlinks (HTTP URIs) are understood by both humans and machines (software)" (Idehen 2018). As it was stated twenty years ago, "by augmenting Web pages with data targeted at computers and by adding documents solely for computers, we will transform the Web into the Semantic Web" (Berners-Lee, Hendler and Lassila 2001, 36).

A former, now outdated, scheme to frame the initiative was provided by Tim Berners-Lee in 2007. It is known as the "Sematic Web Stack" or the "Semantic Languages Cake", as plotted in Figure 10.

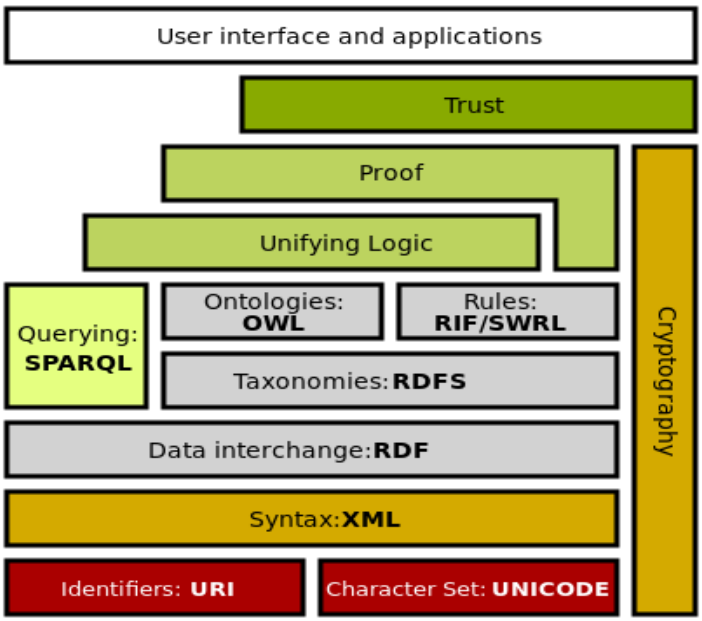


Figure 10. *Semantic Web Stack. Source: W3C: https://www.w3.org/2007/Talks/0130-sb-W3CTechSemWeb/#(24)*

There are not that many works on ethnography, Artificial Intelligence, and the Semantic Web. Lindsay Poirier (2017) conducted several interviews with AI and W3C computer science early designers and reviewed the first literature on the Web. She concluded that there were divergent and sometimes conflicting tendencies in the original design. The results-oriented "scruffy", practical, or ad hoc design eventually prevailed over the "neat", logical one. These are interesting findings, confirmed by John Sowa's technical

analysis. Sowa analysed previous versions of the SW stack and compared it with the final 2005-2007 figure. According to him, “the final report in 2005 was a pale shadow of Tim’s vision” (Sowa 2013), as in 2000, “diversity, heterogeneity, and interoperability were repeatedly discussed throughout the proposal, but in 2005 the words ‘diverse’ and 'interoperable' were mentioned only once, and 'heterogeneous' and ‘heuristics’ were never mentioned”.

While this scheme was being launched, Nova Spivak (2007) proposed a sister-prospective diagram to understand how the web was evolving from the web of documents (web 1.0) to a social web (web 2.0) and eventually to a web of data (Web 3.0) and multi-agent systems (intelligent web: Web 4.0). Figure 11 shows one version of this timely graphic proposal, plotting what Spivak called the ‘Metaweb’. Queries and searches would be done not only with keywords but also using semantics (natural language) in a way that could be computable and understandable by a machine. Web 4.0 would incorporate reasoning, creativity and, to a certain extent, agency.

> The Metaweb is the coming "intelligent Web" that is evolving from the convergence of the Web, Social Software and the Semantic Web. The Metaweb is starting to emerge as we shift from a Web focused on information to a Web focused on relationships between things --- what I call "The Relationship Web" or the "Relationship Revolution. (Spivak 2007)

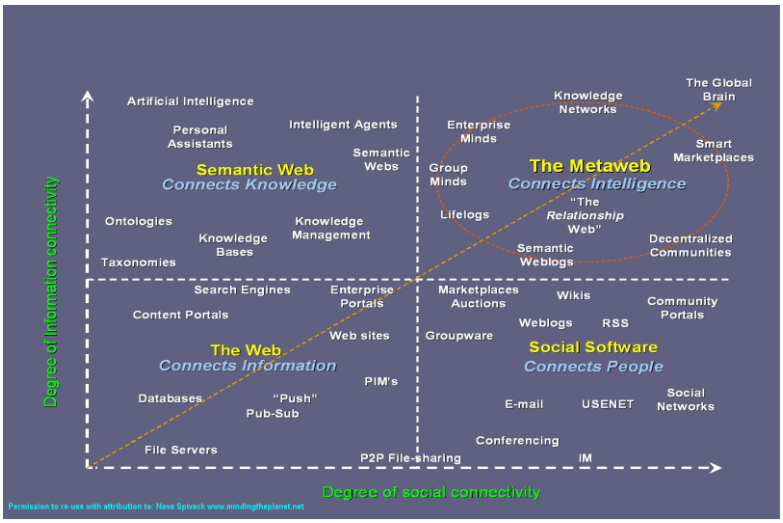


***Figure 11**. Metaweb Graph. Source: Spivack (2007)*[124]

[124] https://novaspivack.typepad.com/nova_spivacks_weblog/metaweb_graph.GIF

2.2.2 Web of Data

The Semantic Web is a web of data.[125] As shown, semantic languages annotate, relate, structure, and layer it. Data is represented in files on XML [*eXtended Mark-up Language*], RDF [*Resource Description Framework*] and OWL [*Ontology Web Language*]. The result leads to information management and processing, as *knowledge—hypertext* links, connection of objects, and information retrieval from the Web using not keywords (terms), but concepts. Table n.4 summarizes the main SW Technologies, distinguishing the *web of data* (*metadata*: the Semantic Web) from the original *web of documents* (Hypertext technologies).

***Table 4**. Semantic Web Technologies*

	Hypertext technologies
Web 1.0/2.0	• IRI [*Internationalized Resource Identifier*], generalization of URI [*Uniform Resource Identifier*], it facilitates the identification of semantic resources to manipulate and handle them.
Web 1.0/2.0	• *Unicode* is a codification standard of features of multiple technical and natural languages (including legacy ones). It drives to uniformity, singularity, and universality of their representation.
Web 1.0/2.0	• XML [*Extended Mark-up Language*] is a tag or mark-up language (a meta-language in fact) defining a set of documents in a readable format language, either by humans or by machines.[126]
Web 1.0/2.0	• *XML Schema* is a schema language that constraints the structure and content of XML documents, adding more abstraction into it.[127]
Web 1.0/2.0	• *XML Namespaces* furnish elements and attributes with a single name to a XML sequence; this sequence may contain element names or attributes coming from more than one vocabulary. It is used to identify and single out entities to be referred to without any ambiguity.[128]

[125] Cfr. Ivan Herman, http://www.w3.org/RDF/FAQ: "The vision of the Semantic Web is to extend principles of the Web from documents to data. Data should be accessed using the general Web architecture using, e.g., URI-s; data should be related to one another just as documents (or portions of documents) are already. This also means creation of a common framework that allows data to be shared and reused across application, enterprise, and community boundaries, to be processed automatically by tools as well as manually, including revealing possible new relationships among pieces of data".
[126] http://www.w3.org/XML/
[127] http://www.w3.org/XML/Schema
[128] http://www.w3schools.com/XML/xml_namespaces.asp

	Standard Semantic Web Technologies (meaning for structured data)
Web 3.0	• RDFS [*Resource Description Schema*] extends RDF vocabulary allowing the description of taxonomies of classes and properties. It also sets the domain and range of properties and relates the RDF classes and properties to taxonomies (hierarchies).[129]
Web 3.0	• OWL [*Web Ontology Language*] adds more structures to describe the semantics of RDF sentences (cardinality, restrictions of values, transitivity…). It is based on descriptive logics, and gives some reasoning power to the SW. It defines sets, properties, instances and operations through the construction of *ontologies*. [130]
Web 3.0	• SKOS [*Simple Knowledge Organization System*] is a common data model for sharing and linking knowledge organization systems via the Semantic Web.[131]
Web 3.0	• SPARQL [***S**PARQL **P**rotocol **a**nd **R**DF **Q**uery **L**anguage*] allows the search of structured data (in RDF, RDFS and OWL). It is a standard search language to perform graph queries and to build up SW applications.[132]
Web 3.0	• TURTLE [*Terse RDF Triple Language*] is a syntax and file format for expressing data in the Resource Description Framework (RDF) data model.[133]
Web 3.0	• N-TRIPLES is a format for storing and transmitting data—line-based, plain text serialisation format for RDF graphs, and a subset of the Turtle format.[134]

An updated model of the semantic stack has been recently drawn by Idehen (2017) (Figure 12) to tweak the original design and shed some light about the achievements and the state of the art. He leans on John Sowa's useful collection of documents on semantic interoperability (Sowa 2019).

[129] http://www.w3.org/TR/rdf-schema/
[130] http://www.w3.org/TR/owl-guide/
[131] https://www.w3.org/2009/08/skos-reference/skos.html#
[132] http://www.w3.org/TR/rdf-sparql-query/
[133] https://www.w3.org/TR/turtle/
[134] https://www.w3.org/TR/n-triples/

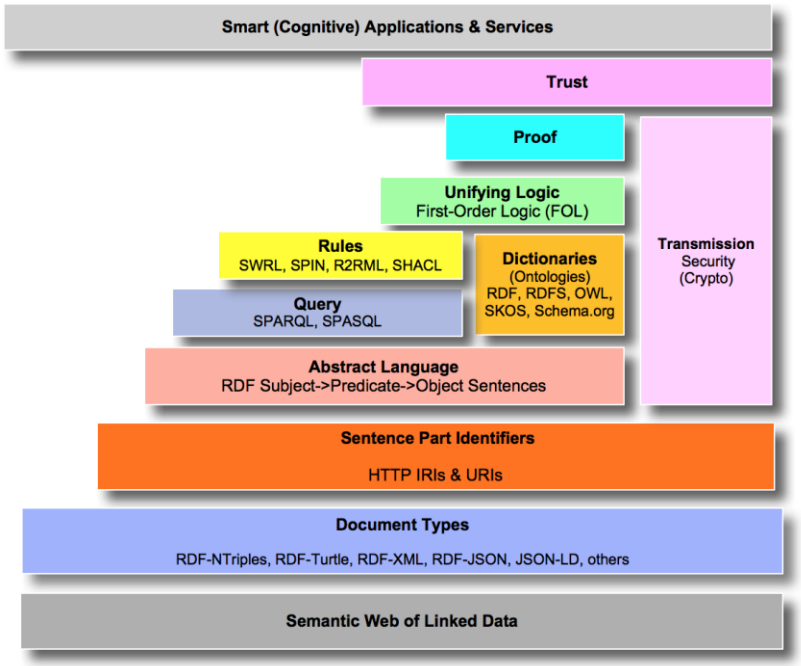


***Figure 12**. Tweaked Semantic Web Technology Layer Cake. Source: Idehen (2017)*

John Sowa (2013, 64) called "knowledge soup" all that is contained, processed, stored, and retrieved in our personal and collective memory. Linked data—whose description is one of the objectives of this Dissertation—makes no exception:

> A heterogeneous, loosely linked mixture: (i) Fluid, lumpy, and dynamically changing; (ii) Many lumps are or can be structured in a computable form; (iii) But they may be inconsistent or incompatible with one another. In anybody's head, *knowledge soup is the totality of everything in memory*. In the WW, knowledge soup is *the totality of everything people downloaded from their heads*, recorded automatically, or derived by any computable method. Linked Open Data is good for finding and classifying anything in the soup – whether loose items or structured lumps. But *understanding the contents of the LOD poses the same challenge as understanding natural language* [my emphasis].

We will have the opportunity to flesh out this argument and the new versions of the SW stack. For the moment, it is worth to note that there is an important twist in the notion of 'language in context'. Context has always been one of the most important notions for the anthropological understanding of language and knowledge. By 'context' we usually mean the situation in which a linguistic entity is generated and sustained. The *Oxford Dictionary* defines it as "the circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood and assessed". The notions of *situated*

knowledge, situated language, situated discourse, and *situated meaning* are key in cognitive linguistics, sociology and anthropology (d'Andrade 1995). Modelling dynamic and moving contexts has been a recurrent challenge. It has been widely accepted that interpretation of information, in any form, is context-dependent.

Broadly, the Open Knowledge Network, linked to the emergence of linked data and knowledge graphs, follows three steps: (i) Data acquisition (crawling and extracting content from distributed sources; (ii) data structure (and ontological building); (iii) knowledge graph building stemming from identified data similarities. The notion of metadata (annotated data) means that in the reuse of data the information about the sources needs to be contextualized (and structured) [see Note 121].

Thus, information about additional structures becomes part of the context. Knowledge graph construction connects all semantic types within 'contexts in context', i.e., its own construction context (Baclawski et al. 2018). The social and cultural content and extent of this double-bounded notion of context can be explored within ontologies and knowledge graphs. It can be linked as well to the broader notion of a *dynamic* social context set up by the cybernetic approach by N. Wiener (1894-1964) and G. Bateson (1904-1980). We will come back into it, because the general framework covers not only Human/Machines (H/M), Human/Human (H/H) and Machine/Machine (M/M) interactions and interfaces but H/M/H or M/H/M ones. These cannot be handled as linear relationships.

2.2.3 The Web of Linked Data: A *Giant Global Graph*

Natural Language Processing (NLP) techniques are specially being applied at a fast pace. Figure 13 shows the last 2021 Gartner Hype Cycle[135] for NLP:

> Natural language technology (NLT) encompasses the technologies and methods that enable intuitive forms of communication between humans and systems, as well as the

[135] Gartner should not be confused with an author. It is perhaps the most influential technology research and consulting company, based in Connecticut with over 15,000 employees (mainly analysts) located in more than one hundred offices worldwide. The 'hype cycle' is a graphical presentation developed, used and branded by Gartner to represent the maturity, adoption, and social application of specific technologies following five successive stages: (i) Innovation (or technology) trigger, (ii) peak of inflated expectations, (iii) trough of disillusionment, (iv) slope of enlightenment, (v) and plateau of productivity. The Hype Cycle represents a kind of maturity level analysis followed by technological industries, companies, investors, and developers.

analysis of those communications. NLT includes natural language understanding (NLU), natural language generation (NLG), text analytics, dialogue systems, language knowledge graphs, machine translation, text summarization, speech technology and neural symbolic language models. While language capabilities have existed for several decades, a new generation of capabilities has emerged that uses deep neural network (DNN) machine learning (ML) methods. These new capabilities, combined with existing methods, enable improved functionality. (Ebert et al. 2021)

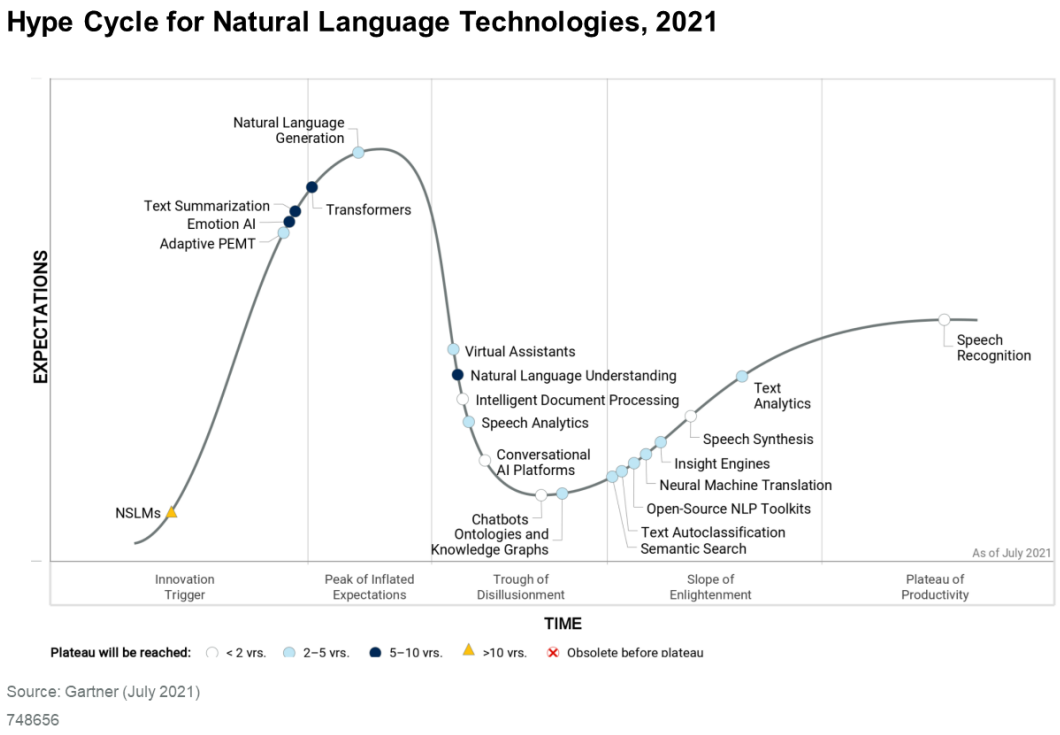


Figure 13. *Gartner Hype Cycle for Natural Language Technologies. Source: Gartner (2021)*[136]

Table 5 distributes NLP according to the degree of development. Chatbots, semantic search, and Intelligent Document Processing (IDP) are expected to be generally adopted in less than two years. It should be clarified that advances in legal document processing have been beyond these expectations. As I showed in Chapter 1, there are already many Legal Web Services companies offering this kind of analyses in the market. According to Gartner as well, Ontologies and Knowledge Graphs will be deployed within five years' time. Again, this is a prudential estimation pointing at the level of generalisation. Legal Ontologies and Legal Knowledge Graphs have crossed the research threshold and are

136 https://www.gartner.com/resources/748600/748656/Downloadable_graphic_Hype_Cycle_for_Natural_Language_Technologies_2021.png

offered as a service as well. Even though, it is true that the level of usage and professional acceptation of these technologies is still low and has not yet reached its full potential.

Table 5. *Priority Matrix for Natural Language Technologies. Source: Gartner, Ebert (2021, 5)*

Benefit	*Years to Mainstream Adoption*			
↓	*Less Than 2 Years* ↓	*2 - 5 Years* ↓	*5 - 10 Years* ↓	*More Than 10 Years* ↓
Transformational	Conversational AI Platforms Speech Recognition	Neural Machine Translation Virtual Assistants	Emotion AI Natural Language Understanding Transformers	NSLMs
High	Chatbots Intelligent Document Processing	Insight Engines Natural Language Generation Ontologies and Knowledge Graphs Open-Source NLP Toolkits		
Moderate	Speech Synthesis	Adaptive PEMT Semantic Search Speech Analytics Text Analytics Text Autoclassification	Text Summarization	
Low				

Source: Gartner (July 2021)

Fabien Gandon published in 2018 a comprehensive survey of the first 20 years of research on SemanticWeb and Linked Data. The Web that started with recommendations and standards of XML and RDF has been extended to many other technologies leaning on this previous work. Gandon (2018, 38) asserts that the names "linked data" and "linked open data" or LOD highlight: (i) the added value of linking data on the Web to integrate different sources; (ii) the wealth of having open data as commons available to everyone's applications; (iii) and the fact that all the approaches of the domain can be used in private spaces (intranets, intrawebs, extranets, etc.).

Figure 14 reproduces this SW new stack, incorporating languages such as, among others: (i) JSON [*JavaScript Object Notation*, a lightweight data-interchange format], (ii) JSON-LD[137] [*JSON for Linked Data*, a lightweight Linked Data format to allow zero-edit use of

[137] https://json-ld.org/

existing JSON to obtain a reasonable representation of JSON as Linked Data], (iii) TURTLE[138] [*Terse RDF Triple Language*, a syntax and file format for expressing data in the RDF data model], (iv) N-QUADS[139] [a line-based, plain text format for encoding an RDF dataset, a simple extension to N-Triples to enable the exchange of RDF datasets], (v) SHACL[140] [*Shapes Constraint Language*s for RDF interoperability, a language for validating RDF graphs against a set of conditions], (vi) CSV-LD[141] [*Comma-Separated Values for Linked Data*, a CSV which may represent multiple entities, with one line per entity description and each column represents a property of that entity]. These are computer languages to represent meaning—i. e. the *triples* (subject/predicate/object expressions) identified by early semantic web developments—in a more complex way. Their syntax, grammar and some coding examples can be found in the W3C RDF Working Group Primer.[142]

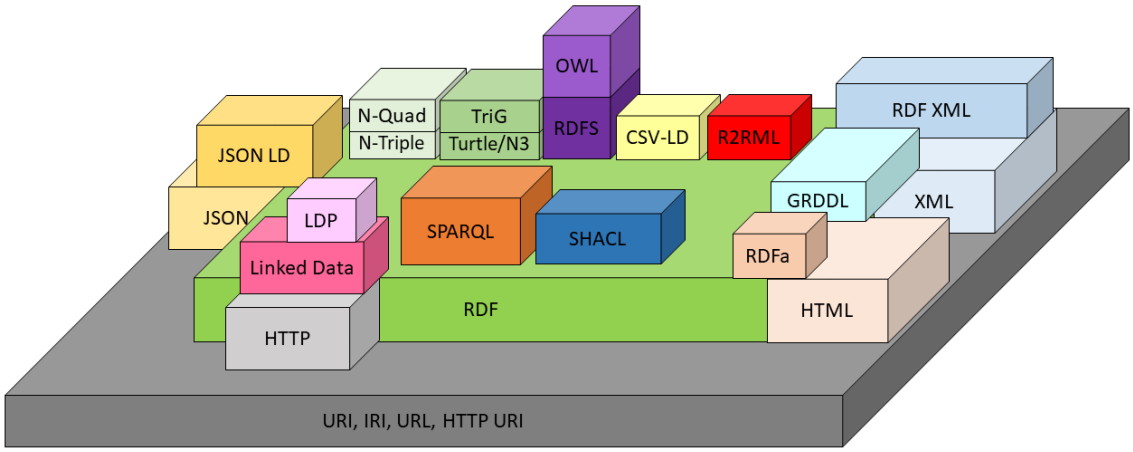


***Figure 14**. Semantic Web New Stack. Source: Gandon (2018)*

Some of these these languages have been developed by specialised communities, and extended to Linked Data by W3C Working Groups. They have in common the specific aim of dealing with contexts, patterns, and data graphs to encapsulate formal repesentations linking them with a broader and richer framework. For instance, as said,

[138] https://www.w3.org/TR/turtle/
[139] https://www.w3.org/TR/n-quads/ See a technical example in Section 5.1.4 of the W3C Primer: https://www.w3.org/TR/rdf11-primer/#section-n-quads
[140] https://www.w3.org/TR/shacl/
[141] https://www.w3.org/2013/csvw/wiki/CSV-LD
[142] https://www.w3.org/TR/rdf11-primer/

SHACL is a language for validating RDF graphs against a set of conditions. RDF graphs that are used in this manner are called "shapes graphs", and the RDF graphs that are validated against a shapes graph are called "data graphs". Interestingly, "as SHACL shape graphs are used to validate that data graphs satisfy a set of conditions *they can also be viewed as a description of the data graphs that do satisfy these conditions* [my emphasis]. Such descriptions may be used for a variety of purposes besides validation, including user interface building, code generation and data integration."[143]

These languages can be considered components of what Berners-Lee (2007) termed the *Giant Global Graph*:

> […] the Net and the Web may both be shaped as something mathematicians call a Graph, but they are at different levels. The Net links computers, the Web links documents. Now, people are making another mental move. There is realization now, "It's not the documents, it is the things they are about which are important". Obvious, really. […] There are cries from the heart (e.g The Open Social Web Bill of Rights) for my friendship, that relationship to another person, to transcend documents and sites. There is a "Social Network Portability" community. Its not the Social Network *Sites* that are interesting—it is the Social Network itself. *The Social Graph. The way I am connected, not the way my Web pages are connected*. We can use the word *Graph*, now, to distinguish from *Web*. I called this graph the Semantic Web, but maybe it should have been *Giant Global Graph*! Any worse than WWWW? Not the "Semantic Web" term that has been established for a long time, I'm not proposing to change it. But let's think about the graph *which it is* [my emphasis].

It is worth mentioning here that the languages introduced above are operating on top of RDF and RDF Scheme data formats, thus, at syntactical and grammatical level to encode semantic relationships.[144] OWL, *Web Ontology language*, operates at a superior level. OWL is an upgraded language pointing at the semantic level of relationships. It is a W3C standard, a computational-logic "designed to represent rich and complex knowledge about things, groups of things, and relations between things", that computers can process

[143] https://www.w3.org/TR/shacl/ . See a technical example of a SHACL notation for representing 'person' in Section 1.4 of the W3C document.

[144] "The Semantic Web concept is to do for data what HTML did for textual information systems: to provide sufficient flexibility to be able to represent all databases, and logic rules to link them together to great added value. The first steps in this direction were taken by the World-Wide Web Consortium (W3C) in defining Resource Description Framework (RDF) [Lassila et al. 1999], a simple language for expressing relationships in triples where any of the triple can be a first class web object." https://www.w3.org/2000/01/sw/DevelopmentProposal

"*to verify the consistency of that knowledge or to make implicit knowledge explicit*" [my emphasis].[145] In December 2012, the OWL 2 Web Ontology Language, OWL 2, was published as W3C recommendation: OWL 2 provides ontologies defining "classes, properties, individuals, and data values, and are stored as Semantic Web documents".[146]

What is and how does an 'ontology' operate? What does a 'knowledge graph' consist of in the Web of Linked data? An answer is provided in the next Sub-sections (2.2.4 and 2.2.5).

2.2.4 The Web of Linked Data: Philosophical and Computational Ontologies

Computational ontologies have been built for more than thirty years now. 'Ontology' is a term coming from the philosophical tradition, but not that old as it appears to be. It is confronted with 'metaphysics' because both terms refer to the same idea of 'being'. It is interesting to briefly recall here its historical origins, as 'ontology' was set at the beginning of the 17th century to make the difference between the Catholic doctrine of 'metaphysics'—sketched at the time by the second Spanish Scholastic School, mainly by Francisco Suárez (1548-1617)—and the Protestant science of the *representation* of being. For the former, 'reality' is directly accessible; for the latter, reality is always mediated through knowledge and the conceptual and material tools put in place to obtain such a knowledge.

A 'being' is an 'entity', plus 'knowledge'. This holistic view embraced not only descriptions of 'what is', but its modalities as well, 'what can be', 'what will be', 'what should be', 'what must be'. It also encompasses the normative and evaluative side of 'reality', i.e., its 'deontic' aspects. Jakobs Lorhard's definition of 'ontology' reads: "*The science of the intelligible as intelligible insofar as it is intelligible by man by means of the natural light of reason without any concept of matter*" (Lorhard [1606: Book 8, p.1] quoted by Øhrstrøm, Uckelman and Schärfe 2007).

Lorhard's *Ogdoas Scholastica* (1606) was remarkable for several things: (i) the use of diagrams to represent entities, probably inspired by Peter Ramus' *Dialectics* (1555), (ii) the attention to temporal aspects and tenses, (iii) the use of hypertextual signs, (iv) the

[145] https://www.w3.org/OWL/
[146] https://www.w3.org/2012/pdf/REC-owl2-overview-20121211.pdf

replacement of the term metaphysics with the word 'ontology'.[147] This represented a new stage after the introduction of print and the development of a new toolkit to reproduce artworks and writing.[148] I analysed this early processes and the links with the semantic web elsewhere.[149] However, it is worth mentioning here that the difference with 'metaphysics' is an attitudinal one. Elaborated empirical knowledge of the world as it is offered by the sciences matter; not only the objectuality of a perceived reality. Therefore, beings, entities, do not exist by themselves only, but because they are perceived, described conceptualised and drawn (represented) as *knowledge*. On the contrary, metaphysics, as it was understood at the same time (between 1597-1610) by the so-called Second Scholastic School, mainly Francisco Suárez, was centred around the notion of *being, ens,* and more specifically, on the *modes of existence* of being, i.e. on its *modality*. Metaphysics according to Suárez (*Metaphysicae Disputationes* 1597) is the "*study of objective concepts*" (Disp. II, Sect I). Norms would be *entities of reason*. "*Indeed, sometimes we conceive deprivations [prohibitions] and other things, called entities of reason, because objectively they do not exist except in understanding*."

Computational ontologies are related to these origins, but we should bear in mind that they show many differences with philosophical ontologies (Guarino 2009). Philosophical ontologies deal with the 'nature' or 'essence' of reality at a high epistemic and abstract level. Computational ontologies, on the contrary, refer directly to the models used to compute relationships, attributes, and values.

[147] On the relevance of Pierre de la Ramée [Petrus Ramus] (1515-1572) on the European thought, its differences with Scholastics, and the consequences of the transition from orality to a writing expression, see Ong (1958). On the early works by Jacob Lorhard (1561-1609) and Rudolf Göckel [Goclenius] (1547-1628), see Øhrstrøm et al. (2007, 2008), and Uckelman (2008).

[148] Goody's (1973) classical work on the introduction of the written reproduction of thought paid attention to them. This graphic order introduced in the 16 c. and composed of tables, diagrams, indexes, rosters… structuring the onset of pages, chapters and books reveal a different relationship between references, meaning and the subjects who interpret them. This changed the way how humans are able to store, retrieve, manage, and use information. According to Goody (1973), cognitive skills—especially memory—were affected by this new toolset and adapted to it.

[149] In Casanovas (2013b, 2014) I described the ontology and historical works carried out by the Catalan philosopher J.M. Ferrater Mora (1912-1991), who was one of the first to raise the issue of the binomial ontology/metaphysics in the 16 c. In Casanovas (2010a) I connected different rhetoric trends with semantic web developments.

"An ontology is a *formal, explicit* specification of a *shared* conceptualization", according to Studder, Benjamins, and Fensel (1998, 184).[150] Therefore, a computational ontology carries on a "a shared and common understanding of some domain that can be communicated across people and computers" (ibid.). With the limitations that I will mention later, it entails the pragmatic exercise of sharing, marking, formalising, and making explicit and available the content of what is being represented on a natural and/or formal language.

This common Human/Machine space is key to understand its computational meaning. Logic and metalogic—thinking from meta-ontologies—are integrated in the philosophical field. Therefore, there is not a sharp divide for a fruitful connection does exist. Even though, both approaches should not be confused, and avoiding this ambiguity will help us to better understand and evaluate the anthropological ontological trend, as the philosophical stance does not share the requirements and constrictions of computational ontology building.

Following this path (Guarino et al. 1995, 2009), we can identify more granularly some more meanings carried on by the notion of *Ontology*. For example: (i) as a philosophical discipline (Philosophy); (ii) as an informal conceptual system, (iii) as a formal semantic account, (iv) as a specification of a conceptualisation, (v) as a representation of a conceptual system via a logical theory, (vi) referred to sets of entities by specific formal properties and characterized only by its specific purposes, (vii) as a vocabulary used by a logical theory, (viii) as a (meta-level) specification of a logical theory.

I will only use the general philosophical and computational meaning in this work, as they are enough to ground the contentions related to the anthropological usage that I will sustain later in this Dissertation. At risk of repetition, the denotation of *Ontology* in computer science has been sequentially specified as follows: (i) "explicit specification of a conceptualization" (Gruber 1992a), (ii) "a formal, explicit specification of a shared conceptualisation" (Studer, Benjamins, and Fensel 1998)[151], (iii) "a means to formally model the

[150] This understanding of what an ontology is summarises and resumes the first ten years of ontology building. For a classical view, See Gruber (1992a, 1992b).

[151] "A *conceptualisation* refers to an abstract model of some phenomenon in the world by having identified the relevant concepts of that phenomenon. *Explicit* means that the type of concepts used, and the constraints on their use are explicitly defined. For example, in medical domains, the concepts are diseases and symptoms, the relations between them are causal and a constraint is that a disease cannot cause itself. *Formal*

structure of a system, i.e., the relevant entities and relations that emerge from its observation, and which are useful to our purposes" (Guarino et al. 2009, 2); (iv) "a 4-tuple [C,R.I,A], where C is a set of concepts, R a set of relations, I a set of instances and A a set of axioms" (Davies et al. 2006).[152]

2.2.5 Some Precisions from Recent Research

Ontologies can be expressed informally or formally, but they are always related to a conceptual *representation.* As assessed by Gruber (2009): "In computer and information science, ontology is a technical term denoting an artifact that is designed for a purpose, which is to enable the modelling of knowledge about some domain, real or imagined." In ontology building, we are facing *structured meaning*, not the alive process of making sense of a symbol, an interaction, or a situation. This cognitive process is more complex, as it involves the latent, tacit and implicit presence of cognitive semantics and its entangled pragmatics (i.e. its relationships with the inner and outer linguistic context and with the environment). These difficulties have been acknowledged by the Ontology Summit (2018). The "context in context" to be formalised are still a subject of research by the Open Knowledge Network (OKN). According to its collective *Communiqué*:

> The context needed to understand any subject matter may include information of any kind, general or specific. For this reason, *any reasoning about context is at a metalevel*: it's not about the current subject matter, *but about the methods for finding some implicit information that should be added to the interpretation of the subject*. [my emphasis]
>
> The information needed for context can come from several sources. The immediate context includes the sentences that precede or follow the current sentence. The background knowledge includes information about the subject matter that is assumed by the speaker, listener, viewer, author or reader. The situation includes the time, place, and audience or readers. All these sources of information may change at different points in a document or discourse. (Baclawski, et al. 2018, 182)

---

refers to the fact that the ontology should be machine readable, which excludes natural language. *Shared* reflects the notion that an ontology captures consensual knowledge, that is, it is not private to some individual, but accepted by a group" (Studer et al. 1998, 184).

[152] In this latter version, ontologies are a specific sort of Knowledge Base (KB), O = <C, R, I, A> , "where C is a set of classes representing *concepts* we wish to reason about in the given domain (invoices, payments, products, prices…); R is a set of *relations* holding between these classes (Product *hasPrice* Price); I is a set of *instances* by relations (product17 *isA* Product; product23 *hasPrice* €170); A is a set of *axioms* (if a product has a price greater than €200, shipping is free)" (Davies et al. 2006, 118).

Computational ontologies have been evolving over time. Stemming from general categoric taxonomies and conceptual classifications, they are now understood in a more granular way, as a cooperative, intersectional accomplishment of tasks involving several engineering, domain, and scientific expertise. Corcho, Poveda-Villalón and Gómez-Pérez (2015, 14) have defined it in a clear way, stressing the shift produced by *linked* data:

> Ontology engineering encompasses the method, tools and techniques used to develop ontologies. Without requiring ontologies, linked data is driving a paradigm shift, bringing benefits and drawbacks to the publishing world. Ontologies may be heavyweight, supporting deep understanding of a domain, or lightweight, suited to simple classification of concepts and more adaptable for linked data. They also vary in domain specificity, usability, and reusability. Hybrid vocabularies drawing elements from diverse sources often suffer from internally incompatible semantics. To serve linked data purposes, ontology engineering teams require a range of skills in philosophy, computer science, web development, librarianship, and domain expertise.

Figure 15 depicts the engineering expertise in which the field is divided nowadays, according to the same authors (2015, 15):

> (i) The *upper-level ontology* engineers have deep knowledge about formal logic and philosophy. Upper-level ontology are general, categorial ones, embracing notions such as time, space, identity, consequences, place, locations… Formal upper-level ontologies are usually written in first order logic, Object Web Language (OWL) or Open Biomedical Ontology (OBO). Examples are Descriptive Ontology for Linguistic and Cognitive Engineering (DOLCE)[153], Basic Formal Engineering (BFO)[154], General Formal Ontology (GFO)[155], and Suggested Upper Merged Ontology (SUMO)[156].
>
> (ii) *Heavyweight ontology* engineers can be domain experts in the field (Chemics, Physics, Biology, Medicine, Law…) or computer scientists with a logical background, *reusing* axioms, properties, and concepts from general upper-level ontologies.
>
> (iii) *Lightweight ontology* engineers, developing vocabularies to be used in the linked data context, written in RDF Schema or in OWL profiles with little expressivity (for example, OWL Lite).
>
> (iv) SKOS (*Simple Knowledge Organization System*) concept scheme developer, developing thesauri and other types of classifications.

[153] http://www.loa.istc.cnr.it/dolce/overview.html
[154] https://basic-formal-ontology.org/
[155] https://github.com/Onto-Med/GFO
[156] http://www.ontologyportal.org/

(v) Web developers contributing to *Schema.org*[157] or using it to annotate websites from the cluster of Schema.org vocabulary developers (with HTML, RDF, or JSON-LD).

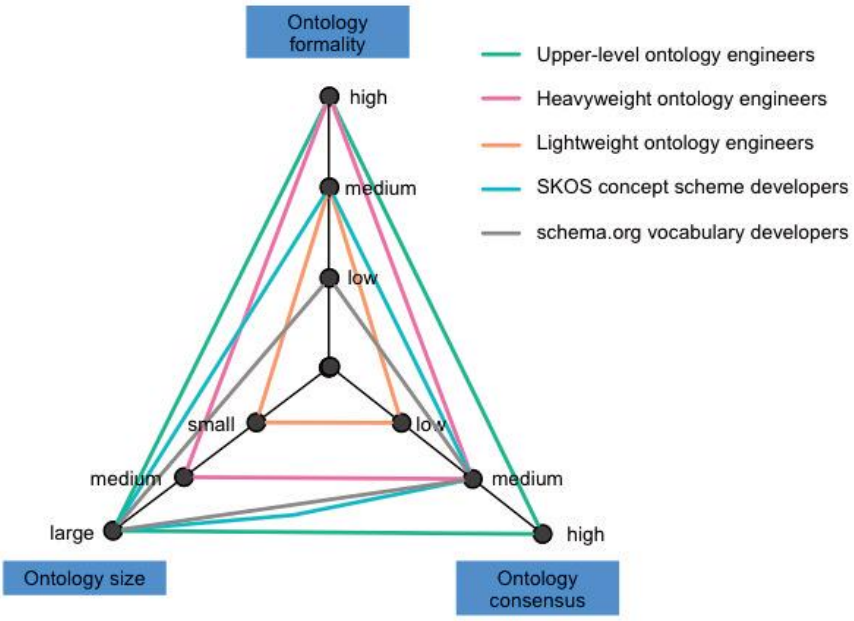


Figure 15. *Ontologies by size, formality and consensus level for each developer profile. Source: Corcho et al. (2015, 16)*

An example of upper-top level ontology based on general categories is furnished by John Sowa's work on Peirce's semiotics to represent conceptual graphs.[158] Sowa focuses on relational semiotic categories.[159] They can be deemed the origins of knowledge graphs, as they will be described in the next sub-section 2.2.5. Figure 16 reproduces Sowa's well-known diagram to deploy categorial entities [Things (T)]. For Sowa (2000, xii), "knowledge representation is the application of logic and ontology to the task of constructing computable models for some domain." Thus, ontology building assumes structured knowledge for computable purposes.

[157] https://www.schema.org/

[158] "Conceptual graphs are a two-dimensional form of logic that is based on the semantic networks of AI and the logical graphs of C. S. Peirce. Both notations are exactly equivalent in their semantics and instructors may choose to use either or both in lectures and exercises" (Sowa 2000, xii).

[159] For an explanation of Peirce's existential graphs, see Sowa (2011); for conceptual graphs (Sowa 2013): "Existential graphs (EGs) are a simple, readable, and expressive graphic notation for logic. Conceptual graphs (CGs) combine a logical foundation based on EGs with features of the semantic networks used in artificial intelligence and computational linguistics." Cf. Sowa's five tutorials on AI, knowledge representation and ontologies (March 2013) available at http://www.jfsowa.com/pubs/

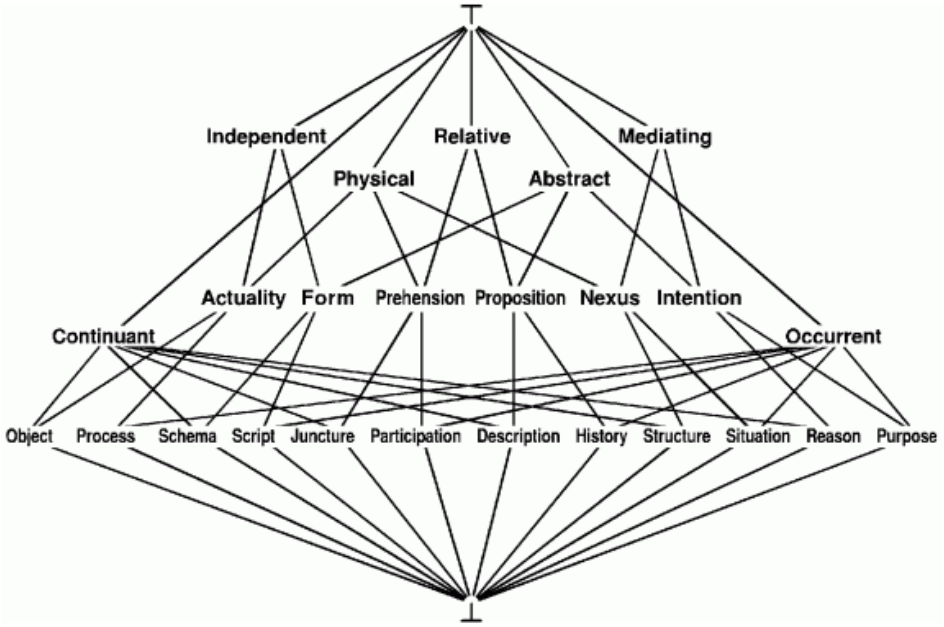


Figure 16. *Hierarchy Top-level Ontology Knowledge Representation. Source: John Sowa (2000)*[160]

2.2.6 The Web of Linked Data: Knowledge Graphs

Heath and Bizer (2011) have summarised the features of the Web of Linked Data (WoLD): (i) it is generic and can contain any type of data; (ii) it is available to anyone and anyone can publish data; (iii) it is able to represent disagreement and contra dictionary information about an entity; (iv) entities are connected by RDF links, creating a *global data graph* that spans data sources and enables the discovery of new data sources; (v) this means that applications do not have to be implemented against a fixed set of data sources, but they can discover new data sources at run-time by following RDF links; (vi) data publishers are not constrained in their choice of vocabularies with which to represent data, (vii) data is *self-describing*, thus if an application consuming Linked Data encounters data described with an unfamiliar vocabulary, the application can *dereference* the URIs (Uniform Resource Identifier) that identify vocabulary terms in order to find their definition[161], (viii) the use of HTTP as a standardized data access mechanism and RDF as a

[160] John Sowa (2000) http://ontology.univ-savoie.fr/.../exemples.html.
[161] *Dereferecing* is a technical notion.: "The act of retrieving a representation of a resource identified by a URI is known as *dereferencing* that URI. Applications, such as browsers, render the retrieved representation so that it can be perceived by a user. Most Web users do not distinguish between a resource and the rendered

standardized data model simplifies data access compared to Web APIs, which rely on heterogeneous data models and access.

The Web of Linked Data (WoLD) is represented within *Knowledge Graphs*. This term was popularised by Google in 2012, although little is known about the system and algorithms they built up to answer semantic queries on the web. OntoText, A. Kiryakov's SW company, defines knowledge graphs as follows:

> A knowledge graph represents a collection of interlinked descriptions of entities—objects, events, or concepts. Knowledge graphs put data in context via linking and semantic metadata and this way provide a framework for data integration, unification, analytics and sharing.[162]

Thus, a Knowledge Graph represents a network of interlinked descriptions of entities (objects, events, concepts etc.), i.e., "a graph-theoretic representation of human knowledge such that it can be ingested with semantics by a machine" (Ehrlinger and Wöß 2016). Fensel et al. (2020) have updated this definition, placing it in the context of AI-base communication services. Data increasingly becomes semantically annotated, allowing bots (software agents) to search the Web with an understanding of its contents. The development of automatic methods for speech recognition, dialogue systems, and automatic language understanding are being displayed through data mining, NLP, and Machine Learning techniques. Notwithstanding that, as the authors point out, more is needed to give a meaningful answer: *An agent needs knowledge*, human knowledge semantically annotated, searchable, and available on the web from a plurality of data sources. The Semantic Web is based on schema.org that is used by more than 1.2 billion web pages hosting more than 38 billion semantic statements. These are big numbers. Referring to *facts,* not to any deductive logical shortcut. This leads to an empirical definition:

> The underlying assumptions of traditional logic with small axiom sets, 100% correctness and completeness, and static character of the knowledge break at the scale of the web or large Knowledge Graphs. […]. Summing up the discussion we could state that *Knowledge Graphs are very large semantic nets that integrate various and heterogeneous information sources to represent knowledge about certain domains of discourse* [my emphasis]. (Fensel et al. 2020, 6)

representation they receive by accessing it." Rhys Lewis (ed), *Dereferencing HTTP URIs*, 31 May, 2007, W3C, http://www.w3.org/2001/tag/doc/httpRange-14/2007-05-31/HttpRange-14

[162] https://www.ontotext.com/knowledgehub/fundamentals/what-is-a-knowledge-graph/

KG were rapidly undertaken by industry after its inception by Google in May 2012 (Singhal 2012). Airbnb, Amazon, eBay, Facebook, IBM, LinkedIn, Microsoft, Uber… followed, and they have been generalised by now to practically all sectors and global and national corporations.

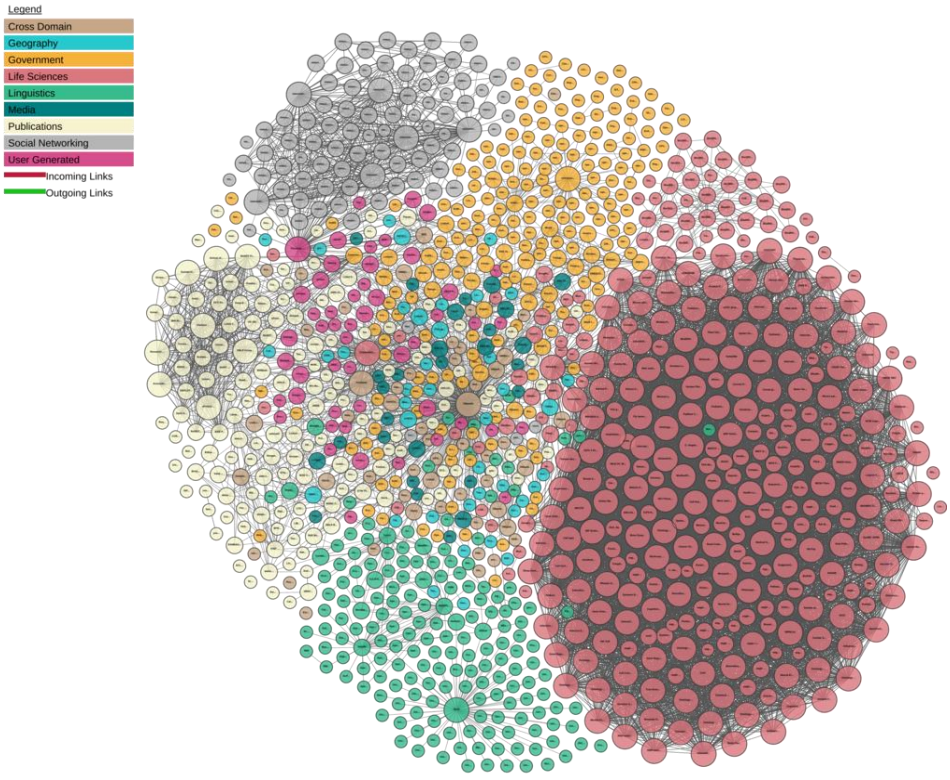
Using graphs to represent data has many advantages. Most of all, its flexibility and capacity to integrate, manage, and extract value from many data sources *at large scale* (Hogan et al. 2020, 2021). Edges are able to reflect relations between entities of all kinds of data, linking interactions, citations, transport networks, references... rendering them visible on the web. Interestingly for our purposes, knowledge representation formalisms—mainly ontologies and rules—can be employed to define and reason about the semantics of the terms used to label and describe the nodes and edges in the graph (ibid.). Thus, a KG is a "*graph of data intended to accumulate and convey knowledge of the real world, whose nodes represent entities of interest and whose edges represent potentially different relations between these entities*" conforming it to a graph-based data model (Hogan et al. 2021, 71:3).[163] Data models are based on SW languages.[164]

KG can be Open or proprietary. We will put the example of DBpedia and CyC, respectively. Both graphs have been built on an impressive accumulation of data previously

[163] This is the most comprehensive explanation so far: "The definition of a "*knowledge graph*" remains contentious, where a number of (sometimes conflicting) definitions have emerged, varying from specific technical proposals to more inclusive general proposals […] Herein we adopt an inclusive definition, where we view a knowledge graph as *a graph of data intended to accumulate and convey knowledge of the real world, whose nodes represent entities of interest and whose edges represent relations between these entities*. The graph of data (*aka data graph*) conforms to a graph-based data model, which may be *a directed edge-labelled graph, a property graph*, etc. […]. By *knowledge*, we refer to something that is *known*. Such knowledge may be accumulated from external sources, or extracted from the knowledge graph itself. Knowledge may be composed of simple statements, such as "*Santiago is the capital of Chile*", or quantified statements, such as "*all capitals are cities*". Simple statements can be accumulated as edges in the data graph. If the knowledge graph intends to accumulate quantified statements, a more expressive way to represent knowledge – such as *ontologies* or *rules* – is required. *Deductive methods* can then be used to entail and accumulate further knowledge (e.g., "*Santiago is a city*"). Additional knowledge – based on simple or quantified statements – can also be extracted from and accumulated by the knowledge graph using *inductive methods*." (Hogan et al. ibid, 71: 3). This definition encompasses one of the main features of big data: The increasing emergence on the Web of inferred knowledge or *synthetic data*, i.e. data that is accrued, enriched or completed with the help of deductive methods of inference, data that is constructed using a particular data model according to Torra (2017). We will have the occasion to come back to this, because this is a shared characteristic of LOD and data production that is shaping the IoT scenarios.

[164] For instance, "RDF defines three types of nodes: Internationalised Resource Identifiers (IRIs), used for globally identifying entities and relations on the Web; literals, used to represent strings and other datatype values (integers, dates, etc.); and blank nodes, used to denote the existence of an entity" (Hogan et al. 2021, 71:5).

collected, structured, and managed on general ontological bases. Going to the former one, DBpedia is a project that started in 2007 as the Wikipedia backbone. DBpedia was initiated by Sören Auer, Christian Bizer, Georgi Kobilarov, Jens Lehmann, Richard Cyganiak and Zachary Ives. DBpedia extracts structured, multilingual information (as knowledge) from Wikipedia pages and makes it freely available on the web (Lehmann et al. 2015). Thus, users can receive answers to their questions where the information is spread across multiple Wikipedia articles. DBpedia maintained from 2007 to 2018 the clustering and visualisation of the so-called Linked Open Data Cloud (LODC), integrated into DBpedia Global since June 2021.[165] Figure 17 shows one of the last images published, as of February 2017, clustering Geography, Government, Life Sciences, Linguistics, Media, Publications, and Social Networking. This image shows datasets that have been published in Linked Data format.



[165] https://www.dbpedia.org/blog/dbpedia-global/

***Figure 17**. The Loud Cloud Diagram. Source: Abele et al. (2017)*[166]

DBpedia Knowledge Graphs are increasingly growing and maintained.[167] DBpedia Diamonds are aggregated, ready-to-use, knowledge graphs from Wikipedia/Wikidata and Linked Open Data (LOD).[168] The DBpedia Ontology currently covers 768 classes which form a subsumption hierarchy and are described by 3000 different properties. It contains about 4,233,000 instances.[169]

CYC (fo Cycorp Co.) is an AI project that started as early as 1984, led by Douglas Lenat. It has been running for nearly forty years to encode, store, annotate common knowledge using heuristics and a huge knowledge database. This means all kind of rhetorical devices, and especially common metaphors and similes. CYC was described as follows:

> The test of this idea-solving problems by analogizing to far-flung specific knowledge-will be in the performance of the CYC system, once it has a large enough accumulation of specific knowledge. The CYC project is an attempt to tap into the same sources of power by providing a comprehensive skeleton of general knowledge (to use directly) plus a growing body of specific knowledge (from which to draw analogies). (Lenat, Prakash and Shepherd 1985, 64)

CYC knowledge base includes more than 300.000 terms (concepts), 3 million assertions (facts and rules), and 15.000 relations by now, although the internal composition and gearing details are less known than the DBpedia ones (it is not Open Access). OpenCyc, a public version of CYC, was released in 2002 and remained active until 2017. Figure 18 shows an example of CYC upper-level top ontology, as it was partially released.

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[166] Andrejs Abele, John P. McCrae, Paul Buitelaar, Anja Jentzsch and Richard Cyganiak, http://lod-cloud.net (not active now, but preserved at https://en.wikipedia.org/wiki/Linked_data#/media/File:Lod-cloud_2017-02-20.png

[167] Some more information, as of November 2021. Cf. https://www.dbpedia.org/resources/knowledge-graphs/ The Latest Core Release is the smallest dataset collection based on the English Wikipedia. The Marvin Bot releases 21 Billion triples per month (5500 triples per second) from 140 Wikipedia languages. DBpedia Archivo is a BETA prototype. It detects and crawls all available ontologies every 8 hours and store them persistently on the Databus. DBpedia Largest Diamond, also BETA, describes 220 million entities using 1.45 Billion triples from DBpedia, Geonames, DNB, Musicbrainz, etc. and is continuously growing.

[168] For a tutorial, cf. https://docs.google.com/presentation/d/1jMRr9CrhjWuCMoGkMMMC7See1FPIiLMi-VMvbicYwY0/edit#slide=id.gd5ac60c251_7_8

[169] https://www.dbpedia.org/resources/ontology/

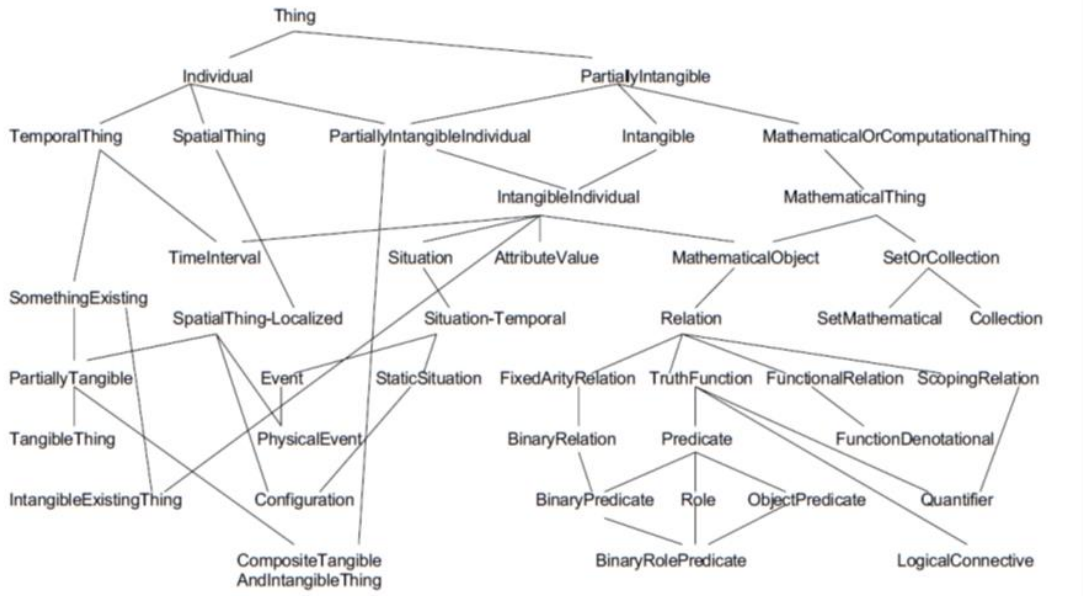

Figure 2: *The OpenCYC Upper Ontology.*
Source: http://www.cyc.com/cycdoc/upperont-diagram.html

Figure 18. *The OpenCYC Upper Ontology. Source: Jansen (2008)*

The CYC example fostered non-conventional research that was quite successful in the end when combined with deep machine learning and NLP. For instance, the CYC precedent was important to develop IBM WATSON, the question-answering computer system in natural language. CYC performs common-sense reasoning, based on logic and rule-based representations plus associative, analogy-based reasoning. Likewise, the Open Mind Common Sense (OMCS) project at MIT has focused on representing common sense knowledge but rather than using a formal logical structure it collects full English sentences. OMCS was developed from 1999 to 2016 by Marvin Minsky, Push Singh, Catherine Havasi, among others, followed by ConceptNet[170], a crowdsourced multilingual knowledge base, representing words and phrases that people use and the common-sense relationships between them.[171] ConceptNet (or Concept.net) is "a knowledge graph that connects words and phrases of natural language (*terms*) with labelled, weighted edges (*assertions*)" suited to be used with NLP techniques such as word embeddings (Speer, Chin and Havasi, 2017).

[170] https://www.conceptnet.io/
[171] https://github.com/commonsense/conceptnet5/wiki

It is also worth mentioning here CommonKADS, the project led by Robert Wielinga in the nineties to create a methodology to support structured knowledge engineering (Schreiber et al. 2000). Its cognitive bases grounded some of the most interesting legal ontologies, as we will show in the next Section, as Joost Breuker, one of the most important legal ontology-builders in the nineties and at the turn of the century, participated actively in this project.

2. 3 The Legal Semantic Web

2.3.1 The Quest for a Legal Semantic Web

In the legal field, the early SW framework was understood as a scaffolding for legal ontology building, incepting something such as a ruling "Legal Semantic Web". Semantic languages would represent legal norms, furnishing a suitable framework to develop legal automated reasoning and decision-making. Automated drafting, contracting, and ruling would be related to legal norms in such a way that the creation, implementation and eventually enforcement of law could be attained to ease court heavy caseloads and rulers' painstaking work. In this vein, Giovanni Sartor plotted the main argumentation concepts coming from legal theory onto Berners-Lee's first stack of languages (Fig. 19).[172] Doing so, he also followed the ascendant abstraction from legal identifiers (identifiers for legal documents-resources) to concepts, rules, arguments and, finally, logical consistency (or trust, certainty in judgements).

[172] I first used the expression "Legal Semantic Web" at the Introduction of Benjamins et al. (2005) in the course of EU Project SEKT (2003-2006). However, my intention was not plotting legal theory onto the SW stack but using the latter to achieve regulatory effects. This still is the main orientation of my work.

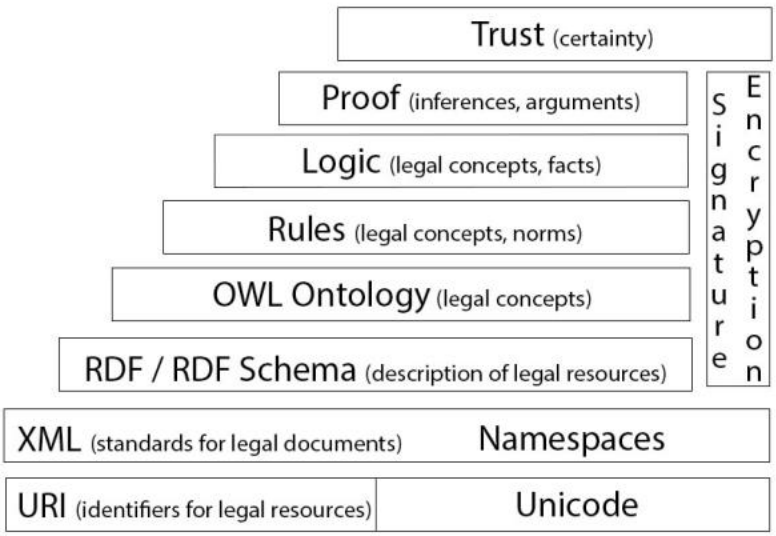

Figure 19. *Legal Semantic Web. Source: Sartor (2008).*

But how such a result could be achieved? In which way? We will answer this question critically in the central chapters of this Dissertation. This new "noble dream" was brought into several EU research projects to standardise core-legal ontologies.[173] The proposal was to formalise law as "legal knowledge" from a number of perspectives.[174] Several approaches were developed in three different PhD approaches following (i) a positivistic (documentary), (ii) a cognitive (common-sense), and (iii) a practical (socio-legal) path.[175]

The quest for a documentary legal semantic web has been pursued at the MIREL EU Project.[176] It is worth noticing that in this version legal texts are the basis for the deployment of normative Multi-agent Systems (norMAS) (Boella 2016). The system is based on extracted normative content. I.e., *it is supposed that law and the "supervenient" quality of "legality" are documentary self-contained*. I cannot discuss this argument here. I

[173] See e.g. SEKT (2003-2006), STELLA (2006-2009) and NeON (2006-2009). The NeON project aimed at advancing the state of the art in using ontologies for large-scale semantic applications in distributed organizations.

[174] Proposals were related to many interrelated fields and traditions. For instance, we can trace the conceptual analysis carried out by legal theorists stemming from the 19 c. German *Begriffsjurisprudenz* (Rudolf von Jhering), the Vienna School (Hans Kelsen), Scandinavian legal realists (Alf Ross), American legal realists (Karl Llewellyn), and the Oxford philosophy of legal language (Herbert Hart). Anthropology and Law and Society tradition played also a role in some more practical approaches.

[175] Hoekstra (2009), de Boer (2011); Casellas (2011). For a comprehensive summary of all approaches, see the volume Sartor et al. (2011).

[176] Cf. http://www.mirelproject.eu/ The MIREL project "will create an international and inter-sectorial network to define a formal framework and to develop tools for *MIning and REasoning with Legal texts*, with the aim of translating these legal texts into formal representations that can be used for querying norms, compliance checking, and decision support". See also Boellla (2016).

will do it in the second part of the Dissertation, but it is of outmost importance to understand automated and semi-automated compliance systems.

There is a second argument that is worthwhile to mention, without developing it now either. I mean the social assumptions for several legal ontological approaches based on John Searle's framework. Searle's successful but simple scheme has been reproduced many times in the recent non-standard deontic logic developments that are being used to trigger inferential reasoning in complex legal systems (Gabbay et al. 2013). As said, I will discuss it in the next chapters. I will just remind that Roy D'Andrade had an interesting exchange with Searle from an anthropological perspective in 2006. From my side, the question will be: *What is considered "legal knowledge" and what count as "X counts-as Y in context C" on the Web of Data?* This is a crucial component of the problem. Searle's formula has been reproduced, used, and fleshed out in many AI developments to grasp societal, social, and legal aspects. Let's link it to legal ontologies to understand its semantic content.

It is assumed that intentional and functional notions are generalised over physical phenomena by the design of *intentional stances*. Hoekstra (2009, 168 and ff.) assumes, with Searle (1995), that these notions are social constructs that can be attributed to, or imposed on *brute facts*, phenomena the existence of which does not depend on human agreement. Rules have the form already mentioned—*X counts as Y in context Z.*

Institutional facts are created when a 'regulative rule' imposes additional restrictions on something which actually does exist independently from that rule, fully or partially determined by a 'constitutive rule' that defines the existence of the entities. Regulative rules have a normative character, while constitutive rules are definitional. I introduce here these classical distinctions as sustained by Searle (1995) because he has developed them in his later works (Searle 2005, 2010) and they have had a notable impact on cognitive anthropology, non-standard deontic logic, legal ontology building, and legal web services developments. I will review it in due course, but it is worthwhile bearing these concepts in mind from the beginning, as most legal ontologies have accepted constitutive and regulative rules as epistemic pillars.

2.3.2 Legal Ontologies

Legal ontologies have been built for more than thirty years now, following the thread of F5, F6, F7 and H2020 European Projects for the digital construction of a mindset and a toolkit for the law. I have been defending during the last fifteen years that there is an asymmetry between the main architectural design of the Semantic Web, and the architectures built so far to give an account of the main components of legal theory. At the beginning of the ontological work that would pervade the following years, André Valente and Joost Breuker (1994) referred broadly to this problem as "the missing link between legal theory and AI & Law". Thus, legal theory would constitute the kernel of concepts to be modelled to reach an interoperable conceptual set.

Computational ontologies would help to bridge the gap leaning onto legal theory assumptions about norms, rules, principles, values, directives, and the like. However, almost thirty years later and despite longstanding efforts to build up a core-ontology for law, we do not have just one core-ontology, but many of them according to different functionalities, ends, and purposes. It should not come as an unattended fact. There are several approaches to legal ontology building (Sartor et al. 2011). I will assert in the following pages that there is not only one reason for that to happen, but many. Ontologies have revealed themselves to be quite useful for classification and information retrieval, but they still need to assume conceptual schemes that are complex in nature and not completely developed for other purposes (such us legal implementation and enforcement). They should be represented within dynamic and evolving social, political, and legal contexts. Their deep social roots have not yet been fully revealed and expressed.

Therefore, a *hybrid perspective* taking into account phenomena that are different in nature —e.g. linked open data; the conceptual structure of legal data, metadata and rules; the conceptual structure of networked governance…— would better match the link between legal ontologies and pluralism in legal theory. In other words, within the so-called Web 3.0 and Web 4.0 law itself turns out to be *relational*. The "missing link" does not occur between legal theory and AI & Law, but between the plurality of options from which law can be theorized and the plurality of perspectives open in the next generation of Semantic Web technologies.

In addition, "legal knowledge" is an ambiguous expression. Its meaning might change according to the accepted sources (statutes, judgements, etc.), the speaker (judge, prosecutor, lawyer, etc.), the environment (court, parliament, etc.), the situation (formal session, informal interchange, public or private discussion, etc.). This is the reason why it is difficult to capture it in a single ontology. Ontologies, as nets of structured concepts, are never "task neutral", as Bench-Capon (2001) made clear using the example of migration concepts.They are built up according to the values, goals, and interests of analysts and developers. And, depending on the complexity of the final goal, several ontologies are needed—aligned, merged—to reach usability. Ontologies should be scalable, reusable, and heritable to allow better querying and browsing on the Internet or in large databases. But they may serve to other purposes as well (such as a fast and clearer interface between human, agents, and computers) and to different social functions (e-commerce, e-administration, e-court, e-business, etc.).

This is a well-trodden path in the legal area. Casellas (2011) reported more than fifty legal ontologies with different levels of maturity, covering a variety of subjects (tax law, property, intellectual property, Dutch criminal law, fraud detection, legal theory, etc.). We may notice that each one of these fields has constructed its own method, strategy, atomic elements, tasks, and theoretical assumptions. Some of current legal ontologies were built twenty years ago (Gangemi and Breuker, 2002):

> 1. LLD [*Language for Legal Discourse*] based on atomic formula, rules, and modalities;
> 2. NOR [*Norma*] based on agents, behavioural invariants, and realizations;
> 3. FOLaw [*Functional Ontology for Law*] based on normative knowledge, world knowledge, responsibility knowledge, reactive knowledge, and creative knowledge; it constitutes an epistemological framework for LRI]
> 4. FBO [*Frame-Based Ontology of Law*] based on norms, acts, and descriptions of concepts;
> 5. LRI-*Core Legal Ontology* [Leibniz Center for Law (LRI)-Core] based on objects, processes, physical entities, mental entities, agents, and communicative acts;
> 6. IKF-IF-LEX *Ontology for Norm Comparison* based on agents, institutive norms, instrumental provisions, regulative norms, open textured legal notions, and norm dynamics.[177]

[177] I am listing here the most classical ontologies, as they were incepted in the nineties and the turning of the century.

Figure 20 visualises the layers of LRI-Core Ontology built up by Breuker and Hoekstra (2004).

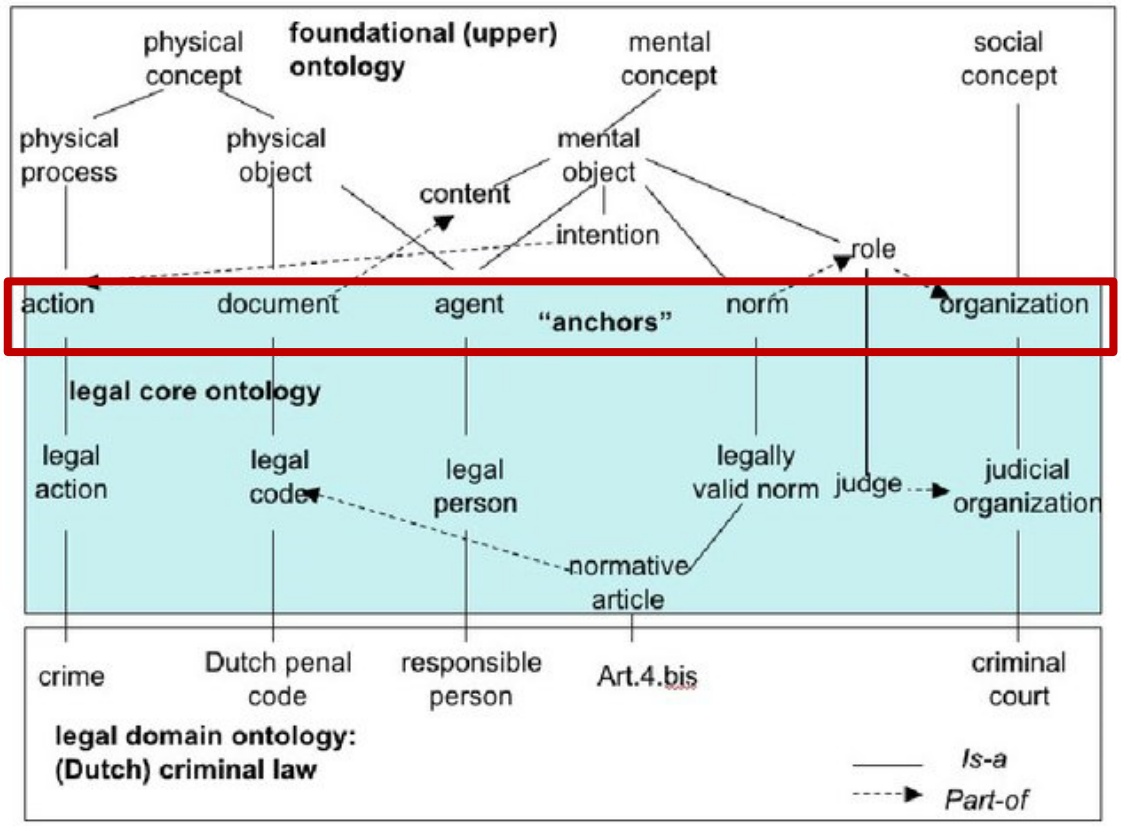

***Figure 20**. LRI-Core layers: foundational and legal core share 'anchors' (high level concepts typical for law). Source: Breuker and Hoekstra (2004). I highlighted the "anchoring" concepts.*

I will return here to the notion of ontology, as it was developed following a theoretical stance since the beginning from the legal side. Breuker and Hoekstra (2004) for instance, brought it closer (but different from) Minsky's notion of 'framework'. An ontology is basically conceived as "a set of terminological definitions built around a taxonomic backbone", while "a framework is an assembly of concepts or types of knowledge that reflect recurrent patterns of use." I will use later in the Dissertation the difference between framework and ontology in the evaluation of some of the present trends in social anthropology.

I will just make by now the point that the concept of legal ontology, as built in the nineties by some of the AI&Law founders, did not just entail the common notions of inheritance and interoperability, but the structure of a legal architecture to "anchor" upper-top ontologies into legal-core ontologies. *Anchors* are high level concepts typically used in the

legal domain, present in the upper and core levels. Thus, LRI-Core is grounded in common-sense concepts, i.e. in categories used in natural language carrying legal knowledge (action, document, agent, norm, organisation).

Experts in applied ontologies such as N. Guarino and A. Gangemi made the proposal to term generically *regulatory ontologies* those conceptualizations that typically involve the description of rules and regulations within the social world. However, common sense and plain natural language are sometimes difficult to distinguish from a more technical or specific language. *Legal professional knowledge* is a different kind of knowledge than jurisprudence. Judges, prosecutors and lawyers, for instance, share legal knowledge, but have developed different professional ones (Casellas 2011). Legal and non-legal (common sense) ontologies may constitute libraries of ontologies to be used for LawTech Web Services, public administrations, and members of the legal profession (law firms, judges, prosecutors, etc.).

Therefore, in the following years, up until this very moment, the ontological work has mainly focused on domain ontologies to solve problems in specific domains. The two last surveys on legal ontology building are coincident in this point. In the second decade of this century, knowledge representation has been focused on the modelling of specific legal sub-fields, while Linked Data principles and the adoption of SW standards are now common and available for publishing legal resources (de Oliveira et al. 2019, Leone et al. 2020).

De Oliveira et al. (2019) carried out a systematic mapping of thirty years of legal ontologies. They also classified the existing legal theories according to different criteria, i.e. their *interoperability,* and their *relationship to legal theories*. With respect to the latter, they considered their relationship with the concepts stemming from legal theory (especially from the classical general theories of law by Kelsen, Hart, Hohfeld, and Alexy), in a way that we will re-examine later in this Dissertation. With respect to the former, interoperability, they pointed out the following objectives: (i) *integration of laws* from multiple jurisdictions; (ii) *legal harmonisation* of selected corpus/data sets of documents (such as regulations, directives, and case law); (iii) *legal harmonisation between language standards* addressing specific domains (such as digital rights licenses); (iv)

harmonisation between technical and legal perspectives. "In essence, harmonisation seeks to capture common knowledge elements, bypassing the barriers of semantic heterogeneity and dispersion of data." (de Oliveira et al. 2019, 17)

2.3.3 New Trends in Legal Ontologies

In their Editorial to the Special Issue on Law and the Semantic Web published in SW, Casanovas et al. (2016, 219) summarised the new trends in the field, stressing their regulatory side:

> Ontology-driven systems with reasoning capabilities in the legal field are now better understood. Legal concepts are not discrete but make up a dynamic continuum between common sense terms, specific technical uses, and professional knowledge in an evolving institutional reality. Thus, the tension between a plural understanding of regulations and a more general understanding of law is bringing into view a new landscape in which general legal frameworks – grounded in well-known legal theories stemming from 20th-century legal positivism or sociological jurisprudence – are made compatible with specific forms of rights management on the Web. In this sense, Semantic Web tools are not only being designed for information retrieval, classification, clustering, and knowledge management. They can also be understood as regulatory tools, i.e., as components of the contemporary legal architecture, to be used by multiple stakeholders – front-line practitioners, policymakers, legal drafters, companies, market agents, and citizens.

De Oliveira et al. (2019, 19) identify twelve legal subdomains in which ontologies have been built and applied: Traffic Law, Tax Law, Civil Law, Local Government Law, Labour Law, Succession Law, Commercial Law, Contractual Law, Consumer Law, Criminal Law, Privacy Law, and License Law. It is worth noting that they cross the boundaries of the usual distinction between private and public law in many ways, because they must situate themselves *from a relational perspective* to identify legal requirements as constraints to carry out inferencing, information retrieval, reasoning, and eventually legal implementation and enforcement of rules. Even though, an analysis of where they have been applied reveals a predominance of the transactional and contractual domains, i.e. they have been mainly market-driven, with two exceptions. First, the interest for modelling national and international legislation to enhance classification and interoperability in legal information retrieval. Second, the interest of Administrations, Governments, and legislative bodies to implement some of the publishing solutions that have been already applied by corporate legal publishers. The most complete and full-fledged legal

ontologies are private, for all publishers (Westlaw, Lexis-Nexis, Wolters Kluwer…) have developed their own taxonomies, vocabularies, attributes, and relationships, and they keep them confidential. All public legal publishers have adopted their own taxonomies and classifications as well, as texts are coded to be consumed by machines, including legal provisions and legal dictionaries (Peroni 2016).

The Publications Office of the European Union (OP) is a key player, being a public institution department and a legal publisher at the same time. "In these two roles it is aimed to provide information services (in particular legal information) able to guarantee accessibility, maintainability and re-usability of legal information resources" (Francesconi 2018). Numbers are impressive:

> At European level, one of the main LOD initiative has been developed at the OP by providing a Linked Open Data dissemination service for the Cellar, semantic web content and metadata repository of legal and non-legal documents produced by the European institutions. Cellar includes about 150 million of documents in 24 languages; metadata in as many languages are stored and described in RDF, resulting in about 800 million of triples. Currently the Cellar SPARQL endpoint, recently exposed in order to complement linked open data services to potential consumers [9], receives about 10 million requests per day (Cellar statistics dated April 2018). Cellar is also the source of information of the Eur-Lex portal (http://www.eurlex.eu) which provides access to several types of legal resources including treaties, legislation, case-law and legislative proposals. (Francesconi 2018, 6)

The European Legislation Identifier ontology "includes the description of the FRBR levels of abstraction, the needed date properties to describe legislation and links to relate legislative acts. *Legislation metadata is thus viewed as a global graph of interconnected entities* [emphasis is mine]". (Drancart et al. 2019, 137)

The Functional Requirements for Bibliographic Records (FRBR) is a conceptual entity–relationship model developed by the International Federation of Library Associations and Institutions (IFLA). As said, the CELLAR repository provides semantic indexing, advanced search and data retrieval for multilingual resources. The Common Metadata Model (CDM) ontology is based on the FRBR model, described by their views according to the FRBR model in terms of Work, Expression, Manifestation and Item (Francesconi 2015). Figure 21 shows the CDM organisation system. "FRBR hierarchy represents a sort of pivot knowledge organization system" (ibid.). However, we should also consider the

criticism by Francesconi et al. (2015) regarding legal documents, for such a model does not establishes properly subClass relations between FRBR classes (Work, Expression, Manifestation) and classes for document classification (GeneralPublication, LegalResource, and the like).

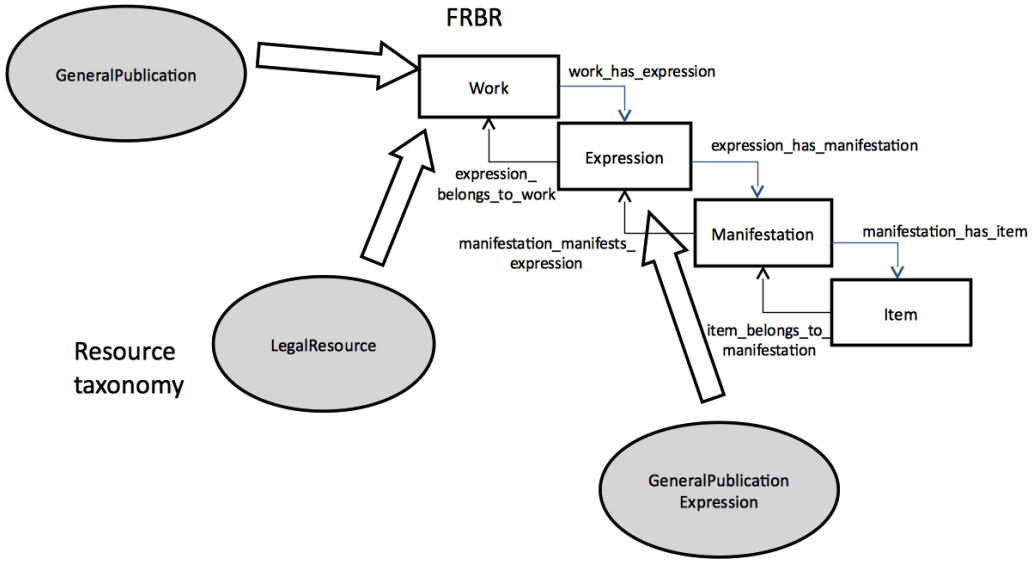

Figure 21. *CELLAR Common Metadata Model (CDM) Organisation System. Source: Francesconi et al. (2015).*

The publication and coming into force of the European General Data Protection Regulation in May 2018 has been especially important, as "data protection by design" and "by default" is explicitly mentioned and promoted in the new EU legislation. This means that modelling its content has represented a priority in the past four years. Table 6 summarises and defines some of the current ontologies in the legal domain.[178]

Table 6*. Some Current Legal Ontologies*

Open Digital Rights Language (ODRL)	A policy expression language that provides a flexible and interoperable information model, vocabulary, and encoding mechanisms for representing statements about the usage of content and services.[179]
Linked Data Rights Ontology (LDR)	The Linked Data Rights (LDR) ontology models the rights which can be exercised on a Linked Data resource. LDR ontology is based on ODRL from

[178] For our purposes, this table is an account, not a maturity-level analysis. I have used the content of Casanovas et al. (2016), de Oliveira (2019) and Leone et al. (2020) as a template.
[179] https://www.w3.org/TR/odrl/

	which it extends the classes Action, Asset, Policy and Rule in order to model the conditions of use of the Linked Data resources.[180]
Creative Commons Rights Expression Language (ccREL)	ccREL is a proposed Rights Expression Language (REL) for descriptive metadata to be appended to media that is licensed under any of the Creative Commons licenses.[181]
Licences for Linked Open Data (L4LOD)	L4LOD (Licenses for Linked Open Data) is a lightweight vocabulary for expressing the licensing terms in the Web of Data. The vocabulary is not intended to propose yet another license, but it is intended to provide the basic means to define in a machine-readable format, i.e., RDF, the existing licensing terms.[182]
Ontology of European Public Procurement Notices (LOTED2)	LOTED2 is an ontology for the representation of European public procurement notices. It follows initiatives around the creation of linked data-compliant representations of information regarding tender notices in Europe but focusing on placing such representations within their legal context.[183]
Public Procurement Ontology (PPROC)	Public procurement or tendering refers to the process followed by public authorities for the procurement of goods and services. PPROC gives support to publication and accountability by semantically describing public procurement processes and contracts.[184]
Privacy Ontology (PrivOnto)	PrivOnto establishes a semantic framework for the analysis of privacy policies, based on annotated data obtained from US companies.[185]
GDPR Ontology (PrOnto)	PrOnto provides a legal knowledge modelling of the privacy agents, data types, processing operations, rights, and obligations.[186]
Extension of ODRL to GDPR	It models the obligations defined in the GDPR for controllers and processors, and then translate the model into a machine readable format by extending the Open Digital Rights Language (ODRL) ontology to be used for a compliance checking tool.[187]
GDPR Text Extensions (GDPRtEXT)	GDPRtEXT uses the European Legislation Identifier (ELI) ontology published by the European Publications Office for exposing the GDPR

[180] Leone et al. (2020, 211)
[181] https://wiki.creativecommons.org/wiki/CC_REL
[182] https://ns.inria.fr/l4lod/v2/l4lod_v2.html
[183] Distinto et al. (2016, 267). Based on Directives 2004/18/EC and 2004/17/EC on EU contracts.
[184] Muñoz-Soro et al. (2016, 295). Based on the same EU Directives on public contracts, and the Spanish Public Sector Contracting Platform (PCSP, https://contrataciondelestado.es).
[185] Oltramari et al. (2018). "PrivOnto relies on an ontology developed to represent issues identified as critical to users and/or legal experts. PrivOnto has been used to analyze a corpus of over 23,000 annotated data practices, extracted from 115 privacy policies of US-based companies. We introduce a collection of 57 SPARQL queries to extract information from the PrivOnto knowledge base, with the dual objective of (1) answering privacy questions of interest to users and (2) supporting researchers and regulators in the analysis of privacy policies at scale."
[186] Cf. Palmirani et al. (2018).
[187] Cf. Agarwal et al. (2017).

	as linked data. A SKOS vocabulary is provided that links concepts with the relevant text in GDPR.[188]
EuroVoc	EuroVoc is the EU's multilingual and multidisciplinary thesaurus. It contains keywords, organized in 21 domains and 127 sub-domains, which are used to describe the content of documents in EUR-Lex.[189]
European Legislation Identifier Ontology (ELI)	The European Legislation Identifier (ELI) is a system to make legislation available online in a standardised format, so that it can be accessed, exchanged and reused across borders. This initiative, taken jointly by EU countries and institutions, is enshrined in the Council Conclusions of 6 November 2017 on the European Legislation Identifier (2017/C 441/05).[190]
European Case Law Identifier (ECLI)	ECLI is a uniform identifier that has the same recognizable format for all Member States and EU courts, using metadata according to the Dublincore Metadata Initiative.[191]
EurLex CELLAR Common Metadata Model (CDM)	The CDM semantic approach for the CELLAR resources is based on FRBR model to improve accessibility of the OP multilingual documents. CELLAR represents the central information system of the OP, providing storage as well as advanced semantic indexing and access facilities to all the dissemination portals. [192]
European Legal Taxonomy Syllabus (ELTS)	ELTS is a multi-lingual and multi-jurisdictional terminological vocabulary enriched with concepts denoted by vocabulary entries, with semantic relations between different concepts. is used to model the legal terminology created by the Uniform Terminology project on EU consumer protection law as an ontology.[193]
Open Standards for Linking Governments Ontology (OSLO)	OSLO introduced open standards for e-government vocabularies and guidelines for governments in Flanders. Bottom-up organized working groups

[188] Cf. Pandit et al. (2018).

[189] https://eur-lex.europa.eu/browse/eurovoc.html About the integration of Thesauri and Semantic Web techbologies, see Martínez-González and Alvite-Díaz (2019): "Thesauri are Knowledge Organization Systems (KOS), that arise from the consensus of wide communities.RDF has been adopted by thesaurus management tools to store, distribute, and share thesauri. Semantic repositories are used to store the RDF representations of thesauri."

[190] https://eur-lex.europa.eu/eli-register/about.html "ELI is based on a voluntary agreement between the EU countries. It includes technical specifications on (i) web identifiers (URIs) for legal information, (ii) metadata specifying how to describe legal information, (iii) a specific language for exchanging legislation in machine-readable formats.

[191] Cf. Van Opijnen (2011), Van Opijnen and Ivantchev (2015), Van Opijnen et al. (2017). The ECLI system is not an ontology. It is built upon five pillars that must be implemented: identifier, metadata scheme, governance structure, ECLI website and ECLI search engine.

[192] Francesconi et al. (2015)

[193] Ajani et al. (2016, 325): "ELTS is not a formal ontology in the standard sense, i.e., an axiomatic ontology formalized, for instance, in description logic. Rather, it is a lightweight ontology, i.e. a knowledge base storing low-level legal concepts, connected via low-level semantic relations, and related to linguistic patterns that denote legal concepts in several languages spoken in the European Union (EU)."

	delivered a reusable formal specification and serialization of domain specific models. As a result, public administrations and private partners can model people, organizations, public services and locations (including addresses and buildings) for data exchange.[194]
Unified Foundational Ontology for Legal Relations (UFO-L)	UFO-L is a legal-core ontology based on the Unified Foundational Ontology. It articulates the semantics of the content of judicial decisions, contracts, and legal acts focusing on legal relations and related positions instead of abstract norms (and subsumptive facts).[195]
Normative Requirement Vocabulary (NRV)	It has been designed to give support to deontic reasoning on the web, being an extension of the RuleML Metamodel for deontic reasoning (permission, obligation, prohibition).[196]

Ontologies are a reasonably well-developed domain in computer science and engineering. A useful roster of working legal ontologies has recently been offered by the EU Program LYNX, including some classic ontologies that I have not listed, such as LexDania (Denmark) Norma in Rete (Italy), CHLexML (Switzerland), and Nomothesia (Greece) for national legislations.[197]

Legal ontologies have been under research as a result of several recent H2020 Research Programs.[198] All these ontologies have not had an equal degree of implementation. Many of them—except these that are being used for Linked Open Government, legislation, case-law, and legal European accessibility and information retrieval—have been built for research purposes to facilitate further applications. They must be combined with AI techniques (ML, DL, NLP) for scalability and better results. But knowledge acquisition, annotation, maintenance, automatic updating, and adaptation to context are still issues to be solved. In the next generation Internet, the convergence between the Web of Data, the IoT and Industry 4.0 regulations must lean on interoperable format languages. I will deal

[194] Cf. Buyle et al. (2016). "The project was the result of a public-private partnership initiated bottom-up by the Flemish Organization for ICT in Local Government (V-ICT-OR), and co-funded by Flemish ICT service providers and Flemish Government Administrations. The project was also supported by a wider community, including Local, Regional and Federal administrations, non-profit organizations, academic partners and the European Commission program Interoperability Solutions for European Public Administrations (ISA)."
[195] Cf. Griffo et al. (2015a, 2015b, 208. 2020). This is a theoretical work based on Hohfeld's jural relations and Alexy's theory of rights.
[196] Gandon et al. (2018).
[197] https://lynx-project.eu/data2/reference-ontologies
[198] For instance, ManyLaws, LYNX, EUcases, CaseLex, N-Lex, OpenLaws, EUAuthority. See a summary in Loutsaris, M.A. and Charalabidis (2020).

with it in Chapter 5. I will come back to OASIS standards, Akoma Ntoso, LegalXML and LegalRuleML later in the Dissertation. Leone et al. (2020, 210) consider them as *cross-domains* ontologies, "because they were proposed as a more generic model for expressing deontic operators (*Normative Requirement Vocabulary*), representing the content of legal texts in a machine-readable format (*LegalRuleML*) and indexing documents for search (*Eurovoc* and *European Legislation Identifier*)".

It is worth mentioning at this point the linguistic nature of current legal ontologies for compliance and inference retrieval. The LYNX documents of graph ontology, for example, are compliant with NIF (NLP Interchange Format)[199] specification and reuse many ELI metadata elements. Lynx Documents may be grouped in Collections and may be enriched with Annotations.[200] It also follows ISO 632.2 for the representation of names.[201]

In a different vein, there are also other interesting attempts to build up ontologies on theoretical legal concepts. Griffo et al. (2015a, 2015b, 2018, 2020) follow the research in legal-core ontologies beyond LKIF. They built up UFO-L, in which instead of focusing "on general relations between norms as *universals*, it contemplates legal relations *that are manifested as relationships among individuals (subjects) in concrete specific situations* [my emphasis]" (Griffo et al. 2020, 66). UFO-L is based (i) on the concept of *substantial law* theorised by Robert Alexy (2009) in his theory of constitutional rights, (ii) using the concept of *relator* from the Unified Foundational Ontology (UFO)[202]. This notion is not culturally but epistemologically founded (in the Aristotelian square). Figure 22 is a

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[199] https://raw.githubusercontent.com/NLP2RDF/ontologies/master/nif-core/nif-core.ttl "The NLP Interchange Format (NIF) is an RDF/OWL-based format that aims to achieve interoperability between Natural Language Processing (NLP) tools, language resources and annotations. NIF consists of specifications, ontologies and software, which are combined under the version identifier "2.0", but are versioned individually. This ontology is developed by the NLP2RDF project (http://nlp2rdf.org) and provided as part of NIF 2.0 under CC-BY license as well as Apache 2.0", cf. https://persistence.uni-leipzig.org/nlp2rdf/ontologies/nif-core/nif-core.html "The NIF 2.0 Core Ontology provides classes and properties to describe the relations between substrings, text, documents by assigning URIs to strings. These URIs can then be used as subjects in RDF triples and therefore they can be annotated easily."

[200] https://lynx-project.eu/doc/lkg/#R003

[201] https://www.loc.gov/standards/iso639-2/php/code_list.php

[202] Cf. Griffo et al. (2018) "So, for instance, it is true that "John is married to Mary" because there is a relator (a particular marriage) binding them; likewise, it is true that "Paul works for the United Nations" because there is a relator of another type (an employment) connecting them. As a result, many of the fundamental tasks in enterprise and information systems management requires a proper understanding of the nature and lifecycle of relators such as employments, enrollments, marriages, contracts, presidential mandates. In UFO, a relation of mediation is defined to connect relators to their relata. Mediation is, like inherence, a type of existential dependence."

visualisation of a fragment of the ontology, which reflects the triadic version of legal (jural) relations contended by Alexy (based on Hohfeld's squares):

> Alexy proposed a system of legal positions embedding Hohfeldian legal positions in *triadic legal relations* and considering also the possibility of denying the legal relation's object (thereby augmenting Hohfeld's theory). As a result, for each legal concept *right*, *duty*, *privilege*, and *no-right* to an action, there exists a concept of *right*, *duty*, *privilege*, and *no-right* to an *omission*. These legal positions are relevant because they define duties to negative actions (effectively prohibitions). For instance, in e-mail service contracts, the customer often has a duty to omit sending the same message indiscriminately to large numbers of recipients on the Internet (unsolicited e-mail or spam). (Griffo et al 2018)

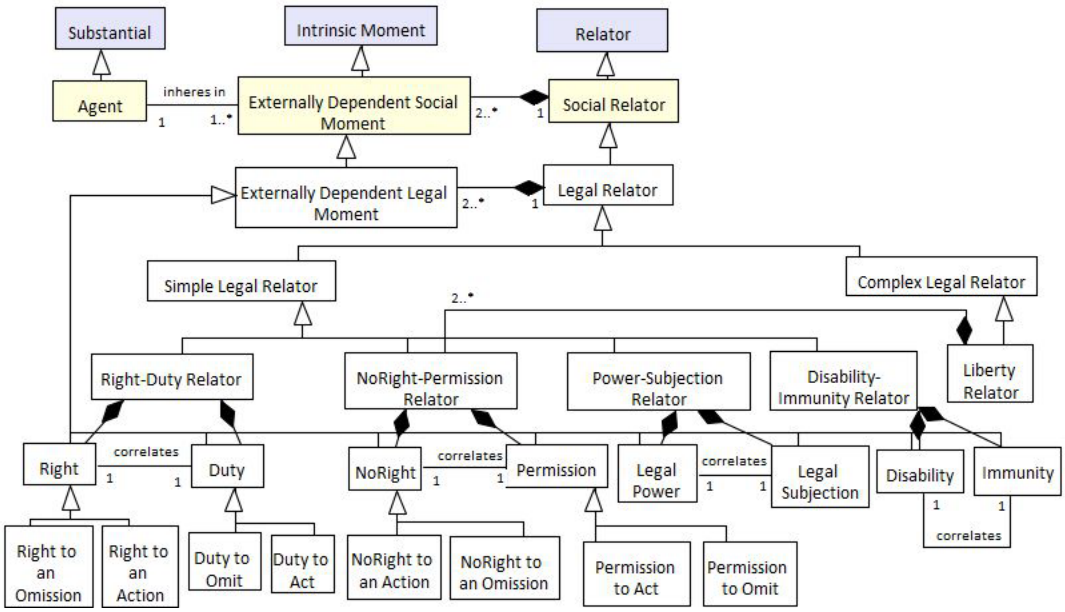

Figure 22. *UFO-L Fragment. Source: Griffo et al. (2018)*

2.3.4 Rights on the Web of Data

We will keep this presentation short, as rights are an essential component of this Dissertation, and I will deploy their analysis in the next chapters. As we saw in 2.3.2 and 2.3.3 rights are one of the essential approaches in legal ontology building. This is partially due to its pragmatic nature. Open Digital Rights Management (ODRM)[203]—at present Open

[203] According to Rosenblatt et al. (2001), Digital Rights Management (2001) is an "umbrella term" referring hardware, software, and services that govern the access to information assets through associated rights and controls their distribution. This perspective is associated to intellectual property rights and has been highly

Digital Rights Language (ODRL)—and Rights Expression Languages (REL)[204] have also been built for almost twenty years now. With the development of Semantic Web (SW) languages—mainly RDF, SPARQL, and OWL— they are experiencing a new life. The second wave of Semantic Web projects points at governance, privacy, and law not only as applications, but as fields to be developed by their own: (i) possible standards for LegalXML and LegalRuleML are discussed in the literature[205]; (ii) forms of algorithmic governance for privacy and data protection have been launched in parallel with computational ontologies, (iii) Natural Language Processing[206] techniques (NLP) are currently used to build and exploit large databases centred on licenses and intellectual property vocabularies, (iv) and beyond standard deontic logic[207], non-standard deontic logic[208] is offering some solutions for reasoning and argumentation (mainly solving well-known deontic puzzles and reformulating the inferential language for norms, rights, duties, and powers). These computational stances bring a different set of scenarios for

controversial However, practically at the same time, Open Digital Rights Management (ODRM) focused more on rights management issues, sharing, interoperability and reuse than on access and content protection Iannella (2001). See, for a comparison, Casanovas (2015b). ODRM evolved into Open Digital Rights Language at the W3C context in the last ten years. See the roadmap of the W3C Permissions and Obligations Expression Group: https://www.w3.org/2016/poe/charter. DRM, access control, enforcement, and legal jurisdictions are explicitly considered out of scope.

[204] Rights Expression Languages (REL) are computer languages created to handle and manage rights and obligations (permissions and prohibition) about content use. REL include W3C ODRL, ccREL, and MPEG-21, among others. See Casanovas et al. (2016a).

[205] See for a recent updating of the state of the art, *Special Issue on Law & the Semantic Web* (Casanovas et al. 2016b). Also: Palmirani et al. (2011), Athan et al. (2015).

[206] Natural Language Processing (NLP) is a field of computational linguistics which performs the modelling of large natural language corpora. It includes, among other computational tasks: lemmatisation, morphology, tagging, parsing, machine translation, sentiment analysis, discourse analysis, and speech recognition.

[207] According to McNamara (2010) deontic logic is "that branch of symbolic logic that has been the most concerned with the contribution that the following notions make to what follows from what:

permissible (permitted)	must
impermissible (forbidden, prohibited)	supererogatory (beyond the call of duty)
obligatory (duty, required)	indifferent / significant
omissible (non-obligatory)	the least one can do
optional	better than / best / good / bad
ought	claim / liberty / power / immunity".

[208] Standard Deontic Logic (SDL) is meant to be the logic that came after E. Mally's first attempts in the twenties and thirties, Jöergensen's paradox in the forties, and and H.v.Wright's first logics of permission and actions in the fifties. Axioms are similar to modal logic. Non-standard Deontic Logic (NDL) takes deontic puzzles and paradoxes as a challenge, focusing on norms (or normative notions), agency, time, and conditionals. Cfr. McNamara (2010), and esp. Hilpinen and McNamara (2013), Gabbay (2013).

anthropological, socio-legal, and legal research, fostering the construction of new analytical tools and regulatory models.

We deem very relevant to our subject the modification of the ODRL model of rights proposed by Agarwal et al. (2017) based on their work on GDPR modelling (Figure 23). They write:

> Unfortunately, some of the paragraphs of these articles [GDPR] *cannot be modelled as simple obligations or rules* [our emphasis]. The normative text also discusses recommended actions which are not obligatory as well as scenarios which are exempted from certain obligations. As such, we refer to the optional actions as Discretional and exemptions as Dispensation. Using Privacy icons (Art 12 para 7) is an example of discretional actions and processing for legitimate interests can be considered as a dispensation for the obligation of obtaining consent.

Legal relations can be discretional, non-mandatory, decision-based, optional, and the conceptual schemes to represent these situations should be clarified. We will come back to these issues in the next chapters. But what should be highlighted is the complexity of legal relationships, which cannot be easily captured and represented in general rights schemes without human intervention at the implementation level.

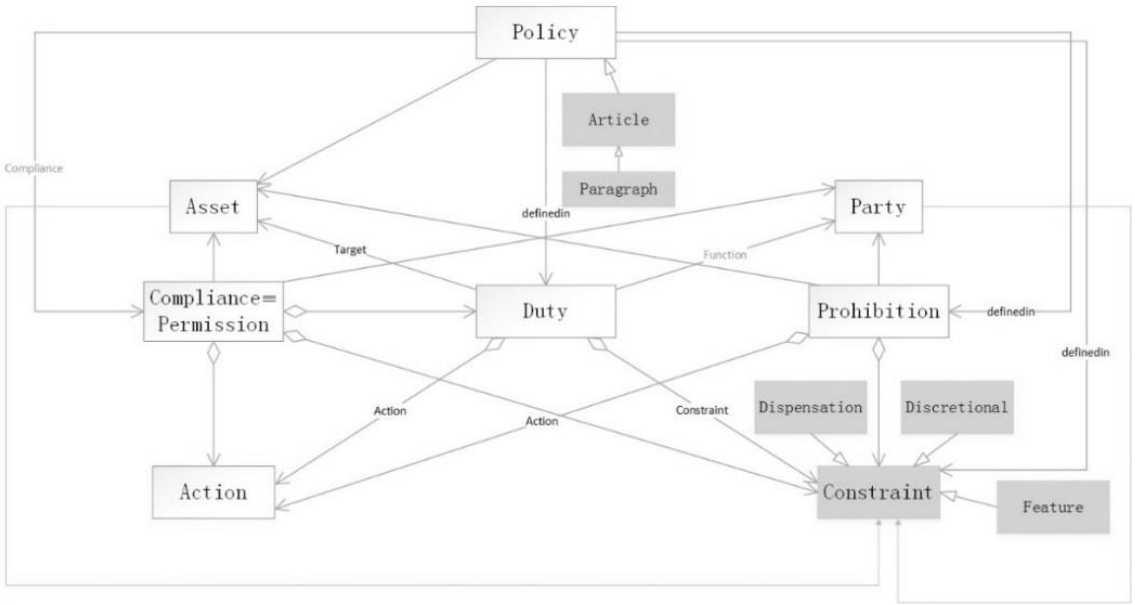

***Figure 23**. The modified ODRL model for the GDPR. Source: Aarwal et al. (2017,3)*

This raises the issue of reusability, scalability, and functionality of legal ontologies. It is in principle sound to separate information retrieval from the implementation (or enforcement) of rights and norm. Most legal ontologies refer to publication to facilitate interoperability on the web, as we have already explained (e,g, LYNX). But sometimes the difference is not that clear. For instance, PPROC, Muñoz-Soro's et al. (2016) ontology for tenders and procurements, is mainly addressed to the publication process but explicitly handles transparency and the accountability of public powers.

There is a relationship between improving management and the enhancement of rights. PrOnto ontology explicitly addresses this broader objective as well: "The goal of this ontology is to support legal reasoning and check compliance by using defeasible logic theory (LegalRuleML standard and SPINDle engine), *as opposed to exclusively improve information retrieval on the web*." (Palmirani et al. 2018, 140). We have already described the main attempt of modelling the concept of 'legal relations' using Alexy's triadic approach (Griffo et al. 2018, 2020).

In the EU, handling and participating in decision-making processes requires to model information as a pre-condition "according to a proper knowledge organization system able to represent legal contents under debates (basically pre-legislation) and social activities linked to the debate (as agreement or disagreement on specific matters or texts, amendments on specific fragment of pre-legislative documents, etc." (Schmitz et al. 2017).

2. 4 Some Precautionary Perspectives and Limitations

I have been exposing in this Chapter the evolution of the Web of Data related to the modelling of law and rights. I already have shown some internal boundaries, leaning on the knowledge acquisition process, the nature and expressivity of the languages being used, and the need of getting end-users involved from the beginning up to the end.

We should gain some perspective now and ask about its limitations from the outside. Is this approach deep enough, considering the global shaping of a digital society? What are

its boundaries, hindrances, and backlashes, if any? Is there any "dark side" of the Semantic Web?

Some critics, such as Shirsky (2003), believed that "an over-specified solution in search of a problem" (Ford 2003) on deductive syllogisms, metadata and ontologies would not work properly in a real world full of uncertainties, partial information, and unconclusive reasoning. The dark side of the SW is also the provocative title of one of the Editorials of Jim Hendler, one of the founders of W3C along with Tim Berners-Lee, although he was alluding to the "dark side" of the moon rather to negative aspects, i.e., to what was happening in the dark, out of the bright side, to understand the Web "not as a linked set of documents but as a technical construct of protocols, processes, languages, and tools that make it all work." (Hendler 2007, 2)

Hendler pointed out the use of tagging to associate keywords with non-text items in photo and video sites, and the social dimension of crowdsourcing and blogging. Thus, the convenience to embed simple or little semantic solutions into applications with a huge impact. Little AI innovations could lead to big solutions. "Semantic Web developers are beginning to understand that our technology can similarly gain use by being successfully embedded into the somewhat chaotic, but always exciting, world of Web applications"—he said (ibid.3). From the very beginning, he had a clear vision about what ontologies should be and how they should work on the semantic web:

> I define ontology as a set of knowledge terms, including the vocabulary, the semantic interconnections, and some simple rules of inference and logic for some particular topic. […] The Semantic Web, as I envision it evolving, will not primarily consist of neat ontologies that expert AI researchers have carefully constructed. I envision a complex Web of semantics ruled by the same sort of anarchy that rules the rest of the Web. Instead of a few large, complex, consistent ontologies that great numbers of users share, I see a great number of small ontological components consisting largely of pointers to each other. Web users will develop these components in much the same way that Web content is created. (Hendler 2001, 30-31)

Nowadays, this pragmatic engineering trend has become the rule in the legal field as well, as shown by the recent Rules as Code (RaC) movement. Hogan (2020) has recently evaluated the SW evolution, including a survey among the main developers. The general opinion is that there is still room to improve and realise Berners-Lee's original vision. The lack of availability of usable tools and interfaces, end-users' participation, and the

need to align SW technologies with AI developments constitute hurdles to overcome. I will come back to this point when explaining some features of the Internet of Things in Chapter 5. Stemming from a broader anthropological perspective, the point I would like to make here is not directly related to reaching end-users or merging, aligning, or improving its technical side. It is rather addressed to its placement and public function into the broader Internet framework. Let's put the argument in the following way.

I deem essential knowing the size, structure, destination, and evolving functions of information flows. There have been metrics to measure and analyse the traffic flow on the Internet for decades, but only in recent times scientists have been able to overcome the multiple technical, social, and legal barriers to carry out these metrics. The Center for Applied Internet Data Analysis (CAIDA) Telescope in San Diego has observed a continuous stream of packets from an unsolicited dark space representing 1/256 of the Internet. During 2019 and 2020 over 40,000,000,000,000 unique packets were collected representing the largest ever assembled public corpus of Internet traffic (Kepner et al. 2021). What does it mean?

> This unsolicited traffic results from a wide range of events, such as backscatter from randomly spoofed source denial-of-service attacks, the automated spread of Internet worms and viruses, scanning of address space by attackers or malware looking for vulnerable targets, and various misconfigurations (e.g. mistyping an IP address). In recent years, traffic destined to darkspace has evolved to include longer-duration, low-intensity events intended to establish and maintain botnets. (Kepner et al. 2021)

This is not the first time that CAIDA warns about security and, what is most important, alludes to the problems the Supercomputation centre has to face to offer reliable results. In 2008, before an attentive Stanford audience of lawyers, Kimberley Claffy pronounced a memorable speech in 2008 entitled *Ten things lawyers should know about the Internet*. I deem the following points made by Claffy (2008) relevant to my purpose:

> I. Updating legal frameworks to accommodate technological advancement requires first updating other legal frameworks to accommodate empirically grounded research into what we have built, how it is used, and what it costs to sustain.
> II. Our scientific knowledge about the Internet is weak, and the obstacles to progress are primarily issues of economics, ownership, and trust (EOT), rather than technical.
> VI. While the *looming problems of the Internet* indicate the need for a closer objective look, a growing number of segments of society have network measurement access to, and

> use, private network information on individuals for purposes we might not approve of if we knew how the data was being used.
> VII. The traditional mode of getting data from public infrastructures to inform policy-making—regulating its collection—is a quixotic path, since the government regulatory agencies have as much reason to be reluctant as providers regarding disclosure of how the Internet is engineered, used, and financed.

This was written in the eve of the last economic crisis starting in 2008, but long before scandals enfolded—such as PRISM, Edward Snowden, the Chinese social credit system, and Cambridge Analytica—triggering important books such as *Weapons of Math Destruction* (O'Neil 2016) and *The Age of Surveillance Capitalism* (Zuboff 2019).

In the next decade, the issues pointed out by Claffi (2008, 17) as the biggest problems of the Internet remain: (i) the fundamentally insecure software ecosystem, (ii) the fundamentally unscalable routing and addressing architecture, (iii) the fundamentally unsustainable economic architecture, (iv) and a stewardship model broken along so many dimensions that solving or studying the first three problems *is no one's responsibility* [my emphasis].

It would be clearly needed a joint effort of all stakeholders (academics, private companies, and governments) at local, regional, national, and global level to face these problems. But are there enough incentives for such a collective endeavour?

We will keep the question open by now, but many indicators are negative. The final Report of the last Workshop on Overcoming Measurement Barriers to Internet Research (WOMBIR 2021) asserts that often edge measurements allow for inference of properties or behaviour, *but not direct assessments*, as "much of the data that would help inform better research is gathered internally by network operators" (Claffy et al. 2021). Data for the Internet longitudinal analysis over time is especially difficult to obtain. Likewise, Internet data for macro-economics is equally poor. The structure of the Internet may reflect trade agreements between countries, as well as a given nation's power and dataflows. But there are some obstacles too: Bandwidth between countries is usually not revealed in data sources, and adjacency matrices for macro-economics are thus difficult to obtain (Claffy and Clark 2021).

In the same vein, Test and Clark (2020) have given real-world evidence of the levels of malicious activity enabled by the global routing protocol called the Border Gateway Protocol (BGP). The Internet is composed of Autonomous Systems (ASs), which interconnect to form the global Internet independent entities independent entities that make their own decisions on policies (business plans, investment, interconnection….), affecting the global Internet traffic. There are about 70.000 ASs on the Internet, which handle blocks of Internet addresses used by the routers. But there are many BGP vulnerabilities, and the cryptographic keys to verify the identity of BGP routers are not always working.[209] On the upcoming Internet of Things, the situation is even worse: "Whenever an appliance is described as 'smart', it is vulnerable" (Hypponen and Nyman 2017). And cryptographic algorithms based on public key schemes can easily be broken by the next generation of quantum computers (Cheng et al. 2017).

I my opinion, these results on dark spaces, measurements, and vulnerability issues give support to Europol studies on the growing of the so-called deep and dark web, along with the growing cryptocurrencies and blockchain markets (Broadhusrt et al. 2018). The Internet offers an indexed and non-indexed side. But according to Europol (2017) the public surface layer in which Linked Open Data is operative covers only 4% of the Internet information flow. The remaining 96% is out of reach (including the estimated 6% of the dark web). The iceberg graphic of Figure 24 has been reproduced many times in the literature with different variants.

[209] The critical security flaw with BGP is well-known: a rogue Autonomous System can announce a falsehood into the global routing system, i.e., a false assertion that it uses or is the path to a block of addresses that it does not in fact have the authority to announce. Traffic to addresses in that block may then travel to that rogue AS, which can drop, inspect, or manipulate that traffic." (Test and Clark 2020, 2)

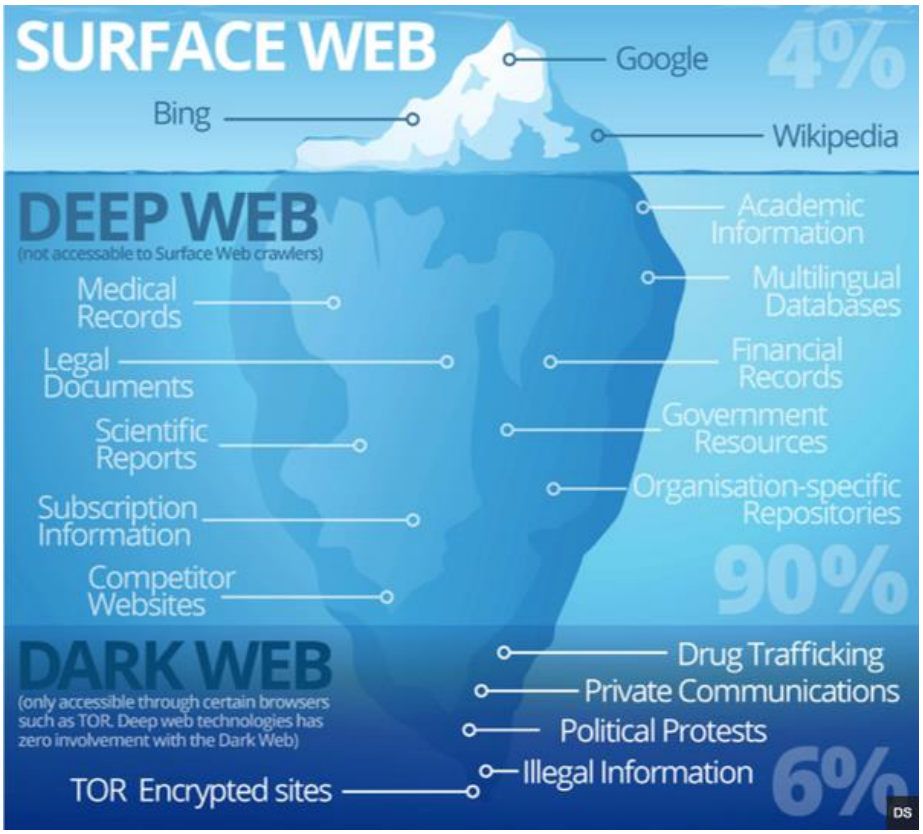

***Figure 24**. Mapping the Internet layers. Source: Europol (2017).*

The availability of cybercrime tools and services on the Dark Web appears to be growing relatively faster than more established market commodities such as drugs. I cannot assert the validity of this mapping, but my intuition is that is quite close to reality. The related infographics of the dark market and conducted operations is very detailed. But, as Bayoumy et al. (2018) have pointed out:

> A qualitative, netnographic study is a suitable approach to get an understanding of social phenomena based on limited sets of unstructured data. However, results from such a study should be considered to be more in the line of indications and norms rather than cold hard facts.

The conclusion is obvious: *Semantics and the W3C, relevant as they might be, only operate a minimal part of the Internet activities.* To situate and understand the legal and ethical issues of the Web of Data, it would be necessary to broaden up the lens and to focus on the relational turn experienced by the law in the turning of the century. The quick digital turn has fuelled some trends that were already there. This will be the subject of the

next chapter. Chapter 1 offered a prospective of the transformation of the legal field into a market of Web Services in a platform-driven economy. Chapter 2 has drawn an internal representation of the Web of Linked Data and the so-called Legal Semantic Web. This will be the subject of chapter 3, in which I will consider the notion of relational law and its connection with the digital environment of the Web of Linked Data.

Table 1. *Structure and Concepts of the Dissertation*

MODULES	CONCEPTS	FIELDS	CHAPTERS
Legal Web Services and Artificial Intelligence	Law as Data	Legal Anthropology and Sociolegal Studies	1. The Double Implosion of the Legal Profession and Web Services
	Law as Meaning		
	Law as Sense		
Law as Knowledge	Knowledge Graphs	Ontology and Semantic Web	2. Law as Knowledge: The Web of Linked Open Data
	Legal Ontologies		
Law as Dialogue	Agreement	Legal Theory, Sociolegal Studies, and Legal Anthropology	3. From Positivist to Relational Law: Law as Dialogue
	Legal Pluralisms		
	Relational Law		
	Relational Justice		
	Regulatory Model		
	Regulatory System		
Reciprocity and Dialogue	Integration	Legal Anthropology	4. The Legacy of Legal Anthropology
	Reciprocity		
	Legal Culture		
	Vindicatory Systems		
Legal Governance	Middle-out Approach	Epistemology	5. The Convergence between the Web of Data, the Internet of Things and Industry 4.0
	Inside-out Approach		
Linked Democracy	Rule of Law	Political Anthropology and Artificial Intelligence	6. *Legal Isomorphism* and the Emergence of Legal Ecosystems
	Metarule of Law		
	Legal Ecosystems		
	Legal Isomorphism		
	Institutional Design	Social and Political Sciences	

Sociolegal Ecosystems	Interoperability	and Artificial Intelligence	7. Sociolegal Ecosystems: Political Forms of Legal Governance
Metarule of Law	Compliance *by* and *through* Design	Methodology and Use Cases	8. From Compliance by Design to Compliance through Design: An Empirical Validation Model
	Scheme		
	Metamodel		
	Validation Model		

CHAPTER 3

From Positivist to Relational Law: Law as Dialogue

> If only some judges acted 'for their part only' on the footing that what the Queen in Parliament enacts is law, and made no criticisms of those who did not respect this rule of recognition, the characteristic unity and continuity of a legal system would have disappeared. For this depends on the acceptance, at this crucial point, of common standards of legal validity. In the interval between these vagaries of judicial behaviour and the chaos which would ultimately ensue when the ordinary man was faced with contrary judicial orders, we would be at a loss to describe the situation. We would be in the presence of a *lusus naturae* worth thinking about only because it sharpens our awareness of *what is often too obvious to be noticed*.
>
> [H.L.A. Hart, The Concept of Law, 2nd ed., (1961) 1994, p. 116]

Summary. This chapter sets forth the legal theoretical approaches that can be related with the sociolegal and anthropological ones. The Chapter is divided into three main sections. The first one approaches the subject of agreements and legal relationships adopting a legal theoretical perspective. It describes the views by the three main positivist theories of the 20th century—belonging to Hans Kelsen, Herbert Hart, and Alf Ross. The second one unfolds the origins and developments of a sociolegal perspective which was historically termed *relational* by realists Roscoe Pound and Karl Llewellyn. The Chapter identifies four stages of development of relational law and justice, including the work of several socio-legal scholars and anthropologists. This empirical approach can be worked out to build several concepts that will be most useful (i) to understand and explain the regulatory challenges on the Web of Data, (ii) and to set the pillars upon which I will deploy the mindset and toolkit of legal governance. The third section contains the definition of r*elational law, relational justice, regulatory models* and *regulatory systems*, including some important aspects and trends such as the framework of cloud and fog computing for web services, crowdsourcing platforms, and democratic values. The kernel of this Chapter is the notion of law as dialogue.

Keywords: Agreement, Legal Theory, Law and Society, Legal Anthropology, Relational Justice, Relational Law, Crowdsourcing, Fog Computing, Democratic Values

3.1 Introduction: From Positivist to Relational Law

I will set forth in Chapter 3 on a journey that will head us to the foundations of legal anthropology in the next one. It will be a long journey, but I deem it necessary to understand and explain the conceptual constructs that I will propose in the second part of this Dissertation, i.e. to *make sense* of them.

I have always been puzzled by the final sentence of Hart's famous paragraph at the central chapter of *The Concept of Law* (1961) that I reproduced above. What is the meaning of *what is often too obvious to be noticed*? He was referring to a counterfactual, and counterfactuals are quite important in law. We will meet them again when we deal with validation issues in the chapters to come. Hart was not pointing here to legal argumentation but to the fundamental question of validity. What is a 'valid' law? Why law should be valid (or not)? According to Hart, *if* "common standards of legal validity" disappear, *then* it would be "chaos", a *lusus naturae*, a freak of nature, an abnormality. It would sharpen, by contrast, "our awareness of what is often too obvious to be noticed".

What is that obvious? It is difficult to say. I would dare the law itself, validity of the law, legal reality, i.e. the conceptual structure of the legal foundations he plotted on the rule of recognition. This pervasive nature of what is legal or "what can count as law" (Hart [1961] 1994, 270) would be present at all times and places under a determined jurisdiction, within the general framework set by legal rules and concepts. Law does *exist*, and its *mode of existence* is complex, i.e., conceptual legal validity, which is also the timber, the lattice beam, the mainmast of the social vessel.

I will approach this subject in the present chapter from a different angle. I will start, first, with the legal value of interactions, relationships, and agreements in law and in legal theory (Hans Kelsen, Herbert Hart, Alf Ross). I will expose, then, the rise of *relational* law, another perspective on this topic, incepted by the realist vision of Roscoe Pound and resumed and fuelled by Karl Llewellyn's (and E.E. Hoebel's) seminal work in the thirties and forties of past century.

I should mention that I will not intend an overall description of these different legal philosophies. I will just pinpoint only what is relevant to heading towards a workable notion

of *relational law* and *relational justice* to address some of the regulatory problems of the digital society. This is a quite narrow scope, and I hope it will pay off in the next chapters because Chapter 4—specifically targeting legal anthropology—is a sister chapter, a companion of the present one. Both are bridging the two parts of the Dissertation. Chapters 3 and 4, first, and Chapter 5, on the new digital setting of LoD and IoT, are the two hinges that hold the door.

A discussion on *dialogue as a source of law* will follow. This is a key aspect of my argumentation. After singling out the four stages or steps of the relational law approach, Section 3.5 will begin the discussion of four essential trends on the Web of Data—crowdsourcing, agreement and disagreement, validity and regulatory models, and democratic values. The Chapter ends with a summary of the conclusions.

3.2 Agreement in Law

One of the most popular legal Dictionaries online differentiates two different meanings of 'agreement' in law: "1) any meeting of the minds, even without legal obligation; 2) another name for a contract including all the elements of a legal contract: offer, acceptance, and consideration (payment or performance), based on specific terms."[210] These two meanings are carried on by a multitude of different legal words, which can be nuanced regarding to the specific terms and conditions of the agreement.[211] The "languages" of law, the symbols through which law is expressed, conveyed and formulated, encompass all forms of ancient and modern natural languages (Mellinkoff 1963), and foster legal dictums and mottos—the ancient (and not always consistent) *brocards*. Eg. *Conventio vincit legem* [Agreements overrule statutes], *Conventio facit legem* [Agreements make the law], or *Pacta sunt servanda* [Agreements must be respected]. In the Middle Ages, in some parts of Europe, such as the Veyne or Catalonia, this was reflected in a

[210] http://legal-dictionary.thefreedictionary.com/agreement

[211] (I) Agreement as concurrence: *accord, amity, arrangement, assent, common assent, common consent, common view, community of interests, concord, conformance, congruence, congruency, congruity, consent, consentaneity, consentaneousness, consentience, consonance, cooperation, good understanding, harmony, meeting of the minds, mutual assent, mutual promise, mutual understanding, oneness, reciprocity of obligation, settlement, unanimity, understanding, uniformity, unison, unity.* (II) Agreement as contract: *alliance, arrangement, bargain, binding promise, bond, commitment, compact, concordat, concordia, contractual statement, convention, covenant, deal, engagement, legal document, mutual pledge, obligation, pact, pledge, settlement, transaction, understanding, undertaking.*

strong principle of public law—*Pactes rompen lleis* [Agreements can overcome (or break) statutes] (de Montagut and Ripoll 2019-20).

It is worthwhile to highlight the strength of agreements in ancient and medieval law. In pre-modern societies, ties among relatives, social groups and the community had the additional value of being a survival bond in everyday life (Watson, 1989). We can understand then the non-intuitive point of a value-correlated chain between the two legal meanings pointed out, the epistemic and the behavioural one—the *implicit* cognitive agreement about something, and the *explicit* proactive and intentional agreement on some plan of action or expected behaviour.

From the political point of view, the problem can be formulated as the limitation of the ruler's power (usually the monarch, but often the tyrant). From the legal point of view, it goes as the birth of the obligation to fulfill the agreement because of the existence of this same agreement. When can it be enforced? At what moment does it appear the *obligatio*, the binding power that qualifies as enforceable the link between the subjects of the agreement? And, even more important, can regulatory effects of agreements do exist outside of legal formalism?

This was the origin of the theory of *causality* in law, as explained by Lorenzen (1919):

> Roman law, even in the last stage of its development, did not enforce an agreement unless it could be brought under certain well-defined heads of contracts or pacts. In the time of Justinian all agreements would become actionable by being clothed in the form of a *stipulation*, which for practical purposes may be regarded as equivalent to a written form. (…). In all real contracts the obligation arose not from the agreement of the parties but from the delivery of property or the performance of the plaintiff's promise, that is, in our terminology, from an executed consideration.[212]

In other words, *nude pacts* were not enforceable unless they entered a more concrete formal way in a process of ritualization in which certain use of words and *mise en scene* to produce artificial effects close to religion and magic were due.[213] These legal grounds

[212] In the Common Law *consideration* is the correlative of *causa* in the Civil Law. "Something of value given by both parties to a contract that induces them to enter into the agreement to exchange mutual performances." http://legal-dictionary.thefreedictionary.com/consideration

[213] But see the warning by MacCormack (1969) on going too far in the "magical" interpretation of law in pre-modern societies

were the *causa* of the contract. An agreement had to show an underlying "cause" to become a contract. There were no contracts *sine causa*, "without cause".

> With us an agreement is actionable unless there is some reason why it should not be so. With the Romans an agreement was not actionable unless there was some reason why it should be so. (Buckland, quoted by Lorenzen, 1919)

I think that at least three consequences can be drawn from this statement: (i) asserting what a legal agreement is or could be is a theoretical issue, in which jurists have been involved since the Roman times; (ii) defining 'agreement' as a concept means activating at the same time a certain degree of inner knowledge of the legal system in which the definition works; (iii) discrete categories of agreement are at odds with the continuum between nude pacts and more coercive forms of contracts.

Taxonomies are entrenched with the concrete performance of *types* of agreements susceptible to variations. A set of "nearly considered" contracts do exist either in the Roman or in contemporary Civil Law.[214] Lorenzen's conclusion is nowadays a common belief.[215] What happened, then?

The most natural explanation is the occurrence of the modern state, since the 17th c., and the formulation of the legal framework of the rule of law in the 19th c. One of the main contributors to the doctrine of causality in law was Jean Domat (1625-1696), the French jurist who at the same time, within the *Traité des loix*[216], organized in one single legal body the public order system of Louis XIV. There is a direct line from this theoretical body and the French *Code Civil* (1804), through which Napoléon intended the political reconstruction of the nation-state, stemming from the administrative organization of the *Ancien Régime*.[217]

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[214] Cfr. Radin (1937). The *Institutes* of Justinian (III, 13) divided obligations "into four species; *ex contractu, quasiex contractu; ex maleficio, quasi ex maleficio*, i. e. contract, quasicontract; tort, quasi-tort. Gaius, (about 150 AD) listed only contract, tort and an unclassifiable miscellaneous group, *ex variis causarum figuris.*

[215] "There is in reality no definable 'doctrine' of causa. The term 'causa' includes a variety of notions which may equally well be derived from the nature of a juristic act and from considerations of equity." (Lorenzen, 1919) See also Orestano (1989).

[216] The *Traité des Loix* is the preface of *Les lois civiles dans leur ordre naturel* (1689), in which Domat equated Roman and Civil Law with rational order and with Christian principles. Law is *raison écrite*.

[217] See the intellectual and personal genealogy from Domat (17 c.), Pothier (18 c,) and the nine drafters of the *Code Civile* (19 c.) in Arnaud (1973). See also Tarello (1976).

3.3 Agreement in Legal Theory

Legal theory in the 20th c. took seriously this mutual embedment between law and the state. Although it may come as a little surprise, thinking simultaneously a theory of law *and* the state was not commonplace in jurisprudence until the last third of the 19 c., after the unification of the German State in 1871.

Perhaps the first full theory of this kind is Georg Jellinek's *Allgemeine Staatslehre* (1900). It was clear for him, following previous Romanist (i.e., Rudolf von Jhering, Carl F. von Gerber) and Germanist (i.e., Otto von Gierke) scholars, that the State could be considered a *moral* person, susceptible of holding rights and duties. If this is so, the private notion of agreement could be expanded to the public sphere: as subjects of law, states would behave and act as a person, and actually the regulatory value of agreements between private persons—their 'subjective rights'—would be defined by the 'objective' laws of the states in the public sphere.

3.3.1 Hans Kelsen

This is the trodden path of Hans Kelsen's *Reine Rechtslehre* [*The Pure Theory of Law*] as well. In its last version, as late as 1960, he still fights the 'fiction' of freedom of self-determination as a source of law.[218]

To me, this denial is not what counts. Kelsen's approach is important for what he was really questioning, i.e. through the critique of the concept of autonomy, the concept of legality itself. Why can we qualify an act as 'legal' or 'illegal'? How to define the obligation to do or not do something as 'legal'? Kelsen would set up his theory of norms to answer this kind of questions. He conceived it as a complementary balance between norms—defined as 'schemes of interpretation', 'the meaning of acts of will'—and normative decisions, in which the link between norms and facts would be performed by the formal quality of their normative content—the property of *validity*. Norms had to be

[218] "The fictitiousness of this definition of the concept of the subject of law is apparent. (…). The legal determination ultimately originates in the objective law and not in the legal subjects subordinated to it. Consequently, there is no full self-determination even in private law." (Kelsen, 1960, 1967: 170-71; see 258 as well)

legally ‘valid’ to acquire a ‘binding’ character and be applied. In such a conception, the State was conceived as a logical *prius*, in a pure neo-Kantian way.

It is not my aim to go deeper into it now. It is worth noting that Kelsen broadened up the space to discuss legal issues on different grounds than plain jurisprudence. Instead of discussing just at the level of positive legal doctrine, he would have shown the need to structure a coherent theory about the tools employed to describe and operate on legal systems. And nevertheless, his conceptual framework remained solidly anchored onto the same doctrinal bases he tried to overcome. As Alf Ross (1936, 2011) would put it commenting the first edition of the full version of the theory (1935), in Kelsen´s view “legal science is not social theory but *normative cognition*, doctrine [emphasis added, P.C.]”.

3.3.2 Alf Ross

However, although Ross wanted to clear up old and broad legal concepts and deemed legal theory a non-doctrinal social science, Ross remained close to Kelsen as regards the reflecting value of agreements as a source of law. It is interesting to follow his argument, because in his major work he would compare agreements to promises:

> If it has been agreed that in order to gain admittance to a private night club a person must utter a meaningless word, this word in itself will remain meaningless even if by agreement it functions as a directive to the doorkeeper. The position is exactly the same in pronouncing a promise. In itself, abstracted from the legal order, the expression ‘I promise’ is meaningless. It would just do as well to say abracadabra. But by the effect the legal order attaches to the formula it functions as a directive to the judge and can be used by private parties for the exercise of their autonomy. (Ross 1959)

If we replace the doorkeeper with the judge, the private nightclub with the legal order, and abracadabra with the ‘will’ of an agreement (or a promise), we would obtain a quite precise—and unintended Kafkian—image of Ross’ legal theory. “A legal rule is neither true nor false; it is a directive” (ibid.) addressed to the judge, that is to say, an utterance “with no representative meaning but with intent to exert influence” (ibid.).[219] What it

[219] The interested reader is invited to follow the late formulation of the argument in Ross (1968): “Directives which are impersonal and heteronomous-autonomous include the rule of games and similar arrangements grounded on agreements.”

counts then is the binding force of a "national legal order", which is an integrated body of rules whose function is to carry out the exercise of this physical force.

We would need two more ideas to complete the picture: (i) Compliance with rules and rule enforcement are related through patterns of behaviour, operating in judges' mind or in the legal consciousness of the population, which eventually would agree to comply with the law according to the dynamics shown in Figure 25; (ii) 'validity' is an empirical property of rules related to the judges' behaviour, for "valid law is never a historical fact, but a calculation, with regard to future" (ibid.). 'Validity' stands for the binding force of the law, but it is not an inter-normative property, for it cannot be derived from norms but stems from the social behaviour itself —"the relation between the normative idea content and the social reality" (ibid.).

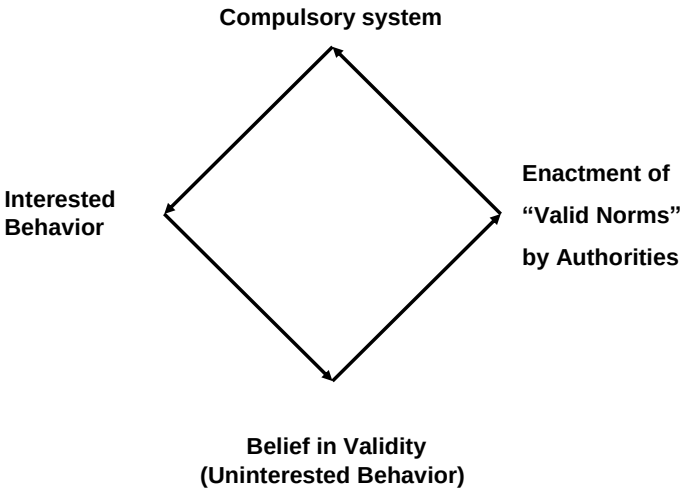

***Figure 25**. Compliance with the law. Source: Ross (1946).*

Ross' positions and the so-called Scandinavian realism have been recently revisited by legal theorists. For our purposes, I will single out only two revisions. The first one points at what Ross left out of the legal system—reasoning through the "intermediate legal concepts" of jurisprudence, the semantics of law. The second is in a sense complementary to the former one. It states the proximity between social positivism and Ross's approaches to fundamental problems, mainly the problem of validity of legal rules.

By intermediate legal concepts are meant "those concepts through which legal norms convey both legal consequences and preconditions of further legal effects" (Sartor, 2009). Sartor uses the term *inferential links* (broader than legal norms, or rules) to describe how legal concepts (but other concepts as well, e.g., moral or social) can carry on and transfer meaning. He is embracing then the Fregean view according to which the meaning of a term results from the set of inferential links concerning the *sentences* in which the term occurs (ibid.).

This view was advanced by Ross in a famous paper, *Tû-Tû* (1957), in which he figured out a fictional society with concepts representing fictional facts or states of mind (tû-tû).

> FOR ANY (x) IF x eats of the chief's food THEN x is tû-tû, which really means, connecting this factual precondition to deontic conclusions FOR ANY (x) IF x eats of the chief's food THEN x should be purified, or x is forbidden from participating in rites.

Ross aims at stating that this kind of intermediate terms are also fictional, because they are not adding any deontic meaning to the whole reasoning, and they are not needed to represent any semantic content. This reproduces the abracadabra argument for promises—doctrines about *ownership*, or other legal concepts such as *claims* or *rights*, are just meaningless terms to facilitate the deontic conclusions in a legal order. From a theoretical point of view, they are useless, and we should get rid of them. This task "is a simple example of reduction by reason to systematic order" (Ross, 1957).

We encounter here the rejection of the "magic" power of words, one of the subject-matters of Hägerström philosophy (Pattaro, 2010). However, asserting that the concept of right has no substance is quite different from stating that it does not carry on any meaning.

Sartor (2009) is proposing an alternative solution, setting an inferential field for legal meanings to encompass dogmatic concepts as well within the legal system. As I will show later on, this position has to do with the possibility of reasoning with ontologies on the web. However, it considers also what we may call the *pervasiveness* and *resilience* of some fundamental legal concepts that bridge the common understanding of what law is about.

3.3.3 Herbert L.A. Hart

Law expressed through its common or natural language, the semantics of law, constitutes the timber of perhaps the most influential work of legal theory in the 20th c., Herbert Hart's *The Concept of law* (1961).

I will choose an indirect approach here because I will bring up the second revision I mentioned above. It deals with the natural language in which Ross expressed his analysis, and it comes from the new generation of the Scandinavian legal theory that he helped to build. Svein Eng (2011) explains that the most central technical term in Alf Ross's book *Om ret og retfærdighed* (1953) [translated as *On Law and Justice*, 1959] is *gældende ret* [valid law, in Danish].[220] This corresponds to the Norwegian term *gjeldende rett* and the Swedish term *gällande rätt*.

Those Scandinavian terms have been translated into English as *validity* but have different uses which express a broader and more context-sensitive meaning. In Latin languages, e.g., *gældende ret* has been translated as *derecho vigente*, *diritto vigente* or *droit en vigueur* for it points at the efficacy of the legal rules as well.

Hart made the review of Ross's book, pointing at the differences between their theories. Shortly after, he published *The Concept of Law* (1960), where he sets up a broad conceptual framework to 'elucidate'[221] the meaning of the most common legal concepts, assuming that law is embedded into society and it *rules* over their members, including the members of the ruling elite.

Social and legal rules are differentiated, because in "complex societies" rules with social content adopt a legal form, according to which secondary rules—of change, adjudication,

[220] Eng (2011) recalls that in Ross' theory, the term *gældende ret* refers to "(i) normative meaning-content in the form of directives (ii) that have the property of being part of the judge's motivation when he is reaching a decision in the case at hand".

[221] This is an important epistemological and methodological concept in Hart's theory. It stems from the Oxfordian philosophy of common language originated in Wittgenstein. It was also used in the fifties and sixties of the past century by moral philosophers such as Elizabeth Anscombe and Philippa Foot. It is worth noticing that it is assumed that concepts have some kind of shared semantic content, 'meaning', that should be clarified or 'elucidated'. This has been criticised in social sciences by E. Gellner (against P. Winch, as it is well noted) and in legal studies and history by B. Simpson (this is less known), who had participated in the early discussions of Hart's seminar in the fifties: "My basic argument was that it was an error to suppose that the elucidation of the nature or meaning of legal concepts could be advanced by reference to the typical or regular function legal words or sentences served." (Simpson 2011, 11)

and recognition—operate over the primary ones, controlling the production, enforcement, and implementation of new rules, and solving possible conflicts among them. The rule of recognition plays then the same fundamental role than the set of directives that Ross would call "sources of law"[222] (and Kelsen, *Grundnorm*). I have framed Hart's legal architecture in Figure 26 with some detail so that it can be used in the second part of the Dissertation too.

The diagram intends to portray the perhaps most popular legal architecture of the 20th century jurisprudence. Herbert Hart's model for *The Concept of Law* (1961) has been immensely popular among computer scientists, as I will show in the next chapters, although it has also been represented as a sort of procrustean bed by many legal anthropologists questioning the general layout of his theory (e.g., Sack 1982, 1992). As said, Hart conceives the law as a set of primary and secondary rules (as "autonomous law") to define, identify, and control both state officials and citizens.

Hart designed his model in the context of post–World War II, having in mind the possibility of rotten or authoritarian states, and the misuse of violence. The British and Scottish empiricism is embedded into the model. It is very structured, and his framework reflects the concerns of the British Enlightenment with the social conditions that should be endorsed. Mainly, the rejection of violence and the defence of personal property and rights in a competing social environment with scarce resources. Natural requirements or "needs" reflect the assumptions he figured out for the existence and endurance of (i) human society (left side of Fig. 26), accorded and coordinated with (ii) the conditions for the dynamics of a legal system (right side of the figure).

[222] In Ross's theory, sources of law "are understood to mean the aggregate of factors which exercises influence on the judge's formulation, of the rule on which he bases his decision." (Ross, 1959)

		SIMPLE SOCIETY	COMPLEX SOCIETY	
	SOCIAL RULES	PRIMARY RULES	SECONDARY RULES	
SOCIAL SYSTEM	(1) General (2) Permanent (stable) (3) Coactive	(1') Lack of certainty (2') Static quality (3') Spread social pressure PRE-LEGAL	(1'') Recognition (2'') Change (3'') Adjudication LEGAL	LEGAL SYSTEM
SOCIAL SYSTEM CONDITIONS	LAW'S MINIMUM CONTENT : "NATURAL NEEDS" (1) Vulnerability (Prohibition of violence) (2) Approximate equality (Obligations and concessions' system) (3) Limited altruism (Obligations and concessions' system) (4) Limited resources (Property) (5) Understanding and limiting power (Need of sanctions)	EXTERNAL POINT OF VIEW	INTERNAL POINT OF VIEW	
		EXTERNAL FACTUAL STATEMENT (Effectiveness of rules)	INTERNAL SENSE STATEMENT (Validity of rules)	LEGAL SYSTEM CONDITIONS
		DESCRIPTIVE USE OF LANGUAGE (Prediction, explanation)	OPERATIVE USE OF LANGUAGE (Understanding)	
		PRIMARY RULES' OBEDIENCE BY CITIZENS	EFFECTIVE ACCEPTATION BY THE CIVIL SERVANTS AS A GUIDELINE OR PUBLIC MODEL OF OFFICIAL CONDUCT	

Figure 26. *Herbert Hart's Model of Law, based on Hart [1961] (1994)*

To our purposes, I will pinpoint only three points of the Hart's model: (i) Hart keeps separate the "internal" and "external" points of view about rules, depending upon the degree of commitment and operability (according to different social roles in the system, citizen, judge, expert etc…);[223] (ii) the "rule of recognition" is in fact a complex criterion of identification that might encompass different kind of behaviours and rule interpretations (depending onto the legal system we are facing at); (iii) if the "rule of recognition" might be used not only to identify individual rules but to indicate also whether or not they

[223] "Statements made from the external point of view may themselves be of different kinds. For the observer may, without accepting the rules himself, assert that the group accepts the rules, and thus may from outside refer to the way in which they are concerned with them from the internal point of view. But whatever the rules are, whether they are those of games, like chess or cricket, or moral or legal rules, we can if we choose occupy the position of an observer who does not even refer in this way to the internal point of view of the group. Such an observer is content merely to record the regularities of observable behaviour in which conformity with the rules partly consists and those further regularities, in the form of the hostile reaction, reproofs , or punishments, with which deviations from the rules are met." (Hart [1961] 1994, 89).

are ‘legal’, then this criterion is not only about the ‘validity’ of rules but about the *existence* of the whole system as well.

Officers, civil servants, are kept apart from members of the community (the ‘civil society’), following the empiricist dual pattern for sovereignty obedience/sovereign common since *The Leviathan* (1651) in political philosophy. Secondary rules must be accepted by, and are really addressed to, state officers. Conceptual understanding of the rules is the common path to their compliance. Social interactions are glued by the dynamics of the internal and external points of view, which go necessarily through the semantics of language.

This position seems to open a gap between social positivism, as it is conceived by Hart, and Ross. Nevertheless, a closer look to the grounds of both positions leads to a unified and coherent conception of the law, referring not only to the validity of legal rules, but to their *existence*, as interpretive schemes are ‘shared’ by groups, be they lawyers, the population or (especially) judges (Eng 2011). Interestingly, legal positivists discussed on the content of “agreements as concurrence” but accorded the same relative value to “agreements as contracts”.

3.4. Agreement in Sociolegal Theory

I have presented the conceptualization of agreements in the classical theory of law of the 20th c. so far. But, before going further in the argumentation, let’s go to the sociolegal side of legal theory. I will not describe in this section the traditions of pure sociology or psychology, but only the so-called Legal Realist tradition of the thirties, and some Law and Society approaches that followed up regarding relational law.

3.4.1 Karl Llewellyn

As his late editor, Frederik Schauer (2011) has reminded, according to Llewellyn’s *The Bramble Bush* (1930), rules are no more than “pretty playthings”. Rule reckonability

would lay in multiple *situated* forms, adapted to what Llewellyn calls *situated concepts, working practices, devices.*[224]

Llewellynesque has become a common expression in legal theory to characterize informal writing. But I think that it would be misleading to believe that his loose and sometimes bizarre expressions are merely rhetoric. I have plotted in Figure 27 the structure of the legal realist approach he was advancing in 1930 (Llewellyn, 1930a).

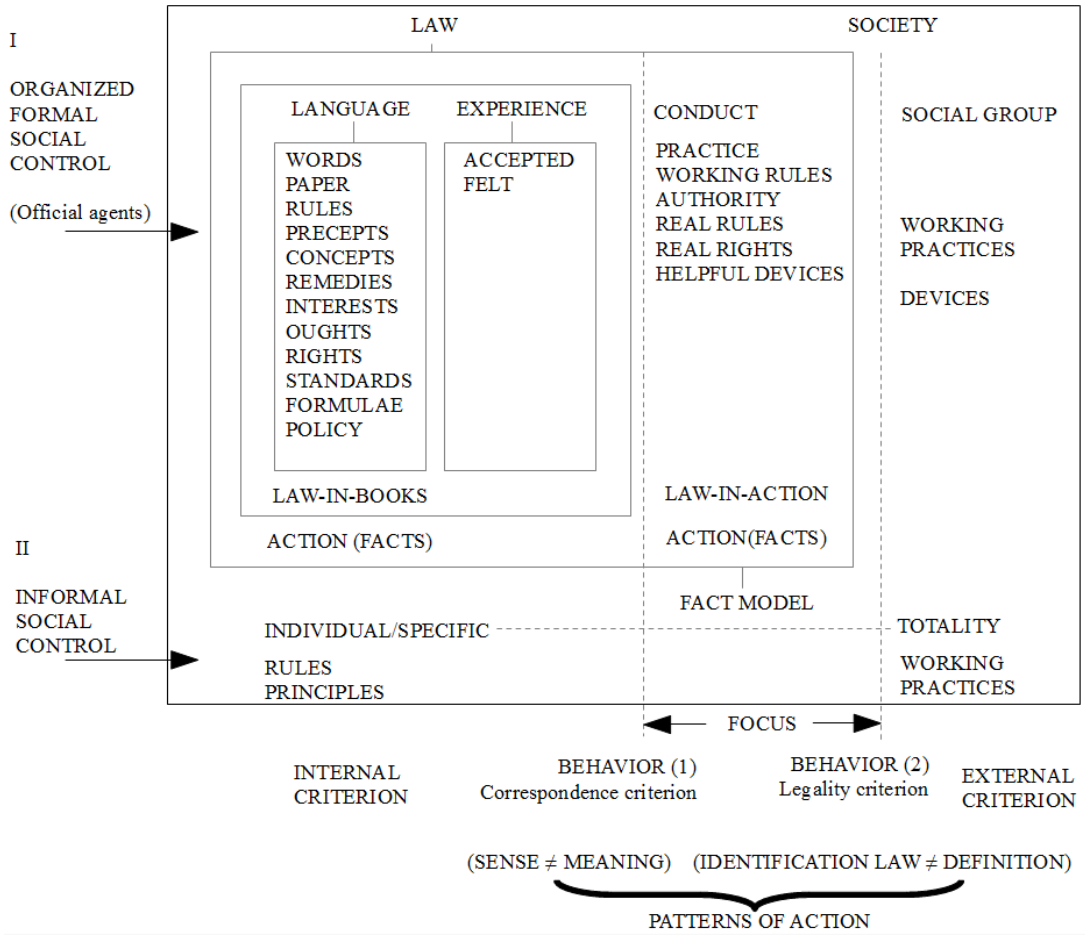

Figure 27. *Legal Realism Approach, based on Llewellyn (1930a)*

[224] "[…] I am not going to attempt a definition of law. (…). I have no desire to exclude anything from matters legal. (…). I shall instead devote my attention to the *focus* of matters legal. I shall try to discuss a *point of reference*; a point of reference to which I believe all matters legal can most usefully be referred." (Llewellyn, 1930a)

Following Pound, *law-in-action* is opposed to *law-in-books*, and *paper rules* are opposed to the *working* ones. There is no mechanical way to decide whether a rule is legal or not: this is left to the variable conditions set by the actors and to the conventions accepted by the market or the social community in which legal acts and rules operate. In a way, then, language is experienced and reflected as *felt* or *accepted* into the rules but meaning is a function of too many variables to be structured as an object (in a contract e.g.). There is no way to fix a stable meaning, as there is no way to fix a stable legal standard or value. The internal criterion for meaning or legality is doubled and revamped by externalities, first within the legal community, and then within the open society (market sectors, organizations, and the political community).

It is worthwhile to notice the division between informal and formal control (performed by the law, especially through organized judicial institutions and behaviour). But this comes from the first-hand knowledge that Llewellyn possessed of Max Weber's and Eugen Ehrlich's sociology and of German legal philosophy.[225] Thus, phenomenology had an influence on his thought, especially on his rejection of written rules and his embracement of practices, cases, professional behaviour, *living* law. This should be linked to the formal/informal distinction that is so relevant for Weber's notion of law and for his own work. As a result of the German experience, Twining (1985, 109) remarked that Llewellyn realised "how much general jurisprudential writing was based on *the selective use of examples* rather than on the disciplined testing of the hypotheses against the facts of daily practice" (my emphasis).[226] In my opinion, this perspective was later implemented into *The Cheyenne Way* (1941) published with young anthropologist E. A. Hoebel. An

[225] Llewellyn studied in Germany when he was sixteen years old and had a German education at *Realgymnasium* at Schwerin, in Mecklenburg. He fought in the I World War with the 78th Prussian Infantry Regiment and was injured at the First Battle of Ypres. He was awarded the Iron Cross, Second Class. One of his first books was published in German, out of a course that Llewellyn gave in 1928-29, when he was on leave from the Columbia Law School faculty and visiting Leipzig Faculty of Law. It was revised and published in 1933 under the title *Präjudizienrecht und Rechtsprechung in Amerika* (Theodor Weicher Verlag). It was eventually translated into English by Michael Ansaldi and edited by Paul Gewirtz as *The Case Law System in America* (Chicago University Press, 1989). It stands between *The Bramble Bush* (1930) and *The Common Law Tradition* (1960). Another book, with the revealing title *Recht, Rechtsleben und Gesellschaft* was also ready for publication in 1933. However, these were difficult times. The publication of this second German volume awaited until M. Rehbinder eventually edited it in 1977 (Duncker & Humblot, Berlin). I do not know any English version of this work. Cf.Twining (1985), Ansaldi (1989), Llewellyn (1988). Llewellyn's description of Weber's notion of law and especially Ehrlich's sociological trends on *lebendes recht* all along the latter book are interesting to follow.

[226] Also quoted by Whitman, R. and Wynns (2010).

analysis of his German works shows how Llewellyn argues that “courts do not ‘apply’ legal rules, but either expand or contract them; creation is unescapable (§ 52)”.

His editor, Paul Gewirtz, comments that the doctrine of precedent is two headed, (i) providing one technique for narrowing an unwelcome precedent and (ii) techniques are each "correct," and in fact, their coexistence is necessary

> for the viability of the case law system. Furthermore, as Llewellyn argues in his brilliant discussion of concurring and dissenting opinions, there is leeway in deciding "what 'the' facts are" and how they are classified for purposes of legal analysis, with "each way of construing the facts [containing] a degree of violence to either the fact situation or the classifying category" (§ 42). Llewellyn's focus on contradictions, dualities, and leeways in the law clearly anticipates some elements of modern critical theory. (Llewellyn 1933; commented by P. Gewirtz, Llewellyn 1988, 991)

It seems to be a common bond between public law and legal philosophy. Jellinek, Kelsen, Hart, Ross… were all public law scholars. Llewellyn, on the contrary, was the Chief Reporter of the USA Uniform Code of Commerce from its inception in 1940 until his death in 1962. The code was his main contribution, and it was a revolutionary one. Section 1-201(3) of the U.C.C defines *agreement* as “the bargain of the parties in fact as found in their language or *by implication from other circumstances* including course of dealing or usage of trade or course of performance as provided in this Act. [emphasis added P.C.]”

American scholars have underlined the significance of this legal change with respect the understanding of contract as a formal promise (Patterson, 1989; Breen, 2000; Blair, 2006). It is a departure from previous Holmes, Langdell and Williston’s interpretations of the offer-acceptance-consideration model.[227] Patterson (1989) has extracted the underlying conception of language—contract terms do not have a plain meaning, and written contract terms might not have priority over all unwritten expressions of agreement:

> Under the Code, as Llewellyn conceived it, the meaning of contract terms was not a function of intent, mercantile or otherwise. In construing the meaning of a contract, a court

[227] As Breen (2000) puts forward, under the Code: (i) “the context of an agreement —the unspoken background of beliefs and understandings formed by repetition within an industry and familiarity among individuals, which are taken for granted by the parties involved— becomes central to the meaning of the contract. Contextual evidence is thus fully recognized as an ‘effective part’ of the agreement itself.” (ii) Art. 2 states that the meaning of a written agreement is determined not only “by the language used by [the parties] but also by ‘their action[s], read and interpreted in the light of commercial practices and other surrounding circumstances” (U.C.C. *Id.* § 1-205 cmt. 1.).

> should focus not on what the parties mentally intended by their words but on what the trade took the words to mean. (...) Llewellyn believed that there should be no unitary concept of contract or agreement, *only a myriad of ways that parties could come to agreement against the background of commercial practice.* [Emphasis added P.C.]"

This is related to Llewellyn's conception of rights as *legal* rights being defined or instantiated not from rules or even from the parties' intentional interpretation but from the situational conditions at the crossroads of legal materials and the dynamics, scope, and nature of the particular transaction at stake. This *making sense* of contracts is close to our distinction of law as meaning and law as sense, as for him it is not the meaning what counts but the *situated* meaning that is the outcome of a particular complex environment (including documents, relationships, the bounded legal agreement, and stakeholders' behaviour).

Notwithstanding that, we should bear in mind the professional framework in which Llewellyn operated. For him, judicial interpretation was a kind of unescapable national reality, and law was the natural social framework in which laymen should behave, to the extent that laymen's legal certainty "exists *only as a reflection of lawyers' legal certainty* [my emphasis]. A person who consults no lawyer, or a bad one, must bear the consequences of his own stupidity." (Llewellyn 1988, 989) This obviously is a lawyers' assessment.

3.4.2 Legal Pluralisms

Stemming from legal realism, socio-legal scholars have embraced a pluralist perspective and they do not refer to a validity criterion nor a validity rule to describe norms or rules as social artifacts.[228] The legal field is defined, e.g., as "the ensemble of institutions and practices through which law is produced, interpreted, and incorporated into social decision-making. Thus, the field includes legal professionals, judges, and the legal academy." (Trubek et al. 1994) From this behavioural perspective, they actually do not embrace one

[228] The term 'legal pluralism' was used for the first time in 1939 by J.S. Furnivall in a book on Indonesian economy (*Netherlands India: A Study of Plural Economy*, Cambridge). Rouland (1993: 449) distinguishes three meanings of the expression: 1. Doctrinal trend that insists on the fact that multiple legal systems correspond to the plurality of social groups arranged following relationships of collaboration, coexistence, competition or negation (where the individual is an actor of legal pluralism to the extent that it is determined based on his multiple memberships in these social networks). 2. In the political dimension, the various anthropological theories of pluralism tend to relativize the state's tendency to present itself, through the precedence of the law, as the main or exclusive source of law. 3. In the methodological dimension, these theories insist on the need to look for manifestations of law outside the areas where the classical theory of sources of law places them (1993: 449).

version of legal pluralism but many, based on multiple regulatory forms[229] and contexts.[230] For this reason, Tamanaha suggested the less confusionary expression "normative pluralism", Melissaris and Croce (2017) prefer the expression "pluralism of pluralisms", and Sally F. Moore (2014) has referred to them as "omnium gatherum", rejecting pluralism as a methodology and preferring "non-official law" over "legal pluralism". Even though, she points out

> a basic difficulty about trying to create a typology. There is an important reason why we cannot easily describe in general terms the relation of non-official norms to official systems. This is because their interaction is not a fixed state of affairs. It is a process, taking place over time. The official and unofficial are not static "systems." Official law may be thought of as fixed, but over time, and even at one time, as Galanter pointed out, its content or its practical implementation can be quite variable. By definition, the unofficial can also undergo variations and transformations. (Moore 2014, 5)

On the contrary, Sally E. Merry has sided with Snyder, Teubner, von Benda-Beckmann and many others in sustaining a pluralistic approach to *global law.* For her, in the globalisation age, the human rights system represents "another level of legal pluralism", another "overarching legality", in which global law has been assumed ("appropriated") by local groups—e.g., women, socially vulnerable groups etc.— and has been reflected as well on the local political struggles and legal claims to enact such rights (Merry 2003, 2005,

[229] Cf. Casanovas (2002). I distinguished between several aspects being considered by the authors in the discussion: (i) negotiation on rules, norms and rights (Gilissen), (ii) mechanisms from diverse legal systems, especially in the post-colonial relationship (J. Vanderlinden), (iii) capacity for action and selection of subjects and decision-making forums (forum shopping, *répertoire normatif du juge*, M. Galanter, B. Garth, J. Vanderlinden, B. Dupret), (iv) plurality of sources of an "unofficial" right with respect to the "official" one centralized in the state (M. Chiba), (v) growing complexity of transnational normative structures in the harmonization of European law (A.J. Arnaud), (vi) regulation of "semi-autonomous social spaces" in industrial societies (S.Falk Moore), (vii) plurality of forms of regulation based on the difference of gender, class or culture (C. Greenhouse), (viii) recourse to dialogue between different cultures to understand the different symbolic functionality of regulation (R. Panikkar, Ch. Eberhard), (ix) the self-regulation of normative structures that are organized as a space of social regulation (G. Teubner), (x) recourse to cultural models of implicit ordering of rights and obligations (E. Le Roy). An example of such cultural models is the odological (travel: topos of nomadic societies) and topological (center/periphery) conception of space not based on a geometric conception of abstract space. Le Roy (1998), following Bohannan's studies of the Tiv, shows that this is the case in many African communities' conceptions of land rights.

[230] I also distinguished (ibid. 2002) between several contexts: (i) the context of post-colonial societies in relation to the state law of the metropolis of origin (including the problem of so-called "indigenous rights") (S.E.Merry) (ii) the context of state/company/administration/citizen relations in complex industrial societies (S.E.Merry, R.Abel) (iii) the context of transnational organizations and companies in the global economy (the so-called global legal pluralism theorized by Francis Snyder as a network of transnational legal sites) (iv) the technological context of human relations in virtual communication (e-commerce; e-confidence; patent and intellectual property rights…).

2006). Thus, "global law is an amalgam of multiple local and national legalities" (Merry 2005, 215), entailing a cross-linked process from legal international law documents to their use in more specific political and legal acts (including controversies, political fights, and specific case-based law decisions).

In her first seminal article on the subject, Merry distinguished "classical legal pluralism"— i.e., the analysis of the intersections of indigenous and European law in colonial and post-colonial societies"—from what she called "new legal pluralism"— the application of the concept to "noncolonized societies, particularly to the advanced industrial countries of Europe and the United States" (Merry 1985, 872). It is worth noticing the impact of Galanter (1981) on this trend. Galanter observed the increasing *reciprocity* of implicit relationships in contemporary "socio-economic networks rather than bounded groups":

> Such partial communities, linked by informal communications and sometimes by formal communication devices as well, provide much of the texture of our lives in family and kinship, at work and in business dealings, in neighborhood, sports, religion and politics. There are varying degrees of self-conscious regulation, varying degrees of congruity with the official law and varying degrees of reliance on the support provided by official institutions. This is a realm of interdependence, *regulated by tacit norms of reciprocity and sometimes by more explicit codes* [my emphasis]. The range of shared meanings is limited but the cost of exit is substantial. If we have lost the experience of an all-encompassing inclusive community, it is not to a world of arms-length dealings with strangers, but in large measure to a world of loosely joined and partly overlapping partial or fragmentary communities. *In this sense our exposure to indigenous law has increased at the same time that official regulation has multiplied* [my emphasis].

Nevertheless, what can count or not as 'legal', remains a problem to be solved in specific contexts and domains. I will circumscribe it in the digital age as an empirical *validation problem* rather than a preliminary categorial one. I will deal with it in the last Chapter of the present Dissertation. Meanwhile, I will avoid the conceptual discussions about the existence or inexistence of law related to the state that, in my opinion, has been the kernel of an extended literature pro or against legal pluralism within the Law and Society field (Tamanaha 1993, Roberts 1998, F. von Benda-Beckmann 2002). My own position is close to Tamanaha's pragmatic notion of law:

> Law is whatever people identify and treat through their social practices as 'law' (or *recht* or *droit*, and so on). (Tamanaha 2000, 313)

However, this a pragmatist definition that conflates descriptive and prescriptive dimensions (patterns and norms) rather than a pragmatic definition. ‘X is what S does as X’ or ‘X is what S thinks X is’ are arguments that might beg the question as they do not offer a theoretical definition but an indirect, ostensive, recognition. I will not delve into it now. I will just observe that to dealing with the identification of entities on the Internet of Things, a more precise definition of the components (including frameworks, norms, rules, practices, procedures and so on) is required.

Pluralisms lead to different social approaches and methodologies. As Sack and Aleck contended many years ago, if plurality means diversity rather than mere duplication (the coexistence of a multitude of clones of the same thing), it implies that this 'thing' does not exist at all, that there is no such thing as the 'law' that can be defined.

> We can only ask ourselves: ‘What can law be? And we must admit the possibility that it could take forms that we cannot even imagine. Put more forcefully: if 'law' is a plural phenomenon, it can no longer be positive or natural.” (Sack and Aleck 1993, xxiii).

Thus, as I have already explained in Chapter 2, legal theory and social studies have been often seen as opposite fields, and this is not tenable in a digital society.

3.4.3 Four Stages of Relational Law

One of the reasons for such a situation lies on the first stages of relational law. Legal realists understood that law was ‘relational’ as an adversarial shift from the existing approaches and as a self-affirmative action. Llewellyn (1931) posited it as “Pound’s development of ‘relation’ as a status-like element constantly latent and now re-emergent in our order”.

3.4.3.1 First Stage: Legal Realists

Roscoe Pound, in a series called “The end of Law as Developed in Juristic Thought” (1914; 1917)—the Harvard papers that constituted the bases for *The Spirit of the Common Law* (1921)—explained the history of the Common Law tradition as opposed to the Roman Civil Law tradition:

> The idea of relation, and of legal consequences flowing therefrom, pervades every part of Anglo-American law. (…). The action for use and occupation may only be maintained

> where a relation exists. *When the relation does exist, however, a train of legal consequences follows***.** (Pound 1917)

Therefore, the "spirit" of Anglo-American Law would be *relational* (and not authoritative), bottom-up (rather than top-down), and collective (as opposed to the individual trend of natural law philosophy).

3.4.3.2 Second stage: Sociolegal Scholars

More recently, this way of constructing a broad legal perspective contrasting to other concurrent ones twisted in favour of particular approaches. This is the second step for relational law. 'Relational' is considered a common property that emerges from the existing social and economic bonds among companies, providers, customers, consumers, citizens (or digital neighbours). It seems to be a pervasive quality, perhaps straddling too many genres and fields, from psychology to jurisprudence, and from political science to business managing and marketing studies.[231]

Relational refers to the capacity to set up a common space of mutual relations —a shared regulatory framework— in which some reciprocity is expected regarding goods, services, attitudes, and actions. Thus, relational law is more based on trust and dialogue than on the enactment of formal procedures or on the enforcement of sanctions. This has been proved especially useful regarding the analysis of norms—e.g., in consumer research studies (Johar, 2005), in B2B relationships (Blois and Ivens, 2006), in relational governance (Ott and Ivens, 2009).

Either Stewart Macauley (1963), Ian R. MacNeil (1974, 1983, 1985, 2001) or Phillip Blumberg (2005) stress a view of contracts as *relations* rather than as discrete transactions looking at the evolving dynamics of the different players and stakeholders within their living constructed shared contexts. "Relational norms"[232], "relational exchange norms", and "relational contract" are concepts widely used ever since. By the term "relational thinking" it is meant an approach emphasizing the complex patterns of human interaction

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[231] 'Relational' has been applied not only to *contracts* but to *sovereignty* (Stacey, 2003), *rights* (Minow and Shandley, 1996), *copyright* (Craig, 2011), *governance* (Zeng et al., 2008; Chelariu and Sagntani, 2009), and *conflicts* (Wallenburg and Raue, 2011), broadening up the field from private law to the public domain.
[232] MacNeil (1983) distinguishes five relational norms —role integrity, preservation of the relation, harmonization of relational conflict, propriety of means, and supracontract norms.

that inform all exchanges (MacNeil 1985). But in fact, this does not mean getting rid of a more conventional notion of what law is or how lawyers think (for a good comprehensive summary of MacNeil's works, see Campbell 2001). More recent studies confirm that there is no simple opposition or alternative choice, but different combinations in between: legal contracting and regulatory governance may intertwine, substitute each other, or co-apply (Poppo and Zenger 2002; Fisher et al. 2011; Cannon et al. 2012).

Finally, we should also mention the use of the expressions 'relational theory' and 'relational law' in feminist, ecologist and indigenist jurisprudence, with an explicit moral and political philosophical content in addition to the analytical one.[233] I understand the values and correlated prescriptive content of such theories, but my use of the term is mostly analytic. I don't exclude the political value of the concept, and I embrace it on many occasions, but the kernel of its meaning refers to a shared regulatory framework in horizontal relationships.

3.4.3.3 Third Stage: The Social Web and the Web of Data

Thus, relational regulatory systems and models are complex, and their strength stems from sources other than the normative power of positive law only. But, again, legal drafting, contracting, and sentencing matter and can play changing roles within the system. I will call *regulatory systems* this set of coordinated individual and collective complex behaviour that can be grasped through rules, values and principles which constitute the social framework of the law. I will call *regulatory models* the set of structured principles, norms and rules that can be designed to control and monitor the interaction between technology and regulatory systems. I will call *relational justice* the set of procedural devices to manage and eventually solve disputes and conflicts within the framework of dialogue as a source of law. I will spell out further these definitions in Section 4.4.3, in the next Chapter, when dealing with reciprocity from an anthropological point of view.

This is the third step for relational law—when social patterns, networked governance, ethical principles, and legal systems are entrenched through the regulatory protocols of

[233] In this sense, the meaning of 'relational law' entails: (i) opposition to liberal individualism, (ii) defence of vulnerable populations and social groups, (iii) political and ethical positioning in favour of feminist, ecologist and indigenist legal theories, (iv) preferential attention to the body rather than to the individual in the abstract. E,g, Seck (2019). Cf. on 'relational feminism', Nedelsky (2011).

technological environments. This is properly the field in which Online Dispute Resolution developments (ODR), privacy by design, security by design or identity patterns take place and will operate in the next stage of the web (ubiquitous computing, cloud computing, open data, XML standardization etc…).

In this third sense, relational law refers to the point in which the Social Web (2.0) and the Web of Data (3.0) intersects with the way of regulating systems and end users' behaviour alike (be the users considered as citizens, consumers, companies, or political organizations). Figure 28 is a simple visualisation of what I mean by the third stage of relational law. The base was proposed by Jim Hendler (2009) thinking of Semantic Web Services when it became evident that the semantic web was heading to a web of data. I extended it (Casanovas 2010a) to include a pragmatic layer of dialectical inference, so that the dynamic perspective of dialogue as a source of law could be also accommodated. (Ontomedia was a project to build a semantic platform for mediation).

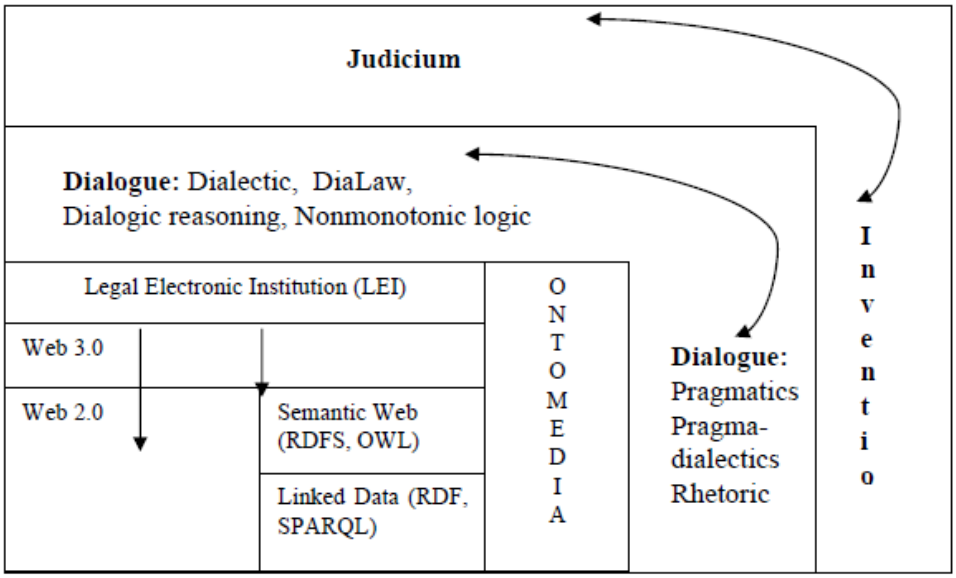

Figure 28. *Linked Data and the Semantic Web. Dialectic and Rhetorical Links. Source: Casanovas (2010, 198)*

3.4.3.3 Fourth Stage: The Internet of Things and Industry 4.0

The fourth step has occurred with the recent convergence of the Web of (linked) Data, the Internet of Things, and Industry 4.0 from 2010 onwards. Relational law is becoming the way of regulating the interactions, transactions and processes taking place in the

hybrid space between humans and machines that has been recently called *hybrid intelligence*, i.e. "augmenting human intellect with collaborative, adaptive, responsible, and explainable artificial intelligence" (Akata et al. 2020). Most of all, cryptocurrencies and blockchain have provided a new context for economic transactions that should be carefully analysed (in the so-called *platform-driven economy*).

I will further address in detail the changes that this fourth stage entails for the concept of law in Chapter 5, where I will sustain a middle/out and inside/out approach to describe the different dimensions of *legal governance* to be applied to data flows and sensors.

3.4.4 Regulatory Systems, Relational Justice, Regulatory Models

Regulatory systems are broader than their legal side because they include all aspects set by players in the social, political, and economic games at stake. They are situated, flow-driven, and work specifically in a multitude of similar but different evolving scenarios. As long as they contain procedural ways to solve and manage conflicts as well, they shape relational systems of justice.

Relational justice is thus the type of justice emerging from the different conceptualisations, practices and strategic moves of the actors dealing with, managing, or solving a controversy, quarrel, dispute, conflict or fight within these situated contexts and frameworks (Casanovas and Poblet 2008, 2009). Personal attitudes, moral and political beliefs are highly relevant in this kind of situations which can be initially unstructured and eventually embedded or plotted onto bigger organizational or social conflicts. Institutions may be involved (or not) at different stages and at different times (Lederach 2005). The situation is the same for state agencies, companies and corporate entities in the market.

Regulatory systems and relational justice can be monitored by regulatory models. A *regulatory model* is the particular normative suit encased by platforms built up to monitor a regulatory social system; the specific structure of principles, values, norms and rules that guide technical protocols.

These concepts—relational law, relational justice, regulatory systems and regulatory models—will be spelled out further in the chapters to come. They have to be carefully distinguished from virtual or *electronic institutions*, *corporate governance*, all forms of

networked governance and computer or machine *ethics*. From this point of view, agents, networks, and principles are components of social regulatory systems and they should be taken into account by the specific regulatory models built up to control and monitor the technology applied to particular fields—ODR platforms, security platforms, digital rights management, mobile applications etc. for e-commerce, e-administration, e-security etc.

3.5 Discussion: Dialogue as a Source of Law

I have summarised so far the perspective of legal theory and sociolegal approaches on agreements. My brief description did not intend to be exhaustive. Three legal theories and four stages of relational law have been exposed. This Section will launch an open discussion about the tenets and will propose some issues that can be raised from them.

The starting points are the following: (i) a continuum line between the two poles of agreement —as a "meeting of the minds" and "agreement as a contract" (see section 3.2); (ii) a history of agreements in modern and contemporary societies that reverse the value and role of agreements in ancient (and face to face) societies (3.2); (iii) the prominent role of the state and public law in the value accorded to agreements in contracts under the rule of law (3.2); (iv) the agreement in classical theories of law about the existence of a system based on the "legal" (i.e. "valid") use of the physical force by the state (or the final ruler) (3.3); (v) the agreement in classical theories of law on describing theoretically the legal space as a single normative system with a criterion of validity (3.3); (vi) the agreement between Hart and Ross on the *existence* of the legal system, the existence of a method to test the validity of norms, and (most important) a "shared acceptance" or "common understanding" of law by state officers (e.g. judges) and the civil population (3.3.2-3.3.3); (vii) the clash of such a perspective with more behavioural and empirical approaches to contracts from a "myriad of ways that parties could come to agreement" (Llewellyn) and the importance of context and working practices of the field (3.4.1); (viii) the development of legal pluralisms in both the sociolegal and the legal anthropological field (3.4.2); (ix) the existence of four different stages of development for relational law (3.4.3); (x) the shift towards relational contracts, and networked and corporate governance in the second step of the relational conception of law, in which positive statutes, acts and sentences are components of the regulatory framework (3.4.3); (xi) the role and meaning of

concepts such as ‘relational law’, ‘relational justice’, ‘regulatory systems’, ‘regulatory models’ (3.4.4); and (xii) the entrenchment of technological environments and regulations in the next stage of the Web (3.4.4).

I will address in this Section 3.5 five issues related with these points: (i) cloud and fog computing; (ii) crowdsourcing; (iii) the relation between agreement and disagreement; (iv) the notion of ‘legally valid norm’, (v) and democratic values. These can be read as a useful threshold, a preparation for the chapters to come in the second part of the Dissertation. I will resume this discussion on dialogue as a source of law delving on the anthropological notion of reciprocity, the notion of rights, and the way of conceiving a general framework from a legal anthropological approach, in Chapter 4.

3.5.1 Cloud and Fog Computing

The five issues have to do with the idea of dialogue in the cloud. We might consider cloud services infrastructures, platforms, and software as well. According to the NIST standards the cloud computing model is composed of five essential characteristics, three service models, and four deployment models (Srivasta 2011).[234] E.g. the five essential characteristics are: on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service. This is still on place, extended by the NIST conceptual model on fog computing released in March 2018 focusing on decentralised services and distributed and federated computer models on the Internet of Things.[235] Figure 29 depicts the NIST general model for fog computing, assuming the representation of a generated ecosystem.[236]

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[234] The NIST definition of cloud computing reads: “Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.” (NIST, Mell and Grance 2011).

[235] “Managing the data generated by Internet of Things (IoT) sensors and actuators is one of the biggest challenges faced when deploying an IoT system. Traditional cloud-based IoT systems are challenged by the large scale, heterogeneity, and high latency witnessed in some cloud ecosystems. One solution is to decentralize applications, management, and data analytics into the network itself using a distributed and federated compute model. This approach has become known as fog computing.” (NIST, Iorga et al. 2018)

[236] “Fog computing is a layered model for enabling ubiquitous access to a shared continuum of scalable computing resources. The model facilitates the deployment of distributed, latency-aware applications and services, and consists of fog nodes (physical or virtual), residing between smart end-devices and centralized (cloud) services. The fog nodes are context aware and support a common data management and communication system. They can be organized in clusters - either vertically (to support isolation), horizontally (to support federation), or relative to fog nodes’ latency-distance to the smart end-devices. Fog computing

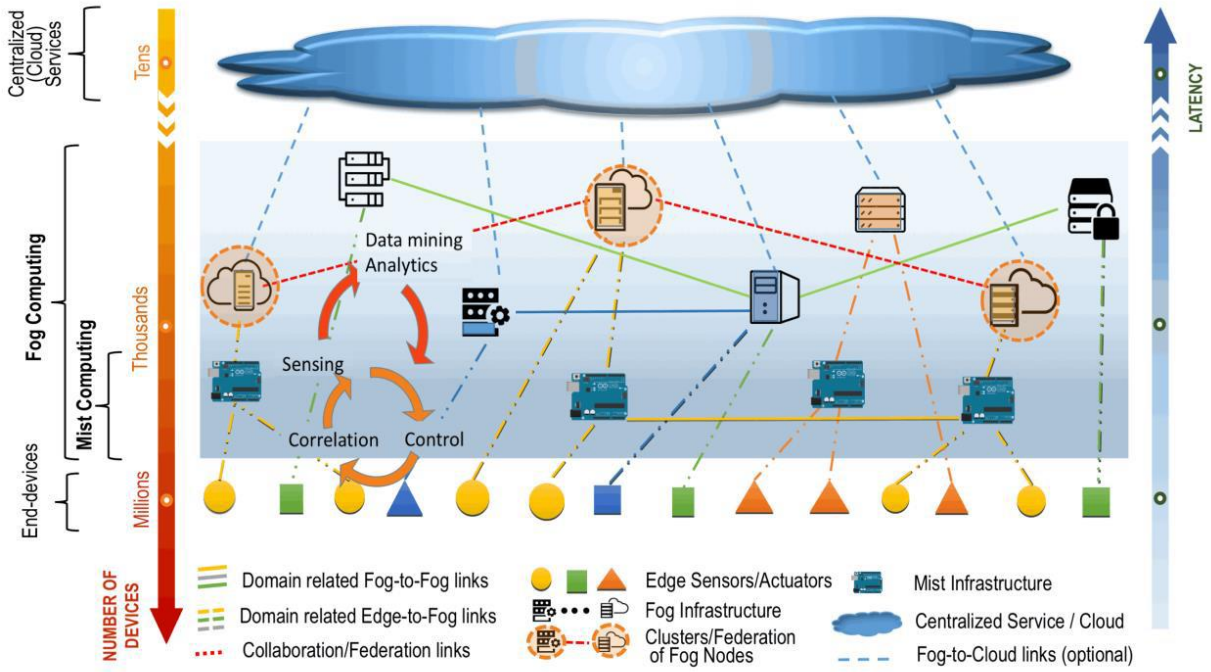

***Figure 29**. Fog computing supporting a cloud-based ecosystem for smart-end services. Source: NIST, Iorga et al. (2018)*

These are the types of service models that can be implemented (NIST 500-325)[237]:

1. *Software as a Service (SaaS).* The capability provided to the fog service customer is to use the fog provider's applications running on a cluster of federated fog nodes managed by the provider. It implies that the end-device or smart thing accesses the fog node's applications through a thin client interface or a program interface. The end-user does not manage or control the underlying fog node's infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

2. *Platform as a Service (PaaS).* The capability provided to the fog service customer allows deployment onto the platforms of federated fog nodes forming a cluster, of customer-created or acquired applications created using programming languages, libraries, services, and tools supported by the fog service provider. The fog service customer does not manage or control the underlying fog platform(s) and infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment.

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minimizes the request-response time from/to supported applications, and provides, for the end-devices, local computing resources and, when needed, network connectivity to centralized services." (NIST, Iorga et al. 2018)

[237] These definitions must be read from the previous ones (also on SaaS, PaaS and IaaS) referred to cloud computing. Cf. NIST, Mell and Grance (2011).

3. *Infrastructure as a Service (IaaS).* The capability provided to the fog service customer is to provision processing, storage, networks, and other fundamental computing resources leveraging the infrastructure of the fog nodes forming a federated cluster. Similar to cloud computing Infrastructure as a Service (IaaS) services, the customer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying infrastructure of the fog nodes cluster but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls).

With cloud and fog computing, the services that can be offered (either public or private) and the autonomy of the end-users should be made compatible. At the same time that information grows on the net, *personalisation* and *empowerment* of users becomes an issue, because knowledge is increasingly produced through cooperation and participation. The Web fosters participation but biases, risks, and threats are increasingly growing at the same time. Crowdsourcing is one side; identity management is the other side of the picture. Trust and security come along. The risks advanced in the *Identityt meta-system layer*, as was put forward by Kim Cameron (2005), coexist with the Linked Open Data movement, and the development and implementation of fog computing to gearing cloud services on the IoT. I will describe Cameron's work later in the next Chapter (Subsection 4.4.3, Table 8). For the first time, regulations must cope with a semantic structure that organizes them as metadata, and this is changing the whole framework.

3.5.2 Crowdsourcing

Originally, this term was introduced in relation to distributive labour. Different types of crowdsourcing have been distinguished (Geiger et al. 2011). Most of the more successful examples, like the Wikipedia, may be defined as non-profit collective aggregation of information stemming from micro-tasks widely distributed across the Web, and freely performed by people. Therefore, crowdsourcing implies much more than a new way to recollect information or to respond to labour offers or contests—following the Amazon Mechanical Turk or Microworks.com models— because (i) it points at the personalisation of services and applications, (ii) it creates a link between Web 2.0 and 3.0 (the Web of Data), (iii) it creates the conditions to transform the aggregation of individual information into the clustering, classification and enhancement of collective knowledge, and (iv) it broadens up and enhances a democratic way of living and behaving in the global world.

This is the main reason why people use it when they need it, reacting to events that concern them or into which they want to get involved. No measures based on routine or loyal customer behaviour are accurate enough to capture this public dimension. The broad democratic political model to be implemented cannot be taken for granted, as the integration between the regulatory forms of law, relational governance and what Charles Petrie (2010) calls *Emerging Collectivities* (EC) has to be thought on new bases. Crowdsourcing can be expanded then into *crowdservicing* (Davies 2011).

In the last ten years it has been a flood of new initiatives, websites, and platforms on crowdsourcing, especially in political crowdsourcing, crisis mapping, civic technologies, and disaster management. Legal crowdsourcing arose to perform legal tasks, as exemplified by the work of Tarik Nesh-Nash, first in reforme.ma and the in GovRight (http://govright.org/resources-media/). There are several possibilities all along the legal field. From crowdfunding lawsuits[238] and class actions (Seiner 2017) to microtasks that can be offered, bartered, performed (so, 'uberised') by young lawyers (Casanovas 2012, Luz et al. 2015, Poblet et al. 2019). Internal[239] and space[240] crowdsourcing are related to the development of the web. Quality and data verification are still an issue in the IoT (Phuttharak and Loke, 2018).

Political crowdsourcing is linked to people witnessing, denouncing, and eventually reacting against corruption, violence, and rotten elections. Ushahidi (https://www.ushahidi.com/) was one of the first platforms, meaning 'witness' in Kiswahili. It started as a tool for people who witnessed acts of violence in Kenya to report incidents that they have seen. The incidents were then placed on a map-based view for others to see. Most incidents listed on the website were verified by local groups working on the ground.[241] Crisis

[238] In 2014, Dorian Nakamoto crowdsourced his lawsuit against Newsweek, because the magazine had portrayed him as the creator of bitcoin, and this resulted in harm to him and his family (Orozco 2016, 146). The author sdopts the term 'lawsourcing' "to describe these examples and other various ways that legal crowdsourcing has developed as a force to achieve substantial legal reform and innovation in the United States" (ibid. 2016, 148).

[239] "Internal Crowdsourcing refers to the firm extending its problem-solving to a large and diverse group of self-selected contributors beyond the formal internal boundaries of a large firm; across business divisions, bridging geographic locations, levelling hierarchical structures" (Ulbrich 2021, 2)

[240] I.e. mobile crowdsourcing, "The major difference between spatial crowdsourcing and Web-based crowdsourcing is that the former requires each worker to move in the physical world to perform tasks." (Tong et al. 2019, 218)

[241] Ory Okolloh, one of the founders of Ushahidi, explains the origins of the platform as follows: "The idea behind the website was to harness the benefits of crowdsourcing information (using a large group of people

mapping movements across the world followed, to monitor elections and to help in natural disasters, humanitarian crisis, and in the aftermath of violent and war conflicts.

However, as we already wrote several years ago (Poblet and Casanovas 2012), technology and access to technology is just one side of the problem. The other is *people*, i.e., how people bridge the gap between the creation and sharing of knowledge and action based on that information. Certainly, flog computing, edge computing[242], and the Internet of Things bring about new possibilities, also based on the development of mobile technologies but, to our purposes, we should focus on the knowledge chain without breaking the (cognitive) human / (machine) sensor link. Figure 30 represents the information data-flow, from raw data to structured data (from sensors to micro-taskers).

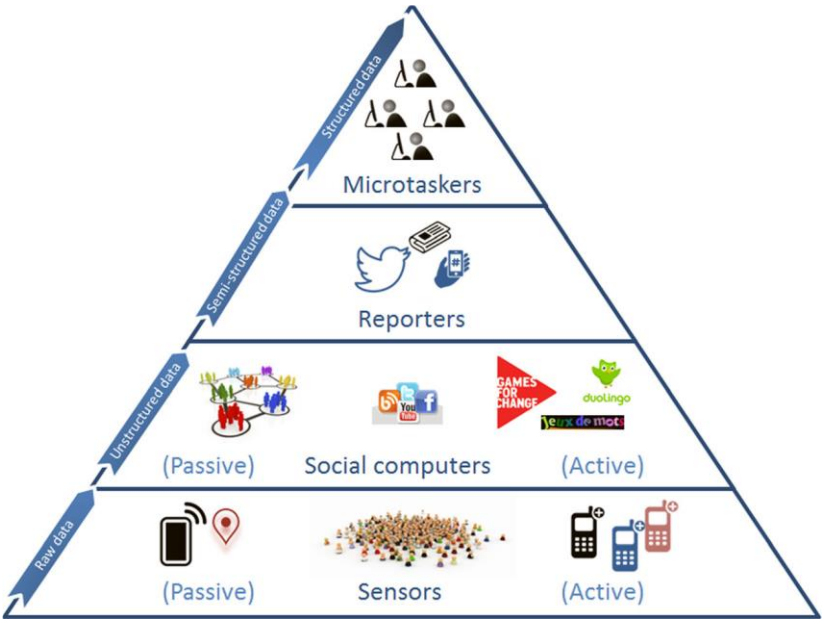

***Figure 30**. Crowsourcing roles, based on types of data processed and level of involvement. Source: Poblet, García-Cuesta, Casanovas (2019)*

to report on a story) and facilitate the sharing of information in an environment where rumours and uncertainty were dominant. At the height of the post-election violence in Kenya in late December 2007 and early January 2008, my personal blog become one of the main sources of information about the flawed electoral process and the violence that broke out thereafter […] On 3rd January 2008, I shared my thoughts on my blog and encouraged Kenyan 'techies' who were interested in building such a website to get in touch. The response was lightning fast. Within a day or two a group of volunteers had coalesced and the domain was registered. That was the genesis of Ushahidi, which means 'testimony' in Kiswahili. The website went live less than a week later. It was built using open source software with around 15-20 developers making different contributions." (Okolloh 2009, 59-60)

[242] NIST defines edge computing as "the network layer encompassing the end-devices and their users, to provide, for example, local computing capability on a sensor, metering or some other devices that are network-accessible. This peripheral layer is also often referred to as IoT network." (NIST definition, 2018)

Figure 30 has been drawn considering the ubiquity and variety of data, according to the different roles of the participant crowds based on the type of data they produce or process. In this regard, we have distinguished: (i) *raw data* (e.g. data collected from mobile position sensors, geo-social check-ins) (ii) *unstructured data* (e.g. texts, images, videos) (iii) semi-structured data (e.g. tags, geotags, hashtags) (iv) and *structured data* (e.g. spreadsheets, tables, datasets, metadata) (Poblet et al. 2019). Nevertheless, we found in our survey a scarce connection with ontology building, and I should also mention that the ethical problems raised by citizen participation in conflictive or violent environments have not yet been completely solved (Table 2, in the Introduction, shows the centrality of the principle 'cause no harm' in crisis mapping activities on the field).

3.5.3 Agreement and Disagreement

Classical positivist theories (including Ross') assumed the existence of a united central state —a national order— and a legal order as a *common project* to explain obedience or acceptance of norms. Both aspects are interconnected, and point at legal theory as a privileged approach. However, *power*, not empowerment, is the subject-matter or *idée force* that guides the argumentation process in classical legal theories.

This is not to blame. Hobbes, Kelsen, Ross or Hart had to tackle the problem of violence and survival in a convulse world. As Abizadeh (2011) has shown, the primary source of war, according to Hobbes, is not necessity, greed or even glory, but weakness, human disagreement. Disagreements can turn into *deep disagreements*; and this is an existential stage in which argumentation and rationality stop, for they undercut all essential conditions to arguing (Fogelin 1985).

However, philosophical argumentation is *nonpreemptive*: "philosophical issues are always such that arguments of prima facie cogency can be built up for a cluster of mutually incompatible thesis" (Rescher 1978: 220). This is the case for legal theory as well.

The notion of "genuine disagreement" was used by Ronald Dworkin (1986) to challenge what he called "the semantic sting" —i.e., the idea that lawyers follow certain linguistic criteria for judging propositions of law. Therefore, Hart (and other positivists) would

derive the use, the pragmatics of law from the semantics of legal language, a mistake that would prevent them of properly explaining theoretical disagreements.

Dworkin's criticism raised a passionate debate in legal philosophy, especially after Hart's posthumous *Postcript* to *The Concept of Law* (second edition, 1994), where Hart defended what was called *inclusive positivism*, a reassessment of his philosophy as a method for descriptive (non-normative or interpretative) jurisprudence.[243] (see the essays contained in Coleman 2001; especially Raz 2001, and Endicott 2001).

Indeed, Dworkin pointed at the nature of Hart's linguistic endorsement. What does exactly mean for officers to *share* a rule of recognition? Where the *common understanding* of law or (for citizens) the *acceptance* of a primary rule comes from?

Phillip Pettit (2010) has followed the same procedure of refining the meaning of natural language to better define what the content of a norm is. He fills what he calls "the norm-normative gap" —the fact that a norm is such a norm and not a mere behavioural pattern "since people give acceptance or approval to those who conform with the regularity and or reject or disapprove of those who deviate". This is Hart's *internal* point of view, which Pettit elaborates to assess meaning to the norm of honesty as a particular case—"norms come about as a result of rationally intelligible adjustments between the parties" (ibid.).

The question of emergence of norms is an important one and can be studied empirically, because there is not a single general answer for the problem (see e.g., McAdams 2010 for a different solution). At this level, it makes sense to distinguish carefully between two meanings of agreement: *B-agreements* (being in agreement) and *H-agreements* (having an agreement) (Paglieri 2012).

Stemming from cognitive and social sciences it makes all the sense fleshing out these concepts seeking for micro-foundations for agents' behaviour as well in Multi-Agent Systems (MAS) (Castelfranchi 2003). The emergence of meaning and interoperability is another dimension of the problem, with a variety of approaches —specifying the conditions under which two individuals (or one individual at two points in time) will infer they share a diffuse referent (Chaigneau et al. 2012); or conceiving semantic interoperability as a

[243] See the essays contained in Coleman (2001); especially Raz (2001), and Endicott (2001).

coordination problem between the world, information systems, and human users (grounding semantics, semiotic dynamics) (Steels 2006). Philosophy can support theories and empirical testing on analytical grounds. We can find a correlative example on H-agreements in Black (2006), preferring the offer-acceptance model over the undertaking-based model.

It seems to me that we should maintain separate from the analytical point of view *agreements in language* and *agreements of language*. Wittgenstein made a substantial contribution when code or symbolism are involved, distinguishing in his late works *agreement in judgment* and *agreement in opinion*. To disagree means having the capacity to agree, first, in a common communicative ground. Agreement in judgment would mean that what is shared is the language as a 'form of life'; the role inter-subjective agreement plays for the possibility of linguistic communication.

As said, this kind of fundamental questions can and should be addressed not only from the philosophical point of view but from the empirical one. The assumption that obedience or acceptance of norms has an "internal" side than can be solved only by refining the natural meaning; *id est*, that normative agreements "emerge" naturally from the social body, is a strong assumption that can be put under the light of knowledge acquisition through data analysis.

Clearly, assumptions on the general picture—the sovereign state, the division onto citizens and officers…—played a role (and a major one) in the way classical legal theory addressed the analysis of agreements and rules.

3.5.4 Validity and Regulatory Models

Equally, in the new scenarios raised by cloud and fog computing, crowdsourcing, and relational law and justice, assumptions about the whole context have an impact on the way agreements and norms are faced. We generally deal with complex environments, in which power is fragmented and divided into multiple sources of authority, with different levels and degrees of compulsory force, and different jurisdictions.

In networked governance, legality anchors the intended behaviour of state agencies, their relationships, and their relationships with citizens. Hard and soft laws are commonly

differentiated by the existence of *legal* norms. But legality is *situated* within national, communitarian (European), or international borders. In the cloud, nevertheless, the eighty million controversies that e-Bay has to solve every year, e.g., occur in what we could understand as a *dereferenced legality*. There is a procedure to be implemented and followed that is eventually ground on the conditions of dialogue between the parties, and the incentives and disincentives at stake (e.g., reputation), not because there is no other way to enforce a final ruling, but because actually the technological nature of the web can implement a new balance between public power and personal empowerment.

This state of affairs reminds the situation of agreements in pre-modern societies, in absence of the state but with a strong need to maintain the balance of a living social regulation. Online Dispute Resolution procedures lie on ordered steps and the structure of rational agreements —usually between only two different sides (Lodder and Zeleznikow 2010). However, there are other scenarios regarding public goods (e.g., ecological conflicts, polluters etc.) in which non-binding voluntary agreements are most effective if selective, because power is still an issue even in non-enforceable, i.e. non-legally binding, situations (Glachant 2007). This is the first argument in favour of considering dialogue as a primary source of law.

I will elaborate this position stemming from a second argument on the emergence of validity as a result of agreements. My position is that this is so when bindingness is put aside through the *same conditions* in which it appears in a conventional legal reasoning process. Validity, legal bindingness, is not strictly needed, but it is a factor that co-exists with other scenarios in the web. Let's elaborate on that. This discussion precedes the more elaborate one on the validation model that I will present in the last chapter of the Dissertation.

Semantics has a long history in law as well since the inception of Hohfeldian jural schemes. Hohfeld, von Wright, Alchourrón and Bulygin, Lindahl, McCarty, Sergot, among many others, built up a normative space in which it was held to perform the distinction of legal from non-legal norms (or deontic effects from other modal ones). One of the main contributions is due to Giovanni Sartor (2008, 2009a, 2009b). Following Ross's suggestions on inference, Sartor dwells on *semantic* inference. He claims that "certain features of a norm entail the norm's legal validity on the basis of their ability to justify

the norm's legal bindingness (through the mediation of legal validity". This means (i) that a norm is automatically enforceable if it is legal, (ii) that legality is a deontic property that "supervenes" in a process of legal reasoning; (iii) that legality is a moral property (in a broad sense).

However, if legal bindingness depends on a test on the acceptability of premises in an argumentation process, i.e., it is considered strictly dependent on validity as an evaluative concept, then, bindingness requires a *political theory*, i.e. a theory of democracy (broader than legal theory) to set the acceptable criteria and values to be implemented in a legal reasoner. The political side of validity cannot be avoided, even accepting Sartor's moral perspective. The late Ross asserted that "feelings of validity" are "the very foundation of all politically organized life" (1968).

For this reason, as I will enfold along the remaining chapters, I do not consider legality as a moral property, but as a political one; i.e., not only applies through legal reasoning, but through the diverse moves of negotiating agreements (and at the different layers of the possible disputes as well), soft law, good practices and ethical codes than constitute the line of *institutional strengthening*; that is to say, the resulting vector of a regulatory space which is broader than the application of legal norms. If this is so, validity goes along a continuum that cannot be only linearly determined by a unilateral process of reasoning, but by a set of variable procedures that are themselves negotiated, discussed, evaluated, and eventually changed, in a dialogical process between different agents or stakeholders (the notion of "meta-agreements" points at this situation). In a situation of dereferenced legality, what it immediately pops up is not the rationality of the argumentation or the enforceability of the agreement, but the effective satisficing behaviour of both (or more) parties, be they optimal or suboptimal.

There is still a third related argument in favour of considering dialogue as a source of law. As already stated in Chapter 2, many years ago, André Valente and Joost Breuker (1994) suggested that ontologies could help to bridge the gap between Artificial Intelligence and Legal Theory, and in fact many legal ontologies have been constructed since then (see Subsections 2.3.2 and 2.3.3). Sartor correctly states that conflicts between inferential and ontological approaches need to be considered "as a dialectical balance and co-evolution",

and this would require that lawyers and ontological engineers "have the ability to continuously adjust their onto-terminological constructions as the law evolves" (2009b).

I think the analysis can go a bit further for reconciling ontologies and inferential schemes requires an adjustment not only on legal but on social basis as well. Therefore, I would suggest that the adjustment should be produced considering the democratic values carried out by citizen participation and the evolution of the Web of Data. This means that a double and, if possible, coordinated process of dialogue should take place —between personal, local (or singular) knowledge, and expert, global (or general) knowledge.

This is the first step towards the notion of law as *legal governance* that will be developed in Chapter 5, the fourth stage of relational law on the Web of Data. It is noteworthy that this issue can be turned into an anthropological one, for what we are really facing is the way to understand in-context, as *legal ecosystems*, the environments created by legal instruments by means of formal languages, AI techniques and semantic layers. Another way to refer to this problem is conceptualising it as the transformation of law as meaning into law as sense. It is the *legal sense*, rather than raw or structured data, or the production of meaning, what matters in the emergence of legal ecosystems.

3.5.5 Democratic values

Democratic values are consubstantial to crowdsourcing, privacy, data protection, and the transparency and accountability principles that inform Linked Open Data, but they are not strictly necessary to construct artificial societies or Multi-Agent Systems (MAS). This means that they must be *consciously* designed, reflected and implemented, because I do not think they can be simply derived from any theoretical legal model alone. This goes back to dialogue and participation as a source both of *legitimacy* and *legality*.

A political reading, or a pragmatic epistemological position, emphasizes, as e.g. Robert Brandom (2008) does, that the possibility of disagreement and dissent is a condition of democracy. Disagreement is then viewed as "[...] an absolutely essential element of discursive practice. Without the right to disagree, there is no language".

Besides, from a linguistic point of view, it seems that free speech and dissent have (even through "non-politically correct language") a positive effect on the evolving of

democratic systems (Stromer-Galley and Muhlberger, 2009). Diversity of opinion seems to reinforce models of deliberation on the web too (Karlsson, 2010). However, I would not defend the existence of an implicit common law model to articulate a linguistic model of normativity as a political ground for the rule of law on the WWW. There are other means to seek for collective aggregation of information or knowledge than assuming normative restrictions at the speaker level.

The proposal of an I-we structure of normative scorekeeping and discursive updating instead of an I-thou structure (Brandom), or the "we-mode social groups" hypothesis put forward by Tuomela (2007) stress the function of collective action in the construction of a common social order based on agreement (implicit or explicit).

From the legal point of view, it is my contention that the basic question raised by Cass Sunstein (1994, 1996) some time ago is still a valid starting point to reflect on the implementation of a democratic model:

> How is law possible in a heterogeneous society, composed of people who sharply disagree about basic values? (…) Much of the answer to this puzzle lies in an appreciation of how people who disagree on fundamental issues can achieve *incompletely theorized agreements on particular cases.*

People disagree everywhere and on everything, and very likely they will keep disagreeing everywhere and on everything. But (and this is Sunstein's strong point) they do not need to agree on general principles to reach agreements: "people from divergent starting-points, or with uncertainty about their starting-points, can converge on a rule of a low-level judgment" (ibid. 145).

More recently, Sunstein has warned against the biased reasoning trends and polarization to which the 'blogosphere' is prone. In rational choice theory, there is an ongoing interesting discussion on *meta-agreements*—the conceptualization of issues at stake, the context of sets of judgments over multiple interconnected propositions—and *single-peakedness*—individuals rationalise their preferences in terms of a common issue

dimension to overcome the well-known voting paradoxes (List, 2007; Ottonelli and Porello, 2012).[244]

I still think that there is no valid argument against the capacity to produce new knowledge through the empowerment of individual participation on the web. Developing these theses falls out of the scope of the present Chapter. However, I hope to have shown that both theoretical and empirical approaches are needed to face them in a consistent manner.

In Chapter 4, I will contend that the points stressed so far on conflict, agreement, dialogue, crowdsourcing, and political values can find a theoretical ground on anthropological bases as well. The way how anthropologists have conceived legal relationships, rights, and the emergence of social orders gives support to the notion of relational law sustained in this chapter, for reciprocity, contracts and the allocation of rights can be shown as the backbone of the legal governance approach displayed in the second part of the thesis.

3.6 Conclusions

Chapter 3 concludes the first part of the Dissertation and facilitates the development of the toolkit on digital legal governance that will be presented in the second part. At risk of repetition, the notions of regulatory system, regulatory model, relational law, and relational justice can sustain an approach to legal relationships based on the idea of dialogue as a source of law.

In due course, I will show that a similar idea, based on argumentation and a dialectal approach to legal inferences, has fostered Artificial Intelligence and Law studies during the last thirty years. I have introduced the subject in Subsections 3.5.4 and 3.5.5. Legal theory and computer-based approaches have been working along similar lines of

[244] This term refers to a class of preference relations. Wikipedia offers the following definition: “A group of agents is said to have single-peaked preferences over a set of possible outcomes if the outcomes can be ordered along a line such that: (i) Each agent has a "best outcome" in the set, and (ii) For each agent, outcomes that are further from his or her best outcome are preferred less”. In rational choice theory, *single-peaked preferences* were first theorised by D. Black (in 1948) and K. Arrow (in 1963) on sufficient conditions to restrict the list of preferences that are present in a society, ensuring the transitivity of the simple majority rule. Thus, rational deliberation helps avoiding cyclic or intransitive group preferences by fostering meta-agreements, which in turn ensures single-peaked profiles. For a discussion of this thesis, see (Rad and Olivier 2021) contending that: (i) rational deliberation does not necessarily foster coherent aggregation; (ii) the hypothesis falls short of supporting the claim that deliberation also leads to an increase in proximity to *single-plateauedness* (single plateau preference profiles allows individuals to be indifferent among several best alternatives).

reasoning for a long time now, with a scarce contact with the empirical side of the question. What is missing is the dialogue between these two approaches, and what is still pending is the relationship between the formal analytical side of legal theory and the relational empirical approaches unfolded in the Chapter.

This is not saying that the outcomes are the same. AI and Law approaches have mainly followed the positivist guidelines set by the general theories of law of the 20th c., and their perspective on social, cultural, and political dialogue have been bounded by a set of legal requirements that have been closely selected and built either upon them or/and upon general ideas about what the legal profession—officers and lawyers— would consider acceptable and appropriate. Hence, not all the social sources of law have been considered and brought into the modelling. And the dialogue has often been restricted as well (i) to those that are considered "knowledgeable"—judges, prosecutors, drafters, lawyers, legal scholars—; (ii) to those that manage and administrate the legal systems—drafters, officers, policy agents—; (iii) to those that are considered to add economic value—industry, business, companies, corporations.

I will show in the second part of the Dissertation that the evolution of the Web and the Internet of Things is changing the bases for this set of requirements. Modelling law on Web 4.0, with sensors, web services in the cloud and in the fog (SaaS, PaaS, IaaS), and using linked data, NLP and ML, means thinking of the conditions to create sustainable legal ecosystems among *all* stakeholders—end-users: Lay people, consumers, citizens…and machines. This is also pending. I will tackle these problems in Chapters 5 and 6 and I will put some examples. In the meanwhile, Chapter 4 will open the second part of the Dissertation delving on the legacy of legal anthropology. The contributions that legal anthropologists have been consistently apporting to relational law since the beginning should be identified, highlighted, and valued, as well as its possible limitations when addressed on the WoD.

As I already said in the Introduction, Chapter 3 has put the seeds that will head us to the foundations of legal anthropology in Chapter 4. Both chapters are closely linked.

I have contended so far:

1. The scope, architecture, and methods of the 20th c. general theories of law constitute a useful starting point to understand interactions and legal relationships. I have plotted out several entry and exit points.

2. Legal realists (Roscoe Pound, and mainly Karl Llewellyn) incepted an empirical way to describe and analyse legal relationships that were resumed and followed thereafter by Law and society scholars (including legal pluralists). This approach was termed 'relational' since the beginning.

3. There are four stages of development of relational law and justice. The two last ones have taken place with the emergence of the Internet, the Web of Data and the Internet of Things.

4. Law as dialogue assumes, extends, and expands the empirical side of law as knowledge. Knowledge means socially 'situated', 'contextual', 'ecological' knowledge. Several concepts have been defined to catch up with this approach.

Table 1 below, situates the contents of Chapter 4.

Table 1. *Structure and Concepts of the Dissertation*

MODULES	CONCEPTS	FIELDS	CHAPTERS
Legal Web Services and Artificial Intelligence	Law as Data	Legal Anthropology and Sociolegal Studies	1. The Double Implosion of the Legal Profession and Web Services
	Law as Meaning		
	Law as Sense		
Law as Knowledge	Knowledge Graphs	Ontology and Semantic Web	2. Law as Knowledge: The Web of Linked Open Data
	Legal Ontologies		
Law as Dialogue	Agreement	Legal Theory, Sociolegal Studies, and Legal Anthropology	3. From Positivist to Relational Law: Law as Dialogue
	Legal Pluralisms		
	Relational Law		
	Relational Justice		
	Regulatory Model		
	Regulatory System		
Reciprocity and Dialogue	Integration	Legal Anthropology	4. The Legacy of Legal Anthropology
	Reciprocity		
	Legal Culture		
	Vindicatory Systems		
Legal Governance	Middle-out Approach	Epistemology	5. The Convergence between the Web of Data, the

	Inside-out Approach		Internet of Things and Industry 4.0
Linked Democracy	Rule of Law	Political Anthropology and Artificial Intelligence	6. *Legal Isomorphism* and the Emergence of Legal Ecosystems
	Metarule of Law		
	Legal Ecosystems		
	Legal Isomorphism		
Sociolegal Ecosystems	Institutional Design	Social and Political Sciences and Artificial Intelligence	7. Sociolegal Ecosystems: Political Forms of Legal Governance
	Interoperability		
Metarule of Law	Compliance *by* and *through* Design	Methodology and Use Cases	8. From Compliance by Design to Compliance through Design: An Empirical Validation Model
	Scheme		
	Metamodel		
	Validation Model		

CHAPTER 4

The Legacy of Legal Anthropology

L'avare a toujours peur des cadeaux

[The miser is always afraid of gifts
not gladly the niggard gives.]

Hávamál, Sayings of the high one, *Codex Regius*, Scandinavian Edda, #48
cited by Marcel Mauss (1923-24, 32)

Summary. This Chapter sets forth the anthropological bases to build a conceptual toolkit to understand and explain legal relationships on the Internet of Things. This is an exploration of the legacy of legal anthropology (i) focusing on the classical ethnographies by B. Malinoswski, L. Pospisil, M. Gluckman, I. Schapera; (ii) followed by the contributions of the next generation, between the 20th and 21st c.—M. Sahlins, S.E. Merry, S.F. Moore, S. Roberts, M. Chanock, J. and J. Comaroff, I. Terradas Saborit, among others. The chapter explores the original concepts coined in the legal anthropological tradition—integration, reciprocity, social cohesion, legal pluralism—and posits and defines a set of new concepts to be developed in the Dissertation—*relational law, relational justice, regulatory systems,* and *regulatory models.* Three different notions of *legal reciprocity* are discussed as well—legal, institutional, and anthropological. It is also suggested the relevance of a dialogical approach (*law as dialogue*), and the notion of *vindicatory systems* that is introduced at the end. To close the chapter, the conclusions resume and summarise sixteen lessons learned that will be used as pillars for the argumentation in the next ones.

Keywords: Legal anthropology, legal pluralism, legal culture, legal history, relational law, relational justice, regulatory systems, regulatory models, law as dialogue, legal reciprocity, vindicatory systems

4.1 Introduction: Anthropological Pillars

Chapter 4 deals with the foundations of legal anthropology, and how its outcomes can contribute to the development of relational law for the WoD. I will be selective here. Not all results will be described and not all the work carried out by legal ethnographers and

anthropologists so far will be mentioned. In this sense, this Chapter can be deemed a piece of *bounded and focused* intellectual history. I will not address the relationships between the different schools of legal anthropology. This would be a painstaking job, because this field has experienced a fast grow since the past century, distributed in countries and legal systems of all over the world.

Moreover, it has already been a true interest in reconstructing a detailed historiographic account of the relations between cultural and social anthropology, legal realism, and the sociolegal field. This belongs to national intellectual histories as well, because fights, resilience and resistance have been quite different in all colonial and post-colonial nation-states, including those with huge internal divides (South Africa, Rhodesia, Nigeria… but also New Zealand and Australia). The boundaries of the legal anthropological field and what does exactly mean to be counted as 'legal realist' or/and 'legal anthropologist' constitute separate issues in which I will not plunge this time. In USA, before Llewellyn, other legal realists, such as Huntington Cairns and Felix S. Cohen, had written on this subject, fuelled by the New Deal and the situation of native American Indians in the nineties and thirties of the past century.[245]

Let me add that I will not oppose legal, sociolegal and anthropological theories. All along the 20th c. they resisted, tensioned, or even combatted each other. Polemics are the natural breed of academia. Legal theorists, anthropologists, historians, and legal scholars are after different objectives and purposes. I will have a closer look at them in this chapter, but only from the intellectual point of view. I.e., trying to understand the way legal anthropologists have identified, conceptualised, and clustered legal relationships in a way that can be discussed and reused for our own sake to capture and better explain digital reality. Let's lean on the bright side.

We will get started with the quest for the legal order as a spring point, in Section 2. How is social order produced? What holds a society together? And what is the structure and function of law and the state in that relationship? The reader will realise that I am looking

[245] Kaius Tuori has been consistently exploring the relationships between legal realism and anthropology. On the origins of legal pluralism in USA, Llewellyn, Cohen, and especially A. Arthur Schiller, see K. Tuori (2011). Kaius Tuori (2017, 805) contends that "the unusual convergence of legal realism and functionalist anthropology was founded on the shared goal of replacing hypothetical or metaphysical constructs with sound observations on reality."

for some substantial pillars as epistemological guidelines for the regulatory functions, actions and processes-in-context that will be deployed in the second part of the Dissertation centred on Digital Legal Governance. 'Law' from the relational point of view, is based on interactions, transactions, and conditions. But power, authority, and the general regulatory framework are essential as well. How can they be held together?

When confronted with ethnographic data, social and cultural anthropologists dealt at least with three main problems. First, language—natural, technical, and common language—is an essential component of regulations, decision-making, and conflict resolution. In the encounter with distant societies, which concepts should be used to capture the meaning of the language used in the interactions, exchanges, and argumentations? Second, what do 'legal' or 'regulatory' mean in stateless cultures? How ethnocentric and cultural biases could be avoided? Third, what do 'institutions' mean? Did it make any sense to find explanatory organisational principles or guidelines that could shed light at the same time about kinship, work, and allocation of resources?

These questions were even more difficult to solve if these societies had had any contact with Western civilisations. And, in addition, when the second generation of social anthropologists defined themselves as "legal anthropologists" and turned their eyes towards comparative ethnographies within their own cultures and societies of origin, their home societies, these issues got really blurred and controversies erupted. How cross-cultural analyses should be tackled, and how to validate their results?

It is not my aim to give a full answer to all these questions in the present Chapter. Its purpose is simply to pinpoint some relevant elements to underpin the concepts that were introduced in the first part of the Dissertation. So to speak, the discourse will be conceptually driven, because even if the controversies were not completely resolved—e.g. about the use of inner and/or external concepts, the scientific method to be used, or the political commitment of the ethnographer—the problems were there and they elicited interesting approaches and relevant data.

The remainder of the Chapter will be distributed as follows. After describing some classical notions—integration, legal relationship, social cohesion…— Section 2 and Section 3 will introduce the historical dimension. Section 4 will deal with several aspects of

reciprocity and legal culture—including the notions of relational law and relational systems that will be fleshed out in Chapters 5 and 6 of this Dissertation—. This Section singles out three different approaches to reciprocity and explores the notion of 'vindicatory systems' in the end. Finally, Section 5 draws some conclusions and identifies sixteen lessons learned that will provide the bases for the development of legal governance that will be introduced and explained in Chapter 5, in the second part of this Dissertation.

4.2 The Legacy of Legal Anthropology

4.2.1 Legal Relationship and Integration Order

I should connect the anthropological knowledge on legal matters with the first and second stages of relational law that I described in the last chapter (3.4.3.1 and 3.4.3.2). As said, Law and Society scholars led the relational turn, just before the hatching of the Internet, the Internet of Things, and the Web of Data. Social and legal anthropologists played a major role in this relational turn, which took place from the inside and from the outside of the relationships between legal theory, sociolegal studies and legal anthropology.

There are some interesting points to be mentioned in advance. The first one deals with the social approach claimed by the general theories of law. There are two main concepts that were sequentially elaborated in the 19th and 20th centuries by the legal doctrine. The first one is the oldest: the idea of *legal relationships* extracted, induced, or generated from social relationships. When can we assert that a marriage has been *legally* produced—i.e. is 'valid', 'legal'—out of a social relationship? What conditions must be fulfilled? How should they be complied with? Through what means and procedures? And, most of all, what is the role of the state to build a public space?

This definition of the legal scope was the legacy of the French Civil Code of 1804, the subject-matter of the German Historical School—see the controversy between Savigny and Thibaut, among many others, in 1814—and the elaborations of the *Pandectas* and *Begriffjurisprudenz* (Puchta, Windscheid…). Bernhard Windscheid coined the concept of *Anspruch* (a legally enforceable claim), and Rudolf von Jhering (along with the Criminal Law scholar Karl Binding) the notion of *Norm* as a logical assumption related to the coercive force and sanctions of a central power *(Staat*). It was quite clear the pervasive influence of the Roman law, for the building of the legal and the unification of the modern

German state in 1871—the *edificazione del giuridico* to quote Riccardo Orestano (1989)—took place on strong normative and historical bases. Public German Law schools built upon the concepts of *Staatrechts*, *Subjektive und Objektive Rechte, Norm*, etc.

The second generation of the German Public Law school—among them, Georg Jellinek and Max Weber—elaborated on the meaning of *Rechtsverhältnis* (legal relationship). For them, it was clear that the social dimension belonged to the scope of law, i.e. it could not be law without social patterns, and they started thinking *outside* of the limits of an autonomous, self-contained, concept of law. This entailed that human societies were not meant to be peaceful (or a mere aggregate of individuals) but the result of internal and external conflicts among social groups and, eventually, nations.

For the third generation, working in the interwar period, between World World I and II, this assumption was going to be the rule and one of the pillars of Public Law. A close look to the work of politically antipodean legal thinkers—such as Hans Kelsen and Carl Schmitt, among many others, i.e. Rudolf Smend or Hermann Heller—can shed light on the concept of social and legal *integration* to produce a social order (it is the same word in German and English). Solutions were, of course, politically diverse, the Kelsenian *Grundnorm* had nothing to do with the Schmittian principle of the integrative role of Führer's decision-making. But they were similarly placed at the foundations of Public Law and Constitutional grounds (*Verfassung* is the technical word).[246]

I would add to this brief explanation that the theory of social conflict and reconciliation, i.e the existence of social groups and subgroups in tension that should be integrated into a biggest unity, came from the German Historical School and the Germanist branch of the Public Law school—mainly Eichhorn, Georg Beseler and Otto von Gierke[247]. The State was simply the mightiest organisation that could prevail and rule over all other social organisations, integrating them into a political social order.

Thus, legal scholars assumed that legal integration would be able to produce legal orders that would be, by its very nature, social. This is what was contested in the interwar period

[246] For this reconstruction, cf. Casanovas and Moreso ([1994] 2020), Casanovas (1996), Stolleis (2001), Stolleis (2017), Koskenniemi (2001).
[247] *Das deutsche Genossenschaftsrecht* (German Law of Associations), Berlin 1868–1913.

by legal realists and legal anthropologists (starting in the mid-twenties of the past century), but assuming at the same time the intertwined relationships between legal order, social groups, and economic and political organisations.

4.2.2 Social Cohesion and Social Structure

Stemming from legal anthropology, Max Gluckman reversed this approach. He replaced *integration* with the function of *social cohesion.*

> Studies of societies in which private vengeance and self-help are the main overt sanctions against injury by others, and where this exercise of self-help is likely to lead to the waging of feuds, have led to one of the most significant contributions which social anthropological research has made to our understanding of social relations. Anthropologists have been able to see the situations which give rise to internecine fights, and, more importantly, to examine the mechanisms which lead to settlements. The critical result of their analysis is that these societies are organized into a series of groups and relationships, so that people who are friends on one basis are enemies on another. Herein lies social cohesion, rooted in the conflicts between men's different allegiances. (Gluckman 1955a, 2)

Thus, conflicts were deemed to be functional to the production of social order, and tensions and social norms were embedded into customs and patterns than could be more crucial than formal law to understand societies that were stateless and, in a way, without law, but not without a strict social order.[248] Gluckman considered legal judgements, procedural law and case-based arguments against an *idealtypen*, the *reasonable man*, which he believed that was to be found in every society, according to the way regulatory minds were shaped. Thus, as it has been pointed out many times, Gluckman endorsed Radcliffe-Brown's notion that behaviour appropriate to a social position was universally the legally relevant standard of right/doing and wrong/doing. The *reasonable man* is the man who behaves correctly according to the standards of a particular society, as he had shown in Barotse's judicial behaviour and deeds.

The truism "the approach to the study of both rules and cases must be from a study of society itself" was defended in his contribution to Hoebel's *Festschrift* to point out that, from Malinowski onwards, to unravel the structure of the society at stake was a previous

[248] "Conflicts in one set of relationships, over a wider range of society or through a longer period of time, lead to the re-establishment of social cohesion. Conflicts are a part of social life and custom appears to exacerbate these conflicts, but doing so custom also restrains the conflicts from destroying the wider social order" (Glukman 1955a, 2)

commitment both for anthropologists and legal scholars (Gluckman 1973, 619). Holmes, Llewellyn, and legal realists would have done so. Knowledge of factual situations and knowledge of all the rules of law are both essential to understand a case, and only knowledge on the social environment can help the analyst to correctly situate the factual situations of the legal case. Thus, "cases, rules and praxis have all to be handled together".

> We are caught in a circle, in which law, it is true, can only be understood through cases-but cases can be understood only through law, *and both have to be set in the matrix of social process* [my emphasis]. (Gluckman 1973, 622)

> Only in a total context of social process and of the significance of particular rules within the whole body of law can one begin to cope with the following sort of problems: What is the scale of a particular case both in its scope and in its effect in time? By what criteria does one select certain cases for analysis and determine which are the key disputes? By intuition? How is a particular decision related both to changes in the law and to changes in the whole or parts of praxis? What factors move judges or conciliators to particular decisions? How are disagreements and breaches related to law as observed? (Gluckman ibid. 632-33)

Gluckman spelt out for the Barotse how judges used what he called "moral exemplification", by which "law in [one] sense is constantly exhibited in the conformity of upright people to norms" beyond the letter of the law (Gluckman 1955, 93). He carried out his research on field trips to Northern Rhodesia in I940, 1942, I944 and 1947. His focus was the central political-legal institution of the Lozi, the dominant group among the Barotse. This institution is the Council, or *Kuta*. His ethnography— *The Judicial Process Among the Barotse of Northern Rhodesia* (1955)—contains a detailed analysis of Kuta as *institution*.

While Gluckman does not claim that law can also be understood as a set or cluster of institutions (comprising the dynamic of rules being implemented beyond what they strictly say), it is my contention that his work can be understood from this point of view as well. There is no 'living law', i.e. no legal norms, if they cannot be defined as a set of social rules that are enacted, handled, managed, amended and transformed through a dynamic process of institutional nature. Law, even customary, non-written, is not to be confused with cultural values, religion, or symbolic attitudes. It requires something else that specifically identifies and separates what is right, acceptable, enforceable, or 'legal', from what is wrong, forbidden, or not 'legally' doable.

This is a problem that Gluckman solved asserting that law might not be forcibly reduced to "legal norms", customs could be break into more granular concepts allowing legal reasoning with "a precise degree of imprecision". Thus, what we understand by 'law' in non-Western societies according to the cohesive forms of social structure could perfectly be 'non-legal' according to Western legal doctrine. But actually is. The answer to his critics in the "Reappraisal" of 1966, mainly to Paul Bohannan notion of "double institutionalisation", follows the same line of argument— "I call 'custom' a source of what I call 'law' and hence what I call 'forensic' (formerly legal) rulings." (Gluckman 1973, 403)

4.2.3 Legality: Malinowski's Chain of Reciprocity

Legality, what might count as 'legal' to express rights and obligations, was certainly a problem that the authors of other classical ethnographies on legal anthropology—from Bronislaw Malinowski to Isaac Schapera and Leopold Pospisil—faced as well.

Gluckman was quite familiar with legal realism, judicial precedent, and the Common Law tradition. He felt less comfortable with history, the legal theorists of the German tradition, and the procedures of the French Civil Code (Gluckman 1966). But because of their origins, education, and mother tongue language, Malinowski[249], Pospisil, and to certain extent, Schapera, did not have this limitation and actually used Roman Law, German philosophy and its theorisation of rights as an implicit hidden mirror to find a more anthropologically accurate meaning for rights, norms, and rules. Segmented societies departed from the political and legal integration principle that fed Continental jurisprudence, and they could prove it.

For instance, Pospisil, quoting in his ethnography on the Kapauku law the Romanistic notion of contract adopted by the French Civil Code (rather than Roman law itself, but

[249] Malinowski possessed "an unusual linguistic virtuosity. grounding in classical Greek and Latin, he had a thorough knowledge of English, French, German, Italian, Polish, Russian, Spanish, and native Motuan and Trobriand." (Murdock 1942, 442). Should we remind that he wrote his *Argonauts of the Western Pacific* (1922) in the Canary Islands? Paluch (1981) has shown the importance of his Polish philosophical and scientific education, from phenomenology to, especially, the positivistic school of Avenarius and Mach. His conception of functions and culture as a cluster of instrumental components go back to these early years.

this is not what matters here) shows the different value and weight of agreements in Kapauku transactions[250]:

> Unlike in Roman law, a Kapauku sale contract is not considered closed by the mutual agreement of the parties. Not until the sold object is transferred and the full payment does the object belong to the buyer. This fact has very important consequences in the fields of liability and annulling of the deal. Furthermore, by tacit underselling which consists of the acceptance of a low price for a commodity without explicitly agreeing to the finality of the deal, a sale may "be invalidated" by the seller or his heirs any time in the future. Under certain circumstances, sales of land may be declared invalid by the legal heirs. *The legal irrelevance of an agreement and the frequent possibility of breaking a contract differ profoundly from the Romanistic notions of contracts* [my emphasis] (Pospisil 1956, 217-218)

Malinowski, stemming from his first studies on Australian aborigines and ending up in his brilliant social, economic, cultural, and legal work on the rings of *Kula*, struggled with the civil law concepts of Civil and Criminal law to define non-Western regulatory practices and what was meant by the law of Kiriwina and the Trobriand Islands.

> In our own province we have so far met with positive commandments only, the breach of which is penalized but not punished, and the machinery of which can by no procrustean methods be stretched beyond the line which separates civil from criminal law. If we have to provide the rules described in these articles with some modern, hence necessarily appropriate label — they must be called the body of 'civil law' of the Trobriand Islanders" (Malinowski 1926, 17).

Schapera devoted an essay to follow the different ways in which Malinowski approached the subject:

> Although at the very beginning of *Crime and Custom* (1926) he refers loosely to 'primitive law' as 'the various forces which make for order, uniformity and cohesion in a savage tribe' (p. 2), he later emphasises that law is 'clearly distinguishable, and distinguished by the natives, from the other types of norm, whether morals or manners, rules of art or commands of religion' (p. 74). 'There must be in all societies', he says, 'a class of rules too practical to be backed up by religious sanctions, too burdensome to be left to mere goodwill, too personally vital to individuals to be enforced by any abstract agency. This is the

[250] The 176 cases and 121 rules presented in Pospisil's ethnography were divided into five main categories: offences against persons, against rights in things, against contractual agreement, against and by authority, and against society (Pospisil 1956, 258). These categories loosely reflect some divisions contained in the Preliminary Title of European Civil Codes and in the positivistic view of legal theorists such as G. del Vecchio (quoted in his dissertation) e.g. *ius in personam* and *ius in rem*. The existence of abstract rules does not mean that theyare applied as such: "Of 176 cases, only 87 correspond to a rule. In other words, in 89 cases which represent almost 51 per cent of the total, the actual results differ from the statements in the rules" (ibid. p. 419).

> domain of legal rules' (pp. 67 f.). 'The rules of law', he says in another context, 'stand out from the rest in that they are felt and regarded as the obligations of one person and the rightful claims of another' (p. 55). (Schapera 1957)

Thus, civil law, in contrast to criminal, is "the law obeyed and not the law broken", i.e. he was looking for the mechanism that paste together the different regulatory elements of a society. This could not be political integration, obviously absent from stateless societies. He found it in *reciprocity:* "Instead, they are 'kept in force by a specific mechanism of reciprocity and publicity'. Their observance rests upon a sense of duty and recognition of the need for cooperation. The dominant factor is enlighted self-interest" (Schapera 1957). On reciprocity lies the "binding force of economic obligations" (Malinowski, 1926, 9)—actually a binding *chain of reciprocity* in a *system of communalities*[251], the "inner symmetry of all social transactions" or "reciprocity of services" that the author deemed the condition of existence of all "primitive" societies.

I will come back to reciprocity in the next sections. Reciprocity applies between communities, subgroups, or individuals, as there is no obligation without it. For instance, while complying with her mourning duties, the widow will receive a payment from the members of her husband's matrilineal kinship (ibid., 11). After a ritual gift of yams to her sister, her husband must compensate the gardener for this transaction, and "this whole ceremonial side of the transaction has a binding force", "a definite psychological constraint upon the giver — "they satisfy and reward him, when successful work enables him to give a generous gift, and they penalize and humiliate him for inefficiency, stinginess, or bad luck." (ibid. 12). Malinowski (1926,18) offers the following summary:

> 'Civil law', the positive law governing all the phases of tribal life, consists then of a body of binding obligations, regarded as a right by one party and acknowledged as a duty by the other, kept in force by a specific mechanism of reciprocity and publicity inherent in the structure of their society. These rules of civil law are elastic and possess a certain latitude. They offer not only penalties for failure, but also premiums for an overdose of fulfilment. Their stringency is ensured through the rational appreciation of cause and effect by the natives, combined with a number of social and personal sentiments such as ambition, vanity, pride, desire of self-enhancement by display, and also attachment, friendship, devotion and loyalty to the kin. It scarcely needs to be added that 'law' and

[251] "This is not limited to the exchange of fish for vegetables. As a rule, two communities rely upon each other in other forms of trading and other mutual services as well. Thus every chain of reciprocity is made the more binding by being part and parcel of a whole system of mutualities." (Malinowlski 1926, 9-10).

> 'legal phenomena', as we have discovered, described and defined them in a part of Melanesia, do not consist in any independent institutions.
>
> Law represents rather an aspect of their tribal life, *one side of their structure*, than any independent, self-contained social arrangements. Law dwells not in a special system of decrees, which foresee and define possible forms of non-fulfilment and provide appropriate barriers and remedies. *Law is the specific result of the configuration of obligations*, which makes it impossible for the native to shirk his responsibility without suffering for it in the future. [my emphasis]

As Murdock (1943) recalled, to a social group and the sub-culture it bears, Malinowski applied the term *institution*. The collective life of any society is manifested in a series of organised systems of behaviour or 'institutions', resolving themselves into six interrelated elements.[252] In his last work, posthumously published—a review of *The Cheyenne Way* (1941)—Malinowski was even more specific about the complexity of the legal procedural lifecycle underpinning the social structure.

He contended that all the fundamental categories of human behaviour are subject to the intrinsic determinism of culture. Therefore,

> […] we shall have to remain satisfied with *general* principles of the *fundamental* and relevant: *De minimis non curat lex* —whether this be scientific or man-made law" The social and legal rules of property, of privilege, and of duty are part and parcel of the solution of a practical problem through applied knowledge, social co-operation, and the establishment of cultural values. (Malinowski 1942, 1239-40)

He points out four different meanings of 'law' that introduce the interesting problem of how rules and norms interrelate, i.e. how a legal order based on compliance might *emerge* from common social and cultural constraints that are just taken into account. There is a process of selective regulatory differentiation and accommodation of norms. Legal compliance and its reverse, the breaching of norms, are thus possible and come true through

[252] These are: (i) *personnel* (a group of individuals cooperating in the performance of a common task; (ii) *material apparatus* (the artifacts employed in their activities), (iii) *norms* (the rules or ideal patterns to which behaviour is expected to conform; (iv) *activities* (the behaviour, including deviation from norms, which actually takes place in the performance of the joint tasks, (v) *charter* (the express cultural definition of the common aims or purpose of the institution; (vi) *function* (the actual effect of the collective enterprise in satisfying human needs). In Malinowlski's theory of culture, he highlighted four elements: "In every instrumental phase of preparatory activities, the following factors are disclosed: (1) *artifacts*; (2) *normed behavior*; (3) *organized cooperation*; (4) *symbolic communication* by means of language or other signs. These four cardinal constituents of culture are present in each phase at any level of civilization." (Malinowski 1941, 192). Or: economics, social control, education, political organisation (ibid.).

a complex iterative cycle in which *knowledge* of the environment and the social and political system is necessary to set up the whole legal mechanism.

> *Law (1)* is the rule of determinism. It is used here in the same sense in which "law" appears in the phrase "law of science" or "law of nature". In this context we are primarily concerned with the laws of cultural determinism.
>
> *Law (2)* is the rule of conduct standardized in behaviour or verbally formulated. The rules of knowledge, of technology, of cooperation, of common life, and of convention, enter into this class. The rules of primitive knowledge usually occur as imperative or, at least, normative statements, since they are formulated invariably so as to fit pragmatic contexts. They bear a strong surface resemblance to other imperatives of tradition.
>
> *Law (3*) applies to rules of conduct which refer to relations between individuals and groups, delimit divergent interests, and curtail disruptive physiological and sociological tendencies. Here enter most rules of property, contract, status and authority, as well as the rules protecting human life and limb, and limiting sexual rights to well-defined social relations.
>
> *Law (4)* is the specific mechanism which is brought into existence when a conflict of claims arises or a rule of social conduct is broken. (Malinowski 1942, 1243)

Let's follow this late Malinowki's line of argument, as it can be reinterpreted from the light of the emergence of legal ecosystems in the Chapters to come. What I deem essential here is the scientific need to ground the legal norms and related individual and collective behaviour empirically and causally on social patterns and forms that are specific for each human community. These should be separately substantiated to unveil the conditions underlying the construction of a legal order. Malinowski went further with the following explanation:

> Law (1) contains the principles of determinism stated by the observer, Law (2) the principles of conduct derived by the natives from their own traditional body of doctrine. The interest of jurisprudence begins with the distinction between Law (2) and Law (3). The rules of Law (2), in so far as we find in them an automatic sanction, are not subject to the tensions and the conflicts which make the maintenance of Law (3) invariably a dynamic process. They lack above all the element of sanction as a social reaction. Law (3), on the other hand, corresponds definitely to *Law* as we use the term in our own society. Rules which delimit claims and interests have to be known and clearly stated. Their maintenance is a matter of concern to those whose claims and interests are involved. Laws of this type are often positively sanctioned, that is, strict observance is rewarded, quite as much as inadequacy and breach punished. I suggest, however, that it is the distinction between Law (3) and Law (4), that is, *the law of order and law maintained, as opposed to the retributive and restitutive social action*, which has to be emphatically stated. The two are

> in a way exclusive of each other. When we speak of a law-abiding community, we mean Law (3). When we speak that "law" has been brought into action, we mean Law (4). Law (4) comes into being when Law (3) ceases to work. As long as Law (3) reigns, there is no room for Law (4). (Malinowksi 1942, 1244)

To use his own words, he tried to keep separated the *maintenance* and *restitution* of the social order, i.e. order and the mechanisms of its reestablishment. I will show later that these distinctions—for the sake of clarity: (i) Law of cultural determinism, (ii) law or rule of native conduct, (iii) law of order and maintenance, (iv) and restitution, the mechanisms of law when breach occurs—may have a counterpart on the regulation of the Internet. "*Law is but a part of social and cultural engineering*" [my emphasis] (Malinowski 1942, 1247).

At the end, Malinowski was clearly advocating for a science of culture that comprised jurisprudence as a science as well for

> "it is gradually tending to regard law not as a self-contained universe of discourse, but as one of the several systems of social control in which concepts of purpose, value, moral constraint, and customary force have to be considered, besides the purely formal apparatus of code, court, and constabulary". (Malinowski [1944] 2014, 6).

Collective coordination, cooperation and reciprocity are the backbones of the institutional approach to culture and society. In his posthumous theory of culture, law is viewed as the most important regulatory means for the survival and development of transactions and exchanges in an institutional economy and, eventually, the social community as a whole.[253]

> Order and law have to be maintained, since cooperation is the essence of every cultural achievement. In every community there must exist arrangements for the sanctioning of custom, ethics, and law. (ibid. 29)

[253] "The legal rules which define large sections of the economic processes but which also dictate forms of marriage, *establish the sanctions of its validity*, and declare the consequences of marriage in terms of descent, have to be precisely stated. In other words, we have to be aware how the rules of customary law, courtship, marriage, descent, and extended kinship are formulated, where they run smoothly or else give rise to difficulties and complications, and the manner in which they are sanctioned through coercion or belief. [my emphasis]. Malinowski ([1944] 2014, 102).

4.2.4 Legality: Pospisil's Pattern of Criteria

Likewise, Leopolod Pospisil[254] drew the formal dimension of the law under an anthropological legal theory that he deemed universal. He did not share with Malinowski his "dissolving" idea of law into customary obligations, "the error of dissolving law into ubiquitous social obligation or omnipotent 'custom'" (Pospisil 1973, 538). As contended many times in his works, he was looking after "a real science of law", "valid cross-cultural generalisations and a comparative theory of law" (Pospisil 1973, 540), as Llewellyn and especially Hoebel would have done before him:

> A proposition derived from cross-cultural research: *Law is manifested by decisions of a legal authority rather than by abstract rules or by the behaviour of the litigants*. (Pospisil 1956, 418)

This legal authority can change, as it did in Papua New Guinea with the Dutch and Indonesian State administration for aboriginal affairs.[255] Pospisil acknowledged the existence of legal systems in any organized group and their subgroups within the state: "Even a small grouping such as the American family has a legal system administered by the husband, or wife, or both, as the case may be" (Pospisil 1966, 13). For Pospisil, both in traditional and Western societies, law is linked to social subgroups, relating themselves according to an explicit political bond. Thus, there is law even if there is not judicial authority, chiefery or centre to enforce it.[256] Law is *relational* and *dynamic*, incorporating

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[254] At the origins of Pospisil's interest in law there are his experiences with totalitarian regimes and WW II: "When did you become interested in anthropology? [*The Ethnologist*, 26 Sept 2016] I had had a number of friends during Masaryk´s Czechoslovakia before the Second World War. I had many German friends, because at that time Olomouc was a German city. However, some of these friends rapidly changed within one year after the arrival of Hitler and they became SS men. They were decent guys from decent families, sometimes even Catholics and these people would kill me just because I am Czech. Then I began to wonder, how this is possible? How is it possible that from the decent young people came such a beast? Well, through this it all began." http://ethnologist.info/interview/leopold-jaroslav-pospisil-2/

[255] "Originally, I studied the Kamu Kapauku in the years 1954-1955, before they had been pacified; many of them saw in me their first white man. Since that time, I have followed my research with periodic restudies of the people, as political and financial circumstances allowed (1959, 1962, 1975, 1979). This long-term study has yielded a dynamic picture of a Stone Age society, its rather abrupt transition to civilization, and the concomitant changes in its legal structure." (Pospisil 1981, 93) Patrilineal descent, patrilocal residence, and the patriarchal polygynous family are the principal characteristics of their social structure. Cf. also Pospisil (1958).

[256] […] there is, strictly speaking, no Kapauku law. Indeed, an overwhelming majority of wars and feuds in which these Papuans engage takes place within the tribe. However, this does not mean that we have to declare this society to be devoid of law, and settle for this very easy and comfortable solution. Law implies regularity and order and its existence requires an organized group of people who uphold the order and take care that it is enforced in situations involving individuals who are unwilling to conform. Consequently, it

the disposition to behave or the social rules of what is allowed in specific scenarios that have been incorporated to it:

> To get away from the traditional Roman concept of ownership, which formulates too narrow a definition to be useful cross-culturally, the present writer conceives of the concept as a right of an individual, or individuals, to an object, *which is manifested by the tendency of an automatic increase of rights on the part of the owner at times when those rights cease to be exercised by other individual*s. [My emphasis] Thus, for example, the owner of the land is identified by an automatic gain of the right to cultivate a plot of land when the individual who made a garden on it ceases to use it. An owner of a house would be a man who gains, automatically, the right to use it exclusively after his brother, who had the right of residence, moves away. (Pospisil 1956, 307-308)

There is another feature that is most relevant to our own discourse—the notion of freedom, balance, and non-compulsory compliance or conformity with the norms. According to Pospisil, freedom of movement and of premeditated action was regarded as the basic condition for life. “"As in disease, you cannot move on your free will, and the soul leaves," I was told several times by the old headman of the Ijaaj-Enona sublineage.” This is the reason why the sudden replacement of the headmen (*tonodi* and *magoodo tonowi*) by local administrators (*bupati*, the resident-officers), first, and then by far away colonial government powers, was so difficult for them to accept. It changed their social, judicial, and legal system to a less effective one.

Reciprocity, again, was lost. A reciprocal system of flexible loans and goods led by the richer headmen was replaced by a system of administrative permits and (criminal) penalties. They became *dependants*, a condition that was much different from the previous autonomous social control, as being dependant from or follower of a *tonowi* gave much more incentives and opportunities to thrive, economically and politically, than being officially administered by a contemporary state. The decrease of indebtedness and this loss had occurred quickly, in the first four years after the Kapauku exposure to Western civilization, between 1958 and 1962.

> Kapauku political and legal systems were based on an egalitarian philosophy and notion of equity. All people were ideally regarded as equal in law and their relations were expected to be balanced: any favor or payment extended to another person ultimately had to be countered by an equivalent prestation--a notion of balance called *uta-uta*, "half-half"

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is at the politically organized confederacy level, and those of its subgroups, that we have to look for the law that is responsible for social control in this native society (Pospisil 1966, 18).

> (or even better, "fifty-fifty"). Conformity with social and legal norms was achieved by *inducemen*t rather than compulsion. The Kapauku did not force anyone into conformity. They did, of course, punish offenders for crimes and torts, but the punishment was regarded as reestablishing the *uta-uta* balance and was recognized as a corrective measure for the culprit and a deterrent for potential offenders. (Pospisil 1981, 96)

There was a second political characteristic that was lost as well—the notion of *legal authority*, the reference point for stability and change of some parts of the system. In the old days, even the most sacred ones could experience a change because of the persistent will of a mighty *magoodo tonowi.* He illustrated it with the story of Awiitigaaj, the headman of the village of Botukebo, a prosperous pig breeder and courageous war leader, and "an enthusiast about feminine beauty" (Pospisil 1958, 832) who break the taboo and contracted an incestuous marriage in 1935.[257] After eloping the bride and being hidden in the jungle, the father's bride would eventually accept a payment for his daughter. This created a precedent and, ever since, other men followed this example. After the legal colonisation, this kind of behaviour was no longer possible because of the decline of the power and legal authority of the *tonowi.*[258]

Types and degrees of 'authority' were of outmost importance for Pospisil. This is the first of the four components of the "pattern of criteria" (1956, 431) to differentiate what is legal from other kind of political decisions or advice among the Kapauku. Actually, these four criteria are the *functional* (non-descriptive) components of Pospisil's cross-cultural

[257] The story is also told, with slight differences, as case n. 33, in Pospisil ethnography (1956, 288 and ff.) This is the outcome of this complex case: "After a while, however, Uga, the father of the girl and hpfl^an of Kojo, became tired of the futile hunt and asked Awi's relatives for bride price. These people refused to pay and insisted on punishing the couple. Uga, who came to be more interested in getting the money than in seeing his daughter executed, managed to secure the support of the whole Jamaina sub lineage and with the help of its numerous members, he fought a stick battle against the Bnona. sublineage of Botu. By this action, the whole Jamaina sublineage actually accepted the incestuous marriage as rightful. Otherwise, there would have been no reason to fight for the bride price. Moreover, by fighting the stick battle they absolved the Botu people from payment of the bride price. This, in turn, induced the relatives of Avi, who were the latter's followers anyway, to accept the Inevitable and recognize the Incestuous marriage. The happy groom, however, paid the bride price later. Thus, Avi, headman of Botu, through his cunning, courage, influence, and awareness of the rules, started an important change in law and social structure which tends to transform Botu community into an endogamous village with incipient moieties already present." (1956, pp. 289-90). Pospisil reported and analysed 176 cases, told by informants in different sessions (some of them with more than 20 people listening, participating and eventually correcting the informant.

[258] On the role of chiefs in legal innovation, see also Schapera (2004).

theory of law: (i) *authority*[259]; (ii) *intention of universal application*[260] (iii) *true obligation*[261] [obligatio], (iv) and *sanction*[262]. In addition, a law must have the form of a *decision* to be workable (Pospisil 1956, 436 and ff.). These decisions occur at many *levels* (household, family, clan, tribe, federation etc.). Those are the levels relative to social groups and sub-groups, defining a multi-levelled notion of law:

> *Legal levels*: A proposition derived from cross-cultural research. Law is not limited to the society as a whole. Every functioning subgroup of the society has its own legal system which is necessary different in some respects from those of the other subgroups. The hypothesis of a uniformity of law and of the existence of a single legal system within a given society is herewith denied. (Pospisil 1956, 460)

We should precise here, as Pospisil (2001) replicated to Goodale's reappraisal of his theory (Goodale 1998), that he was not thinking of 'legal pluralism' but of a 'multiplicity of legal systems': "I have never tried to present a model of legal pluralism applicable cross culturally" (Pospisil 2001, 116). His notion of societal structure entailed a "segmentation of the society into its constituent subgroups" (Pospisil 1967, 2).[263] This is a conception of a society as a multi-level unit with a dynamic centre of power. As I will contend later, in our case, digital societies do not hold a single centre of power, but a plurality of them. It remains to be seen whether these multiple centres constitute a unity on the Internet and

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[259] "A decision to be legally relevant, or, in other words to effect social control, has to be accepted by the parties to the dispute as a solution of the situation caused by the clash of their interests. An individual, or a group, who possesses an influence which causes the majority of the members of the group to conform to his decisions, the writer calls an authority." (1956, ibid.)

[260] "While analyzing the data arrived at from cross-cultural research, the writer conceived of the field of law as an ellipse surrounded by a zone of transition which separated the field from the rest of the culture. […]This criterion demands to be applicable that the authority in making a decision intends it to be applied to all similar or "identical" situations in the future." (1956, 441, 443)

[261] "It corresponds to that part of the decision of an authority which determines the rights of one party and the duties of the other." (ibid. 443). Rights and duties correspond to the two directions of the obligation. Both directions are necessary to create the legal relationship.

[262] "The form of a sanction is relative to the culture and to the subgroup in which it is used; it may be physical or psychological. We can define a legal sanction as either the negative behavior of withdrawing some rewards or favors that otherwise (if the law had not been violated) would have been granted, or the positive behavior of inflicting some painful experience, be it physical or psychological." (ibid. 451)

[263] "As there are inevitable differences between the laws of different legal levels, and because an individual, whether a member of an advanced or a primitive society, is simultaneously a member of several subgroups of different inclusiveness (for example, a Kapauku is a member of his household, sublineage, lineage, and political confederacy, all the groups being politically and legally organized), he is subject to all the different legal systems of the subgroups of which he is a member. Consequently, law in a given society differs among groups of the same inclusiveness (within the same legal level); thus different laws are applied to different individuals." (Pospisil 1967, 9)

the Web of Data. But, still, the notion of multiplicity as differentiated from plurality should be taken into account.

In my opinion, Pospisil's "pattern of criteria" constitutes a *pattern of legal validity*. As it is asserted by the author, they fulfill a similar function to the concept of *obligation* (reciprocal obligation ties) proposed by Malinowski, and the concept of *physical sanction* used by Radcliffe-Brown. We should stress that these concepts do not belong to social or legal philosophy, as they are *empirical* theoretical constructs, and they assume the methodological requirements of a normal social science approach. Thus, descriptions and interpretations must be explicitly stated, explained, and tested. This makes a difference with the definitions of validity carried out by legal philosophers using a doctrinal or logical method—*Grundnorm, Rule of Recognition* or, the more subtle *inferencing from previously selected legal sources* (the implicit legal theory mainly followed by the so-called Scandinavian legal realists and some Polish theorists such as Georg Wróblewski and Aleksander Peczenik). Thus, the attributes defined by Pospisil can be the subject of metrics measuring their actual performance.[264]

4.3 Anthropology and Contemporary History

4.3.1 History and Law in Troubled Times

The latter comment holds for history as well. This was in the 20th century an inescapable issue, as it is now, because the close contact with Western culture had a big impact on the structure of non-Western societies. To understand the processes of colonisation, decolonisation, and globalisation from the legal point of view necessarily entails building a historical toolkit to describe and explain the changes. The issue was explicitly addressed by Isaac Schapera commenting Evans-Pritchard, Malinowski, Hunter, and Gluckman's work:

> The tribes they studied had been so greatly influenced by contact with Europeans that to ignore the resulting changes would have led to an incomplete and distorted view of present-day social life; and study of the changes always included study of when, how, and

[264] E.g. Authority: "An authority then will be defined by the following possible combinations of the two measured attributes [absoluteness and formality] and their negatives: formal and absolute, informal and absolute, forma], and limited, or informal and limited. The distance from the limits of the ranges can be designated qualitatively or quantitatively." (ibid. 438)

> why, they had come about. […] the anthropologist must necessarily supplement his study of modern tribal life with a study of tribal history. (Schapera 1962, 145-146)

Simon Roberts observed in one of his last writings that "what was perhaps distinctive of the British colonial project was the concurrent imagination and reconstruction abroad of a metropolitan legal order *and* the making of explicit arrangements for the qualified survival of local government arrangements and normative orders" (Roberts 2013, Preface).

We should remind here that Schapera's main work was the reconstruction of oral (customary) and written (positive) law with both theoretical and practical purposes. His *Handbook of Botswana Law and Custom* (1938)[265] continues to be used by Botswana courts into the 21st century.[266] So, establishing changing patterns of law and government policies (Schapera, 1958), identifying the early influences of European law (Schapera 1987), and having reliable evaluation criteria to make a proportionate balance are components of the mindset that anthropologists, legal scholars and rulers, alike, should share so as not to perpetuate biases or produce negative impacts and unintended consequences in the evolution of tribal societies, developing countries, and emergent states.[267] He was quite clear about the practical effects that a serious empirical knowledge can bring about:

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[265] The Handbook was commissioned by the Bechuanaland Administration who desired a guide and not a legal code, for officers of the administration. The research was mainly among the baKgatla and the baNgwato. However, Schapcra was drawn to the baNgwato particularly, who had a highly centralised traditional systems of government (along with the Ashanti and the Zulu). The *Handbook* was criticised because in amounted to an 'imposition' of baNgwato Customary Law over the whole of Botswana, while the country had nine tribes. Cf. Roberts (1972)

[266] See an example of the Handbook citation in a 21st c. judicial ruling by the Botswana High Court, in *Chakalisa v Mmemo (Misca 242 of 2003) [2006] BWHC 39 (11 August 2006)* : "According to the celebrated authority on these matters, Prof. I. Schapera, "A Handbook of Tswana Law and Custom" at page 125, the main essentials of the marriage contract amongst the Tswana are the following: (a) the mutual agreement between the two families concerned, as reflected in the formalities of betrothal; and (b) the transfer of certain livestock, generally cattle, referred to as *bogadi*, to the bride's family by the family of the bridegroom." http://www.saflii.org/cgi-bin/disp.pl?file=bw/cases/BWHC/2006/39.html&query=schapera . I am grateful to Louis de Koker for providing me with this example.

[267] Schapera wrote many times to give some answers to the reluctance against anthropologists shown by some colonial administrators. Cf. for instance Schapera (1951) about Sir Philip Mitchell's tilt—"they only were gifted with understanding". He did not write in a confronting political way but giving some practical indications about how anthropological knowledge could be usefully implemented into running policies and regulatory planning. I.e. he wrote about innovations: "This inevitably leads him to examine critically the activities of the various European agencies that have intervened in tribal life. Here we are confronted with the question of the anthropologist's relation to matters of policy. It has sometimes been suggested, and even forcibly maintained, that it is not his business to interfere with practical issues; the Government, the missionaries, and the others, have their particular tasks to perform, and it is not within his province to criticize their work, let alone attempt to dictate what their work should be. There seems to be some confusion here between the criticism of aims and the criticism of methods. It may be granted that the anthropologist, as a scientist, should concern himself solely with the facts of the situation, and not question the motives that

> [..] the anthropologist is certainly justified in discussing the methods by which the realization of such aims is attempted. His comments, in fact, should be welcomed by those who have practical dealings with the Africans. The Government, the missionary, the teacher, and the trader, are all trying, in some form or other, to alter the traditional pattern of tribal life. Have the methods employed by them succeeded in accomplishing the changes they desire, or have they proceeded in such a way as to produce results other than those expected? The anthropologist is often in a better position than they are to evaluate the effects of their activities, and to point out where they have gone astray, or along what lines they could have proceeded; and this he can do without questioning their motives at all. (Schapera 1951, 132)

Asserting this kind of claims in *apartheid* times, in 1950s South Africa, Rhodesia, Botswana… entailed some risks that could be only overcome by the quality, detail and acuity of the outcomes. Even though, as Gluckman experienced in his first attempts to practice legal ethnography in Rhodesia, this was not always possible. But the next generation of legal anthropologists understood perfectly well the lesson, after encountering the same political (and social) obstacles.[268]

To remain with Schapera, his work has been reviewed and completed recently by John Comaroff (Schapera 1953, 2019), and his extended photographic archive has been curated and partially published as well by John and Jean Comaroff, and Deborah James (2007).[269] I should mention that Schapera, as he had shown in the descriptions carried out in *The Tswana* (1953, 11 and ff.), was extremely sensible to the spoken (oral) and discursive (written) nuances of native languages. Thus, he was able to respond to Comaroff's and Simon's criticisms with detailed pragmatic and contextual analyses of the modal and

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have led to their introduction. He may have his own ideas about the advisability of evangelization or labour recruiting, of apartheid or the pass system, of abolishing bride-price or polygamy, of attempting to bolster up the chieftainship or introduce local councils; but whether he approves or not of the ends at which they aim is a personal and not an anthropological problem." (Schapera 1951, 132)

[268] Jean and John Comaroff, both Sout-Africans, talked about apartheid conditions and their relationship with Gluckman and especially with their mentor, Isaac Schapera, in a long 2012 interview with Kalman Appelbaum. According to them, LSE functional and structural-functional methods were blurred and useless when they faced their ethnographic work: "The most significant thing about all this was that the kind of structural-functionalist methods that we had learned at the LSE were just totally inadequate when we got to this world, where you couldn't separate religion from politics, "local" ethnography from the structure of the whole colonial, Apartheid state. There was no way that you could see these things as anything but a product of a very large history, the borders of our "field" were, in a sense, there and not there. This forced us into a kind of anthropology that was difficult to write when we got back to the LSE; some of that material was put on hold until we started writing our books and had independent jobs." See: https://web.archive.org/web/20130701115111/https://www.dspace.cam.ac.uk/bitstream/1810/217640/2/Comaroff.htm (July 2013)

[269] This volume was prepared some years before but was published four years after his death. Cf. the explanation about Schapera's photographic archive, J. and j. Comaroff (206a).

normative Tswana expressions and concepts for law and custom. It is a morphological, phonological and, most interesting, semantic and pragmatic analysis, making clear that there was not a mirror-correspondence but a social and situational one between the native language and the conceptual legal content of the expressions.[270]

Notwithstanding that, the problem was the problem itself, not its resolution. I mean, the *definition* of the problem had shifted. For social researchers conducting their inquiries in the last quarter of the 20th century in South Africa, the problem was not to rebuild customary law, nor was it to rebuild Indigenous law under the supposition that something had to be reconstructed after being lost. The problem was the construction of the new South African state, and how the colonial and postcolonial law had to be adapted to the population, i.e. had to be *invented, and doing that, how it had invented its own past and would invent its own present and future as well,* creating 'customary law' out of a brittle evidence of native regulatory life.

Schapera's work could not be deemed right or wrong, accurate or inexact, but just a reflection of the whole administrative process to create its own subjective and objective legal relationships with the population. Personal and estate rights, *jus ad personam* and *jus ad rem*, were created at the same time than the colonial state, and now, under the abolition of the apartheid, the new South African state was going to recreate them again. With the post-colonial state, 'White law'—i.e. the legal system created, defined and administered by Whites[271] — persisted. Alike with the capitalist economic development, the redefinition of property went along with the redefinition of commodities and

[270]In the standard Tswana dictionary, "*mokgwa* is defined as "a custom, a habit, a peculiarity", and *molao* as a "law". Schpera showed that they could be differentiated according to their use in specific contexts and different degrees of coerciveness. For instance, *mola*o (law) was used in many ways meaning different things according to the use and context: (i) the law in general, (ii) the law personified, (iii) some particular matter of a general kind with which the law was concerned, (iv) a specific single rule, (v) the law as a system of social control or moral principles, (vi) a binding injunction or series of injunctions, (vii) rule of conduct decreed by the chief (or other authority). Cf. Schapera (1983, 143-44) This corresponds to "native law and custom ", i.e., "rules not specially promulgated but established by popular practice and long usage" (Schapera 1957, 161).

[271] I.e. "The imposed legal system has been made up of an amalgam of statutes which have been based largely on English models and drafting style; English-style court procedures and rules of evidence; a Roman-Dutch common law derived from western Europe; and a subordinate system of African personal laws defined and administered by Whites." (Chanock 1991c, 52)

relationships. As Chanock (1991, 66) contended, “with the development of migrant labour, both labour power and goods could be sold as commodities”. Thus,

> The production of commodities, which enabled dependants to have access to cash independently of elders, both accentuated the fragmentation of households and produced 'custom' as an ideological response to this fragmentation. 'Custom' was a weapon in the battle against the economic independence of dependants. [...]. In the colonial context western law superimposed definitions of what could and could not be commodities. […] eventually the kinship idiom and the new 'custom' could no longer cover all of the potential and actual property relations, and they became first mixed with, and then overwhelmed by, a new discourse about things. In disputes over the nature of exchange relationships, in which the new discourses were employed, basic ideas about property and its exchange were expressed. The importance for legal history of trying to get to these moralities of exchange is that they are the bases of the developing ideas about contract. (Chanock 1991, 67)

In this process, the role of the state was key. It had a nuanced response to the changes. It did not merely impose a legality governing from above without listening to the ruled. On the contrary, the creation of a customary law that was functional both to administrative interests of a developing country and to tribal powers kept the *status quo* straight. Chieftaincy was used as an institution of colonial government. The customary law land tenure, the role for the chiefs regarding ownership and allocation of land belonged to the same schema (Chanock 1991b). It was the political system who defined the possible roles and functions. But it did not act alone:

> […] customary law was formed in the process of a dialogue between rulers and ruled during the colonial period. The colonial state impeded the development of individual tenure by the 'invention' of communal tenure but was ambivalent in response to attempts by younger men, and by women, to separate estates from the control of older males. [Chanock 1991a, 88]

Even though, with the post-apartheid state and the 1996 South Africa Constitution, Chanock (1991c, 2001) perceived a new opportunity to think customary law in relation to new legal issues such as human rights, access to law, and the transformation of the legal colonial mindset. But things were going to be hard to change. For instance, the constitutional requirement that land rights on communal land be secured, and that gender equality be promoted was unlikely to be met by the *Communal Land Rights Act* 11 of

2004.[272] Reflecting on the role Constitutions have had in Africa, the role of corruption, and the constant failure of brand new states, Chanock (2010, 2016) contended that only a bottom-up, socially anchored African rule of law could start shedding some light on the complex situation created within and by failed states.[273] Chanock (2016) is pointing out (i) not only the failure of states but the failure of law and the inhibition of the emergence of the rule of law, (ii) the rejection of a pluralist democracy, allegedly incompatible with African traditions, (iii) the lack of any successful constitutional architecture to deal with ethnically fragmented states.

> What appears now to be necessary is a re-establishment of a rule of law among African communities, which can only be based on a thorough decolonisation of the common law which must reflect African lives, cultures, languages and processes. Until this is achieved, top down institutional structures will have nothing on which to rest. (Chanock 2010, 126)

There is an interesting point in this proposal that I would like to underscore. Regulations, and most of all, *legal* regulations, Constitutions, should be reached through dialogue, i.e., negotiations and agreements. Chanock (2016) uses the expression *government by consent*. For him, it is not only a sufficient condition but a necessary and sufficient one. There cannot be an effective and proper African rule of law in postcolonial states without dialogue at all levels of social and political organisations. I deem this position close to Lederach (2005). Peace processes that are not granular and layered within the population are prone to fail. This is not just an issue of restorative justice, but of constitutive justice.

Legal scholars learned from these historical and anthropological perspectives. Stemming on the works already done, T.H. Bennet (1991) edited a new *Sourcebook of African Customary Law for Southern Africa* acknowledging the difficulties that have been pointed

[272] "The Act is informed by a flawed conception of communal land rights, adopts an inappropriate "transfer of title" approach, and lends support to a distorted version of traditional authority." (Cousins 2005, 512).
[273] "The habit, in academia, and, more sadly, in practice, has been to start at the top, with the writing of increasingly complex constitutions, with increasingly sophisticated institutions and rights guarantees, which have, as has been shown time and time again, floated meaninglessly above the societies for which they have been designated, until the bubble bursts in outbreaks of violence." (Chanock 2010, 127) Enacting bills od rights top-down has not prevented war, famine and massive movements of population in the Congo, Nigeria, Sierra Leone, Uganda, Liberia, Ivory Coast, Zimbabwe, Rwanda, Angola, Mozambique, and many others (Chanock 2016). Chanock is crystal clear about violence: "No kind of 'law' -- constitutional, common, customary or local or international human rights law -- provides a solution to the violence produced by predation, a disintegrating social compromise, and collapsing states. Over the past half century large numbers of African states have failed to establish legitimate and peaceful governance." (ibid.)

out by historians and anthropologists. Bennet has been quite critical with the concept[274], with the way courts have been handling these cases, and with the constitutional reflection of customary law on the new South Africa Constitution. According to him, "words, such as 'bridewealth', 'brideprice' or 'bridebarter' have given a seriously misleading impression of the nature and function of the institution" (Bennett 2009, 31). Words such as *Ilobolo* or *Ukulobola*, the giving of livestock for a wife, do not find an English equivalence. Introducing African living law into South African legal system remains a challenge. The status of women, for instance in inheritance and succession rights, is still pending from patriarchal attitudes and as Tebbe (2008) has pointed out, it is a difficult matter, and real change has to be produced within and above communal groups and leaderships.[275]

4.3.2 Aftermath: History and Law in the Turning of the Century

Classic ethnographies by Malinowski, Gluckman, Pospisil, and Schapera constitute the benchmark against which the anthropology of law in the Anglo-speaking world has been developed so far. They are in all Handbooks. They have cross-fertilised the relationship of the field with Law and Society scholars. They have fostered further research on Courts, Parliaments, power, legal reasoning, and rights across the five continents in the second half of the 20th century. As said, the second generation of legal pluralism stood on their shoulders and has been able to offer interesting new findings on decolonisation, globalisation, and Human Rights resilience. History, as I have just shown, has played an essential role in this process.

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[274] "Another change concerns the reduction of oral rules to writing. What is apparently no more than a difference of form entails profound changes of substance. The rules of an oral regime are porous and malleable. Because they have no clear definition, it is difficult to differentiate one rule from another and, hence, to classify rules according to type If rules cannot be classified, they cannot be arranged into a system and, without the constraints of a system, rules may overlap and contradict one another. In fact, the oral versions of customary law should not be called systems at all. They are probably better described as repertoires, from which the discerning judge may select whichever rule best suits the needs of the case.165Until now, courts seem to have been unaware of these shifts but, if they are to do justice to the principle of living law, they need to avoid forcing a vibrant regime into the mould of common law, which was the mistake of the colonial and apartheid era. And, in a more adventurous future, the courts may consider the way in which their judgments affect the living law and how litigants are active in exploiting the advantages of one regime at the expense of the other." (Bennett 2009, 31).

[275] "Vigorous exercise of judicial power carries the danger of sparking a a political backlash that could undermine the same progressive constitutional commitments that the court rightly wishes to pursue. If that is right, and perhaps even if it is not, allowing community deliberations to unfold may carry significant appeal." (Tebbe 2008, 495-96).

Members of legal pluralism, as movement, have also both absorbed and discussed some elements of the classical works. Sometimes I have had the impression that Pospisil's critics and I have read his book with different eyes (and different purposes, as I will explain in the next section). For instance, when Comaroff and Simon (1981) established the *rule-centred* paradigm vs. the *processual-centred* one, they clustered Schapera's and Pospisil's theories into the first paradigm, and they depicted them as too close to the concepts of European and English jurisprudence.[276] On the contrary, according to the same reading, Malinowski would have not been focused on institutions but on social processes that he would described as "legal" (pointing out their regulatory functions in the production of social control).

In my view, Malinowski's and Pospisil's theories are not so distant. They both were looking for functions and roles, i.e., for social mechanisms instead of abstract norms and codes, and they both deemed reciprocity, organisations, and the positions of power (i.e. "authority") crucial to understand "primitive law". They conceived differently the regulatory and legal forms but, still, they created a conceptual toolkit to collect ethnographic data and to interpret and explain it (i) from an empirical point of view, (ii) for the sake of ethnographic analysis, (iii) to unveil all kind of regulatory relationships. Today, I would better describe their methods to understand and explain the emergence and implementation of law *as a set of legal governance mechanisms that can be also used as preliminary stances for the study of law and the Web of Data.*

John and Jean Comaroff have sharply pointed out that the sudden hatching of new Constitutions in more than one-hundred countries at the turning of the century seems to give birth as well a new *culture of legality* where the language of rights pervades all kind of actions:

[276] Comaroff and Roberts (1981, 7) describe Schapera's categories as "corresponding closely to those found in Western systems; it is implied thorough that these normative statements have the same characteristics as legal rules in that they constitute a code employed by judicial agencies to determine the outcome of disputes. In the same vein, Pospisil represents 'Kapauku law' as a catalogue of rules, although he orders them according to indigenous categories. However, in defining law as 'principles extracted from judicial decisions', Pospisil is insistent that these rules operate in a manner similar to that contemplated in a more formalistic accounts of the English legal system," I cannot agree with this description. Pospisil's work shows just the opposite: Abstract rules can be inferred but are not followed in most of the judgements he could collect. Pospisil's ethnographic work was not rule-driven.

> The enchanted faith in constitutionalism speaks to something yet deeper: a 'culture of legality' seems to be infusing everyday life almost everywhere, becoming part and parcel of the obsession with order that haunts many nation states nowadays. […] Nor is it just rights, interests, identities and injuries that have become saturated with legality. Politics itself is migrating to the courts. Conflicts once joined in parliaments, by means of street protests, media campaigns, strikes, boycotts, blockades, tend more and more to find their way to the judiciary. […] Citizens, subjects, governments, congregations, chiefdoms, communities and corporations litigate against one another in an evermutating kaleidoscope-changing 'constellations', legal pluralism might call it- often at the intersections of tort law, human rights law, constitutional law and the criminal law. Even democracy has been judicialized: few national elections these days go by without some resort to the courts […]. For their part, states are having to defend themselves in courts against unprecedented sorts of things in unprecedented ways and against unprecedented sorts of plaintiff (J. and J. Comaroff 2009, 33, 35)

Law and technology are mutually fuelling this new trend that, in fact, shrinks the boundaries of ethics and politics. I termed it *hyperreal justice*. In an over-saturated image culture like ours, it is the perceptual intuitive representation, the *image* of rights, obligations, or duties, which replaces the rights, obligations, or duties themselves (with legal or ethical basis) (Casanovas 2010, 272). Beliefs, be they fictional or even false, can trigger true emotions that are present in the course of actions. They should be contextualised and explained on historical grounds.

> Perhaps the overriding irony of the contemporary age—the Age of Futilitarianism, we called it, in which the rampant promises of late capitalism run up against a thoroughly postmodern pessimism—is how unanticipated it was. None of the grand narratives of the orthodox social sciences came anywhere near predicting the sudden transformation of the 20th-century international order, the fall of the Soviet Union, the crisis of the nation-state, the deterritorialization of culture and society, the ascendance of an unevenly regulated global economy. The surprising recent past of South Africa is one instance of this irony, one refraction of this world-historical process. Here too, notwithstanding an intense struggle, the end came unexpectedly. (Comaroff and Comaroff 1999, 292)

At least for thirty years now, history plays a central role in the making of practically all legal ethnographies (Comaroff and Comaroff 1992). Postcolonial anthropology and its relationship with violence have been thoroughly discussed. The effects of violence themselves have been described in war and post-war scenarios. Likewise, the devastating effects of colonialism and the creation of strange attractors, sects, characters, and new religions have been the subject of many monographies and academic articles. Jean and John

Comaroff have developed the concept of "occult economies" that reflect the dark side of post-colonial countries:

> By occult economies we intend a set of practices involving the (again, real or imagined) resort to magical means for material ends; or, more expansively, the conjuring of wealth by inherently mysterious techniques. (J. and J. Comaroff 2003, 150)

According to them, this was framed as a reaction of youth to loss and lack of opportunities in the post-apartheid world, while they were targeted by the market promise of a wealthier and richer future that never came true. In the new age, this time, violence came from below, bottom-up:

> For another thing, it was youth, not men in authority, who felt most moved to execute ''instant justice'' and to cleanse the countryside of malevolence. Singing freedom songs (p. 62), they marked Nelson Mandela's release from prison with a furious spate of witch burnings. All this was fed by a growing fear that some, usually old, people were turning others into zombies: into a virtual army of ghost workers, whose lifeblood fueled an energetic immoral economy beneath the slow rhythms of rural life. (J. and J. Comaroff 2004, 524)

This idea of *occult economies* was presented in the 1998 Max Gluckman Memorial Lecture, where John and Jean Comaroff extended it not just for the South African new witchcraft (including zombies and other spiritual phenomena) but for USA and other developed countries in the expansion of liberal elites.[277]

In my view, this "historical imagination", the reading of the hidden and sometimes surprising effects that historical events have on individuals, has certainly a heuristic and, likewise, scientific value. I would better say, it *may* have scientific value. They are not 'hyperreal' impressions, or mere intuitions. But they need to be tested with more direct and indirect evidence. Sally F. Moore (1999a, 304) observed that "there is a difference between imaginative interpretations and proof".

[277] "Postcolonial South Africa, like other postrevolutionary societies, appears to have witnessed a dramatic rise in occult economies: in the deployment, real or imagined, of magical means for material ends. These embrace a wide range of phenomena, from "ritual murder," the sale of body parts, and the putative production of zombies to pyramid schemes and other financial scams. And they have led, in many places, to violent reactions against people accused of illicit accumulation. In the struggles that have ensued, the major lines of opposition have been not race or class but generation—mediated by gender. Why is all this occurring with such intensity, right now? An answer to the question, and to the more general problem of making sense of the enchantments of modernity, is sought in the encounter of rural South Africa with the contradictory effects of millennial capitalism and the culture of neoliberalism." (J. and J. Comaroff 1999, 279)

> Without doubting for a moment the Comaroffs' striking evidence of the present widespread uses of the occult in South Africa, the official and media attention it has received, the anxieties that surround it, and the violence attributed to it, one may nevertheless have some hesitation about the Comaroffs' conviction *that they have solved the much larger and more troublesome question of causality*. [my emphasis]

This comment is pertinent and triggered the authors' response, making a virtue of necessity.[278] But perhaps historical readings and essays might have a deeper and distinct role, shaking our scientific common sense, identifying the most relevant issues and problems, and creating unattended relationships among variables that should be first selected and defined as well. The research program was ambitious and broad. Their agenda:

> It is to dissect millennial capitalism and the culture(s) of neoliberalism: to explore their impact on the ways in which people at different coordinates on the global map come to define the nature of value, grapple with the forces of production and reproduction, inhabit moral economies, and engage in political action. Witch hunts are forms of political action: they seek to divert and control power, channel the distribution of resources, establish a public sphere in which moral order may be negotiated, and construct reality itself. In a rampantly neoliberal world, these imperatives often seem especially urgent. (Comaroff and Comaroff 1999b, 309)

In our case, as I will explain in the second part of the Dissertation, finding reliable causal models for legal validation processes will become mandatory for Industry 4.0 and e-government agencies. Metrics are an unavoidable step to prove the accuracy of the models, as offering a clean representation of causal relationships constitute the main theoretical challenge. In due course I will differentiate between schemes, models and metamodels to deal with the problem.

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[278] Cf. the answer of John and Jean Comaroff (1999b, 307): "Taking this critique at face value, we plead guilty. Unashamedly. The lecture, read in honor of a charismatic provocateur, is a think-piece, styled to pose and ponder provocative questions. It was not written in the hubristic "conviction that [we] have solved the troublesome question of causality"-quite the contrary. Our objective was to make sense of some highly visible yet opaque, apparently disarticulated yet interconnected phenomena in the "new" South Africa-phenomena that perplex by hiding in the full light of history. In so doing, we sought to address two conundrums: why should these phenomena, glossed as an "occult economy," manifest themselves so forcibly now when received wisdom would have us expect otherwise? And why, while patently the product of local conditions, should this economy bear strong resemblance to similar economies in other places-most of all in "postrevolutionary" contexts where, suddenly and simultaneously, neoliberal capitalism liberates and disables, enriches and impoverishes."

4.4 Legal Reciprocity and Relational Law

4.4.1 Three Approaches to Legal Reciprocity

Let's resume in this last Section the analysis of what we can call 'legal reciprocity', the idea of *horizontal* relationships in the three dimensions of language, law, and society, and its relationship with relational law and justice. For the sake of brevity, I will skip the long explanation that reciprocity indubitably deserves. From Mauss (1923-24) onwards, it is one of the main pillars of legal anthropology. It has been recently analysed the documentation that shows the mutual influence of Mauss and Malinowski in the interwar period. Hence, both thinkers believed in the end "that sovereignty should be dethroned as an organising principle of international order in favour of intersocial exchange and the obligations it produces" (Coleman 2021, 78). Mauss offered a holistic view of *Kula* in his *Essai sur le Don* (1923-24) but he used legal formulae to describe its blended nature.[279] Malinowski was sensible to Mauss's international—legal—understanding of exchanges and, as we already saw in his review of Llewellyn's and Hoebel's book, he came back during the war to the relationships between the cultural constraints of an emergent order (cultural determination) and the prospective side of legal rules (legal order). Perhaps the outbreak of World War II mattered too to make him aware of the new political relevance that rights and legal issues were going to acquire in the aftermath.

There are at least three notions of reciprocity at stake. The first one is purely legal, *quid pro quo*, *do ut des*, the ancient Roman law way of understanding exchanges produced through contractual means. 'Reciprocity' in this first meaning is horizontal but it lacks the collective dimension pointed out by Malinowski and Mauss, i.e. it lacks the framework that is needed to *make sense* socially of the content of the exchanges. It is a principle of purely commutative justice form, *mutuality*, *synalagma*, between two parties and with one performance being given in return for another. "In such a state of affairs, performance (or at least the tender of performance) by one party becomes conditional upon the right

[279] « C'est donc bien une propriété que l'on a sur le cadeau reçu. Mais c'est une propriété d'un certain genre. On pourrait dire qu'elle participe à toutes sortes de principes de droit que nous avons, nous, modernes, soigneusement isolés les uns des autres. C'est une propriété et une possession, un gage et une chose louée, une chose vendue et achetée et en même temps déposée, mandatée et fidéi-commise : car elle ne vous est donnée qu'à condition d'en faire usage pour un autre, ou de la transmettre à un tiers, « partenaire lointain », murimuri . Tel est le complexus économique, juridique et moral, vraiment typique, que M. Malinowski a su découvrir, retrouver, observer et décrire. » (Mauss 1923-24, 71)

of the other party to receive counter-performance" (Henderson 2013, 3). Actually, its roots can be traced back from Aristotle to Aquinas and the Scholastics *glossatori* based only on what the mediaeval jurists called the *causa* of contracts—the reciprocal (*causa onerosa*) or liberal (*causa gratuita*) exchange. There is no mention of the collective effects on the society as a whole or on the societal structure.

The second notion is an institutional one, shared by theorists focusing on social interactions from different fields, such as Josiah Ober (ancient Greek history)[280], Elinor Ostrom (institutional economics and policies), and Frans de Waal (primatology), among many others. They all develop their work against an idea of exchange related to human (and primate) feelings, emotions and rationality acting in a dynamic strategic environment, in which (i) agents have to face societal problems, and (ii) the actions of other agents are part of the context. Behavioural economists have endorsed reciprocity beyond the assumptions about self-interested behaviour made by rational choice theory. It can be represented in a simple but effective way to understand its content:

> Reciprocity means that in response to friendly actions, people are frequently much nicer and much more cooperative than predicted by the self-interest model; conversely, in response to hostile actions they are frequently much more nasty and even brutal. The *Edda*, a 13th century collection of Norse epic verses, gives a succinct description of reciprocity: "A man ought to be a friend to his friend and repay gift with gift. People should meet smiles with smiles and lies with treachery." There is considerable evidence that a substantial fraction of people behave according to this dictum: People repay gifts and take revenge even in interactions with complete strangers and even if it is costly for them and *yields neither present nor future material rewards*. Our notion of reciprocity is thus very different from kind or hostile responses in repeated interactions that are solely motivated by future material gains. (Fehr and Gächter 2000, 159)

Elinor Ostrom contextualises this mutual behaviour in collective responses to common evolutionary problems from a regulatory perspective:

> The common assumption is that humans would have dealt with social dilemmas related to rearing and protecting offspring, hunting, and trusting one another to perform future

[280] Cfr. "Power is not simple; a proper explanation of the demos' kratos will have to embrace not only the more obvious elements of the franchise and the reality and threat of physical force but also authority and legitimacy, ideology and communication, interpersonal and intergroup relationships, reciprocity, and heterogeneity". (Ober 1989, 19) See the concept of *charis* in the juries' interplay (ibid. 242). On the reciprocal relationship between democracy and dignity, Ober (2012). On the Greek information sharing, the "economy of esteem", and its importance for the construction of common knowledge (norms for knowledge sharing) see Ober (2008, 119, 136).

> promised actions millennia before oral commitments could be enforced by external authorities. All reciprocity norms share the common ingredients that individuals tend to react to the positive actions of others with positive responses and to the negative actions of others with negative responses. Many sequences of actions could qualify as a form of reciprocity. (Ostrom 2003, 42)

The inadequacy of the economic canonical rational choice model to explain exchanges and transactional human behaviour and decision-making have been tested at the crossroads of economics and anthropology. After conducting experimental research in fifteen small-scale societies in three continents[281], Henrich et al. (2001, 73) reported among other findings that "the canonical model is not supported in *any* society studied". This is most relevant to contracts, allocation of property rights and the use of common gods. It has a public political side as well. As asserted by Ober (2008, 272), "democracies are more likely than oligarchies or autocracies to regard criticism as legitimate".[282]

Empirical cross-cultural research bridges the path with economic and legal anthropology. This is the third set of notions related to reciprocity from a holistic, anthropological, point of view, in which exchanges, transactions and interactions occur in a multi-dimensional world at different scales at the micro and macro levels. As it is well-known, Polanyi (1948) differentiated between *reciprocity*, *redistribution,* and *market* economies. He intended to give an explanation to the sudden collapse of Western civilisation. Why did a prolonged period of relative peace and prosperity in Europe, lasting from 1815 to 1914,

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[281] This study is an example of joint research between anthropologists (12 field experienced researchers) and behavioural economists. The sample consisted of three foraging societies, six who practice slash-and-burn horticultural, four nomadic herding groups and three sedentary, small-scale agriculturalists. Eg. Machiguenga (Peru), Hazda (Tanzania), Quichua (Ecuador), Torguud (Mongolia), Mapuche (Chile), Lamerala (Indonesia)… The experiment is called the "ultimatum game": "The "proposer" in this game is provisionally assigned an amount equivalent to a day or two's wages in the society and asked to propose an offer to a second person, the "respondent." The respondent may then either accept the offer, in which case the two players receive the proposed amounts, or reject it, in which case the two receive nothing. If both players conform to the canonical model and if this is common knowledge, it is easy to see that the proposer will know that the respondent will accept any positive offer, and so will offer the smallest possible amount, which will be accepted." (Henrich 2001, 74)

[282] "The situation in respect to the reciprocity of institutions and ideology in a democracy is in some ways distinctive. Democracies are more likely than oligarchies or autocracies to regard criticism as legitimate. Democratic public discourse and institutional authority are likely to respond (if only at some remove) to criticisms that identify genuine problems and point to feasible solutions.5 Reciprocity between institutions and ideological dispositions is to the fore in a participatory democracy on the Athenian model, because a relatively high percentage of the community's residents have had the distinctive experience of serving as an agent of institutionalized authority, as well as the ordinary human experience of being its subject." (Ober 2008, 272).

suddenly give way to a world war followed by an economic collapse?[283] Subordination of society to self-regulating markets followed the two 'modes of integration' before industrialisation—reciprocity and redistribution. This entails a substantive notion of economy. I would like to bring up Polanyi's use of the juridical idea of 'integration' underpinning his broad historical view. As said, this was the common way in which the interwar public law scholars in Germany and Austria (including Max Weber, quite close to Jellinek) explained the construction of a social and legal order.

Anthropologists faced the problem from a different angle. Sahlins (1965, 140) contended that in primitive societies the material flow was embedded into social relationships and if force was decentralised, peacemaking was "not a sporadic intersocietal event but a continuous process within the society itself".

He drew a spectrum of forms of reciprocity, ranging from *negative* (the unsociable extreme, looking to maximise utility at other's expense, getting something for nothing) through *balanced* (the midpoint, direct exchange) to *generalised* (putatively altruistic).[284] Norms are "relative and situational rather than absolute and universal", "a given act is not so much in itself good or bad, it depends upon who the 'Alter is'" (Sahlins 1965, 153). The collective side is complex, as the social effects on the community are not always the same or proportional, as he also says elsewhere, "everywhere in the world, the indigenous category for exploitation is 'reciprocity'" (Sahlins 1972, 120). Thus, reciprocity is not a moral or legal category, but an anthropological theoretical construct to understand and explain the many ways humans interact to produce sustainable patterns of exchange that produce in turn moulded forms of collective and public behaviour. From this point of view, it can be seen as an enabler of the social and political plasticity of legal and political forms and regulations.

4.4.2 Reciprocity and Legal Culture

Sahlins's sceptical warning should apply to the societal assumptions of legal and social philosophy. Since the past century, from fifty years onward, legal philosophers have been

[283] See the Foreword by J. Stigliz and the Introduction by Fred Block in the 2001 edition of *The Great Transformation* (1957).
[284] Cf. for a general summary and explanation of the different positions, Hann (2006).

opposing reciprocal relationships to relations of power, i.e. “in different ways and with different accents, contemporary philosophers such as Rawls, Nagel, Habermas, Taylor, Gadamer and Ricoeur all posit the principle of reciprocity as constitutive for the normativity of the law, no less than for politics and ethics.” (Lindhal and van Klink 2014, 108).

Reciprocity has been performing the role of an abstract benchmark against which individual and collective rights, the social contract, and the building of social bonds and societal relationships could be formulated instead of the liberal assumption of a society set out from individual exchanges, where market prices could be described as the basic social link, the “cement” of society (as Friedrich Hayek postulated in the interwar period as well). In social and legal philosophy, the constitutive and regulative side of institutions have been also following this path, a theoretical pillar for normative institution building.

However, from an empirical point of view, more elements should be required before setting an acceptable threshold. The three different concepts of reciprocity that I described above—legal, institutional, anthropological—cannot be easily conflated and merged into a single view. Contractual *synalagma* is a legal doctrinal construct of normative nature; it can be performed without social explanations and outside social theories, against a philosophical background or theory of justice. Institutional reciprocity has a descriptive and normative (legal) side. It can be constructed to raise hypotheses about the social nature of exchanges and to give a more nuanced and precise answer about the reasons, motives and emotions behind the exchanges and transactions. It is a matter of cognitive science, social psychology, behavioural economics, history, and political science. Hann (2006, 221) concluded his survey asserting that

> On the whole, the main thrust of the anthropological tradition goes against that of the mainstream economists. Whereas the latter assume or search for universal foundations, usually in psychology and/or biology, those who study the full range of actual human societies emphasize the diversity of forms of exchange and their motivations, and resist what they consider to be seductive reductionisms.

This has happened as well in the relationships between legal anthropology and socio-legal scholars. The work by Marc Galanter, Stewart Macauley, R. MacNeil, and Phillip Blumberg that I have summarised above (3.4.3.2), after Llewellyn’s criticism of formal law, has been attentively followed and quoted by legal anthropologists. But sociolegal scholars

have also been criticised for their lack of granularity, depth, attention to the diversity and forms of power, or historical negligence. This assertion can be tracked back to the discussion on the definition of legal pluralism and to the description of Law and Society as academic movement.

Take the concept of *legal culture*. It was coined in the nineties to point out the ideas, values, expectations and attitudes towards law and legal institutions. Legal knowledge is not to be inferred (or deduced) from the construction of a legal theory, but it is inductively reconstructed through the functional analysis of empirical (mainly professional) data. In this sense, legal culture means "the cluster of attitudes, ideas, expectations and values that people hold with regard to their legal system, legal institutions, and legal rules" (Pérez-Perdomo and Friedman 2003: 2). Friedman (1975), following Almond and Verba's related work on "political culture" (Almond and Verba 1963), distinguished between *internal legal culture* (the culture of lawyers and jurists) from *external legal culture* (users, citizens, laymen. . .). Many scholars participated in the discussions about the components and uses of the concept—among them, Austin, Sarat, Nelken, and Cotterrell.

S.E. Merry (2010) specifically discussed this concept, stressing that "it is not clear how such a concept can deal with the extensive borrowing, transfer and imposition of legal ideas and forms which takes place across the borders of legal fields". She defined culture as "the product of historical influences rather than evolutionary change", "porous, with ideas and practices that are constantly shifting", with changes that "take place in terms of existing cultural ideas and practices", "marked by hybridity and creolisation rather than uniformity". She advocated "grounding the concept of legal culture in an anthropological understanding of how culture works and dividing it into its distinct but interconnected dimensions." (Merry 2010, 21). Actually, this meant feather her own nest, focusing on the link between detailed ethnographic description, globalisation, history, and political change rather than defining variables to build up comparative models. "The law is clearly a cultural resource for making meaning within a society" (ibid. 49). This hermeneutic turn did not facilitate the dialogue between anthropologists, professional sociologists, and economists.

Conversely, Erhard Blankenburg, a Dutch sociologist that worked in many institutional projects in the making of the EU, proposed the construction of *patterns of legal cultures*, i.e. (i) the application of metrics to measure and compare litigation rates, legal education, and legal arguments in EU countries; (ii) to collect and interrelate data. Thus, "for explaining relations between behaviour and systems of law it would be better to define 'legal culture' as interrelationships of various levels" (Blankenburg 1998). For the comparison of German and Dutch legal cultures he proposed the following four levels:

- Starting with patterns of legal behavior such as become visible in litigation or remain invisible such as avoidance of lawyers and courts;
- trying to relate them to patterns of legal consciousness and thereby differentiating between expectations of the general public and values beliefs and attitudes of professional elites;
- which leads us to institutional features such as the legal training, the composition of the legal profession, the organization of courts and the infrastructure of access to them; and finally, the relation of these to scholarship and the patterns of legal discourse.
- To round up, it would be desirable to relate these behavioral and institutional factors to explaining differences in the body of substantive law. (Blankenburg 1998, 43)

I deem both perspectives, quantitative (statistical) and qualitative (ethnographic) most relevant to represent the outcomes and processes of legal systems.[285] However, they work at distinct dimensions and at different levels of abstraction and scale. The link between micro-level and macro-level approaches is related with the connectors and variables that can be identified to perform this mediating role. Technology, all kinds of technology, matter here. To bring together the three aspects that are needed to reconstruct the way reciprocity works—legal, institutional, and holistic—nothing should be left behind, as I will show in the next section.

4.4.3 Reciprocity, Relational Law (RL) and Relational Justice (RJ)

Some years ago, Marta Poblet and I defined broadly Relational Justice (RJ) as follows:

> […] a bottom-up justice, or the justice produced through cooperative behaviour, agreement, negotiation, or dialogue among actors in a post-conflict situation (the aftermath of

[285] This strictly sociolegal quantitative approach can also be found in the substantive work on national judiciaries carried out by Giuseppe di Federico at his Institute in Bologna (Italy), or by José-Juan Toharia, Santos Pastor Prieto, and Juan-José García de la Cruz in Spain. It would have been quite interesting to perform a deeper comparison between the ethnographies carried out by legal anthropologists and these quantitative studies. Unfortunately, to the best of my knowledge, this discussion never took place. Perhaps because the difference of intention, scope, and methodology between the two disciplines prevented it.

> private or public, tacit or explicit, peaceful or violent conflicts). This field includes Alternative Dispute Resolution (ADR) and Online Dispute resolution (ODR), mediation, Victim-Offender Mediation (VOM), restorative justice (dialogue justice in criminal issues, for juvenile or adults), transitional justice (negotiated justice in the aftermath of violent conflicts in fragile, collapsed, or failed states), community justice, family conferencing, and peace processes. (Casanovas and Poblet 2008, 323)

We enriched this definition encompassing the birth of Web 3.0:

> *Relational Justice* may be defined as the substantive and formal structure that allows end users, in the broader sense (as citizens, consumers, customers, clients, managers, officials...), to participate in the making of their own regulation and legal outcomes through all the mixed and plural strategies that the Semantic Web framework allows. This implies the coexistence of legal and social norms, rights and duties to be shared by subjects (artificial or natural agents) in a structured environment. Therefore, user-centred strategies of the next SW generation fit into a middle-out legal approach in which there are rights to be protected and duties to be put in place. The expressive content of Web 2.0 may be shaped as well by the service-oriented motivation of the Web 3.0. (Casanovas and Poblet 2009),

'Relational' refers to the capacity to set up a common space of mutual relations —a shared regulatory framework— in which some reciprocity is expected regarding goods, services, attitudes, and actions. Thus, relational law is more based on trust and dialogue than on the enactment of formal procedures or on the enforcement of sanctions. The spectrum of RJ is very broad, and many scientific and academic fields (without much contact between them) are dealing with it. In the survey we carried out for the Catalan White Book of Mediation (2008-2011) we specified the knowledge that was required to understand most of its components, from cognitive and emotional empathy to functional magnetic resonance imaging (fMRI).

Table 7. *Relational Justice Fields of Research. Source: Casanovas and Poblet (2008)*

Domains of research	Scientific areas involved
1. Basic empirical research on mind, language, empathy and emotions	1. Social Neuroscience 2. Cognitive Science 3. Primatology 4. Basic Social Psychology Research
2. Evaluation and applied social psychology research on empathy, forgiveness, and apologies	5. Social Psychology, Therapy and Counselling 6. Social Psychology and Narrative Analysis 7. Social Psychology and Criminology
3. Applied linguistics research on culture, politeness, apologies and excuses	8. Frame Semantics and Cognitive Linguistics 9. Cross-cultural Pragmatics and Linguistics 10. Linguistics and Functional Pragmatics 11. Sociolinguistics, Discourse Analysis and Corpus-based Linguistics

4. Sociological research on micro-situations, cognition, emotions and discourse	12. Interactional or Micro-sociology 13. Ethnomethodology 14. Discourse and Conversational Analysis 15. Cognitive Sociology
5. Research on social and political violence, conflict resolution and reconciliation processes	16. Political Anthropology and Conflict Resolution Studies 17. Communication and Intercultural Conflict Studies 18. Political Science 19. Conflict Resolution and International Relations Studies
6. Empirical and theoretical research on dialogue, argumentation, negotiation and mediation	20. Argumentation and Dialogue 21. Negotiation Studies 22. Management and Organization Studies 23. Applied Artificial Intelligence and Online Dispute Resolution
7. Criminological and judicial research	24. Criminology 25. Social Work and Professional Mediators' Studies 26. Comparative Restorative Justice and Judicial Studies
8. Legal, social, political, and philosophical foundations	27. Socio-legal studies 28. Legal Theory, Rights and Jurisprudence 29. Philosophy and Ethics

From a theoretical point of view, we broadly assumed that relational justice intersects with Relational Law (RL). I have already shown in Chapter 3 that this concept goes back to the American scholarship tradition. It was coined by Roscoe Pound and reused by many Law and Society scholars on empirical grounds. It refers to the concrete social and economic bonds among the parties in business, companies, corporations, or other organizations. User-centred strategies of the Web of Data fit into a legal approach in which there are rights to be protected and duties to be put in place. Let's redefine it for our present purposes.

> **Relational law**: The allocation of behavioural expectations (assignment of rights and obligations) in terms of a shared technological framework; computer systems and human-machine interfaces that create an aggregated value fostering the connection between Web 2.0 (Social Web) and Web 3.0 (Web of Data) in the environment of the Internet of Things.
>
> **Relational justice**: the justice produced through cooperative behaviour, agreement, negotiation, or dialogue among actors along a (balanced or unbalanced) horizontal situation—transactions, ODR, ADR, restorative justice, negotiation agreements, peace processes.

Rights and duties occur in a technological environment. This is what is being shaped, a new environment for a platform-driven economy, in which the bonds and boundaries for framing social relationships are being challenged and replaced by design-driven regulations and incentives. But, again, some realism about realism is required when we talk about relational bonds and binding rules, because what is experiencing a natural grow fuelled by big tech companies is *negative reciprocity*, rather than a balanced one.

James W. Williams, a former Google engineer, has written a best-selling book—*Stand out our light*— on how attention deficits are partly created by big tech companies. Williams (2018) writes about his experience lucidly:

> I soon came to understand that the technology industry wasn't designing products; *it was designing users*. These magical, general-purpose systems weren't neutral "tools"; they were purpose-driven navigation systems guiding flesh-and-blood human lives. They were extensions of our attention. (…). The new challenges we face in the Age of Attention are, on both individual and collective levels, *challenges of self-regulation*. […] But I also knew this wasn't just about me – my freedom, my attention, my deep distractions, my frustrated goals. Because when most people in society use your product, you aren't just designing users – *you're designing society*.[286]

This connects with the ethical challenges I was referring to in Chapter I. The idea of a pre-existing law shaping a public space is also called into question. Again, there is a tension between citizenship, the public audience, and the self-granted innovation and entrepreneur roles adopted by digital corporations. Behind the scenes we encounter the *identity metasystem layer* explored by Microsoft Chief Engineer Kim Cameron (2004)[287] about the unresolved Internet regulatory issues, and the *Bowden Report* on mass surveillance written by Caspar Bowden, a former Microsoft Chief Privacy Advisor (2013).[288] In my opinion, this is where the true challenges lie, because this second underlying level is moulding the hybrid intelligent space between humans and machines that is defining the civilisation shift we are living in.

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[286] https://www.theguardian.com/commentisfree/2018/may/27/world-distraction-demands-new-focus
[287] https://www.identityblog.com/stories/2005/05/13/TheLawsOfIdentity.pdf
[288] https://www.europarl.europa.eu/meetdocs/2009_2014/documents/libe/dv/briefingnote_/briefingnote_en.pdf

To frame the space of relational law and justice, and to understand its boundaries, I reproduce in Table 8 the 7 laws of the Internet underpinning the metasystem layer. Cameron stated clearly that the identity layer on the Internet was missing from the beginning:

> Since this essential capability is missing, everyone offering an Internet service has had to come up with a workaround. It is fair to say that today's Internet, absent a native identity layer, is based on a patchwork of *identity one-offs*. As peoples' use of the web broadens, so does their exposure to these workarounds. Though no one is to blame, the result is pernicious. Hundreds of millions of people have been trained to accept anything any site wants to throw at them as being the "normal way" to conduct business online. […]

Cameron raised and answered a fundamental question:

> *Why is it so hard to create an identity layer for the Internet? Mainly because there is little agreement on what it should be and how it should be run. This lack of agreement arises because digital identity is related to context* [my emphasis], and the Internet, while being a single technical framework, is experienced through a thousand kinds of content in at least as many different contexts – all of which flourish on top of that underlying framework. The players involved in any one of these contexts want to control digital identity as it impacts them, in many cases wanting to *prevent spillover* from their context to any other.

He proposed to build an architecture to implement a protective metaidentity layer. What is interesting for us is the structural scheme he drew focusing on the rules to overcome different risks, because this eventually became one of the main bases for the discourse of *Privacy by Design* (PbD) that came soon after. Table 8 should be read along with the table that I reproduced in the Introduction (Table I: Comparison between FIPs, Privacy by Design, Linked Open Data, Legal Information Institutes and Online Dispute Resolution principles). We should bear in mind that Cameron was not talking from a moral or legal point of view but from a computing engineering perspective. These laws "explain the successes and failures of digital identity systems."

***Table 8**. The Seven Laws of the Internet. Source: Cameron (2005).*

1. User Control and Consent	Technical identity systems must only reveal information identifying a user with the user's consent.
2. Minimal Disclosure for a Constrained Use	The solution which discloses the least amount of identifying information and best limits its use is the most stable long term solution.

3. Justifiable Parties	Digital identity systems must be designed so the disclosure of identifying information is limited to parties having a necessary and justifiable place in a given identity relationship.
4. Directed Identities	A universal identity system must support both "omni-directional" identifiers for use by public entities and "unidirectional" identifiers for use by private entities, thus facilitating discovery while preventing unnecessary release of correlation handles.
5. Pluralism of Operators and of Technologies	A universal identity system must channel and enable the interworking of multiple identity technologies run by multiple identity providers.
6. Human Integration	The universal identity metasystem must define the human user to be a component of the distributed system integrated through unambiguous human-machine communication mechanisms offering protection against identity attacks.
7. Consistent Experience Across Contexts	The unifying identity metasystem must guarantee its users a simple, consistent experience while enabling separation of contexts through multiple operators and technologies.

Relational law is situated in this space between data and metadata, where accessibility and interoperability depend on the previous identification of subjects *as entities of the system.* It is in the interface, across the hybrid intelligence space that defines Human/Machine interaction, where reciprocity, distribution, or exchange—to use Polanyi's categories—might be applied to transactions performed in the platform-driven economy.

This space, as I explained in Chapter 1, is not harmonised, peaceful or neutral. Data can be unstructured, semi-structured or structured, and only the surface of the iceberg (see Chapter 2, Figure 24 on the Internet layers and the size of the dark web) contain ordered, structured, manageable, annotated data. We cannot properly speak of a homogeneous public space.

I will deal with this situation from another angle now. The way I have defined relational law is not to be confused with Alternative Dispute Resolution procedures or even with ODR. It is much wider, comprising all kinds of self-, co-, and hetero-regulatory systems. The use of blockchain, crowdsourcing, ODR and what have been termed *civic technologies* can be deemed contemporary sources of collective regulation. I will not be going

into it now. I will confine myself to looking at the public dimension of reciprocity, where binding relationships and conformance, obedience or acceptance shape individual attitudes and build institutionally public legal systems.

4.4.4 The Public Dimension of Reciprocity

Reciprocity, redistribution, and exchange should also be considered from their public side. This raises the issue of the participation of people, the ruled, in the building of normative and regulatory systems and eventually in law making. This is the political and legitimation dimension of 'legal institutions'—to use this time one of the favourite notions of Paul Bohannan. It points at the intertwined relationships between economic and legal systems from a historical perspective, which presupposes simultaneously the explicitation of the rulers/ruled relationships and the definition of the framework in which these relationships are taking place.

Reciprocity has been usually situated into regulatory frames set in clans, tribes, and chiefdoms. The reflection of 'Ego' into kinship schemes, into native languages, and into the spatial topography of social groups on the territory and their ecosystems has been especially considered from functionalist (Sahlins), structuralist (Lévi-Strauss) and Marxist (Godelier) ethnographies and theoretical accounts. Stemming from the family and the household, Sahlins drew the inverse strength of reciprocal relationships among people belonging simultaneously to different social groups. Reciprocity creates behavioural expectations and jural relationships (rights) according to social roles and functions.

It is worth noticing that both in early and modern states, such distal and proxemic relationships survived in regulatory patterns. There is not a fixed evolutionary scheme ruling clans, tribes and chiefdoms in segmented societies and opposed to states in class societies. Home is a 'kind of space', a 'typical gift economy' (Douglas 1991, 302). Structural characteristics are not mechanisms of social control, as they cannot be separated from what is controlled. Rather, they provide the frame to exert this control through patterns of reciprocity, kinship, and marriage (Douglas 1986, 32).

The regulatory side of reciprocity and its relationships with political and legal forms has been thoroughly discussed since Maine's and Mauss' assumptions of a sequential relationship between gifts, dons, exchanges, and contracts. This issue is not trivial, and it is

striking how the answers have been related to the legal cultural background of the anthropologist giving a response. For instance, almost all legal anthropologists of the French speaking world know and quote regularly the 1804 Napoleon Code, on personal rights, family, property, and so on. *L'essai sur le don* (1923-24) was actually written holding the Code Civil notions and mapping of rights.[289] This does not happen in the English-speaking world, and there is sometimes a clash and/or cross-fertilising criticism between both traditions (for instance, Goody reminding Godelier Hohfeld's jural classification of rights, Godelier reminding Heritier about Goody's work).[290]

The tensions among citizens, oligarchs and tyrants in Greece can illustrate the relation between reciprocity and rights. In the classic period of the Greek culture (Athens) and in the Hellenistic states, democracies were built on citizens' sharing of goods *and mostly, of knowledge*. Citizens could immediately draw a personal profit from knowledge, so that incentives supported innovation and new solutions (especially in agriculture and navigation). This has been termed *epistemic* democracy. How did the new democracies resist oligarchic threats? Why did the new democracies prove so robust against oligarchic and tyrannical *coup d'état*?

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[289] Cf. Mauss (1923-24, 106): "La grosse difficulté consistera à isoler les droits relativement purs, car très généralement, on aura affaire à des sociétés composites, où la segmentation de la société est telle que certaines parties sont indépendantes les unes des autres. Une société est composée d'elle-même, de sous-groupes et d'individus. Notre plan pour l'étude des phénomènes juridiques s'établira donc de lui-même comme suit :
Organisation politique et sociale, l'État.
Organisation domestique, politico-familiale ou politico-domestique : clans, grande famille, famille. Mariage.
Droit de propriété.
Droit contractuel.
Droit pénal et Procédure."

[290] In his review of Godelier's *Métamorphoses de la parenté* (2004), "a blockbuster of a book", Goody writes about the way Godelier conceptualises exchanges between male and female: "That situation, although unequal, requires a more subtle and complex analysis than the simple economic metaphor of exchange usually allows. An alternative British tradition draws heavily on studies like Hohfeld's *Fundamental Legal Conceptions* (1923) to analyse situations of this kind in terms of a quasi-juridical grid of rights and corresponding duties". (Goody 2005, 131). The same year, in the *Réponse* to his critics, Godelier wrote: "en tant qu'anthropologue, connaissant son domaine, il est gênant de voir par exemple caricaturés et dévalorisés les écrits de Jack Goody qui, dans son fameux article "A Comparative Approach to Incest and Adultery" (1956, *British Journal of Sociology*), avait adressé aux *Structures Elementaires* de Lévi-Strauss, et particulièrement à sa théorie de l'inceste, des critiques identiques à celles que Françoise Héritier a développées dans son livre en 1994 et dont elle ne reconnaît pas l'importance. Ceci peut passer inaperçu de la part de lecteurs non avertis, mais pas des spécialistes." (Godelier (2005, 194).

This is one of Josiah Ober's questions, and the solution lies on the legal institutions that helped to stabilise democracy—notably legislation on the killing of tyrants. This set a kind of equilibrium in an "oligarchs and democrats" game that favoured the perpetuation of democracies as a political form (Ober 2015, 307-8). The reason why plain people and self-interested elites converged and choose to support democracy despite high internal tax rates leans on reciprocity.[291]

Putting aside democratic values, reciprocity was also present in the Roman state and in the Middle Ages. The idea of rights exclusively linked to contracts as the legal form of exchanges is not tenable.[292] Paul Veyne made clear in *Le Pain et le Cirque* (1975) the social relevance of *Euergetism* during six centuries across the Roman empire (before and after C.E).[293] 'Euergetism' (from εὐεργετέω, "do good deeds") was a synonym of *munificence* and *magnificence*, i.e., the practice of distributing part of the wealth of high-status individuals to the community for the public good. This created bonds with people who would elect the giver for public positions (such as magistratures).[294] It was a broad and extended practice:

> *Euergetism* means the fact that communities (cities, *collegia*) expected the rich to contribute from their wealth to the public expenses, and that this expectation was not disappointed: the rich contributed indeed, spontaneously or willingly. Their expenditure on behalf of the community was directed above all to entertainments in the circus or the arena, and, more broadly, to public pleasures (banquets) and the construction of public buildings - in short, to pleasures and public works, *voluptates* and *opera publica*. Sometimes *euergesiai* were provided by the notables without their being under any definite obligation to do so (this I shall call 'voluntary *euergetism*'), and sometimes on the occasion of their election to a public 'honour', a municipal magistracy or function of some kind, in which case I shall write of euergetism *ob honorem.* (Veyne [1976] 1990, 10)

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[291] "The elaboration of a public language of reciprocity, reinforced by institutionalized practices of civic honoring, at once encouraged high levels of generosity on the part of elites and imposed restraint on the democratic majority's impulse to tax the wealthy minority at extortionate rates. Stable regimes promoted polis security because attackers were able to take advantage of internal divisions by holding out a credible option of regime change. Democratic poleis also enjoyed advantages in respect of mobilization and morale, as well as in disclosure and aggregation of useful knowledge dispersed across the citizenship. Those democratic advantage […] helped to make Athens a preeminent polis in the classical period." (Ober 2015, 308).

[292] Cf. The very interesting debate on reciprocity held by Paul Veyne, Georges Duby and Maurice Godelier, among others (Veyne et al. 1974). It helps to settle the different historical, anthropological, and economic backgrounds and starting points of the authors according to their field respect to Mauss and Polanyi.

[293] For a systematic comparison between the positions of Mauss and Veyne, cf. Le Goff (2016).

[294] Magistrate *ob honorem*. "Every magistrate and dignitary had to make *a euergesia* to his city, by virtue of his office." (Veyne [1976] 1990, 70 and ff.)

Apparently, *euergeia* was not a tax, nor a set of legal duties, nor a political action, it was instead a social action (voluntary or according to the role) which linked the donor to her followers, first, and then to the city.[295] It is about collective goods: "*Euergetism* is thus seen as a form of pride that causes collective works to be performed" (Veyne (1976) 1990, 17). We could wonder whether this "spontaneous generosity" was 'legal', or just 'social'.

The answer is *both*. Veyne adds that at least for *ob honorem*: "This was morally, or even legally, obligatory" (ibid. 10). There were no formal requirements under the form of the law, but the expectations were too high to be ignored. Everyone *knew* what was expected from him and what he had to do if he wanted to climb the social ladder:

> In the evolution of *euergetism*, spontaneous generosity was the primary element and continued to be the principal one. It would therefore be possible to draw two contradictory pictures of *euergetism*. In one of them we should see notables competing with each other in liberality and inventing unimaginable refinements of munificence. In the other we should see them being pressed by the plebs, or by their peers, fearful of the people, to provide pleasures for the masses. *Both pictures are true* [my emphasis]. It is all a question of circumstances and of individual characters. This duality is just what constitutes the crux of the problem. (Veyne [1976] 1990, 11]

My contention is that there is a wide room between these two poles to show the socially blurred reality of legal institutions. This would not be possible from a strictly doctrinal point of view, at the legal metalevel created later, in the late Middle Ages. I already have mentioned the divide between *causa gratuita* and *causa onerosa* in Scholastic case-based law writings. But this formal taxonomy does not occur at institutional level, where other mechanisms can make the balance, especially in commercial and international law— *Ius Gentium* and the medieval *Ius Commune* after the reception of the *Corpus Iuris Communis*. We should bear in mind that the oldest division between subjects as reciprocal

[295] "Euergetism thus implies that decisions concerning certain collective benefits, which are paid for by patrons, lie outside the scope of the state's sovereignty and are taken by the patrons themselves. Now the collective nature of *euergesiai* entails important consequences. By collective benefits or services we mean those satisfactions which, owing to their external nature, are, like the radio or national defence, at the disposal of all users, without being in principle objects of competition between them. If people have to fight to get a seat on the tiers of an amphitheatre which is too small, that means the euergetês has not done all he should have: the consumption of these benefits by each individual should not entail a diminution of consumption by others. If the public banquet is as it ought to be, there will be enough to eat for everyone. The characteristic feature of collective benefits is that, being provided without discrimination to all who want them, the betterment they bring is the same for everyone, whoever it may be that is making a sacrifice in order to provide them for the community. Since a gladiatorial show will be seen by all, it is best for everyone who wants to be among the spectators to let somebody else pay for it." (Veyne 19751990, 12-13)

agents in ancient Rome was a religious one, between gods and mankind (*fas*/*nefas*) (Orestano 1939, Sini 2002).[296]

Perhaps it would be possible to trace back the *generation* of legal knowledge as a kind of organised case-base taxonomies and a series of rules gearing opinions, letters, decrees, decretals and constitutions to the structured interpretation of Justinian's *Corpus Iuris Civilis.* Scholastic jurists and philosophers of the first half of 13th c. were supported by Pope Gregory IX. He had in mind the construction and ruling of Christendom around the community and the Church understood as *Corpus Mysticum*. I have already shown the origins of ontologies against metaphysics in Chapter 2. The use of conceptual trees and discrete categories certainly contributed to the creation of a corpus of *legal doctrine.* Jack Goody (1977) has shown how the material innovation of diagrams and graphs (etchings) led to the notion of law as *raison écrite* in the 17th century—the French translation of his book reads *La raison graphique*).

I started some years ago a research program on medieval legal realism to show the contrast between legal cultures, as in medieval Iberian kingdoms legal institutions were not always reflected into documents, and these documents were quite different if addressed to the Christendom, noblemen, peasants, Jews, or Muslims (Casanovas 2021a).[297] But I rather prefer exploring the recent Terradas-Saborit's attempt to represent in one single system the ancient law mechanisms triggered by composition, revenge, and responsibility.

4.4.5 The Vindicatory System, and Relational Law and Justice

After an extended survey on legal mechanisms of justice, stemming from the idea of 'legal experience' worked out by legal historian Riccardo Orestano (1989a, 1989b) and ethnographer Antonio Pigliaru[298], anthropologist and historian Ignasi Terradas (2019, 2021)

[296] There are objects that cannot be exchanged. On sacred objects, the "double imaginaire", and the boundaries of reciprocity, cf. Godelier (1996).
[297] See, Catalan Philosophy in the Middle Ages, JOCIH special Issue (2020-21). https://journalofcatalanintellectualhistory.org/index.php/jocih
[298] Cf. Puggioni (2020) for a recent presentation of Pigliaru's work on *vendetta* and reciprocal intersubjective bonds. The ground for reciprocity, according to Pigliaru, ""risiede «nella ipotesi che è legittimo parlare di essenza umana solo nella misura in cui se ne può parlare postulandola come l'insieme delle relazioni sociali»" (Puggione 2020, 189). For a comparison of versions of legal experience by Orestano (a legal

has come up with the aggregation into a single composite system of the elements of *vindicatory justice*.[299] 'Vindicatory' means *authorised revenge*, based on an everlasting element of *composition* that articulates the whole process, mainly addressed at the reestablishment of peace, the inner and outer balance within social groups, and the compensation of losses (Márquez Porras et al. 2021).

According to Terradas, the vindicatory justice system underlies ancient *and* modern law, underpinning the legal relationships written, coded, implemented, and eventually enforced by medieval and modern states.[300] In this sense, vindicatory justice is (i) older than law[301]; (ii) historically determined, intuitive, and spontaneous, (iii) encompassing the relational social patterns expressed in natural language that have been shared within a given community, segment, or social group in a whole; (iv) with some hidden biases, i.e. prone to corruption to break the horizontal proportional balance between the parties, and pervading all social life)[302]; (v) constituting a moral, social and legal order *alike*, with cognitive attributes; (vi) embedded into social and political life and institutions at a deep level, so that it might generate different constitutive normative orders (customary or positive) that emerge out of it according to different social and historical circumstances; (vii) framed into structured judiciary institutions as a third party at the implementation of

scholar of Ancient Roman law) and Pigliaru (a sociologist and philosopher from Sardinia), see Cerrone (2016).

[299] "Compositions, reconciliation ceremonies, authorised vengeances, ordeals, legal duels, oaths, oracles, legal clamours, proclamations of infamy, formulae of defiance and claims for satisfaction, all appear together in ancient and medieval codes and compilations, as well as in the jurisdictional spaces of primitive Societies (and to some extent in societies that have developed a vindicatory system isolated from the state)" (Terradas Saborit 2021, 4)

[300] The author refers to the main elements as follows: "non-independence of the legal institutions from moral, political, economic or religious motives; fusion between the legal theory of action and that of process; the intermingling of private and public law, civil and criminal law, subjective and objective law, and moral and legal legitimacy." (Terradas Saborit 2021, 7)

[301] "Asimismo, hay que decir que la idea vindicatoria de justicia antecede a la de derecho en el mismo sentido: la justicia viene antes que el derecho, porque procede del juicio y sentencia del primer caso de asimetría entre las partes, algo que antecede siempre a cualquier declaración o institución de derecho por más que este lo represente al revés. Así por ejemplo, han sido los conflictos entre posesores asimétricos los que han establecido la propiedad con leyes, es decir con derecho." (Terradas 2019, 357).

[302] "Vicios históricos" (historical biases): "los excesos en el arbitrio judicial, perjudicando la igualdad y proporcionalidad en las resoluciones (aparte de la mayor facilidad para enmascarar la prevaricación) y la fusión del derecho con todos los demás aspectos de la vida social, incluyendo la política, la religión y la moral en el sentido más amplio de la palabra." (Terradas 2019, 361).

vindicatory mechanisms of conflict resolution, so that facts and norms can be hatched at the same time.[303]

According to the author, the vindicatory system constitutes an *order* that is analogous to the positive one but precedes it in time and it is situated at a deeper level of perception and abstraction.[304] Proceedings can give a clue to the nature of the process. Accountability (liability or/and responsibility) is the main issue, entailing the identification of the culprit, subjects, and allocation of rights, and drawing of consequences. Thus, the establishing of facts towards the fulfillment of rights is an act of *reciprocity*: "The action of responsibility is always a fact in front of a collective body, and consequently, reciprocal." (Terradas 2019, 30). Table 10 gathers the main components of the vindicatory system, as a whole.

Table 9. *Excerpt of the core criteria of vindicatory systems, summarised by Silvia Chiara Congiu (PhD Thesis 2019), reproduced in Terradas (2021, 29.-32)*

Essential features of the Vindicatory system	**Substance**	**Is it a basic characteristic of the vindicatory system?**
1. Composition	Composition is an old legal institution This system consists of both reconciliation and a gift for reparation, the latter being a compensation for damages. Composition is the general rule for dispute resolution in vindicatory systems. Exile or vengeance occurred when composition failed or could not take place.	Composition is the backbone of the entire vindicatory system. The expression 'vindicatory system' refers to composition.

[303] "Este universal de todo ámbito jurídico es el que mejor se conceptúa con la idea de ordenamiento y es el que defiendo especialmente en esta aproximación teórica, porque además me refiero a un ordenamiento, el vindicatorio, que es moral y jurídico a la vez, que se manifiesta
penetrando en realidades fácticas muy definidas, las cuales juegan un papel muy importante para hacer surgir y definir la norma. La norma no se aplica sobre los hechos sino que surge con ellos, incluso de un modo contradictorio si se compara en términos de aplicar una norma. Proceso y hechos establecen la esfera normativa de un modo conjunto, sintético. La ley, si llega a concebirse, puede parecer una generalización con excepciones: en realidad es un criterio para el que el espíritu de la ley puede hasta suspender o contradecir la ley. Es algo que se entiende mejor si se parte del establecimiento de la equidad como un imperio. Algo que procede de la experiencia de reunirse para juzgar, no para legislar." (Terradas 2019, 17).

[304] "La tesis principal que sostengo pues, es que en muchas sociedades en las que solo se ha visto un derecho de venganza privado, o algunos elementos rudimentarios de Derecho positivo, gérmenes o pre- o proto-derecho, ha existido de hecho todo un ordenamiento jurídico mucho más complejo, sistemático, con sus propios valores y lógicas, análogo a lo que se reconoce en términos de un Derecho positivo. Con ello me enfrento a la perspectiva evolucionista de progreso hacia el Derecho positivo, y sostengo evoluciones basadas en variedades históricas, con fluctuaciones y *retrocesos* (siempre desde la perspectiva del progreso positivista). El paradigma vindicatorio es un derecho construido históricamente, como lo es el paradigma positivista; no es un derecho natural ni una teoría de éste. El sistema vindicatorio es un fenómeno de ordenación social, y a la vez de conocimiento también social. Es uno de estos complejos fenómenos jurídicos y morales que constituyen todo un sistema de valores y criterios normativos, con lógicas y actitudes propias, características" (Terradas 2019, 28).

2. The Role of Clans	Deliberation of a council, mainly composed of the elders of the lineages and constituting a 'vindicatory court', was implemented by the parties' families and in particular by the clan leaders of each party, who acted as 'legal representatives'. This involved an active role for both families in managing the resolution of the conflict, preventing feuds and the escalade of violence. A collective responsibility was placed on the entire clan of the guilty.	In all vindicatory systems, lineages played an essential role. They were responsible for carrying out those functions usually attributed to judicial corpus in legal systems. All clan negotiations and all legal solutions that could be practised (even vengeance) had to be authorised by the court. These were not instances of private negotiations (typically private vengeance) but judicially authorised actions adopted or practised by the families of the parties.
3. The Vindicatory Court	There was a need for a person or more frequently a college of elders to elect a 'third party' to resolve disputes arising between members of society. Usually, judges were elders from the lineages involved in the dispute, although in some cases an 'arbitrator' was found among foreign clans or tribes. In all cases, the judges were deemed impartial and responsible for: (i) Ascertaining the commission of a criminal offence, (ii) ensuring that the offence had actually been made by the justiciable, (iii) (3) sentencing (after a composition intent).	A vindicatory court and a judge (or judges) were always required in vindicatory systems. Otherwise, all negotiations carried out by the parties would have been an expression of private justice, and not expressions of a legal system.
4. The Vindicatory Trial	In the vindicatory system, it is not for the law to create (and regulate) trial, but vice versa. Vindicatory systems followed the test case-rule, led by unwritten and customary sources according to which judgment and resolution of the case instantiate the 'creation of law'. Starting from that judgement, a rule will be created and passed down orally from generation to generation. In vindicatory systems, there was then a fusion between 'action' and 'procedure'.	The trial is a characteristic of all vindicatory systems, as in all legal systems. The judge complies with his role by pronouncing a formula, considered a new proposition of justice or *resolutio*. A key feature of the vindicatory trial is the prediction of solutions. Vengeance and composition were solutions authorised by the trial and the judge. They were then not an alternative to judgement, but part of it.
5. Vengeance	'Legal' (as institution) and 'social' (as subjective feeling) vengeance should be distinguished. Vindicatory systems try to transform the instinct of	Vengeance is a residual institution of vindicatory justice, which means that the presence of vengeance alone is not enough to consider a system as vindicatory.

	revenge into *reconciliation*; or, alternatively, to admit the irreparability of offence and to authorise a special kind of punishment that can be called 'vengeance'. Revenge is then an inevitable consequence of the offence, not intended as a harm to the individual, but as a harm to the community (with limitations). The possibility to practice vengeance is subject to a judicial authorisation by the vindicatory court (characterised by proportion, prudence and progression according to 'the least possible harm').	In fact, a vindicatory system is always defined by the presence of composition. Revenge must be carefuly distinguished from vengeance, which is a legal (residual) institution linked to composition.
6. The way to peace	The ultimate goal of vindicatory legal systems is to resolve conflicts and restore peace between factions. For this reason, it is important that in cases where vengeance is enacted, it is proportionate, prudent, and progressive.	All vindicatory systems have 'a peaceful soul', because otherwise an endless feud would be triggered. Endless or massive feuds lead to genocides of clans, communities and even tribes. This has happened in history, but it deviates from the aims of vindicatory justice.

It is always possible to highlight what could be improved in this proposal, because Terradas, a social scientist, is acting here as a positivist legal philosopher would do, i.e, first, selecting and conceptualising the elements; second, constructing inductively the relationships among them as an organised system; third, presupposing the existence of such a system on historical *and* universal grounds; and fourth, inferring new norms or knowledge from the legal system to be applied to new cases or ethnographic data. He argues "that the vindicatory system constitutes a set of interrelated elements or institutions forming a unity of logical-legal ideas and ethical motives." (Terradas-Saborit 2021, 8).

Therefore, he is offering a whole picture, that could be compared to previous attempts to conceptualise and systematise legal reciprocal bonds (e.g. Raymond Verdier's extended works on revenge). The author refers to vindicatory justice in many different ways—as a 'system', as a 'legal system', as 'a legal system with historical existence', as a 'scientific paradigm', as 'ethos', and, quite surprisingly, as a 'legal order'. This latter expression was coined by the 20th c. Italian positivist doctrine (*ordinamento giuridico, ordenamiento jurídico* in Spanish), spanning from Santi Romano to Giorgio del Vecchio and Norberto

Bobbio. In my opinion, the epistemology, ontology, and methodology of vindicatory justice as a system should be spelled out, in the same way that Gioele Solari, Giovanni Tarello and Paolo Cappellini did to explain the birth and conceptual evolution of *systema juris* in the European legal culture.[305]

Having said that, it is more fruitful to my purposes to focus on the positive contributions. What I found interesting in this attempt is the rationalisation process of clustering all the components in an intelligible way. This is quite useful to be practically used when compared with the notion of relational law and justice to work out the regulatory systems emerging from the double legal implosion that I described in Chapter 1, as legal forms are turning again, like tabs in a digital kaleidoscope. In the tension between civic, jurisdictional, and corporative forms of justice, new forms of settling conflicts and rule/ruled bonds are emerging. I will recover this thread at the end of Chapter 5.

The notions of RL and RJ are not conflating the components pointed out by Terradas. These notions (RL, RJ) should be understood as a theoretical scaffolding to put some order on the phenomena acting in the digital world. They are, directly, an epistemic construct, built up for methodological purposes, i.e. a way of referring to legal normative systems and legal models, a categorisation to pinpoint the bricks to build up the legal scheme and metamodels that I will introduce in the next chapters. They should not be understood as a general theory of law. They have a limited scope, and they should be kept for what they are and what they were built for—the fundamental bases to differentiate horizontal and vertical axes to build the regulatory instruments able to express the metarule of law and to be used for validation purposes.

4.5 Conclusions: Lessons Learned

In the landscape that I have been drawing, technology is somehow missing. Would we be able to draw some inferences and guidelines from these classical works? In our hybrid intelligent world, in the interplay between humans and machines, we should approach

[305] Cf. Cappellini (Tarello (1978), Cappellini (1984). Both started from the philosophy of private law of Gioele Solari.

H/M regulations with a thorough knowledge of agents, their actions, and the environments where their actions take place.

Stemming from classical anthropological visions, I would highlight some components of our own assumptions about how legal relations look like. At least: (i) *reciprocity;* (ii) *authority*; (iii) and *social cohesion*. It is my contention that these are not only functional elements of tribal or non-Western law (or "primitive" law), but components of the law on the Web of Data as well. The "domain of legal rules" to find a "minimum definition of law", to say it with Malinowski[306], or, with Pospisil, the "three different forms" of law—abstract rules, patterns of behaviour, and decisions—to cluster social relations[307] can be also grasped from the way people interact and legal rules behave in domains such as blockchain technologies, smart contracts, and platform driven economies. The "vindicatory justice system" proposed by Terradas Saborit could be used to better understand the role of third (and fourth) parties in ODR contemporary processes and the way in which DAOs are looking after their political and economic expression in the governance of blockchain relationships and smart contracts.

The problem we will encounter is that these three elements cannot be used as such on the Internet of Things. They should be redefined, as the fragmentation of transactions and the weakness and brittle consistency of the social bonds precludes using them as general attributes. They cannot be simply predicate to transactions. To cope with information flows, the implementation of rules on real time, and the settling of SW institutions, i.e. with digital legal governance, we need to capture the system dynamics, *as a system*. In my opinion, this goes beyond the classical notions of reciprocity, authority, and cohesion. Stemming from reciprocity, I will have the opportunity to describe and discuss in the next

[306] "With a wider and more elastic 'minimum definition' of law, there is no doubt that new legal phenomena of the same type as those found in N. W. Melanesia will be discovered. There is no doubt that custom is not based only on a universal, undifferentiated, ubiquitous force, this mental inertia, though this unquestionably exists, and adds its quota to other constraint. There must be in all societies a class of rules too practical to be backed up by religious sanctions, too burdensome to be left to mere goodwill, too personally vital to individuals to be enforced by any abstract agency. *This is the domain of legal rules, and I venture to foretell that reciprocity, systematic incidence, publicity and ambition will be found to be the main factors in the binding machinery of primitive law*. [emphasis is mine] (Malinowski 1926, 19)

[307] "The Kapauku material on social relations presented in the second and third parts of the dissertation assumes three different forms: l) the abstract rules -which state what the relations should be; 2) the abstraction from the actual behavior of the people; and 3) the decisions of the native headmen about proper behavior." (1956, 418)

chapters the use of the Social Exchange Theory (SET) as a methodological tool to explain the cooperative creation of value in Industry 4.0. I will apply the elements of relational law as they have been defined in this chapter.

In a non-exhaustive way, the lessons learned can be listed as follows, pivoting on law as knowledge:

1. The legal dimension is irreducible to a social or a linguistic one. It possesses a technical autonomy by its own, with a specific language and specific devices to rule archetypical situations and scenarios that can be new and old (already known) at the same time. This dimension does not constitute a separate sub-system, as its components can be entirely social (negotiations, binding and non-binding agreements, protocols, standards, etc.) and expressed into natural and/or formal languages.

2. There is a specific legal knowledge, encompassing technology, social values and rules, and all other regulatory aspect of Western and non-Western societies (including economy, kinship and myths or religion).

3. Language matters, and it is essential to understand the fabric of human relationships in any possible context (this was also the basis for Pike's distinction between *emic* and *ethic*). Human and formal languages do not share one single grammar, as formal languages obey to well-defined syntactic rules, and natural languages are contextually and pragmatically driven.

4. Collective human behaviour is deeply rooted onto reciprocal relations underpinning all kind of interactions, exchanges, and transactions. Reciprocity is irreducible to abstract rules in any legal and political system we may think.

5. Rules, norms, principles, values, and the concepts we may use to describe (or construct) regulatory models should be instantiated into specific social environments.

6. Human behaviour, and especially *collective* human behaviour, has the capacity to innovate facing unattended or unknown challenges. This means that both descriptive and normative projections are needed to represent the legal dimension.

7. Legal anthropological knowledge is situated at the crossroads of the descriptive and normative sides of law. Therefore, it might contribute to the drafting, construction, implementation, or enforcing of the legal system at stake, and it is responsible and accountable for both aspects, theoretical and practical.

8. Human societies are based on a specific kind of social mechanisms or constructs that can be called *institutions*. Institutions present an individual and a collective side. Likewise, they have a cognitive (psychological) side and a political (social) side.

9. The specific history (evolution or disruption) of language, institutions, and regulatory mechanisms should be taken into account to understand any collected data.

10. The ethnographic work needs to be guided by a theory that should be formulated separately.

11. Law as data, law as meaning and law as sense could provide the foundations to set forth law as a dialogue approach, encompassing reciprocity, authority and social cohesion. This defines a holistic account to be used as a modelling pointer or point of departure.

12. Holistic accounts should be granular and analytically differentiated into (i) dimensions, levels or/and clusters, (ii) layers or levels of activity.

13. Thus, models and metamodels are also required to describe legal systems (to understand the way they behave and are related to internal components and external elements).

14. If this is so, we should separate *validity* from *validation.* 'Validity' is a theoretical construct; 'validation' consists of a methodological set of procedures to properly test the hypothesis that have been made.

15. Claiming an empirical approach means that the researcher is committed to find and measure the causal link between properties, values and relations that have been defined. Leaving these tasks to interpretation means prioritising social philosophy over the collection and description of social facts.

16. Thus, the problem we are facing in the digital age can be paraphrased in this way: What are the social conditions that should be taken into account to model, put in place and eventually implement legal ecosystems?

The former statements are the basis for making the distinction between the three dimensions, four cornerstones, and four clusters that will constitute our initial scheme for digital legal governance. This is the subject matter of the developments of Part II. This scheme will be introduced in Chapter 5, where I will define the strategies for legal governance on the Internet of Things and the Web of Data.

There is a very important point that I should mention in advance. In regulations running on the formal languages of the WoD and IoT, there is not much room for speculation. Attributes, values, and relationships must be properly defined to produce what is called Compliance by Design (CbD)—for corporate and business governance—and Compliance through Design (CtD)—for legal governance.

This means that norms and rules will be instantiated on real time and fed with data coming from a myriad of sensors (think of Connected Automated Vehicles). To properly describe such computerised systems means to set up them, i.e. *for the first time in history, the descriptive and normative side of law must be constructed alike.* This is a civilisation

change, in which normative systems are being replaced with *legal ecosystems* or, better, *sociolegal ecosystems*, because their normative forms are turned into normative patterns. Finding out the conditions to build up such ecosystems, preserving citizens' rights, and allowing social transactions and interactions to develop and grow, constitutes the subject matter of the second part of the present Dissertation. I will complete the question I raised in point num. 16, above: What are the social conditions that we should take into account to model, put in place, and eventually implement legal ecosystems? *And how? Which is the best way to model a legal ecosystem?*

Table 1 is a reminder of the general plan of the Dissertation, to situate the contents of Chapter 5. The entire chapter is addressed to the definition of the concept of *legal governance*, according to the new scenarios that the convergence between WoD, IoT and Industry 4.0 have brought about from 2010 onwards.

Table 1. *Structure and Concepts of the Dissertation*

MODULES	CONCEPTS	FIELDS	CHAPTERS
Legal Web Services and Artificial Intelligence	Law as Data	Legal Anthropology and Sociolegal Studies	1. The Double Implosion of the Legal Profession and Web Services
	Law as Meaning		
	Law as Sense		
Law as Knowledge	Knowledge Graphs	Ontology and Semantic Web	2. Law as Knowledge: The Web of Linked Open Data
	Legal Ontologies		
Law as Dialogue	Agreement	Legal Theory, Sociolegal Studies, and Legal Anthropology	3. From Positivist to Relational Law: Law as Dialogue
	Legal Pluralisms		
	Relational Law		
	Relational Justice		
	Regulatory Model		
	Regulatory System		
Reciprocity and Dialogue	Integration	Legal Anthropology	4. The Legacy of Legal Anthropology
	Reciprocity		
	Legal Culture		
	Vindicatory Systems		

Legal Governance	Middle-out Approach Inside-out Approach	Epistemology	5. The Convergence between the Web of Data, the Internet of Things and Industry 4.0
Linked Democracy	Rule of Law Metarule of Law Legal Ecosystems Legal Isomorphism	Political Anthropology and Artificial Intelligence	6. *Legal Isomorphism* and the Emergence of Legal Ecosystems
Sociolegal Ecosystems	Institutional Design Interoperability	Social and Political Sciences and Artificial Intelligence	7. Sociolegal Ecosystems: Political Forms of Legal Governance
Metarule of Law	Compliance *by* and *through* Design Scheme Metamodel Validation Model	Methodology and Use Cases	8. From Compliance by Design to Compliance through Design: An Empirical Validation Model

4.6 ANNEX I to Chapter 4: Comparative Table of Legal Anthropologists

Table 10. *Comparative Table of Legal Anthropologists*

Social and Legal Researchers	Contributions	Cross-References	Notions of law	Dimensions	Rights and Duties
Marcel Mauss (legal ethnologist, sociologist) [1872-1950]	*Essai sur le Don* (1925) *Manuel d'Ethnographie* (1926) [France] [Ethnography on Eskimos, 2006-Beuchat]	E. Durkheim Drafters and interpreters of the French Code Civil (1804)	*Système d'échanges réciproques* *Droit* : 'Le droit comprend *l'ensemble des coutumes et des lois*; comme tel, il constitue l'armature de la société, il est « le précipité d'un peuple » (Portalis); ce qui définit un groupe d'hommes, ce n'est ni sa religion, ni ses techniques, ni rien d'autre que son droit.' 'L'ensemble des idées morales et juridiques correspond au *système de ces attentes collectives*. Le droit est *le moyen d'organiser le système des attentes collectives*, de faire respecter les individus, leur valeur, leurs groupements. Leur hiérarchie. Les phénomènes juridiques sont les *phénomènes moraux organisés*.' (1926)	Il existe une '*conscience* et une *connaissance latentes* dans toute coutume et dans toute morale - j'ajoute : dans tout droit' (1926) *Morphologie sociale:* 'On appelle société un groupe social, généralement nommé par lui-même et par les autres, plus ou moins grand, mais toujours assez grand pour contenir des roupes secondaires dont le minimum est de deux, vivant ordinairement à une place déterminée, ayant une langue, une constitution et souvent une tradition qui lui sont propres.' (1926)	D'après le Code Civil de Napoléon (1804): (i) *droit coutumier et droit écrit*, (ii) *responsabilité civile et responsabilité criminelle, (iii) obligation morale et sanction.* *Pluralité des droits*: 'chaque clan a son droit, chaque tribu, dans une société composée de plusieurs tribus, a son droit. Le droit des hommes n'est pas la droit des femmes. Enfin, il existe une inégalité complète suivant les possesseurs et une variété de droits selon l'objet de la possession' (1926)
Bronislaw Malinowski (social and cultural anthropologist) [1884-1942]	*Argonauts of the Western Pacific* (1922) *Crime and Custom in Savage Society* (1926)	M. Mauss J. Frazer W. Wundt K.Bücher	*Reciprocity*: "With a wider and more elastic 'minimum definition' of law, there is no doubt that new	Maintenance and restitution of the social order through four concepts of law: : (i) Law of cultural determinism, (ii) law or rule of native conduct, (iii) law	Obligations, duties and rights lie on the reciprocal bonds between individuals, tribal groups and subgroups, and families (kinship) in segmented societies.

	Review of *The Cheyenne Way* (1942) [Mailu (Australia), New Guinea, North-Western melanesia, Kiriwina, Pacific Islands]		legal phenomena of the same type as those found in N. W. Melanesia will be discovered. There is no doubt that custom is not based only on a universal, undifferentiated, ubiquitous force, this mental inertia, though this unquestionably exists, and adds its quota to their constraint. There must be in all societies a class of rules too practical to be backed up by religious sanctions, too burdensome to be left to mere goodwill, too personally vital to individuals to be enforced by any abstract agency. This is the domain of legal rules, and I venture to foretell that reciprocity, systematic incidence, publicity and ambition will be found to be the main factors in the binding machinery of primitive law." (Malinowski 1926, 19)	of order and maintenance, and (iv) the mechanisms of law when breach occurs (Review of *The Cheyenne Way*, 1942)	"In our own province we have so far met with positive commandments only, the breach of which is penalized but not punished, and the machinery of which can by no procrustean methods be stretched beyond the line which separates *civil* om *criminal* law. If we have to provide the rules described in these articles with some modern, hence necessarily appropriate label − they must be called the body of 'civil law' of theTrobriand Islanders" (1926, 17).
Karl N. **Llewellyn (Lawyer and legal scholar) [1893-1962]**	*The Bramble Bush: On Our Law and its Study* (1930) With E. A. Hoebel, *The Cheyenne way: Conflict and Case Law in Primitive Jurisprudence (1941)* [Ethnography (limited participation) : Cheyennes Oklahoma, USA]	O.W. Holmes Max Weber John Dewey Morris R. Cohen Roscoe Pound	*Law*: "This doing of something about disputes. This doing of it reasonably, is the business of law. And the people who have the doing in charge, are officials of the law. *What these officials do about disputes is, to my mind, the law itself*" (*The Bramble Bush 1930*) "… for too much law, most law will be the cure. If too	"there is less possibility of accurate prediction of what courts will do than the traditional rules would lead us to suppose" (*Some Realism about Realism* 1931) "The particular kind of certainty that men have thus far thought to find in law is in good measure an illusion." (ibid. 1242)	*Realist jurisprudence*: 1. 1. The conception of law in flux, of moving law, and of judicial creation of law. 2. The conception of law as a means to social ends and not as an end in itself. 3. The conception of society in flux and in flux typically faster than the law. 4. The temporary divorce of Is and Ought for purposes of study. 5. Distrust of traditional legal rules and concepts insofar as they purport to describe what either courts or people are actually doing. 6. A distrust of the theory that traditional prescriptive rule-formulations are the heavily operative factor in producing court decisions. 7. The

			much blind. If law makes lind, nore law will make you to see" (ibid. 119)		belief in the worthwhileness of grouping cases and legal situations into narrower categories than has been the practice in the past. 8. An insistence on evaluation of any part of law in terms of its effects, and an insistence on the worthwhileness of trying to find these effects. 9. Insistence on sustained and programmatic attack on the problems of law along any of these lines. ('Some realism about realism', p. 1237-8)
Leopold Pospisil (Legal anthropologist) [1923-]	*Kapauku Papuans and their Law* (1958) [Ethnographies: Ethnographies: Kapauku Papuans, Nunamiut Eskimo, and Tirolean peasants)	G.H. Murdock K. Llewellyn E. Adamson Hoebel O. v. Gierke E. Ehrlich	*Legal system*. 'Rules or modes of conduct made obligatory by some sanction which is imposed and enforced for their violation by a controlling authority' *Societal structure*: 'segmentation of the society into its constituent subgroups' *Legal pluralism*: each segment or subgroup possess its own legal system. (1966) *Law*: In 1958, Pospisil considered 'law' as the principles abstracted from authoritative judicial decisions which are intended for universal application, define the relations between the two parties and are accompanied by effective sanctions.	*Levels of law* to relate accounts of political and legal organizations to the segmentation systems of the pertinent societies (1966) *Pattern of criteria*: authority, intention of universal application, *obligatio*, and sanction (1956) *Legal levels*: A proposition derived from cross-cultural research. Law is not limited to the society as a whole. Every *functioning subgroup* of the society has its own legal system which is necessary different in some respects from those of the other sub-groups. The hypothesis of a uniformity of law and of the existence of a single legal system within a given society is herewith denied. (Pospisil 1956, 460)	*Obligatio*: "It corresponds to that part of the decision of an authority which determines the rights of one party and the duties of the other." (ibid. 443). Rights and duties correspond to the two directions of the obligation. Both directions are necessary to create the legal relationship" "(…) the tribe's functioning subgroups cannot exist without law and order. Adjudication of disputes and determination of the rights and duties of the parties (including punishment for offenses) are entrusted to their headmen." (1966, 18)
E. Adamson Hoebel (Legal anthropologist) [1906–1993]	*The Cheyenne Way: Conflict and Case Law in Primitive*	Franz Boas, Karl Llewellyn, Max Gluckman, Wesley N. Hohfeld	"*Privileged force, official authority and regularity* are the elements that modern jurisprudence teaches us we must	*Case Study Method*: Determining legal practice from ethnographic *description of "trouble cases*", including mediation and	"The anthropologist must perforce agree with the Hohfeldian view that the object is of less significance -in property- than is in the network of legal relations which determine and

	Jurisprudence (1941) [with K. Llewellyn] *The Law of Primitive Man: A Study in Comparative Legal Dynamics* (1954) [Cheyennes, Oklahoma, USA; also: Northern Cheyenne, Northern Shoshone, Comanche, and Pueblo]		seek when we wish to identify law. "	negotiation as well as adjudication (applied both to social systems with and without formal courts od justice). *Comparative Legal Dynamics* "The science of comparative legal dynamics is called upon to add its catalytic effect to the crystallizing metamorphosis from primitive law to modern on the plane of world society." The Law of Primitive Man (1954, 333)	prescribe permissible behavior with respect to that object. Property in its full sense is a web of social relations with respect to the utilization of some objets (material or nonmaterial) in which a person or group is tacitly or explicitly recognized as holding quasi-exclusive and limiting demand-rights , privilege-rights, powers, and immunities in relation to that object. Thus, there are two essential aspects of property: (1) the object, (2) the web of social relations, which establishes a limiting and defined relationship between persons and the object. […] *Even though the individual may create or acquire the object of property through his own efforts, it is society and not the individual which create the circumstances that make property out of it*". The Law of Primitive Man (1954, 58)
Gregory Bateson (Cultural anthropologist, ecologist) [1904-1980]	*Naven: A Survey of the Problems suggested by a Composite Picture of the Culture of a New Guinea Tribe drawn from Three Points of View* (1936) [Iatmul, Sepik River, New Guinea]	Margaret Mead, Warren McCulloch, Norbert Wiener, B. Malinowski, A.R. Radcliffe-Brown	"The 'strength of traditional law' is very important in some African communities, but the phrase is almost meaningless when applied to the Iatmul who have a highly individualistic culture and will readily respect the law-breaker if he have but sufficient force of personality". (1936, 31) "The Iatmul are fundamentally a people without law" (1936, 97) Periphery oriented system (Iatmul, vengeance) vs. centripetal system (Europe, codified law) "The only resemblance between the European legal	*Schismogenesis, i.e. differentiation and inversion, symmetrical, complementary*, "a process of differentiation in the norms of individual behaviour resulting from cumulative interaction between individuals" (1936, 175), how groups of women and groups of men inverted their everyday, gendered norms for dress, behaviour, and emotional expression. *Affective function Ethos, Naven Rite* to avoid escalation "I shall use the word *eidos* to refer collectively to the emotional emphases of a culture" (1936, 32)	"Let us consider some other examples of *pragmatic functioning*, The term is applied to such effects as: increase of sociability among individuals; increased solidarity of the community, increased family pride; the confirmation of the privilege of individuals and the enforcing of their rights and duties; substantiation of belief in magical effects; and the strengthening of efficiency in traditional law and order (1936, 30-31)

			system and such a system that of the Iatmul lies in their widest sociological functions." (1936, 97)		
Max Gluckman (Social anthropologist) [1911-1975]	*The Judicial Process Among the Barotse of Northern Rhodesia (1955)* *Politics, Law and Ritual in Tribal Society* (1965) *The ideas of Barotse Jurisprudence* (1965) [Ethnography: Lozi, Barotse, Rhodesia, Zambia]	A.R. Radcliffe-Brown, E. Hoebel, E.E. Evans-Pritchard, I. Schapera	Law as a social cohesive form of customs and mores, expressed through the reasoning and implementation of judicial decisions and rulings. — "I call 'custom' a source of what I call 'law' and hence what I call 'forensic' (for-merly legal) rulings" (Gluckman 1973, 403).	Gluckman endorsed Radcliffe-Brown's notion that behaviour appropriate to a social position was universally the legally relevant standard of right/doing and wrong/doing. The *reasonable man* is the man who behaves correctly. "*Conflicts* in one set of relationships, over a wider range of society or through a longer period of time, lead to the re-establishment of *social cohesion*. Conflicts are a part of social life and custom appears to exacerbate these conflicts, but doing so custom also restrains the conflicts from destroying the wider social order" (Peace in the Feud 1955, 2)	Difference between rebellion and revolution: "The Zulu had no idea of any political organization other than hereditary chieftainship and their stage of social development did not conduce to the establishment of new types of regime. Their only reaction to bad rule was to depose the tyrant and to put someone else in his place with similar powers, though individuals could escape from Zululand to other nations' protection; that is, the people could take advantage of the princes' and chiefs' intrigues for power, and the latter in intriguing sought to win the backing of the people. The king's policy was therefore to prosecute anyone who threatened to be able to take his place; he had to meet rivals, not revolutionaries…" (1963, 42)
Isaac Schapera (Legal anthropologist) [1905-2003]	*A Handbook of Tswana Law and Custom* (1938) [Botswana, South Africa] *The Tswana* (1953, reed. J. Comaroff,) Ethnography : baKgatla, baNgwato Botswana	A.R. Radcliffe-Brown, B. Malinowski, E.A. Hoebel, Simon Roberts, John and Jean Comaroff	Conceptual, functional way of understanding law through native language: 'In the juridical field, the following were some of the ways in which *molao* was commonly used: (i) the law in general, (ii) the law personified, (iii) Some particular matter of a general kind with which the law was concerned, (iv) a specific single rule; (v) The law	*Customary law* History of native societies should be reconstructed to understand their legal conceptualisations	Violations are as important as compliance to understand legal enforcement. Ethnographic observation shows that individuals respect the law when they do not find benefits on the contrary.

			as a system of social control or moral principles, (vi) A binding injunction or series of injunctions, (vii) rule of conduct decreed by the chief (or other author).” (1983, 143-44)		
Paul Bohannan (1920-2007) [Legal Anthropologist]	*Justice and Judgment among the Tiv* (1958) *Tiv Economy* (1969) (with L.A. Smith) *How culture works (1*995) [Ethnography: Tiv, Nigeria]	Laura Nader, Laura Altman Smith, B. Malinowski, E. Evans-Pritchard, L. Firth, and Meyer Fortes	*Double institutionalisation or reinstitutionalization:* ‘the process in which some particular usages within an institution are recast so that hey can be used as a basis for conflict resolution by legal institutions’ (Preface Justice and Judgement 1968, viii) ‘Body of binding obligations... which has been reinstitutionalized within the legal institution’ Any institution (social or legal) of customs contain patterns of behaviour Purely social customs are those which become legal on the process of reinstitutionalisation. There is a passage from the social to the legal insofar as certain customs are chosen among others by legal institutions to provide the enabling conflicts that interfere with the proper functioning of others social institutions.	*Conflicts as social enablers* ‘Comparatively, little law arise in a purely legal context. The sources of law are to be found in the customs within other institutions in society and in the ideas and values that underlie those institutions’ (*How culture works*, 1995, 71) *Folk system* *Legal Institutions*	“…what is important in legal anthropology is the institution of judgment and compromise, and that what can be compared among societies are the 'legal institutions' and certainly not the substantive law’ (Justice and judgement, Preface 2,d impression, 1968, 2018, viii) ‘The Napoleonic code, or Roman law, or the common law cannot provide the the-retical basis for comparative law. Rather, they are important examples, but the patterns within them are very likely not to fit the ethno-graphic facts’ (*How culture works* 78)

Clifford Geertz (Cultural anthropologist) [1926-2006]	*Local knowledge: further essays in interpretive anthropology* (1983) [Ethnography: Java, Bali and Sumatra]	Gilbert Ryle, Quentin Skinner, Talcott Parsons, Ludwig Wittgenstein, Max Weber, Paul Ricoeur, Alfred Schütz, L. Rosen.	*Thick description* '…between what Ryle calls the "thin description" of what the rehearser (parodist, winker, twitcher . . .) is doing ("rapidly contracting his right eyelids") and the "thick description" of what he is doing ("practicing a burlesque of a friend faking a wink to deceive an innocent into thinking a conspiracy is in motion") lies the object of ethnography: a stratified hierarchy of meaningful structures in terms of which twitches, winks, fake-winks, parodies, rehearsals of parodies are produced, perceived, and interpreted, and without which they would not (not even the zero-form twitches, which, as a *cultural category*, are as much non-winks as winks are non-twitches) in fact exist, no matter what anyone did or didn't do with his eyelids.' (Thick Description, 1973)	*Law*: 'Law doesn't just mop up, it defines. It doesn't just correct, it makes possible. What it defines, the meaning frames it sets forth, is an important force in shaping human behavior and giving it sense, lending it significance, point and direction. It is this sort of thing-law not so much as a device or a mechanism to put things back on track when they have run into trouble, but as itself a constructive element "within culture," a style of thought, which in conjunction with a lot of other things equally "within culture"--Islam, Tibetan Buddhism, etc.-lays down the track in the first place, that our panelists here today are chiefly concerned with.' (Off Echoes, 1996, 33) *Hermeneutics:* "I am not engaged in a deductive enterprise in which a whole structure of thought and practice is seen to flow, according to some implicit logic or other, from a few general ideas, sometimes called postulates, *but in an hermeneutic one--one in which such ideas are used as a more or less handy way into understanding the social institutions and cultural formulations that surround them and give them*	"Rather than conceiving of a legal system, our own or any other, as divided between trouble over what is right and trouble over what is so (to use Llewellyn's piquant formulation, if only because it has been so influential among anthropologists) and of "juristic technique," our own or any other, as a matter of squaring ethical decisions responding to the what is right sort with empirical determinations responding to the what is so sort, it would seem better--more "realistic," if I may say so--to see such systems as describing the world and what goes on in it in explicitly judgmatical terms and such "technique" as an organized effort to make the description correct. The legal representation of fact is normative from the start; and the problem it raises for anyone, lawyer or anthropologist, concerned to examine it in reflective tranquillity is not one of correlating two realms of being, two faculties of mind, two kinds of justice, or even two sorts of procedure. *The problem it raises is how that representation is itself to be represented."* (1983)

				meaning. They are orienting notions, not foundational ones." (1983)	
Sally E. Merry (legal anthropologist) [1944-2020]	Getting Justice and *Getting Even: Legal Consciousness among Working-Class Americans. (1990)* *Colonizing Hawai'i : The Cultural Power of Law (2000*) *Human Rights and Gender Violence: Translating International Law into Local Justice (2006)* Ethnographies: Hawaii, USA	M. Foucault Franz and Keebet von Benda-Beckmann Laura Nader Austin Sarat, Susan Silbey, Barbara Yngvesson, M. Goodale	*Legal Pluralism* *Legal Culture:* 'the concept of legal culture in an anthropological understanding of how culture works and dividing it into its distinct but interconnected dimensions' (2010, 41)	*Cultural Vernacularization*: the process to localise and translate in specific groups and territories the modification of the content of Human Right norms. *Strategic Vernacularization*: strategic processes of negotiation that are controlled by transnational activists and intermediating human rights entrepreneurs *Indicator culture*: the increasing global dominance of quantitative measurement as a technology of knowledge production and governance. *Commesuration*: the measurement of complex social phenomena relies on a process of aggregation in which categories—like "severe and moderate violence" against women—become more and more detached from the phenomena they purport to objectively measure.	*Paradox of legal entitlement*: working-class Americans feel entitled to use the law in order to resolve their problems, yet lose power over their lives—and personal conflicts—when they make use of this entitlement. *Social uses of international law and Human Rights doctrine* *Ethnographic deterritorialization:* ethnographic engagement with the fragments of [the wider human rights] system" precisely because the system itself is "neither coherent nor fully graspable. (Merry,
Sally F. Moore (legal anthropologist) [1924-2021] Former Wall Street lawyer, staff attorney at the International	*Law As Process: An Anthropological Approach* (1978) Ethnography: Tanzania (Chagga)	B. Malinowkski L. Pospisil E.A. Hoebel M. Weber	*Rules, Coercion / Compliance / Conformity* *Complex chains, networks* *Both oficial bodies / conflictual approach*	*Semi-autonomous social fields* "The approach proposed here is that the small field observable to an anthropologist be chosen and studied in terms of its semi-autonomy- the fact that it can	"Many lawyers and law professors view law as an instrument for controlling society and directing social change, but most anthropologists are concerned with law as a reflection of a particular social order. This difference in

Military Tribunal at Nuremberg			*"legal, illegal and non-legal norms all intermesh in the annual round of its activities"* "The semi-autonomous social field is defined and its boundaries identified not by its organization (it may be a corporate group, it may not) but by a processual characteristic, the fact that *it can generate rules and coerce or induce compliance to them*. Thus an arena in which *a number of corporate groups deal with each other may be a semi-autonomous social field*. Also the corporate groups themselves may each constitute a semi-autonomous social field. Many such fields may articulate with others in such a way as to form complex chains, rather the way the social networks of individuals, when attached to each other, may be considered as unending chains. The interdependent articulation of many different social fields constitutes one of the basic characteristics of complex societies"	generate rules and customs and symbols internally, but that it is also vulnerable to rules and decisions and other forces emanating from the larger world by which it is surrounded. The *semi-autonomous social field* has rule-making capacities, and the means to induce or coerce compliance; but it is simultaneously set in a larger social matrix which can, and does, affect and invade it, sometimes at the invitation of persons inside it, sometimes at its own instance. The analytic problem of fields of autonomy exists in tribal society, but it is an even more central analytic issue in the social anthropology of complex societies. All the nation states of the world, new and old, are complex societies in that sense. The analytic problem is ubiquitous. (S-F. Moore 1973, 720) *Regularisation / Situational adjustment* Two kinds of processes: those of *régularisation* in which people control their situations by fixing rules and establishing categories by against indeterminacy; and those in which they exploit existing indeterminacies or generate new ones, named *situational adjustment*	perspective has had considerable effect" (1969, 2883) "*legal, illegal and non-legal* norms all intermesh in the annual round of its activities" (1973, 723) "(...) the same social processes that prevent the total regulation of a society also reshape and transform efforts at partial regulation" (1978, 1) *Regularisation / Situational adjustment* "those of "régularisation " in which people control their situations by fixing rules and establishing categories by against indeterminacy; and those in which they exploit existing indeterminacies or generate new ones (" *processes of situational adjustment* principles of descent need not to be the direct or exclusive source through which rights and duties linked in the ideology to descent may be enjoyed (1978) *"*"the kind of processes that produce 'conscious models', that produce rules and organisations and customs and symbols and rituals and categories and seek to make them durable" (...) We have called these attempts to crystalize and concretize social reality to make it determinate and firm 'processes of regularization'" (…) "The second, the countervailing processes, are those by means of which people arrange their immediate situations (and/or express their feelings and conceptions) by exploiting the indeterminacies in

					the situation, ot by generating such indeterminacies, or by the reinterpreting or redefining the rules or relationships". (…) We have called these, processes of situational adjustment (1978, 50)
Simon Roberts (Legal anthropologist, legal scholar, and mediator) [1941-2014]	*Tswana Family Law* (1974) *Order and Dispute: An Introduction to Legal Anthropology* (1979, 2013) With John Comaroff: *Rules and Processes* (1981) *Order and dispute: an introduction to legal anthropology* (2013) Ethnography: baKgatla Botswana	Max Gluckman, Isaac Schapera, S.F. Moore-John and Jane Comaroff, Clifford Geerz, Yves Dézalay, Bryan Garth, Marc Galanter, WFL Felstiner, C. Greenhouse	*Family law* *Law as ideology and symbolism* *Alternative Dispute Resolution* *Reinterpretation of Schapera's account of Ttwsana law* (as reconstructed 'rules') *Against 'legal pluralism'* (attributes the first use of the term to F.v.Benda-Beckmann (1970) "Colonial societies are now encapsulated within the overarching reach of nation-states and subject to their legal systems. So for all of those societies the more or less coerce domination of the colonial world has given way to that of some post-colonial polity" (Afterword to the second edition *Order and Dispute")*	Notion of *sociocultural order* Convergence of *rule-centered (normative) and processual (interpretative) paradigms* (not opposed) Link between 'the structural principles that underlie the sociocultural order and the experienced negotiability of everyday life" (*Rules and Processes*, 1981, 31) *Symbolic and homiletic dimensions of legal discourse* "Finding that our ideas about law provide an insecure starting point for examining other people's institutions of social control, the boundaries of the study must be identified in some other way. In attempting this, two simple assumptions are made. First, it is taken for granted here that a degree of order and regularity must be maintained in any human group if the basic processes of life are to be sustained. Secondly, it is recognized that quarrels will inevitably arise, and that these may	"To be successful, bilateral negotiations must be seen as the 'right' way of resolving a dispute: the ready disposition to talk and the conciliatory gesture must represent approved responses." (1979) "norm-governed do not refer to the determination of outcomes but to the meaningful constitution of argument and adjudication" (*Rules and Processes*, 239)

				disrupt that order if they are not resolved or at least contained" (O and D, 1979, Introduction)	
John and Jane Comaroff (political and legal anthropologists)	With S. Roberts, *Rules and Processes* (1981) Ethnography: Botswana	M. Gluckman, Simon Roberts, Isaac Schapera, Michel Foucault, Toni Negri	*History* Power and occult economy, witchcraft (and zombies) as response "Perhaps the overriding irony of the contemporary age—the Age of Futilitarianism, we called ft, in which the rampant promises of late capitalism run up against a thoroughly postmodern pessimism—is how unanticipated it was. None of the grand narratives of the orthodox social sciences came anywhere near predicting the sudden transformation of the 20th-century international order, the fall of the Soviet Union, the crisis of the nation-state, the deterritorialization of culture and society, the ascendance of an unevenly regulated global economy. The surprising recent past of South Africa is one instance of this irony, one refraction of this world-historical process. Here too, notwithstanding an intense struggle, the end came unexpectedly. (Comaroff and Comaroff 1999, 292)	Local/Global. Four dimensions	Rights as constitutive of the collective identity; forms of governance, domination and resistance in global capitalism Our agenda: "It is to dissect millennial capitalism and the culture(s) of neoliberalism: to explore their impact on the ways in which people at different coordinates on the global map come to define the nature of value, grapple with the forces of production and reproduction, inhabit moral economies, and engage in political action. Witch hunts are forms of political action: they seek to divert and control power, channel the distribution of resources, establish a public sphere in which moral order may be negotiated, and construct reality itself. In a rampantly neoliberal world, these imperatives often seem especially urgent." (Response to Moore 1999, 309)

Martin Chanock (Legal historian) [1942-]	*Law, custom, and social order: The colonial experience in Malawi and Zambia* (1985) *The making of South African legal culture 1902-1936: Fear, favour and prejudice*. (2001) Ethnography: Malawi, Zambia, South-Africa	Max Gluckman, S.E. Merry, R. Abel, J. Comaroff	Criticism to a conflictual perception of what law and order consists of Criticism to legal constructions/reconstructions of social life from the nation-state "I tried, with partial success, to demolish the narrative of the innocence of legalism in the construction of South Africa's racist state. And I am trying to question the assumption of the virtues of the global constitutional project and the particularinstitutionalised forms of "human rights", as they trap states and peoples in inappropriate state structures" (2019)	*Comparative legal history* *Neocolonial recreation of colonial customary law* "But how had this African law come into being? In my account it was the product of intense economic changes. These produced defensive actions by men and elders in African societies as their social power over young men and women, who could now be cash earners, was waning. Money also created new powers, among them the ability to buy land from the economically stressed, and this challenged basic African ideas about land rights. *Customary law, in other words, was colonial.* (2019, 4)	*African constitutionalism* "But it became clear to me that law was less about limiting power than it was about increasing and endowing it. Law justified acts of violence and allocated resources. But to understand how it did this, one had to focus on all of the complex discourses around law in a society. Law, Custom and Social Order had already shown how limited it is to think about law as just "rules" applied. How then to think about it? Law and society studies correctly placed it "in context". Some emphasised society and economy underlying legal doctrine and practice. But there is also a discursive context. Lawyers' legal discourse is but a part of an interrelated set of discourses about law – bureaucratic, radical, religious" (2019) *Government by consent* "What appears now to be necessary is a re-establishment of a rule of law among African communities, which can only be based on a thorough decolonisation of the common law which must reflect African lives, cultures, languages and processes. Until this is achieved, top down institutional structures will have nothing on which to rest." (Chanock 2010, 126)
Laura Nader (Legal Anthropologist) [1930-]	*Talea and Juquila; a comparison of Zapotec social organization* (1964) *Law in culture and society* (ed. 1969)	Ralph Nader Philip Gulliver Max Gluckman Paul Bohannan Michel Foucault	Law and culture as expression and organisation of relations of control and power Law as rule-using modes of dispute settlement	Comparative legal ethnography and dispute resolution Controlling processes and dynamic components of power	"…the life and death of the law derive from the plaintiff, and that this fact is nowhere more important, perhaps, than in our democratic society. (…)Furthermore, regardless of whether anthropologists have been able to decide on a strict definition of law that is universal, we have been able to document the

	With Harry F Todd *The Disputing process: Law in ten societies* (1978) Ethnography: Oaxaca, México		Law should address justice issues and not be redirected to reproduce harmony-ideology to maintain the status quo. The ADR extension in USA contributed to this political ideology. "From 1965 to 1999 dispute resolution became an industry that penetrated the neighborhoods, the schools, the prisons, the corporations of our country while NAFTA, GATT, and the WTO all have developed the means for dealing with international disputes over resources, development, and other projects of neocolonization" (Nader "Moving On" 1999, 190)	Criticism of '*harmony ideology'*, the belief that the existence of conflict is necessarily a bad or dysfunctional minimising conflict and confrontation. The Zapotec used a harmony strategy to prevent the Mexican government from interfering with their autonomy.	universal presence of justice forums. The search for justice is a fundamental part of the human trajectory, although the meaning of justice and its form varies. (…)Furthermore, decades of research, mine and others, indicate that the direction of law is in large measure dependent on who can and wants to use the law." "In state systems of law, the plaintiff role atrophies because of the monopoly use of criminal cases by the state. Over time, the role of the civil plaintiff is also endangered by the change in relations associated with industrialized wage-labor and the resultant inequities that stand in the way of equal access to law. When predominant users are powerful entities, the law is shaped and becomes hegemonic because their interests are well defined and commonly buttressed **by** justification or propaganda. The powerful react to challenge." (Seegers Lecture, 2002, 295)
Raymond Verdier (legal scholar/anthropologist)	*La Vengeance. Face à face victime/agresseur* (2004) With J.P. Polinand B. Coutois , *La Vengeance* (4 vols) (1988-2000)	Marcel Mauss (don, système d'échanges) Jean Carbonnier (droit et non-droit) Claude Lévi-Strauss	Le Droit traite de l'individu, non en tant qu'être isolé et autonome, mais en rélation avec ses semblables et dans son appartenance à divers groupements ; le droit n'est pas ainsi un pouvoir propre au sujet individuel mais une habilitation conférée par le groupe à ses membres, en tant qu'ils assument des fonctions particulières.	Trois *ordres juridiques fondamentaux* : parenté (ordre parental), terre (ordre territoriel), et religion (ordre spirituel). Ils constituent *espaces sociaux d'autorité.* Réciprocité.	Définition des droits en fonction de la position sociales at des devoirs en rapport à la communauté. Chef de la terre vs. Chef politique. *Dons* de *vie, de terre, de femme* par rapport à la communauté. Cosmogonie/Nomogonie. Système des interdits. Groupes : Interdits totémiques, de l'inceste et de la vengeance. Particuliers : roles. Tiers réel ou symbolique représentant la société.
Maurice Godelier (social and political anthropologist) [1934-]	*La production des Grands Hommes. Pouvoir et domination masculine chez les Baruya*	Karl Marx (modes de production) Michel Foucault (pouvoir)	Superstructure *Domination masculine* : la domination masculine chez les Baruya ne relève pas à des idées mais répond à des	Don et contre-don comme origine de la forme symbolique des liens sociaux	« les rapports de production sont représentés juridiquement par des formes de propriété et de possession qui définissent les droits et obligations réciproques des individus et des groupes en matière de production et de

	de Nouvelle Guinée (1982)	Claude Lévi-Strauss (systèmes de parenté) Fernand Braudel (histoire totale) « …ce sont essentiellement des auteurs français (M. Godelier, C. Meillassoux, E. Terray) qui, depuis la fin des années soixante, se sont attachés à renouveler les cadres conceptuels du marxisme afin de pouvoir les appliquer à l'analyse des sociétés traditionnelles. » (Rouland, 1989, 89)	contraintes liées aux conditions économiques et politiques « Pour l'instant, les sciences sociales n'ont pas encore été capables de déceler les corrélations entre les manières de produire et les manières sociales de se reproduire » (« Inceste : l'interdit original", cit. Rouland, 1988, 201)	Réinterprétation de l'interdit de l'inceste : critique de Lévi-Strauss et Françoise Héritier	répartition des ressources . Mais les mécanismes d'appropriation réelle peuvent différer de leur image juridique, et contribuer ainsi à la modification des rapports et équilibres sociaux. Dans ce cas, le droit traditionnel tend à devenir une fiction qui dissimule le contenu réel des rapports de production. » (Rouland, op. cit 221)
Étienne Le Roy (Legal anthropologist) [1941-2020]	*Le Jeu des lois. une anthropologie dynamique du droit* (1999) *Pourquoi et comment la juridicité des communs s'est-elle imposée dans nos travaux fonciers* ? (2019) (ethnography : Wolofs of Senegal : Mali)	Louis Dumont (englobement du contraire, logiques de complémentarité des différences) Michel Alliot (institutions) Pierre Bourdieu (pratiques)	*Degrés de juridicité*. Modèle tripartite : (i) interactions entre systèmes de dispositions durables (*habitus*), (ii) modèles de conduite et de comportement, (iii) et normes générales et impersonnelles. *Juridicités* (i) Faire (geste posé), (ii) Dire (Dialogismes) et (iii) Écrire (Légistique). Knowledge stemming from experts, mediators and drafters. *Ordonancemen*t: accepted, negotiated and imposed (enforced).	*Anthropologie politique de la juridicité* Propriété (droit foncier). Droit des communs. *Juridicité des communs* *Droit foncier sans propriété privée et droit sans règles générales et impersonnelles* *Compréhension dynamique des phénomènes sociaux* *Modes endogènes de règlement des differends*	Criticism of the "philosophie spontanée des juristes" "Le droit dit positif, celui proposé ou reconnu par l'État, ne répond pas à l'exigence d'universalité que ses zélateurs juristes lui ont attribué. [On postule donc que les membres de nos sociétés, comme de toutes les sociétés à des degrés divers, peuvent vivre sous des régimes de juridicités originaux, combinant les régulations étatiques et celles que ces peuples ont héritées d'un passé plus ou moins lointain et glorieux ou qui sont le produit de leurs adaptations, bricolages ou « bidouillages » les plus contemporains]. (Le Roy 2019, 5, 12) Les « communs », comme domaine original de la vie juridique, permettent d'en vérifier les opportunités. " (Le Roy 2019,

			(« types idéaux qui dans la réalité des pratiques institutionnelles contemporaines vont pouvoir se combiner de manière plus ou moins cohérente ou pragmatique” (2019)		

PART II: DIGITAL LEGAL GOVERNANCE

CHAPTER 5

Legal Governance: The Convergence between the Web of Data, the Internet of Things and Industry 4.0

Summary: The Web of Data, the Internet of Things, and Industry 4.0 are converging, and society is challenged to ensure that appropriate regulatory responses can uphold the rule of law fairly and effectively in this emerging context. The challenge extends beyond merely submitting digital processes to the law. We contend that the 20th century notion of 'legal order' alone will not be suitable to produce the social order that the law should bring about. The article explores the concepts of rule of law and of legal governance in digital and blockchain environments. We position legal governance from an empirical perspective, i.e., as an explanatory and validation concept to support the implementation of the rule of law in the new digital environments. As a novel contribution, this chapter (i) progresses some of the work done on the metarule of law and complements the SMART middle-out approach with an inside-out approach to digital regulatory systems and legal compliance models; (ii) sets the state-of-the-art and identifies the way to explain and validate legal information flows and hybrid agents' behaviour; (iii) describes a phenomenological and historical approach to legal and political forms; and (iv) shows the utility of separating driving and enabling regulatory systems.

Keywords: Regulatory models, rule of law, metarule of law, Internet of Things, Industry 4.0, Web of Linked Data, Artificial Intelligence, legal compliance.

5.1 Introduction

This is a Chapter on the concept of legal governance and the convergence of technologies represented by the Web of Data (WoD), the Internet of Things (IoT), and Industry 4.0. Its point of departure is that the 20th century concept of 'legal order' alone will not be suitable to produce the social order that the law should bring. In practical terms, it holds that more laws and more regulations, standards, and regulators will not solve the challenge of legal governance in the IoT and Industry 4.0 environments. The convergence of complex technologies will change the context to be regulated as well as what should be regulated—the perception, processing, and emergence of a hybrid human–machine behaviour that is not just human or just computational.

This behaviour is in between and beyond the 20th century human/machine divide. It will produce new kinds of actions and social outcomes that are not easily captured and regulated by the way we have conceived rules and norms in the past. It will also do so in volumes and at speed with far higher levels of complexity than had to be processed by the legal system in the past. This new reality is not augmented reality, it is an emergent, added reality to our lives and social interactions. This is a hybrid reality. How are we going to regulate it?

This Chapter considers the concept of legal governance and how it could be made meaningful and relevant to the new reality. I do not intend to change or challenge the normal usage of well-established concepts in legal theory and the legal doctrine deploying the rule of law, such as 'legal system', 'legal order', 'enforcement', 'legal rule', 'legal norm', and the like. These will continue to be used in the normal sense lawyers and legal scholars have adopted in the 20th century. This Chapter, however, introduces 'legal governance' from another perspective, from an empirical approach, i.e., as an explanatory and validation notion, primarily informed by a social and cognitive science perspective, to support the implementation of the rule of law in IoT and Industry 4.0 environments.

I will support this Chapter onto previous Chapters 3 and 4. They will sustain the construction that I will posit to regulate the data flows of the Internet of Things. We should bear in mind the 16 points that I highlighted at the end of the First Part of the Dissertation, Chapter 4. They will sustain the main theses of Chapter 5, i.e. the epistemic middle out / inside out approach, and the construction of a scheme of the metarule of law on a horizontal and vertical axes.

To delve into the complexity of legal governance, I will resume in this Chapter the conceptual work carried out in previous articles on big data and regulatory models.[308] In essence, legal governance in the IoT and Industry 4.0 environments entails that (i) concepts

[308] Casanovas et al. (2017a, 2017b, 2017c, 2017d, 2017e,2021a, 2021b, 20121c) 2022); Hashmi et al. (2018a, 2018b); Poblet et al. 2019; Governatori et al. (2021); Rodriguez-Doncel et al. (2016), Rodriguez-Doncel et al. (2020, 2021). I will also link it to other concepts that have been previously analysed to produce a holistic view of the regulatory domain, especially as applied in the regulatory toolbox set of On Good AI Governance: *14 Priority Actions, a SMART Model of Governance, and a Regulatory Toolbox*, the AI4People Report on the legal side of governance (Pagallo et al. 2019a, 2019b). However, the concept of legal governance was not made fully explicit in the latter report. Its meaning related to Artificial Intelligence (AI) was taken for granted.

such as ‘enforcement’, ‘implementation’, ‘effectivity’, ‘application’ and so forth, i.e., the concepts linked to the practical realization or performance of the law, and (ii) the concepts related to the system as a whole—for example, ‘validity’ or ‘legality’—should be empirically defined and used to create a specific regulatory mindset and toolkit for the IoT.

This allows metrics to be applied, offering in return more information about the system’s ability to adapt to its environment, to create a new one, and to sustain legal ecosystems. For this approach, legal governance means socio-legal governance. This is the subject of the developments of Part II of the Dissertation.

5.2 A Changing Regulatory Framework

5.2.1 Web 4.0, Industry 4.0, and the Internet of Things

Web 4.0 has been described as a ‘symbiotic’, ‘intelligent’, ‘read-write-execution-concurrency’ web (Aghaei et al. 2012) in between humans and machines, explicitly related to social computing (Hendler and Berners-Lee (2010) and the emergence of the IoT (White 2015). Industry 4.0 is a term first used at the Hanover Fair in 2011 as *Industrie 4.0* and quickly adopted into English. It defines the relation of industrial workplaces and production with the IoT Cyber-Physical systems (CPS) in relation to the industrial processes involved in manufacturing, engineering, material usage and supply chain and life cycle. Oztemel and Gursev (2018) define the notion as a manufacturing philosophy that includes modern automation systems with an increasing level autonomy, flexible and effective data exchanges enabling the implementation of next generation production technologies, and also being more personal and more agile in production as customized products.

Industry 4.0 has two key factors, *integration* and *interoperability* (Lu 2017). Drath and Horth (2014) differentiate three Cyber-Physical Systems (CPS) levels—the physical objects, data models of physical objects in a network infrastructure (cloud), and services based on the available data. Using the Strategic Options Development and Analysis (SODA) method, Almeida (2017) has drawn a cognitive map with five dimensions—symbiotic, Web of Things, social computing, pervasive, and ubiquitous computing.

Lee, Bagheri and Kao (2015) propose a five-level CPS architecture for developing and deploying a manufacturing application through a sequential workflow—*smart*

connection, *data-to-information conversion*, *cyber level* (information hub, e.g. twin model for information and machines), *cognition* (decision-support system), and *configuration* (resilient control system).

Papcun, Kajáti, and Koziorek (2018) relate CPS with Human Machine Interaction (HMI) 4.0 and emphasize that Service Oriented Architectures (SOA) for HMI should be built on robust (fault-tolerant) and quick (good latency) API (Application Programming Interface), because HMI has to react to alarms very quickly, and operators have to have up-to-date information about the production.

Based on a quantitative text analysis and a qualitative literature review, the survey by Hermann, Pentek and Otto (2016) identifies four design principles of Industry 4.0—*technical assistance* (virtual and physical), *interconnection* (collaboration, standards, and security), *information transparency* (data analytics and information provision), and *decentralised decisions*. Industry 4.0 can improve cross-organisational logistics in terms of real time information flows and end-to-end supply chain transparency, helping companies to optimise value-creation. For instance, *Kanban*—the system of supplying parts and materials just at the very moment they are needed in the factory production process—and *Just-in-Time/Just-in-Sequence* logistics can be drastically ameliorated (Hofmann and Rüsch 2017). The new discipline of business and information systems engineering (BISE) is focusing on these lifecycle changes based on the industrial integration of the IoT (Lasi et al. 2017). The Industry 4.0 convergence with Web 4.0 and the IoT is proceeding at pace, increasingly affecting society as a whole. The convergence gained momentum during the COVID-19 pandemic and accelerated its impact (Umbarkar 2021).

What should especially be noted is the fusion of technologies brought by the Industry 4.0 revolution, which is blurring the lines between the physical, digital, and biological spheres, turning data into more manageable information, increasingly in the form of open data that can be freely used, re-used and redistributed by anyone *either in public or in private ecosystems*. This is the essential point in which the IoT, Web 4.0 and Industry 4.0 converge. What are the main issues? And what are their regulatory requirements?

I will explore these questions below. Let me say from the beginning that industrial developments are mainly private, i.e. industries can make use of open data for private uses, keeping the results by their own. This is the more frequent situation, in which manufacture processes will be increasingly regulated and automated on real time.

5.2.2 New Regulatory Challenges

As expected, the convergence between Web 4.0, Industry 4.0 and the IoT (i) has already challenged the regulatory landscape, e.g. relating to law, governance, and the legal profession; (ii) brings about new regulatory challenges regarding e.g. legal liability, data rights, data protection, trade restrictions, agreements, standards, contract models, supervision, surety, monitoring and control; and (iii) creates and stabilises new regulatory (or socio-legal) ecosystems that bind together all related stakeholders.

The IoT, for example, is changing the social nature, function, and perspective of regulatory systems, both in its public and private dimensions. Recent Gartner reports have highlighted that legacy silos of systems, data and processes continue to limit government participation in broader digital ecosystems and constrain the implementation of fully digital end-to-end citizen services (Howard et al. 2019). These results also reflect the evolution of the web from Web 3.0 to 4.0, the emergence of Industry 4.0, and the construction of regulatory ecosystems.

Open data can enable greater transparency, higher levels of citizen trust, better public service delivery, and more effective policymaking but *opening up data does not mean having to make it public* (Mickoleit 2020). Setting up platforms or apps for citizens' participation is not ensuring tangible results, it does not lead *per se* to reuse and value creation. Something else is needed, as the roles of citizens, consumers, stakeholders, and actors might be also changing in the new data-driven scenarios of the IoT.

Foe instance, from 2018 on, *Rules-as-Code*, a regulatory movement fostered by some government agencies, civil servants and entrepreneurs in New Zealand, Australia, Canada, France and some other countries, try to facilitate the enhancement of citizens' rights and a faster drafting and implementation of legal provisions by means of computer languages (Waddington 2020). *Better-Rules* and *Legislation-as-Code* are parallel

developments as well (i) to design policies, and (ii) to create and publish regulations, legislation, and policies as machine and human readable (Barraclough 2021).

Gartner analysts, again, have recently represented the emerging trends in e-government into a new *2021 Hype Cycle for Digital Government Technology*. But the interpretation of the proposed solutions—*digital twins* (DT) and automated *compliance by design* (CbD)—are somewhat surprising:

> A digital twin of a citizen is a digital representation of an individual. […]. Governments are developing digital twins of citizens to monitor the environment citizens live in and address health, safety, travel and social media impacts on society. The spectrum of complexity of the models and tools can help governments make better decisions for monitoring and supporting patients, prisoners, passengers, or the elderly. Some governments, such as China's, are building a scoring methodology. Aggregated citizen twins can help map broad patterns and drive resource allocation. […] By implementing MRL [Machine-readable Legislation], *the room for interpretation of legislative or executive intent is eliminated from the process, instead making the law that is passed the same as that which is implemented* [my emphasis] (Mendonsa 2021)

Assuming that "the policy is the technology and technology is the policy and the two are inseparable in a digital society", "closing the gap between legislative intent and implementation", and the crude projection of new technological trends to legislative and case-based law, are components of the problem not of the solution. What is surprising is the acceptation of constructing a citizen's replica, a digital twin, to allocate rights and to set a top-down accessibility to goods and services. This is not a passive but a proactive acceptation of a granular control. In our terminology, instead of *making sense* of the law and allowing the regulated (citizens, consumers…) to have control over the situation, *law as meaning* pervade all situations and is directly applicated to them, i.e. enforced, eliminating all possible dissent.

Doing so, the new *hybrid* reality we are trying to understand is completely set apart. The problem is not that these kinds of solutions are wrong. They are simply not helpful to address the challenges of the emergent reality that we are trying to understand, capture, and (hopefully) plot in design modelling.

We contend that only a holistic, relational view can appropriately address data-related hindrances, linking societal, economic, political, and legal dimensions to human-centred

interactive computing. Machine-readable legislation (MRL) and legal Linked Open Data (LOD) have been developed for twenty years now but their aim is not replacing human-driven institutions with corporate social engineering techniques.[309]

Semantic Web researchers and developers have been very aware of the social uses and impact of the technology they are building and deploying in social environments (D'Aquin et al. 2008, D'Aquin et al. 2015, Francesconi 2018, Rehm et al. 2020). The present Semantic Web based on schema.org is used by more than 1.2 billion web pages hosting more than 38 billion semantic statements (Fensel et al. 2020). Surveys on the web of data literature based on a mixed methods approach—both qualitative (top-down) and data-driven (bottom-up (using PoolParty, Rexplore and Saffron)[310]— have already provided evidence that topics such as linked data, open data and data sources have an upward trend, while topics such as semantic web, web service, service description and ontology matching appear to be on a downward trend (Kirrane et al. 2019). IoT, sensor, and streaming data are identified as future topics. The way how legal provisions will be executed in real time, and the way how knowledge graphs, MRL, and NLP techniques will be developed and used for the governance of the layered information flows occurring in Industry 4.0, are still being researched. As I will argue in the remaining Sections below, the implementation of law as data, semantic reusability and scalability, legal knowledge graphs for compliance, and blockchain applications, are challenges that need the coordination and cooperation of all agents involved, artificial, and human. Again, the process of making sense of the law—i.e. of creating the conditions for the emergence of legal ecosystems—is complex not just from the technical but from the social side.

[309] Cf. I mean legalXML, legalRuleML, legal ontologies… as deployed in Chapter 2. See Breuker et al. 2009, Athan et al. 2013, Casanovas et al 2016, Rodriguez-Doncel et al. 2021, among many others. See the results of the 3rd COHUBICOL Philosophers' Seminar organised by Mireille Hildebrandt and Laurence Diver on 'The Legal Effect of Code-driven Law' in November 2021, especially Palmirani (2021) on this subject https://www.cohubicol.com/about/philosophers-seminar-2021/

[310] Cf. Kirrane et al. (2019). *PoolParty* is a semantic technology suite that supports the creation and maintenance of thesauri by domain experts. *Rexplore* is an interactive environment for exploring scholarly data that leverages data mining, semantic technologies and visual analytics techniques. *Saffron* is a topic and taxonomy extraction tool whose main applications include expert finding, document classification and search.

5.2.3 The Emergence of LawTech Services

In this regard, the emergence of LawTech web services aims to bring technological solutions and law to business, industry, and people, enabling them to better organise and automate both the management of their legal data and legal operations. Let's resume here the thread I have described in Chapter 1.

As already said, *LawTech* is a comprehensive notion that embraces the activities and solutions of a range of companies developing products to support the application of law and the functioning of legal professionals and the legal system, including the so-called *FinTech*, *RegTech*, *Insuretech* and *SupTech* companies.

Over the past five years, an expanding legal market has formed around LawTech where LawTech companies offer a variety of legal services mainly based on AI and machine learning solutions—not just the more traditional e-discovery but supervision, monitoring and automatic compliance of regulatory systems, including smart contracts, cryptocurrencies and online dispute resolution (The Law Society 2019; Rakshit, Koh, and Xiaohan 2019).

Mills and Uebergang's (2017) includes a non-complete list of companies already operating in the market, along with the fields of automation. I have reported it in Chapter 1 (see 1.3.1 and 1.3.2, Figure 1), focusing on the functions performed and the services offered. I situated and described the general framework in which LawTech companies operate.

However, it still is a volatile market. According to Blijd (2019) LawTech venture capital investments increased dramatically until January 2019. From 2015 to October 2019, 992 LawTech portals disappeared, but many others were created at the rate of 2.4 new start-ups per day. Blijd (2019) reckoned 4,298, with a support of $ 22.7 billion of venture capital. He calculated a 532% decline in February 2020 in LawTech venture capital funding. Losses have been confirmed at the end of the year because of the pandemic (Blijd 2020a, 2020b).

Recent ILTA surveys corroborate that law firms' interest in this market based on AI techniques is higher than ever (ILTA 2019, 2020, 2021). Especially in the Asia-Pacific market, the offer of LawTech Web Services and legal analytics increases in part because the

number of law firms is also growing (Soh 2019). In May 2020, without recovering yet, (Blijdt 2020a, 2020b) has seen greater activity and a greater capital flow in ten areas that he as grouped by pairs: (i) divorces and real estate; (ii) lawsuits and litigation; (iii) fraud and identity; (iv) supplier chains and risk; (v) accounting and spending. He also points to a greater organization in CivicTech, the collective non-institutional organization to solve social problems (such as the protection of victims of gender violence during the crisis). The numbers have skyrocketed with the pandemic. Blijdt (2021), based especially on S1 of INTAPP[311], estimate the combined market value of Lawtech and GRC (Governance, Risk and Compliance) to be as high as US $3 trillion ($3x10^{12}$).[312]

For purposes of this Chapter several aspects of the impact of the IoT technologies on legal practice highlighted by the recent literature are relevant to note: (i) legal entities on the web[313]—i.e., legal concepts—can be used not just for information retrieval but also enhanced for legal activities and operations (contracting, drafting, sentencing) combined with factual data flows; (ii) Machine Learning prediction power can lead to better and more nuanced decisions, increasing the need for structuring data, exercising judgments to triage options (Tung 2019); (iii) thus, as assessed by Tung (2019, quoting Schrage 2017), AI can supercharge management tools such as the Pareto principle beyond the 80/20 threshold to target 10%, 5% or even less than 1%;[314] (iv) robust predictions can generate more valuable and reliable insights (ibid.) and are stimulating the demand, as the examples of legal analytics companies show in the last five years—Judicata, Neota Logic,

[311] Blijd's estimation is based on Docusign, Legalzoll, Disco S-1, Intapp S-1, Docusign S-1, NUIX Prospectus, Law Society in relation to their registers *SEC filing* (*U.S. Securities and Exchange Commision*).
[312] Cf. Intapp S-1 (2021, 8) "We believe private capital, investment banking, legal, accounting, and consulting collectively represent a massive industry with $3 trillion in total global revenues, based on research we have conducted. We believe this industry has a significant need to utilize software to help drive business success, with total addressable market for business software at approximately $23.9 billion. We calculate our total addressable market by multiplying the number of firms in the professional and financial services industry by the potential annual contract value of the software solutions used in the business management of such firms, based upon our historical data and experience. We estimate the total number of firms across the private capital, investment banking, legal, accounting, and consulting sectors on a global basis to be approximately 60,000 firms. This figure excludes firms in the professional services industry with fewer than 50 employees, as they are outside of our current target market focus."
[313] The expression 'legal entities' refer to digital entities in relation to the representation languages of the web; this expression is not used here in the usual legal meaning (referred to persons).
[314] Pareto's principle claims that 80% of effects (sales, revenue, etc.) come from 20% of causes (products, employees, etc) (Schrage 2017). These correlations do not hold for the IoT: "Extreme distributions transcend and dominate industry. Fewer than 10% of drinkers, for example, account for over half the hard liquor sold. Even more extreme, less than 0.25% of mobile gamers are responsible for half of all in-game revenue." (Schrage 2017).

Ross, among many others (Mills and Uebergang, 2017, Ashley 2017, McCarty 2019); (v) the available technology is changing the relation between the legal profession and its clients (as users, consumers, citizens) because it is transforming their expectations—as Rule (2020) has recently contended, technology is empowering people and changing their idea of justice; (vi) accordingly, faster and wider Online Dispute Resolution can be carried out by platforms that are not just offering mediation in all its variants but algorithm-related advice and decision-making, but "the introduction of algorithms and Big Data into the dispute resolution arena is hardly a one- way, positive- only development" (Katsh and Rabinovich-Einy 2017, 45). We will return to this point in the last section. Pros and cons of legal technology applications should be carefully balanced.

The IoT impact is also reaching what is known as 'legal knowledge' so far, both in legal doctrine and in legal theory, based on prescriptive, enforceable provisions. In Industry 4.0, the convergence between the IoT, WoD (LOD) and Industry 4.0 changes the way in which regulatory and normative systems are implemented. The emergence of Open Rights systems, agreement technologies and blockchain secured transactions is fuelling the development of a digitally based society and culture. This means that the enforcement of norms through the central authority of the nation states is balanced by the emergence of *sociolegal ecosystems,* acting in the inter-space created by and within this convergence. Let's describe the state of the art, first, to highlight some trends that give support to the contributions of the Dissertation.

5.2.4 Social, Data, Open Data, and Legal Ecosystems

Within the contexts of Web 2.0 and 3.0, ecosystems were identified as relevant to data governance:

> The Social Web is an ecosystem of participation, where value is created by the aggregation of many individual user contributions. The Semantic Web is an ecosystem of data, where value is created by the integration of structured data from many sources. (Gruber 2008, 5).

People are producers and costumers, machines are enablers (ibid.). On Web 4.0, value is created through the layers of the IoT—i.e., it is a *hybrid* system, an ecosystem of things, entities or twins that may have replicas in the physical world, plus agents (human and artificial). In the same vein, a (socio)-legal ecosystem of artificial/human agents,

information processing, robots and data is created and stabilised when the social behaviour of autonomous and semi-autonomous agents can be embedded, implemented, monitored, and controlled within the computer design. Intelligent web services, socio-technical systems and especially artificial normative socio-cognitive systems share this ability to set social ecosystems, and eventually a community of users.

Ten years ago, Mazhelis et al (2011) defined an IoT business ecosystem "as a special type of business ecosystem which is comprised of the community of interacting companies and individuals along with their socio-economic environment, where the companies are competing and cooperating by utilizing a common set of core assets related to the interconnection of the physical world of things with the virtual world of Internet." Three key technical domains were typically targeted: (i) *device* (sensing/actuating technologies), (ii) *connectivity* (providing the access and core network connectivity), (iii) and *application* services. The authors also identified some of the IoT regulatory roles: (i) Intellectual property rights (IPR) holder, (ii*) standard development organisation* (SDO) (official organizations, industrial alliances, special interest groups focusing on standard development), (iii) *regulatory bodies* (controlling processes, as mandated by a legislative body), (iv) and *legislative bodies*.

From a legal viewpoint, fundamental questions and principles related to obligations / responsibilities, and liability / rights / accountability remain valid (Millard 2017). IoT ecosystems on the web of data involve different types of contracts, licenses, insurances, patents, privacy, and consumer and data protection.[315] However, it is my contention that the traditional legal approach will not be enough as the complexity of the systems develop.

In the case of extended vehicles and autonomous cars (CAV), competition law, for example, can be only partially applied to solve some of the issues that arise on data portability and access rights (Kerber 2019). The civilian use of drones, unmanned aerial systems, and autonomous vehicles require enriched regulatory systems to implement security and privacy principles (Pagallo 2013, Bassi 2019, Bassi et al 2019). Smart cities are natural environments for linked open data (D'Aquin et al. 2015, Neves et al. 2020) and this

[315] Cf. for the European framework, see Rodríguez-Doncel et al. (2016), on NLP for legal services, Moreno-Schneider et al. (2020).

will give rise to legal questions at frequency and volume that the traditional legal approach cannot process and adjudicate.

A governance response to the evolution of the IoT requires a more granular regulatory approach (Casanovas et al. 2017a, 2017b). A few years ago, big data ecosystems (BDEs) were deemed lacking the kind of metadata management support that were essential in traditional enterprise systems (Smith et al. 2014). The challenges included: (i) frequent evolution of both data sources and processing algorithms; (ii) need to share both data and algorithms; (iii) analysis over long time periods (ibid.). Drafters and regulators have been focusing on these challenges to develop the digital EU market strategy (Casanovas et al. 2016b). The notion of IoT *legal governance* related to linked open data and forms of sustainable ecosystems has drawn much attention.[316]

Zuiderwijk et al. (2014, 29-30) suggested a number of actions to build Open Data (OD) ecosystems. An OD ecosystem consists of a multilayered and plural framework "characterized by multiple interdependent socio-technical levels, dimensions, actors (including data providers, infomediaries and users), elements and components", and a "need to address challenges related to policy, licenses, technology, financing, organization, culture, and legal frameworks and are influenced by ICT infrastructures". They systematically describe the activities that can be performed in the open data process, and elements of open data ecosystems that can be used to enable and support these activities. A lifecycle of data includes actions such as data creation, publication, exportation, importation, use, transformation and reuse. They offer a useful summary:

> To create an open data ecosystem at least four key elements should be captured, namely, 1) releasing and publishing open data on the internet, 2) searching, finding, evaluating and viewing data and their related licenses, 3) cleansing, analyzing, enriching, combining, linking and visualizing data and 4) interpreting and discussing data and providing feedback to the data provider and other stakeholders. Furthermore, to integrate the ecosystem elements and to let them act as an integrated whole, there should be three additional elements 5) user pathways showing directions for how open data can be used, 6) a quality management system and 7) different types of metadata to be able to connect the elements. (Zuiderwijk et al. 2014, 17)

[316] Some authors in the literature use the expressions *Data Ecosystems* (DE) and *Open Government Data Ecosystems* (OGDE). According to Curry et al. (2019), DE shape the next-generation smart environments (OGDE. See also Davies (2011), Reggi et al. (2016), Styrin et al, (2017), Njabaldi and Luna-Reyes (2017).

Linked data should be understood as integrating the Internet of Things ecosystems as well, as "connectivity and smart components become more important than the physical element of the 'thing'".

A survey carried out by Leminen et al. (2018) on IoT and business models has shown that value drivers are related to the reduction of the real world-virtual world transaction costs, the reduction of operating costs, and the streamline of companies through heterarchical strategies. They differentiate two kinds of ecosystems. In a *hierarchy*, each node is connected to one parent node, whereas in a *heterarchy*, a node can be connected to any of its surrounding nodes without the need to go through or get permission from another node. Thus, "a heterarchy implies a relationship of interdependence and trust, and it is a complex and effective adaptive system, self-organized by a variety of non-hierarchical principles." (Leminen et al. 2018, 755)

As we will contend later, *trust* is very relevant, not only for business models to thrive but to regulate the entire ecosystem and to relate it with broader regulatory environments. The idea of *heterarchy* is an important one, because it may help to better understand why the concept of legal governance can be useful to take IoT decentralised architectures into account.

Several proposals have been made in relation to decentralised architectures. Dasgupta et al. (2019), for example, consider that decentralised IoT architectures like fog, cloudlets and edge have shown that centralized approaches to governance are not viable.[317] They consider IoT governance as an extension of IT governance through a 4I model framework—*Identify*, *Insulate*, *Inspect*, and *Improve*. Zdravković et al. (2017) state that IoT ecosystems demands appropriate policy principles addressing M2M connectivity leaning on five categories: (i) *connectivity*; (ii) *privacy*; (iii) *security*; (iv) *standardisation* and (v) *data ownership*.

Sign et al. (2018) have convincingly argued that it is the exchange of information—the flow of data—that determines what happens in the IoT, and that a legal focus on transparency should be on communicating known risks and incentivizing effective processes

[317] See Chapter 3, Subsection 3.5.1 in which I introduced and defined cloud and fog computing. For an architecture, see Fig. 29.

for identifying unknown risks. Thus, data-flow management and emerging data provenance methods that track the flow of data end to end should be developed to ensure compliance and transparent and accountable processes. They have also developed a perspective in which a middleware-enforced, unified policy model applies end-to-end, throughout the IoT chains of data flows (Sing et al. 2016). Again, the idea of a middleware model is an important one, compatible with the middle-out perspective that I will posit later.

Compliance with policy and regulatory models has been the subject of legal compliance developments, which for more than a decade now have extended business compliance models to social and legal environments using many different business languages and methodologies[318]. However, validation processes in this kind of layered architecture in the new IoT environments must still be developed. Legal compliance will be a key topic, as the whole information lifecycle should be designed and monitored to foster trust, transparency and accountability in a sequential, controlled process outcomes deemed as 'valid' or 'legal' *by* or *through* design. Trust is not necessarily a direct product of compliance, but it is a by-product of the conditions created by a sustainable legal ecosystem. In the IoT, we define trust as knowledge-based reliance on received information, that is, "an agent (i.e., a person or a software program) decides to trust (or not) based solely on her/his knowledge, and the decision to trust implies the decision to rely on the truth of received or on already known information to perform some action" (Schwabe et al. 2020, 8). Thus, trust it is an essential component of the sustainability of legal ecosystems as will be shown later, but unlike reliability and legal compliance it is not a *continuum*, but a discrete category.

Blockchain technologies have been already incorporated into the compliance process (Weber et al. 2016, Mendling et al. 2018). Regarding legal compliance, *Compliance through Design* (CtD) will be decomposed from different approaches to select several implementation types according to the normative environment, selected formal languages, stakeholders, and the kind of processes to be regulated (regulatory compliance, legal compliance, partial compliance, full compliance, distributed compliance etc.).[319]

[318] Cf. Sadiq et al. (2007), Governatori (2015), Hashmi et al. (2016), Hashmi et al. (2018b, 2018c).
[319] Singh et al. (2016), Singh et al. (2018), Casanovas et al. (2017a,2017b, 2017c), Hashmi et al. (2018a, 2018b), Lam et al. (2020).

Embedding compliance modelling into sociolegal ecosystems—with human and artificial agents— is the next step. In Chapter 6, the OPTIMAI project will provide specific examples of such a modelling in Industry 4.0.

5.3 Sociolegal Governance

5.3.1 Legal Governance, Blockchain, and the Limits of Legal Instruments

The concept of *legal governance*, as such, is not new. It has been employed in several fields of social science with different meanings. To begin with, some usages of the term lean on the notion of governance, separating corporate governance from legal governance based primarily on statutory and case-based law. This is a common practice, meaning simply that legal implementation has different features. Other usages of the term highlight its practical side, referring to regulatory practices or models driven by Civil or Common Law-based policies. For example, the Law and Development Movement first pointed to the transplants of the rule of law to foster economic development in Latin America, Africa, and Asia. This movement has received critical attention from Law and Society authors since its inception in the late sixties of the past century (Trubek and Santos 2006; Trubek 2016). Their work focused on the World Bank's concept of 'legal governance' meaning governance through the rule of law and procedural justice mechanisms to offer legal defences and guarantees to small companies and entrepreneurs. Likewise, the term has been used in a similar way—"reactive law enforcement by courts and proactive law enforcement by regulators"—by financial scholars targeting suitable means to develop stock markets in transition economies (Pistor and Xu 2005). Despite the socio-political differences of these authors, a common argument that they advance is the insufficiency of legal instruments to produce the intended economic and social effects. The same reasoning is evident in the work of the proponents of the legal origins thesis—discussing the economic value of the Continental rule of law vs. its Common Law counterpart (La Porta et al. (2008) and the reply by Michels (2009))—and in some of the discussions around blockchain regulation through decentralized ledgers.

Hildebrandt's research[320] distinguishes between artificial legal intelligence or *data-driven law*, based on machine learning; and cryptographic or *code-driven law*, based on blockchain technologies. Or, broadly, between two types of algorithmic regulation, data-driven and code-driven (Hildebrandt 2018). We should also distinguish between smart contracts and blockchain technologies. The first were developed before, self-executing contracts directly written into lines of code (Szabo 1997), and supported by Ethereum much later, in 2014. As it is well-known by now, blockchain is a distributed database that is shared among the nodes of a computer network, mainly used in cryptocurrencies systems to secure a decentralized record of transactions. It is designed to foster trust in a 'trustless' environment.

De Filippi et al. (2020) and De Filippi (2021) have argued that blockchain technology was created as a response to the 2008 financial crisis. Bitcoin and other blockchain-based systems were presented as an alternative to centres of traditional power such as financial institutions, banks, and even governments. It is contended that (i) blockchain relies on cryptographic rules to increase confidence in the operations of a computational system, (ii) this ultimately relies on the proper operation and governance of the underlying blockchain-based network, (iii) which require trusting a variety of actors to ensure the proper operation and governance of that underlying blockchain-based network.

However, an important point is that it facilitates the creation of autonomous systems that can challenge the authority of governments and "what makes the technology particularly potent is its ability to facilitate the creation of resilient, tamper-resistant, and automated code-based systems that operate globally, providing people with new financial contractual tools that could replace key societal functions" (de Filippi 2018). This is the *lex cryptographia* without intermediaries with which people can construct an "order without law and implement what can be thought as private regulatory frameworks" (ibid.).

Permissionless blockchains are distributed, decentralized peer-to-peer networks in which everyone can participate interacting with unknown counterparties, trusted or not. Citizens' rights constitute a challenge for blockchain technologies under the European law

[320] COHUBICOL: Counting as a Human Being in the era of Computational Law https://www.cohubicol.com/about/philosophers-seminar-2021/

(e.g., subject's right to erasure and right to restriction of processing). This has been raising many concerns, as the clear allocation of responsibilities that is required by GDPR is not present in this situation (de Filippi 2021). Many solutions have been proposed, for instance, polycentric governance (*ex-ante* execution and *ex-post* verifiability) (Finch 2019), aligning contracts with doctrinal and judicial interpretation (through declarative rather than imperative languages) (Governatori et al. 2018), *hashing* (the insertion of data in the blockchain) to offer public services (Konashevych and Poblet 2018, 2019), closing agreements between regulators and the private sector, and the elaboration of codes of conduct and certification mechanisms for blockchain technologies that should be "compliant by design" (Finch 2019). To the best of our knowledge, this has not been yet solved, but it shows that solutions are not based on legal instruments (national or international) *only* but mainly on the building of legal governance frameworks. We addressed this problem in the EU project OntoRopa (2021), adapting the provisory solutions provided by the French *Commission Nationale de l'Informatique et des Libertés* (CNIL) in 2018.

According to the CNIL participants in blockchain technologies can be considered also as data controllers, because (i) they define the purposes (objectives pursued by the processing) and the means of the processing (data format, use of blockchain technology, etc.), (ii) and hey have the right to write on the chain to decide to send data for validation by the miners. More specifically, the CNIL considers that the participant is a data controller: (i) when the participant is a natural person, and the personal data processing operation is related to a professional or commercial activity (i.e. when the activity is not strictly personal); (ii) when the participant is a legal person (a company, bank, store, corporation, administration….) that registers personal data in a blockchain. (CNIL, 2018)

Table11 reproduces the comparison of legal risks (blockchain legal issues) and CNIL recommendations. I elaborated it for the OntoRopa project (Martínez González et al. D1, 2021a, CNIL 2018)

***Table 11**. Blockchain Legal Risks and CNIL Recommendations. Source: elaboration on CNIL Document (2018)*

Privacy problems in Blockchain	Legal Risk	CNIL Recommendation

Identification of Data Controller	All participants may be qualified as data controllers when the processing is related to a professional or commercial activity (i) as natural persons, (ii) as legal persons, (iii) as "joint controllers".	To identify the data controller in advance (a representative or a legal person).
Identification of Data Processors	In blockchain, smart contract developers and miners are deemed to be processors under GDPR	Processors and miners should establish a contract with the participant acting as data controller which specifies each party's obligations
Identify the reasons to use blockchain solutions over other possible instruments	Not to comply with all requirements and safeguards set by GDPR	Favouring other solutions that allow for full compliance with the GDPR.
Consider the requirements that affect data transfers outside the EU	The requirement for appropriate safeguards for transfers outside the EU, such as binding corporate rules or standard contractual clauses, are entirely applicable to permissioned blockchains.	Permissioned blockchains should be favoured as they allow a better control over personal data governance.
Carefully choose the format under which the data will be registered	In blockchain, the data registered on a blockchain cannot be technically altered or deleted once a block in which a transaction is recorded has been accepted by the majority of participants.	Some technical solutions should be examined by stakeholders in order to solve this issue.
Identifiers of participants and miners	The architecture of blockchains means that these identifiers —alphanumeric characters which constitute the public key linked to a private key, known only by the participant— are always visible.	This data cannot be further minimised and that their retention periods are, by essence, in line with the blockchain's duration of existence.
Additional data (or payload) stored on the blockchain containing personal data related to other individuals	The GDPR principle of data protection by design requires the data controller to choose the format with the least impact on individuals' rights and freedoms.	The CNIL considers that personal data should be registered on the blockchain preferably in the form of a *commitment*[321], or alternatively in the form of a hash generated using a hash function with a key, or, at least, in the form of an encryption ensuring a high level of confidentiality.
To ensure the effective exercise of rights	The GDPR was designed to give individuals back their control over personal information. The right to erasure, the right to rectification and the right to object to a blockchain are difficult to apply in blockchain.	The format chosen to register the data on a blockchain can also facilitate the exercise of individual rights.

[321] A "commitment" is a cryptographic mechanism that allows one to "freeze" data in such a way that it is both possible - with additional information - to prove what has been frozen and impossible to find or recognise such data by using this sole "commit".

Compatibility of rights	The GDPR rights of information, of access and of portability are not problematic.	The data controller must provide concise information that is easily accessible and formulated in clear terms to the data subject before submitting personal data to miners for validation.
Incompatible rights	It is technically impossible to grant the request for erasure made by a data subject when data is registered on a blockchain	However, when the data recorded on the blockchain is a commitment, a hash generated by a keyed- hash function or a ciphertext obtained through "state of the art" algorithms and keys, the data controller can move closer to the effects of data erasure using *commitment schemes*[322] and *deletion of the keyed hash function's secret key.*
Security requirements	The different properties of a blockchain (transparency, decentralisation, tamper-proof and disintermediation) mainly rely on two factors: the number of participants and miners, and on a set of cryptological mechanisms.	For permissioned blockchains, the CNIL recommends: (i) Carrying out an evaluation of the minimal number of miners which would ensure the absence of a coalition that could control over 50% of powers over the chain; (ii) setting out technical and organisational procedures to limit the impact of a potential algorithm failure (including an emergency plan); (iii) the governance of changes to the software used to create transactions and to mine should be documented (ensuring an alignment between planned permissions and practical application).

This kind of solutions are most needed, as the validity of the content must be ensured. This has been specially addressed by the Semantic Web community.

> Blockchain-based authentication systems provide a more secure mechanism than conventional identity tools since they remove the intermediaries and as they are decentralized, the records are retrievable, even after cases of disaster. In order to achieve a successful transition between a centralized government to a decentralized one, the data in all the

[322] "When a commitment scheme is perfectly hiding, deleting the witness (i.e. the element that allows to verify that a given value is committed in a given commit) and the value committed is sufficient to render the commitment anonymous in such a way that it can no longer be considered personal data". (CNIL 2018)

> official databases needs to be transferred on the blockchain. Whenever new data is to be added in the blockchain, the smart contract regulates the process of validation as a governmental official will confirm or not the truthness of the data. In the case of e-Estonia, the citizens can identify themselves in a secure way and every transaction can be approved and stored on the blockchain. The communication between different departments of the government is shortened in time, which makes the institutions more efficient. In the case that a citizen needs a certificate from the government, they identify themselves in the system and send the request to an institution. The employees of the institution (miners) are competing for the task and the first that completes the task is rewarded inside the blockchain. As soon as the task is done, it is stored in the system and can be accessed by the citizens. (Bucur et al. 2018, 96).

As we will see in Chapter 8 (8.3.7) *legal validity is not LOD validity*. The quality of data and smart contract validation are necessary but not sufficient conditions.

5.3.2 Phenomenology, Hermeneutics, and Political History

Besides legal anthropology, another legal governance example of interest is found in political history. The concept has been used in this context to point out the transformation of law and the state at the end of the 20th century in relation to the change in mindset fostered by economic globalization and privatization.

> In contrast to conventional forms of institutional government, governance is a series of informal, flexible and expedient strategies of problem-solving and crisis management based on bargaining and negotiation. (Heidebrand 2003, 325)

Legal governance in this context is the concept used to describe (i) the restructuring and replacement of the classic Weberian substantive and formal notion of law with a set of business, management driven techniques of government, and (ii) the emergence of informal networks as sites of governance that "by definition, cannot be held accountable to elected, appointed or otherwise legitimate structures of authority" (Heidebrand 2003, 326).

This type of analysis assumes a historical perspective in which organizational and rational forms of government are intimately related. According to it, the liberal 'legal formalism' of the rule of law, understood as a set of legal norms conceived as general, clear, public, prospective, and stable, was superseded at the beginning of the 20th century by alternative state-centred conceptions, according to which a substantive legal rationality was designed

to concretize the application of law to the solution of specific social and economic problems.

Then, in turn, the economic, cultural, and political globalisation that took place in the last twenty years of the past century changed the general framework again. In short:

> While 19th century formal legal rationality was largely bracketed and superseded by the substantive rationality of the 20th-century regulatory state, both are now being challenged by the rise of a new legal rationality, namely negotiated process rationality and the attraction it holds for the interests of corporate and transnational governance. (Heidebrand ibid., 327)

This framework, sketched with broad strokes, is representative of political philosophy views rooted in the Hegelian, Marxist, or Frankfurt School analysis. It is not very granular, and its interpretation of what regulatory systems entail can be challenged. For example, the definition of substantive rule of law linked to rationality does not correspond to the regular legal one, in which the protection of civil or fundamental rights is deemed to play an essential role (Tamanaha 2004). However, such a general framework holds some analytical benefits, and ignoring the warnings against equating corporate and government regulatory practices shared by many political scientists from (very) different backgrounds would not be a good strategy. We refer to Arendt (on automation, from 1951-56, Simbirski 2016), Pitkin (on political representation, 1967), Habermas (on regulatory structures, 1996), Sassen (on nationalism and territoriality, 2008) and Scheuerman (criticizing the 'affinity' between global economics and the rule of law, 2017).

Heidebrand's criticism is addressed both to the *instrumental* and the *idealistic* sides of the rule of law (Tamanaha 2005). For a socio-legal governance formula, it is our contention that we can benefit from the historical-phenomenological perspective, retaining the formal scaffolding of the substantive rule of law without the need to reproduce its heavily overloaded historical interpretation.

Finally, legal anthropology has used this expression 'legal governance', with two quite different purposes. The first one is close to hermeneutics and the Foucauldian notions of *bio-pouvoir, plebs,* and *gouvernementalité.* This latter concept has been translated into English as 'governmentality', "a concept whose whole rationale was to grasp the birth and characteristics of a whole variety of ways of problematizing and acting on individual

and collective conduct in the name of certain objectives which do not have the State as their origin or point of reference" (Rabinow and Rose 2006, 200).

Michel Foucault (along with the Italian philosopher Antonio Negri) has had a non-negligible influence on legal and political anthropology via the transcultural research, translations and readings carried out mainly by Paul Rabinow, a former student of Geertz and perhaps the most interested American anthropologist in French culture. This impact is quite evident in John and Jane Comaroff's work, and in political and legal anthropologists focusing on discourse, institutions (prisons, jails, hospitals, schools, etc.), and knowledge as a source of control and power.[323] Foucault's perspective has been paramount in the so-called postmodernist (or critical) ethnographies and analyses, mostly in USA rather than in France (Abélès 2009).

The term 'legal governance' has been also used for a second purpose, critical as well, but this time as a subject of study. I'm referring to S.E. Merry's late project on the making of legal indicators:

> The production of indicators is itself a political process, shaped by the power to categorize, count, analyze, and promote a system of knowledge that has effects beyond the producers. In these respect indicators are comparable to law. Law as a Technology of governance can have very substantial effects on knowledge—the legal processes and legal forms of trials, investigations, inquests, legislative hearings, statutes, and treaties, for instance, can all be important sources of information that shape wider understandings of the world. Like law, indicators order the buzzing array of actual behavior into categories that can be understood in more universalistic terms. Like law, indicators not only make sense of the messy social world but also help to manage and govern it. (Davis et al. 2015, 2)

"Technology of governance" here means "legal governance", *governance through law*, according to the authors, "indicators purporting to measure practices or perceptions of good governance, rule of law, corruption, regulatory quality, and related matters" (ibid., 1). This is close to the political science meaning of 'governance' in its classical use, as 'techniques of government' or the set of actions, processes, and devices used to rule, control and monitor social and/or political bodies. But the overall project was inspired also

[323] In her survey of anthropology, law and transnational processes, Merry (1992, 362) wrote: "The concept of discourse, adopted from Foucault, has provided an important bridge between the sociolinguistic analysis of talk in legal settings and theories linking prevailing modes of talk with power, language and law".

by Foucault's idea of governmentality: "The underlying theoretical framework for this volume is the link between power and knowledge" (ibid., 1).

Both uses of legal governance in anthropology cannot be equated with the meaning of 'legal governance' as it will be proposed in this Dissertation, pointing at the multiple dimensions of the relationship between law and technology through natural and formal languages on the convergence of WoD, LOD, IoT, and Industry 4.0 in the digital society.

5.3.3 Corporate and Legal Governance

In addition to the blockchain, another relevant example of reactive behaviour to an external crisis or a tough environment can be found in the corporate legal and compliance risk management sphere. In response to a spate of US financial scandals (e.g. Enron Corporation, Tyco International Plc, and WorldCom), the US Congress enacted the Sarbanes-Oxley (SOX) Act in July 2002[324]. The main objective of the SOX Act was to protect investors from fraudulent reporting by corporations by increasing management responsibility for the accuracy and comprehensiveness of corporate financial statements of large companies. This Act fuelled business and corporate compliance developments to avoid fines and loss of reputation.

Regulatory and corporate responses informed increased regulatory requirements for enhanced corporate compliance risk management, especially in response to international standards such as the Basel III[325] international regulatory framework for banks and Financial Action Task Force's international anti-money laundering and combatting the financing of terrorism and proliferation standards.[326] These developments fuelled interest in *compliance by design* initiatives to improve corporate compliance levels. Well-known corporate risk management models—such as the COBIT framework for information and related technologies (COBIT 5, in 2012)[327] and the COSO frameworks on internal

[324] United States Public Company Accounting Reforms and Investor Protection Act (Sarbanes-Oxley Act) 2002, Public Law 107-204, 116 Stat. 745
[325] Basel Committee on Banking Supervision (BCBS). Basel III: The Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools, 2003. URL http://www.bis.org/publ/bcbs238.pdf
[326] Financial Action Task Force (FATF) URL: https://www.fatf-gafi.org/home/
[327] COBIT 5 identifies five basic principles, seven categories of enablers to govern and manage the information requirements, new process reference model, improved goals and metrics, and aligns with the ISO/IEC 15504 process capability assessment model and ISO/IEC 38500 Corporate governance of information technology (Omari 2012)

control, risk management, governance and fraud deterrence[328]—also incorporated legal (and ethical) requirements as essential elements for good corporate risk management (Omari 2012) Similarly, section 18 of ISO/IEC 2700215 on information security addresses compliance with legal requirements.[329]

In these frameworks and standards, however, 'legal governance' was not considered in its legal dimension, i.e., from a public space or civil rights approach, but rather from an internal corporate perspective, as components and necessary conditions of safe and successful business strategies that comply with complex regulatory requirements.

> Efficiency means doing something at the lowest possible cost and effectiveness means doing the right thing to create the greatest value for the company. In this context, IT operations must be carried out efficiently minimising security risks and in accordance with legal requirements (Gehrmann, 75).

This is known as 'IT Governance', developed in the first decade of the century as a set of responsibilities of corporate governance boards, and expanded in the second decade to audit, control and monitor agencies and administrations in the public sector (Hardy 2006, Shamei et al. 2011, Mangalaraj et al. 2014).

IT governance developments have fostered human rights activism and the reflection on ethics and the reconstruction of the public space. Even without a special political aim in mind, it seems reasonable that platform-driven economy, blockchain and the social and societal effects of the corporatisation of public administrations should be submitted to public scrutiny and accountability before taxpayers, i.e., consumers and citizens. As advanced by de Filippi et al. (2020)—see also Hildebrandt (2018)—there is a still unresolved tension between cryptocurrencies practices and investments and the way how they should become publicly accountable. Ethics might certainly play a role in the "uneasy coexistence" between "code as law and law as code" (Yeung et al. 2016).

Floridi and Cowls (2019) have suggested to simplify the ethical principles to be applied to AI building a framework with four classical core-principles—beneficence, non-

[328] https://www.coso.org/Pages/default.aspx (COSO)

[329] The ISO/IEC standard was revised in 2005, and renumbered ISO/IEC 27002 in 2007. It was revised again in 2013, and in 2015 the ISO/IEC 27017 was created to suggest additional security controls for the cloud which were not completely defined in ISO/IEC 27002.

maleficence, autonomy, and justice—and a new one that is relevant for our discussion: Explicability, "understood as incorporating both the epistemological sense of intelligibility (as an answer to the question 'how does it work?') and in the ethical sense of accountability (as an answer to the question: 'who is responsible for the way it works?" (ibid. 2019, 1). 'Explicability' is not a synonym of 'explainability' (a more common concept in the field). In our understanding, the normative effects (responsibility/liability) endorsed by the former notion are not necessarily entailed by the latter. The model of metarule of law that will be briefly described in the next Section could be understood from this point of view as well. The presentation that follows of the rule and metarule of law can be deemed the first touchdown with the subject. It will be fleshed out in the next Chapter in a more technical way.

5.4. Rule and Metarule of Law

5.4.1 Definitions

The rule of law refers to the principle that the law applies to everyone, in contrast to the idea that the ruler is above the law. In its classical formulation, it excludes tyranny (and its contemporary version, dictatorship), as it encompasses the creation of participatory political forms that put aside the passive role of the regulated, i.e., to some extent, rather than simply obeying, people subject to the regulations have to accept, acquiesce or even approve them formally through their cooperative behaviour. Thus, from a procedural point of view, the rule of law purports to restrict the arbitrary exercise of power, i.e., to avoid tyranny and dictatorship, as a political form. This poses the issue of legitimacy as a necessary (non-sufficient) condition for the existence of the rule of law.

In a more substantive definition, the rule of law refers to principles embracing fundamental rights. It broadly points to a regulatory framework protecting life, property, and—after the Enlightenment—the well-being of individuals, communities, and society as a whole. Negative rights, conceived as a shield to safeguard individuals from discretionary power, can be taken back to Medieval constitutionalism.[330]

[330] Cf. Art. 39 *Carta Magna* (1215). "No freemen shall be taken or imprisoned or disseized or exiled or in any way destroyed, nor will we go upon him nor send upon him, except by the lawful judgment of his peers or by the law of the land."

However, there is no single agreed definition of rule of law. Common law countries—including USA, Canada Australia, UK and most countries of the Commonwealth—understand the rule of law from a bottom-up approach, meaning the set of layered practices and behaviours that shape the production, management, and preservation of the legal order, centred on the case-based law carried out by Courts of Justice. Civil law countries—most European countries, France, Germany, Italy, Spain, etc.—understand it from a top-down approach, centred on the sovereignty of the nation-state, and setting a hierarchical rank for the generation of legal provisions and instruments of authorities of different kinds—Parliament, Government, Courts, and central, regional, and local administrations. This specific organization of power was known in the 20th century as *Rechtstaat, état de droit, stato di diritto, estado de derecho*, etc.

These nuances matter because modelling Human rights and the rule of law is based on functional requirements that lean on cultural and political assumptions that should be made explicit (according to the nature, objective, scope, and territory of regulations). Some law is also international and, especially as a result of economic and cultural globalization in the late 20th and early 21st centuries, *transnational*.

Thus, one of the main challenges is implementing and extending the protections and provisions of the rule of law not only within the jurisdictional space of the nation-state but beyond, within the intersectional space of global business, industries, emergent markets, and geopolitical stakeholders. This transnational scope is one of the first features of the metarule of law that we will define later, beyond the rule of law applied to national states. The Greek particle *meta,* μετά, 'beyond' and 'above'.

'Metarule' usually means a rule governing other rules. But as in 'physics' and 'metaphysics' or 'data' and 'metadata', our use of 'meta' does not match the computational sense of 'on' or 'above'. As noted by the Merriam-Webster Dictionary, 'meta' "means '*transcending*' and is often used to describe a new but related discipline designed to deal critically with the original one"[331]. These are the concepts we have in mind when we use the term *metarule of law*. The primary meaning of the 'metarule of law' entails *transcending*

[331] https://www.merriam-webster.com/ dictionary/metadata—a meaning apparently embraced by Facebook when it re-branded as Meta and launched its "metaverse" in 2021. I quoted it in Note 121.

the rule of law, extending its protections outside of the sovereignty of the nation-states avoiding its limitations. As we will see, this position is an opportunity to add this regulatory dimension to Linked Open Data (LOD). Thus, building it as a legal open public space as well.

It is worth noting that our aim is setting a suitable framework to validate the regulatory models to be applied in IoT, LOD, WoD and Industry 4.0 environments, platforms, and applications, from a legal point of view, i.e., embedding the protections of the substantive rule of law into the systems.

There are three dimensions that should be built to perform the suite of tasks that are needed to carry it out: *social, legal, and technical*. The technological side implies the elaboration of a conceptual toolkit, including the use of algorithms, semantic languages, logic, and metrics to test and validate the models. As we will explain later, this technical dimension has a mediating role between (i) social descriptions, explanations, and social data, and (ii) the legal normative provisions usually understood as sources of law (in the broad sense, including the four clusters we will describe in the next section, standards, protocols, values, etc.).

From this empirical approach, there are many problems to be solved at the methodological level (metrics, thresholds, triage of formal languages, modelling of causal chains, etc.). The elements of the theoretical discourse—'norm', rule', 'regulatory system', and the like—will be understood in context, i.e., *cognitively situated*, as our aim is setting the conditions to generate legal ecosystems. The ontological and epistemological levels will be set apart.

Stemming from the globalization process that occurred in the last decade of the past century, there is a rich tradition in legal philosophy and socio-legal scholarship focusing on regulations and the rule of law. Researchers stressed the difference between legal and regulatory systems as developed by business and corporative organizations, and how this would affect administrations and governments (Braithwhite and Drahos 2000, Black 2001). There is a continuous thread from "responsive law" (Nonet and Selznick 1978), "responsive regulations" (Braithwaite and Drahos 2000) to "really responsive regulations" (Black 2008), and "regulation theory" (Drahos 2017) that shapes the way how

sociolegal scholars are facing the emergence of Lawtech, RegTech and the increasing implementation of AI techniques to the legal fields.

There is a divide as well that should be bridged with the way how AI and Law, and semantic scholars build formal regulatory and normative systems (Rodriguez-Doncel et al. 2021). Sociolegal scholars have pointed internally at the social dimension of regulations and externally at the dimension of technology so far. The other way around, AI and Law scholars have been internally focusing on the technical construction of models and externally on their social impact. We will propose a *middle-out* and *inside-out* approach in the next sections, as it is not possible building reusable and scalable solutions without formalisation, just as it is not possible either to implement them without social theory.

Which legal governance models should apply to regulatory technologies in new sociotechnical ecosystems? How should these governance models be implemented, and how could these toolkits encompass the general principles and protections of the rule of law?

5.4.2 Scheme of the Metarule of Law

Figure 31 provides a general schematic representation of the rule of law, i.e., the principle that the ruler and the ruled are bound by the law. It highlights the difference between regulations that were conceived to rule human social behaviour, and the new digital dimension in which rules, principles, and instruments are embedded into formal languages and computational codes to be digitally generated, interpreted, and implemented. We should stress that, for me, this is a useful scaffolding to start building validation and causal models, but it is not yet a meta-model, as I presented it in Poblet et al. (2019). I will draw here a first sketch on the canvas, without a granular description of the details, i.e. going deeper into the concepts. This will be faced in the next Chapter.

Figure 31 contains two axes along the *vertical binding power*, i.e., the capacity of enforcing norms, and the *horizontal social dialogue*, i.e., the individual and collective behavioural expectations that bind members of society to each other. I will also put aside here the problem of sovereignty, i.e. the foundations of power and authority.[332]

[332] For a recent systematization, Pohle and Thiel (2021, 13). “The issue is no longer cyber sovereignty as a non-territorial challenge to sovereignty that is specific to the virtual realm of the internet. Today, digital

The scheme of Figure 31 is flexible enough to allow different degrees and types of authority and power, and different political forms under the rule of law, excluding dictatorship and authoritarian regimes. It embraces (vertically) different forms of legitimate power, legal monism, legal pluralism and nation state polyarchies, under the condition of the active cooperation of the regulated (social dialogue, social power).

Community and societal power are situated on this horizontal axis. This is not new: these two axes have been drawn in different ways by many classical scholars (from Max Weber to Jürgen Habermas[333], Elinor Ostrom[334], and many legal and socio-legal scholars, e.g., Kaarlo Tuori (2001), have been using them to situate rights and duties with regards to norms and the binding power of authorities (be they political, such as the state, or social, e.g., dominant social groups).

sovereignty has become a much more encompassing concept, addressing not only issues of internet communication and connection but also the much wider digital transformation of societies. Digital sovereignty is—especially in Europe—now often used as a shorthand for an ordered, value-driven, regulated and therefore reasonable and secure digital sphere." See also Floridi (2020) advocating for an European "differentiated integration".

[333] Habermas explicitly allocated rights in the horizontal axis as with "the conceptual move from the horizontal association of consociates who reciprocally accord rights to one another to the vertical organisation of citizens within the state" institutionalises the practice of self-determination" (Habermas [1992]1996,135) In the *Postscript* he wrote two years later, he insisted on the social powers of the law, "a 'transmission belt' that picks up familiar structures of mutual recognition from face-to-face interactions and transmits these, in an abstract but binding form, to the anonymous, systemically mediated interactions among strangers" (Habermas 1994).

[334] As it is well known by now, Ostrom (1996, 1074) prioritised the organisation of community relationships at scale, as "the living units exist on a horizontal plane, however, rather than in vertical relationships to one another". However, in our complex world, Ostrom (2007, 11) also asserted that interaction effects often occur among variables at one or more tiers. "Thus, one needs to examine both vertical and horizontal relationships of a partially decomposable conceptual map".

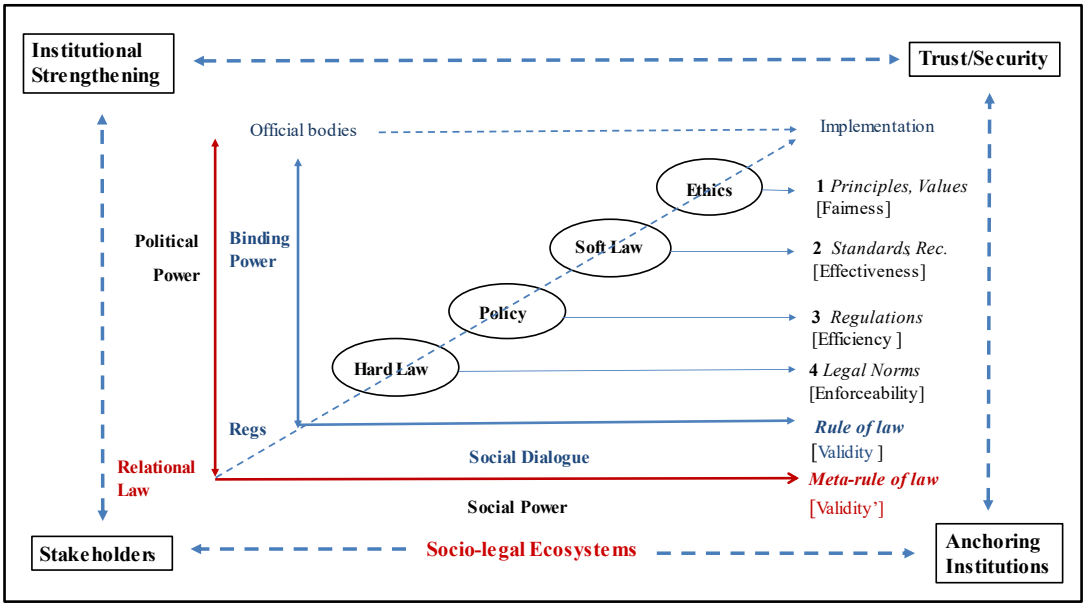

***Figure 31**. A General Scheme for the Rule and Metarule of Law. Source: Poblet et al. (2019)*

I will not full-fledge these concepts right now. In this first introduction, I prefer to underline that legitimation is deemed to be a component of legality, for 'what it counts as legal', emerges from the different degrees of adherence of the regulated, and the collective acceptance of the legal system. I.e. 'legality' can be considered a collective property that does not occur outside of the active social behaviour of all stakeholders in their different roles (consumers, citizens, tax-payers etc). This is perfectly compatible and can be aligned with some definitions and principles set by specialised international institutions. E.g. according to the World Justice Project "the rule of law is a durable system of laws, institutions, norms, and community commitment that delivers: Accountability, Just Law, Open Government, and Accessible and Accountable Justice."[335]

Note that axes are a simple lineal way to represent the contrast between coercive power and negotiated dialogue or *binding vs. reciprocal relationships*. However, in our version of the model there are three (not only two) dimensions that help interpreting this scheme and allow the emergence of regulatory ecosystems—the social, legal, and linguistic dimensions of the environment. Obligations and what is felt as being permitted or forbidden

[335] Cf. "What is the Rule of law?", https://worldjusticeproject.org/about-us/overview/what-rule-law

(i) occur in between these two axes and three dimensions, (ii) are formulated, expressed and communicated through natural and artificial languages.

In Figure 31,

> (i) *Hard law*, refers to legally binding obligations, either in the national or international fields, under regulations that can lead to adjudication court processes;
>
> (ii) *Soft law* consists of legally non-binding rules, best practices, protocols, standards and principles that facilitate the governance of networks, organizations, companies, and institutions;
>
> (iii) *Policy*, which usually defines a (binding) plan that has been officially agreed by a business organization, a corporation or a government agency; and finally
>
> (iv) *Ethics*, which primarily refer to morals, social mores, values and principles that can infuse ethical codes and professional practices, and can also be incorporated into laws, policies, standards, best practices, and governance structures.

These are regular components of the rule of law as they can be combined and embedded into formal languages and regulatory systems. *Principles* are applied to and by agents, who often have specific roles in the regulatory ecosystem. For example, supervisory agencies typically monitor and control the policies laid down by governments to implement Acts and Regulations. They typically have the option to enforce fines after a violation of policy rules has occurred. *Soft law* instruments, i.e., non-binding standards and principles, are an increasingly important regulatory mechanism. For instance, regarding the GDPR, the recent proposal for a European Digital Act[336] sets out risk analysis, intermediary services, and certification for AI products as a preferable regulatory strategy. Certifications of compliance can be obtained from an accredited certification body, but personal intermediaries are also considered in a low intensity non-compulsory strategy.[337]

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[336] Cf. Brussels, 25.11.2020 COM(2020) 767 final 2020/0340 (COD) Proposal for a REGULATION OF THE EUROPE-AN PARLIAMENT AND OF THE COUNCIL on European data governance (Data Governance Act)
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0767

[337] "For the certification or labelling of trusted data intermediaries, a lower intensity regulatory intervention was envisaged to consist in a softer, voluntary labelling mechanism, where a fitness check of the compliance with the requirements for acquiring the label as well as awarding the label would be carried out by competent authorities designated by Member States (which can also be the one-stop shop mechanisms also established for the enhanced re-use of public sector data)." (Ibid. p. 5)

The semi-automation of legal governance is the next step, i.e. the creation of a regulatory interspace, bringing together all relevant stakeholders (including rulers, industry, and citizens), and the AI and legal instruments at their disposal.

In this sense, the notion of metarule of law has been used both as a name and as a concept, much as the notion of rule of law, to design (i) the use of languages for legal and logical compliance expressing the concepts of rights, duties, obligations and prohibitions, (ii) AI instruments (such as machine and deep learning), (iii) semantic devices (NLP technologies, legal ontologies and ontology design patterns), (iv) IoT technologies (augmented reality and digital twins), that are put in place to embed the negative and positive rights of the classic rule of law into platforms, websites, mobiles, and multi-agent and socio-technical systems (Casanovas 2015a).

Substantial and formal (procedural) rights remain essentially the same, with some additions such as digital accessibility rights, but the fabric to enhance them—conceptualisations, contexts, environments, scenarios, etc.—has dramatically changed. [338]

Therefore, artificial languages and devices are regulatory components that mediate and bridge the content of norms, the legal institutions that are supporting them, and the subjects that must comply with them. Poblet et al. (2019) put forward some ideas in the pursuit of distributed, technology-supported collective decision-making processes from a *polycentric perspective*. Thus, embedding/implementing the principles of the substantive rule of law into automated regulatory systems can foster the emergence of sociolegal ecosystems that are sustained and developed both by humans and machines in an intertwined way. The *metarule of law* refers to principles governing humans and programs, rights, and languages, etc., to generate trust among officers and stakeholders of rights (in a multi-stakeholder digital governance process). The creation of sociolegal ecosystems refers to the social, formal, and legal conditions that are required to enhance these rights online in real time in WoD and IoT environments.

Rights, agency, and the coordination of artificial and human behaviour (M2M, M2H, H2M, M2H) lie at the core of the metarule of law. There are several ways to handle these

[338] *Directive (EU) 2019/882 of the European Parliament and of the Council* of 17 April 2019 on the accessibility requirements for products and services (Text with EEA relevance) PE/81/2018/REV/1.

issues and to offer a general governance framework. As I have already explained in Chapter 2 (Subsection 2.3.4) the notions of data and metadata, Digital Rights Management (DRM), Rights Expression Languages (REL), Open Digital Rights Language (ODRL), Licensed Linked Data Resources (LLDR) and Creative Commons Licenses have been worked out for twenty years now[339], The last developments are proposing ODRL for compliance checking against GDPR and business policies (modelling both in a policy pipeline) (De Vos et al. 2019), using refined vocabularies recently proposed by W3C's Data Privacy Vocabularies and Controls Community Group, (DPVCG) (Bonatti et al. 2020). Another example is furnished by eFLINT, a domain specific language developed for formalising norms based on transition systems and in Hohfeld's framework of legal fundamental conceptions (van Binsbergen et al. 2020).

5.4.3 Sociolegal Governance for Hybrid Intelligence

There have been many proposals to coordinate norms and rights in artificial environments using AI or algorithmic governance. Akata et al. (2020) recently launched a research agenda for hybrid intelligence, augmenting human intellect with collaborative, adaptive, responsible, and explainable AI. They define hybrid intelligence (HI) as "the combination of human and machine intelligence, augmenting human intellect and capabilities instead of replacing them and achieving goals that were unreachable by either humans or machines" (2020, 19) and formalise four challenges: (i) *Collaborative* HI: How do we develop AI systems that work in synergy with humans?, (ii) *Adaptive* HI: How can these systems learn from and adapt to humans and their environment?, (iii) *Responsible* HI: How do we ensure that they behave ethically and responsibly?, (iv) *Explainable* HI: How can AI systems and humans share and explain their awareness, goals, and strategies? The most interesting contributions, for purposes of this Chapter, are the research questions related to these challenges. Some of them, pointing at validation and ethics, are specially interesting for us. We will return into it at the evaluation process, focusing this discussion on the causal chain that can be built to assess legal validity:

> What are the appropriate models for negotiation, agreements, planning, and delegation in hybrid teams? What is the best way to verify the agent's architecture and behaviour to

[339] See the work by the Open Digital Rights Language Community Group led by Renato Iannella at W3C, https://www.w3.org/community/odrl/

> prove their ethical "scope" (ethics in design)? What is the best way to measure ethical, legal and societal (ELS) performance and compare designed versus learning systems (ethics in design)? Which methodology can ensure ELS alignment during the design, development, and use of ELS-aware HI systems (ethics by design)? How can explanations be personalized so that they align with the users' needs and capabilities? How can the quality and strength of the explanations be evaluated?

Autonomy and self-organisation are key concepts to understand the human/machine interface in socio-technical systems (intertwined systems consisting of human agents, technological artefacts, and institutional rules). Pitt et al. (2020) proposed the idea of algorithmic *reflexive governance* for socio-techno-ecological systems through algorithms for deliberation, introspection, and self-organisation. They focus on reflexivity as "the ability of a structure, process, or organization to reconfigure itself in response to reflection upon its own performance".

In a slightly different line of thought, stemming from Deming's idea of evolutive rational management and Alexander's ideas on habitability, Noriega et al. (2021) position the concept of *conscious design* (CD) for this new space in which platform-provided affordances (e.g., "buy", "like", "ban") and online participants' expectations are putting new constraints. Online Institutions (OI)—or 'electronic institutions' (EI)—play a significant role, as they are able to regulate the interaction of human and artificial agents online, or in multi-agent systems (MAS) within a Value Sensitive Design (VSD).

> OIs contain policies that facilitate the governance of participant activity, either through what a participant is allowed to do in certain circumstances or what a participant may choose (not) to do for the sake of any social consequences. Online institutions embody both affordances and norms. […] the sociotechnical systems complement of object-oriented programming's Model-View-Controller, where the world (W) is a collection of social spaces, that are sub-contexts of the real world, institutions (I) are the policy frameworks into which the values that characterise the system are imbued, and the technological space (T) where online interactions are processed according to software representations of the institutional conventions. (Noriega et al. 2021, 2-4)

This is the WIT (World + Institution + Technology) metamodel, i.e. a framework for the operationalization of the CD values in the construction of socio-technical systems. Resuming this metamodel Noriega and Casanovas (2022) recently defined five levels of autonomy in the governance of autonomous systems. At the first level there is an instrumental delegation in which, once a process has been defined, the AI system automatically

makes the decisions that are applied to a task –or a well-defined part of the process– within a predefined universe of situations. Some examples are Roomba, automatic text translators or automatic imaging assistants, in which their expertise is limited to a well-defined task. Increasing degrees of complexity follow. Teleological, competent-responsible agents combining reasoning capabilities and ontologies (e.g. crowdsourcing processing, CyC and DBpedia), and agents endowed with some moral competence in the social world (patient assistant robots, GMT-3, 4-5 level Coordinated Autonomous Vehicles) would integrate the next levels of autonomy. The fifth level is still to come, integrating general human intelligence into artificial systems. This will take time. But handling and controlling evolving hybrid intelligence is the next step in the so-called *Internet of Autonomous Things* (IoAT). Scalability is also a key issue in IoAT (Barbulescu, M. and Hagiu, A. 2020)

Likewise, Theodorou and Dignum (2020) call for an "actionable policy to assess, develop, incentivize and support the use and development of AI" that "should thus focus on social aspects of AI". They convincingly call for a more granular down-to-earth specification of *ethical and sociolegal governance*. Mechanisms of legal compliance should figure out concrete ways to implement, apply and enforce in a more specific way ethical general principles and policies. Ethics for AI development play a central role in this formulation, but research should be able to find some concrete paths to further develop general principles. We will follow this thread later, as our proposal to understand the four clusters of the metarule of law scheme according to a *driver* or *enabler* system approach is related to this claim for a better and more granular specification.

5.4.4 Legal Compliance: Compliance *through* Design (CtD)

From a practical perspective, legal compliance or *Compliance through Design* (CtD) holds several features that are related to the conditions fostering legal ecosystems. Among them: (i) it is *intermediate*, i.e., at the crossroads of LOD, IoT and Industry 4.0 (i.e., it should be carried out on real time scenarios, using linked, interoperable data); (ii) *semi-automated* (not full or hardcoded, as human intervention is always needed at several stages, i.e., first to interpret legal and ethical provisions, and then to control and monitor the results); (iii) *hybrid* (as semi-automation entails the activation of hybrid intelligence,

between humans and machines); (iv) *modular* (as it requires the construction of models using norms, principles and values stemming from different sources: hard and soft law, policies, and ethics); (v) *adaptive and scalable* (dynamic not static, to accommodate legal changes); (vi) *partial* (as full compliance is not always possible: This means the establishment of accepted thresholds) (Lam et al. 2021); (vii) *adjustable* to the different typologies of PaaS (*Platform as a Service*) economies (i.e., platform-driven solutions can be centralized or decentralized, private or shared, normal or cryptocurrency oriented, etc.) (Derave et al. 2021)]; and (viii) flexible to overcome the difference between 'internal' corporate/organizational policies and 'external' legally driven processes from a middle-out/inside out approach (i.e., encompassing regulatory systems considering properly the legal perspective as a third dimension, linked to the social scenarios and formal languages of Industry 4.0).

This raises, among others, the interesting question of the nature of legal requirements. In computer science and engineering, functional requirements specify what the software system must do, non-functional requirements specify, among others, how well the system shall perform its functions (Guizzardi et al. 2014). The definition and identification of legal requirements have drawn much attention, with different methodological trends regarding the specific systems and tools at stake but combining goal-oriented requirements engineering tools, defeasible logic, NLP, and ontology building (Ghanavati et al. 2014, Bartolini et al. 2015, Sartoli et al. 2020, Amantea et al. 2021).

In the EU Project LYNX[340], a Project to build a European legal graph, we differentiated between *functional requirements* (referring to what is expected from legal web services) and *systemic requirements* (referring to broader system expectations related to law firms) (González-Conejero et al. 2017).[341] But LYNX is a SMEs' legal compliance service. In

[340] https://lynx-project.eu/ (LYNX)

[341] We identified functional and systemic requirements. The first ones were users' requirements and led to building functionalities on the building functionalities on the LYNX platform. For instance, (i) monitoring law, jurisdictions, regulatory compliance and alert users in case of innovations and legal changes, and (ii) providing access to tax law, labour law, required permits or necessary authorizations and operating licenses (etc.). Systemic requirements were more generic, denoting the properties of the legal 'ecosystem' the users intended to deal with. Law firms' representatives used several narratives to refer to what they expected from the system: "The notion of "customization" of the service, i.e., adaptation to the needs of different end-users, and the metaphor of "radar", as used in the legal focus group, suggest an intended meaning which is implicit in this kind of narratives: (1). Legal advisors provide a 'summary': arguments about key issues to make it easier for the lawyer to choose one strategy or another, taking into account the client's needs.

other Industry 4.0-oriented platforms focused on smart and intelligent manufacturing such as OPTIMAI[342], an integration of both systemic and functional requirements would be better suited for legal governance validation purposes. Think of real time scenarios with augmented reality (context-aware environment using AR glasses to optimize production chains) and digital twins (digital technology allowing the virtualization of the production process) (Casanovas et al. 2021b).

5.5 Beyond the AI4People SMART Model for Legal Governance

5.5.1 The AI4People SMART Model for Legal Governance

From a legal point of view, much work has already been done on legal compliance and validation processes. Boella (Boella et al. 2013), Ghavanati (Boella et al. 2013), Palmirani (Palmirani et al. 2018), Governatori (Governatori 2015), Bartolini (Bartolini et al. 2016), Robaldo (Bartolini et al. 2016), among many other researchers of the AI and Law community, have richly seeded the regulatory field mainly from a computational stance, working on legal ontologies, semantic languages, rules, and defeasible logic modelling. Legal theory and legal reasoning have also been fleshed out from an AI and analytical philosophy approach for more than three decades now (Sartor and Prakken 2015). We are focused on a more detailed description of the sociolegal field, especially on the variety of behaviours, conceptual mindsets and tools that are transforming it in a complex processing information network at different levels.

Both for the private and public sectors, the SMART model of AI governance—scalable, modular, adaptable, reflexive, technologically-savvy—presented by AI4People to the EU Parliament in November 2019—recommended 14 Priority Actions that can be undertaken within three new groups of priority: (i) forms of engagement; [343] (ii) top-down no-regrets

(2). 'Our lawyers need to know that they know everything. We are like a radar system. In this regard, we should have a lead on the way the market is developing from a technical or legal perspective.'" (González Conejero et al. (2017, 32).

[342] https://optimai.eu/ OPTIMAI: *Optimazing Manufacturing Processes through Artificial Intelligence and Virtualization*

[343] I.e., as defined in the Report (Pagallo et al. 2019a): "cross-disciplinary and cross-sectorial cooperation - and debate - on the issues of AI, the creation of an European observatory for AI, and of legally deregulated special zones, or living labs, for AI empirical testing - and development for a better interaction between scientists and laymen. By taking into account today's limited understanding of the stakes of AI, the creation of new type of forums for collective consultation and discussion becomes a priority".

actions[344]; and (iii) middle-out coordination mechanisms for the governance of AI.[345] It is worth noticing that these three approaches portrait the law from the implementation point of view as 'legal regulation', thus, trying to describe how mechanisms of governance are contained and handled into legal practices and legal documents such as the GDPR. For instance, forms of co-regulation are defined by Recital 44 of the 2010 AVMS Directive and Article 5(2) of the GDPR. The 2019-2020 pandemic has fuelled the mechanisms of governance inserted into legal documents and provisions.

In this sense, the notion of 'legal governance' is used, i.e., assumed and displayed, without being specifically defined, although Pagallo et al. (2019b) go a bit further pointing out that legal governance specifies how to address the interaction between (i) law and ethics; (ii) general vs. sector-specific regulation; (iii) different needs that may be regulated; (iv) different levels of regulation (e.g. global, international, national, or regional); and (v) different ways of modernisation of the legal framework. A legal governance toolkit of coordinating mechanism is presented, based on *middle-out* grounds, beyond hetero-regulatory (i.e. authoritative forms of law), co-regulatory, self-regulatory or monitored self-regulatory models of governance. It is proposed that an effective regulatory toolkit should include at least the elements of modular adaptability, systemic interdependence, semantic interoperability, organic decentralisation, intermediate conceptualisation (logical intervenients), and abductive (inferential) reasoning for AI systems. Not all of them can be present at the same time or can be implemented with the same level of maturity.

Inferring abstractions from current sensor observations, converting raw data into machine-interpretable abstractions (Endler et al. 2017, dos Reis et al. 2019), aligning NLP and rule modelling, and annotation methodology in semantic languages is a matter of research. Modelling abductive (semiotic, associated, situated) and streaming reasoning in

[344] I.e., as defined in the Report (Pagallo et al. 2019a): "the achievement of sustainable development goals, such as capacity building in a good AI society; an interoperable AI strategy between the EU and Member States; a support for the capacity of corporate boards of directors to take responsibility for the ethical implications of companies' AI technologies; strategies of inclusive innovation; the creation of educational curricula around the impact of AI and a coherent European AI research environment".

[345] I.e., as defined in the Report (Pagallo et al. 2019a): "represent a sort of interface between top-down and bottom-up approaches, that is, between the different forms of engagement and the set of no-regrets actions. These coordination mechanisms include participatory procedures for the alignment of societal values and understanding of public opinion, upstream multi-stakeholder mechanisms for risk mitigation, systems for user-driven benchmarking of marketed AI offerings, cross-disciplinary and cross-sectorial cooperation, and a European observatory for AI to consolidate these forms of coordination".

a usable way is still a difficult problem (Ganz et al. 2015, Maarala et al. 2016, Shreyas et al. 2020). Likewise, aligning systemic interdependence, semantic interoperability and organic decentralisation constitutes a challenge. But confronting these conditions and finding some solutions is essential to facilitate the emergence of socio-legal ecosystems, including ontologies, blockchain technologies and smart contracts[346]; and the regulation of processes and supply chains of Industry 4.0 (system control, quality control, fault diagnosis, predictive maintenance) (Silva Peres et al. 2018). I reproduce in Fig. 32 the wind rose SMART model, with slight changes, as self- and co-regulation can adopt nuanced forms (including benchmarks and sandboxes) (de Koker et al. 2020) and can be monitored and linked to standards, protocols, policies, and ethical bodies. We have already shown that this is feasible using hard-law instruments (such as legislative and case-based law) as well. Thus, the idea is that a middle-out approach can show these nuanced forms of self- and co-regulation, and it is not necessary to get stuck to the initial clustering proposed in Fig. 31 as sources of law.

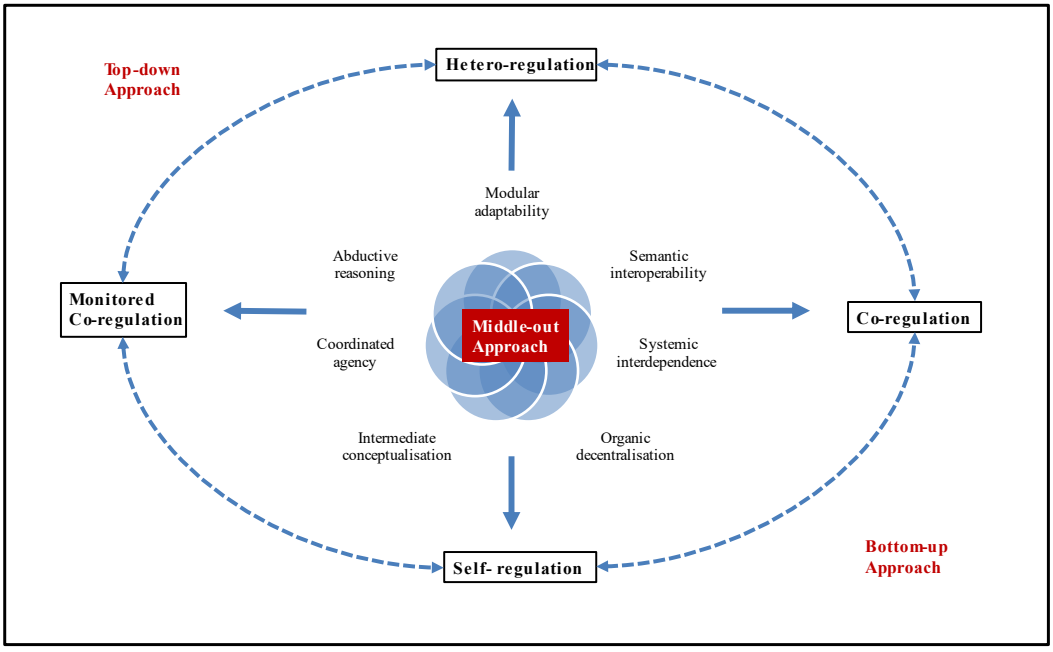

Figure 32. *AI4People: SMART Good Governance Model, Source: Adapted from Pagallo et al. (2019a, 2019b).*

[346] As proposed by ONTOCHAIN, a *New Generation Internet* hub for start-up companies. Cf. https://ontochain.ngi.eu/

This scheme should be understood as a set of initial *drivers* that can be used to create many *enabling systems* to enhance citizens' rights. It is worth noting that, especially in the convergence of LOD, IoT and Industry 4.0, rules operate at least at three different layers of perception, network, and application. So do the instruments and simulations of quality control, augmented reality, and digital twins in Industry 4.0, as explained above. From the legal side, this means that data flows in real time must comply with the protections of the metarule of law in a situation of multi-stake holder governance (Poblet et al 2019), with the plural participation of all subjects involved along the production and distribution chain. This kind of requirements and conditions for legal and ethical compliance cannot be checked externally. Legal compliance checking must be initiated from the inside, and then reach other external control and monitoring layers (the last resort being the case-based law system). The taken perspective matters, as the implementation of the rule of law through enforcement is crossed in all clusters by social dialogue and its (online and offline) *relational* side. Figure 33 depicts the orthogonal projection of this *inside-out approach* that complements and extends the middle-out one.

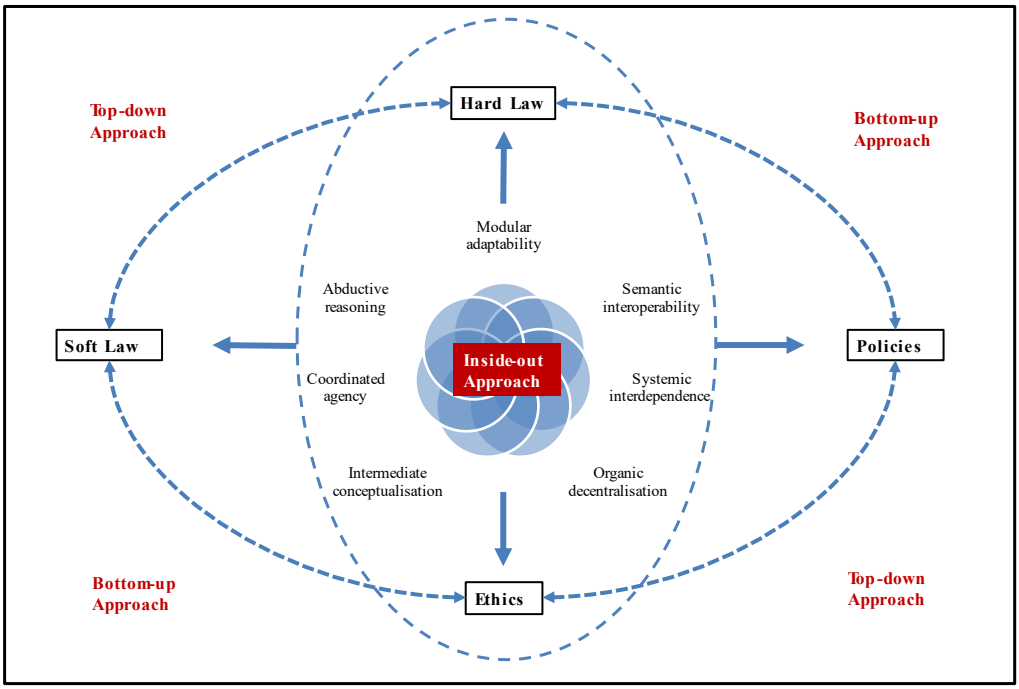

***Figure 33**. Inside-out Approach to LoD, WoD, and IoT Regulatory Systems*

5.5.2 Driving and Enabling Systems

As new technologies evolve, sociolegal governance models must change to meet human and social needs. As said, the legal instruments clustered in the scheme depicted in Fig. 30 can also be understood as *drivers*, *driving systems* enabling communication between norms and their implementation. But when we refer to agents (stakeholders, rulers, regulated…) we need another category to describe their relationships with the regulatory system, distinct from *capability* or *power*, i.e. outside of the well-trodden path of Hohfeldian jural concepts or the deontic description of 'power'. *Empowerment* is a different category than holding a 'subjective right' (Civil Law) or a 'power' (Common Law). It refers and enriches the affordances of the human and/or the artificial system at the perception level as well. Our intuition is that its validation process, i.e. the causal chain that can be built to check its degree of compliance with legal regulatory models, cannot be completely captured either by the Searle's formula *X counts as Y in context Z* nor from institutions defined as a set of constitutive rules (or counts-as conditionals logic). Making sense of law entails a different modelling process than assessing meaning. Determining the way to check legal validity is an empirical process. Validating—'making sense'—requires a complex selection and combination of the right variables at different level of depth to be explanatory and to properly ground a reusable toolkit.

This attribute and its values (empowerment and being empowered) can be better described in a representation (democratic) context as political form. Its 'validity' or 'legality' does not come from the fulfilment of a norm (or from a rule extracted from the norm) but from a whole set of facts related to the empowerment framework. This is the reason why logic, semantic rules, business languages, and compliance regulatory models (Hashmi 2018a, 2018b) have a role in it as valuable tools, they are necessary conditions but not sufficient, as they cannot build and proof by their own the empirical validation chain.

Following Hannah Pitkin's intuition about political representation (Pitkin 1967, 2004), we would say that 'empowering' a cognitive agent means '*made its self-representation* present', acquiring and exercising *a political power of self-representation*, i.e. a 'legal' power that is phenomenologically different from the representation of power as a deontic

capability. This points out the dimension of rights as *enablers* and *digital sovereignty* as a possible basis for the socio-legal ecosystems created by enabling systems. I cannot explore this line of thought here. I will explore it in the next Chapter, as *CivicTech* systems— platforms and applications for political participation; corruption, online hate, and fake news monitoring; crisis disaster-management; community building; assistive tecnologies…—might benefit from this analysis. I do not solely understand CivicTech as systems to enhance the relationship between the people and government, but to *enable* their users as self-driven, self-empowered citizens (Oboler and Casanovas 2021).

5.5.3 Online Dispute Resolution (ODR) on the IoT

Another example of such sociolegal ecosystems is provided by the evolution of Online Dispute Resolution (ODR), in which access to justice has also been expanded with little or no government intervention. This is an example of *enabling systems* mainly situated at the axis of dialogue and relational law at the societal level. Born in the last third of the past century in commercial and business environments and within the civil society, ODR systems have been boosted in the 21st century with the evolution of agreement (Ossowski 2012), negotiation, mediation, and conflict resolution technologies (Katsh and Rabinovich-Einy 2017). In a similar way to AI governance, ethics play a central and increasingly regulatory role in their evolution, but it has yet to be developed and enhanced (Ebner and Zeleznikow 2016).

Colin Rule, the former director of ODR for eBay and PayPal between 2003 and 2011, has recently written on the future of justice. He also underscores the need of a hybrid, entrenched Machine-Human cooperation on automating and improving justice systems to avoid unduly and biased systems.

> Technology is now starting to disrupt the law. These changes are not being driven primarily by lawyers, bar associations, judges, or court administrators. They are being pushed most significantly by the disputants and litigants themselves. Because citizens utilize technology in almost every area of their lives, they now expect that when they encounter a dispute or file a lawsuit they will have access to similar kinds of tools to help them manage that process. (Rule 2020)

Covid-19 fuelled this approach, fostered by new ways of understanding what is a dispute resolution mechanism. Entrepreneurs are using blockchain technology to create new ones,

and existing mechanisms of dispute resolution that might feed into blockchain-based smart contracts can be arrayed alongside new blockchain-based dispute resolution mechanisms (Allen et al. 2019).

Actually, this might change the rules of the game. Until recently, ODR did not fulfil all the expectations mediators had only ten years ago. Technology in the IOT environments can change the rules of the game. Let's see where the problems lie, because we are encountering again the problem of enforceability, acceptability, and legality of the outcomes.

5.5.4 ODR: Ethics-*in*-Mediation and Ethics-*of*-Mediation

A classic way of analysing moral principles in the mediation process is to understand mediation as a procedural framework for dispute management or conflict resolution. In this sense, the typical gradual scale of *negotiation*, *mediation*, *arbitration*, *adjudication*, is activated through basic functions that define the impartiality, neutrality, confidentiality, and independence of the mediator. The usual way of looking at this process lies on how this procedural framework is structured: (i) as a problem to solve (Harvard model), (ii) as an opportunity to change the relationship between the parties (transformational model), (iii) as a dynamic of intra- and inter-personal change (narrative or systemic model).

From this perspective, the relationships between the process, behavioural patterns of the "third party" (or "third party" professional behaviour patterns) and the mediation outcomes, have been discussed in the past twenty years. This is properly the domain of what I will call *ethics-in-mediation*, since the *ethical principles are articulated and/or instantiated within the conceptual procedural framework that they incept and contribute to create.* That is, the institutional process is constituted through the expected and active behavior of mediators and the mediated parties. These are constitutive rules: ethics are embodied into the definition of what mediation is or should be.

However, there is another way to conceptualise the process, which is also implicit in the classic way of approaching conflict resolution. Social anthropologist William Ury (2000) had in mind the reciprocity and the intervention of a third party—*it takes two sides to fight, but a third to stop*— in the *collective* dimension that all disputes have, and not only

in the private, internal, and/or procedural ones. It is from this perspective that conflicts acquire properly an ethical dimension, since there may be some side effects, and the social context itself can be altered by their escalation and generalization.

As we have seen in Chapter 4, anthropologists have often opposed traditional, stateless societies, where relations between their members must be heeded to maintain integration and social cohesion, to demographically larger societies with a centralized state and power, where citizens are anonymous and use the state system of justice to resolve their litigation (Comaroff and Roberts 1981; see also chapter 2 of Diamond 2012). The plurality of methods of alternative conflict resolution (ADR), and within them legally sanctioned mediation (in areas where it is already well established), replicate the ability to restore personal relationships or, at least, to manage the conflict without obliterating its protagonists and who are affected by —the family of the victim, children in case of divorce, etc. But as we have already seen, there is an American anthropological tradition pointing at the *harmony ideology* that ADR entails.

The base for these two oppositions—process vs. rules; and reality vs. myth (or ADR vs. law)—is what is being transformed on the Internet of Things. The *ethics of mediation* points at the dynamics established between principles and collective values that ODR entails as a conflict management and resolution process. The applicable ethical principles in AI and the digital society mean that ethics is founding morality and dialogue as a source of law. Procedure and outcomes are wrapped into the same set of procedures, practices, and patterns.

Once technology is introduced to define the protocols and scope of action, the structural framework changes (Wahab et al. 2012; Katsh and Rainy 2012). In ODR, there are two additional parts in addition to the three above mentioned: (i) *computer tools and technology* with which the mediator works (Katsh and Rifkin, 2001; Katsh and Choi, 2003); (ii) and the *service provider* (Lodder, 2013; Lodder and Zeleznikow, 2010). Platform-driven economy seems to support these early distinctions.

One of the problems is that ODR services are usually linked to the internal control of the companies that use them.[347] Another problem is transparency and accountability. Claiming honesty, justice, and *equity*, to the very system that serves and manages the ODR system requires transcending the procedural framework of mediation and dispute resolution, since the public place that occupies "the fifth party" requires *transparency* regarding the composition and use of the technology used, and with respect to the behavior, practices, and interests of the service provider behind. It is worth noting that transparency and accountability are virtues that are *public virtues*, since they affect the knowledge that everyone must have about the conditions of use and operation of the service.

ODR principles are *process-centered*. They can be enacted and applied in a *global space*, in which what must be protected is not only the specific outcome of a negotiation, *but the system as a whole*: *Up to now, it mattered that trust could be enhanced through fairness and the legality of the final outcome. Fairness* is one of the main points stressed by Zeleznikow, Lodder, Bellucci, and Abrahams (see Table 12).

Table 12 *Fairness in ODR Principles. Source: Lodder and Zeleznikow (2010), Zeleznikow (2011a, 2011b); Abrahams, Bellucci and Zeleznikow (2012).*

Fairness Principle 1 Developing Transparency	For a negotiation to be fair, it is essential to be able to understand and if necessary, replicate the process in which decisions are made. In this way unfair negotiated decisions can be examined, and if necessary, be altered.
Fairness Principle 2 – Enabling discovery	Even when the negotiation process is transparent, it can still be flawed if there is a failure to disclose vital information. Such knowledge might greatly alter the outcome of a negotiation.
Fairness Principle 3 – Bargaining in the shadow of the law and the use of *BATNAs*[348]	Most negotiations in law are conducted in the shadow of the law. These probable outcomes of litigation provide beacons or norms for the commencement of any negotiations (in effect BATNAs). Bargaining in the shadow of the law thus provides standards for adhering to *legally just and fair norms*.

[347] "Is it a violation of neutrality if eBay runs the overall dispute resolution system while also deciding individual case outcomes? The company strives to build fair and open dispute resolution processes, but the fact remains that eBay will not offer a system it believes operates contrary to the overall objectives of the marketplace. Should the standard for process impartiality be changed in ODR? Perhaps we should worry more about the overall appearance of partiality (the "kangaroo court" phenomenon) than obsessively trying to wring every last drop of bias that might exist at every stage in the process. In one possible solution, ODR systems could substitute a mediator requirement to "serve in a balanced capacity" rather than an impartial capacity. Rather than just protecting one party, this protects everyone, including the system, thus upholding the notion of fairness." (Demars et al. 2010, 2)

[348] BATNA stands for "Best Alternative to a Negotiated Agreement".

	Providing disputants with advice about BATNAs and bargaining in the shadow of the law and incorporating such advice in negotiation support systems can help support fairness in such systems.

These principles certainly constitute a bridge between *ethics-in-mediation* and *ethics-of-mediation* but I think they are not enough to understand the scope of the regulatory problem and the applicable guidelines of conduct on the convergence IoT/WoD/Ind 4.0. The critical point lies on what is understood by the global legal sphere, what can be and what cannot be shared. The BATNA is treatable through game theory, but the calculation based on the differentiated level of preferences finds its limits (i) in the transnational character of the process, (ii) in the controls that should be put in place in a public space in a global society (and are not); (iii) in the opacity that sometimes is seen as an asset by people using blockchain and smart contracts ('secure transactions'). How does transparency work here? Who can control the process? And how?

"There is no sheriff in town", as Ebner and Zeleznikow (2016) have recently stated while proposing a governance model (after considering the role of UNCITRAL[349] and other international bodies):

> Online dispute resolution generally knows little or no regulation, authority, standards, or monitoring. Within the field itself, governance is virtually nonexistent: nobody monitors quality control, no well-recognized and accepted standards of practice exist, and there is no one to take complaints or investigate bad practice. Because ODR practice is by nature Internet-based, any external supervision, such as that stemming from consumer protection laws, is weak, and subject to jurisdictional shortcomings — which is ironic, considering that ODR has often been offered as the solution to such deficiencies in other arenas

[349] UNCITRAL: United Nations Commission on International Trade Law. https://uncitral.un.org/ UNCITRAL has six running Working Groups. The second one is on Dispute Resolution. Many standards and accreditation processes have been proposed over the years. But it remains uncertain. There is a smorgasbord of standards of practice depending on the the area of law (e.g. trade and commerce), country, jurisdiction and professional association. The EU set a European Dispute Resolution Platform that has not been yet developed to its full potential. https://ec.europa.eu/consumers/odr/main/?event=main.trader.register . This was a result of the European effort handle the subject. Cf. ADR Directive 2013/11/EU of the European Parliament and of the Council of 21 May 2013 on alternative dispute resolution for consumer disputes; and the ODR Regulations (Directive 2013/11/EU of the European Parliament and of the Council of 21 May 2013 on alternative dispute resolution for consumer disputes). Ethics have received much attention and principles and standards have been promoted by EOS Standards for Dispute Resolution and the International Council for Online Dispute Resolution.

> without any acknowledgment that they are inherent in ODR's own modus operandi. (Ebner and Zeleznikow 2016, 304)

This was before the pandemic. As said, the new situation has fuelled the use and extension of ODR, but not just for mediation, but for the transformation of judiciaries and case-based systems as well (Sourdin and McNamara 2020), with several experiences already in place (especially for small claim courts, see Larson 2020).

Resolving the relationship between transparency and equity is not easy because, in the absence of any version of the global state, it reveals the tension between the public and the private that makes the rule of law a set of legitimised governance mechanisms. Properly legal mechanisms tend to be included into the universalizable principles of democratic states. *Transnationalism* —law beyond the nation-state—, *systemic justice*, *meta-justice*, are some of the expressions used in the specialized literature to design principles of justice that allow us to anticipate predictable results in online mediation.

I prefer the concept *relational law*, because it better reflects the regulatory nature that ethics is acquiring in the development of intelligent cities, cloud computing, the Internet of objects, and linked data. *Metarule of law* means that the protections and principles of the rule of law can be represented into the languages of the Web of Data and embedded into ODR systems.

5.5.5 ODR for the IoT

But the problem of ODR governance persists, even if its five parts (or sides) and building blocks have been identified—credentialing, practice standards, procedural justice, monitoring and supervision (Ebner and Zeleznikow, ibid. 2016). In my opinion, enabling systems for autonomous agents can be modelled as multi-agent systems gathering data on real time and to identify and anticipate some solutions before the conflict arises and escalates. If this is the case, the regulatory ecosystem should incorporate this kind of safety monitoring mechanisms. But this metalevel of automation is the next step. There are other mixed solutions being applied now.

There is the possibility to embed ODR into blockchain transactions and smart contracts, as "in contrast to traditional paper and e-contracts, smart contracts bypass and ignore the

legal model" (Schmitz and Rule 2019, 106). No ink, no paperwork, no court is needed, especially if the contract is dropped into blockchain (distributed ledgers). It is a self-enforcing computer program. However, disputes might rise on effective compliance based on triggering effects on automated bases if requirements are not met. Smart contracts will be "the new normal" very soon (ibid.). Smart contracts are transactions, coded agreements, but is unclear that they constitute 'contracts' in the legal sense. If this is so, they should be *validated* anyway to avoid misconducts, including hacking, and to give a remedy to possible disagreements. Ricardian contracts are used for this objective, but these are regular legal contract placing the defining elements of a legal agreement in a format that can be expressed and executed in software.[350]

Thus, a middle-out / inside-out approach could also be applied to face the problem and to automatise it. In the meanwhile, there have been other solutions in place, all based on a fifth party approach (Schmitz and Rule 2019). Sagewise, Openbazaar, were examples of it. But, like Cognicor[351], they could not be considered ODR on smart contracts only, as they were business and commerce-oriented, offering other kind of services, developing protocols for e-commerce transactions in decentralised marketplaces.

Crowdsourced solutions are closer to blockchain technologies—for instance, Kleros[352], Aragon[353], jur.io[354] (Auidef et al. 2021). The latter are using DAOs, (*Decentralised Autonomous Organisation*) the form of decentralised governance that is common in blockchain technologies. These are the main players of the justice decentralised market, relying on customers willing to solve their disputes faster and, most of all, privately, discreetly. Schmitz and Rule (2019) have pointed out that smart contracts could contain ODR activating clauses into code. "Redress processes can be built directly into the agreements themselves, independent of legal jurisdiction" (ibid.). They propose a blocking mechanism, similar to the Andon System[355], a system that is manually triggered to quickly alerts

[350] A Ricardian contract, named in honour of David Ricardo by its creator, Ian Giggs, in 1996, are not dropped into blockchain networks. They run and are stored in a private individual computer, linked to other reliable sources. They incorporate a hash cryptographic function and markup languages. Wikipedia offers a good description, cf. https://en.wikipedia.org/wiki/Ricardian_contract
[351] https://www.cognicor.com/
[352] https://kleros.io/
[353] https://aragon.org/
[354] https://jur.io/
[355] https://en.wikipedia.org/wiki/Andon_(manufacturing)

operators in a manufacture about a problem on the line. But I am afraid that this proposal could be interpreted as contrary to the stern effects of smart contracts, i.e. their strict compliance and enforcement policy. My proposal would be *coding them embedding partial compliance, degrees of compliance into them*.

If this could go, then the middle-out / inside-out strategy could be used (i) to create the legal ecosystem (broader than the contract) (ii) to legalise its content. We could turn its compliance into a legal validation problem, anticipating the spectrum of possible disagreements, and representing these scenarios into the contract. One consequence of this proposal consists of adding a sixth party to the pool, for the sociolegal or legal ecosystem, as a validating, legalising, and sustainable framework, could bee considered as a sixth player (in addition to technology and the service provider).

5.6 Conclusions

I provided in this Chapter a general overview of how the convergence of the WoD, the IoT, and Industry 4.0 challenges society to provide appropriate legal governance responses. It is my contention that the convergence of these technologies (in plural) is challenging the way law was understood, drafted, and applied in the 20th century. However, new is old, *gaudium cum pace*. This does not mean that all legal instruments and practices are all changing at the same time and at the same rate.

The way how new behaviours and institutions emerge, how self-organized groups relate and create new collective properties, how legal practitioners and computer scientists are creating a big flourishing legal web services market, and how technology is pervading all dimensions of our lives (including work, manufactures, production and distribution chains) reaches our cognitive stages of perception, memory, and reasoning. It is a civilisation change. New legal web services, comprising ODR and smart contract services, are created and disappear at an astonishing path.

However, legal concepts and architectures have a long history which sometimes pushes us back (and forth) again. Smart contracts, first, are contracts (even not yet ‘legal’), and the existence of political forms and powers are not a big novelty either. Likewise, agreements, negotiations, mediations, and tools for conflict resolution can be infused into

toolkits that were not born today. This holds for private and public law, either in Civil and Common law cultures, even if a digital public space and the transnational rule of law have yet to be created. Therefore, what is the message?

The current legal principles will continue to apply in many non-Industry 4.0 and IoT environments. There and in that context the current understanding of law will still remain valid for a while. However, more will be required to assure their appropriate application to the convergence of the WoD, the IoT, and Industry 4.0. We will therefore have parallel systems of legal governance until the global reality is fully immersed in technology. We cannot predict how technological and non-technological environments and scenarios will intertwine and for how long.

My intuition is, however, that the transitional period will produce new regulatory trends and many new questions. If we return to the research questions about socio-legal governance for hybrid intelligence, we can observe that, after identifying the problems to be solved, some methodological and substantive regulatory issues remain. Especially the need (i) to redefine the elements, entities, properties and relationships that integrate the legal regulatory field in the new scenarios of the WoD, IoT, and Industry 4.0; (ii) to find a suitable methodology and theory to foster and then validate the legal ecosystems that will cross the dimensions (societal, legal, technological) and layers (sensory, network, application) of the IoT; (iii) to find the suitable theories and metrics to build a testable and reliable legal governance mindset.

There are big challenges as well in the expressivity of languages, i.e., about the extraction, conversion and representation of concepts and norms as they appear in natural languages into algorithms and formal languages with a high degree of expressivity. This has not been completely solved.

In Chapter 5, I explored aspects of the notion of legal governance that are meaningful in the new digital environment. I progressed some of the work done on the metarule of law, and I have complemented the SMART middle-out with an inside-out approach to digital regulatory systems. I made a few specific points, such as identifying (i) the need for an empirical approach to explain and validate legal information flows and the hybrid agents' behaviour, (ii) the interest of a phenomenological and historical approach to legal and

political forms, and (iii) the utility of separating enabling and driving regulatory systems. I did not describe in detail all the proposals about hard law, soft law, policies, and, especially, ethics, as this is the subject of Chapter 6, as plotted on the table, below.

Table 1. *Structure and Concepts of the Dissertation*

MODULES	CONCEPTS	FIELDS	CHAPTERS
Legal Web Services and Artificial Intelligence	Law as Data	Legal Anthropology and Sociolegal Studies	1. The Double Implosion of the Legal Profession and Web Services
	Law as Meaning		
	Law as Sense		
Law as Knowledge	Knowledge Graphs	Ontology and Semantic Web	2. Law as Knowledge: The Web of Linked Open Data
	Legal Ontologies		
Law as Dialogue	Agreement	Legal Theory, Sociolegal Studies, and Legal Anthropology	3. From Positivist to Relational Law: Law as Dialogue
	Legal Pluralisms		
	Relational Law		
	Relational Justice		
	Regulatory Model		
	Regulatory System		
Reciprocity and Dialogue	Integration	Legal Anthropology	4. The Legacy of Legal Anthropology
	Reciprocity		
	Legal Culture		
	Vindicatory Systems		
Legal Governance	Middle-out Approach	Epistemology	5. The Convergence between the Web of Data, the Internet of Things and Industry 4.0
	Inside-out Approach		
Linked Democracy	Rule of Law	Political Anthropology and Artificial Intelligence	6. *Legal Isomorphism* and the Emergence of Legal Ecosystems
	Metarule of Law		
	Legal Ecosystems		
	Legal Isomorphism		
Sociolegal Ecosystems	Institutional Design	Social and Political Sciences and Artificial Intelligence	7. Sociolegal Ecosystems: Political Forms of Legal Governance
	Interoperability		

Metarule of Law	Compliance *by* and *through* Design	Methodology and Use Cases	8. From Compliance by Design to Compliance through Design: An Empirical Validation Model
	Scheme		
	Metamodel		
	Validation Model		

CHAPTER 6

Legal Isomorphism and the Emergence of Legal Ecosystems

Summary: This Chapter deals with the notion of 'legal isomorphism', one of the most important concepts in Artificial Intelligence and Law. Roughly, it refers to the supposition that there should be a correspondence between the rules in the formal model and the units of natural language which express them in the original legal sources. This notion has been conceived in different ways in the literature on legal knowledge engineering and knowledge-based systems. The Chapter reconstructs its different meanings since its early usage in the two last decades of the past century, shows its roles and evolution, and connects it with contemporary research on Artificial Intelligence and Law. The notions of metarule of law, sociolegal ecosystem, legal governance, and causal relationships are introduced in the second part to specify our empirical approach to legal modelling. Some practical examples are also provided in some detail at the end before the conclusions, stemming from the Australian Project Data to Decisions CRC and the European H2020 Project SPIRIT.

Keywords: Legal isomorphism, rules as code, semantic web, rule of law, socio-legal studies, legal theory, causal analysis

6.1 Introduction

I am connecting in this Chapter 6 (i) the legal governance perspective that I deployed in Chapter 5, (ii) with their social, political, anthropological, and legal foundations. Doing so, what comes up is the relevance of one of the first notions coined by computer scientists in AI and Law in the eighties and nineties of the past century—the concept of *legal isomorphism*, i.e. how the content of norms, values and principles can be extracted from their legal sources and reflected into formal languages and regulatory models.

Chapter 6 can be read as a general introduction to the subjects that I will develop in Chapter 7 with more detail. I will focus on legal isomorphism, first, while I will pay some more attention to the grounding of the metarule of law in the last Section. Legal isomorphism is an essential standpoint to understand the architectures that have been proposed grounded on legal theory. As the reader will soon realise, I am proposing an empirical

approach in this Chapter, ending up on the representation of chains of causal relationships in Chapter 8. Setting the conditions for the emergence of legal ecosystems is the main objective to be reached, as I will try to make clear in the following pages.

This is related with the general broad framework of cloud computing and fog computing that I already explained in Chapter 3, Subsection 3.5.1 (Software as a Service, Platform as a Service, and Infrastructure as a Service). To be focused, the target are the *legal ecosystems* generated in the hybrid blend of formal languages and human behaviour in the decentralised services and distributed and federated computer models on the Internet of Things. To be practical, let us start with the Rules as Code movement incepted by government agencies and administrations in 2018.

6.2 Rules and Processes

6.2.1 'Rules as Code' and Legal Isomorphism

Rules as Code (RaC) has been broadly defined as 'the process of translating rules in legislation, regulation, policy into code so they can be consumed and interpreted by computers'.[356] I already introduced this trend in Subsection 5.2.2. Rules are a formal representation of a norm or a set of norms (prescriptions) and can be manually constructed in different ways. For instance, to quote the example by Rivéret et al. (2022) in their work on IoT regulations, the prescription 'it is forbidden to engage credit activity' in plain English can be formulated as:

(i) 'IF X is a person, THEN X is forbidden to engage credit activity'

or, closer to logic programming languages,

(ii) 'IF person(X) THEN FORB(X, engage_credit_activity'.

It is a combination of meaning and syntactical formulae.[357] This is a conceptual tool, an instrument to organise, manipulate, express, and infer meaning from structured

[356] https://www.digital.nsw.gov.au/digital-transformation/policy-lab/rules-code

[357] Quoting Sartor (2009), a similar definition is provided by the LegalRuleML Oasis Standard: "norms can be represented by rules with the form *if A_1, ... , A_n then C* where *A_1,...,A_n* are the pre-conditions of the norm, *C* is the effect of the norm, and *if ... then ...* is a normative conditional, which are generally

information, i.e., knowledge. It is pertinent to highlight here that when a mechanism is set, it remains at the data and meaning level. It is triggered, *executable*, as such mechanism. Embedding it into a social environment can or cannot involve human activity and participation. It does not necessarily entail *sense* at pragmatic level, i.e. it does not entail a situation that *makes sense* to a human or to a human group or community in a social dimension.

Thus, assumptions about the relationship between natural and formal languages in law should be clarified. In this Chapter, I will focus only on one of these assumptions, the link between the sources of law and their characterisation into representation languages. It is generally known as *legal isomorphism,* i.e. the supposition that 'there should be a one-to-one correspondence between the rules in the formal model and the units of natural language text which express the rules in the original legal sources' (Gordon et al. 2009).

The notion of 'legal isomorphism' has been conceived in different ways in the literature on legal knowledge engineering. I will explain their different meanings with the aid of the framework set by the *metarule of law*, i.e. the embedding of the substantive protections of the rule of law into platforms and legal web services.

I will also contend that private or public legal web services require a *hybrid*, pragmatic approach to be effective. Systems of substantive rights cannot be completely coded, as rules cannot be extracted and implemented without an extended pre and post modelling work on norms and the context of norms. Knowledge acquisition, rule extraction, and rule implementation pose specific problems and challenges.

Technology is changing the way we think about law. But law should be understood not only as a set of constraints on functional requirements but as a full-fledged regulatory toolkit. As stated in Chapter 5, from this point of view, policies are not sufficiently implementable in digital environments without setting tools of legal governance at the same time, to monitor, control and take care of the whole regulatory process.

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defeasible and do not correspond to the if-then material implication of propositional logic." (Palmirani, Governatori et al. 2021)

This is a relevant issue. Stemming from the tradition in legal anthropology that I described in Chapter 4, rules and processes were conceptualised as contrasting ways to approach legal matters. Since the Gluckman-Bohannan debate, in 1966, the social rule-centred paradigm was presented in opposition to the processual-centred paradigm (Comaroff and Roberts, 1981), taking society as a whole. I.e. assuming a general theory to define what can be counted as law.

However, in law and technology, more granularly, there are many ways to combine rules and processes, at different levels. Rules and processes can be seen as different elements of regulatory models (at conceptual level) and regulatory systems (at the implementation level). Thus, they are components of legal ecosystems.

6.2.2 A Counter-futurist Precursory Tale

Let's begin with a tale, a short story written by the Catholic and former Italian futurist and fascist sympathiser Giovanni Papini (1881-1956). In his second diary of Gog, entitled *Il Libro Nero* (1951), the Black Book, Gog, a millionaire world-traveller, reports on an electronic Court of Justice, after having allegedly watching it in action:

> Thinking machine building has come a long way in recent years […]. The first experiments to use machines in the administration of justice are being carried out nowadays in Pittsburgh. […] The first hearing of the brand-new Court began this morning at nine o'clock. The first justiciable was a young worker in the steel industry, accused of having murdered a young woman who resisted him. The defendant narrated the event in his own way, and the witnesses did the same. The technician then pressed a button to ask the machine which articles of code should apply to the case. In an illuminated square the requested numbers immediately appeared. The same brain, duly managed by his human secretary, granted the generic mitigations, and a few seconds later, in another quadrant, the sentence appeared: twenty-three years of forced labour for the young murderer. The automated dispenser vomited a card in which the sentence was repeated, the police inspector picked up this card and led the convicted out.

I could not resist translating it. The reader will find the whole short story in the Annex at the end of this Chapter, and I kindly ask her to read it before proceeding. This is an exercise of *prolepsis*, a flashforward of what might occur in the future according to the author's projective memory. It was written just after the Nuremberg trials, and we can easily imagine that what might follow the death penalty could be a fast execution and an even

faster cremation, technically managed. Papini's diary (1962, posthumous) tells us about his state of mind when he conceived this story.

There are funny coincidences, as Pittsburgh is the place where Herbert Simon worked in the fifties and sixties on Artificial Intelligence, and Kevin Ashley is working and teaching right now on legal analytics (Ashley 2017, 2020). The Dartmouth Seminar and the invention of the term 'Artificial Intelligence' occurred four years later, in 1955. There are descriptions that are not 'true' as well, as Papini does not refer to adjudicatory Common Law hearings (and jury trials) but reproduces the proceedings under the Italian Criminal Civil law. This is a 'literary truth'. Accuracy lies on the discursive effectivity of the tale. As it is usual in proleptic stories, the author is mixing up what he knows and known unknowns to produce such effects. However, putting aside the circumstances, he relies on the generative and inferential formal structure of legal arguments as a rationale for the sentence.

This is something pursued in AI analyses as well, but we should bear in mind that experts in the field have been consistently opposing the electronic judge and dubious usages of technology since the beginning, as Bart Verheij recently reminded in his presidential address to IAAIL (Verheij 2020). Judicial discretion cannot be effectively modelled. As 'no procedure exists which can efficiently decide whether or not some arbitrary formula of propositional logic is necessarily true […] one practical consequence is that judges must use methods which may result in incorrect decisions' (Gordon, 1994). But, still, this is not just a scientific or technical question but a matter of policy, a political issue.

For the last thirty-five years, AI & Law authors have been focusing on case-based reasoning, the structure of the arguments, normative systems, normative multi-agent systems (norMAS), non-monotonic logic, semantics, deontic logic, non-standard deontic logic, Natural Language Processing (NLP), Machine Learning (ML) and Deep learning (DL) (Bench-Capon et al. 2012; McCarty 2018). For the last ten years, AI have been flourishing in the new LawTech (regtech, fintech, suptech) platform-driven economy of legal web services: the addressable market value of LawTech and GRC (Governance, Risk and Compliance) together, amounts $ 3 trillion ($3x10^{12}$) (according to Blijdt 2021, based especially on S1 of INTAPP, as I already reported it in Chapter 5). For the last three years,

in the public sphere, the *Rules as Code* movement has taken off in government agencies, drawing the attention of a wider audience (Mohun and Roberts 2020, Governatori et al. 2020b). As described by M. Waddington (2021, 180):

> 'Rules as Code' is currently a question, rather than a theory or a product. It is a label of convenience for a set of attempts to investigate the question of whether a new approach to coding (or at least marking up) legislation might produce a workable scheme which benefits both the way legislation is produced and the way it is made available through the medium of computer programs. The idea started in New Zealand, before spreading to New South Wales, and then to Canada, Jersey, the United Kingdom and elsewhere, and then being reported on by OPSI.[358]

Actually, business rules are being used at scale by corporations to simplify and handle the allocation of rights and duties. In his recorded Closing speech to CODEX in 2014, Genesereth (2014) put it quite clearly as well, commenting the possibility of modelling legal analogical reasoning:

> Industry hasn't been stopped by this [analogical reasoning in law]. If you look at companies like SAP and Oracle, and IBM, they are making fortunes selling this technology, applied to business rules as opposed to governmental rules […] they find ways to finding value for their constituencies using this kind of technology. So, what I want to believe, what I want to argue is that we should be able to do a similar sort of thing for governmental rules and regulations… [transcription is mine]

When set by policy makers, officers, and administrators RaC also consists of an interactive play addressed to citizens and companies as rule-consumers (not targeting lawyers or law firms as costumers). This interaction fosters end-user's participation in sandbox spaces—as they can create and test their compliance against simple ontologies.[359]

This is the fast, practical, new field of law in the digital society. It entails a new 'jurisdification' or 'legalisation' of the social space, different from the one we had known in the 19th and 20th centuries: (i) structured through the representation languages of the Web of (linked) Data, (ii) geared and managed through AI techniques and formal languages, (iii) located at the crossroads between the horizontal (relational) and vertical (binding) dimensions of law, (iv) and flexed in the tension between civic self-organization and the pressure of political and financial elites (Casanovas 2021, Noriega and Casanovas 2021).

[358] Waddington refers to the OPSI (OECD) report on Rules as Code (Mohun and Roberts 2020). For a short comment cf. Governatori et al. (2020), for a more detailed one, Casanovas and Hashmi et al. (2020).
[359] https://www.blawx.com/2020/05/testing-your-rules-as-code/#page-content

This was the conclusion at the end of Chapter 1 that triggered and framed the whole Dissertation.

Some Gartner business analysts have seriously asserted already that technology is changing not only corporate culture, but *civilisation*, i.e. the human condition (Plummer et al. 2020), causing mixed feelings. What can we say about this world that is changing at a dizzying pace before our eyes?

On the one hand, we experience Papini's sentiment—'something that gives rise a silent protest in us.' But on the other, there is also the intuition that gearing and coping with 2.5 quintillion bytes of data being created every day requires a regulatory technological effort, for only AI can effectively control AI social applications.

Is there a way to 'make the right balance', to use McCarty's expression? Many computer scientists have expressed ethical concerns, advocating for a collaborative, adaptive, responsible, and explainable *hybrid* Artificial Intelligence, "the combination of human and machine intelligence, augmenting human intellect and capabilities instead of replacing them and achieving goals that were unreachable by either humans or machines" (Akata et al. 2020, 18).

I embrace the same idea, but I also have the inkling that to make it happen, some of the premises that have been implicitly or explicitly assumed in legal design and modelling should be eventually modified or at least better specified. Legal isomorphism is one of such assumptions.

6.3 Legal Isomorphism

6.3.1 Isomorphism

Isomorphism is a mathematical notion. According to the *Encyclopedia of Mathematics*, it refers to 'A correspondence (relation) between objects or systems of objects expressing the equality of their structures in some sense. An isomorphism in an arbitrary category is an invertible morphism, that is, a morphism φ for which there exists a morphism φ−1 such that φ−1φ and φφ−1 are both identity morphisms".[360] This strict meaning of

[360] https://encyclopediaofmath.org/wiki/Isomorphism

structure-preserving mapping of two figures of the same shape has not been restrained to mathematical developments, although it can hold different meanings and raise different problems. For instance, whether there is an efficient algorithm deciding whether two graphs are isomorphic (Grohe and Neue 2021).

In cognitive and social sciences, uses are even wider. The notions of first order isomorphism had been formulated in the analysis of mental images and their relationship with the external world (Phylyshin 2003). Its criticism, under the *first-order isomorphism fallacy* (FOIF)—attributing to an organism internal structure analogous to the external structures of its outputs—was advanced by ecological theories of mind against Fodor and Phylyshin's perceptual representations, redefining Dewey's pragmatism (Turvey et al. 1981, Shaw and Turvey 1981). Simon's ant path in *The Sciences of the Artificial*—especially in the last edition (1996)—conveys the same message. This trend has been essential to develop Gibson's concept of *affordance*, so important right now in robotics, normative Multi-Agent Systems (norMAS), and artificial socio-cognitive technical systems (Noriega et al. 2017). In second-order isomorphism, although no structural resemblance is assumed between an individual internal representation and its corresponding external object, an "approximate parallelism holds nevertheless between the relations among different internal representations and the relations among their corresponding external objects" (Shepard and Shipman 1970).

In political science, the influential paper on *institutional isomorphism* by di Maggio and Powell (1983) brought about many developments in governance, policy, organisational theory, and economics.[361] The paper distinguished three complementary mechanisms (*mimetic, normative, coercive*) to explain the 'startling homogeneity of organizational forms and practices. Following H.A. Simon's direction as well, it asserted that 'the structure of

[361] Cf. Morrill and McKee (1993) on informal social control; Kyvelidis (2000) on post-socialist states; Radaelli (2000) on policy transfers; Venard and Hanafi (2008) on corruption in financial institutions; Leiter and Payne (2008) and Leiter (2008, 2013) on non-profit organisations; Lazarides and Drimpetas (2010) on corporate governance; Currie (2012) on IT; Gellers (2012) on environmental rights; Ilhan-Nas et al. (2015) on corporate financial and social performance; Carter (2016) on policing; Martínez-Ferrero and García-Sánchez (2017) on sustainability reports; Aizawa on industry compliance (2018); Amor-Esteban et al. (2018) on sustainable development (2018); Gao (2019) on global finance regulation and China; Glebovskiy (2019) on organised crime and business; Ufere et al. (2020) on bribery and organisations; Irwin at al. (2021) on research and national policies; Jovanoska and Petrusheva (2021) on the structure of social enterprises; Kezar and Bernstein-Sierra (2021) on higher education intermediary organizations.

an organizational field cannot be determined a priori but must be defined on the basis of empirical investigation.' (ibid. 1983, 148) 'Isomorphism' was the preferred notion to explain homogenisation and adaptation to complex environments mainly constituted by other competitive organisations (professional, corporative, administrative…). For these institutional approaches law constitutes an essential social device for the contextual analysis of regulations, and they have fostered a number of specific socio-legal and judicial studies.[362]

6.3.2 The Concept of Legal Isomorphism

None of these different meanings really mattered for the building of legal expert systems and the development of AI techniques and logic applied to law. *Legal isomorphism* is related to the notion of rule. It was postulated by AI philosophers and computer scientists in the late eighties and in the nineties, and it has been consistently sustained ever since as a component of the epistemological positivistic approach to legal modelling. It is mainly an assumption of knowledge-based modelling systems, originated, among others, from Bench-Capon and Coenen's reading of Michael Jackson's principles of computational design to base programs on the structure of the data to be manipulated by the programs (Bench-Capon and Coenen 1992a, 1992b).

My understanding is that two main different projects were crucial. Both were developed at Imperial College. The former was the logic modelling of the *British National Act* (1981) using an augmented Prolog shell, i.e. Horn clauses extended to allow for negation (Sergot et al. 1986a, 1986b; Baker 2012). The latter, less quoted, but essential to develop the isomorphic approach, was the modelling of the United Kingdom's Supplementary Benefit legislation, contained into the *Supplementary Benefits Act* (1976), and developed (or extended) through ten sets of regulations (Bench-Capon et al. 1987). In this project, legal provisions (their conceptual content) were distributed through documents of diverse length, value, and scope; and this posed several modelling challenges that had to be faced. After these two projects, the notion of isomorphism was reworked at Liverpool by Bench-

[362] Cf. Radaelli (2000), Scheid and Suchman (2001), Beckert (2010), Corby and Latreille (2012), Jia-hui (2008), Leiter and Payne (2008), Ufere et al. (2020).

Capon and Coenen under the MAKE project, in collaboration with British Coal and the software company ICL.

I will differentiate three stages of development.

I. Roughly, from 1986 to 1996, many members of the International Association of Artificial Intelligence and Law (IAAIL) wrote and participated in the discussions on legal isomorphism.[363]
II. In the following decade, from 1995-96 to 2005-06, the concept was refined as a knowledge acquisition procedure and a starting standpoint for legal analysis and argumentation.
III. Finally, from these dates onwards, with the inception of WWW and the deployment of Web representation languages, the concept was strategically placed for scalation, interoperability, information retrieval and, eventually, legal implementation or enforcement purposes.

From the very beginning, a good representation was deemed to reflect the structure of the legal provisions, but it is important to highlight that the concept was mainly used for legislative modelling, partly to set a point of departure, and partly to avoid the nuances and additional difficulties of case-based law.[364] "In essence the term [isomorphism] is intended to capture the notion of creating a well-defined correspondence between source documents and the representation of the information they contain used in the system" (Bench-Capon and Coenen 1992a), according to five conditions previously set by Karpf (1989):

> (i) Each legal source is represented separately, (ii) the representation preserves the structure of each legal source, (iii) the representation preserves the traditional mutual relations, references and connections between the legal sources, (iv) the representation of the legal sources and their mutual relations is separate from all other parts of the model, notably representation of queries and facts management, (v) if procedural law is part of the domain of the model then the law module will have representation of material as well as procedural rules and it is demanded that the whole system functions in accordance with and in the order following the procedural rules

These conditions were discussed by Bench-Capon and Coenen (1992a), but the main idea that *there is a clear correspondence between items to be found in the source material and*

[363] Cf. Sergot et al. (1986a, 1986b), Bench-Capon et al. (1987), Kowalski (1991), Karpf (1989, 1991a, 1991b), Bench-Capon and Forder (1991), Bench-Capon and Coenen (1991, 1992a, 1992b), Routen and Bench-Capon (1991), Brown (1993), Bench-Capon and Staniford (1995), Routen (1996).
[364] T. Bench-Capon, personal communication.

items to be found in the knowledge base [my emphasis] was respected, even if relaxed and without the requirement of one-to-one correspondence between the knowledge base items and the source. Instead of this correspondence, an *intermediate knowledge* between the source and the source items and a one-to-many correspondence between intermediate representation items and executable knowledge base items was introduced. The objective was to clarify and make as explicit as possible the link from source to executable knowledge base. Subsequently the role of intermediate representations was taken over by ontologies.

It is worth noting that, at the time, the principle of isomorphism was introduced as a methodological tool, a *development methodology* (i) that could be taught and learned, (ii) should be validated by experts, (iii) aimed to simplify coding and avoid mistakes when modelling, (iv) and to facilitate maintenance (i.e., limited changes to the source give rise to similarly limited changes to the knowledge base). Thus:

> Isomorphism provides a *style of representation* which enables different people to work in a similar fashion, and this further enables the provision of tools which will facilitate and encourage that working style' [my emphasis] (Ibid, 70).

This idea of legal isomorphism as a *collective* endeavour matter. Some objections were also internally discussed. Mainly that: (i) the isomorphic approach requires the legislation itself to be well structured (Marek Sergot); (ii) efficiency can be affected by a premature need of optimisation. Thus, it was recommended to promote a trade-off between optimisation and clarity of design rather than a rush for expressing and interpreting the whole content (i.e., selecting preferred meaning) into formalisms. Even though, there are interesting observations about legal entities as *composite objects* allocated into clear *type hierarchies* to be manageable. If rules can be attached to the composite object, Entity-Attribute-Value models (EAVs) could also be applied.

6.3.3 Early Criticisms

A closer look at the early use of the term and the way it was discussed may reveal some features of this process that are interesting to our purposes and are often overlooked. Let's go back to the two trends I just mentioned—logical and computational. The first approach undertaken by Marek Sergot and Robert Kowalski, entailed an external application of

logic to regulate situations, acts, events, and behaviour that were contained and regulated as well into legal texts (provisions). However, they kept their work separated from jurisprudence and legal interpretations. Isomorphism was only intended for legislation. They were crystal clear on many occasions when they described their work and the use of logic to represent law—actually following previous experiences, e.g., LEGOL, by Ronald Stamper (1977):

> In general terms, our approach can be summarised as follows. We [the Logic Programming Group at Imperial College] take some legislative text, typically a statute or a set of regulations, and represent its provisions in a formal, logical language. (More precisely, given the nature of the language in which the original legislation is expressed, we represent particular interpretations or readings of these provisions.) We thus obtain a logical representation of what the legislation expresses (*or again, more precisely, of what we think it is that the legislation expresses*) [My emphasis]. We construct in effect a model of the law which captures the essential feature of interest, and which can be executed or manipulated to support tasks related to the legislation. (Kowalski and Sergot 1990, 201)

Both sides of the Imperial College work, this exclusively logical one and the knowledge-based approach represented by T. Bench-Capon, were not unnoticed by lawyers and the legal doctrine. The position taken by sharp critics such as Philip Leith and Robert Moles[365] —Richard Susskind was much more favourable[366]—was to abandon the field: "there is more to life than logic". There were also some more contributions to this debate. Among other things, Zeleznikow and Hunter (1992, 105) pointed out the differences and insisted on the presence of *embedded* (or *embodied*) rules:

> It is surely irrelevant when the statute is reformulated into a computer representation whether it be isomorphic or otherwise. The important point is rather whether this reformulation accurately *embodies the same rules as in the statute*. [my emphasis]

Suskind's response was: "The idea is that an intelligent human user in conjunction with the expert system that is assisting him, *together, as a team, as it were, aspire to human expert performance*" [my emphasis] (1989, 36). Counter-critics reminded that the purpose of modelling law was not replicating human cognitive skills but building tools that could

[365] Cf. Leith (1986, 1989), Moles (1991), Moles and Daval (1992).
[366] Cf. Susskind (1987a, 1987b). Susskind identified two positions that he termed 'pragmatism' and 'purism' related to law. He chose a middle ground, as "socially acceptable, commercially viable, jurisprudentially proper and technically feasible expert systems in law can emerge only from workers who can indeed straddle the two camps" (Susskind 1989, 30).

improve them. The legal tasks of "decomposition, subsumption and inference" (Susskind 1987a) could be better accomplished with computer assistance.

However, the points made by Leith and Moles were far from trivial. They were based on a good knowledge of the complexities of legal decision-making, the *stare decisis* doctrine, and the singularity of case-based outcomes.[367] They stated, basically, that the dynamics of producing legal meaning from oral or written provisions (legal documents) and their interpretation does not match *any* artificial mean to reconstruct them. The argument can be summarised as follows: (i) law is built through a specialised use of natural language, exploiting all its expressive power and its capacity to face and adapt to a huge rank of social scenarios; (ii) these scenarios are related to dynamic and sometimes evolutive (or disruptive) contexts; (iii) thus, to carry out most common legal tasks, such as drafting, contracting, interpreting, implementing, enforcing… expert technical language constitutes a necessary (non-sufficient) condition; (iv) legal knowledge is built through a legal technical language as well, linked to all legal concepts and jurisdictions that articulate what social life consists of under the modern rule of law.

Isomorphism was specifically targeted by the critics:

> While [computer scientists] claim that the reformulated material has 'the same structure' as the original, this is clearly not so", and "the constant references to isomorphism might not conceal more than they reveal about this process" (Moles 1991, 145 and ff.).

Moles pointed out that documentary sources comprising legislation, delegated legislation, administrative guidelines, and precedents were selected and implicitly interpreted in absence of any criteria of relevance. *Relevance* is an old requirement in jurisprudence and legal philosophy. 'Selection of materials' or 'legal stuff'— to borrow some notions from representatives of two distant legal cultures, R. v. Jhering and K. Llewellyn, respectively—is the first departing point both for a legal/juristic method, or for the description of current working practices outside the white room, according to legal realism.

[367] Moles (1987) had already written a sharp criticism of the Hart's notion of law based on rules in his PhD thesis.

6.3.4 Further Developments

These criticisms were considered by the AI & Law community, especially the claim of a better communication and cooperation with lawyers and legal experts, and the need for a better understanding and modelling of legal interpretation processes (e.g., Poulin et al. 1993). Again, interpretation has been a cornerstone for AI & Law progress. This is a matter of theoretical approach, level of abstraction, and planned strategy.

The 'future work' by Sergot, Kowalski, Jones and other Imperial College philosophers evolved in a different direction, focusing on the logical relationship between rights and *normative spaces*, and seeking for a clearer formulation of difficult problems such as the deontic notion of 'legal power'. Thus, orienting their contact and discussions with legal philosophy towards non-standard deontic logic, the semantics of Hohfeld's *juristic* notions, and Lars Lindhal's concepts of *legal inference* and *intermediate positions*. But, interestingly, Bench-Capon's developments stayed true to the original notion of isomorphism because of his interest in legal argumentation and AI applications to case-based law. He fleshed out the concept to adapt it to argumentation theory and was quite influential too adjusting it to Semantic Web representation languages.

This is the point that I would like to make, because this happened while adopting a positivistic architecture of legal concepts. Thus, *shifting from a practical methodological engineering stance to a more complex epistemic position and understanding.* In PLAID, a system designed for legal assistance (Bench-Capon and Staniford1995), dialogue and arguments were integrated into an information retrieval tool, still based on the idea of *methodological* isomorphism, stemming from a plurality of sources (single source fragments from a subsection of legislation, a case, or a paragraph from the Officers Guide in a figured out fictional Poor Law). Key features were: (i) the use of the sources with minimum of adaptation, (ii) a modular design based on a multi-agent architecture, (iii) a knowledge-based system to provide the raw materials for the actual building of arguments, (iv) document preparation techniques to present the argument in the form of a coherent tex.

However, it was clear from the outset that this position was not without problems. The need for nonmonotonic logic evinced that isomorphism was closer to an ideal than to a desirable property of knowledge-based systems, for legal texts use to express exceptions

to general rules in a separated way across a single or a plurality of sources (Prakken and Schrickx 1991). These authors defined *isomorphism* "the situation that one 'source unit' is formalised in one 'KB-unit' ("KB" standing for "Knowledge Base")" and a "source unit" as "the smallest identifiable unit of the source from which a norm can be extracted". They contended that (i) the situation in which one source unit is formalised in more KB units; and (ii) the situation in which one KB unit contains concepts from more source units (unless a source unit itself refers to other source units) constitute violations of isomorphism. They asserted that only nonmonotonic logic modelling could satisfactorily solve them, and in fact, Prakken (1997, 35) replaced the notion with the more flexible of *structuring resemblance*, as an aspect of the result of a formalisation process. His aim was to develop new logical instruments for legal analysis, not being focused on the difficulties of the knowledge acquisition process but on legal theory and logic modelling. This was the path undertaken in legal theory by Sartor (2005) as well, where he did not intend to deal with legal isomorphism either. The existence of legal constructs, fields, and scope was taken for granted.

Nevertheless, the fast grow of the Internet and the rapid development of the Semantic Web (SW) introduced new variables and fostered a renewed interest for the concept. At the beginning of the century, in less than a decade, the Semantic Web evolved from a web of documents to a Web of *linked* Data and *open* linked Data, fostering the need to rethink what was meant by *public space* and what kind of tools could be used to reformulate the 'knowledge acquisition bottleneck' adverted by Feigenbaum (1977, 1980) for knowledge engineering and expert systems design. I already introduced this subject in the Introduction to this Dissertation when dealing with digital ethnography (Subsection 0.3.4). Let's have a closer look.

Knowledge acquisition (KA) research has been running for more than forty years, now. In the 2013 Special Issue of the *International Journal of Human-Computer Studies* to celebrate 25 years of KA, the editor, Enrico Motta (2013), highlighted the parallel development of ontology building and the interactive, interdisciplinary, and socially distributed and situated field of symbiotic intelligence in between humans and machines. Thus, KA was grounded into empirical investigations and cognitive science principles and had

evolved from a relatively small and specialised way to elicit knowledge from experts to a richer set of techniques able to handle data at scale from a wider community of people.

Collective intelligence had already been rephrased by Tom Gruber (2007) as *collected intelligence*, with the value of user contributions being collected and aggregated into community or domain specific sites. Thus, *shared knowledge*, one of the main components of the tuple defining computational ontologies from the beginning of the nineties, enlarged its meaning embracing the more complex idea of *social ecosystems* set by the interface and interaction of computer and human languages. But what this notion entails for the Web of Data (and the law)—how can it be defined, and how it works—is still a matter of debate. Especially because the empirical dimension of the notion of legal isomorphism has not been yet fully developed. Thus, what are the conditions to build a *legal* or *socio-legal ecosystem*, how they can be recognised, and what are their formal and material properties?

6.4 An Empirical Approach

6.4.1 Requirements for Rule Interchange Languages

If we are consistent with an empirical approach, legal ecosystems are socio-legal ecosystems, as they should include end-users' behaviour in respect to the normative or regulatory system. We can count as formal conditions its interoperability requirements. One of the results of the ESTRELLA Project (2006-2008) was LKIF, the *Legal Knowledge Interchange Format*, targeting not legal documents but their content, i.e,, legal norms. A legal norm is supposed to present the structure if *A*1, . . . *An* then *B*, linking consequences (legal effects) to *n* conditions (facts). This structure, in turn, can be represented as a rule.

We should remind here that this was one of the early criticisms addressed to legal expert systems—law does not consist, or not exclusively, of rules. But we can skip it by now. Gordon et al. (2009, 284-285) offered a roster of requirements for building legal rule languages. The first one is legal isomorphism, defined in the same restricted way that Bench-Capon, Coenen, Routen and Karpf had done:

> To ease validation and maintenance, there should be a one-to-one correspondence between the rules in the formal model and the units of natural language text which express the rules in the original legal sources, such as sections of legislation. This entails, for

> example, that a general rule and separately stated exceptions, in different sections of a statute, should not be converged into a single rule in the formal model.

The list followed with some more requirements related to (i) computer languages, e.g. reification— about the process by which an abstraction is turned into an explicit data model: Jurisdiction, authority and time are deemed properties of legal rules—, (ii) logic (e.g. rules do not counterpose), (iii) to classical legal theory—about the structure of law, validity (legality) and validity modification (annulment / abrogation)—, (iv) legal argumentation and modes of inference (e.g. defeasibility); (v) to legal processes (procedures); (vi) normative effects (such as obligations, permissions and prohibitions), (vii) ethics and policies as well—values and preferential values, (viii) and (very important), linked to *contributory reasons* or factors as well:

> It is not always possible to formulate precise rules, even defeasible ones, for aggregating the factors relevant for resolving a legal issue. For example: "The educational value of a work needs to be taken into consideration when evaluating whether the work is covered by the copyright doctrine of fair use." (Gordon et al. 2009, 285)

Table 13 reproduces the list as it was systematically presented. These were the main legal requirements that interchange languages need to comply as singled out by the authors stemming from general theories of law and argumentation. Yet, the authors also highlighted that there is no language able to satisfy all of them simultaneously. Table 12 summarizes the legal requirements they selected, stemming from general theories of law and argumentation

***Table 13**. Requirements for Rule Interchange Language. Source: Gordon, Governatori, and Rotolo (2009)*

1. *Isomorphism*	A one-to-one correspondence between the rules in the formal model and the units of natural language text which express the rules in the original legal sources.
2. *Reification*	Rules are objects with properties: a) Jurisdiction: limits where the rule is authoritative, and its effects are binding. b) Authority: ranking status of the rule within the sources of law (constitutional rule, or statute…). c) Temporal properties: (i) time when the norm has been enacted, (ii) time when the norm can produce legal effects, (iii) time when the normative effects hold.
3. *Rule semantics*	Semantics allows for correctly computing the legal effects that should follow.
4. *Defeasibility*	When the antecedent of a rule is satisfied by the facts of a case, the conclusion of the rule presumably holds, but is not necessarily true). Defeasibility breaks down into:

	a) Conflicts (rules may lead to incompatible legal effects): (i) one rule is the exception of the other, (ii) rules have different ranking status, (iii) rules have been enacted at different times.[368] b) Exclusionary rules (some rules provide one way to explicitly undercut other rules, namely, to make them inapplicable).
5. ***Contraposition***	If some conclusion of a rule is not true, the rule does not sanction any inferences about the truth of its premises.
6. ***Contributory reasons or factors***	It is not always possible to formulate precise rules for aggregating the factors relevant for resolving a legal issue.
7. ***Rule validity***	Rules can be or become invalid. Deleting invalid rules is not an option when it is necessary to reason retroactively with rules which were valid at various times over a course of events: (i) the annulment of a norm is usually seen as a kind of repeal which invalidates the norm and removes it from the legal system as if it had never been enacted (the effect of an annulment applies *ex tunc*: annulated norms are prevented from producing any legal effects, also for past events); (ii) an abrogation on the other hand operates *ex nunc* (the rule continues to apply for events which occurred before the rule was abrogated).
8. ***Legal procedures***	Rules regulate also whether or not some action or state complies with other, substantive rules): (i) procedures that regulate methods for detecting violations of the law, (ii) procedures that determine the normative effects triggered by norm violations (reparative or compensatory obligations).
9. ***Normative effects***	Such as obligations, permissions, prohibitions and also more articulated effects) e.g.: a) Evaluative, there is a value to be optimized or an evil to be minimized. b) Qualificatory, which ascribe a legal quality to a person or an object. c) Definitional, which specify the meaning of a term. d) Deontic, which, typically, impose the obligation or confer the permission to do a certain action. e) Potestative, which attribute powers. f) Evidentiary, which establish the conclusion to be drawn from certain evidence. g) Existential, which indicate the beginning or the termination of the existence of a legal entity. h) Norm-concerning effects, which state the modifications of norms (abrogation, repeal, substitution…).
10. ***Persistence of normative effects***	Some normative effects persist over time unless some other and subsequent events terminate them.
11. ***Values***	Some values are promoted by the legal rule.

This list of requirements has a prudential character: Not all elements or components that can be identified as 'legal' can also be modelled into rules. Interestingly, a second limitation is posed by the diverse nature of the requirements: No format language is deemed

[368] Accordingly, rule conflicts have been traditionally resolved using principles about use priorities: (i) *lex specialis* (it gives priority to the mores specific rule), (ii) *lex superior* (it gives priority to the rule from the higher authority), (iii) *lex posterior* (it gives priority to the rule enacted later).

expressive enough to model all of them at the same time.[369] Moreover: Legal language presents an open-ended nature, and so does legal reasoning. Then: "no formal model of a legal domain, in any logic, can guarantee that inferences are legally correct in some absolute sense" (ibid. 293). In a sister article, Bench-Capon and Gordon (2009) explicitly revisited the concept of *legal isomorphism* adopting this prudential position with regards to legal argumentation but even though, implicitly embracing at the same time the epistemic assumptions of a conceptual legal positivism for legal engineering based on the scheme *general legal rule/with exceptions*.[370]

This general approach, and the use of some notions pointing at the defeasibility of the arguments—such as *dialectical validity*—shows that what the authors had in mind was legal reasoning scenarios rather than information retrieval. Modelling law was understood as reflecting the use of legal provisions to reach a valid conclusion in the context of a particular case. Would it be enough to set forth a (socio-)legal ecosystem?

The answer would depend upon the capacity of describing the causal chain in the argumentation process and its relationship with specific social environments, but this was not intended by the authors. This was not their scope. They tried to show the need of incorporating legal knowledge into the modelling that could justify and explain the different design choices, and this was a valuable result. They worked from an analytical, normative, computational, and legal engineering approach, but they did not consider the social dimension from an empirical point of view, i.e., describing and explaining the interface between systems, end-users, stakeholders, and organisations.

[369] The content of the table is reproduced slightly modified in Balke et al. (2013). The authors explicitly assert that these aspects "contribute to classifying norms and *can be extended to other normative domains besides the law*". We also reproduce it in Poblet, Casanovas and Rodriguez-Doncel (2019).

[370] The benefits would be the classical ones, i.e., "ease of application, ease of understanding, and the possibility of allocating the burden of proof', highlighting the 'circumstances which allow some facts to be assumed in the absence of evidence to the contrary" (ibid. 2009, 12). It should be noticed that "burden of proof' is understood as 'burden of persuasion'" (ibid. n. 3), thus pointing at the set of argumentation strategies that constitutes the framework for using of legal isomorphism. It is shown with the aid of a specific example of German family law that the modelling of any fragment of legislation is never a mechanical process, it requires interpretation, and choices are reflected into the final outcome and can affect the consequences to be drawn from the premises.

6.4.2 Legal Ecosystems: Unsolved Challenges

In the years to come (2010-2021), after CEN-MetaLex[371] and LKIF, this same perspective infused the studies on law, the Web of Data, and regulatory compliance (Casanovas et al. 2016a). We can distinguish three different (related) developments: (i) the so-called 'legal semantic web', with the building of legal ontologies[372], AkomaNtoso[373], Oasis legalXML and Oasis legalRuleML[374]; (ii) the deployment of document and knowledge management systems, based on XML and ontologies, with different architectures[375], (iii) and more specifically, the studies on business, regulatory and legal compliance.[376] We can distinguish different trends but bearing in mind that they are deeply intertwined. The Eunomos' framework constituted a knowledge management toolkit integrating a Hohfeldian juristic model; the Legal-URN set a requirements engineering-based framework for business process compliance; Regorous was displayed as a methodology.[377]

My conclusion is that legal isomorphism has been assumed and adapted according to the needs and tools being developed. Authors have been quite aware of the challenges ahead, especially when confronted with the integration of data analytics, NLP, ML, DL, and blockchain technologies into their different frameworks. Hashmi et al. (2018) offer a long list of these challenges, starting with the problems with the expressivity of formal languages. The effects of the tasks cannot be represented within event calculus, temporal logics does not reach to all intended effects of the legal domain (the difference between abrogation and annulation, for example), and first-order logic does not provide temporal operators. I chose a long citation here on norms extraction and elicitation because the operation to extract rules from legal dispositions (norms) is far from have been resolved (Hashmi et al. 2018, 116):

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[371] http://www.metalex.eu/
[372] Cf. for recent comprehensive surveys on legal ontologies, Oliveira Rodrigues et al. (2019); Leone, di Caro and Villata (2020).
[373] http://www.akomantoso.org/
[374] Cf. for a general view of legal interoperability (comprising legalXML and legalRuleML), https://legalxml.wpengine.com/. See Athan et al. (2013a, 2013b, 2015); Palmirani et. al. (2009, 2011); Palmirani, Paschke, and Athan (2012); Palmirani, Cervone and Bujor (2013). The Standard was eventually released on August 30, 2021, edited by Palmirani, Governatori, Athan et al. (2021): https://docs.oasis-open.org/legalruleml/legalruleml-core-spec/v1.0/os/legalruleml-core-spec-v1.0-os.html.
[375] Cf. Boella et al. (2012, 2016), Ghanavati (2014).
[376] Cf. Hashmi et al. (2018a, 2018b).
[377] Cf. Governatori and Sadiq (2015); Governatori (2015).

> Generally, the source of legal norms that organisations have to comply with is normative documents which are generally written in natural language. It is rare to have some kind of structured representation of rules in such documents. Moreover, these also include complex sentences, legal jargons, and technical terms. For an accurate and effective formalisation of legal norms, it is imperative to properly extract rules from the legal texts. However, mostly this task is manual leaving thus the high chances of errors, misinterpretations and conflicts/redundancies due to human involvement. This is because analysts might interpret technical terms differently, important conditions in the rules might be overlooked or wrongly confer the rights or obligations to agents. This can adversely affect the formalisation of norms as wrong extraction might lead to wrong representations. We observed that current research has exploited *natural language processing* (NLP) and *machine learning*-based approaches to automate the norms extraction task from a variety of perspectives. For example, some to extract the document structure, while others classifying law paragraph according to the regulatory contents and distinguishing terms to be part of the rules—each claiming varied degree of success. However, the experimental comparison with performances claim made in these studies is difficult due to the fact that no data sets nor systems exist to evaluate them. In addition, in our view, norms extraction process is far deeper than just extracting the document structure and classifying the terms but identify and extract deontic component of rules, and correctly assign the terms to the antecedent and the consequent of the rules. Also, extract the co-reference links that are present in the legal documents, align the terms that are used in the legal text and the terms that we want to use in the rule providing, thus, a unified representation of the norms for further formalisation. We strongly believe that the proper extraction of norms is an ongoing challenge and does not seem to be fully automated in near future. However, we also believe that—due to the complexity of the legal texts and time required to manually extract norms, (even partially) automating this task would be beneficial.

But would it be also enough to create a legal ecosystem? Much attention has been devoted to legal engineering requirements. However, social and political conditions—the features of the environment—cannot be simply classified as functional or non-functional requirements, as they set specific constraints that can play a decisive role in the implementation of law and the emergence of legal ecosystems. I will offer a couple of examples focusing first on the interplay between natural and artificial languages, and second, on the need of metrics to establish reasonable thresholds for legal ecosystems to emerge. Both examples are situated in the hybrid M/H/MH space that preserves an explicit role for human behaviour and intervention to regulate Web or AI legal services that can be semi-automated.

6.4.3 First Example: Australian Spent Convictions Scheme

The first example is a prototype to gear spent convictions schemes. In the framework of the Data to Decisions CRC Program (with the Australian Government), and at the

Australian Criminal Intelligence Commission (ACIC) request, we set a team to model the Australian Legal Spent Conviction Scheme, mainly contained in the Crimes Act 1914 (Cth) – Part VIIC – Division 3: Sections 85ZV, 85ZW. The structure was clear, as reflected into the official flowchart (Figure35). We produced several studies from different perspectives (law as data, constitutional rights, conceptual approach, compliance).[378] We also produced a survey (Hashmi 2018b) and we created a conceptual model and a formal proof of concept for ACIC. There are few doubts about the utility of such a modelling. The ACIC operates the National Police Checking Service. The service is used by 251 accredited agencies and bodies. During the period 2017–18 the number of checks processed increased by 11.1% to 5.29 million, and 1.49 million checks were referred to police agencies for further assessment. To better understand the issue of whether disclosing or not a spent conviction, Figure 34 plots the flowchart of the British and the Australian Police (following the UK and Australian legal schemes.[379] Figure 35 plots the three steps modelling figured out by Mira Stammers (2019) from a legal point of view to interpret the outline of the scheme (independently of its contents, i.e. the rights and duties defined by the law).

[378] See a Summary of the obtained results at Casanovas et al. (2019). Deliverable DC7 (Summary) was written by all members of the team: Legal Team: Pompeu Casanovas, Louis de Koker, Patrick Keyzer, Danuta Mendelson, David Watts, Jeff Barnes, Suzanne O'Toole, Mira Stammers, Hon. David Parsons. Scientific Team: Guido Governatori, Victor Rodriguez-Doncel, Mustafa Hashmi, Jorge Gonzßlez-Conejero. This Deliverable DC7 should ideally be read in conjunction with the earlier project deliverables: DC3.1 introduces the subject; DC3.2 presents the clustering for the survey on legal compliance; DC3.3 presents the roadmap towards publishing law as data using Natural Language Processing (NLP) tools; DC3.4 describes in more detail the Spent Convictions Scheme; DC3.5 elaborates on the potential interpretative issues and impact of Crimes Act 1914 (Cth) (Part VIIC – Division 3: Sections 85ZV, 85ZW and Associated Definitions); and DC3.6 analyses the case law perspective. This report briefly discusses (i) the survey on legal compliance in which the difference between regulatory and legal compliance is grounded; (ii) the legal issues raised by the Spent Convictions Scheme (steps, interpretations, case law and privacy); (iii) the Spent Convictions Scheme modelling in defeasible semantic logic, (iv) and Natural Language Processing (NLP) techniques and applications. D3C.7 therefore summarises the results and findings of the Project and offers a proof of concept. All Deliverables can be download from Zenodo OpenAir. DC7: https://zenodo.org/record/3271525#.Yh8KTuhBw2w

[379] In the Common Law, a *legal scheme* is the kernel or mapping of the procedural content to be followed to enact or implement a set of legal provisions (mainly coming from legislative sources). FindLaw Dictionary defines it as: "A combination of elements (as statutes or regulations) that are connected, adjusted, and integrated by design : a systematic plan or program [an administrative inspection]". https://dictionary.findlaw.com/definition/scheme.html

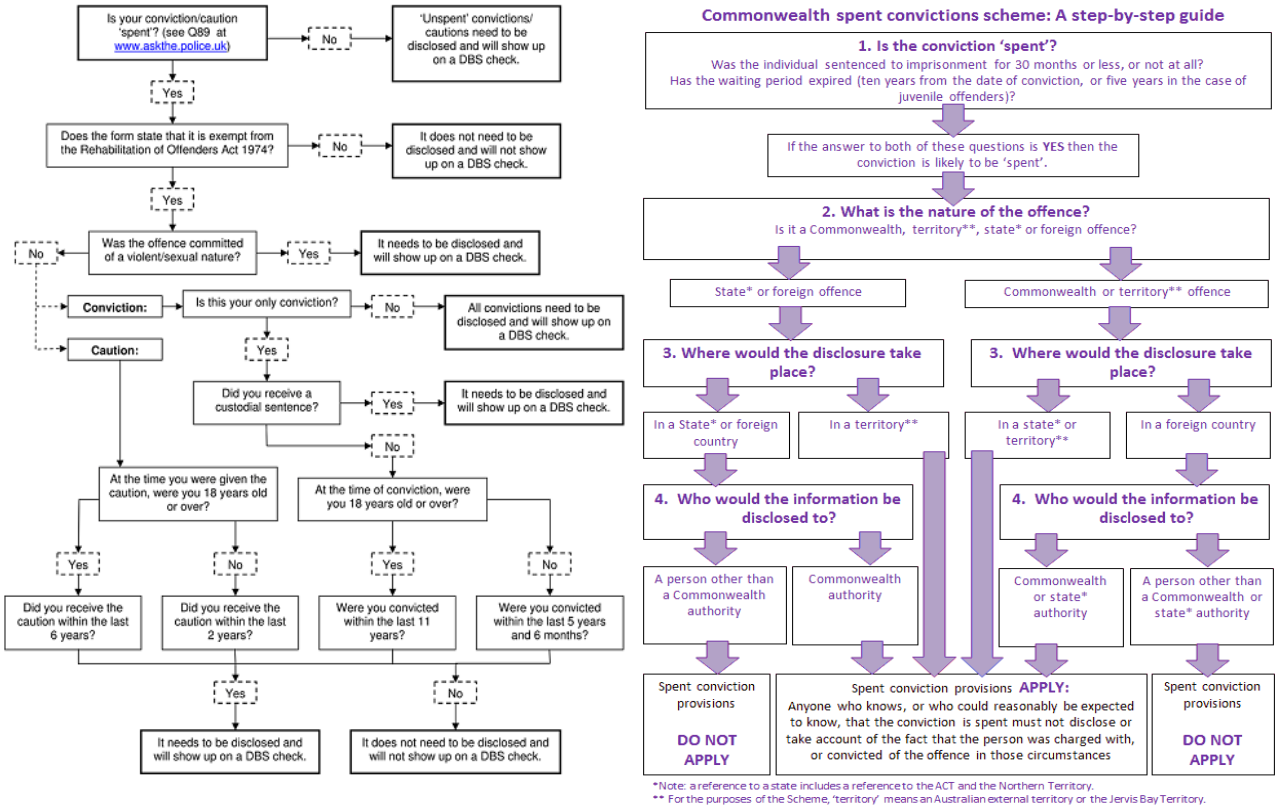


Figure 34. *Spent Convictions Schemes (UK and Australia). Sources: https://www.askthe.police.uk/content/Q89.htm# ; Office of the Australian Commissioner Tree.*

Provisions, flowchart, questions (2018-19): Prototype

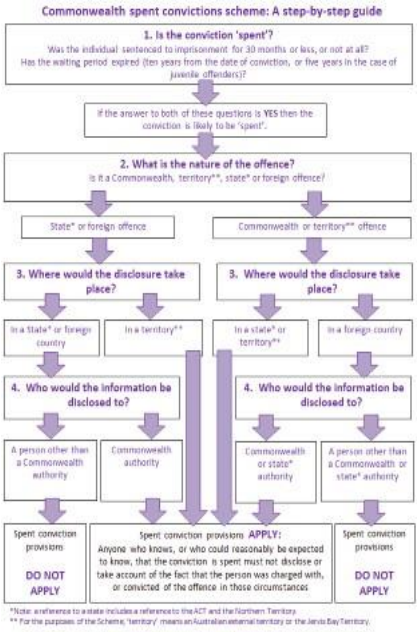
Provisions contained in:

(i) Pt VIIC of the Crimes Act 1914 (Cth) (the "Act") and
(ii) Regulations 7A, 8 and Schedule 4 of the Crimes Regulations 1990 (Cth) (the "Regulations") [repealed in 2019].

Demo: Guido Governatori
https://turnipbox.netlify.app/fiddles/0JZAjImlL1x0JMNJJSWF

https://ratweb.z8.web.core.windows.net/dashboard/5f50c884a787fa001cccd3b5/project/5f50c884a787fa001cccd3b6/workspace/5ee949c90a6dc4002b1d9d77

Office of the Australian Information Commissioner decision tree designed to demonstrate the steps one would follow in determining whether a conviction is spent and/or whether it should be disclosed.



Step 1 – Has there been a conviction?

Step 2 – Is the conviction spent?

Step 3 – Do any Division 6 Exclusions apply?

Figure 35. *Australian Spent Convictions Scheme Modelling*

We were able to offer a proof of concept of the system. Guido Governatori carried out the modelling to integrate reasoning with exceptions, to express deontic concepts such as obligations, permissions, prohibitions, and to represent both prescriptive norms and definitional norms (Governatori et al. 2021).

Governatori used Turnip[380], a (typed) functional programming implementation of Defeasible Deontic Logic, to facilitate the encoding of norms as rules. Even though, in the intensive preparatory work previous to the encoding, nineteen potential issues open to interpretation were identified. Jeff Barnes (2019) suggested to distribute them into three categories: A. *deliberately created* (principles), B. *not deliberately created*, and C. *differential of views* amongst interpreters. Drafters have different styles of writing. In Australian Common Law, these are professional experts. Barnes, a former drafter himself, could identify the origins of the deliberately created potential issues on the document.[381] For instance, the use of "Instrument" and "Commonwealth Law" in s 85ZL or "or otherwise" in Section 85ZW(a):

> *Section 85ZW(a) — scope of 'or otherwise'*
>
> Subject to Division 6, but despite any other Commonwealth law, or any State law or Territory law, where, under section 85ZV, it is lawful for a person not to disclose, in particular circumstances, or for a particular purpose, the fact that he or she was charged with, or convicted of, an offence:
>
> > (a) it is lawful for the person to claim, in those circumstances, or for that purpose, on oath *or otherwise*, that he or she was not charged with, or convicted of, the offence; […]
>
> The meaning of 'or otherwise' in paragraph (a) is potentially ambiguous. Its meaning is coloured by the words 'on oath'. Does 'or otherwise' mean 'by any means other than on oath' (the wide, literal construction)? Or do the words mean 'by other means that are like

[380] An online environment to run Turnip rulesets, with samples of the features it offers is available at http://turnipbox.netlify.com/.

[381] "The potential for issues in this category to arise is deliberately created. The potential is a *by-product of the drafter using a style of drafting known as general principles drafting*. Issues in this category can be readily identified to an extent." [My emphasis]. 'General principles drafting', 'fuzzy law', and 'conceptual specification' are the names used to denotate a writing in wide strokes, leaving the details to be filled in by the courts. The use in Section 85ZL(b) of "Commonwealth law", "instrument", or, in Section 85ZW(a), "or otherwise", or in Section 85ZW(b, "anyone else who … could reasonably be expected to know". Their specific meaning must be filled out by the courts. (Barnes 2019).

> an oath' (the narrow construction, influenced by the noscitur a sociis presumption of statutory interpretation)? In answering that question, regard would be had to the purpose of the provision and to any relevant extrinsic materials including case law. (Barnes 2019, 12)

Making sense of this construction of meaning is out of the scope for any formalisation that we could think of. *Sense* cannot be extracted from the text, only *meaning* can be. In this case, 'or otherwise' would fit into the rule after defining it (i.e. constraining its meaning).[382] This entails a set of decisions at computational level. Governatori, in Casanovas et al. (2019) explained them. For instance, 'or otherwise' was integrated into the context of exceptions and interpreted in a way that could be easily reused.[383]

What is crucial is the cooperative work carried out by encoders, annotators, and legal experts. Witt et al. (2021) recently drew a distinction between (i) processes for technical validation of encoded rules (focusing on ensuring that rules adhere to select coding languages and conventions); (ii) and processes of legal alignment (i.e., enhancing congruence between the encoded provisions and the so-called 'true' meaning of the statutory text).

In my opinion, interpretative processes are an important component both of the problem and of the solution, for they are themselves dependent on the intermediate legal theories used to establish the final meaning to be coded. In the forties and fifties of the past

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[382] The content of Section 85ZW(a) analysed by Barnes was encoded as a prescriptive rule. It can be formalised as an exception at formal level. The aims of Turnip is to provide a reference implementation of Defeasible Deontic Logic and at the same time to offer features to facilitate the encoding of norms as rules. See Governatori et al. (2020):
s85ZS_1a : Person & PardonOrWronglyConvicted
=> [E] Disclose . charged & [E] Disclose . conviction
s85ZS_1b : Person & PardonOrWronglyConvicted
=> [E] Oath . not_charged & [E] Oath . not_conviction

[383] See Governatori in Casanovas et al. (2019, 28 and ff.). Under section 85ZR, a person is, in particular circumstances or for a particular purpose, to be taken never to have been convicted of an offence: (a) the person is not required, in those circumstances or for that purpose, to disclose the fact that the person was charged with, or convicted of, the offence; (b) it is lawful for the person to claim, in those circumstances, or for that purpose, on oath or otherwise, that he or she was not charged with, or convicted of, the offence. Thus:
s85ZS_1a: Person & PardonOrWronglyConvicted
=> [E] Disclose.charged & [E] Disclose.conviction
s85ZS_1b: Person & PardonOrWronglyConvicted
=> [E] Oath.not_charged & [E] Oath.not_conviction
where [E] is the "exempt" modal operator (equivalent to "permitted not" or "not obligatory"), and Section 85ZZGB [my emphasis]

century, *intensional isomorphism*, *synonymous isomorphism* and *identity of belief* were discussed by Carnap, Church, Benson-Mates and Putnam (Church, 1954). These notions lean on the chosen definitional language. As already noticed by Karpf (1991a, 1991b) in the early days of legal isomorphism, there is a pragmatic intentional component considered by the broader dynamics assumed in the contextualisation of legal theory (in a way, Karpf's work is embedded into the Scandinavian legal realism represented by Eckhoff, Sundby, Aubert, and Ross). This is not solving the pragmatic paradox entailed by the 'true' legal meaning: *being 'true' only if there is a consensus to say that the meaning is true*. As I will specify later, a holistic institutional approach, rethinking the context and the organisational toolkit and modelling *alike*, would, if not solve the problem of the differential expressivity of formal and natural languages, at least minimise the risk of over-interpretation.

Distinguishing a societal macro-level, a meso-level in which technology and humans co-operate, and a micro-level in which meaning circulates and can acquire different senses according to the people, situations, and scenarios of a specific environment, can help. As said, we produced a proof of concept, but we did not go further in this project to create the conditions for a legal ecosystem. This would have required the cooperation of the government at federal level, the police units on charge (LEAs) at the state level, and the construction of a pilot to be tested in real settings.

What this project has shown is where some of the difficulties for automatising the content of legal schemes lie at a formal and empirical level. Coding legal semantics also entails to anchor them into a social environment to produce a sustainable legal ecosystem, assembling regulatory models with human and organisational behaviour. Had we had the opportunity to create such *anchoring institution*, we would have also had to set redress mechanisms and guidelines (at ethical, soft law and policy level) to monitor and control it. Nevertheless, having said that, the modelling of the Spent Convictions scheme can be used to process the most common cases at the federal level. As we concluded (Governatori et al. 2020), the encoding proved to be consistent *in the most common cases*. But its implementation with legal effects in more complex scenarios would require embedding it into a broader legal context to create the legal ecosystem I just mentioned. This is when

a semantic reasoning mechanism at the abstract level can be turned into a pragmatic, social one at the contextual one.

6.4.4 Second Example: The SPIRIT Regulatory Model

My second example is taken from the EU project SPIRIT (2018-2021).[384] This is a toolkit to enrich the investigative power of LEAs (fight against organised crime), preserving and enhancing at the same time privacy and citizens' rights (Davarakis et al. 2021). The reader is gently asked to go to Annex 2 to find a short description of how the system is used by an investigator in a real case. It is better having in mind this practical use to aggregate attributes, dismantle organised crime strategies, and find out identities on the Web. In security, this is called an Open Source Intelligence platform, an OSINT platform.

We carried out several actions related to ethics and law—dynamic Data Protection Impact Assessments, ethical sandboxes, risk minimising matrices and policies, among many others. What I would like to highlight here is the importance of setting an integrated environment. Protections and policies were partially embedded into the system in different ways, by means of ontologies and a Privacy Controller System (PCS) toolkit. This integration has a regulatory effect not just of semantic but *systemic* interoperability. Semantic interoperability refers to the ability of computer systems to unambiguously exchange data with an explicit, shared meaning. Systemic interoperability goes beyond semantic interoperability and refers to the ability of complex systems to interact. It focuses onto the coordination of practices and organisational structures, *in between* human behaviour, and artificial systems.

To reach systemic interoperability, some more conditions were needed in addition to ethical and legal requirements. We had to create an *ad hoc anchoring institution* assembling policies, recommendations, principles, and rules, (i) to monitor and control the right use of the system, (ii) to handle and address false positives (mechanisms of redress), (iii) and to minimise the risks of misuse. Most important: we had to redraw the way of redirecting the platform final legal governance back to their legal and ethical sources; and doing that, we had to figure out the metrics (i) to be applied through the whole legal compliance

[384] *Scalable Privacy Preserving Intelligence Analysis for Resolving Identities*. https://cordis.europa.eu/project/id/786993

process, and (ii) to set the thresholds for interpreting and reusing data (e.g., face recognition levels of accuracy).

We made use of some ideas to carry it out—especially the notions of *legal compass*, a regulatory quadrant elaborated by Casanovas, Hashmi and de Koker (2021), and *partial compliance*, to apply the testing metrics (Lam, Hashmi and Kumar 2021). The cycle of the metarule of law is plotted on Figure 36. I highlighted the separation between normative hard law constraints and the remaining ones, especially ethics, as this scheme was introduced in Chapter 5. I will show in the next Chapter the relevance of ethical principles for the regulation of platform-driven economies from the validation point of view, i.e. for the processes of *legal* compliance checking. We will deal with thresholds and metrics in Chapter 7 as well, with the example of face recognition.

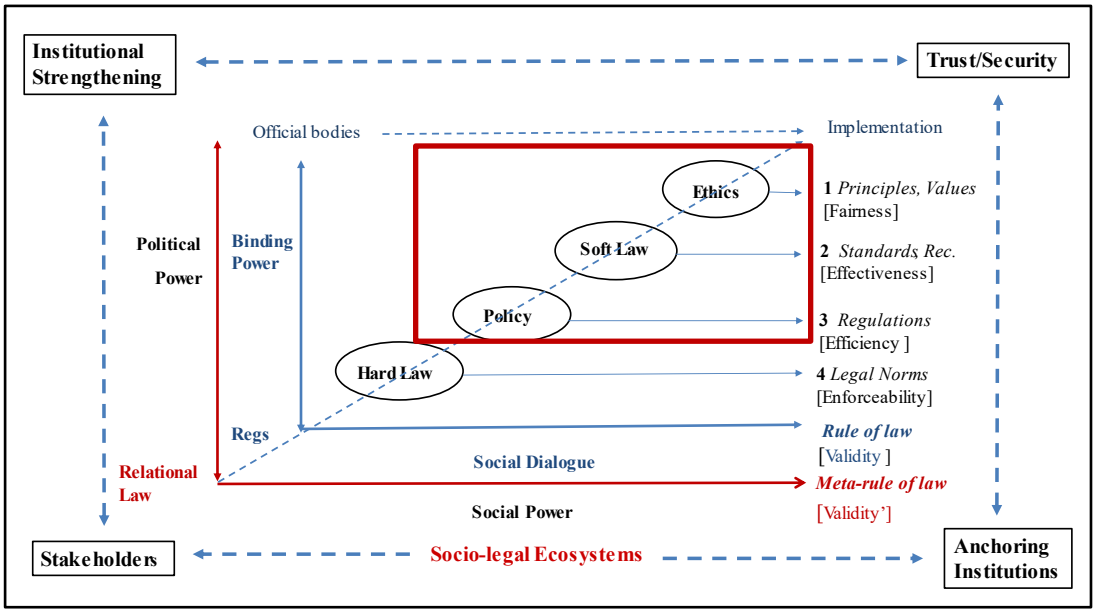

Figure 36. *A General Scheme for the Rule and Metarule of Law (adapted). Source: Poblet, Casanovas and Rodríguez-Doncel (2019)*

This scheme is useful to my objective in the present Chapter, because it shows the use of the two axes (vertical: binding power, horizontal: social dialogue), three dimensions (social, legal, and computational), four clusters (hard law, policies, soft law, and ethics), and four cornerstones (multi-stakeholder governance, anchoring institutions, the binomial trust/security, and institutional strengthening) that have been designed to produce

regulatory effects. All these elements are components of the regulatory system lifecycle under the digital law or, if preferred, elements of *legal governance*, as already introduced in Chapter 5.

It should be noted that SPIRIT is a classic security platform. Its architecture is shown in Figure 37. It combines standard components[385] with original ones.[386] I have underlined the place of the modules that have been specifically set forth to embed GDPR and ethical protections, i.e. to enact the rights of citizens, minimise biases, and monitor the information flow. I will delve on the face recognition problem in the next Chapter (related to metrics and thresholds). I will confine myself to showing now the Privacy Controller System (PCS) developed by Tiemann et al. (2021), before briefly referring to the monitoring and controlling policies because it is relevant here. It is worth mentioning too that the SPIRIT Regulatory Model (SRM) has been built on four different pillars: (i) The construction of the legal and ethical framework; (ii) Dynamic Legal and Ethical Assessments (Data Protection Impact Assessment, Incidental Findings Risk Assessment, AI Impact Assessment); (iii) Monitoring and enforcement of SRM; and (iv) Safeguarding measures. I will refer only to the two latter points in the next Subsections.

[385] Cf. Davarakis et al. (2021, 248-49). "A set of standard components have been deployed as a base of the SPIRIT platform: (i) Docker (an independent container platform to seamlessly build, share and run applications in a way that developers can manage their infrastructure and applications), (ii) Apache Syncope (user's authentication and authorisation, a very important function in SPIRIT)3, (iii) PostgreSQL users DB4 (open source object-relational database system that uses and extends the SQL language combined with many features that safely store and scale data workloads), (iv) ArangoDB content DB (open-source native multi-model database for graph, document, key/value and search needs - in SPIRIT used to store a content as a property graph), (v) RabbitMQ (asynchronous message broker supporting multiple messaging protocols, message queuing etc." In addition, partners provided: (i) UI service, (ii) Refined Search service, (iii) API Gateway service, (iv) Scheduler service, (v) Crawler services (master crawler service, slave crawler service), (vi) Scraper service, (vii) Third Party API service, (viii) NLP service, (ix) Face Detection service, (x) Face Matching service.

[386] Cf. Davarakis et al. (2021, 249). Partners provided: (i) UI service, (ii) Refined Search service, (iii) API Gateway service, (iv) Scheduler service, (v) Crawler services (master crawler service, slave crawler service), (vi) Scraper service, (vii) Third Party API service, (viii) NLP service, (ix) Face Detection service, (x) Face Matching service.

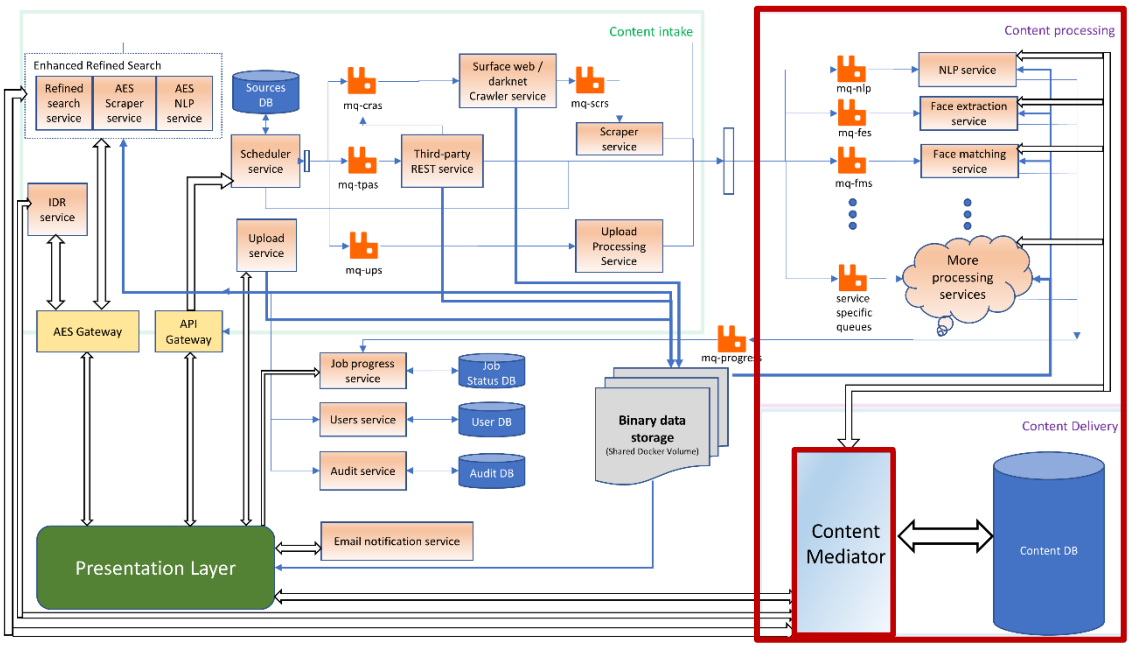

Figure 37. *SPIRIT Architecture, with the Content Mediator in place. Source: SPIRIT Project (2021)*

6.4.5 The SPIRIT Regulatory Model: Safeguards, Privacy Controller, and Ontologies

The tasks carried out by the technical team led by Marco Tiemann to implement protections can be summarised as follows: (i) Provide an authentication and authorisation framework; (ii) Record and store activity log data for privacy, legal and ethics review; (iii) Present, filter and explain activity log data; (iv) Evaluate and analyse activity log data in order to identify issues; (v) Carry out follow-up activities based on analysis output; (vi) Collaborate on addressing algorithmic bias in analytics (e.g. in face recognition) (Tiemann et al. 2021). Thus, the SPIRIT Privacy, Ethics and Legal (or PEL) subsystem was figured out as a set of components that are integrated into the SPIRIT Platform. The components making up the PEL subsystem can be grouped as follows: a) authentication and authorisation (customised Apache Syncope service), b) activity logging, c) analytics, d) output processing and e) user interaction. *The Privacy Controller System is the only entry point to the SPIRIT database*.

> The Privacy Controller System transforms acquired data into a uniform data representation and then evaluates the incoming data in order to generate or update composite data points (such as counts of failed login attempts or searches executed in a specific investigation), assign data points with a criticality score, evaluate whether data points should be

> flagged to ethics review personnel or whether data points trigger any specified actions in the system. (Davarakis et al. 2020, 253)

There are two important aspects in the PCS. The first one is its relationship with ontologies to implement GDPR and ethical requirements. The second one, the use of business rules to trigger the response of the system. Both aspects are deemed necessary (not sufficient, as we will see) to turn the SPIRIT platform used by LEA's investigators into a lawful toolset.

In Chapter 2, Subsection 2.3.6 (see Table 6), I reported some existing general GDPR ontologies. In the past five years, this has been a hot topic in legal ontology building. Nevertheless, down to earth, when the articles protecting rights are going to be built into working modules, the final solution is centred on the possible solutions. Ethical and legal requirements cannot be classified as functional or non-functional—they have an entity by their own. Even the use of the technical engineering term 'requirement' is controversial. They can be understood as *qualifiers* that accommodate and instantiate abstract values and principles rather than functional requirements. Thus, general concepts can foster guidelines, measures to be built and implemented, rather than being applied at their abstraction level.

The legal and ethical team (Emma Teodoro and Andrea Guillén) singled out fifty-two safeguarding measures to be implemented. They represented them onto the SPIRIT architecture (Figure 38). The competency questions to build up ontologies were formulated with these safeguards in mind in the Ethics Sandboxes. Again: This is a process in which the selected concepts, values and principles foster the elaboration of rules that cannot be logically inferred from the model, but 'extracted' or better 'constructed', stemming from it. Figure 38 shows the AI Ethical Principles and 'Requirements' (or ethical qualifiers), according to the following taxonomy, defined and organised according to available EU Ethical sources used in the Impact Assessments:[387]

1. Human autonomy

[387] *Ethics Guidelines for Trustworthy AI* - High-Level Expert Group on Artificial Intelligence of the European Commission (HLEG AI); *Ethical Charter on the use of Artificial Intelligence in judicial systems and their environment* - European Commission for the Efficiency of Justice (CEPEJ); *Facial recognition technology: fundamental considerations in the context of law enforcement* - European Union Agency for Fundamental Rights; *Ethical issues arising from the police use of live facial recognition technology* - Biometrics and Forensics Ethics Group of UK Facial Recognition Working Group.

Requirement 1: Human agency and oversight

2 Prevention of harms

Requirement 2: Technical robustness and safety

Requirement 3: Privacy and data governance

Requirement 6: Societal and environmental well-being

3.Fairness

Requirement 5: Diversity, non-discrimination and fairness

Requirement 6: Societal and environmental well-being

Requirement 7: Accountability

4. Transparency/explicability

Requirement 4: Transparency

Aligned as follows on Figure 38:

- P1-R1: Human autonomy – Human agency and oversight
- P2-R2: Prevention of harms – Technical robustness and safety
- P2-R3: Prevention of harms – Privacy and data governance
- P2-R6: Prevention of harms – Environmental and societal wellbeing
- P3-R4: Transparency/Explicability – Transparency
- P4-R5: Fairness – Diversity, non-discrimination and fairness
- P4-R6: Fairness – Environmental and societal wellbeing
- P4-R7: Fairness – Accountability

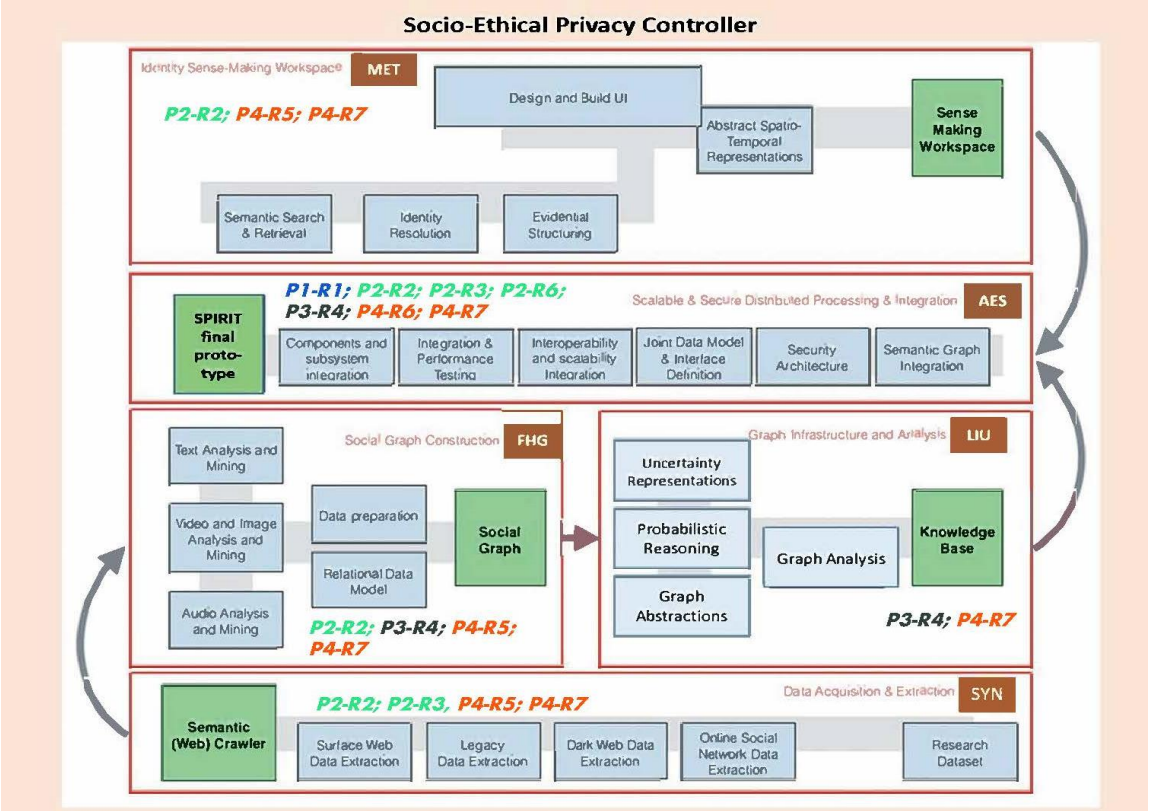

Figure 38. *AI Ethical Requirements embedded into the SPIRIT Architecture. Source: SPIRIT D9.6 (Emma Teodoro and Andrea Guillén)*

An ontology targeting all these measures would not make sense. Looking at the specific objectives, Eva Blomqvist and Olaf Hartig figured out a way to create a "low-level" ontology model that could relate the specific data gathered within the system with the high-level concepts defined in legal ontologies. The selected language and data model was the W3C Data Privacy Vocabulary.[388]

> The developed practical ontology model describes concepts including entities and investigations as they are represented in the SPIRIT Mediator and connects those concepts with elements such as a data subject and data handling concepts as they are defined in the DPV. (Blomqvist in Tiemann et al. 2021, 30)

In terms of data processing, two options were considered for the SPIRIT PEL subsystem, (i) the open source semantic web framework Apache Jena (to enable general reasoning support using Drools rules); (ii) and the SPARQL query format to formulate reasoning as a query that can be executed against an RDF representation of the SPIRIT content database (using Drools rules as well).

Figure 39 is a snapshot of the Data Integration ontology. Figure 40 shows the core concepts of DPV that are used in SPIRIT.

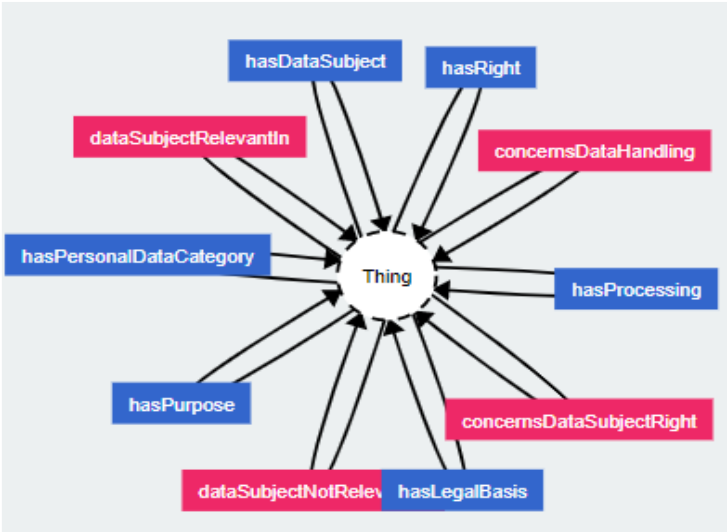

Figure 39. *Example of Spirit Data Integration Ontology. Source: SPIRIT D9.6 and D9.8 (Eva Blomqvist).*

[388] This vocabulary is being elaborated by the DPV W3C Working Group, with well-known SW researchers in the area such as A. Polleres, H. Pandit, P. Bonatti, and the W3C lawyer Rigo Wennig. This is an ongoing work, whose last version (0.4) has been published on 15/02/2022. Cf. https://w3c.github.io/dpv/dpv/

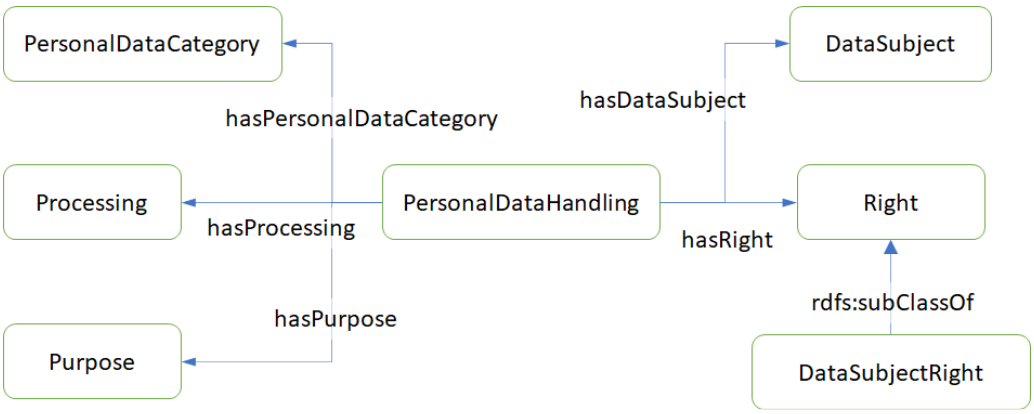

***Figure 40**. Boxes represent classes and arrows represent properties (where no namespace prefix is present this is defined natively in DPV). Source: SPIRIT D3.3. (2018, 14) (R. Adderley, E. Blomqvist, M.Tiemann et al.)*

The second aspect that it is worth explaining is the use of Drools rules in PCS. Drools is a Business Rule Management System engine.[389] It is a rule engine which produces output (actions) as a result of facts/actions processing. Figure 41 defines a rule in order to monitor the frequency with which face match requests are submitted to the system.

> The rule tail in rules defined for the SPIRIT PEL subsystem prototype focus on adding information to display in the auditor log viewer, generating composite events that are displayed as output from analyses and on modifying alert levels for log database entries when rules fire for specific potentially suspicious activities. (Tiemann et al 2021, 28)

Figure 41 shows an example of Drools Rule, where a rule is defined in order to monitor the frequency with which face match requests are submitted to the system. The mechanism is "rule head -> rule tail structure of the rules defined using the Drools Expert rule system." (Tiemann et al. 2001, 28).

[389] https://www.drools.org/

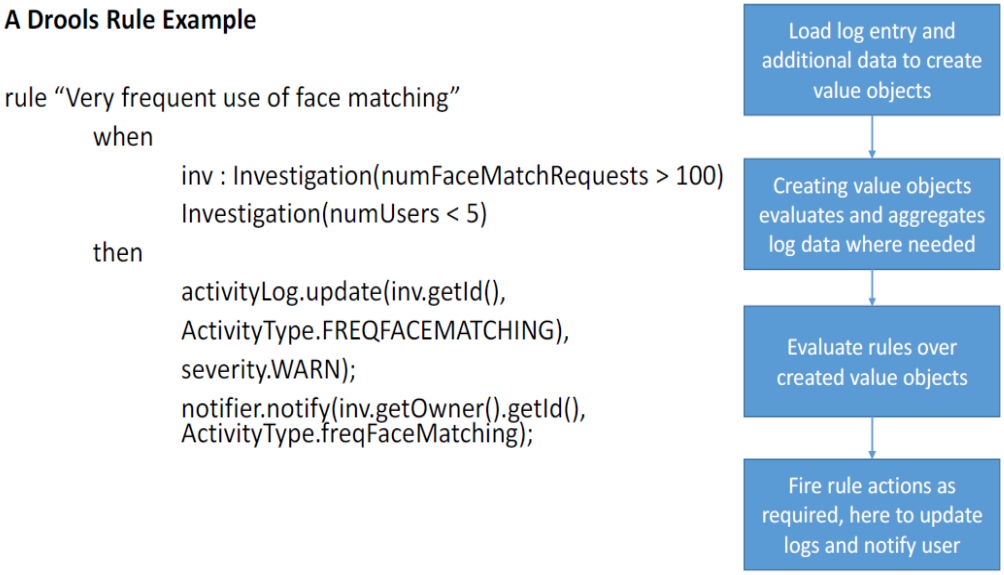

Figure 41. *A Drools Rules Example: System Analytics Usage Frequency Rule. Source: SPIRIT D9.8, Tiemann et al. (2021, 28)*

6.4.6 An Empirical Approach to Legal Isomorphism

The two examples above—the Spent Convictions and the SPIRIT systems—show the complexity of the interrelation between natural and formal languages, and the complexity of the interface between the system and its environment. Both issues require a solution to produce a legal ecosystem, stemming from an empirical approach to legal compliance and the implementation of the rule of law. This is a relevant point, as rules producing effects (Turnip) or triggering actions (Drools engine) could work outside any kind of legal value, and actually they do. Turning rules 'legal' is unavoidably an issue of public law, and it does not directly deal with ontology implementation processes and the use of business rules engines.

Semantic reasoners are a component of regulatory models, implementable into regulatory systems, but they cannot be at the same time a drive chain and the origins of 'valid' norms or 'legal' ecosystems. Their function is to embed into a computer system the internal controls that have been previously identified against a set or ethical principles and legal norms, i.e. against a specific conceptual legal model built to implement the rule of law into a system. But assuming that they *effectively* perform it is another issue, as many other

contextual variables—on the environment, scenarios, agents' behaviour etc.—intervene. In OSINT platforms, controls and checks must be put in place in advance, stemming from internal organisation controls (supervisors) and ending up in regular external controls (including Court-based, judicial ones). The general argument unfolds as follows.

The rule of law excludes tyranny as a political form. It refers to the principle according to which rulers are also abided by the law. Putting aside the formal structure of the rule of law—division of powers, procedural and criminal law, etc.—the *substantive* rule of law entails the protection and enhancement of fundamental rights. These rights can be reflected into formal languages and embedded into computer systems, according to the sources of law. The relationship between these sources and normative systems should be specified as granularly as possible. In my opinion, it can be also possible to sense, describe, and measure the emergence of legal ecosystems, identifying relationships, attributes, and values between concepts. But these ecosystems are collective outcomes, a product of coordinated behaviour and actions of individuals and social groups.

This is the reason why I proposed the analysis of complex legal notions—such as legal *validity* (or 'legality')—not as a first order property of legal components (or 'norms') but as a second order attribute of the system, a by-product of a contextual tuple (enforceability, effectiveness, efficiency, fairness). To validate it, metrics, including thresholds for partial compliance and partial validity, are necessary. I will cope with these methodological issues in Chapters 7 and 8. Producing legality and checking compliance are not discrete or 'once for all' processes. They are related, but they are different gradual processes.

Coming back to Karpf's legal isomorphism, he proposed a parallelism between deductive and inductive systems in law. Statutes are deductive legal sources while legal practice, 'consisting of precedents at various levels, is a collection of inductive sources' (Karpf 1991b. 298). Legal models are *hybrid*, a combination of both. He did not consider only normative sources, but law as data as well, which could be analysed with neural networks, for example. It is worth retaining the plurality of methods and the inductive perspective because isomorphism can also be treated from *a cognitive epistemic* approach, and in this case, it is not strictly necessary to keep the strict correspondence between textual sources and conceptual developments. Legal documents matter, but so do legal behaviour and

behavioural patterns. Most professional knowledge is tacit, implicit, conveyed and shared to specific groups with routines and acquired cultural models. This holds for the legal professions as well. Thus, some non-trivial, empirical, work must be done to structure and gear it as a whole.[390]

To sustain an empirical approach to legal sources and its relation to norms and the emergence of legal ecosystems, we should be able to reconstruct their *causal chains* (including computer *and* human behaviour). Pearl (2019, 58) has proposed a three-level hierarchy of questions that he calls: (i) association, (ii) intervention, (iii) counterfactuals. Association is purely relational statistical data. Intervention entails an active interrogation by the subject. Counterfactuals are deemed to be the third layer:

> Counterfactuals are the building blocks of scientific thinking, as well as of legal and moral reasoning. For example, in civil court, a defendant is considered responsible for an injury if, but for the defendant's action, it is more likely than not the injury would not have occurred. The computational meaning of "but for" calls for comparing the real world to an alternative world in which the defendant's action did not take place. (Pearl 2021, 58)

This assumption is a pre-condition for institution-building to produce organisational and systemic interoperability. An empirical cognitive approach does not emphasise isomorphism from legal sources to applications (legal sources are not just resources) but (i) the abstract construct of the knowledge-base and (ii) the reusability of solutions (ontologies, design patters and ontology design patterns).

I acknowledge that causation, and specially counterfactuals, are still a matter of discussion and dissent in epistemology and social sciences. Discussing, among others, James Heckman's and Judea Pearl's notions of causality and universal methods for causal inferences, Nancy Cartwright (2007, 191) has used the strong term 'impostor counterfactuals' because (i) they are proposed as "causal surrogates" but "at best they provide a way for finding out about causal relations, not a stand-in for them", (ii) they are not used directly in planning and evaluation and they cannot answer the practical questions formulated at the implementation level. I will not discuss her arguments here, but these arguments do not hold for our claim about the need to look at legal isomorphism separating validity

[390] Cf. for specific examples, Hoekstra (2009), Boer (2011), Casellas (2011), Vallbé (2014), Sileno (2016).

from validation processes in legal regulatory models. On the contrary, reinforcing the practical, experimental side of causality, they give support to our contention.

Looking back to the early days of knowledge acquisition, Breuker (2013, 177) stressed that in research apparent solutions bring new problems. From a cognitive science perspective, top-level ontologies are too simple to represent and automatise knowledge acquisition patterns. "The second problem is the fact that despite much empirical research in cognitive psychology, *we have insufficient insight in how we acquire new conceptualisations from text* [my emphasis]". Some years later, automated knowledge acquisition remains a combination of artificial and human information processing, a *semi-automated* process.

The way we structure, handle, manage and use legal knowledge depends on the way we collect, aggregate and interpret data, i.e. on our theoretical constructs. I believe that this holds for reusability—in semantics, ML, DL, NLP, and data analytics as well. So, to foster reusability, beyond the 'knowledge re-engineering bottleneck' (Hoekstra, 2010), ontology commitments, methodology, and epistemology should be made explicit. On the Internet of Things, very likely a digital twins approach to legal entities (as a subject of knowledge) can be more fruitful than the legal isomorphism approach, as the concept of law itself—what we understand by 'law'— is changing as well. This position has some implications for rulers, administration, and public services, as it entails a *holistic approach* to the construction of legal ecosystems:

> From a practical reasoning point of view, planning, monitoring, and diagnosis are parts functional to a whole, and the practical reasoning of an agency cannot but be unbalanced if one of these functions is neglected. This implies that all effort that a public administration puts into simplifying the operations in the front-office of service provision (e.g. diminishing the evidential burden on the citizen) should be coupled with effort in the back-office in support of institutional maintenance. (Sileno, Boer and Engers, 2017, 92)

6.5 Conclusions

The last assertion matters for what I would like to convey. I described in this Chapter the origins, developments, and possible uses of legal isomorphism. I hope I have been true to the authors that coined this notion and are still using it in Artificial Intelligence and Law. Not everyone will agree with my empirical approach, but I do not deem it incompatible

with logical developments. Innovation is not coming from one single position, and sometimes a pure logical application without an extended empirical support or even knowledge of the social context but consciously designed can bring significant impacts, changing the present legal framework and practices. Kowalski (2020) is pursuing his original vision. He is working in a "syntactic sugar for logic programs", a Logical English for general users (drafters, rulers, and citizens), "understandable without training in computing, logic or advanced mathematics; efficiently executable; and as unambiguous as possible, to reduce human misunderstanding, and to facilitate computer executability" (Datoo and Kowalski 2021).

Nevertheless, sociolegal ecosystems, especially in the IoT, are complex and we should be able to cope with their complexity. Atkinson and Bench-Capon (2019) have recently recognised some of the limitations in rule application and legal modelling that lawyers and legal analysts had already pointed out for analogical processes, back in the early nineties. Jointly with Al-Abdulkarim, they have developed the Abstract Dialectical Framework (ADF), replacing intermediate representations and ontologies. In ADF, the upper levels (representing legislation) should be isomorphic with the legislation, but the lower levels (representing case law) should not (although they should be capable of being traced to a case or cases) (Al-Abdulkarim et al. 2020). Stamper (2016), discussing organisation semiotics, has provocatively stated that "working on the analysis and design of an enterprise […] one must deal rigorously with the real world", while "our orthodox methods and tools are 100 years old and due for replacement".

When Waddigton (2020) describes *Rules as Code* as "currently a question, rather than a theory or a product", or the Web of NZW describes it as "the process of translating rules in legislation, regulation, policy into code so they can be consumed *and interpreted* by computers [my emphasis]", they are obviously saying different things. (I agree with the former assertion, and less with the latter one). But it is clear that they are seeking for a 'good enough' solution, able to facilitate the interface between government and citizens in democratic societies. Many times, it will. But I do also believe that sometimes a good solution might not be good enough to reach this objective. Thus, perhaps an empirical, holistic, institutionalist approach in the way I have been describing can help. *What are most needed are the tools to check, test, monitor, and validate the outcomes of such an*

endeavour. Citizens are not just consumers, and drafters, rulers and legislators are in a privileged position of power that should be accountable and transparent. This will be the subject of Chapter 7.

I added two Annexes to Chapter 6. Annex 1 and Annex 2 (Sections 6.7. and 6.8). The reader will find them after the table with the situation of Chapter 7, on political forms of legal governance.

Table 1. *Structure and Concepts of the Dissertation*

MODULES	CONCEPTS	FIELDS	CHAPTERS
Legal Web Services and Artificial Intelligence	Law as Data	Legal Anthropology and Sociolegal Studies	1. The Double Implosion of the Legal Profession and Web Services
	Law as Meaning		
	Law as Sense		
Law as Knowledge	Knowledge Graphs	Ontology and Semantic Web	2. Law as Knowledge: The Web of Linked Open Data
	Legal Ontologies		
Law as Dialogue	Agreement	Legal Theory, Sociolegal Studies, and Legal Anthropology	3. From Positivist to Relational Law: Law as Dialogue
	Legal Pluralisms		
	Relational Law		
	Relational Justice		
	Regulatory Model		
	Regulatory System		
Reciprocity and Dialogue	Integration	Legal Anthropology	4. The Legacy of Legal Anthropology
	Reciprocity		
	Legal Culture		
	Vindicatory Systems		
Legal Governance	Middle-out Approach	Epistemology	5. The Convergence between the Web of Data, the Internet of Things and Industry 4.0
	Inside-out Approach		
Linked Democracy	Rule of Law	Political Anthropology and Artificial Intelligence	6. *Legal Isomorphism* and the Emergence of Legal Ecosystems
	Metarule of Law		
	Legal Ecosystems		
	Legal Isomorphism		

Sociolegal Ecosystems	Institutional Design	Social and Political Sciences and Artificial Intelligence	7. Sociolegal Ecosystems: Political Forms of Legal Governance
	Interoperability		
Metarule of Law	Compliance *by* and *through* Design	Methodology and Use Cases	8. From Compliance by Design to Compliance through Design: An Empirical Validation Model
	Scheme		
	Metamodel		
	Validation Model		

6.6. ANNEX I to Chapter 6: *The Electronic Court*, by Giovanni Papini (1951)

October the 6th

Thinking machine building has come a long way in recent years, especially in our country, which now holds the primacy of technique, just as Italy had in its time the primacy of art, France that of elegance, England that of commerce, and Germany that of military sciences. These days the first experiments to use machines in the administration of justice are being carried out in Pittsburgh. After having built mathematical, dialectical, statistical and sociological electronic brains, the first mechanical device that make judgements has already been manufactured in this city, after two years of work. Such a giant apparatus, with a seven meters front, stands on the back wall of the main hall of the court. The judges, lawyers, and clerks do not take their usual places, but sit as mere spectators in the first rows of the public. The machine has no need for them, it is safer, more precise, and infallible than their small human brains. As its only assistant, the enormous brain has a young mechanic who knows the secrets of the innumerable photoelectric cells and the five hundred interrogation and command keys. The only memory of the past that can be seen in the machine is a bronze scale that platonically crowns the metallic legal brain. The first hearing of the brand-new Court began this morning at nine o'clock. The first justiciable was a young worker in the steel industry, accused of having murdered a young woman who resisted him. The defendant narrated the event in his own way, and the witnesses did the same. The technician then pressed a button to ask the machine which articles of code should apply to the case. In an illuminated square the requested numbers immediately appeared. The same brain, duly managed by his human secretary, granted the generic mitigations, and a few seconds later, in another quadrant, the sentence appeared: twenty-three years of forced labour for the young murderer. The automated dispenser vomited a card in which the sentence was repeated, the police inspector picked up this card and led the convicted out. Then a woman appeared, who according to the accusation had forged the signature of her employer to seize a thousand dollars. This second process was carried out even more easily and quickly: some yellow and green eyes lit up in the forehead of the legal brain, and after a minute and a half the sentence appeared: two and a half years in jail. The third process was more important and lasted a little longer. He was a repeat offender who sold secret documents relating to the security of our country

to a foreign power. The interrogation, made by the machine using acoustic and light signals, lasted for several minutes. The defendant asked to be defended and the mechanical brain, after recognizing the good law of the claim, by means of a talking disk listed the reasons that could be alleged to mitigate the shameful guilt. There was a brief pause, and then another album responded point by point, concisely and almost geometrically, to those apology attempts. The assistant consulted various sections of the machine, and the answers, immediately and orderly expressed by bright signs, were unfavourable to the accused. Finally, after a few seconds of oppressive silence, the highest quadrant of the entire machine was illuminated: first, the gloomy design of the skull appeared, and then, a little lower, the two terrible words: “electric chair”.

The condemned man, a very serious, professorial-looking middle-aged man, uttered a blasphemy when he saw that and then fell backward, writhing like an epileptic. That blasphemy was the only genuinely human word that was heard in the whole process. The traitor was put out on a hand stretcher and, groaning, disappeared from the silent room. I did not have the will or the strength to attend four other processes that had to be aired that morning. I was not feeling well, a nauseous feeling threatened to make me vomit. Was this the effect of some indigestible delicacy eaten at breakfast, or perhaps the consequence of the sinister spectacle that this new court implied? I went back to the hotel and lay on the bed thinking about what I had seen. I have always favoured the prodigious human inventions due to modern science, but that horrible application of cybernetics deeply confused and disturbed me. Seeing those human creatures, perhaps more unhappy than guilty, judged and condemned by a lucid and icy machine, was something that aroused in me a silent protest, perhaps primitive and instinctive, but which I could not silence. The machines invented and manufactured by the ingenuity of men had succeeded in taking freedom and life from their parents. A complex mechanical assembly, animated only by electric current, now sought to solve, by virtue of figures, the mysterious problems of human souls. The machine becoming the judge of the living being; matter sentencing on things of the spirit... It was something too frightening, even for a man who is enthusiastic about progress, as I claim to be. I needed a dose of whisky and a few hours of sleep to recover my serenity. The electronic court undoubtedly has one merit: that of being faster than any court made up of judges of human flesh.

6.7 ANNEX II to Chapter 6: Example of LEA's Query Using the SPIRIT System [D9.6, Annex 2: LEA's SPIRIT Use Case]

[figured out and summarised by Rick Adderley]

SPIRIT toolkit addresses a key cybersecurity issue within the OSINT (Open Source Intelligence) space. SPIRIT toolkit provides support and consultation in resolving identities among people who are deliberately trying to mislead investigators and evade arrest.

The following case study revolving around the importation of drugs is describing the SPIRIT system:

The investigator has been given the task to provide information about a suspected case of importation of drugs into the UK. In house systems are checked and intelligence reveals the surname of a person, Brooks, who may be involved. It is now time to search for open-source intelligence.

The Spirit system Automatic Search is used several times to obtain sufficient information to provide the full name of Grant Brooks, who operates from Hertfordshire and has a number of associates.

With this information to hand, to reduce the number of false positives and to reduce and refine the search space, the Spirit Refined Search is engaged using the search term, Grant Brooks.

The investigator logs in to the system, creates a new investigation and authorise it by filling the purpose of creating an investigation, the necessity, and the proportionality. As soon as the investigation is created, the investigator initiates an extraction job by keyword. Two different jobs are supported, the automated search and the refined search. Investigator selects a refined search, adds reason for searching, keyword: 'Grant Brooks' which is the target, selects the search method: Exact concerns 'Grant' **and** 'Brooks' search, Fuzzy concerns 'Grant' **or** 'Brooks' search, surface web: Google, Yahoo or both, selects media extraction tools face extraction , nlp extraction or both.

The investigator gets the first level search results, a number of entries consisting of a summary, a citation and the actual web page and ticks all the entries to procced to level 2

results. The level 2 results are again a number of entries to be selected for analysis. The analysis is extracting the texts and the images from all the web pages to produce meaningful pieces of information from those texts and link them together into a kind of a list and a chart (Graph).

As soon as the Refined search is completed the investigator accesses the results through a graph. The Graph visualises the extracted entities produced by the Natural Processing Language (NLP) with their relationships. The investigator could also select to view these entities in a relationship list and download it in a csv file.

The investigator could add nodes or links to the graph in order to feed this chart with more information or to link them with information he knows (has) already.

The investigator looking at the chart sees that there are two quite similar areas which is an indication that two person has similar connections and may be the same person. These two identities need to be resolved through the Identity Resolution process. The Identity Resolution's algorithm takes this chart and goes into this relationship list and creates a refine of all of these relationships.

Identity Resolution results return a new chart with similar format with the Refined search chart. A table of people (identities) that the system say could be similar or could be the same person is provided to the investigator.

The investigator clicks on the suspected similar identity 'Billy Smith - Mariett Snehh' to see in a colour graphical view of the connection between the two identities. The connections of 'Billy Smith' are marked with blue colour, the connections of 'Mariett Snehh' are marked with green colour and both people have nodes in common (marked with red).

IDR algorithms indicate the Billy Smith and Mariett Snehh may be the same person.

As an investigator, you will want corroboration that 'Billy Smith' and 'Mariett Snehh' are the same person. The best way to do that is to compare facial images.

The investigator initiates an extraction job to upload to the system a picture of Billy Smith in order to be extracted a face from that image.

The investigator knows who Billy Smith is because comes from his records and thus he will compare the Billy Smith from the faces extracted from the Refined search.

The investigator initiates a matching job and selects the faces from the refined search job to match against the face from the upload job.

The Matching Job results indicate that is clear to see that Billy Smith and Mariett Snehh are the same person.

- The initial graph raised the question.
- The Identity Resolution algorithms made a suggestion.
- The Face Matching service confirmed the IDR’s suggestion.

CHAPTER 7

7. Sociolegal Ecosystems: Political Forms of Legal Governance

Summary: This chapter introduces the notions of 'metarule of law' and 'sociolegal ecosystems' to both foster and regulate linked democracy. The chapter summarises briefly the notions of multi-stakeholder governance; responsive, better and smart regulation; requirements for legal interchange languages (legal interoperability); normative multi-agent systems; and cognitive ecology. It shows how the protections of the rule of law can be embedded into the semantic languages of the web of data and reflects on the conditions that make possible their enactment as a socio-legal ecosystem. The chapter draws in the end a pragmatic layer for the legal governance of the IoT and Web 4.0, and the central position of legal ecological validity to close the system, i.e. to 'make sense' of it.

Keywords: Political forms of legal governance, Responsive regulations, Smart regulations, Better regulations, Network governance, IT governance, Functional and algorithmic Governance, Smart data, Multi-stake holder governance, Types of interoperability, cognitive ecology, socio-cognitive systems, legal ecosystems.

7.1. Introduction

In the next Sections will develop the subject of sociolegal ecosystems. In Chapters 5 and 6 I have already introduced the metarule of law and other notions—such as relational law and justice—that will be used and fleshed out in two last Chapters (7 and 8) of the Dissertation.

Chapter 7 deals with some of the emerging regulatory paths of Web 2.0 (the Social Web), Web 3.0 (the Semantic Web) and the Internet of Things. As already brought up in chapter 2, the layer of legal linked open data has attracted much attention and is still under construction. Yet, this layer of interconnected data and metadata is, broadly speaking, a necessary condition for the social enactment of *sociolegal ecosystems*.

As contended, legal instruments and relationships (the "law") cannot be understood in the same way as in the last century. This also holds true for the rule of law: rights and duties

can be enacted in a more immediate and effective way through the languages of the web of data. This comes with both benefits and drawbacks. In Chapters 5 and 6, I asserted that, in its present form, law does not suffice to regulate the ecosystems that are necessary to keep the social and political conditions of the web safe, secure, and productive. Rather, law, soft law, governance, and ethics should be tied together into a broader regulatory model to grapple with the challenges of algorithmic governance, data analytics, and semantics.

The second Section of this Chapter (7.2.) will briefly describe the two approaches to the rule of law with which legal anthropology is intimately related: (i) historical, (ii) and sociolegal, plus (iii) the political forms of functional algorithmic governance. These approaches are complementary and offer some components for the general scaffolding of the regulatory concepts that will follow. However, it will be argued that this perspective is valuable but not sufficient either, as it has yet to encompass the general framework set forth by the convergence between LOD, Web 3.0, the IoT and Industry 4.0. According with this argumentation, I will redraw the general framework within which regulatory and legal systems will operate.

The third Section (7.3) introduces the list of requirements that usually hold for legal interoperability, and we briefly summarise the notions of multi-stakeholder governance, and responsive, better, and smart regulations. Regulatory theoretical approaches and innovative forms of governance provide the legal foundations for linked democracy. The Chapter will end up with the general framework and pragmatic layer for the legal governance of the IoT and Web 4.0. I will show the central position of legal ecological validity to close the system, i.e. to *make sense* of regulations in the IoT.

7.2 Political Forms of Legal Governance

7.2.1 Against Tyranny: The Hobbes' Problem

Let's get started with Hobbes. The Web of Data is changing the whole regulatory framework of the rule of law.[391] Traditionally, the rule of law—a set of practices, norms, rules

[391] This chapter elaborates on previous accounts of the metarule of law, provided in Casanovas (2012, 2015a, 2015b, 2017), and linked democracy (Casanovas, Mendelson and Poblet, 2017; Poblet, Casanovas

and principles for the functioning of the market and the construction of a collective social body— conceptualises the principle that tyranny and totalitarian forms of government should be excluded from ruling societies. This is also known as the "Hobbes' problem": *the restriction of the arbitrary exercise of power by subordinating it to the scope of well-defined laws, and the constitution of a collective political body under this rule* (Stone, 2015). Hence, the rule of law is supposed to raise protections against three tyrannies: "(i) the *tyranny of fear* —no individual may be arbitrarily treated, punished nor imprisoned by the State, nor by the powerful; (ii) the *tyranny of the few*—no King, Minister, nor Mafioso is above the law; (iii) and the *tyranny of the majority* —no minority group may be persecuted with impunity" (Nicolaidis and Kleinfeld, 2012).

Linked democracy still faces these same issues. Tyranny is the ancient name for dictatorship. But if we wonder whether modern democracy on the web has come to terms with these threats, we are afraid that the answer is negative. All evidence points to the opposite direction. The Internet is precisely a good example of non-democratic governance. Rich nodes become richer, following a probabilistic power law, and semantic contents are being controlled and monitored by a myriad of organisations (including national states), but barely by the people that are creating them. A few corporations have a dominant position. They are able to trade and invade privacy, and they usually do. As Shadbolt and Hampson (2018) have nicely put it, we live in a *hyper-complex environment, shaped by our own tools*. This is a good breeding ground for elites to thrive. But as they point out:

> what *has* changed is human potential, thanks to our transformative new tools. […] The point is not that machines might wrest control from the elites. The problem is that most of us might never be able to wrest control of the machines from the people that occupy the command posts" (Shadbolt and Hampson 2018, 63).

Almost in parallel, some historians and jurists have expressed the concern that, through "heedless acts of conformity" and "anticipatory obedience" people might gradually get used to the present situation, heading again to totalitarian forms of power (Snyder, 2017). On the contrary, by not accepting the way things are, we can empower ourselves to learn from the past and be resilient to new forms of power that mirror the old ones. This is even

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and Plaza, 2017), and especially Poblet, Casanovas and Rodríguez-Doncel (2019, Chapter 5). See, in this Dissertation, 1.6, 7.7.2, and 8.3.3.

more true in a completely digitalised world where we should learn not just from the past but from the (possible) future, because the accelerated paths of innovation require a keener attention.

The risk models during the 2008 global financial crisis failed because they assumed that the future would be no different from the past. Cathy O'Neil (2016) has convincingly suggested the wishful thinking embedded in the belief that mortgages would offset the losses. To her, that thinking was in fact a financial black alley convenient enough to optimize short-term profits for the sellers. The three elements of what she has referred to as "weapons of math destruction" are *opacity*, *scale*, and *damage*. Semantics, algorithmic governance, and AI produce a *hybrid* environment where the human/machine interface is renewed and continuously redefined. This is also a job for human beings. We should learn how to control and monitor it. Empowering people seems to be the first step to protect us from democratic erosion.

Let's have a historical and sociolegal perspective to evaluate the way a methodology should be built to cope with the problem, which is a contemporary variant of the Hobbes problem.

7.2.2 History and Institutional Design

In the Introduction, Chapter 1, and Chapter 4, I paid attention to Josiah Ober's approach to democracy and elite threats in Ancient Greece. Linked democracy as a political form can be better understood and developed if we consider its design at the crossroads of the three conditions that Ober considers: (i) the aggregation, alignment, and codification of useful knowledge to exploit opportunities and learn from mistakes, (ii) the link between liberty and the handling of disperse, collective knowledge among people, (iii) the harmonisation of institutional and technological instruments to foster innovation, coordinate initiatives, and to reach common objectives (Ober 2008). These three conditions should be grounded on ethical principles of social justice and wealth distribution to be effective. They do not lead to an unnecessary idealisation but can stand instead as necessary non-sufficient conditions to develop a sustainable democratic society.

Both *competition* and *cooperation* matter here. According to Ober, "democracy can best compete with authoritarian rivals and meet the challenges of the future by strengthening government by the people" (2008, 6). Democracy as a political system can align rational political choices with moral choices, and theoretical assumptions with practical results. It deals with social solutions to the problems of collective action, coordination, and common pool resources.[392]

This equilibrium was the main achievement of the classical period. Athens and many other city-states (*poleis*) managed to avoid tyranny and overcame oligarchy while undergoing sustained growth. Using the development index, Greece only returned to similar levels of wealth and welfare some 2,300 years later, in the mid-20 c. Ober's work has consistently offered empirical evidence that Greek "effloresce" (5 and 4 c. BFC) lasted several centuries and continued during Hellenistic times.[393]

Efflorescence, defined as "increased economic grow, accompanied by a sharp uptick in cultural achievement" (Ober 2015, 2) is an interesting concept. Among other components, it relies on a decentralised organisation of political power and the ability to reduce transaction costs. Even when Philip of Macedonia and his son, Alexander, imposed monarchic rule to *Hellas*, Greek *poleis* kept thriving under democratic regimes that leveraged their financial and military expertise, and the cooperation between elites, citizens and kings.[394] In his last book on 'basic democracy', *demopolis*, Ober (2017) extends the argument of economic efflorescence to ethical and political conditions of living, *human flourishing*, i.e. "the chance to live as an active participant in a reasonable secure and prosperous society in which citizens govern themselves and pursue other projects of value to themselves" (Ober 2017, xiv).

These theses exclude Mancur Olson's argument, based on general rational choice theory, that once a human group exceeds a certain size, rational self-interested individuals cannot act to achieve their common interests, as they cannot pay the costs of cooperation and

[392] See Ober (2015, 103 and ff) for the formulation of Ober's hypothesis on wealth and growth.
[393] Ober's conceptualization is rooted on the digitization of the available data on 1035 poleis carried out by the *Copenhagen Polis Centre's Inventory of Archaic and Classical Poleis* (Hansen and Nielsen, 2004).
[394] On the superiority of "king-polis equilibrium" over a counterfactual equilibrium predicated on unlimited coercive power, see Ober (2015, 309). See the formal game model at Appendix II, pp. 321-328.

control free riding Olson ([1965] 2009).[395] This argument is similar to the commons paradox contested by Elinor Ostrom, according to which only a superior centralised and hierarchical force is able to produce a stable social order. In *Linked Democracy* (2019), we proposed a raw alignment of rights and protections of the substantive rule of law with the linked democracy properties and principles of Ostrom's Common-Pool Resources (CPR).[396] I will not repeat here this argument. It has been developed in another direction by Pitt and Dionescu (2014, 2015) leaning on Ostrom principles for the commons as well. Pitt and Ober (2018) and Pitt et. al. (2020) have developed an algorithmic model for self-reflexive governance and self-organised communities based on Ober's original ideas on epistemic democracy. An argument based on CPR has also been resumed by Poblet and Sierra (2020), in their analysis of the case of computer-mediated communities of mutual help within the framework of the core design principles of common-pool resources.

Ober, contrary to Olson, shows that non-cooperation was not the case in Ancient Greece:

> The highly complex activities carried on by most middling or large Greek city-states, and especially by large democracies, were the products of communication and choice-making on the part of many individual citizens who did not know each other as individuals. Given that most Greeks lived in middling or large poleis, we cannot resort to Mancur Olson's small-group exception to explain decentralised Greek cooperation. Choices were strongly influenced by formal and informal rules, but the rules of the community were not given or enforced from above, by a supreme ruler or by divine dispensation. *The rules governing each polis, laws and customs alike, were self-consciously devised and often revised, by the citizens themselves*. The citizens of each poleis acted as a collectivity —as a more or less coherent group agent. (Ober 2015, 56) [my emphasis]

Arguably, Ancient Greece's reliance on slavery makes a difference with the modern world. This is right. However, since its inception, democracy in Athens was also based on distributed knowledge that made Athenians stronger than their neighbours, able to resist and respond to violent external threats, while keeping under control dissidence and internal riots. In his last, comprehensive book, Ober (2015) describes the unexpected

[395] Cfr. Olson ([1965] 2009) and Ober (2015, 46).

[396] Ostrom's CPR Principles are: 1. Clearly defined [user and resource] boundaries; 2. Rules in use matched to local needs and conditions; [congruence between appropriation and provision rules, or benefits and costs; 3. Individuals affected by these rules usually participating in modifying the rules; 4. System for self-monitoring members' behaviour [and resource monitoring]; 5. Graduated system of sanctions; 6. Access to low-cost conflict-resolution mechanisms; 7. Right of community members to devise their own rules respected by external authorities; 8. Nested enterprises (multiple layers).

victory of Athenians against the better trained warriors of Sparta, Chalkis, and Beotia in 506 BCE. He quotes Herodotus' comment about it:

> The Athenians at this point become much stronger. So, it is clear how worthy an object of attention is equality of public speech (*iségoria*), not just in one respect but in every sense. Since when they were ruled by tyrants, the Athenians dis not stand out from their neighbours in military capability, but after deposing the tyrants, they became overwhelmingly superior. This, then, shows that *while they were oppressed, they were, as men working for a master, cowardly, but when they were freed, each one was eager to achieve for himself.* [my emphasis, *Histories*, 5.78]

It was a matter of rewarding innovations, aligning skills, and coordinating collective efforts to reach common objectives. A matter of trust, motivation, and distributed power among citizens. I.e. a matter of *personalisation and education*, as noticed by classical studies on Greek culture as well (Jaeger 1973).

As remote in time as they may seem, these features are not dissimilar to the objectives of the web of data. Knowledge sharing, coordination, support to personal queries and objectives, and individuation of services, are among the goals of decentralised data publication and knowledge management (Domingue et al. 2014). Most important: this specific end-user approach is supported by a general policy of *decentralisation* of linked open data and infrastructures from states and big corporations (Taylor and Boniface 2017). We will follow this argument later.

There are four aspects pointed out by Ober that we deem useful to our own work on linked democracy and the rule of law: (i) the longstanding social role of institutional design to frame political relationships, (ii) the importance of legal rules for self-correction and adaptation to changing environments, (iii) the open access to a shared knowledge, (iii) the pragmatic construction of a political (legal) language, to express and communicate both confluence and dissidence in exchanges and negotiations. This means bringing together several ways and methods of regulation to create sustainable regulatory frameworks.

7.2.2 The Sociolegal and Anthropological Approach: Power and the Rule of Law

As we have shown in previous Chapters, since the second half of the 20th century, the sociolegal approach to legal and regulatory subjects has been focusing on the historical, sociological and economic description of legal professions, courts, parliaments, legal

culture, institutions, contextual changes, and the rule of law. In short, on the relationships between regulations, policy, law, and political power. Are laws and legal instruments good enough to secure governance, best practices, and a fair implementation of citizens' rights?

Power can be defined in many ways. We may embrace the classical perspective of the unlimited use of force, or the more nuanced one of institutional theories (Simon [1945] 1955) —where power is the capacity to set the framework within which organisations and social systems make decisions. Both approaches try to capture the unbalanced position where rulers command and the ruled are supposed to obey.

For our purposes, we will adopt a minimalist notion of power, as a capacity to define purposes, reach objectives, and getting things done. Power scaffolds agency and fosters innovation. In this sense, the notion can apply to collective action as well. But power has its dark side. It is hard to attain, deploy, and keep, and once acquired it tends to define and enforce rules (and values) over individual aspirations and decisions. As already shown in previous Chapters, legal anthropologist such as Laura Nader, June Starr, Jane Collier, Carol Greenhouse … focused on asymmetrical power relations and world historical time to carry out their ethnographic work.[397]

Contemporary international lawyers, legal theorists, and legal anthropologists have noted that the rule of law encompasses an idealised image of government and power. Rather than a theory of power and government, the rule of law is a set of normative propositions to be used as a landmark, a "bedrock", or benchmark to test political and legal systems. Authors may diverge about its content. According to Tamanaha (2007, 2009) there is a "thin" or "formal" definition of the rule of law—set forth in advance, public, general,

[397] Starr and Collier explained it as follows: "Historical analysis thus becomes a dynamic aid in understanding the role law plays in changing asymmetrical power relationships among social groups, and how that role is limited. Instead of treating change and power differences as variables that complicate a structural or structural-functional analysis of dispute management, [we] focus on power differentials to understand both the course of legal change and the persistence of certain legal ideas and processes through time. Rather than ask how societies achieve the peaceful resolution of disputes, most ask how individuals and groups in particular times and places have used legal resources to achieve their ends. Instead of focusing on either normative systems or dispute processes, [we] analyze the relationship of law to wider systems of social relations. We have thus modified the field of legal anthropology in the process of revitalizing it." (Starr and Collier 1989, 1-2)

clear, stable and certain, and applied to everyone according to its terms—and a more substantive one "embracing fundamental rights, democracy, and/or criteria of justice". [398]

The link between the rule of law, legal pluralism and the so-called "new legal realism"[399] has been also assessed: the rule of law is not solely "rule by law" (Ginsburg and Moustafa, 2008). Reliable data based on empirical grounds is essential. Several empirical studies on the "unrule of law" in authoritarian and post-authoritarian regimes have consistently shown that implementing its substantive version is still a real challenge for democracies, especially in post-war situations. These studies usually focus on the non-democratic bias of informal practices (Gel'man 2004), political obstacles to implement human rights policies (Uildricks 2010), and the crucial role played by a non-independent judiciary in developing countries to maintain the power of elites (Cheesman 2015).

Moreover, as Stewart Macauley (2006) reminds in his account on old and new legal realism, the issue of political power and how it can influence, manage, and eventually prevent research cannot be ignored. Obstacles for the rule of law affect not only the states with the lowest scores of the fragile states index of the *Fund for Peace*[400], but the more robust ones. To sum it up: "Law is not free" (Macauley 2006).

This position tends to assume the metaphor of the existence of "recursive" relations between social practices and the law (and law and politics) used by most sociologists — Habermas, Bourdieu and Giddens among others— to describe the interface between norms and facts at the end of the 20th century.[401] This metaphor is also present in the debate on the sources of international law (d'Aspremont and Besson 2017, 29):

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[398] See also Carothers (1998).

[399] That is, "the importance of empirical research at the ground level to unpacking how the law works" is enhanced through new analytical methods and capacity of self-reflection (refreshing of pragmatist philosophy, new forms of governance, and democratic experimentalism) (Erlanger et al. 2005). See also Merry (2006) and Miles and Sunstein (2009). A mapping of "new legal realism" is offered in Nourse and Schaffer (2009): "A dynamic new realism would recognize the "principle of simultaneity", "that law, politics, and society, not to mention markets and governments, cannot be reduced to one another because they interact simultaneously" (ibid. 61).

[400] http://fundforpeace.org/fsi/indicators/p3/

[401] In the same vein, Selznick (2003: 178) reminded that "for a well-ordered legal system, nothing is more important than social support. The more integrated law is with other institutions, and with what people can accept as sensible, the easier it is to make the system work, and to deliver justice as well as law. When the police or other officials are isolated from the community, they rely on coercion and on bare assertions of authority. They become weak and defensive, arbitrary, brutal, and costly."

> […] *recursive relationship* privileges unity, coherence, and the existence of a unifying inner logic which transcends mere interstate relations and constitutes a *legal* structure. In this respect, the *social practices* of those officials who are part of the institutional workings of the system, and especially those with law-applying functions are of heightened relevance in conceiving International Law as a system.

Anthropologists and Law and Society scholars have highlighted the obstacles that hamper the social and political uptake of the rule of law. There is no such international system yet. Even worse, the ideology of a generalised 'rule of law' has been the flagship for international policies (and policing) over third-world countries that supposedly had to embrace its benefits to get loans form international financing institutions. From this perspective, promotion of the rule of law can be also understood as a way of constructing a transnational legal order, including projects of electoral monitoring, post-conflict legal reconstruction, or the creation of institutions for transitional justice. This is what Taylor (2017, 394) has recently denominated "regulatory rule of law".

Notwithstanding this, the positive side and protections of the rule of law are deemed to transcend the boundaries of national states to become a general paradigm, an institutional ideal to be embedded into the making of markets, institutions, and human relationships (Palombella 2009, 2010).

We can assume such ideal, under two conditions (Poblet et al. 2019). First, we should treat it is as a *design ideal*, not as a fact (i.e. as a series of principles to be nested into the Internet and the Web through algorithms and the languages of the Web of Data). Second, we should be able to make compatible two competing legal theories of law and regulation since the 20th century. Namely, formal (jurisprudential) and empirical (sociological) approaches to regulations. This is another ideal that has not been completely reached yet, and whose difficulty should not be diminished.

In 1978, sociologists Philip Nonet and Philip Selznik distinguished between three modalities of basic 'states' or *Idealtypen* of what they called "law-in-society": (i) law as the servant of repressive power, (ii) law as a differentiated institution capable of taming repression and protecting its own integrity; (iii) law as facilitator of response to social needs and aspirations. They pointed out the procedural and self-contained nature of "autonomous" law, compared to "responsive" law:

> Repressive, autonomous, and responsive law can be understood as three responses to the dilemma of integrity and openness. The hall mark of repressive law is passive, opportunistic adaptation of legal institutions to the social and political environment. Autonomous law is a reaction against that indiscriminate openness. Its overriding preoccupation is the preservation of institutional integrity. To that end, law insulates itself, narrows its responsibilities, and accepts a blind formalism as the price of integrity. A third type of law strives to resolve that tension. We call it responsive, rather than open or adaptive, to suggest a capacity for responsible, and hence discriminate and selective, adaptation. [...] *It perceives social pressures as sources of knowledge and opportunities of self-correction.* (Nonet and Selznick 1978, 76-77)

We will focus on the passage from the second to the third state in the next Subsections. *Responsive law* has turned out to be an influential concept.

7.2.3 Political Forms of Legal Governance: *Responsive, Smart,* and *Better Regulations*

Embedding legal meaning (top-down) into texts is not the solely way to proceed. Empowerment of citizens and interactions in the social fabric and markets can also offer a complementary starting point. This goes back to the third state of the law theorised by Nonet and Selznick (1978): "a wider sharing of legal authority", "participatory decision as a source of knowledge, a vehicle of communication, and a foundation for consent".

We will highlight three different empirical approaches—*responsive*, *smart,* and *better* regulations—which are not identical, but are devoted to the objective of getting law closer to civil society. These are *political* forms of governance. I.e. forms of opening the institutional sites to participation or cooperation with citizens. Nevertheless, it should be noticed that this is a double-driven (top-down / bottom-up) path. There is an *official, dynamic* framework settlement of these participation mechanisms.

After work done by socio-legal scholars such as Selznick, Nonet and Kazan, and activists such Ralph Nader[402], the "responsive law" idea came into age and was fleshed out by legal sociologists and criminologists. How regulations and law should be approached if their main aim were empowering people? According to Braithwaite:

> Responsive regulation involves listening to multiple stakeholders and making a deliberative and flexible (responsive) choice from regulatory strategies that can be conceptually

[402] http://csrl.org/about/

> arranged in a pyramid. At the bottom of the pyramid are more frequently used strategies of first choice that are less coercive, less interventionist, and cheaper. [403]

Braithwaite and Ayres (1982) showed that compliance, respect, and cooperation in implementing regulations were possible if citizens and professional people could embrace and apply them into their everyday life. So, they should be co-involved in lawmaking, deployment and even enforcement of legislation throughout the legal drafting, implementation, and eventual reform process. Between state regulation and self-regulation there are many stances that it is worth to explore:

> Good policy analysis is not about choosing between the free market and government regulation. Nor is it simply deciding what the law should proscribe. If we accept that sound policy analysis is about understanding private regulation—by industry associations, by firms, by peers, and by individual consciences—and how it is interdependent with state regulation, then interesting possibilities open up to steer the mix of private and public regulation. It is this mix, this interplay, that works to assist or impede solution of the policy problem. (Ayres and Baithwrite 1982, 3).

Thus, democracy is enhanced and citizens are empowered by: (i) doing choices to vote in the marketplace; (ii) voting rights in a representative democracy; (iii) participating "in any local area of collective decision making that has an important effect on their lives—in their workplace, school, local planning authority, nursing home, etc."); and (iv) standing for office, vote, and collectively participate in special-interest and public-interest associations (ibid.).

Elaborating on top of Braithwaite´s work, a related view is contended by the concept of "smart regulation", coined by Gunningham, Grabosky and Sinclair (1998) for the environmental field:

> The term refers to a form of regulatory pluralism that embraces flexible, imaginative and innovative forms of social control. In doing so, it harnesses governments as well as business and third parties. For example, it encompasses self-regulation and co-regulation, using commercial interests and non-governmental organisations (NGOs) (such as peak bodies) as regulatory surrogates, together with improving the effectiveness and efficiency of more conventional forms of direct government regulation. (Gunningham and Sinclair 2017, 133)

[403] http://johnbraithwaite.com/responsive-regulation/

The authors try to avoid dichotomies (government/citizens, state/market…) to focus on the plurality of regulatory forms, influences, and interactions among international standards organisations, trading partners and the supply chain, commercial institutions and financial markets, peer pressure and self-regulation through industry associations, internal environment management systems, and culture (i.e. "civil society in myriad different forms") (ibid.). This leads to different design regulatory principles: (i) preferring complementary instrument mixes over single instrument approaches, (ii) less interventionist measures, (iii) escalating response up an instrument pyramid to build in regulatory responsiveness, (iv) empowering third parties to act as surrogate regulators, (v) encouraging business to go "beyond compliance" within existing legal requirements. (ibid.). Government should bind themselves to entice or induce rather than enforce compliance.[404]

Both responsive and smart approaches have eventually been taken into account by the European Commission when launching a *better regulation* planning throughout the whole European policy cycle. Table 14 summarises the principles:

Table 14. *Principles of Better Regulation. Source: Better Regulation Toolbox, pp. 6-7.* [405]

Embedded in the planning and policy cycle	Be well-planned and timely. All the preparatory and analytical work, including stakeholder consultations, must be done in time to feed into the policy development process.
Of high quality	Be of the highest quality. The basis of any stakeholder consultation should be clear, concise and include all necessary information to facilitate responses.
Evidence-based	Be based on the best available evidence including scientific advice, or a transparent explanation of why some evidence is not available and why it is still considered appropriate to act.
Participatory/ Open to stakeholders' views	Ensure wide participation throughout the policy cycle. Open web-based public consultations should be mandatory elements of any consultation strategy associated with and evaluation or impact assessment.

[404] Thus, "the preferred role for government under smart regulation is to create the necessary preconditions for second or third parties to assume a greater share of the regulatory burden rather than engaging in direct intervention (Gunningham and Sinclair 2017, 139).

[405] This Toolbox complements the *Better Regulation Guideline* presented in SWD (2015) 11, and updated in 2017. https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox/better-regulation-toolbox-0_en; Brussels, 7 July 2017 SWD (2017) 350: https://www.emcdda.europa.eu/system/files/attachments/7906/better-regulation-guidelines.pdf

Respect for subsidiarity and proportionality	EU action must be relevant and necessary, offer value beyond what Member State action alone can deliver and not go further than is necessary to resolve the problem or meet the policy objective.
Comprehensive	They must consider relevant economic, social, and environmental impacts of alternative policy solutions. Stakeholders' views must be collected on all key issues.
Coherent/ Conducted collectively	Be coherent. New initiatives, impact assessments, consultations and evaluations must be prepared collectively by all relevant services in the framework of interservice groups.
Proportionate	Be proportionate to the type of intervention or initiative, the importance of the problem or objective, and the magnitude of the expected or observed impacts.
Transparent	Be clearly visible. Results of evaluations, impact assessments and consultations should be widely disseminated. Stakeholder responses should be acknowledged, and consultation results widely disseminated through a single access point. The reasons for disagreeing with dissenting views must be explained.
Unbiased	Be objective and balanced. They should inform political choices with evidence - not the other way around.
Appropriately resourced and organised	Be underpinned by sufficient human and financial resources to enable each evaluation, impact assessment or consultation to deliver a timely high-quality result.

These principles are applied through several mandatory instruments before an initiative is launched and funds are allocated: roadmaps, Impact Assessments, fitness checks, and eventually final audits. According to the Better Regulation agenda, the EU Commission should ensure that (i) decision-making is open and transparent, (ii) citizens and stakeholders can contribute throughout the policy and law-making process, (iii) EU actions are based on evidence and understanding of the impacts, (iv) and regulatory burdens on businesses, citizens or public administrations are kept to a minimum.[406]

Thus, responsive regulation is a way to cope with the "legitimacy market failure" pointed out by Purnhagen (2014, 51): "top-down macro-economic regulation without a social bottom-up backup by the peoples of Europe has mostly failed".

[406] https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how_en

It is useful to look at this issue from an internal corporative perspective. Susan Silbey's work on compliance, management and organisations is relevant here. She has been consistently studying patterns of professional compliance behaviour during the last twenty years. The professional way of creating institutions to cope with regulations presents a great degree of variability. It can be explicit or tacit, structured through collective accepted norms or, on the contrary, merely reactive to particular situations. Silbey has emphasised the diversity of practices and models to perform organizational governance practices across and within organisations, i.e. "the differential resources and capacities of organisational actors as contributing to and constitutive of the organisation's ability to govern itself" (Gray and Silbey 2014, 139). She has recently introduced the concept of *accountability infrastructures, "*a network of offices, roles, programs, and procedures dedicated to aligning the organization's operations with external standards, codes of conduct, ethical and normative expectations, and regulations" (Huising and Silbey 2021, 40).

Interestingly, Gray and Silbey (2014) proposed a typology to correlate with organizational hierarchy to provide the link between microlevel action and discourse and organizational performance. They identified three different accounts of the ways in which regulators work with organizational actors:

> (i) as threats to organizational performance because the regulator attempted to enforce the law regardless of the efforts or intentions of the organizational actor, (ii) as an ally seeking to achieve the public interests behind regulation by working in collaboration with the organizational actors, (iii) and as an obstacle to organizational production that neither serves the public interest nor achieves compliance with regulations. (Gray and Silbey 2014, 136).

Compliance by and through design, i.e. focusing on mediating compliance technologies, should take into account these findings to better understand the relationship between business languages and organisational design and decision-making.

7.2.4 Political Forms of Legal Governance: Network Governance, IT Governance, and Multi-stakeholder Governance (MSG)

Governance is a widely used concept in political science and management studies. *Network governance* refers to the relational structure that enables the emergence of an ordered regulation among networks of organizations (companies, administrations,

governments…). In the public domain, "the term 'policy network' refers to sets of formal and informal institutional linkages between governmental and other actors structured around shared interests in public policymaking and implementation" (Rhodes 2007: 1244).[407] When technology comes into play, governance acquires a dimension of e-governance or, more precisely, *IT governance*: "regimes of IT-related standards, agreements, methods, rules, and practices that constrain, prescribe, and enable the implementation and use of ICTs to support government activity" (Scholl et al. 2011, 343).

It is generally assumed that complex networks have a legal, organisational and a technological dimension. When defined as multilateral collectivities, networks can be extremely complex, self-initiated, mandated, or contracted to"work together to achieve not only their own goals, but also a collective goal" (Provan and Kennis 2007, 231).

After the 2002 World Summit for Sustainable Development (WSSD) in Johannesburg, the concept of *multi-stakeholder governance* (MSG) is usually understood as a way to bring together all interested players in the global space (Hens and Bashkar 2005). Transnational public policy is deemed to go beyond national states. It is "most legitimately exercised through a network of affected stakeholders" (Malcolm 2008).

Stakeholders were early defined as "those who have an interest in a particular decision, either as individuals or representatives of a group. This includes people who influence a decision, or can influence it, as well as those affected by it" (Hemmati 2002). Thus:

> The term multi-stakeholder processes describes *processes which aim to bring together all major stakeholders* in a new form of communication, decision-finding (and possibly decision-making) on a particular issue. They are also based on recognition of the importance of achieving equity and accountability in communication between stakeholders, involving equitable representation of three or more stakeholder groups and their views. They are based on democratic principles of transparency and participation, and aim to develop partnerships and strengthened networks among stakeholders. (ibid.)

[407] According to Rhodes' summary (ibid.): (i) Any organization is dependent upon other organizations for resources; (ii) to achieve their goals, the organizations must exchange resources; (iii) the dominant coalition retains some discretion; (iv) the dominant coalition influences which relationships are seen as a problem and which resources will be sought; (v) the dominant coalition employs strategies within known rules of the game to regulate the process of exchange; (vi) variations in the degree of discretion are a product of the goals and the relative power potential of interacting organizations; (vii) this relative power potential is a product of the resources of each organization, of the rules of the game and of the process of exchange between organizations.

As a regulatory strategy, this approach originated within the corporate business field as a set of good practices for social corporate governance[408], and was extended to the social field in the public sphere. The differences are quite evident (Fransen and Kolk 2007). Democracy and democratic requirements emerged as political issues almost immediately. "Stakeholder democracy" called for innovative, sustainable, and accountable models of pluri-lateral forms of governance, partnerships agreements, and forums institutionalising relationships between state and non-state actors, such as NGOs, civil rights associations and affected citizens (Bäckstrand 2006).

This MSG approach have been endorsed by a number of international organisations to create multi-stakeholder standards —e.g. Ethical Trading Initiative (1998), Fair Wear Foundation (1999), Voluntary Principles on Security and Human Rights (2000), Business Principles for Countering Bribery (2002), Extractive Industries Transparency Initiative (2002), Fair Labor Association (2002 revision; first version 2000), Climate, Community and Biodiversity Standards (2004), International Council on Mining and Metals Sustainable Development Charter (2004), Joint Initiative on Corporate Accountability and Workers' Rights Base Code (2005), European Telecommunications Network Operators Environmental and Sustainability Charters etc. (Fransen and Kolk 2007).

However, after the effects of the 2008 financial crisis and the wide deployment of MSG in several global fields —e.g. environment, food, public health and Internet governance— the democratic gains and the obtained results are still limited. There are many reasons for that. Among them: the asymmetric power between corporations, states and civil organisations; the interests of economically powerful transnational corporations; the unbalanced participation of transnational actors; the underrepresentation of marginalized groups from developing countries, and the difficulty to identify civil society representatives and affected citizens. Thus, "transnational mechanisms of legal redress and monitoring may be a more viable way of improving the accountability of international institutions" (Bexell

[408] According to Albareda (2008): (i) voluntary activities that go beyond those prescribed by the law; (ii) internalizing or managing externalities that are positive and negative side-effects of economic behaviour; (iii) a multiple stakeholder focus, considering a range of interests and impacts among a variety of different stakeholders; (iv) alignment of social and economic responsibilities; (v) a particular set of business practices that deal with social and environmental issues and with the set of values that underpins these practices; and (vi) beyond philanthropy and community projects, CSR is about how all company operations have an impact upon society.

et al. 2010, 89). But this latter strategy is not without difficulties because pursuing legal cases in international courts, collecting information on compliance, and evaluating policy effectiveness is highly time- and resource-consuming (ibid.).

As NGOs behave without having been elected, MacDonald (2008, 15) contended for an endorsement of a *hybrid* approach to delineating democratic global policies, "one that incorporates multi-stakeholder representation within more conventional structures of representation by nation-states." This position brings about "liquid forms of authority in transnational governance to achieve normative political legitimacy" (MacDonald and MacDonald 2017), lending on "all institutionalized powers for fostering compliance that operate by inducing deference, rather than through coercion or persuasion" (ibid. 330):

> […] the legitimacy of authoritative institutions depends not on an evaluation of the moral worth of the values they advance, but rather on an assessment of these institutions' *functional capacity to facilitate collective action among their addressees in pursuit of values that they share*. (ibid. 334)

Internet governance is one of the more complex examples of conflict and cooperation, involving nearly all national states and a few international organisms.[409] In his account of how MSG links to the Internet Governance Forum, Malcom (2008) reached a quite critical conclusion and claimed for reform as the IGF does not quite strike the correct balance, for "its hierarchical structure under the leadership of United Nations is incompatible with its multi-stakeholder democratic ambitions". Later on, he suggested some criteria to implement MS in Internet governance (e.g. inclusion of significant interests, mechanisms to balance the power of stakeholders, and accountability mechanisms (Malcolm 2015).

7.2.5 Political Forms of Legal Governance: Functional, Algorithmic Governance, and Smart Data

We should differentiate between Internet governance from the forms of contemporary governance on the web. The latter have been increasingly introduced through the combination of algorithms, semantic languages, computational linguistics, data mining[410],

[409] Mainly: Internet Architecture Board, Internet Corporation for Assigned Names and Numbers (ICANN), Internet Engineering Task Force, Internet Governance Forum, Internet Research Task Force, International Organization for Standardization (ISO 3166 MD), Internet Society (ISOC), Regional Internet Registers (RIRs), World Wide Web Consortium (WWW), Internet Network Operators Group.

[410] I.e. Correlation and regression analysis; and data classification, clustering, prediction, and diagnosis (Zhao-hong et al. 2018, 205)

visualization, and, recently, Artificial Intelligence methods (such as deep machine learning).[411] They are ambiguously referred as "big data".[412] Some prudence is required here: after his extended review, Sivarajah et al. (2017, 279) conclude that strengthening empirical research based on in-depth case studies, and qualitative and quantitative research, is much needed as "most of the articles analyzed followed an analytical approach".

A functional typology of algorithmic selection applications is offered by Just and Latzer (2016): (i) search, (ii) aggregation, (iii) surveillance, (iv) forecast, (v) filtering, (vi) recommendation, (vii) scoring, (viii) content production, (ix) and allocation. Each one of them constitute separate domains of computer expertise, understood as a governance "institutional steering", a "horizontal and vertical extension of traditional government", looking *beyond* public and private actors (e.g. governments and industry) and, vertically, looking beyond multi-stakeholder instruments. Social reality is now increasingly shaped and constructed by algorithmic selection (ibid.).

Thus, the problem is now how to assemble, monitor, use and control these different methods. Semantic matching to identify related information, re-engineering, re-using, model-driven engineering and graph analysis operating on ontological basis are some of the techniques that the semantic web community is developing. *Smart data* is related to the 5-V model (see note 35): "an organized way to semantically compile, manipulate, correlate, and analyse different data sources" (Duong 20017) that is adding value to governance and decision-making. From a regulatory point of view, there are several challenges related to them: security and data protection, ownership, privacy, data flows exchange and cross-border data flows. After the enactment of the European GDPR this is a hot topic, with countless contributions.

We would like to point out just one challenge that is key to the linked democracy approach. As already said (above 7.2.2), In *Linked Democracy* (2019) we aligned Ostrom's CPR principles — rules in use matched to local needs and conditions, participation, self-

[411] See the surveys on data-intensive applications (Chen and Zhang 2014), big data life-cycles and management (Khan et al. 2014) big data management (Sidiqa et al. 2016), big data analytics in governance (Bhardwaj and Singh 2017), on data processing methods (Zhao-hong et al. 2018).
[412] It is commonly described as data satisficing a 5-V model: (i) Volume (data scale datasets), (ii) Value (low density, high value information), (iii) Variety (including unstructured and semi-structured data), (iv) Velocity (speed of data collection and analysis), (v) Validity (quality and veracity of data).

monitoring, need of proportional sanctions…— with the substantive principles of the rule of law. This is a new version of the so-called micro-macro link problem. Ostrom´s principles are community driven. How could polycentric governance be compatible with data-driven societies? Pitt et al. (2014) contend that

> Collective awareness can be achieved by analysing big data generated by networked sensors and devices as well as ICT-enabled users. Search, data mining, and visualization technologies make it possible to spot trends and predict the trajectories of higher-level variables. This in turn enables collective action, without which it might be impossible to change community behaviour to reach a desirable outcome—for example, sustaining a scarce resource.

Social intelligence, collective action modelling entails a shift both in governance and legal studies. Our contention is that collective awareness can be also carried out within the framework of the metarule of law.

7.3 Sociolegal Ecosystems

How could we incorporate forms of empowering people on the web? How could algorithmic governance, data analytics and semantics be regulated according to the principles of what we have called the 'metarule of law', i.e. modelling, embedding the rule of law into the languages of the web of data?

We should first distinguish between *systemic* and *semantic* interoperability. Second, we should consider the insights of cognitive science on how agency and action can be coordinated to attain collective goals. Third, we should merge legal and political governance, now in separate silos. Fourth, we should re-conceptualise regulatory and legal compliance according to these guidelines. And finally, we could suggest a metamodel bringing all these elements together.

7.3.1 Types of Interoperability

Semantic interoperability refers to the creation of a common meaning for information exchange across computational systems. Systemic interoperability points at the ability of complex systems to interact, share, and exchange information. The later focuses onto the coordination of practices, including human behaviour, organisational structures, tools, languages, and techniques (Kun et al. 2008, Mathews 2017, Casanovas et al. 2017a). Both

dimensions should be analytically distinguished for a co-integration of the computational and social dimensions into the specific ecosystems created through this mutual interface. As Gottschalk (2009) puts it:

> Interoperability of systems enables interoperability of organizations. Systems interoperability is concerned with the ability of two or more systems or components to exchange information and to use the information that has been exchanged. Organizational interoperability is concerned with the ability of two or more units to provide services to and accept services from other units, and to use the services so exchanged to enable them to operate effectively together. Semantic interoperability is part of the interoperability challenge for networked organizations. Inter-organizational information systems only work when they communicate with other systems and interact with people. (Gottschalk 2009, 76)

Computer science and society co-evolve in intertwined ways. From this perspective, we can also distinguish between computational requirements and social (behavioural, organisational) conditions. Computational requirements focus on the description of computationally tractable elements in some language. For example, object-oriented analysis applies object-oriented programming and visual modelling through development lifecycles. Goal-oriented requirements engineering "is concerned with the use of goals for eliciting, elaborating, structuring, specifying, analysing, negotiating, documenting, and modifying requirements" (van Lamsweerde, 2001, 2009). Both techniques stress the relationship with end-users and stakeholders to enrich the knowledge acquisition process.

However, beyond this preliminary stage, computer sciences do not use the same techniques and inductive inferences than empirical social sciences. It uses their results to turn them up into requirements. In this sense, social conditions imply an empirical description and a theoretical account of social issues, statuses, and conflicts. Both types of modelling are different in nature and scope. Connecting them is a non-trivial task of theoretical nature.[413] It refers to what E. Fingenbaum called "the knowledge acquisition bottleneck" (1982), and R. Hoekstra "the knowledge reengineering bottleneck" (2010). As Hoekstra is suggesting, the rapid increase of linked data poses new challenges for the whole Semantic Web project at the cost of control. Knowledge reuse is more de-contextualised now, and ontology building methodology is becoming more complex as users participate and expert knowledge is diversified, scaling up to more complex forms of cooperation

[413] See the complete account edited by Enrico Motta on 25 years of knowledge acquisition community.

between experts and citizens (Corcho et al. 2015).[414] Citizen science, crowdsourced people's participation in scientific endeavours, is gaining strength and posing more challenges too, i.e. the role that volunteers play in true collaborative co-creation processes at all stages of the scientific design (Celino et al. 2018).

From a democratic perspective, law and legal systems could be shaped in such a way that creates incentives for innovation and change. Semantic interoperability between all jurisdictions in national and international legal systems is an important component; the next layer, as we have shown in Chapter 2 and 5. But anchoring it into different organisations and social communities requires *systemic* interoperability, new forms of better and smart regulations that foster citizens' participation and community building.

The requirements for rule interchange languages presented in Table 12 (6.4.1) are based on concepts elaborated in normative theory (defeasibility, validity, and lifecycle of norms). Other modelling approaches for legal knowledge management are based on a different set of closely related concepts. RELaw Workshops have been held to discuss these issues since 2008, including sociological approaches.[415] There are several ways to include stakeholders into the design process, depending on the objectives of the systems.

They are compliance-oriented so far, as they are designed having in mind the features of legal knowledge as it is used and interpreted by lawyers, external auditors, and business analysts. They are not intended to comprehend citizens' participation, nor the crowd-civic systems´ features that facilitate interaction, debate, and content creation. However, it is not excluded that they could incorporate these functions in the future, as they endorse flexible normative interpretations and end-users' participation, two of the main qualities of relational law.[416]

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[414] I.e. I reproduced their classification (Corcho et al. 2015, 15) in Chapter 2: (i) upper-level ontology engineers (deep knowledge about formal logic and philosophy); (ii) heavywheight ontology engineers (domain experts); (iii) lightway ontology engineers (develop vocabularies to be used in the linked data context); (iv) SKOS (Simple Knowledge Organization System) concept scheme developers (interested in developing thesauri and other types of classifications); (v) web developers contributing to Schema.org.

[415] RELaw: International Workshop Series on Requirements Engineering and Law, http://gaius.isri.cmu.edu/relaw/

[416] See the compatible functions between Eunomos and Legal-Urn in Boella et al. (2014). Both take into account the discussions between different kind of stakeholders (lawyers, auditors, and business administrators).

The Communication from the Commission of March 23rd, 2017, defined the strategy for governance and interoperability across the state members.[417] The EU has adopted a relational view to foster citizen participation, transparency, public monitoring and control, considering interoperability as a prerequisite "for enabling electronic communication and exchange of information between public administrations" and "for achieving a digital single market." (EU 2017). In this regard, the EU provides a set of principles and recommendations[418] to promote electronic communication across administrations, distinguishing four layers of interoperability: (i) *legal* (ensuring that organisations operating under different legal frameworks, policies and strategies are able to work together, setting interoperability checks to identify legal barriers); (ii) *organisational* (relationship between service providers and service consumers); (iii) *semantic* (developing vocabularies and schemata to describe data exchanges in the same format); (iv) *technical* (applications and infrastructures linking systems and services). More precisely:

> (i*) legal issues*, e.g. by ensuring that legislation does not impose unjustified barriers to the reuse of data in different policy areas;
>
> (ii) *organisational aspects*, e.g. by requesting formal agreements on the conditions applicable to cross-organisational interactions;
>
> (iii) *data/semantic concerns*, e.g. by ensuring the use of common descriptions of exchanged data; (
>
> iv) *technical challenges*, e.g. by setting up the necessary information systems environment to allow an uninterrupted flow of bits and bytes. [COM (2017) 134]

Figure 42 reproduces the EIF conceptual model. The model embraces a holistic perspective on interoperability and compliance, acknowledging the complexity of data governance. Yet, it comes with limitations. In a way, this is an administrative model à *la* Hart: it aims at building a EU public space that guarantees and protects citizens' rights, but it is mainly addressed to state officials and members of public administrations. While the

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[417] *European Interoperability Framework – Implementation Strategy*.
Brussels, 23.3.2017 COM (2017) 134 final. Source : https://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_1&format=PDF

[418] Underlying principles for public administration are citizen- and user-centred: (i) subsidiarity and proportionality, (ii) openness, (iii) transparency, (iv) reusability, (v) technological neutrality and data portability, (vi) user-centricity, (vii) inclusion and accessibility, (viii) security and privacy, (ix) multilingualism, (x) administrative simplification, (xi) preservation of information, (xii) assessment of effectiveness and efficiency.

model takes into account individual citizens, organisations, and social groups, it does not consider putting the whole framework into their hands or lending them tools to build their own regulatory orders. In this sense, it is perhaps better to take it as what it is, a useful framework rather than an example of linked democracy.

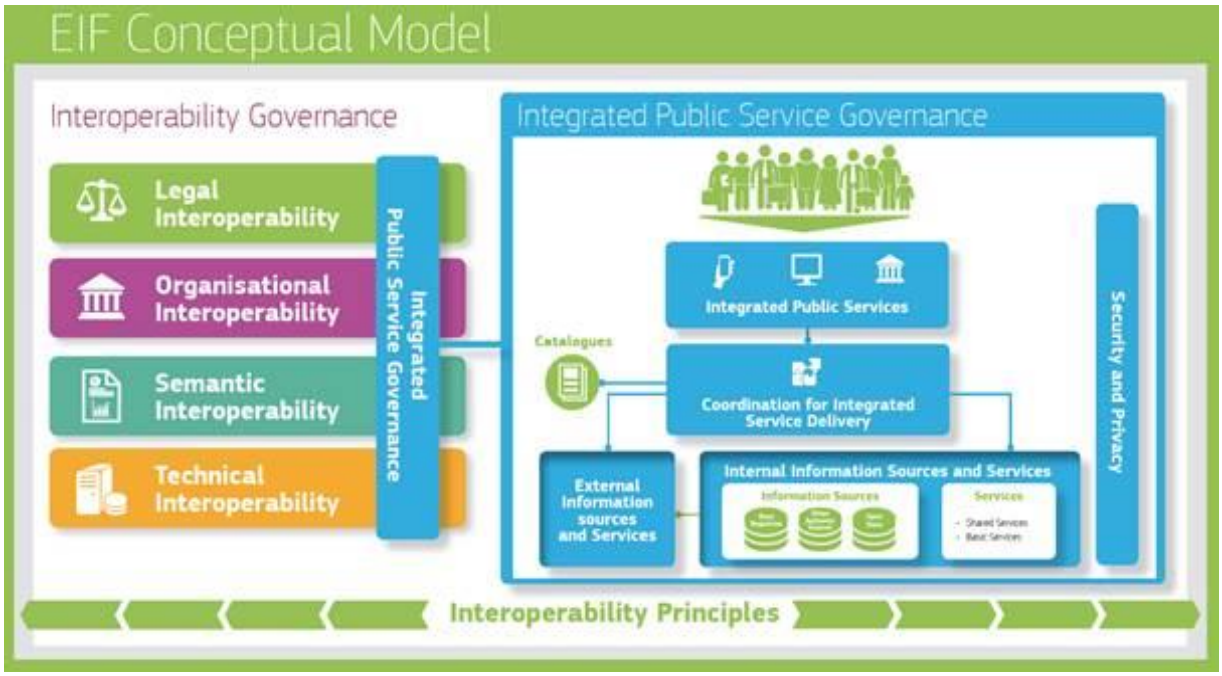

***Figure 42**. European Interoperability Framework Conceptual Model Relations. Source: : https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf*

7.3.2 Cognitive Ecology, Artificial Socio-cognitive Systems, and Sociolegal Ecosystems

The field of Normative Multi-Agent Systems (NorMAS) was incepted to integrate and cope with the different notions of norms stemming from social, cognitive and computer sciences. It can be defined as "as the intersection of normative systems and multiagent systems (MAS)" (Boella, van der Torre and Verhagen 2007). MAS are computer systems composed of multiple interacting intelligent agents, creating contexts for autonomous artificial agents. Thus, reflecting human cogency and agency in context —its "cognitive ecology". We will start from this same point to define sociolegal ecosystems, in addition of what has been said in Chapter 5.

Hutchins (2010, 705-6) defined *cognitive ecology* as "the study of cognitive phenomena in context". The term points to "the web of mutual dependence among the elements of a cognitive ecosystem":

> Everything is connected to everything else. Fortunately, not all connectivity is equally dense. […]. To speak of cognitive ecology is to employ an obvious metaphor, that cognitive systems are in some specific way like biological systems. In particular, it points to the web of mutual dependence among the elements of an ecosystem. (Hutchins 2010, ibid.)

Hutchins draws on Bateson's metaphor of the "blind man" to further illustrate his point. To explain the locomotion of a blind man with a stick, "you will need the street, the stick, the man, the street, the stick, and so on, round and round". The metaphor also echoes Herbert Simon's ant's path, and the first order isomorphism fallacy.[419] As famously depicted in *The Sciences of the Artificial* (1969), an ant, viewed as a behaving system, is quite simple. The apparent complexity of its behavior over time is largely a reflection of the complexity of the environment in which it finds itself. Complexity is in the environment, not in the ant.

Creating a legal ecosystem requires an appraisal of the dynamic coupling between the social environment, the actors and the tools and technologies they use to reach their objectives and recreate their social bonds. It involves experimentation, plasticity and sensitivity. The outcomes of this interplay can also be conceived as *thinking without representation*. For example, collective action *emerges* from a set of conditions and coordinated actions that constitute the system, allowing multiple possibilities to deploy in one direction or another. This *enaction*[420] perspective does not exclude the role of collective emotions in the making of regulatory schemes, as the cognitive properties of groups are different from the cognitive properties of any individual in the group.

[419] I already described it in Chapter 6. First-order isomorphism describes the situation in which a similarity relation exists between an internal representation and the real-world object being represented (Shepard and Chipman 1970). Second-order isomorphism refers to a similarity relation that exists between the similarities among internal representations and the corresponding similarities among multiple real-world objects being represented (Shepard and Chipman 1970).

[420] 'Enaction' is the notion that organisms create their own experience through their actions in a dynamic and multi-modal way. I am assuming that this can hold as well for social groups or communities.

This points to the difference between Socio-technical and Artificial Socio-cognitive Technical Systems (ASCS). The former focus on the human-machine interface and their context, while the later contemplate this interface from a tripartite model where the affordances of the system emerge from the intersection between three dimensions—institutional, the technological and the "real world" (or social space). ASCS have at least three properties or "affordances: "(i) awareness, by which, participants perceive their context (ii) coordination, by which collective action is enabled and (iii) validity which establishes a set of correspondences between the elements of our tripartite description of ASCS" (Noriega et al. 2014). Moreover, an artificial socio-cognitive system is composed by three interrelated elements, in the so-called *WIT framework*:

> 1: The *world system*, W, as the agents (both human and software) see it and relate to it.
>
> 2: An ideal *institutional system*, I, that stipulates the way the system should behave.
>
> 3: The *technological artefacts*, T, that implement the ideal system and run the applications that enable users to accomplish collective actions in the real world, W, according to the rules set out in I. W that enable individuals – who may be human or artificial entities – to interact in a shared web-mediated social space in a purposeful fashion. (Christiaanse et al. 2014)

These elements are connected through binary relationships: (i) '*count-as' relationship* (by which the facts in the real world correspond to institutional facts), (ii) *conventions* in the institutional world correspond to the specification of the requirements of the system that is implemented in T, (iii) the system implemented in T enables *interactions* in W. (ibid.). (Fig. 43).

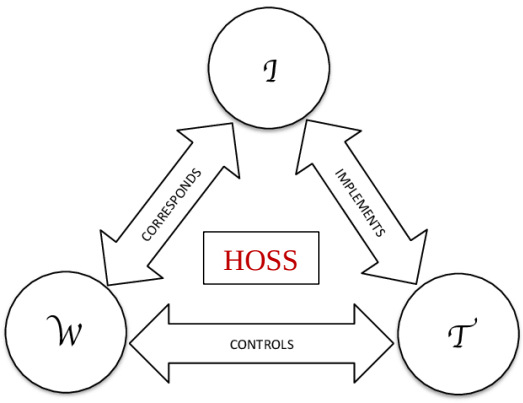

Figure 43. *The WIT Trinity View of Artificial Sociocognitive Systems. Source: Christiaanse et al. (2014). Also: Noriega et al. (2016) added HOSS in the middle of the triangle.*

Practical examples of ASCS include the modelling of auctions (Noriega 1999), agents for e-commerce (Sierra 2004); agreement technologies (Ossowski 2013), costs of the care-related services for disabled and elderly people in the public sector (Christiansee and Hulstijn 2012), and self-organised communities (Pitt and Dionescu 2015). It can be understood as a specific development of Normative MultiAgent Systems (NorMAS). This is a growing field. It was incepted to integrate and cope with the different notions of norms stemming from social, cognitive and computer sciences. It can be defined as "as the intersection of normative systems and multiagent systems (MAS)" (Boella, van der Torre and Verhagen 2007). MAS are computer systems composed of multiple interacting intelligent agents, creating contexts for autonomous artificial agents. Thus, reflecting human cogency and agency in context.

Müller and Fischer (2012) identified one hundred fifty-six Multi-agent Systems applications in private (e.g. banking, e-commerce, energy, manufacturing, information) and public (e.g. e-health, defence, aerospace, security and surveillance) areas. In 2017, Xe and Liu (2017) reported that the total number of installed phasor measurement units (PMUs)[421] had increased to more than 2000 in North America. The number of distributed intelligent electronic devices (IEDs) and distributed energy resources (DERs) keep also increasing globally.

There is a human dimension within this perspective. In 2016, a *Manifesto for conscious design* introduces the notion of Hybrid Online Social Systems (HOSS) and situates them at the centre of the triangle—the impact of AI affects everyday life (Noriega et al. 2016). The *Manifesto* defines HOSS as "IT enabled systems that support collective activities which involve individuals —human or artificial— that reason about social aspects and which can act within a stable shared social space" (ibid.). This implicitly assumes the blended, mixed, hybrid nature of ASCS, in which agency is produced in environments shared by humans and agents.

It would be useful to consider here Cristiano Castelfranchi and Rosaria Conte's perspective on artificial agents and the micro-foundations of power and norms, since their work

[421] A waveform shape described mathematically is called a phasor. Cf. https://en.wikipedia.org/wiki/Phasor_measurement_unit

highlights "the cognitive aspects of spontaneous conventions, implicit commitments, tacit agreements, and the bottom-up issuing and spreading of norms" (Castelfranchi, 2003a). Thus, significant normative notions, such as power, regulation, sanction, empowerment… were not taken for granted and were defined from an empirical bottom-up approach, focusing on their emergence amongst agents (human or artificial), although the bottom-line is drawn stemming from human behaviour: "how individuals (unconsciously) empower institutions (and their representatives) and institutions give power to them" (Castelfranchi 2003a, 210).

The human side have always been attended, before, during, and after modelling. In the *Manifesto*, Noriega, Verhagen, d'Inverno and Padget (2016) advocate for a more *conscientious design* and awareness of the consequences:

> We do not yet know how to take advantage of the opportunities of this technology and avoid its unwanted consequences, but we are justifiably concerned that by the time we understand its side-effects it may be too late to control them. […] We propose to focus attention in those values that are associated with three broad areas of concern that we believe are encompassed by conscientiousness: *thoroughness* (the sound implementation of what the system is intended to do), *mindfulness* (those aspects that affect the individual users, and stakeholders) and *responsibility* (the values that affect others).

Elinor Ostrom design principles for sustainable management of CPRs have also had an impact on the field. For example, when considering the possibility to set communities that control their own energy infrastructure, Pitt and Dionescu (2015) note that excessive demand, which would otherwise lead to a power outage, could be pre-empted with co-dependent institutions that use social capital to stabilise their inter-operations. However, they also observe that rules alone are not enough:

> Co-dependence between socio-technical systems with shared resources implies that such systems cannot run in isolation and follow completely independent rule sets. Indeed, co-dependence requires coordination via dedicated institutions, the management of which is critical to the sustainability and endurance of the resulting system of co-dependent systems.

Pitt and Dionescu draw from Koestler's notion of "holon" (something that is simultaneously a whole and a part): "a *holonic system (or holarchy)* is composed of interrelated subsystems, each of which are in turn composed of sub-subsystems and so on, recursively, until reaching a lowest level of 'elementary' subsystems" (ibid.). We find a similar idea

in Prygogine´s and in Simon's work (who actually inspired Koestler´s formulation). Pitt and Dionescu apply the idea of complex intermediate autonomous subsystems to develop the polycentricism of governance in self-organised institutions.

The idea of complex *intermediation* is crucial to create sustainable sociolegal ecosystems on the web. In the first edition of *The Sciences of the Artificial* (1969), Simon introduced the property of *near-decomposability* of systems: sub-systems can have stronger links within them that between them. The second edition (1984), which includes a new chapter on the social world, shows how coordination in a complex system is complex at every level of the system. We could take advantage of these ideas, as the components of a regulatory system also exhibit the plasticity and diversity of near-decomposable systems.

When it comes to the social implementation of the rule of law —either through ASCS, HOSS, holonic institutions or Open Linked Data systems—it is possible to identify basic components and the relations between them looking at the sources, domains, and position with respect to citizens (bindingness of norms or rules). Rather than discrete categories or lists of requirements, it is a matter of degree and conditions of values and principles,

The implementation of the rule of law is therefore based on two different relational axes at the empirical level: (i) material institutional power [force, *macht*, *fuerza*, *forza*], and (ii) social dialogue (negotiation, compromise, mediation, agreement). This intuition is also implicitly assumed by some data governance classification of principles (Brous et al. 2016; Mondor and Wimer 2016), and recent technical developments of the EU Better Regulations scheme for interoperability (e.g. Legal view, EIRA, by TOGAF 2017, 39). I will come back to the quadrant a bit later in a Figure that plots our regulatory quadrant for the rule of law. The validity of norms (i.e. their 'legality') emerges from four different types of regulatory frames, with some distinctive properties. Properties are understood here as correlating patterns: "units defined in terms of dynamic patterns of correlation across elements rather than in terms of the inherent properties of the elements" (Hutchins 2010, 706).

7.3.4 Digital and Legal Ecosystems Frameworks

The term 'ecosystem', coined by Arthur Tansley (1935), originated in biology and ecology studies. In ecology, the term points at the coexistence of living and non-living organisms in a particular niche, or "integration of *all* biological *(biotic)* and nonbiological *(abiotic)* parts" and "monitoring the *movement of energy* and *materials* (water, chemicals, nutrients, pollutants, etc.) into and out of its boundaries" (Vogt 1997, 71). The concept was later adopted, among many other disciplines, by cybernetics, meaning the interface and exchange of information in complex systems within their environments (i.e. within social and natural contexts). Gregory Bateson entitled the collection of his works *Towards an Ecology of Mind* (1972). This is the tradition we choose to situate our own use of the term, familiar to cognitive sciences and cognitive ecology, along with 'situated meaning' and 'situated cognition'.

The notion of 'legal ecosystem' has been also recently used in professional studies, referring to the involvement of all legal professionals and stakeholders (Brenton 2016). In computer sciences and law, it has been employed to wrap up the methodology that involves the participation of end-users in the knowledge acquisition process and creates a community using the service (Governatori et al. 2009). We will use the notion of 'sociolegal ecosystem' in a different way, meaning *all processes, interactions and exchange of information involved in the social and cultural implementation of a regulatory system, including its designers, supervisors, controllers, and users.* We will be pointing at the dynamic properties of its normative elements and its institutional settings. Sociolegal ecosystems are technologically driven, and can emerge, evolve, and disappear.

If we assume the essential sociocognitive framework described above, it appears that we cannot generate a legal ecosystem by just laying down, enacting, or publishing a law or regulation in an official site. At most, this can be considered a necessary non-sufficient condition in developed societies. Nevertheless, the system should also be understood, accepted, and settled under the social conditions that guarantee its implementation. We contend that legal ecosystems are not just generated from the enactment of laws: They emerge from a set of conditions amongst human and technical interactions, including the requirements of artificial systems and the individual and collective behaviour of their users.

I have already referred to the number of actions and the four key elements Zuiderwijk et al. (2014) have suggested to build open data ecosystems (Chapter 5, 5.2.4): (i) releasing and publishing open data on the internet, 2) searching, finding, evaluating and viewing data and their related licenses, (iii) cleansing, analysing, enriching, combining, linking and visualizing data, and (iv) interpreting and discussing data and providing feedback to the data provider and other stakeholders.

However, to turn this kind of open data ecosystems into sociolegal ones, we should precise a bit more the way how all these elements can be related to the whole regulatory system (not only to the type of license) and to agency. Hence, we would need to articulate a scheme (or metamodel) that could be used (i) to differentiate the properties of the regulatory system and the metarule scheme for the rule of law drawn in Figure 31 (Chapter 5, Subsection 5.4.1) (ii) to flesh out the three dimensions plotted in Figure 43, 44 and 45 (legal, social and semantic), (iii) to embed privacy/data/security and compliance by-design into computer systems and to situate and implement them into specific environments, (iv) and to embed the protections of the rule of law into the metarule of law through formal representations of norms and rights. All components, functions and activities entailed by the construction of an Open Data ecosystem should be evaluable and evaluated.

Moreover, social ecosystems are complex, and micro-agent interaction and change can lead to macro system evolution (Mitleton-Kelly and Papaefthimiou 2002). Some feedback processes are associated to them. In the case of the rule of law, both positive and negative feedback are present: the goal of producing trust and security through institutional strengthening mechanisms tends to create stability, which is one of the features to make a socio-legal ecosystem sustainable; but the whole process is not teleologically-driven, i.e. some changes in the system are not intended.

Sociolegal systems are cultural, in a broad sense. Thus, “a plethora of interacting and interconnected micro-feedback-processes whose connectivity and interaction creates emergent macro-feedback-processes and structures” (ibid. 272). Excessive control mechanisms and inflexible rule-driven organisations can be counterproductive.

Figures 44, 45 and 46 are complementary. The first one is Braithwhite-like, similar to the pyramids for regulatory theory (responsive and smart regulations) drawn by Braithwhite, Gunningham, Grabosky and Sinclair, among others (Drahos 2017). We used an almost identical one to plot the levels of "formality" in mediation: from implicit to explicit dialogue, and from non-binding law to binding law (Casanovas et al. 2011a, Intr.). Processes and outcomes could be accommodated into it, from natural mediation to legal mediation. Interestingly enough, this shed light on the artificial model to support mediation that Noriega et al. (2011) articulated as electronic institution, as the problem that emerged out of it was the legal value of the agreement. When an artificially driven procedure can "count as" legal? When procedural moves through different steps can be considered as 'legal'?

Artefacts, e-institutions, are tools, and as such can be used informally as well. Only when the e-institution is nested into a social set of relationships that assert the degree and value of its "affordances" —the validity, effectiveness and effectivity of its internal moves and steps—the outcome can hold not only as formally or 'normatively' valid, but as 'legally' valid as well.

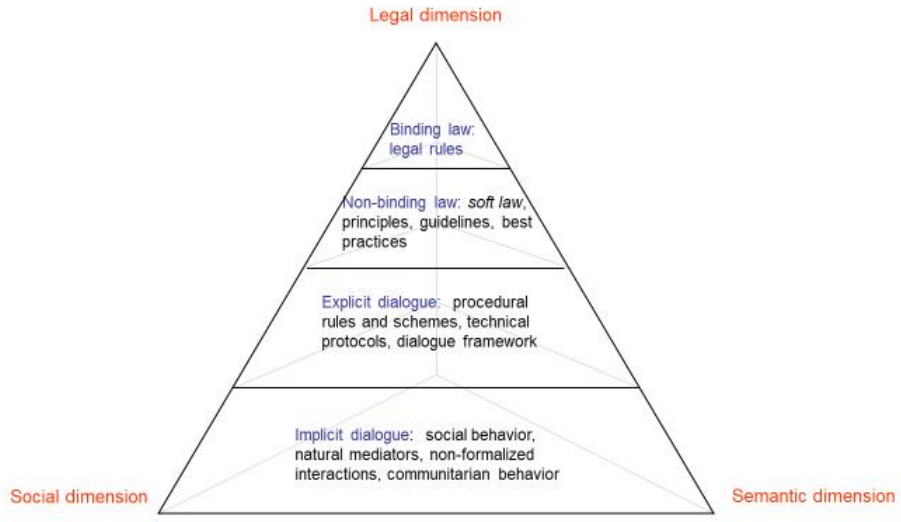

Figure 44. *From Social Informal Control to Legal Formal Power*

Let me add that on the IoT and in Industry 4.0, there are other important elements at stake that are relevant to understand the shift in the general regulatory framework. Mainly, *the*

cocreation of economic value. Benitez et al. (2021) have been able to analyse eleven years on an ecosystem's evolution using a technology mapping, 37 interviews with stakeholders, and a 2.5-year follow-up of a testbed project conducted by 8 companies.[422] They have found that the ecosystem's mission shifted from accessing innovation funds to Industry 4.0 solution cocreation and then, to smart business solutions cocreation. Interestingly,

> As trust and commitment grew, the power structure shifted from the centrality of business association toward a mechanism of neutral coordination of complex projects involving the university and business associations and, lastly, to a platform-driven ecosystem structure, where key technologies emerged as drivers of relationships among the companies and value cocreation.

It is worth mentioning for our purposes something that can be of outmost importance for sociolegal ecosystems to emerge. The cocreation of value possess a dimension of *balanced reciprocity* that, if it is respected, can lead to profitable relational law exchanges that are not necessarily a product of contracts but might have nevertheless a legal (not just economic) value as well, i.e. a value created through the strengthening of bonds that produce a sustainable profitable common environment. In this regard, Industry 4.0 ecosystems are an interesting field to understand the fabric of this new sociolegal regulatory processes.

This brings me back to the anthropological bases I set as a roster of lessons learned at the end of Chapter 4. As a presupposition stemming from the classical work of legal and political anthropology, I assume that law constitutes a specific dimension by its own, irreducible to other social mechanisms and to natural language. *Reciprocity, authority and social cohesion* are the elements that we should have in mind when assembling these three dimensions, because very likely they operate differently according to the level, axes and relationship with other components. Industry 4.0 sets forth a space for competition and cooperation that will force companies, corporations, and very likely state agencies as well, to think differently. i.e. not solely within market or public rules. Autonomy is key: Cyber-physical systems should be able to perform their tasks in the most autonomous possible way but assembling in the end human and artificial skills.

[422] In the same sense of creation of value, focusing on ecosystems and carrying out 56 interviews to leading industry companies, cf. Matt (2021).

Figure 45 combines the three linguistic (semantic) , social and legal dimensions in a single diagram to show the social complexity produced when these three dimensions are put together. It depicts a preliminary general framework in which regulations (including hetero-, co-, and self-regulations) (i) coexist with new instruments of social and political governance on the Web; (ii) are created, implemented and eventually enforced through three regulatory dimensions—*legal*, *social*, and *linguistic* (Web languages, algorithms…); (iii) and are embedded into regulatory models which take into account the "hybrid" interface between human and machines across the Web, the social Web (2.0) and the Web of Data (3.0). It is still preliminary, but as I have already shown in Chapter 5, the next step is the Intelligent Web (4.0), connecting the Internet of Things, Multi-Agent Systems (MAS), and blockchain technologies with linked and big data —also called *Cyber-physical systems* (CPS) (Xu 2018). It is worth noting that policies, standards and, especially, ethics and values embedded into the systems are expected to play an increasing regulatory role in this environment.

This representation can be approached from the metarule of law scheme (Figure 31, Subsection 5.4.2): On top of the space created by the three dimensions, we can use hard law, soft law, policies (governance) and ethics to sustain the four corners of *institutional strengthening, stakeholders (multi-stake holder governance), trust and anchoring institutions* that constitute the sociolegal ecosystems pragmatic layer of regulatory objectives, i.e. the collective aims that are pursued and eventually are brought about and accomplished through the architecture of the metarule of law. Figure 46 adds the final umbrella of validity (*ecological* validity) that generates the 'legality' of the process of governance, as it will be developed in the next Sections. Thus, legal governance is generated through the metarule of law, and it is also relevant to keep separate the theory of legal validity from the theory of legal compliance.

Ecological validity and *causal validation* are both empirical processes, but with a different kind of procedures. The former emerges and is generated through the social use of the regulatory system. The latter is produced as a result of the causal model that we can build to evaluate the performance of the regulatory system.

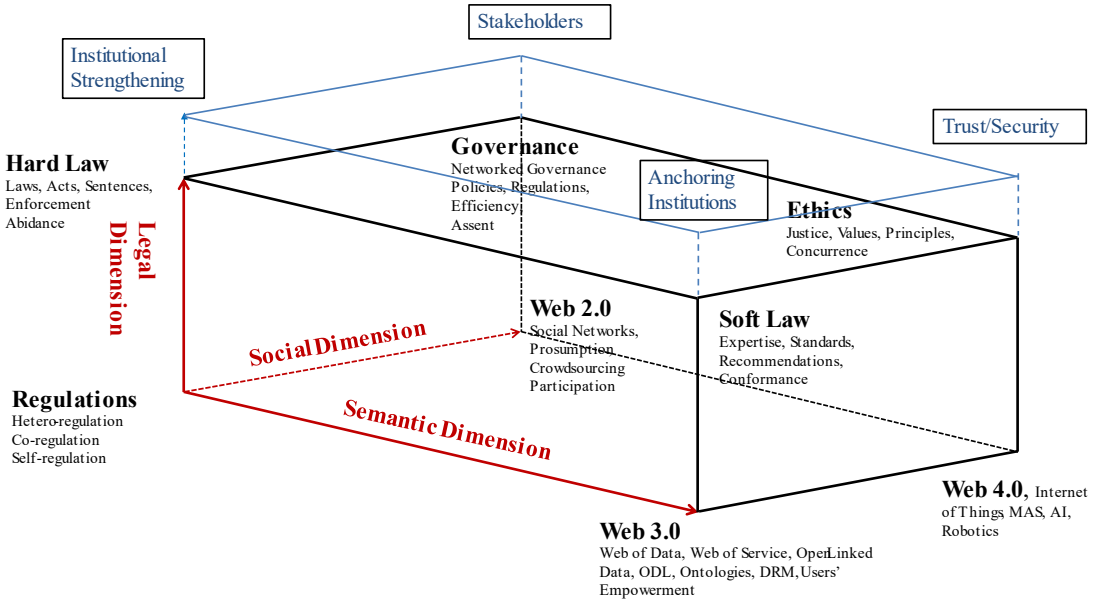

Figure 45. *Metarule of Law and Pragmatic Layer for the IoT and Web 4.0*

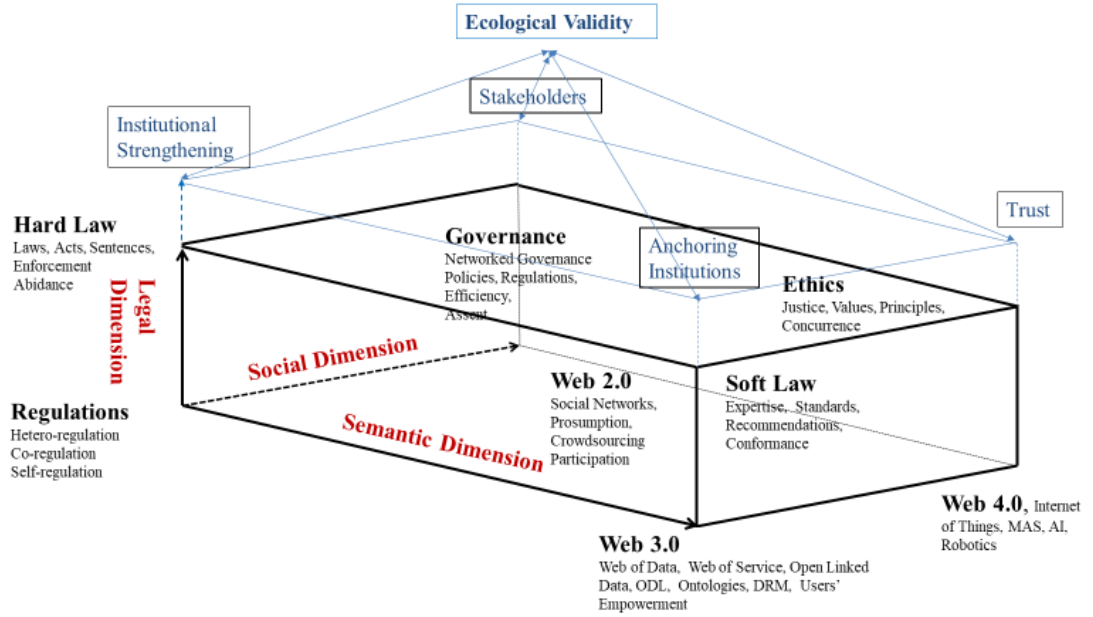

Figure 46. *Legal Ecological Validity on the IoT and Web 4.0*

I should add a few words related to authority. Authority can be decentred, diffused, and organised and allocated across a network of federated platforms. But when it is linked to a nation-state power it posits the problem of *jurisdiction*. This cannot be minimised or

reduced, because putting aside international law, it crosses legal decision-making at local, regional, and national level. The delimitation of *Jurisdiction* was one of the main achievements of *glossatori* in Medieval monarchies. It is a direct result of the romanisation process, and the work carried out by the Scholastics in law and philosophy. It is a legal technical concept, that actually was applied to the Catholic Cannon, to the laws of the king, and to the enacting and procedural powers of Medieval courts and parliaments independently of their different beliefs and ideologies.

In national states, it depends on the conceptual model of sovereignty. If sovereignty is conceived as depending on its political form, then *the* people is the political-legal construct behind this idea. Laws should be equally applied, and access to justice is paramount. This is guarantee by constitutional principles. Keyzer put it nicely when advocating for open laws, open rights, and open courts:

> Constitutional law is the law by and under which *all* of *us* constitute ourselves as a society. For that reason, constitutional law ought to advance opportunities for *all of us* to aspire a to a better system of government. Constitutional procedures should reflect interests in constitutional jurisprudence that more closely align to our democratic goals. (Keyzer 2010, 1966)

Keyzer (2010) argued that access to constitutional justice should be informed by the principles of equal dignity and adjudicative legitimacy.[423] This is relevant in a segmented society such is the Australian (think of first owners Aboriginal claim of sovereignty)[424], but this is even most relevant in a situation in which the rule of law has to be interpreted and *transliterated* from national fundamental rights and constitutional provisions to the formal languages of the metarule of law.

---

[423] Regarding the Australian constitutional system, Keyzer (2010, 150) made four arguments for reform: (i) application for judicial review of legislative action should be characterised as an exercise of political speech; (ii) open access to constitutional courts: people and associations should not be placed in a position where the rule of law depends on their standing or means, (iii) popular sovereignty: people affected by legislation should have the opportunity not only to be listened and held but to challenge that legislation; (iv) increasing access to constitutional justice could enhance the High's Court capacity to tap the values of the community.

[424] We explained and comment on this case comments on Australian political values in Casanovas and Poblet (2021). "Australia is a longstanding democracy in the quest for positive changes in its identity and rejecting past errors committed against the Aboriginal population. Yet, there is no agreement about the Aboriginal notion of sovereignty contained in the Uluru Statement from the Heart.73 In any case, Australia holds multicultural responsive identities that fit into its institutional design, hybrid, sometimes hyphenated, with a strong presence of primary markers (e.g. ethnic diversity) and nuanced secondary ones (e.g. origins and ancestry)." (Casanovas and Poblet 2021, 346)

Interpreted in this way, the idea of open rights and courts is entirely compatible with the principles, techniques, and political forms of the principles of legal governance sustained in this Chapter.

My aim is not simply to suggest that the legal systems and tools already in place should be substituted, replaced, or even complemented with a legal governance toolkit. What is already happening should not be taken for what should be happening. What I am suggesting is that the ideas, mindset, and toolkit related to linked democracy and the substantial rule of law that this concept entails does not require a drastic reform of the formal rule of law. Legal governance is a theoretical concept referring to the entrenched relationships among institutions, organisations, and citizens in a global digital market in absence of a public space. Open constitutional rights could be a way to link it with the institutional legal dimension of democratic states.

7.4 Conclusions

I addressed in this Chapter the problem of power and institutional design. Stemming from the kernel of the rule of law—avoiding tyranny (or dictatorship) and the oligarchical power of exclusionary elites—I delved into the perspective of epistemic and linked democracy. I used several approaches from history and social sciences already in place since the seminal work by Nonet and Selznick (1978) on responsive regulation. I also explored the institutional analyses set forth by Ober in his many books on Classical Greece and the L&S tradition (including the anthropological one) on the subject. I was seeking for solid foundations to build an interpretive scheme on the substantive rule of law.

Several political forms of legal governance have been explained: (i) Responsive regulations, (ii) Smart regulations, (iii) Better regulations, (iv) Network governance, (v) IT governance, (vi) Functional governance, (vii) algorithmic Governance, (viii) Smart data, (ix) multi-stake holder governance. The Chapter also describes four types of interoperability and the fields of cognitive ecology, socio-cognitive systems, and legal ecosystems.

However, only the latter—legal ecosystems— focuses on the integrated legal model that is needed to understand and set forth the regulations for the IoT. Political forms of

governance and cognitive approaches can be understood separately, as analytical proposals or as components of the broad regulatory scheme for the IoT.

I choose to understand them as a way to access the different dimensions and layers of the metarule of law. Hence, I imagined the general framework of Figures 45 and 46 to encompass them as well. They can be fitted into the broad space which has been opened in between the three dimensions and the four main corners and objectives of the IoT, which is the space in which cyber-physical systems will operate. Industry 4.0, Government 4.0, smart homes, and services (SaaS, PaaS) and especially Infrastructure as a Service (IaaS) are not yet regulated from the middle-out / inside-out perspective that should be put in place to meet their technical requirements.

Thus, to build sociolegal ecosystems, Chapter 7 (i) identified four different types of interoperability, (ii) described the insights of cognitive science on how agency and action can be coordinated to attain collective goals, (iii) merged legal and political governance (now in separate silos), (iv) re-conceptualised regulatory and legal compliance according to these guidelines, (v) and finally, it figured out a way to bringing all these elements together.

In Chapter 8, I will deploy the methodology in three steps— legal scheme, metamodel, causal model—that could be used to produce the conceptual and practical toolkit for legal governance.

As usual, the table below places it after the concepts developed in Chapter 7. The box is centred on methodological layers. But the reader could be advised that the theory of legal compliance that precedes the methodological layers is equally relevant for the theory of legal compliance.

Table 1. *Structure and Concepts of the Dissertation*

MODULES	CONCEPTS	FIELDS	CHAPTERS
Legal Web Services and Artificial Intelligence	Law as Data	Legal Anthropology and Sociolegal Studies	1. The Double Implosion of the Legal Profession and Web Services
	Law as Meaning		
	Law as Sense		
	Knowledge Graphs		

Law as Knowledge	Legal Ontologies	Ontology and Semantic Web	2. Law as Knowledge: The Web of Linked Open Data
Law as Dialogue	Agreement	Legal Theory, Sociolegal Studies, and Legal Anthropology	3. From Positivist to Relational Law: Law as Dialogue
	Legal Pluralisms		
	Relational Law		
	Relational Justice		
	Regulatory Model		
	Regulatory System		
Reciprocity and Dialogue	Integration	Legal Anthropology	4. The Legacy of Legal Anthropology
	Reciprocity		
	Legal Culture		
	Vindicatory Systems		
Legal Governance	Middle-out Approach	Epistemology	5. The Convergence between the Web of Data, the Internet of Things and Industry 4.0
	Inside-out Approach		
Linked Democracy	Rule of Law	Political Anthropology and Artificial Intelligence	6. *Legal Isomorphism* and the Emergence of Legal Ecosystems
	Metarule of Law		
	Legal Ecosystems		
	Legal Isomorphism		
Sociolegal Ecosystems	Institutional Design	Social, Political and Cognitive Sciences	7. Sociolegal Ecosystems: Political Forms of Legal Governance
	Interoperability		
Metarule of Law	Compliance *by* and *through* Design	Methodology and Use Cases	8. From Compliance by Design to Compliance through Design: An Empirical Validation Model
	Scheme		
	Metamodel		
	Validation Model		

CHAPTER 8

From Compliance *by* Design (CbD) To Compliance *through* Design (CtD): An Empirical Validation Model

Summary: This chapter explores the notions of legal validity and ecological validity to develop, test and validate sociolegal ecosystems. It is divided into two separate parts. The first one is devoted to the reconstruction of the concept of legal validity from an empirical point of view. The second one sets forth a methodology and a theory of legal compliance. Section 8.2. focuses on the notion of legal validity, as represented by legal doctrine and legal philosophy in the past fifty years, and defines ecological validity. The components of the metarule of law can be turned into a reusable metamodel for legal governance. I.e., how to produce the conditions for the emergence of sociolegal ecosystems. Section 8.3 concentrates on legal compliance and offers a methodological toolkit in three steps to deal with the issues addressed by ethical and legal validity checks. Chapter 8 includes a legal quadrant (or compass) and a causal model to test whether a regulatory model (or system) is *legally* compliant. Several examples of legal governance modelling are also explained.

Keywords: Legal validity, ecological validity, Compliance by Design (CbD), Compliance through Design (CtD), Web of Data, Sociolegal Ecosystems, Rule of law, Metarule of law, Legal Governance, Linked Democracy, Regulatory models, Regulatory Compass, Causal Models

8.1 Introduction

I will address some methodological issues now regarding legal validity, and compliance by and through design in this last Chapter. It contains a metamodel that can be reused to create regulatory models and, most of all, can be used to generate legal ecosystems and compliance checks. It also is a *validation* model that will be further developed as a causal model using statistical metrics.

'Compliance' with the law has had many meanings and uses in the past twenty years. I will clarify the use of the term, because both in European policies and in the literature, it has been defused or lessened in favour of more attractive notions, such as 'accountability'

and ‘transparency’. Because its proximal relation with ‘obedience’, ‘compliance’ is getting a bad press. The underlying argument can be expressed as follows—it is not the people who have to be obedient, but governments who must be accountable. It is a reasonable idea from the political point of view, and I understand and sympathise with it, but unfortunately this is not sustainable from a technical point of view. For governments to be accountable and transparent they must be first compliant with the law.

Rules matter, to be followed or to be violated, to be kept or amended, to be ignored or considered, but they are an essential component of regulatory systems in the digital world. Especially on the Internet of Things and Industry 4.0, all kind of transactions, interactions and decisions must have a certain degree of acceptability and validity, because agents, be they human or artificial, are putting through processes and are producing outcomes following rules in a semi-automated and/or automated way, and these processes are (or should be) under the rule of law.

This Chapter has two complementary but different parts. Section 8.2. undertakes the important notion of *legal validity*, as defined by legal doctrine and legal philosophy in the past fifty years. The idea is to reach a reasonable definition of *ecological validity*, for this notion is most relevant to define what a sociolegal ecosystem under the metarule of law consists of. I will show how the components of the scheme of the metarule of law can be turned into a reusable metamodel for legal governance. I.e. how to produce the conditions for the emergence of a sociolegal ecosystem, in between the social dialogue of agents and stakeholders and the binding power of the rule of law.

Section 8.3 concentrates of the validation problem. The metamodel should be effectively applied and instantiated to generate regulatory models and, on top of that, to check the legal compliance of digital transactions, exchanges, rules, actions, and acts. How are we going to audit, to test, whether a regulatory model (or system) is *legally* compliant? We will end up with the idea of depicting a causal model, after reorganising the clusters of the metarule of law, i.e. as scheme, into a legal quadrant that can be reused for practical reasons.

As it will be widely shown, both Sections embrace an empirical epistemic approach. I will put some examples of use cases extracted from the EU and AUS research reported in the Annex of the first Chapter of this Dissertation.

8.2 Theory of Legal Validity

8.2.1 Plurality of Approaches to the Notion of Legal Validity

Legal validity is a concept that has been related to normative systems, logic, and legal theory since the beginning. It has been usually deemed the kernel of what legality is or what legality consists of—a subject with "no agreed boundaries" (Munzer 1972), the "pineal gland" of the law (Pattaro 2005), or conversely "a fundamental criterion for identifying mainstream approaches to legal philosophy and a major jurisprudential battleground" (Sartor 2005b, 331).

The notion of 'legal validity' is related to other prescriptive notions (such as 'obligation', 'duty' or 'right') and factual ones (such as 'effectivity' or 'efficacity'). From the end of 18th c. onwards, legal philosophers have been dealing with them, trying to make sense of what has been called a 'legal system' or a 'legal order'. There is a great variety of research threads and philosophical and epistemic positions, some of them diving deeply into the cultural roots of Indo-Arabic, Chinese, and Western philosophy notions of power, governance, and justice.

Sometimes a general assumption about a 'legal' self-evident reality is made—law as a legal system does exist by itself as a subject matter and it does not make any sense to question it. It is allegedly a *Dasein*, something out there to be manipulated, used, changed or explained as it is in social life. "That legal systems exist as social realities is a manifest fact that is not in need of explanation, not more than the fact that there are trees or mountains" (Weinberger 1999, 343). In short, there are institutional facts that count as law in a natural way, as social beings. As Summers (1985, 66) put it as well, "if there were no lawmakers, most issues of validity could not arise at all."

Legal philosophers have been trying to frame the scope and boundaries of legal phenomena considering law, legal concepts, and legal systems alike. 'Analytical jurisprudence', 'exclusive' and 'inclusive positivism', 'critical positivism', are some of the categories

that have been proposed to assemble the rational or reasonable use of concepts in the legal field. The use of these concepts is deemed to be analysed, explained or—as proposed by the Oxford school of language, 'elucidated'— through philosophical reflection. The main references are the general theories of law of the 20th c. authored in Europe and UK by Hans Kelsen, Alf Ross, Herbert Hart, among other legal philosophers, and the pragmatic works, commentaries and textbooks of the American realist jurisprudence in USA—O.W.Holmes, Roscoe Pound, or Karl Llewellyn. The former made legality dependent on 'valid norms' [*geltendes Recht*, valid rules] and a theory of law as a system. On the contrary, legal realists linked it to judicial behaviour and the nuances of case-based decision-making processes. As I already explained in Chapter 2, the perspective should be shifted from definitions to "the focus of matters legal" (Llewelyn 1930a). This approach has been influential in Law & Society studies, legal sociology, and anthropology of law, and it is a good example of the battleground Sartor (2005a) was referring to.

In the second half of 20th c., the development of logical approaches embraced a meta-linguistic 'definitional distance' in legal modelling, i.e. definitions as conceptual rules. E.g. Alchourrón and Bulygin put it in the following way: a (general) legal order should be distinguished from a (particular) legal system. 'Validity' is an ambiguous notion, meaning (i) existence, (ii) binding force (iii) or membership. Applying this latter notion—validity as logical membership—they distinguished between the original system and the subsequent systems belonging to it. The notion of competent authority and the Tarskian notion of recursive definition were used according to a criterion of identification[425]. They conceived a (generic) universe of solutions for a (generic) universe of cases as well, able to operate specific microsystems. Thus, they also were practically oriented, with a top-down stance. Authority was never questioned or explained, social cohesion was taken for granted, and reciprocity not even mentioned. All of this was considered out of scope. (Still is, according to some legal philosophers).

[425] Cf. Bulygin (2015); see the original formulation in Alchourrón and Bulygin (1971) and Bulygin and Alchourrón (1974). For a criticism from a phenomenological approach, see Mazzarese (1999). Mazzarese, partially following G.A. Conte's approach, raises three objections against the notion of "norm proposition": (i) rather than the meaning-content of a single statement, it would be the result of the 'disguised' conjunction of two different interpretative and validity statements (ii) that cannot be conceived as descriptive, (iii) nor as true or false (Mazzarese 1999, p. 102).

More or less by the same time, Lars Lindhal, following Stig Kanger, developed a theory of logical positions to be applied to normative systems. Lindahl's aim was exploring whether an "investigation into law and legal systems could lead to the discovery of unrevealed fundamental patterns common to all such systems" (Lindahl 1977). He built three basic systems of legal positions—for one-agent types, for individual two agent-types, for collective two agent-types—, their dynamics and change.

8.2.2 Legal Relation and Legal Interactions

Contemporary authors dealing with 'legal validity'—not all—usually assume that law constitute a unitary field, prone to be described from a theoretical approach that both defines its own concepts and identifies the rules, norms, values, principles, directives, that can be deemed 'legal'. I.e. it creates a specific theoretical and referential space in which they can specify the legal relationships and interactions between (human or artificial) agents.

The notion of *legal relation* has been key in analytical, formal and logical theoretical approaches. The historical origin of this notion goes deeper into the Roman law tradition, back to the work in the early 19 c. German jurists such as Friedrich C. v. Savigny [*Rechtliches Verhältnis-Rechtsverhältnis*] (Orestano 1989, Guzmán Brito 2006). This notion was refined and related to the normative power of the state in the second half of the century, in which Rudolf van Jhering (1852, #60) defined the doctrine of 'subjective rights' as 'legally protected interests' [*gesetzlich geschütztes Interesse*].

Stemming from a different perspective, Kanger's and Lindahl's approach leant on W.N. Hohfeld analysis of "fundamental jural relations" on "the common lower denominator of the law", exposed in two seminal papers in 1913 and 1917 (Hohfeld 1923). Lindahl (2006) highlights that the concept of relation played the essential role of defining the space in which the connection between (I) rights, non-rights, duties, and privileges and (II) power, liability, disability, immunity was made possible.

In I, the relation X versus Y indicates permissibility or ability. In II, the action is deemed to be factual, an 'act-in-the-law" whose result can be considered valid or non-valid (to make a contract or getting married). Kanger realised that the Hohfeld jural relations —or

"fundamental legal concepts"— could not be modelled only using functors such as permission or prohibition. He combined deontic operators (Shall) with action logic (Do) to do so. Lindahl (1977, esp.2006) reformulated Hohfeld's distinctions in terms of *liberty spaces* and *ability spaces* to apply modelled relations to exchange economic transactions, e.g. of rights, or property.

Marek Sergot and Andrew L.I. Jones have adopted and extended the Kanger-Lindhal theory of normative positions, pointing out some of their limits. For instance, Sergot (2013) mentions that it lacks a treatment of the role of counterparty (the agent who is a beneficiary of a right relation or to whom a duty is owed). Likewise, even more important, the theory focuses on the first square; it does not deal with the (difficult) second square, i.e. with the notion of (legal) power, capacity or competence (See Figure 47).

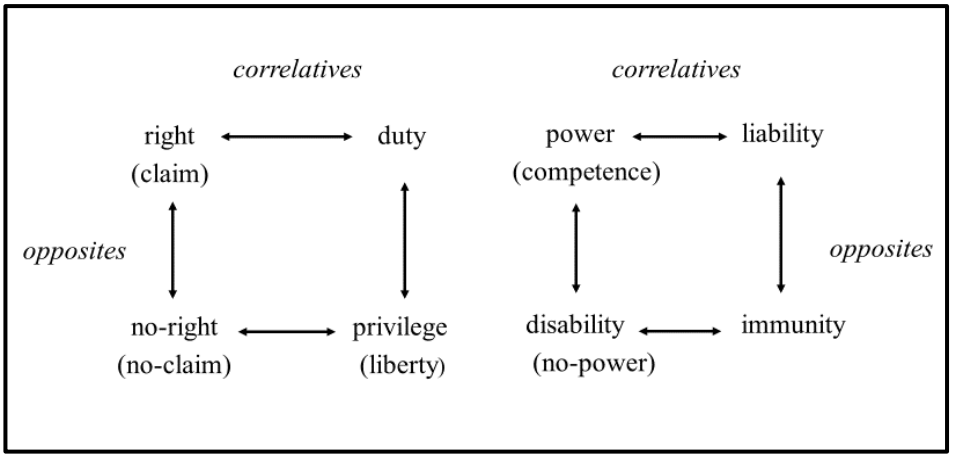

Figure 47. *Hohfeld's Jural Relations (according to Lindhal)*

Nevertheless, within this perspective, legal jurisprudence, dogmatic concepts —but also, ethical, moral and social concepts—might be used as shortcuts, as inferential engines to trigger legal effects. The main idea, as it is formulated in the theory of joining systems (Lindhal and Odelstad 2013), is that the difference between physical and mental, empirical and formal worlds could be bridged through action logic, standard deontic logic (comprising algebraic theory) and a method for generating the space of all possible *logical positions*. Concepts such as property or validity can assume a middle-term (Lindhal 2004), intermediate, or (more technically) *interpolant and intermediary role* in legal reasoning (Lindhal 2013). These intermediate concepts work as triggers, as they connect

facts and logical effects that are deemed 'legal', i.e., valid, either in a syntactic or (in some versions of NSDL) semantic way.

This approach to what is considered 'valid' has been also described using the so-called 'count as conditionals' theory (Grossi and Jones 2013): *X count as Y in context C*. It is, again, an inferential theory regarding validity, as it can be found in John Rawl's work on rules, John Searle's notion of institution (and constitutive and regulative rules), and Alf Ross's "technique of presentation" in *Tû-Tû* (1957).

As it is well-known, everything is presented upside down in *Tû-Tû*—the Noï-sulli Islands (Illusion), Noït-cif tribe (Fiction), the anthropologist Mr. Ydobon (Nobody), and the meaningless word *tû-tû*. It is worth noting that the reverse 'ut-ut' means 'such as' in Latin. In short, the meaning of most common legal notions —'ownership', 'contract', 'claim'. . . —might be illusory too, as they can be operationally turned into the connection between facts and consequences. This thesis is linked to Ross' epistemic assumptions on language and meaning. Words do not stand alone, and they may have no reference, but nevertheless *they have a function that can be used in meaningful sentences as connectors*, i.e. as an "expression of prescriptions and assertions".

8.2.3 Institutional and Cognitive Validity

I would like to make an excursus at this point on the notion of 'institutional validity', a highly influential notion in social sciences, analytical jurisprudence and, as shown, deontic logic. [426] I will recover here some of the threads of Chapter 2 (Subsection 2.3.1) and Chapter 5 (Subsection 5.5.2), where I discussed some of Searle's formulae.

As stated by Searle (1995, 63), "institutional facts are *epistemically objective* but *ontologically* subjective".[427] In his reply to anthropologist Roy d'Andrade, who had made the

[426] Cf. Casanovas (2021c), circulated manuscript. I made this argument as a comment to "Abracadabra! Law, Language, and Agency in the Digital Real", by Jason G. Allen and Peter Hunn, in occasion of Mireille Hildebrandt's COHUBICOL Seminar on Rules as Code, in November 2021. I am grateful to the authors, organisers, and participants for their fruitful exchanges and discussions on the subject.

[427]: "[…] a type of thing is money only if people belief it is money, something is property only if people believe it is property. All institutional facts are, in this sense, ontologically subjective, even though in general they are epistemologically objective". Searle (1995, 63).

point of keeping separate the cognitive and the structural dimensions of agency (normative structures and normative systems), Searle wrote:

> when I say that language is partly constitutive of social reality, I do not mean that one of the elements in social reality is language. That is too obvious. Everybody agrees that language is a social phenomenon. I am making a much more ambitious claim. *All institutional reality, without exception, requires a linguistic or symbolic component.* Language is not a component of social reality, so to speak, on all fours with money, property, marriage, or government. But rather, you cannot have money, property, marriage, or government without a linguistic component.

D'Andrade had asked for the relationship between culture and institutions, and Searle replied with the pervasive presence of language as the main constitutive component of (i) *social reality*, (ii) *human social reality*, (iii) *human social reality into one single material world*. D'Andrade (2006, 35) viewed norms as the "collective shoulds of life", Searle named them "deontic powers":

> An important fact about institutions is that they are constructed by a linked pair of fusions. The first is the fusion of the constitutive rule with collective commitment. The second is the fusion of an idea about how things should be with a collective commitment that they will be this way. This second kind of fusion is called here a *norm*. Norms are the *collective shoulds* of life, which Searle calls *deontic powers*. Norms are more than just ideas. Like institutions, norms are collectively agreed upon; one can be sanctioned for breaking a norm. *Thus an institution contains two basic ideas: the first that X counts as Y, the second that certain norms apply to situations involving Y. For each of these ideas there has to be a separate collective agreement and commitment.* [my emphasis]

I highlighted the distinction made by d'Andrade at the end, because it is relevant for my argument. Implementation, application, enforcement, practical management of norms in specific environments and situations cannot be taken for granted, top-down, from an abstract conceptual perspective. Implementation of norms is not a derivative inferential point; *it is the standpoint* for an empirical analysis of what collective behaviour means. In my own terminology, *how norms make sense* within a community, i.e. how an abstract regulatory model is turned into a regulatory (normative) system, or the other way around, how a regulatory (normative) system can be inductively obtained from collective behaviour, again, making sense of what we can observe.

As mentioned, the collective agency of norms and related problems—mainly the *cooperation* and *coordination* of artificial agents—have drawn much attention in the computer

science community focused on Normative Multi-Agent Systems (NorMAS), Socio-technical Systems, and Artificial Socio-cognitive Technical Systems (Alderweld et al. 2016). Philosophers have delved into the notions of collective reasoning in institutions as well, the "importance of us" and "we-intentions", as Raimo Tuomela (2007) contends.

This is appealing, but what I would like to highlight here is that Searle's institutional perspective was also built to answer the issues raised by socio-biology. His research was also addressed to identify *what is specifically human* in human behaviour. The question is, according to him:

> *Why should the social sciences treat human beings differently from the way ethologists treat other social animals*?" […] one way to see my work on social ontology is to see it as an effort to answer the challenge of socio-biology. (Searle, 2006)

I am not sure that I share this perspective. Searle has been very attentive to the developments of primatology. Primates (especially chimps and bonobos) *constitute* social realities. Could they have institutions too, X counting for Y in context Z? Do they have selective lines of culture (e.g. different solutions for the same problem that can be learned and transmitted by different social groups) from which different regulatory *institutions* would emerge?

If the response is affirmative, primates cannot be treated as different from humans in this respect. There is a discussion right now among primatologists. Michael Tomasello is not convinced but Frans de Waal has always been open to this possibility. He and his team have been experimenting on what they call "arbitrary conventions" (Bonnie et al. 2007). In fact, a very recent survey on the question 'do we see any economic organization or institutions emerge among groups of nonhuman primates?' published in *Philosophical Transactions* seems to offer a positive answer (Bourgeois-Gironde et al. 2021). So, after all, language could not be *the* essential component of social institutions, and there is a social ontology that could be shared between primates and humans. What would be essential is *knowledge*: the *structural coupling* between systems and reality, to express it in a cybernetic way. And, following the argument up to the end, social ontology could be shared between primates, humans, and machines.

Back to Searle's questions, I have the feeling that they are not formulated from an ontological approach only[428], but from a metaphysical (pure) and ontological (represented) perspective *alike*. I.e., in his work, institutional reality is a *mode of existence* and the product of an embedded semantic logic expressed by the institutional scheme at the same time. Searle's research questions are plainly about the "nature of human sociality itself", as he clearly put it just at the beginning of his last books:

> What is the *mode of existence* of social entities such as governments, families, cocktails parties, summer vacations, trade unions, baseball games, and passports? […] The book attempts to explain the *fundamental nature and mode of existence*—what philosophers call the *essence* and *the ontology of human social institutional reality*. What is the mode of existence of nation-states, money, corporations, ski clubs, summer vacations, cocktail parties, and football games, to mention just a few? (Searle 2010)

I contended in 5.5.2 on the notion of *empowerment* that (i) the causal chain that can be built to check its degree of compliance with legal regulatory models cannot be completely captured either by Searle's formula *X counts as Y in context Z* nor from institutions defined as a set of constitutive rules (or counts-as conditionals logic); (ii) to determine the way to check legal validity is an empirical process (not coming from a social ontology); (iii) the operation of validating (processes, norms, systems…)—i.e. assessing that they 'make sense'—requires a complex selection and combination of the right variables at different level of depth to be explanatory and to properly ground a reusable toolkit; (iv) following Pitkin (1966), 'empowering' a cognitive agent means '*made its self-representation* present', acquiring and exercising *a political power of self-representation,* i.e. a 'legal' power that is phenomenologically different from the representation of power as a deontic capability.

Deontic capabilities are not natural; they are defined and *constructed* according to different theories that can be used to do so. To me, it is an important step to create formal executable actions and effects. Phenomenological approaches cannot be coded. But this is not saying that cannot be formulated in a way that facilitate coding through interpretation, translation, and formalisation.

[428] See the explanation about the origins, metaphysics, ontology and knowledge in Chapter 2, Subsection 2.3.2.

On the contrary, phenomenological approaches can foster an empirical view to consciousness, agency, and regulatory modelling. What should be put in place is the clarification of all cognitive mechanisms at work in Human/Machine interfaces. Primatologists, again, have been quite clear about the precision of observations and the experiments that could be carried out to understand institutionalisation processes. In primates (and human) interactions, agents *resonate* with or *echo* other agents. This is *empathy*, or, put it in the preferred way by de Waal (2009, 65 and ff.) using Theodor Lipps' expression, *Einfühlung* (feeling into), the direct access to the "foreign self" that makes us feel within another human being, sharing her experiences immediately and without representing them in any language. We don't decide to be empathic; we simply are.[429] This can be represented, but not reproduced by a machine.

A different way of taking a phenomenological approach to institutions, this time in logic, is analysing the dichotomies produced to reconstruct them. The Italian philosopher G.A. Conte coined the term *praxeme* (from 'phoneme') to refer to the practical side of *eidetico-constitutive rules* (also: instantiations of Searle's constitutive rules) and the term *pragmeme* to refer to their types. I.e., "the rules of a praxis like the game of chess are constitutive both of the *praxis* itself and (in the praxis) of its *praxemes*" (Conte 1988, 143). This means that there is no stark division between constitutive and regulative rules, but constitutive rules can ground *the game itself* and *allow* the moves or actions according to the types defined by the game. Thus, there are *anankastic* rules, *rules founded on rules*, that regulate but should not be confused with regulative rules.[430] Again, this can be represented, but not reproduced by a machine. Natural language, and the philosophical nuances that natural language can express, find some limits in formal and computer languages.

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[429] "Lipps offered a bottom-up account, that is, *one that starts from the basics* [my emphasis] rather than the top-down explanations often favoured by psychologists and philosophers. The latter tend to view empathy as a cognitive affair based on our estimation of how others might feel given how we would feel under similar circumstances. But can this explain the immediacy of our reactions? Imagine we're watching the fall of a circus acrobat and are capable only of empathy based on the recall of previous experiences. My guess is that we wouldn't react until the moment the acrobat lies in a pool of blood on the ground. But of course this is not what happens. The audience's reaction is absolutely instantaneous". (de Waal 2009, 65-66).

[430] "In the case of a deontic eidetico-constitutive rule, one and the same deontic statement expresses both an eidetico-constitutive rule of the game (game), and an anankastic rule of the ludic activity." (Mazzarese and Conte 1985, 61).

Presence, collective reasoning, resonance, empathy, *Einfülung*, pragmatic weight, *pragmemes* (types of moves), *praxemes* (or pragmatic moves) … There are many things that are relevant to understand what a valid set of rules is, how institutions are built, and how regulatory systems work. We could add the intuitive and inner world of the affective and subjective mind (better, brain) recently explored by the affective neuroscience (Solms 2021) following (surprise!) Freud's intuitions on the self.

Another point is the relationships of institutional analysis with ethics. In his reply to D'Andrade, Searle (2006, 42) writes: "My original analysis of institutions *is ethically neutral*. The Nazi state is as much a set of institutional structures as is the United States of America". Hans Kelsen wrote *à la lettre* exactly in the same vein about his pure theory of law: it could be applied to the Nazi state, to the Soviet state, and to the Francoist state. It was "ethically neutral". Both thinkers separated morality (that should always count) from ethics (a completely separated field), and they ended up wondering about 'validity': When can a legal norm be deemed 'valid' (i.e.'legal')? When can an institution be deemed 'valid'?

8.2.4 Legal Theory: From Legal Positivism to Practical Reason

Let's start the discussion with legal theory, because in the 21st c. few legal philosophers would identify themselves with the classic theories of law. Ethics is a good point to start with. As I have presented it so far, ethical concepts, methods, theories, and procedures are a cluster of the metarule of law scheme. However, in the next Subsections, I will place ethics as a privileged space enabling Legal Compliance through Design (LCtD) and the notion of ecological validity. What does it mean? Doesn't this mean that I adopt a jusnaturalist position, i.e. a stance in which moral validity overcomes or supersedes legal validity?

This is not what I have in mind. 'Ethics' is a descriptive term for values, principles and behavioural patterns to be implemented *with a transnational scope through Artificial Intelligence techniques (i.e. machine learning) and the semantic technologies of the Web of Data*. If I am choosing it as a privileged conceptual space is because hard law, soft law and policies are usually defined according to the notions of *sovereignty* and *jurisdiction*;

i.e. properties of the nation-state. (I will come back to definitions in the next Section about compliance).

Classical theories of law in the 20th century—mainly Kelsen's, Hart's and Ross' theories—are quite clear on this subject. Law is connected to (or even derived from) a central point of authority. This is no longer the case in the 21st century, in which literally millions of transactions with a legal form are performed on the web using all kinds of formal languages and technical devices—from blockchain to ODR and agreement technologies.

There is an interesting feature in Hohfeld's and Lindahl's approach. Contrary to the German jurists of the 19th c. there is no reference (nor need to refer) to the official state that makes the relation secure or ensures that the content of the legal act will be protected. What Hohfeld had in mind as ultimate space or social and political framework was the Common law tradition and the notions of precedent and equity which are present in this tradition, including equity courts. In a third article, less frequently quoted, Hohfeld interestingly positioned the notion of *apparent validity* of a legal act that could contravene the common law principles of equity (Hohfeld [1913] 1923, 121). In the supplemental note that followed, he wrote that "it is necessary to consider definitely the 'conflict' of the 'legal' and the 'equitable' relations involved and to discover the net residuum derived from a 'fusion' of law and equity" (ibid., 158).

In legal theory, discussions around whether or not defining legal validity with reference to moral conditions—or Human Rights, the Bill of Rights, natural justice, substantial due process, substantial rule of law, etc.—have been lasting for thirty years now, triggered by H.L.A. Hart's postscript to the second edition of *The Concept of Law* in 1994. As Waluchow (2009, 123) reminds us, after Dworkin's criticisms, Hart explicitly stated that "in some systems, as in the United States, the ultimate criteria of legal validity explicitly incorporate principles of justice or substantive moral values". The separation between *inclusive* and *exclusive* positivism stands on this crucial point.

The former one defends moral contents as imposing requirements to legality that should be respected; the latter prefers standing only on sources that are considered 'legal', i.e. the sources of law (such as legislation and case-based law). Waluchow distinguishes four concepts of legal validity using the Hartian 'rule of recognition' framework, i.e. Legal

validity as: (i) *Existence* (or acceptance)[431]; (ii) as *Systemic validity*[432] ; (iii) *Systemic moral validity*[433]*;* (iv) *Moral validity*[434].

The publication of the *Treatise of Legal Philosophy* (from 2005 onwards) fuelled the philosophical discussions on the concept of validity among many legal philosophers from different traditions.[435] Pattaro (2005, 86) linked it to a general "matrix of all norms", a "matrix of *normativeness* as the ultimate source of the binding force of positive law, and hence of what is right by virtue of human-posited legal norms." Thus, morality, but also normative contents, objectivity, and subjectivity, what counts as right and duty, empirical and formal approaches, would have a common origin or generative *locus*.[436]

Following a similar path, legal knowledge, *Scientia Iuris*, according to Peczenic's expression, defines what 'sources' should be conceptually considered to bring about the concept of law. The notions of "strictly institutionalized" and "quasi-institutionalized" sources of law (Shiner and Rotolo 2005, Shiner 2007) delves into it. A law (or, as the author puts it as well) has a strictly institutionalised source if "(i) the existence conditions of the law, or law-like rule, are a function of the activities of a legal institution; and (ii) the contextually sufficient justification, or the systemic or local normative force, of the law, or law-like rule derive entirely from the satisfaction of those existence conditions".

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[431] R is officially accepted and practiced in legal system, L, as a norm which fully satisfies all systemic criteria of legal validity (both pedigree and merit based) included within rule(s) of recognition.

[432] R is officially accepted and practiced in legal system, L, as a norm which fully satisfies all systemic criteria of legal validity (both pedigree and merit based) included within rule(s) of recognition; and does, as a matter of (objective) fact, satisfy all such systemic criteria of validity.

[433] R is officially accepted and practiced in legal system, *L*, as a norm which fully satisfies all systemic criteria of legal validity (both pedigree and merit based) included within L's rule(s) of recognition; does, as a matter of (objective) fact, satisfy all such systemic criteria of validity; and "has the normative consequences [it] purport[s] to have"42 because it is the product of a legal system which (a) fulfils "the need to have effective law"; and (b) issues from "a justified authority."

[434] *R* is morally justified on its own terms, i.e., independently of its membership in L.

[435] See an account of the discussions and diferent positions in Shiner (2007).

[436] "What is objectively right and what is subjectively right belong equally to the reality that ought to be, but only what is subjectively right can be said to be, in a sense, individual and concrete, since it is necessarily linked—by way of the legal pineal gland: by way of legal validity—to the reality that is. Indeed, obligations, rights, and other normative subjective positions get ascribed to subjects (people) who live in the reality that is, and these are actual and hence individual and concrete subjects. Further, the obligations and rights that people have under the law are bound up together; they interlace in a web of legal relations: These, too, belong to what is subjectively right (in the reality that ought to be), and likewise get ascribed to individual and concrete subjects (people) who live in the reality that is." (Pattaro 2005, 86).

This strong conceptualist way of understanding regulatory instruments as norms—mainly what we have termed 'hard law'— shared by authors such as Pattaro, Peczenic and Summers, is also reflected by Grabowski's notion of "post positivist concept of statutory law". The "pragmatic" conception of norm is expressed by the necessary and sufficient practical conditions for the successful performance of the institutional acts of norm-making, the outcome of which are legal norms:

> "A norm of statutory law is valid if, and only if the potential addressee of this norm does not have any legal options of refusing to behave in the way prescribed by it or to take action aimed at achieving the end determined by it*."* (Grabowski 2013, 433).

This definition (i) asserts a unitary intensional meaning that excludes the possibility of accepting the fact of the application of invalid legal norms by a judge, (ii) is limited to statutory law; (iii) is limited to the civil (centre-European) conception of law, (iv) it assumes that all 'juristic' conceptions on validity constitute a 'system of connected concepts', (v) it endorses the difference between the *rule (or norms) of action* and the *rules (or norms) of end*, set by Atienza and Ruiz Manero (1996).[437]

I think that this difference stems from a conception of practical reason and legal argumentation also shared by philosophers and legal scholars such as Georg H. von Wright and Robert Alexy, i.e. a philosophical stance that broadens the scope of logic and law to reach the meta-level of logic and philosophy. After setting his seminal analogy between modal and normative concepts, Georg H. v. Wright tried to "clarify the philosophical rather than the formal logical aspects of deontic logic" (von Wright 1999, 30). This is related to the assertion that "any syntactic structure of deontic sentences and their molecular compounds can be interpreted as a truth-functional structure of norm-propositions" (ibid. 32).

Von Wright proposed two distinctions that are most relevant here. The first one, between the specific practical circumstances of a norm (*must*) and its general deontic level (*ought*), i.e. "the 'ought of obligation' and the 'must of practical necessity'" (ibid. 36). The second one between "the *Sein-Sollen* (-) and *Tun-Sollen* (-), between that which ought to be and

[437] Rules of action: "If a state of affairs X is given, then Z ought to take an action Y". Rules of end: "If a state of affairs X is given, then Z ought to achieve an end (a state of affairs) F" (Atienza and Ruiz Manero 1996, 180-181).

that which ought to be done" (ibid.). These are *second-order distinctions* underlying normative systems in such a way that "the definitions of normative consistency and entailment rely on the notions of *doability* of norm-contents and *rationality* of norm-giving activity".

This approach entails a practical turn, pointing at practical reason as the underlying level of the connection between the logic of action and the logic of norms. When dealing with validity, this perspective operates beyond the Alchourrón and Bulygin distinction between rules (or behavioural norms) and conceptual rules. For the Argentinian authors, definitions are conceptual rules, and admission and rejection rules alike define what a valid norm is according to recursive inferences (pertinence to the system). This notion regarding validity is substituted with the notion of anankastic-constitutive rules in Atienza and Manero's work, and with the notion of legal validity in Alexy's work. This opens the door for bringing in notions of justice that are put aside from a strict positivistic point of view.

After his extended work on legal argumentation, Robert Alexy published a famous essay on the concept of law and validity, *Begriff und Geltung des Rechts* (1992). It was translated into English with the title *The Argument of Injustice. A Reply to Legal Positivism* (2001), by Bonnie and Stanley Paulson. The Translator's Preface specifies that the new title was chosen (with Alexy) because it was an "accurate reflection of the focus of the book" and "it also seemed to us much too close to H.L.A. Hart's title *The Concept of Law*" (Alexy 2001). This work was very much focused on justice, reason (i.e. giving reasons) and a compounded vision of the concept of law, which Alexy deemed as consisting of a moral, social and specifically legal dimension (referring to Kelsen's *Grundnorm*). This fuelled the discussions around the basis of legality and morality and elicited some replies and several rounds of controversies with Bulygin and Raz, among many others.[438]

[438] Part of Alexy's third round response to Bulygin refers to the inclusive argument: "The argument from inclusion consists of two parts, and the first part is this. It is a conceptual necessity that law raises a claim to correctness. The second part of the argument is that this claim to correctness necessarily leads to an inclusion of non-authoritative normative —that is, moral— elements, not only at the level of the application of law but also at the level of determining the nature and defining the concept of law." (Alexy 2010, 4)

Alexy's definition of the concept of law reads as follows:

> The law is a system of norms that (1) lays claim to correctness, (2) consists of the totality of norms that belong to a constitution by and large socially efficacious and that are not themselves unjust in the extreme, as well as the totality of norms that are issued in accordance with this constitution, norms that manifest a minimum social efficacy or prospect of social efficacy and that are not themselves unjust in the extreme, and finally, (3) comprises the principles and other normative arguments on which the process or procedure of law application is and/or must be based in order to satisfy the claim to correctness. (Alexy 2002, 127)

Alexy argued that there is a *necessary* connection between morality and law from the inside, a *necessary* connection between society and law from the outside, and a *necessary* connection between law and reason that bridged both approaches (interior/exterior) from a pragmatic, discursive or argumentative approach. These are the main points that have been largely debated so far, especially this notion of necessity, expressed through what the author calls 'the dual-nature of the law', i.e. that "law necessarily comprises both a real or factual dimension and an ideal or critical dimension" (Alexy 2008, 281).

More recently, Köpcke (2019) has shown that legal validity can also be understood as a 'fabric of law', mainly a useful *technique* from the social and historical point of view, i.e. endorsing sustainability through time—"legal validity can help a large community to foster justice precisely by helping it *bypass* concerns about justice and other concomitant matters" or, more explicitly, "the technique of legal validity can bestow a power to craft requirements of justice" (ibid. 3,5).

We would like to highlight from our side that all these distinctions and classifications, including the procedural ones, (i) assume a notion of social power or legal authority that is barely defined, although there are many references to abstract rulers, lawmakers and legislators, (ii) do not describe in detail the instruments, technologies and devices of what we have called the *meso-level*, the intermediate technology that relates humans and machines. This is another sign of the rapid digital change we are experiencing. These reflections reflect in turn an analogue (non-digital) conception of human societies.

It is assumed that society as a whole follows and is ruled by the law through the idea of *systemic validity*, which is differentiated from the validity which is attributed to norms, principles or rules stemming from positive sources of law—what Dworkin famously

called the “pedigree” of norms. Kelsen, Hart and, to certain extent, Ross, contributed to this kind of social isomorphism, by which it is rational or reasonable to assume the previous matching between law as an order or system of norms and the society in which this order is produced and by which is being regulated. Another way to describe it (in cybernetic terms this time) is asserting that it is supposed a *structural coupling* between law and society.

We do not need such a strong assumption. We would like to lower the level of abstraction to simple assert that a certain degree of ecological validity would suffice to sustain regulatory systems and to turn them ‘legal’. The idea can be summarised as follows. If imperatives (and also norms) lack truth-value, then they nevertheless can be the object of a *validation* process. But this entails that we must bridge the formal description of norms—for our purposes, it does not matter which formal language might be used (descriptive or normative)—, their empirical properties, the environments they are nested in, and the contexts they contribute to create. I.e. Validity (what counts as ‘legal’) cannot be predicated from the system itself to define which norm is or not legal on an individual basis. It is a collective property that *emerges* (i) from the way rules (or norms) are contextually used in specific lifecycles; (ii) from the conjunction of the empirical attributes related to the context; (iii) from the interface between computer languages, digital artefacts, and humans. Let’s go deeper into it.

8.2.5 Ecological Validity and a Metamodel for Legal Governance

We can broaden up the discussion about what a ‘valid’ norm, rule, decision, or act are. I have already introduced at length the idea of rule and metarule of law and its four clusters— hard law, soft law, policies and ethics. I will complete the picture now, focusing on the path between *ethics, compliance, ecological validity, and legal governance.*

Subsection 7.4.5 complements the diagram of the metarule of law (Chapter 5, Subsection 5.4.2 Figure 31) and the epistemic middle-out/inside-out approach drawn in Figures 32 and 33 (Chapter 5, Subsection 5.4.3). Figure 31 is a scheme, a way of representing graphically the main components of the metamodel. Figure 48 represents the legal governance metamodel. A metamodel is a surrogate model containing the main elements to be reused

and fulfilled in models that instantiate the modules of the architecture drawn as a general design. Let's summarise the components of the metarule of law:

- Two axes (vertical: binding power, horizontal: social dialogue)
- Three dimensions (social, legal, and computational)
- Four clusters (hard law, policies, soft law, and ethics)
- Four cornerstones (multi-stakeholder governance, anchoring institutions, the binomial trust/security, and institutional strengthening)

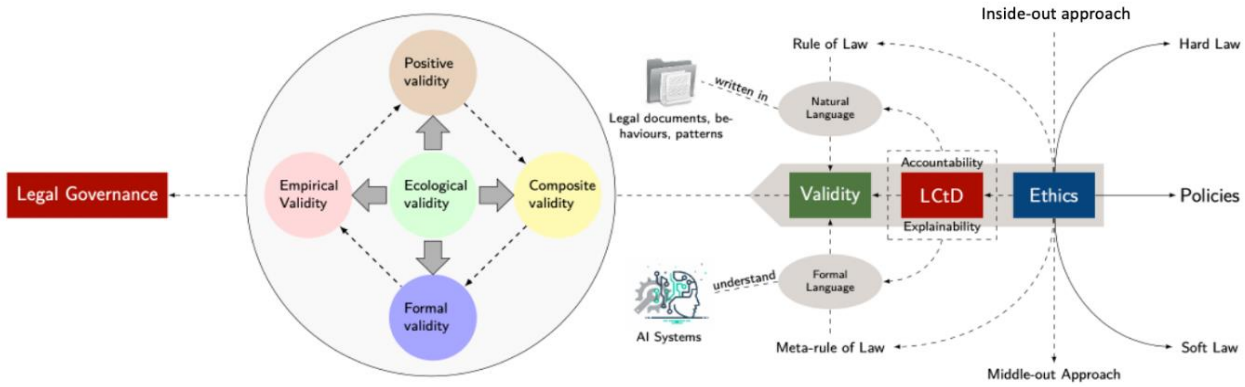

Figure 48. *Metamodel of Legal Governance and the Metarule of Law*

We will use the notion of *legal linked data ecosystem* or *legal ecosystem* meaning all processes, interactions and exchange of information involved in the social and legal linked data ecosystems referring to the rule of law, including its design, monitoring, and users' compliance and behaviour. I contend that legal ecosystems are not just generated from the enactment of laws. In IoT and WoD, legally valid ecosystems originate from a set of conditions amongst human and technical interactions, including the requirements of artificial systems and the individual and collective behaviour of their users. Hard law jurisdictional conditions can be certainly added in each country that is subject to sovereignty to complete the set of legal requirements under a national rule of law. Nevertheless, this is a too narrow perspective to give reason for the governance of lawtech—fintech, insutech, suptech…—markets and for the social relationships and economic transactions that are performed and take place through the implementation of formal rules.

Zuiderwijk et al. (2014, 30) have suggest that an Open Data ecosystem consists of a multilayered and plural framework: (i) "an open data ecosystem is characterized by multiple

interdependent socio-technical levels, dimensions, actors (including data providers, info-mediaries and users), elements and components", and (ii) "need to address challenges related to policy, licenses, technology, financing, organization, culture, and legal frameworks and are influenced by ICT infrastructures"

If we take these conditions seriously, publishing, republishing or enacting law on the internet is not a sufficient condition to create such a legal environment. *Ecological validity* refers to the extent a normative system or regulatory model is socially anchored and institutionalised in a digital data environment to generate a sustainable legal ecosystem. In this sense, it relates to the way that abidance, accordance, conformance and congruence with norms—the four properties of hard law, policies, soft law and ethics—are effectively materialized and the affordances that the regulatory system puts into play and offers to the (human or artificial) agents, depending on how it has been designed.

The gap between the substantive rule of law and the modelling into formal languages of its protections and rights can be bridged fleshing out the ethical quadrant of the legal compass, i.e. making *accountable* and *explainable* both the nature, steps and stages of the modelling process, and the impact and results of its implementation in digital social environments.

From this point of view we can differentiate four different types of validity in a regulatory system: (i) *positive* validity, (ii) *composite* validity, (iii) *formal* validity, and (iv) and *empirical* validity. Positive validity refers to the source, i.e. Where are norms, principle or values coming from? Are they standards, protocols, acts, contracts, rulings….? This is the normal sense of *positive* in legal doctrine. The four sections of the legal compass point at the different sources—where norms are coming from or to the set of regulatory bodies and instruments they might pertain to.

Positive validity is often assumed by legal semantic web developers also as an *ontological commitment* that must be defined. This relates to the *existence* of entities because they are linked to a vocabulary or lexicon with specific semantic assumptions that should be clarified too. However, again, this is not a sufficient condition to predicate their existence, i.e. their social occurrence and usage. Ecological validity entails such an acceptance as a precondition for the sustainability of the regulatory system.

Composite validity runs parallel to the notion of a composite indicator for the legal domain (Ciambra and Casanovas 2014). From an empirical point of view, validity is a secondary property that *emerges* from the legal ecosystem, i.e. it is a property of the system, not of an individual norm or rule. Once first-order properties such as *efficacity*, *effectivity*, *enforceability*, and *fairness* (justice) have been accomplished up to a certain degree and assessed as belonging to the system, then validity or a certain degree of validity can be assessed as well. Moreover, to be sustainable, a system should also be *formally* consistent, and the system of rules should be expressed consistently.

The difference between *emergence* and *supervenience* does matter here. Supervenience is often used to describe how normative facts (facts about how things ought to be) fall upon or have an influence on natural facts (facts about how things are). R.M. Hare (1952) used the term in this sense, to characterize a relationship between moral properties and natural properties (McLaughlin and Bennett 2018). In legal philosophy, this has been a natural pathway to explain validity. This property is supervenient from normative (Hage 2005) or argumentative conditions, linked to the bindingness of law. This is an *inferential* notion of validity, prescriptive and irreducible to factual descriptions (Sartor 2009), although sensitive to the incorporation of conceptual interpretations (i.e. doctrinal argumentation schemes) to ground it. Prakken and Sartor (2013, 121) have contended that "the validity of a new norm can be supported by referring to authoritative sources, such as legislation or precedent, but also through interpretations of such sources, or through analogies or *a contrario* arguments based on existing authoritative norms".

Rotolo (2018, 4) defines normative supervenience (NS) as "a logical entailment that makes properties normative and that correspond to ways for identifying the set of normative possible worlds (normative necessity)". He suggests that non-standard logic can grasp specific aspects of normative supervenience, such as the institutional supervenience corresponding to the *count-as-relation*—logically viewed as a conventional type of NS—and modal logics to generate a meta-theory for supervenient properties.

The process drawn in Figure 48 does not entail the supervenience of validity but its emergence from specifically determined individual conditions to collective effects. 'Emergent' in this sense can be understood as a synonym of 'coming into existence', and more

precisely, ‘coming into *social* existence’. I.e. We understand validity as being an empirical *emergent property* (O’Connor 2020) that occurs in interaction between its elements and a wider whole.

There is a long tradition in social studies, from Ullman-Margalit to Elinor and Vincent Ostrom to refer to social norms as *emergent* from social interactions, i.e. “to provide a rational reconstruction of the formal features of states of social interaction in which norms are generated” (Ullman-Margalit 1977, 1) or to describe them as emerging as self-governed rule systems (Ostrom and Basurto 2011). Thus, the emergence of social, internalised, and personalised norms—as cooperative behaviour patterns— could also be viewed as a necessary component of public policy governance (Kinzig et al. 2013).

In our case, legal ecological validity is reached through an empirical process stemming from the original regulatory sources ending up to instruments of legal governance. It is a complex property with several dimensions—empirical, formal, positive. and composite—which algo emerge from the social interaction *and* its interface with artificial languages, applications, platforms and agents.

Almost all legal theorists consider the legal system as a whole, assembling legitimacy and legality, and assuming that the system has been set to produce a *legal* and a *social* order, alike. Thus, rulers and ruled, or officials and citizens, are equated as pertaining to the same general regulatory system. The former having the power to enact, implement, interpret and eventually enforce laws; and the latter having the explicit or implicit duty to obey or at least to conform, or not to be disruptive with the legal order.

For the post-Westphalian states of the 19th and 20th centuries—the legacy of Bodin and Hobbes—it has been a common approach. However, the Web of Data and the Internet of Things have added complexity to this relationship because the technological environment has had a huge impact not only on the content of regulations, but on the form and interfaces of how this content is being constructed, conveyed, and eventually implemented. Data-driven systems are transforming our everyday world, and the way how we understand our smart environments. The Internet of Things involves many components (often ‘systems of systems’)—as architectures include “physical devices (sensors, actuators);

gateways (hubs, phones, domain administration agents); and private/hybrid/public cloud services, for storage, processing and analytics." (Singh et al. 2016)

This high order of complexity can be characterised as a *data ecosystem* (Curry and Sheth 2018).[439] I have dealt with it in Chapter 5. This notion is usually defined from a market and business point of view, pointing at "socio-technical complex networks in which actors interact and collaborate with each other to find, archive, publish, consume, or reuse data as well as to foster innovation, create value, and support new businesses." (Oliveira, Barros and Faria 2020, 589). Although the authors also conclude their survey contending that "there is also a lack of engineering methods to provide a common structure in the form of well-defined rules, procedures, protocols, and processes to develop, manage, and evolve Data Ecosystems" (ibid. 626).

Digital ecosystems have been outlined as being (1) cyclical, (2) sustainable, (3) demand-driven environments oriented around agents that are (4) mutually interdependent in the delivery of value (Heimstädt et al. 2014). In open government data ecosystems, interoperable entities form a closed-loop system in which "instead of a one-way perspective to the open data, as the society and the government communicate, the benefits for both government and society can be leveraged" (Najafabadi and Luna-Reyes 2017, 2713). Curry and Sheth (2018) have asked the following questions regarding large-scale data-rich smart environments:

> How can intelligent systems leverage their data ecosystem to be "smarter?" How can we support data sharing data between smart systems in an ecosystem? How can systems adapt to take advantage of the data within the ecosystem? What are practical approaches to the governance of data within an ecosystem? How can we make trusted decisions using data and humans within the ecosystem?

We can add the questions about the reinterpretation of concepts to produce legal meaning, i.e. to *validate* norms, rules, operations, actions, agreements… to turn them *legal*. What

[439] Curry and Sheth (2018, 73) offer the following typology: (i) Directed data ecosystems which are centrally controlled to fulfill a specific purpose; (ii) Acknowledged data ecosystems which have defined objectives and pooled dedicated resources, (iii) Collaborative data ecosystems that have participants interact voluntarily to fulfill an agreed upon central purpose, (iv) Virtual data ecosystems which have no central management authority and no centrally agreed upon purpose.

does it mean a *valid* legal act or a legal norm in these scenarios? How can we redefine 'validity'?

When Linked Open Data (LOD) and the IoT come into play and are intertwined with legal issues —intellectual property, patents, privacy, security, data protection…—concepts and categories are reinterpreted to fit into the new digital environment.

Ecological validity is a notion that can contribute to the understanding of how the practice and experience of law, either for professionals, citizens and lawmakers, is evolving towards a more flexible plural order of legal governance, operating through technological means.

This approach can shed light to the process by which technology impacts and change the nature of law as a set of regulatory instruments. Instead of just focusing on the linguistic modal notions of bindingness, enforcement or dialogue, the idea is to nest them into specific digital ecosystems for the IoT, providing a set of pragmatic contexts that are empirically approachable and measurable. This entails a description of the available technologies stemming from a middle-out toolkit for legal governance (Pagallo et al. 2019a, 2019b; Casanovas et al. 2021)—at the technical *mesolevel* (Poblet et al. 2019), as a set of *middleware* enforcement or implementation techniques (Arjunan et al. 2012, Singh and Bacon 2014, Singh et al. 2016, , Singh et al. 2018)[440], or as a set of artificial cognitive systems—the *WIT* trinity model—(Noriega et al. 2014a, Noriega et al. 2014b, Christiaanse et al. 2014).

Privacy and surveillance, safety and security, governance and responsibility, liability, and AI design trustworthiness and consciousness, can be approached and (partially) modelled stemming from these complex environments of law change. As Singh et al. (2018) asserts, "legal frameworks provide a basis for establishing rights, liability, responsibilities, and mechanisms for compensation and holding entities to account", while technology "can

[440] "Our big idea is for a *legally-compliant IoT* [our where the supporting infrastructure enables the enforcement of policy to allow parties to demonstrably meet their responsibilities. Middleware can support secure, managed (i.e. driven by policy), data sharing. There is a clear role for middleware that enables dynamic, external reconfiguration, allowing management policy to be applied within the federated, decentralised and long-lived systems environment of the IoT." (Singh et al. 2016)

assist with accountability, providing means that facilitate the control and auditing of IoT technologies".

We can add from our side that to make a *legally compliant IoT* (and WoD) happen, a list of legal issues comprising privacy, security, patents etc. is always helpful (Rodríguez-Doncel et al. 2016, Millard and Singh 2017), but it does not suffice to articulate a global framework and a general definition of what is legal in a transnational legal scenario, i.e. what 'validity' consists of. It also raises the question of the boundaries of applying legal categories and concepts linked to specific jurisdictions to digital environments.

8.3 Theory of Legal Compliance

8.3.1 Compliance *by* Design and Compliance *through* Design

Compliance —and particularly legal compliance— is a hot topic now in big data analysis, blockchain, digital currencies, fintech, regtech, crowdsourcing, tax regulations, smart cities, cloud computing, normative multi-agent systems, electronic institutions, health, security, data protection, and privacy. From fifteen years onward, it has been the subject research matter of many EU H2020 Projects centred on the management of rights, legal documents, and administration.

Legal compliance requirements increased significantly in recent years. As we have explained all along of this Dissertation, environmental concerns, consumer protection, global standard-setting and the political and social fall-out of large corporate failures, e.g., WorldCom, Enron, and the Global Financial Crisis, are some examples of drivers of increased regulatory complexity. Legislation such as the Sarbane-Oxley Act and the Foreign Account Tax Compliance provisions of the US and voluntary frameworks such as the Basel III Accord of the Basel Committee on Banking Supervision are examples of regulatory responses that have had a global impact on compliance practices of affected institutions.

Existing efforts primarily focus on the identification and management of formal compliance requirements related to corporations and public agencies. COMPAS defined compliance and corporate compliance governance as follows:

> *Compliance* is a term generally used to refer to the conformance to a set of laws, regulations, internal policies, SLA, standards, or best practices. *Compliance governance* refers to the set of procedures, methodologies, and technologies put in place by a corporation to carry out, monitor, and manage compliance (COMPAS 2010, D5.5v2.0, p. 6)

However, the term “compliance" is far broader. It is not confined to compliance with the (hard) law or with internal policies but extends to compliance with ethical and societal norms and non-binding soft law such as industry standards and codes.

We can offer some definitions. *Compliance* refers to conformity in fulfilling official requirements, or demonstrating conformity with regulatory or legal constraints. *Compliance by Detection* (CbDt) means conformity check after the runtime stage (in the execution environment). When the compliance set of rules is considered during or after the execution of the business process, it is called ‘compliance by detection’. Therefore, after the execution of the compliance set of rules, if noncompliant behaviour is detected, the business process needs to be redesigned.

Compliance by Design (CbD) refers broadly to the set of formalised rules that are considered in the design stage of a business or regulatory process. *Legal compliance by design* (LCbD) is another general term that is mainly focused on the legality of the compliant business process as a whole. *Compliance through Design* (CtD), on the other hand, explicitly encompasses the social and institutional aspects of legal compliance (i.e. legal interpretation processes, institutionalization, the interface between modelling and coordination, and the relation between the regulated entity and citizens, consumers, and the law).

This approach requires us to view the legal compliance challenge through a sociolegal lens to understand and properly define appropriate compliance responses. By incorporating the sociolegal aspect into the compliance problem LCtD takes the compliance problem to a whole new level of complexity while promising a more appropriate, ethical and responsible response to complex compliance requirements.

Figure 49 shows an overview of the analytical scheme of the regulatory field. Figure 50 connects the analytical scheme with the formal languages that have been used.

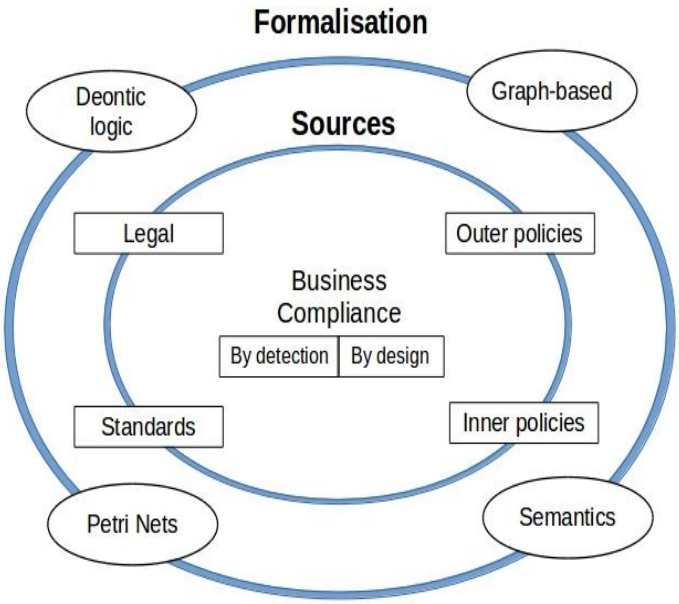

Figure 49. *Compliance Analytical Scheme. Source: Casanovas, González-Conejero, de Koker (2018d)*

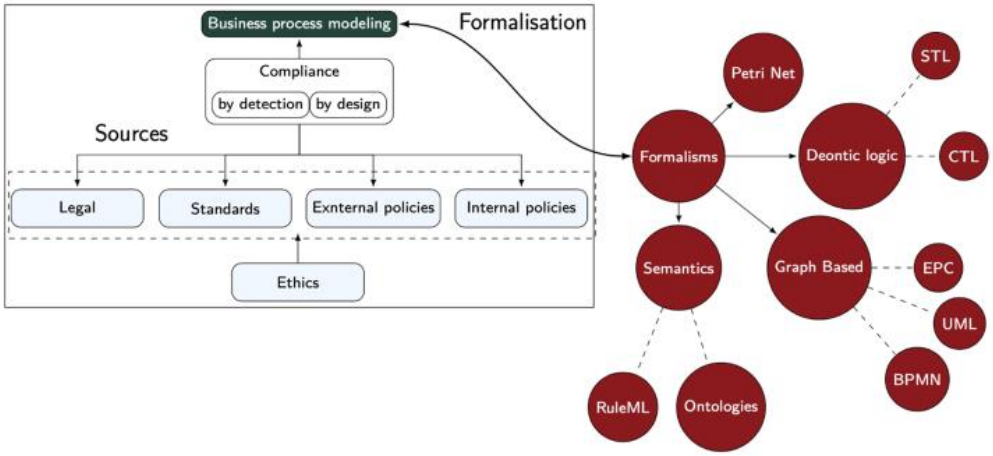

Figure 50. *Business Compliance Overview. Acronyms- SDL: Standard Deontic Logic, CTL: Computer Tree Logic, BPMN: Business Process Model and Notation, EPC: Event-driven Process Chain, UML: Unified Modelling Language. Source: Hashmi, Casanovas, de Koker (2022, Legal Compliance Survey, forthcoming)*

8.3.2 The Legal Quadrant: A Conceptual Compass for Legal Compliance Checking

This Subsection introduces a quadrant reflecting the four basic concepts at play in the societal implementation of the rule of law, and the relationship among them. The quadrant was figured out to provide a comprehensive clustering of the main legal concepts. This clustering was required to map and frame selected papers concerning regulatory, business, and legal compliance in a range of different datasets. These formed the framework for an extended survey on legal compliance that we carried out between 2017 and 2019, on more than 900 articles.[441] Its preliminary results have been presented in Casanovas et al. (2017d), and Hashmi et al. (2018a).[442] A first comprehensive explanation of the components of the legal quadrant can be found in (Casanovas, Hashmi and de Koker 2021a).

Figure 51 shows the four sections according to the degree of bindingness (rule of law) and social dialogue (involvement) implied by the regulations. Institutional strengthening and the fostering of trust among citizens, refer to the intended effects of the regulatory system. Validity (legality) is the emergent property at the centre of the vertical axis of bindingness and the horizontal axis of social expectations (enactment of rights). Legal compliance with norms, rules, directives or principles can be conceptualised from different angles—*abidance*, when approached from a (binding) hard law perspective; *conformance*, from a policy (governance) perspective; *accordance*, related to soft (non-binding) law; *congruence*, according to morals and ethical values. These four planes are deemed to capture citizens' relationships—aspects of compliance—within the four dimensions of legal instruments.

[441] We identified and extracted literature from two types of literature sources: (a) technical literature covering the technical aspects of regulatory compliance such as tools and techniques for modelling, extraction and automated verification of legal norms, and (b) conceptual legal literature covering the social and legal aspects of regulatory compliance such as concepts, statutory documents etc.

[442] We derived a codification protocol to meet the objectives of the analysis. In the coding process, we used a sample of the most frequently used concepts—and we created 327 nodes across four clusters of distinct themes according to the hard law, ethics, policies and soft law quadrant. Within each cluster we maintained the level of coding depth into no more than five levels of hierarchy to manage the complexity of the analysis. Along these lines, we also created 157 additional relationship nodes, expanding the analysis to 484 nodes.

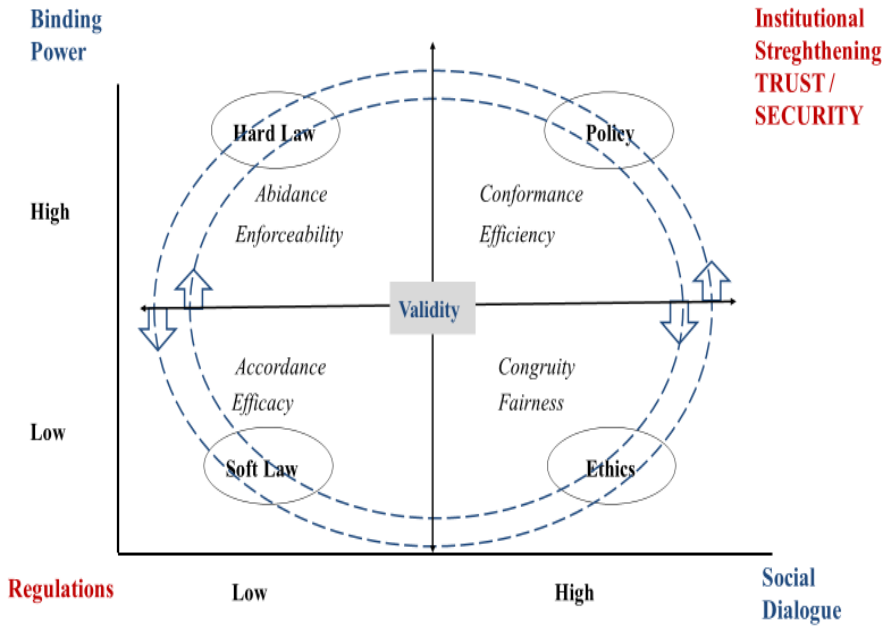

Figure 51. *Regulatory Quadrant for the Rule of Law. Source: Casanovas, Hashmi, de Koker (2021b)*

Hard law refers to legally binding obligations, either in the national or international arena, under regulations that can lead to adjudication court processes. *Soft law*, on the contrary, is not mandatory. It consists of non-legally binding rules, best practices, and principles that facilitate the governance of networks, social organizations, companies, and institutions. Soft law makes room to dialogue, negotiations, and shared decisions by relevant actors. Soft and hard law are non-discrete categories situated on a *continuum* that allows the coordination of different powers and authorities to produce *global law* and regulations across borders involving citizens, organizations, and states (Karlsson-Vinkhuyzen and Vihma 2009).

> International actors choose softer forms of legalized governance when those forms offer superior institutional solutions. […]. The realm of soft law begins once legally arrangements are weakened along one or more of the dimensions of obligation, precision, and delegation. This softening can occur in varying degrees along each dimension and in different combinations across dimensions. We use the shorthand term *soft law* to distinguish this broad class of deviations from hard law – and, at the other extreme, from purely political arrangements in which legalization is largely absent. But bear in mind that soft law comes in many varieties: the choice between hard law and soft law is not a binary one (Abbot and Snidal 2000, 421-422).

Policy is usually defined as a "a set of ideas, or a plan of what to do in particular situations, that has been agreed officially by a group of people, a business organization, a government, or a political party." [443] In our use of the term, it refers to *policies* designed, enacted, and implemented by national states or international agencies and organisations. Policies cannot be understood as soft law when they are enacted by government agencies that have the capacity of enforcing them by means of sanctions, fines and lawsuits. On the contrary, from this point of view, professional practices and technical protocols are all forms of soft law.

W3C recommendations and standards on linked open data fall within this category. Developers adopting them benefit from their wide acceptance. Yet, standards are not expected to gain compliance but *conformance*. They refer to the quality of coding and markup tools such as HTML and CSS and offer validators to check the conformance of web coding to them.[444]

There are also best practices and standards set by international professional organisations. ISO/IEC 27001[445] is an information security standard published by the International Organization for Standardization (ISO) and by the International Electrotechnical Commission (IEC), entitled *Information technology —Security techniques— Code of practice for information security management*. ISO/IEC 27002: 2005 has developed from BS7799, published in the mid-1990s. The British Standard was adopted by ISO/IEC as ISO/IEC 17799:2000, revised in 2005, and renumbered (but otherwise unchanged) in 2007 to align with the other ISO/IEC 27000-series standards. ISO/IEC 27001:2013 and 27002:2013 replaces the 2005 standard and highlights the importance of security in the cloud and the need not only of internal, but external (legal) controls.[446]

Both ISO/IECs and W3C standards can be conceived as forms of soft law, network or multi-stake holder governance. Yet, these latter concepts have a broader regulatory scope, intended to solve political social and disputes in regional, national, and international arenas (e.g. *conflicts* between social groups, corporations, companies, sub-state and state entities).

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[443] https://dictionary.cambridge.org/dictionary/english/policy
[444] http://validator.w3.org/ , http://jigsaw.w3.org/css-validator/
[445] http://www.iso27001security.com/html/27002.html
[446] See also (i) ISO 17799 (developed today by ISO 27001/02), a guide for implementing a set of policies, practices and procedures to consolidate the information security administered by an organization, (ii) ISO/IEC 27002, which requires that management systematically examines the organization's information security risks, taking account of the threats, vulnerabilities and impacts; (iii) Clause 6.1.3 of ISO/27001:2013, describing how an organisation can respond to risks with a risk treatment plan; an important part of this is choosing appropriate controls; (iv) ISO/IEC 27002 seeking the preservation of confidentiality, integrity, and availability.

Corporate governance is still another broad category than can also be considered as a form of soft law. It includes methodologies, models and standards developed over the last twenty-five years (for example, ISO standards related to corporate and regulatory compliance and security). Some models for IT Governance draw from COSO, COBIT, ISO 27002 (ISO 17799) and ISO 38500.[447] There is some confusion around the different models, as they are meant to pursue different objectives that are not always compatible: (i) stewardship of IT resources on behalf of various stakeholders, (ii) planning, organizing, and monitoring the use of IT resources; (iii) creating value for the stakeholders; (iv) complying with national and international laws to avoid regulatory risks; (v) both protecting consumers and customising consumer experiences; and (vi) improving market quality.

Finally, *Ethics* primarily refer to morals, social mores, practical knowledge and principles that should be implemented into legal regulations, policies, and governance structures. But, most interestingly, ethics double and can be infused across them.[448]

Ethics and law were not mentioned in the first accounts on the semantic web (e.g. Bizer et al. 2010), but this is experiencing a dramatic turn. The defence of ethical values embedded into computer systems, Multi-Agent Systems (MAS) and Artificial Intelligence is a hot topic now.

In 2013, the now well-known *Onlife Manifesto* was published (REF). Two years later, Luciano Floridi would add some comments and studies. The *Manifesto* reflects on the fading distinction between reality, virtuality, human, machine, and nature that seems to be prevalent in our hyperconnected world. Likewise, it stresses the blurring role of the nation state. Floridi advanced the idea of a "transparent state", "practically invisible not because it is not there but because it delivers its services so efficiently, effectively, and

[447] This standard is based on the AS 8015-2005 Australian Standard for Corporate Governance of Information and Communication Technology (2005).

[448] We can identify schematically at least four stages in privacy and data protection related to ethical principles. This is a well-known history: (i) the inception of *Fair Information Practice Principles* (FIPs) that were published in 1973 by the Advisory Committee on Automated Personal Data Systems in the Department of Health, Education and Welfare (USA) under the inspiration of Alan Westin; (ii) the proposal of a *unifying identity metasystem layer* by the Microsoft Chief Architect Kim Cameron in his blog in 2005; (iii) the proposal of Privacy-by-design principles (PbD) issued by Ann Cavoukian in 2006; (iv) the development of PbD and by default in the General Data Protection Reform launched by the EU in 2012 that led to the new EU Regulation that came into force in May 2018.

reliably that its presence is imperceptible" (2015, 62). This is consistent with his definition of transparency not as an ethical principle in itself but as a "proethical condition for enabling or impairing other ethical practices or principles" (Turilli and Floridi, 2009). However, as J. Simon (2015, 36) pointed out in her comment, "official contracts and hidden agreements between nation states and multi-national internet companies are used to consolidate the supremacy of those mastering the power game". For example, the power of (administrative and economic) elites, which we think is the real threat to the democratic development we try to incentivise in our developments.

V. Dignum (2018) has shown that ethics and AI are related at several levels: (i) *Ethics-by-Design* (EbD, the technical/algorithmic integration of ethical reasoning capabilities as part of the behaviour of artificial autonomous system), (ii) *Ethics-in-Design* (EiD, the regulatory and engineering methods that support the analysis and evaluation of the ethical implications of AI systems as these integrate or replace traditional social structures), (iii) and *Ethics-for-Design* (EfD, the codes of conduct, standards and certification processes that ensure the integrity of developers and users as they research, design, construct, employ and manage artificial intelligent systems).

All three approaches are required to implement the principles of the rule of law beyond the boundaries of the nation state. To set out sustainable and reliable socio-legal ecosystems, we should be able to figure out linked democracy instruments and tools.

8.3.3 Legal Compliance and the Rule of Law

This is the first step to carry out an empirical approach to legal compliance and the rule of law. In recent times, different conceptualisations have been proposed to create rule of law indicators. They focus on a variety of objectives: (i) United Nations: "*to measuring the strengths and effectiveness of law enforcement, judicial and correctional institutions*" (criminal institutions, judges, the police, prosecutors) (UN 2011); (ii) World Bank: "*the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence*" (WB 2019); (iii) Heritage Foundation: "*the degree to which a country's laws protect private property rights and the degree to which its government enforces those laws*" (HF, 2020), (iv) Freedom House: freedom, advance and decline of

democracy (FH, 2020); (v) World Justice Project: "*based on the experiences and perceptions of the general public and in–country legal practitioners and experts worldwide*" (WJP 2020).

These are not harmonised efforts as such indicators also (i) reflect different political positions and attitudes—from the liberal defence of property to the activist defence of democracy, i.e. "*democracy and pluralism are under assault*" (FH 2020), (ii) are not methodologically aligned, (iii) are conceptually incompatible, (iv) and cannot reach the level of granularity that is needed at the micro–level for concrete actions. Thus, their measurements and use have been widely criticised (Merry, Davis and Kingsbury 2015). Versteeg and Ginsburg (2017,111) observe that "*all the RoL indicators are perception-based measures created by experts who rely on a limited set of information sources, including each other's assessments and past scores*".

This lack of agreement reflects the division on understanding the rule of law at national and international level. I.e. the persistence of a nation state-driven perspective. As (Arajärvi 2017) concludes after examining the UN Sustainable Development Goals Agenda for 2030:

> The disappointingly diluted position of the rule of law in the 2030 Agenda is not for the lack of aspiration or a vision for a better, just world but a consequence of the long-running division among the Member States on how they view international law (2017).

Our approach to the rule of law is descriptive. It does not endorse an external combinatory perspective but an internal one, stemming from a linked network of legal concepts present in the literature. It is mainly focused on the different aspects and regulatory sources to build some metrics for understanding the quality and degree of compliance according to the two vertical (formally binding) and horizontal (substantively endorsing rights) axes of the rule of law.

These vertical and horizontal approaches have been explicitly or implicitly elaborated in well-known works on legal knowledge. In legal philosophy and legal theory, there is a widespread assumption that "private law regulates horizontal relations between equal parties; public law regulates vertical relations of subordination" (Pattaro, 2005, 34-35). Pattaro also distinguishes the *outer* from the *inner* system of private law. The former refers

to the readable and accessible ordering of legal materials. The latter one is deemed "a system of justificatory relations", referring to principles that unify the system in a coherent whole (ibid). According to Habermas (1996), the horizontal effect (*Drittwirkung*) of the system of basic rights protects citizens from the vertical relations with the state. Rights consist of reciprocal relations between the members of society; not of public power, i.e. the vertical relations between them and the state (Tuori 2002, 86). Aarnio (1986, 93-94; 2011, 147 ff.) disposes the legal sources according to their (vertical) degree of bindingness and their (horizontal) substantial or authoritative reasons. Likewise, Peczenik refers to *may*, *should* or *must*-sources of law, asserting that "all legal reasons are sources of the law in the broadest sense" (Peczenik 2008, 260 and ff.). This is related to the revival of practical reason in legal philosophy, stemming from the three seminal articles on the foundation of legal reasoning published by Aarnio, Peczenic and Alexy in *Rechtstheorie* (1981).

Our theoretical approach can benefit from this argumentative view that has become dominant in the last thirty years, but it does not need to endorse its conceptualist perspective. It is not a way to differentiate moral or subjective rights and civil law from its public sphere counterpart. It just defines and measures the framework to carry out a legal compliance checking that entails a set of functional and non-functional requirements referred to the legal compass (Casanovas et al. 2021a). There is no need for an ontological assumption pointing to reason and argumentation as sources of law. What is required is a sound comparison between regulatory and legal dimensions to test the deeper complexity of compliance when approached from a legal perspective. It is worth noting that, compared to Compliance by Design what is encompassed by the notion of Legal Compliance through Design is the hybrid intelligence notion as recently proposed by Akata et al. (2020) to handle Augmented Reality and Human/Machine interfaces.

8.3.4 Methodology: A Causal Model in Three Steps

We figured out a methodology in three steps to validate legal governance models, i.e. to validate the results of conditions, and the interrelationship among the conditions, selected to generate legal ecosystems in the convergence of the so-called Internet of Things (IoT),

the Web of (Linked) Open Data (LOD), and Industry 4.0. A first synthetic version of this methodology can be found in Casanovas et al. (2021c).

The first step is already known. It consists in following the scheme of metarule of law of Figure 31 (Chapter 5, 5.4.2) and Figure 36 (Chapter 6, 6.4.4). Figure 31 provides a general schematic representation of the rule of law and its counterpart, the meta-rule of law, i.e. the embedded protections of the substantive rule of law into computer systems through formal languages. It highlights the difference between regulations that were conceived to rule human social behaviour, and the new digital dimension in which rules, principles and instruments are embedded into formal languages and computational codes to be digitally generated, interpreted, and implemented.

Figure 31 shows the cycle of metarule of law. Figure 36 shows the use of the two axes (vertical: binding power, horizontal: social dialogue), three dimensions (social, legal, and compu-tational), four clusters (hard law, policies, soft law, and ethics), and four corner-stones (multi-stakeholder governance, anchoring institutions, the binomial trust/security, and institutional strengthening) to produce regulatory effects. All these elements are components of the regulatory system lifecycle, i.e. elements of legal governance. The semi-automation of legal governance is the next step, i.e. the creation of a regulatory interspace, bringing together all relevant stakeholders (including rulers, industry, and citizens), and the AI and legal instruments at their disposal.

For instance, in SPIRIT, after selecting all the relevant provisions, ethical principles and values, and having before us the modules, workflow information and stakeholders, a regulatory model was elaborated, with several roles. The first one was setting the legal and ethical requirements for the privacy protection tool (the mediator service) that was eventually embedded into the system. The second was establishing a SPIRIT regulatory model, following the middle/out / inside-out strategy, i.e. starting from the modules, knowing how the system worked, and addressing the possible risks, biases and mechanisms of redress in case of false positives.

I should comment on the data protection strategy and tactics embracing end-users (LEAs in this case), internal supervisors and external controllers. Norms are not just there. They are first selected, interpreted, constructed, combined and eventually implemented by

means of a set of intermediary processes into regulatory models. Moreover, to ingrain legal rights into computer models, a process of correlating and mapping design strategies, e.g. against privacy and data protection patterns, must be put in place.

Working on the privacy modelling strategy, Colesky et al. (2016) have proposed to add a further level of abstraction that they define as *tactics*. Strategy "specifies a distinct architectural goal in privacy by design to achieve a certain level of privacy protection", while tactics is "an approach to privacy by design which contributes to the goal of an overarching privacy design strategy". Therefore, in the line of Goal-oriented requirements engineering, they flesh out the "quality attribute" for privacy strategies regarding data, i.e. (i) enforce, (ii) demonstrate, (iii) control, (iv) inform, (v) minimise, (vi) abstract, (vii) separate, (viii) and hide. This is related to compliance. I have plotted it onto Table 15.

Table 15. *Privacy Design Strategies. Source: Adapted from Hoepman (2014)*

Privacy Design Strategies [J.H.Hoepman, 2014]			
Data-Oriented Strategies	**Minimize**: The amount of personal data that is processed should be restricted to the minimal amount possible.	Select before you collect, Anonymization, Use of pseudonyms	**Design Patterns**
	Hide: Any personal data, and their interrelationships, should be hidden from plain view.	Encryption, Mix networks, Attribute base credentials, Anonymization, Use of pseudonyms	
	Separate: Personal data should be processed in a distributed fashion, in separate compartments whenever possible.	No specific design patterns known	
	Aggregate: Personal data should be processed at the highest level of aggregation and with the least possible detail in which it is (still) useful.	Aggregation over time (used in smart metering), Dynamic location granularity (used in location based services), and k-anonymity	
Process-Oriented Strategies	**Inform**: Data subjects should be adequately informed whenever personal data is processed.	Platform for Privacy Preferences (P3P), Data breach notifications, Patterns from the Human Computer Interfacing perspective	
	Control: Data subjects should be provided agency over the processing of their personal data.	No specific design patterns known	
	Enforce: A privacy policy compatible with legal requirements should be in place and should be enforced.	Access control, Sticky policies, Privacy rights management (a form of digital rights management involving licenses to personal data)	
	Demonstrate: Be able to demonstrate compliance with the privacy policy and any applicable legal requirements.	Privacy management systems , the use of logging and auditing	

There are at least three ways to embedding Privacy by Design (PbD) into modelling (design planning): (i) *direct strategy* (compliance by design, as it was classically understood by Cavoukian), (ii) *tactics* (near compliance, as defined by Colesky and Ghanavati, 2016) and (iii) *indirect strategy* (Compliance through Design). The notion of "near compliance" reflects the difficulties of modelling legal rights: "software designed with compliance in mind from the beginning, resulting in less legal consultant work".

An indirect strategy is subjected to some more requirements, as it embraces a pragmatic approach. It considers the information flow, the organisation, the functions and affordances of the technological device, the roles of designers, controllers and end-users, including lawyers or consultants that participate all along the process. It constitutes a pragmatic approach to the web of data (Casanovas et al. 2017c), in which ontology building is one of the components to enhancing and implementing rights. Figure 52 shows the internal/external bridge we figured out for OSINT platforms, leaning on data-oriented and process-oriented strategies (Casanovas et al. 2014b, Casanovas 2017e).

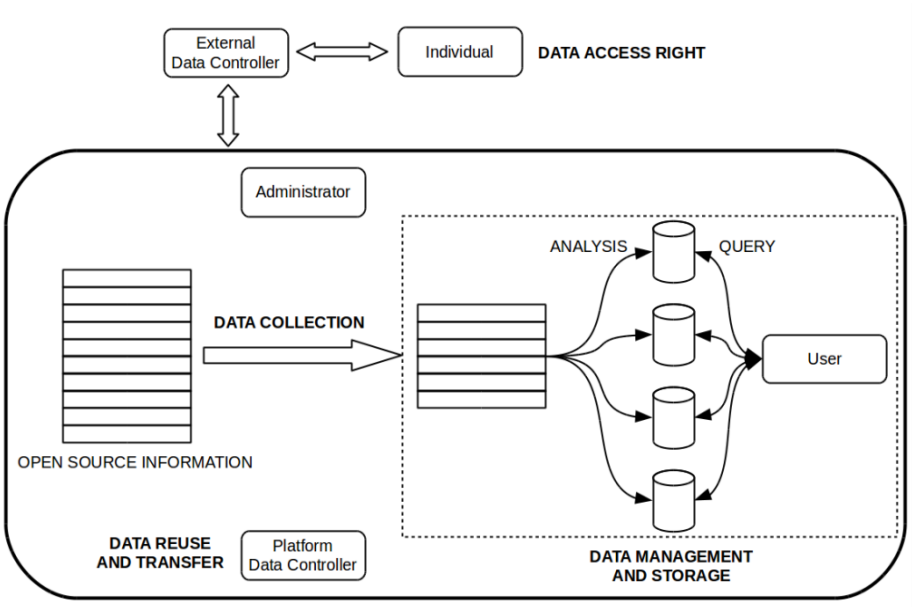

Figure 52. *Indirect Data Protection Strategy for OSINT Platforms. Source: Casanovas, González-Conejero et al. (2014b), Casanovas (2017e)*

There is an additional condition to implement such a model because a previous architecture and modules to process information flows should have been created before or alike

with the governance model. We figured out this kind of approach having in mind the CAPER general[449] and D2D CRC governance architectures. Figure 53 shows the allocation of internal rules on the CAPER (an OSINT project[450]) architecture and information flows. Only some of the rules could have been embedded. Figure 54 shows their place on one of the D2D CRC data governance designs. It is fair to say that these were the first attempts to understand and solve the problem in this way. To our best knowledge they have remained at a pilot stage.

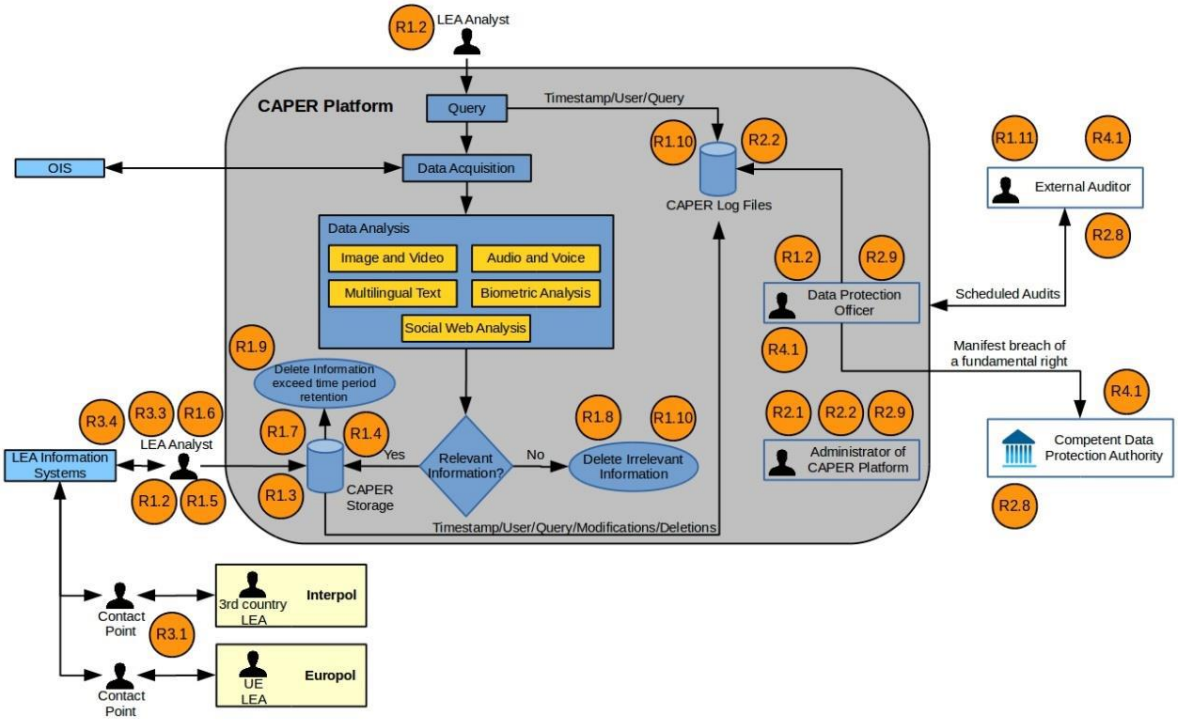

Figure 53. *CAPER Architecture and Information Flow (with plotted rules) Source: Casanovas, González-Conejero, Teodoro, Roig et al. (2014) CAPER D7.8. González-Conejero et al. (2014).*

My second example comes from the Australian Integrated Law Enforcement (ILE) Project, conducted by the Data to Decisions Cooperative Research Centre (D2D CRC D2D CRC. Markus Stumptner and Wolfgang Mayer worked out a modular architecture for

[449] The whole system was based on technology SOA (Service Oriented Architecture), with the following features: (i) Orchestrator was Talend ESB, (ii) Communication between the ESB and the system modules was performed with SOAP Web Services, (iii) Repositories were MongoDB. The system contained the following databases: (i) Database of original documents: these documents (HTML, PDF, images, videos, etc.) were collected from open sources (Internet, social networks and TV channels).

[450] https://cordis.europa.eu/project/id/261712

management of linked data in the law enforcement domain and implemented our work on legal and policy issues related to workflows and information sharing in this context. The Project also aimed to develop a platform where investigators could manage the information collection, analysis, and processes pertaining to a case.[451] Figure 54 plots the overall architecture on which we started the implementation of our indirect data protection strategy drawn in Fig. 52.

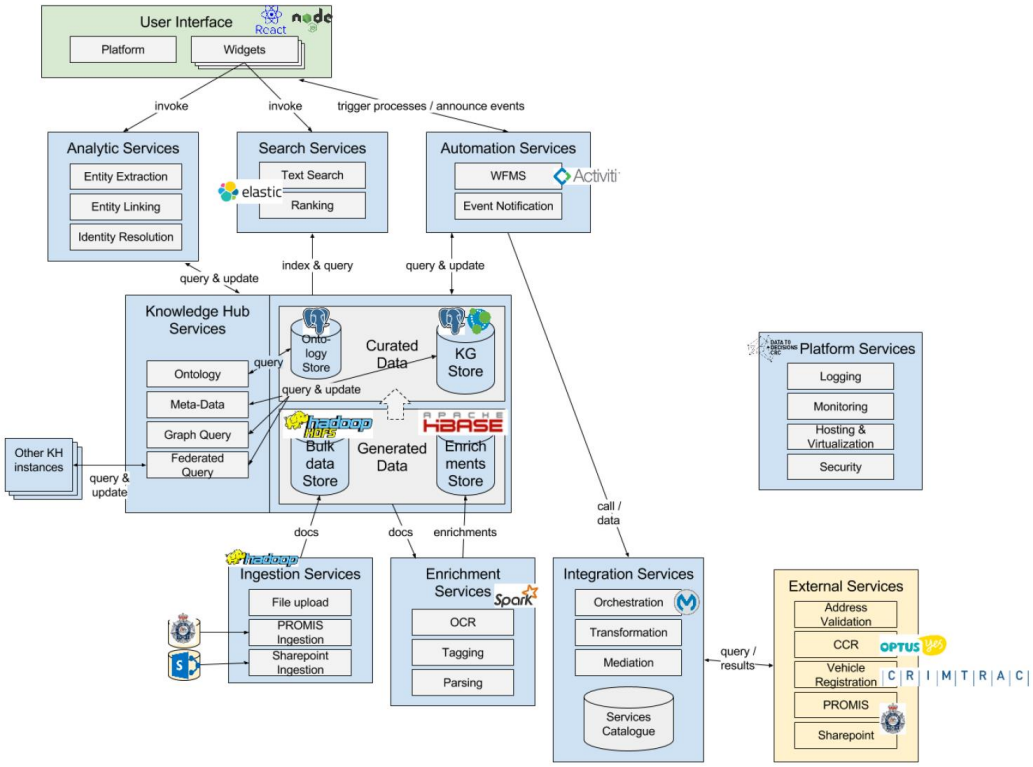

***Figure 54**. ILE Architecture and Data Flow. Source: Mayer et al. (2017), Stumptner et al. (2018)*

A federated architectural model was adopted, where one or more instances of the ILE platform could be deployed and access a number of external data sources. Each instance

[451] The work "has resulted in a data access framework for law enforcement which provides a comprehensive data and meta-data model including provenance, security, confidence, links and timeline information related to entities and links. This meta-data layer spans a Knowledge Graph-like view of information pertaining to enti-ties relevant to investigations. The resulting data and meta-data model serve as the foundation for information use, governance, data quality protocols, analytic pipelines and exploration of search results." (Mayer et al. 2017, 18)

provided query and analytic services to the front-end applications and could obtain data from other instances and external sources on demand.

The planned legal strategy was the same CAPER strategy, adapted to a different OSINT platform and data flow. However, legal governance policies could have only been partially embedded, as the external behaviour of investigators, controllers and supervisors should have been also regulated and endorsed by the integrated regulatory system. However, under the Australian security law, this was kept confidential. Researchers did not know how the system would work and how it would be applied, i.e. what protections would have been actually implemented in practice.

8.3.5 Second Step: A Metamodel for Legal Governance

The second step encompasses Legal Compliance through Design (LCtD), embraces legal interpretation and decision-making, and bridges the path from the four clusters previously identified (deemed as sources of law) to legal governance. As said in previous Subsections (7.5.2, 7.5.3), ethics is situated in an intermediary position because it can be directly applied to AI devices, platforms, modules and applications with independence to jurisdictional and sovereignty restrictions. LCtD leads to the emergence of ecological validity (a tuple of positive, empirical, composite, and formal validity). The metamodel drawn in Figure 48 plots the whole process.

It is worth mentioning that the elements of the three dimensions (social, legal, and technological) can and should be computed in real time. Validation occurs in the technological dimension, between the social and the legal one, as a separate process but uniting and linking the two former dimensions. Technical systems, the coordination of MAS, and cyber-physical systems lean on continuous informational flows at three different layers (perception, network, and application layers). The metamodel of legal governance performs their compliance validation process with legal requirements in real time. As I have already shown (Section 7.4), from a theoretical point of view, this third technological dimension adds some more complexity to the notions of *normative and empirical validity* that have been situated into two separate fields by many legal and sociolegal theorists (from Max Weber to Robert Alexy). *We are focusing on the validation process in an*

empirical chain, which cannot be equated to the current theories of sociolegal or legal validity.

Validity and validation, from our point of view, are not black and white discrete processes. There are degrees of compliance, and degrees of regulatory validity as well. Legal validity occurs when the regulatory system is anchored in specific environments and triggers a legal ecosystem. I.e. when it is *sustainable* and all the elements of the legal quadrant are in place (including stakeholders that legitimate its implementation). But even though, ecological validity requires a previous decision-making process on *acceptable thresholds of compliance* that should be shared and agreed by all parts involved.

Following up with SPIRIT, I will put two examples showing the crucial relevance of thresholds in decision-making processes affecting OSINT platforms. This time, I will lean on the work carried out, respectively, by Christian Weigel and Mustafa Hashmi. Weigel (2021) faced the problem of minimising face recognition biases in the databases and on the platform. Hashmi (2021) elaborated a table that could be applied to self-assess or to hetero-assess these degrees. Let's proceed orderly.

Machines embody values and reproduce human biases. The use of algorithmic systems in criminal justice can have significant detrimental consequences for individuals. Biases are reproduced algorithmically. Policing is a very sensitive domain, as discriminatory feedbacks can affect individuals and vulnerable populations, reinforcing social inequalities. The deployment of facial recognition software by law enforcement agencies can have an impact on fundamental rights. Racial or gender bias within training datasets, the quality of images, the size of watchlist, can affect error rates. It has not been solved so far. A recent NIST Vendor Test study evaluated 189 software algorithms from 99 developers — a majority of the industry, focusing on how well each individual algorithm performs one of two different tasks that are among face recognition's most common applications. It examined four collections of photographs containing 18.27 million images of 8.49 million people (from operational databases provided by the State Department, the

Department of Homeland Security, and the FBI). The main finding regarding demographic effects was that *different algorithms perform differently.* [452]

Thus, since no face recognition system can be completely accurate, decisions need to be made about what kinds and degrees of bias are ethically admissible. These errors can be balanced by raising or lowering the similarity threshold:

> […] the results of a matching are framed in terms of a similarity value, which gives an estimate of how similar two faces are. In order to strive for accuracy, a similarity threshold must be set. The similarity threshold is the lowest value that the system counts as a match. Thus, values under the threshold mean discarding a possible match. Consequently, where to set the similarity threshold is a crucial decision. Determining the similarity threshold entails a critical trade-off between false negatives (people falsely deemed not to be a match) and false positives (people that are falsely matched and should not have been matched). (Weigel, in Casanovas et al. D96., 2021, 8, 11)

The threshold was set around 0.7. If the matching was below that, as a measure of protection, no relationship between faces was created in the database and it would not even appear to investigators.[453]

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[452] Cf. NISTIR, Grother et al. (2019). These are the findings: 1. For one-to-one matching, the team saw higher rates of false positives for Asian and African American faces relative to images of Caucasians. 2.Among U.S.-developed algorithms, there were similarly high rates of false positives in one-to-one matching for Asians, African Americans and native groups (which include Native American, American Indian, Alaskan Indian and Pacific Islanders). The American Indian demographic had the highest rates of false positives. 3.However, a notable exception was for some algorithms developed in Asian countries. There was no such dramatic difference in false positives in one-to-one matching between Asian and Caucasian faces for algorithms developed in Asia. 4.For one-to-many matching, the team saw higher rates of false positives for African American females. 5.However, not all algorithms give this high rate of false positives across demographics in one-to-many matching, and those that are the most equitable also rank among the most accurate.

[453] "For each matching, the system provides a normalised similarity measure (0 … 1.0) which gives a similarity value between faces. This value is comparable to the confidence measure. As men-tioned, the similarity threshold is the lowest value that the system flags as a match. The threshold is configurable, and a decision must be taken about where to set it, e.g. 0.6, 0.7, 0.75. In SPIRIT, the decision was made after the Ethical Sandboxes took place. Close collaboration with the technical partners and LEAs is needed since this decision affects false positive and false negative rates. It was important to make a joint decision about such trade-off since while it was paramount to keep false positive rates low to protect citizens' rights, it was also necessary for LEAs that the system is fit for purpose and thus false negatives must remain at a manageable rate. We decided to select a middle ground approach, in which the acceptable threshold would be situated around 0.7. This is flexible enough to not prevent investigators from running their professional work, but also high enough to minimise risks. Despite this, additional measures should be taken in case of false positives, as we will discuss further in the recommendations. If the matching is below 0.7, no relationship between faces is created at all in the database. Thus, matchings below 0.7 do not appear to investigators." (Weigel, in Casanovas et al. D96. 2021, 11]

The second example refers directly to the regulatory model. Legal validity, as already stated, cannot be assumed as a supervenient property (resulting from the normative structure of the regulatory system), but as a dynamic emergent property once the proper audits and checks and balances have been performed. In this case, the ethical and legal validity and validation of the SPIRIT system entailed a controlled process, rather than a set of attributes to be rostered and clicked in ticking boxes.

To evaluate the implementation of the AI ethical principles into the SPIRIT components, Hashmi (in D9.6, Casanovas et al. 2021, 5) created an interval-based partial compliance assessment matrix based on the partial compliance framework proposed by Lam, Hashmi, and Kumar (2020). The partial compliance framework is grounded on the following principles/axioms underlying the partial compliance giving more fine-grained assessment result than just all-or-nothing answers:

> *Principle 1*. Compliance should not be binary i.e., 0/1 rather it should cover a spectrum of scenarios between 0 and 1.
> *Principle 2.* Partial compliance should be recognized and treated fairly.
> *Principle 3*. Partial compliance can be rectified by compensation mechanisms (remedial actions) such as enforcement of penalties, or sanctions monotonically proportional to the extent of violation.
> *Principle 4.* The level of compliance decreases monotonically as the severity of the violation increases.

These principles are used to evaluate the degree of compliance of the attributes (e.g., race, age, etc.) or various attribute sets suggested by the algorithm according to the matrix of Figure 55. So, metrics were provided to measure compliance for this specific setting. Basically, a case is deemed fully compliant if any of the attributes at the dimension are not violated i.e., an ideal case scenario. A case is determined partially compliant if its attributes at any dimension $\mathcal{D}c$ are to a large extent compliant with the specified ethical requirements while some have been violated, but remedial measure have been taken to repair the detected violations. The case is rendered non-compliant otherwise (Hashmi, 2021 ibid.).

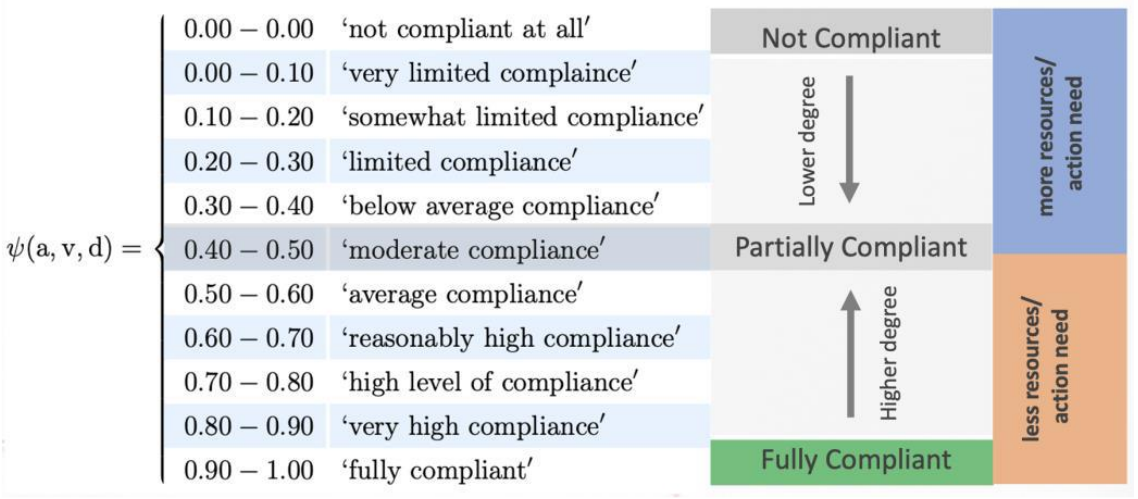

Figure 55. *Evaluation Matrix for Partial Compliance. Attribute dimension values mapped at non-numeric value. Source: M. Hashmi, in Casanovas et al. (20121) SPIRIT D9.6, p.51*

I would like to highlight several points of the methodology that are most relevant for our purposes:

1. This is a method that combines metrics, axioms, and qualitative (coordinated, collective) decisions to take responsibility for the results and possible impacts. Objections of most legal anthropologists (i.e. S.E. Merry or J. Comaroff) to statistic indicators and quantitative methods do not apply, as the methodology has been designed to evaluate the performance of specific platforms in specific contextual environments. What is actually evaluated are *the conditions to produce a sustainable and fair legal ecosystem.* So, its is a method for the legal governance of regulatory ecosystems.

2. This is a method encompassing ethnographic results and collective discussions and decisions. In this regard, this is a *dialogical* method. It requires data-sharing, collective evaluation, and teamwork. One single researcher, alone, could not be able to carry out all the tasks that are needed to get reliable results.

3. This is a method that provides *fine-grained assessment results* other than just all-or-nothing answers along an interval based qualitative scale.

4. This is a *reactive and proactive* method that allows end-users (LEAs in this case) to evaluate their results and take action if breaches or non-compliant situations occur. However, one must not misinterpret the results of partial compliance as the status of 'being partially compliant' with the required conditions. As the

Principles 4 of the framework states: ‘the level of compliance decreases monotonically as the severity of the violation Increases,’ while we measure the level of compliance (degree), the lower the level compliance on the threshold scale, the higher the violation of the norms. So, if the system determines LEAs being partially compliant, this means that LEAs have not met all necessary conditions. Hence, LEAs needs to look where the violations have occurred, and take necessary actions to amend the violations.

5. This is a method that supports informed decision-making, providing a *rationale for decisions* that can go beyond the regulation of the information flows or LEAs behaviour. For instance, it can be used in a co-regulatory and hetero-regulatory way as well, by internal supervisors tracking the logs or by external controllers looking after specific cases.

6. In this regard, what we are proposing is not just a Compliance-by-Design testbed to check the performance of a system, but a Compliance-through-Design toolkit and mindset that is able to directly produce regulatory effects and assess the legality of the decisions and outcomes being produced through the information flows on the platform.

7. Thus, validation should be keep separated from validity, but for ecological validity to emerge, i.e. to predicate legal validity as a second order attribute of the system, a certain degree of compliance is needed, and this method is a good way to evaluate it.

8.3.6 Third Step: A Compliant Causal Model

To enable an *empirical approach* to legal sources, norms, and legal ecosystems, we will construct their causal chains (including computer and human behaviour). This is the third step. This involves constructing the causal-loop models learning and defining the degree of relationships, inter-dependence between various components of the regulatory ecosystem impacting the validity (positive or inhibitory effects) and modelling deeper (three-tier) levels of complexity of interactions in the legal governance model. Figure 56 draws the components of the meta-model of sociolegal governance and their relationships which can be used in the regulatory simulation process.

The model will be tested, refined, and optimised in three different Industry 4.0 scenarios: (i) *quality checking* (multimodal sensor network allowing for smart and secure data collection on production lines); (ii) *augmented reality* (context-aware environment using AR

glasses to optimise production chains); and (iii) *digital twins* (digital technology allowing the virtualisation of the production process). These three use cases (corresponding to three separate pilots) will be provided by OPTIMAI, an Industry 0.4 EU project to create a Decision Support Framework for the EU industry.

This third step is on track, it is not yet finished, and it is exploratory. In a preliminary way, I would conceptualise it as a case of *mid-range-theory*, and more specifically, following Cartwright (2020) as a *causal-chain mechanism*. Quoting Bearman and Hedström (2011), she states that a mid-range theory is

> a clear, precise, and simple type of theory which can be used for partially explaining a range of different phenomena, but which makes no pretense of being able to explain all social phenomena… It is a vision of sociological theory as a toolbox of semigeneral theories each of which is adequate for explaining a limited range or type of phenomena. (Cartwright 2020, 270)

They are "theories of the causal pathways from particular inputs to particular outputs afforded systematically by structural mechanisms" (Cartwright 2020, 285).

It is a clear way to represent social processes centred on knowledge. Middle-range theories perhaps cannot predict, but they are able to offer robust explanations that can be tested and, most interestingly, used to offer guidelines for a reasonable and actionable social behaviour. Hence, they are especially convenient for policy making.

A causal-chain model, usually called 'mechanisms' as well, "lays out a series of significant steps, one after the other, by which a cause produces an effect" (ibid.). In our case, Figure 56 shows the relational path, i.e. the causal link that we can draw within the loop between the rule of law, ethics and validity. This is a model to test legal CtD, describing their relationships, and checking their validity at different levels of depth. We will feed the model with data coming from the OPTIMAI use cases of Industry 4.0.

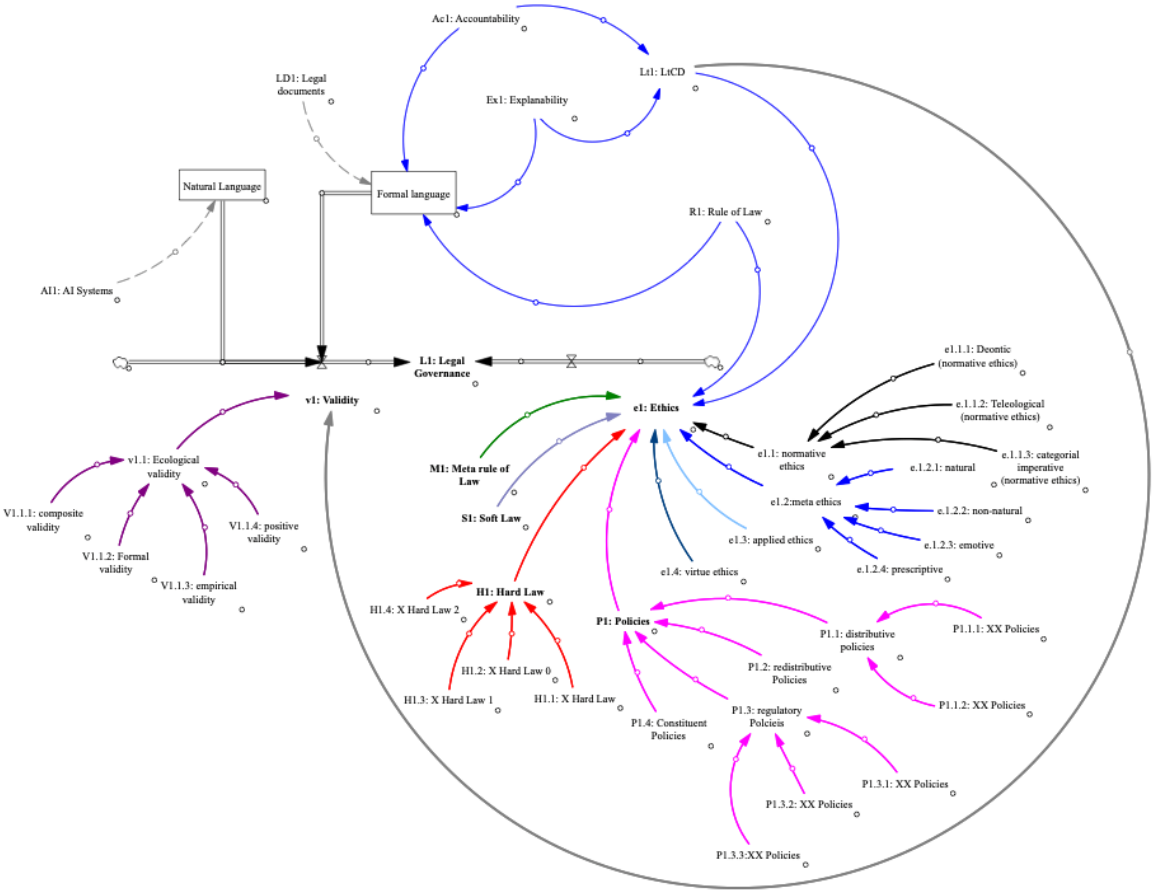

Figure 56. *Third Step: Causal Validation Model. Source: Hashmi (with Casanovas and de Koker). Source: OPTIMAI D9 (forthcoming). Unpublished work (2022)*

The compliance causal model of Figure 56 maps the components of the metamodel (Fig. 36). Our aim is to investigate how these components interact and impact each other during the interactions. Currently, we do not have a detailed understanding on how each of these elements relates and interact. Legal governance should be decomposed in a way that we could reconstruct analytically its internal performance, getting a better understanding about how validity is produced, i.e. how the quality of 'legality' is acquired by the system.

8.3.6.1 Example: OPTIMAI

OPTIMAI is a smart platform that is taking into account the regulatory model so as to define an architecture that reflects the concept "security and privacy through design". It

will develop (i) a multimodal sensor network allowing for smart, secure data collection on production lines, (ii) AI methodologies to allow for the early detection of defects in the manufacturing chain, (iii) An intelligent marketplace for the profiling, indexing and repurposing of defective parts; (iv) Digital twinning technologies to allow for the virtualization of the production process; (v) A context-aware Augmented Reality environment using AR glasses to optimize production.[454]

To put an example, the objectives of one of the use cases (in the hydraulic sector) are to automate the calibration procedure in order to reduce calibration time and improve the final product providing an optimal setup of the hydraulic power unit valve block. To meet this goal, OPTIMAI will develop a solution that (i) will assist the direct adjustments of the valve block based on quality control measurements from noise, vibrations and speed; (ii) will assist the human operator to rapidly adjust the hydraulic unit's parameters, including the valve block, using OPTIMAI's AR and HCI environment.

We can produce a semi-automated legal regulatory model for compliance checking. Industrial manufacturing cases are apparently 'neat' cases, i.e. the checking is mechanical at first sight. But there many other issues at stake, such as the labour relationship with workers, their situation in the workplace, the chance of suffering some sort of accident, and the possibility to accommodate the workplace for persons with disability. Again, ethical and legal requirements matter, and can be partially embedded into the system.

8.3.6.2 Example: OntoRopa[455]

Another possible legal ecosystem to test the causal model is OntoRopa.[456] It is a project related to Next Generation Internet Project OntoChain.[457] OntoChain aims at developing Blockchain-based knowledge management solutions, providing a secure environment for transactions and service providers. The project runs on iExec, a platform with a cryptocurrency, eRLC ('Run on Lots of Computers'). iExec intends to be a blockchain-based

[454] https://optimai.eu/
[455] I will reproduce in this Section some of the contents already written for the Proposal, as it is an example of how a (socio)legal ecosystem looks like, with the specification of all the necessary components. See M. Martínez-González et al. (2021a, 2021b).
[456] https://ontochain.ngi.eu/content/ontoropa
[457] https://ontochain.ngi.eu/

decentralized marketplace for computing assets.[458] The eRLC token is "the only way to make transactions the iExec Enterprise Marketplace. It's an ERC-20 compliant digital asset, sitting on the Ethereum blockchain."

OntoRopa was partially funded by OntoChain, and it is still an ongoing project. It stems from an original idea and architecture of M. Martínez-González, with the cooperation (among others) of M.L. Alvite in NLP, and N. Casellas in legal ontologies. I provided the regulatory framework. The project focuses on the automated creation and maintenance of a critical piece of legal compliance required by the GDPR—the *Records of Processing Activities* (ROPA). This is contained in Recital 82 and article 30 of GDPR[459], the starting point of the modelling (along with Spanish legislation as well). It includes the design of a RDF knowledge graph to handle information about ROPAs, combining a professional legal ontology with the collection and management of the specific knowledge of the community of privacy and data protection experts—mainly including lawyers, legal advisors and scholars, data protection officers, and rulers who are proficient in the creation and manipulation of ROPAs. It also uses blockchain technology to innovate in legal compliance checking and monitoring**.**

The interesting point for our purposes is the legal ecosystem that OntoRopa can generate within and in between all stakeholders. Interestingly, the OntoROPA architecture is law and data driven. ROPAs are critical piece of legal compliance *from a social perspective*,

[458] https://iex.ec/

[459] GDPR: Article 30. Records of processing activities
1. Each controller and, where applicable, the controller's representative, shall maintain a record of processing activities under its responsibility. That record shall contain all of the following information:
(a) the name and contact details of the controller and, where applicable, the joint controller, the controller's representative and the data protection officer;
(b) the purposes of the processing;
(c) a description of the categories of data subjects and of the categories of personal data;
(d) the categories of recipients to whom the personal data have been or will be disclosed including recipients in third countries or international organisations;
(e) where applicable, transfers of personal data to a third country or an international organisation, including the identification of that third country or international organisation and, in the case of transfers referred to in the second subparagraph of Article 49(1), the documentation of suitable safeguards;
(f) where possible, the envisaged time limits for erasure of the different categories of data;
(g) where possible, a general description of the technical and organisational security measures referred to in Article 32(1) […]

for they are the only available source of information, accessible to non-technical people (including citizens, judges, rulers, law experts, data protection users, supervisors, etc.).

The architecture is distributed in two layers—software and data—where each module is the answer to a legal requirement. To be interoperable, data is complying with standards, and we also set a legal governance scheme set to harmonize an innovative design for the marketplace within a law, policy, and ethics framework. Blockchain ins included for secure processing, the use of verifiable credentials with standard certificates for identity management, and the use of oracles for accessing external services.

Beyond legislation, it is worth noting that the legal value—i.e. *legal validity*—is created through a process that fosters legal security and social trust among all stakeholders in the market (including companies, corporations, administrations and citizens). Relevant ISO standards and technical protocols (such as the W3C standards and recommendations) are applied.

As stated by EU recent strategies, better regulation principles involving Impact Assessments and citizens' consultations, and the introduction of digital currencies as a basis for the EU digital market foster the general use of specific policies and best practices that benefit from the experiences already gathered. A Pan-European blockchain regulatory sandbox, and a *Markets in Crypto-Assets Regulation*—MiCA— are the next steps. on the way. They will intend to support innovation while protecting consumers and the integrity of crypto-currency exchanges (no insider trading, front running etc).[460]

The legal value of these exchanges must be assessed, focusing on *digital transactions*. Doing so, regulatory tools become more complex and granular, leading to the notion of *legal governance* to refer to all regulatory components that should be put in place to build the legal validity—i.e. the *legality*—of the exchanges. As stated all along of this Dissertation, beyond the usual definition in business compliance modelling, legal governance can be understood as *the mindset of all computational and systemic (organisational)*

[460] The Markets in Crypto-Assets Regulation (MICA) is being brought in to complement anti-money laundering (AML) rules and enhance financial stability and investor protection in Europe. See the EU Proposal for a *Regulation Of The European Parliament And of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937* COM/2020/593 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593

instruments that are required to generate legal ecosystems, i.e. the sustainable regulatory framework in which digital transactions take place fostering security, trust and institutional strengthening (see Figs. 31, 36 and the components of the Legal Quadrant).

We can bring here as a reminder that the middle-out approach can be defined as the middle-ground between top-down and bottom-up regulatory approaches, fostering co-regulation, co-responsibility and dialogue between rulers and the subjects of regulation (Pagallo, Casanovas, Madelin, 2019; Casanovas et al. 2022).

Figure 57 plots OntoROPA legal governance system, keeping separated the modules of the software layer and the processing of the data layer (RDF, OWL ontologies, verifiable credentials). Figure 58 specifies a how a new Ropa can be created (as a use case) Figure 59 draws its different layers and dimensions, mapping the Dataflow for the use case, integrating a Certified Validated ROPA, a Proof-of-Contribution, and Blockchain. Figure 60 shows the whole OntoROPA legal ecosystem emerging both from the social conditions and the legal and functional requirements of the technological design. To me, this is a good example of how a legal ecosystem (with the automated part of blockchain) can work.

We can summarise it as follows:

- The overall design refers to a new LawTech Web Service, law and data-driven, able to generate a *legal ecosystem*, decentralised and distributed among several communities (ROPA providers).
- The architecture design covers *two layers* (data and software) within *three different dimensions* (technological, social, and legal).
- The modular software architecture facilitates the organization of *independent proofs of concept* for each layer.
- The clean separation of software and data facilitates an independent *ontology building process*, with its own specific methodology, workflows, tasks, and milestones.
- Thus: (i) provides technical innovative solutions, (ii) automates the required legal procedural requirements with Compliance *trough* Design (CbD/CtD), (iii) and creates social and economic value.
- OntoROPA solves blockchain issues and concerns about GDPR legal compliance raised by EU privacy experts and several national and international institutions.

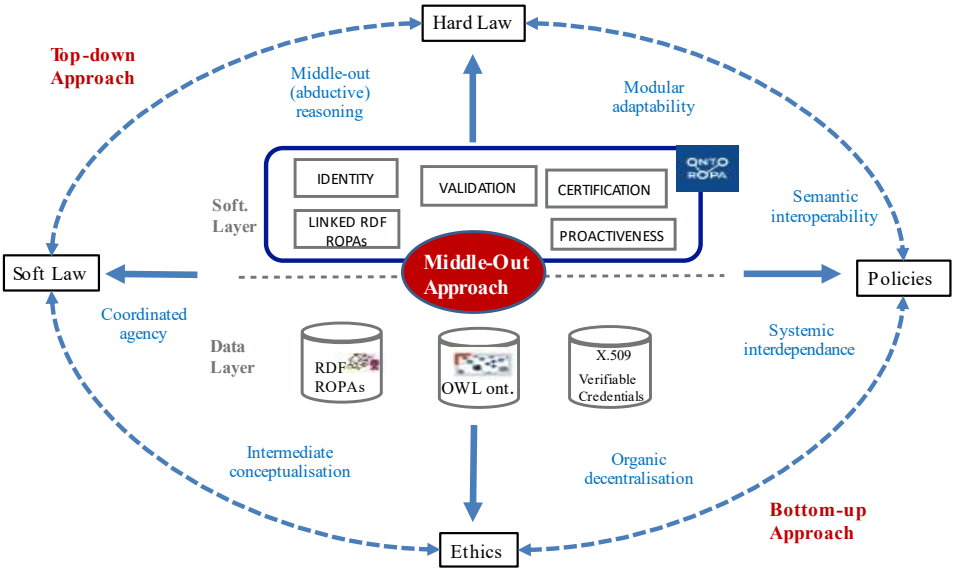

***Figure 57**. OntoRopa Legal Governance System. Modules and Architecture, by M.M. Martínez-González. Source: M. Martínez-González, P. Casanovas, M.L. Alvite, N. Casellas (2021b). OntoRopa-OntoChain Deliverable 2.*

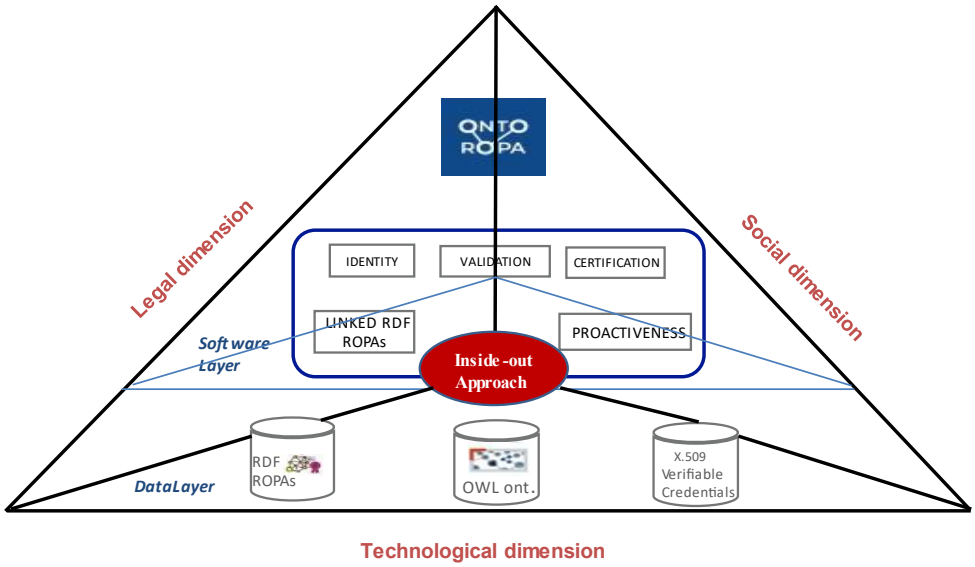

***Figure 58.** Inside-out Approach. Inside-Out Approach. OntoRopa Three Dimensions (Legal, Technological, Social) and Two Layers (Software and Data). Source: M. Martínez-González, P. Casanovas, M.L. Alvite, N. Casellas (2021b). OntoRopa-OntoChain Deliverable 2.*

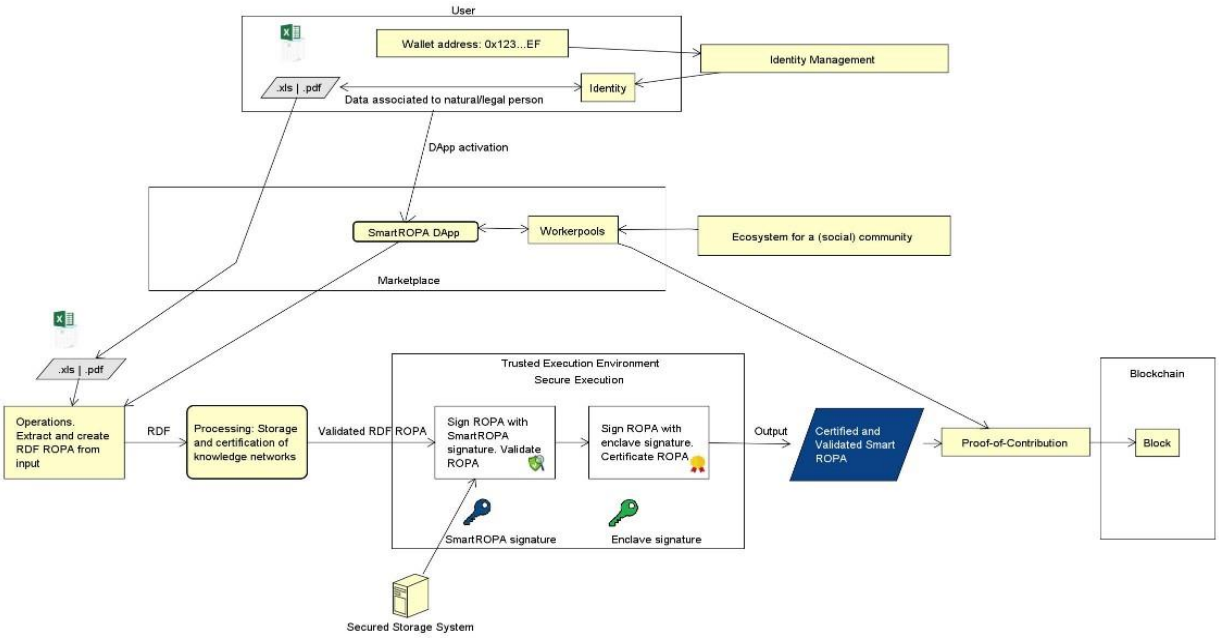

***Figure 59**. OntoRopa Dataflow for a Use Case,integrating a Certified Validated ROPA, a Proof-of-Contribution, and Blockchain to create a Ropa. Source: Dataflow by M. M. Martínez- González, in M.M. Martínez-González, P. Casanovas, M.L. Alvite, N. Casellas (2021b). OntoRopa-OntoChain Deliverable 2.*

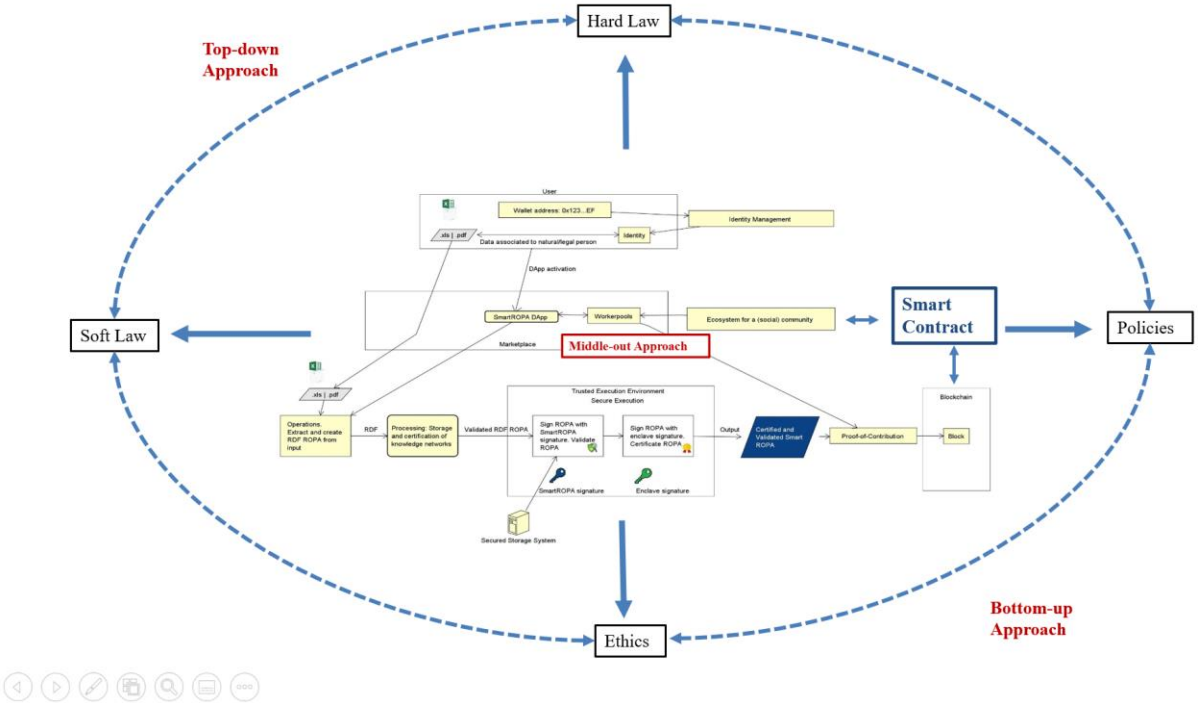

***Figure 60.** Middle-out Approach. : OntoRopa Legal Ecosystem. Source: M. Martínez-González, P. Casanovas, M.L. Alvite, N. Casellas (2021b), OntoRopa-OntoChain Deliverable 2.*

It is worth mentioning that law or its digital version, legal governance systems, do not constitute in OntoROPA a third layer on top of the data layer and the software layer defined above. There is no legal layer consisting mainly in documents that can be deemed 'legal'. What it does exist instead is a dynamic set of normative systems, guidelines, values, policies, standards and best practices that integrate a complex cognitive system embedded into human behaviour and (now) information systems.

This dynamic set constitutes a *dimension* of human and artificial systems and interfaces. It pervades the software and the data layer *from inside out*. This is why a middle out approach can be the most appropriate to generate the legal ecosystem that is needed to validate ROPAS and ROPAS' computational management in both senses—technological and legal. There are two layers—software and data layer—and three dimensions—technological, social, and legal. The links between them occur stemming from the secured process to produce a certified and legally valid ROPA.

The OntoROPA legal ecosystem is generated by the set of technical requirements and social and legal conditions that are taken into account by controllers, supervisors, professional agents in the marketplace (legal web services, law firms and companies). Thus, the certification and validation processes involve the participation of all stakeholders. Again, technical requirements do not reflect per se the social and legal conditions: they are reached through (i) the mutual understanding of regulations, i.e. the shared agreement on the rights and duties set by the regulatory system (legislation, policies, best practices, and ethics), (ii) the mutual understanding of the position of all agents participating in the process, (iii) the mutual understanding of all necessary actions to be taken to make the final product 'legal'. This is where the legal validity of certification comes from. Certification and validation processes do not stand by their own: they are necessary components of the legal ecosystem generated through the coordination of all required elements, as shown by Figure 57. Figure 58 shows the architecture of OntoROPA legal ecosystem. Certified and validated ROPAs are followed by a proof of contribution and a smart contract linking users, controllers, and supervisors, in between blockchain and the community of users.

8.4 Semantic Web Regulatory Models (SWRM)

8.4.1 Normative and Institutional Semantic Web Regulatory Models

I will finish this Chapter with a final observation on the relationships between the three-steps methodology introduced in the Chapter and Semantic Web Regulatory Models. I coined this expression some years ago to draw the attention about the regulatory aspect of SW languages and tools. I suggested to make a distinction between *normative Semantic Web Regulatory Models* (nSWRM) and *institutional Semantic Web Regulatory Models* (iSWRM) (Casanovas 2015). The former ones would be based on semantic languages, encompassing almost exclusively inferential tools and LegalXML, RDF, LegalRuleML SPARQL, OWL (among many other languages). In this sense, implementation is not a direct objective, it is not a modelling priority. Digital Rights Management (DRM), Rights Expression Languages (REL), machine processable languages for the expression of licenses, such Open Digital Rights languages (ODRL) constitute privileged examples: the ODRL Core Model was designed "to be independent from implementation" (2009).[461]

But this is not the same for iSWRM. Conversely, they need to be much more attentive to the community of users and their organisations. iSWRM allow people to communicate, interact, share, and set self-regulated collectives for specific purposes. They are built for rebuilding, maintaining, and changing social bonds. Crowdsourcing platforms for e-learning, e-health, disaster management, crisis-mapping or political participation are examples of them. They are designed having the needs of a specific community, or specific contexts and situations, in mind. The difference is that to manage iSWRM, some institutional tools for handling the relationship between the designers, managers (be they supervisors or controllers) and end-users are needed too. And to design management policies and redress mechanisms entails some combination between automated embedded rules and provisions (norms, rules, values, principles…) for handling human behaviour and H/M interfaces.

However, this is not an absolute distinction, for institutions and norms are built alike and they often constitute distinctive sides of the same sociolegal ecosystem. Would it be

[461] https://www.w3.org/2012/09/odrl/archive/odrl.net/2.0/DS-ODRL-Model-20090923.html

possible to speak of personal ecosystems? For example, when I make a personal use of a Creative Commons license, should I be considered a member, element, or component of the CC ecosystem?

According to the organisation, there is an affirmative answer for this question:

> Initially we define the ecosystem as the network in which CC operates. Creative Commons often must respond to events over which we have little control or influence. These events arise from the fields of technology, society and non-users of CC licenses, and economic, regulatory and environmental influences. CC exerts some control and influence over licensing of digital content; users of CC licenses, our Affiliates and the digital "commons, and the technical infrastructure we use. CC has a high degree of control over our internal processes, how we communicate and promote our work and our suppliers."[462]

This means equating ecosystems with the performance and scope of social networks. Our use of the term can also encompass this version, in a broad sense, as this is referred to the implementation of codes, rules and principles empowering the user and having impact on her behaviour. It empowers the user to choose and select the framework she wants for labelling and managing her content on the web. But it is not institutionally driven nor self-centred. It does not create and manage the public identity of the user.

An institutionally driven model focuses instead on the identity of the social group that creates or uses the tool as a necessary condition to constitute the institution. It intends to mainly set up a structured environment for the community or social group that comes up as a consequence of its inception.

Susan Silbey's work on compliance and organisations has shown that, when focusing on industry, business and corporations, identity is functionally dependent on internal practices and behaviour, as "*selective compliance*, adaptation and invention enact professional expertise: interpretations of hazard and risk" (Evans and Silbey 2021, 1). There are many political forms and models of legal governance, as I have shown in Chapter 7 (Subsections 7.2.2-72.5), that are relevant to understand the construction of identity from the end users' side. This same reflection holds for civic technologies and the emergence of communities of users that might (or not) have related each other.

[462] https://wiki.creativecommons.org/wiki/Research

What type of SWRM have we adopted in the previous examples of ecosystems? What kind of design?

To me, regulatory ecosystem design fits into iSWRM. Figuring out a regulatory framework, selecting languages, and determining regulatory content are all tasks related to institution building at the pragmatic level. This is not saying that nSWRM are not relevant. On the contrary, they are most relevant at the level of abstraction of ontology building and ontology design patterns. Modelling rights entails the construction of grammars, syntaxes, lexicons. These are carried out at the most general level, to be used and inevitably accommodated to situations, environments, and scenarios. Again, making sense of them should not be confused with understanding, reconstructing or communicating their semantics, i.e. their referential meaning. Their purpose should be carefully specified, will they be used for classification and information retrieval? Or, will they be automatically enacted, i.e. implemented with legal effects?

W3C Working Groups do not usually work at empirical level. They don't have to. On the contrary, they focus around the most general features to produce a result that can be reused by many, i.e. *reengineered*. The work by Renato Iannella, Victor Rodríguez-Doncel, Serena Villata, Aldo Gangemi, Axel Polleres, Asunción Gómez-Pérez, and many other researchers, fits into this mixed level of abstraction that is pragmatically driven but theoretically performed. They work, play, handle data and *meaning*, but not *sense at the situational level*. They set up conceptual and technical constructs, toolkits, and they accurately test and check their performance. But they do not hold , curate and manage the construction of legal ecosystems, i.e. turning regulatory models into effective regulatory systems in specific social and political environments. Or not yet. Let's go deeper into it.

The SW community *does* work at the pragmatic level. Describing its work denying this fact would not be accurate. For instance, *eXtreme Design* (agile) methodology aims at minimising the risk of obsolescence—i.e. the impact of changes at any stage of the development—with incremental releases based on the prioritisation of customers' requirements (Presutti et al. 2009). But this is an *oriented* design. A fair way to look at it is to say that they have always tried to make sense of their theoretical constructs. My point is that this still is a top-down // bottom-up approach. They listen, take into account specific

contextual requirements, they refine the digital outcome, but taking the responsibility of creating the ecosystem is something out of their reach. They cannot do it alone—in hospitals, legal settings, companies, corporations, administrations, industry. This entails a set of very complex cooperative collective tasks, painstaking, time-consuming, with uncertain results, involving all stakeholders, as I have been contending all along this Dissertation.

Ecosystems, and especially legal ecosystems, require as pre-condition the creation of institutional elements to facilitate their emergence. This is a non-trivial, collective, sometimes political, process, as institutions and iSWRM must be created alike to ensure the sustainability of the regulatory (or legal) system. I.e. the construction of semantic web solutions entails the proposal of regulations, guidelines, policies, that must be accepted *and enacted* by the community of end-users. This is *social* engineering, and to take it seriously means accepting that the whole system, *the whole regulatory system*, is and should be put in place within human (not just machine) behaviour at the same time.

Thus, legal validity and legal validation should not be confused with data and semantic validity. The problem of validation, i.e. *LOD validity*, quality, accuracy and truthiness of the data being linked, has recently been addressed by SW researchers. They have differentiated *textual data validity* and *Linked Data validity* and stated that structured data extracted from text through NLP is a promising approach to address both issues.

> Structured data from reliable sources could be used to validate data extracted with NLP, and reliable textual sources could be processed with NLP techniques to be used as a reference knowledge base to validate Linked Data sets. (Annane et al. 2019, 23)

However, related to context, "the validity of a LOD dataset is subject to various contexts and might hold true only for a certain timespan or under certain circumstances." (Agrawal et al. 2019, 25). There is a conundrum here:

> Linked Data is context dependent, but context information is usually not specifed explicitly at all, mixed with other data, or only available implicitly, as e.g. encoded in a natural language text string which is only understood by humans (ibid.).

Metainformation, metadata, are key to assess the validity of LOD.[463] But these contextual aspects are limited, and do not include idiolects (personal vocabularies and interpretation) nor collective frameworks that might be relevant in a social context. Thus, only some (pre-defined) contextual dimensions can be used to determine LOD validity.

8.4.2 Institutional Semantic Web Regulatory Models (iSWRM)

I have addressed a different kind of problems in this Chapter, related to ecological validity and causal validation. I will finish with a late reflection that is pertinent for the present discussion. In August 30th 2021 OASIS released its standard for LegalRuleML, Its objective is "to extend RuleML with formal features specific to legal norms, guidelines, policies and reasoning" defining

> a specification (expressed with XML-schema and Relax NG) that is able to represent the particularities of the legal normative rules with a rich, articulated, and meaningful markup language (Palmirani, Governatori et al. 2021, 1).

In my conceptualisation, this is a nSWRM, structured within a set of meta-models that are complex and rich enough to be reused in particular regulatory models. Annotations allows an intermediate mechanism through which different interpretations of a single norm can be possible, i.e. to "annotate the original legal sources and to connect them to rules, so permitting an N:M relationship (e.g. many rules in relation to one textual provision; many textual provisions for one rule)" (ibid. 32). 'Meta' in 'Meta-models' are to be interpreted in the computational science way, not meaning 'beyond', but 'over', as in the meta-rule case and contrary to 'meta' in 'metaphysics' or 'metarule of law'.

This is a rich formalisation and I'm not going to discuss here the source meta-model proposal, i.e. the relation with what a source of law is. In my opinion, this is a refined version of legal isomorphism, as we have already seen in Chapter 6, which assumes that

[463] "LOD contains contextual information on the dataset level in the form of metainformation and within the dataset in the form of data. Based on examples, we have shown that contextual information is an important part of LOD Validity. For example, data may vary over time at multiple levels, or user's expectation may depend on her cultural context. In this work, we have provided a set of dimensions that can influence either dataset and user contexts. We demonstrate the importance, for both user and dataset owner, to provide this information in the form of metadata using the Provenance Ontology. We also provide a way to add, in metadata, templates to show to users how to use temporal data in the dataset without time-consuming study of the data. We proposed to reuse existing vocabularies to describe contextual meta information of datasets." (Agrawal et al. 2019, 32)

> *because the legal text is the only legally binding element*, the connection between text and the rule(s) (or fragment of rule) guarantees the provenance, authoritativeness, and authenticity of the rules modelled by the legal knowledge engineer. (ibid., my emphasis)

But then, how the annotation process (metadata) operates? What kind of mechanisms are at stake, and which are the principles in between the system and the end user providing the guidelines for implementing it? What does exist *in between*? It seems that the law is defined in advance, without the possibility of changing across the implementation (enforcement, enactment, application…) process.

This inferential perspective of how law operates would need further specification, because if LegalRuleLM is a grammar with syntactic and semantic elements, its relationship with the user should be specified as well. I have three observations. First, the annotation process could become a black box in itself, the relationship between data and the adds-on, metadata, should be made explicit, and this means ruling, controlling the annotators themselves, and especially their knowledge, the interpretation process. This implies controlling human behaviour. Second, if this is so, we are talking about validation processes and not only about rules extracted from norms. And third, this means starting an institution building process to be applied in this middle-ground that is the hybrid intelligent space between machines and humans.

If the general process is semi-automatised, the evolving and changing variables coming from the environment should count as well. This is the reason why causal validation models could help, because these represent an empirical approach that it has not been contemplated in LegaRuleML metamodels, but (i) it is not incompatible with them; (ii) provided that some empirical audits and tests regarding rule implementation are carried out. To my best knowledge, these tests do not yet exist. They would be most necessary to embed rules into regulatory models, and to turn these models into regulatory systems, i.e. into the set of pre-conditions that are needed to foster the emergence of legal ecosystems. This cannot be foreseen or produced in advance. The creation of a sustainable ecosystem requires the proactive participation of the regulated. It cannot be a top-down process.

As I already have shown in 8.3.5 and 8.3.6, the regulation of transactions and interactions legally compliant on real time in an IoT environment fed by constant information flows coming from sensors requires the identification and monitoring of humans deciding in the

behavioural or production chains. This cannot be reached without legal experimentation and institution building.

As I have already contended, to be effective, institutions should embrace not only the linguistic (formal) and legal (conceptual) dimension but the social (phenomenological) one. This means that institutions cannot be only taken in the Searlean sense of 'constitutive norms' to define and create so called 'institutional facts': They must embrace all *relevant* variables, and this cannot be only represented as constitutive norms and prescriptive norms represented as 'count-as rules' in a deontic model. Figure 61 is a simple, elegant model to represent rules for deontic specification, incorporating compliance and also its counterparts—violations, penalties, and reparations—i.e. not just obligations, permissions and prohibitions. Its discussion is beyond the scope of the present Subsection. I will confine myself to say that, to create a legal ecosystem, should be complemented with some more tools that integrate it into a regulatory system. This is for the next future, and this is still a subject of research.

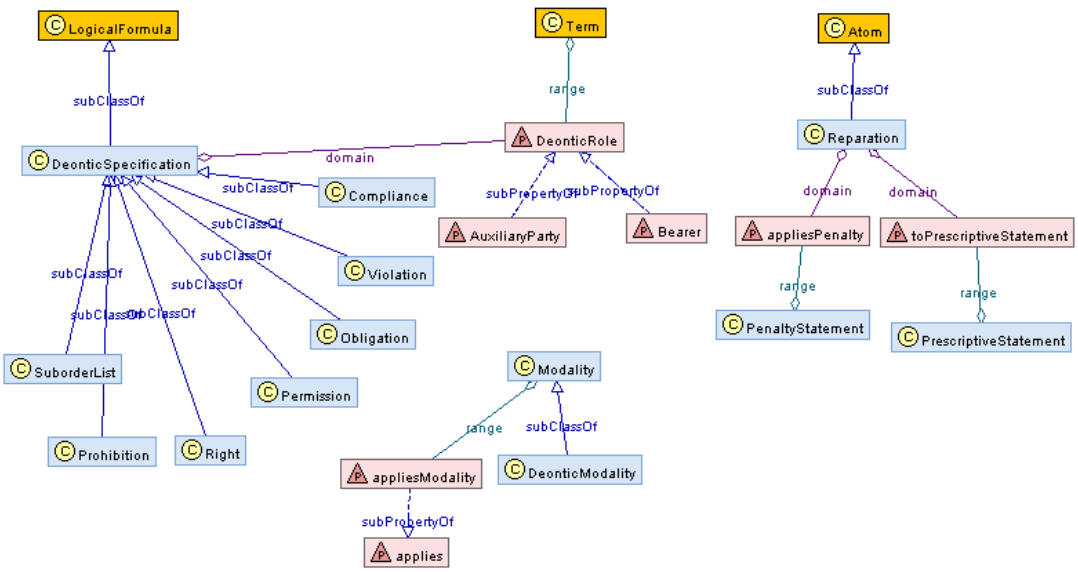

Figure 61. *Partial Metamodel for Deontic Concepts. Source: Oasis Standard, Palmirani, Governatori et al. (2021).*

8.4 Conclusions

Chapter 8 is the last Chapter of Part II, on the deployment of the mindset and toolkit for legal governance. I have divided it into two to deal separately with the two issues at stake—*legal validity* and *legal validation*. I have shown that they can be aligned but not merged to cope with the regulatory challenges of the convergence between IoT, LOD, WoD and Industry 4.0. There is no mechanical way to calculate, infer or deduce validity from a regulatory model or a regulatory system. But it is a formal property that can be reasonably constructed and tested in particular settings.

However, attributing 'legality' or 'validity' as a normative or regulatory property is not trivial. It entails an intellectual process in which many kinds of knowledge participate as relevant and differentiated components. Legal ecosystems are not just generated from the enactment of laws. In IoT and WoD, legally valid ecosystems originate from a set of conditions amongst human and technical interactions, including the requirements of artificial systems and the individual and collective behaviour of their users. *Ecological validity* is a notion that can contribute to the understanding of how the practice and experience of law, either for professionals, citizens and lawmakers, is evolving towards a more flexible plural order of legal governance, operating through technological means.

Chapter 8 contains an empirical methodology to test the 'validity' (or 'legality') of interaction, exchanges, contracts, transactions… made through normative systems or regulatory models. The first part of the chapter includes a thorough discussion of what 'legal validity' means from the jurisprudential, philosophical and (deontic) logical perspective. It also contains a criticism of the definition of an institution as 'X counts as Y in context Z'. I contend that a more phenomenological and pragmatic approach can enrich the regulatory design. Following my previous arguments in this Dissertation, I have proposed to differentiate institutional from normative Semantic Web Regulatory Models.

The second part of Chapter 8 has addressed the problem of legal compliance and offered a theoretical explanation for the proposed methodology. To sustain an empirical approach to legal sources and their relation to norms and the emergence of legal ecosystems, we should be able to reconstruct their *causal chains* (including computer *and* human behaviour). Hence, we have presented a methodology in three steps to validate legal governance

models, i.e. to validate the results of conditions, and the interrelationship among the selected conditions to generate legal ecosystems in the convergence of the LOD and the Internet of Things (IoT). The first step is the application of the metarule of law scheme. I put several examples of indirect strategies in data protection. The second step is the implementation of the metamodel for legal governance. The third step is the construction of a middle-ground causal theory for legal validation, i.e., focusing on the validation process in an empirical chain, which cannot be equated to the current theories of sociolegal or legal validity.

There are degrees of compliance, and degrees of regulatory validity as well. This chapter has offered specific examples of how the conceptualisation and calculations can take place in practice, stemming from the CAPER, D2D CRC, SPIRIT, OPTIMAI, and OntoRopa Projects. This is a method that combines metrics, axioms, and qualitative (coordinated, collective) decisions to take responsibility for the results and possible impacts. Summing up, it is a method for the legal governance of regulatory ecosystems.

Finally, in agreement with what I have been contending all along this Dissertation, I have proposed to differentiate institutional from normative Semantic Web Regulatory Models.

PART III : CONCLUSIONS, FINAL COMMENTS, AND REFERENCES

CHAPTER 9

Conclusions

"[…] dans le monde totalement historique qui menace d'être le nôtre […]"
"[...] in this totally historical world that threatens to be ours […]"

Albert Camus, *L'homme révolté* (1951)

9.1 In this totally legal world that threatens to be ours…

Nineteen fifty-one. 1951. This is the year that Giovanni Papini published *Il libro nero* (1951), containing the short story on the electronic Court that I have translated in Chapter 6 (Annex I). The same year, Albert Camus published *L'homme révolté* [The rebel: Man in revolt]. Just after the end of WW II (1945), the Universal Declaration of Human Rights (1948), and the beginning of the Cold War. Camus wrote about these deranged times that should still see the Algerian war in the immediate future:

> […] la révolte métaphysique suppose une vue simplifiée de la création, que les Grecs ne pouvaient avoir. Il n'y avait pas pour eux les dieux, d'un côté et, de l'autre, les hommes, mais des degrés qui menaient des derniers aux premiers. L'idée de l'innocence opposée à la culpabilité, la vision d'une histoire tout entière résumée à la lutte du bien et du mal leur était étrangère. Dans leur univers, il y a plus de fautes que de crimes, le seul crime définitif étant la démesure. *Dans le monde totalement historique qui menace d'être le nôtre, il n'y a plus de fautes, au contraire, il n'y a que des crimes dont le premier est la mesure*. [my emphasis]

Camus observed the simplified world of dichotomies, in which reflexivity, historicity, the inner reflection on our own deeds, play a major role. He depicted with broad strokes a new Allegory of Good and Bad Government, according to the three famous fresco panels by Lorenzetti (1338-39), in which the clean and clear lines between good and bad , right and wrong, have been definitively lost, although the official discourse sustained

dichotomic discursive political terms, such as Capitalism vs Communism, or Democracy vs. Totalitarianism. Just replace *historical* with *legal* and you will have a hint of the up-coming digital world that is approaching at an incredibly fast pace.

We are living in the new field of law in the digital society, and in this 'totally legal world that threatens to be ours', everything will be split up into what is legal or illegal, allowed or forbidden, right or wrong. This is a heritage of the 20th c. past and the invention of the 'legal' version of the state. But shattered into a myriad of little, also blurred, pieces at all dimensions and levels of a segmented society. In a platform-driven economy each singular platform, website and app generates its own ecosystem. This is the reason why legal governance mechanisms are so necessary. And this is also the reason why it is most needed to build a public digital space where the notion of empowered citizenship can be supported and enacted. Only imagining a way of controlling the indirect side effects of regulatory models and systems can be effective to enhance rights and preserve liberties in the digital contemporary world.

There are many paradoxes that will come out within this world. One of them is the position of the law. I have been showing the radicality of the change. Information processing has brought a civilisation change. But, even though, the main forms and backbones of private and public law can be traced back to Greek, Roman, and Medieval law. The radicality of the change is not incompatible with the maintenance of old legal forms.

To pour new wine into old vessels is not going to work. But the regulatory power of financial markets and smart contracts can benefit from all existing legal forms of contracts. A smart contract is not a legal contract, but it can be legalised following a trodden path. Property rights can adopt a blockchain register to secure them. And perhaps the most striking fact is that the new markets of legal web services develop upon the existing structure of corporate firms and lawyers handling rights, duties, obligations, lawsuits, obligations… on top of the same public structure of parliaments, courts, and governments that we have had in the 19th and 20th centuries. By now, the formal dimension of the rule of law, i.e. the structural framework of democratic nation-states, is not changing at the same pace than technology and the human relationships that technology is fostering.

9.2. Summary of the Main Theses contained in the Dissertation

The main theses of the Dissertation can be summarised as follows:

1. The so-called big bang of lawyers preceded and was a condition for economic, political, and cultural globalisation in the twentieth century. In the legal field, the implosion of legal forms, practices, organisation, and composition of the legal professions entailed by globalisation has been followed in the beginning of the 21st century by a second implosion fuelled by digitalisation and the impact of Artificial Intelligence on the legal domain. The emergence of legal web services, the corporatisation of law firms, the hatching of a platform-driven economy, has changed not only the profession but the legal forms that are being used in transactions and legal acts.

2. There is a new 'legalisation', 'jurisdification' or jural construction of the social space, different from what we had known in the 19th and 20th centuries: (i) structured through representation languages, (ii) articulated and managed through semantic and Artificial Intelligence techniques, (iii) located at the crossroads between the horizontal and vertical dimensions of law, (iv) and flexed in the tension between civic self-organization and the pressure from political and financial elites.

3. The original Web of Documents has evolved in the last ten years into a Web of Data and a Web of Linked Data, in which what is being connected is not just documents but websites, web services and people (as prosumers, citizens or organisations). In this new environment of semantically enriched content, law can be theorised according to three different approaches—law as data, law as meaning, law as sense. *Law as data* refers to semi-structured and structured content; *law as meaning* refers to deep semantics and ontologies; *law as sense* refers to the relationships between law and the ecosystems that emerge from regulatory systems in context.

4. In the new scenarios set within the Web of (Linked Data), the instruments of law and the concept of law have been transformed. The scope, architecture, and methods of the 20th c. general theories of law constitute a useful starting point to understand interactions and legal relationships. I have plotted out several entry and exit points. Legal realists (Roscoe Pound, and mainly Karl Llewellyn) incepted an empirical way to describe and analyse legal relationships that were resumed and followed thereafter by Law and society scholars (including legal pluralists) and many legal anthropologists focusing on cases, conflicts, and processes. This approach was termed *relational* since the beginning.

5. There are at least four stages of development of relational law and justice: (i) *legal realism* (1920-1960); (ii) *Law and Society* (1960-2020); (iii) the *social web* and the *web of data* (relational law and justice) (2000-2020); (iv) the *Internet of Things* and *Industry 4.0* (2010-2020) The two last ones have taken place within the emergence of the Internet and the convergence between the Web of Linked Data, IoT and Industry 4.0.

6. I called *regulatory systems* the set of coordinated individual and collective complex behaviour that can be grasped through rules, values and principles which constitute the social framework of the law. I called *regulatory models* the set of structured principles, norms and rules that can be designed to control and monitor the interaction between technology and regulatory (or normative) systems. I called *relational justice* the set of

procedural devices to manage and eventually solve disputes and conflicts within the framework of *dialogue as a source of law*.

7. Law as dialogue assumes, extends, and expands the empirical side of *law as knowledge*. From an empirical point of view, 'legal knowledge' means socially 'situated', 'contextual', 'ecological' knowledge. This is the regulation that 'makes sense' in a particular environment. But we should consider the other two approaches as well (law as data and law as meaning) to get a completer and more complex picture. They operate at a different level of abstraction, in which contexts have been turned into 'fields of application'.

8. The technological and computer science approach crosses several tensions, controversies, and misunderstandings between social fields in the 20th century. Jurisprudence, legal theory, and Law and Society scholarship, first. But, inside the same social field, also between social and cultural anthropology and sociolegal scholarship. Moreover, within social anthropology, between a 'scientific' or cognitive stance and a 'moral' or political one. Legal anthropology has experienced these different misreadings and misbeliefs since the fifties of the past century ('turbulent' was the word used by S. F. Moore at the turning of the century). All these perspectives are being bridged and should be overcome adopting a *hybrid intelligence* perspective, as the theoretical mindset and tools required to face the hybrid human/digital, human/machine [H/H//H/M//M/H//M/M] reality on the Internet of Things situate the discussion in the dimension of a radical civilisation change. This new reality should be understood and explained to be manageable through regulatory tools.

9. Identity, and especially the relationships between data and metadata to define it, has become crucial to foster any regulatory system, for what language and specifically rule-languages have entered a new phase. The notion of *relational law* aims at bringing together these previous antagonistic perspectives. This was anticipated fifteen years ago by the recognition of *the Internet Identity Metasystem Layer* by the then Microsoft chief engineer Kim Cameron (2005).

10. *Relational law* can be understood as the allocation of behavioural expectations (assignment of rights and obligations) in terms of a shared technological framework; computer systems and human-machine interfaces that create an aggregated value fostering the connection between Web 2.0 (Social Web) and Web 3.0 (Web of Data) in the environment of the Internet of Things.

11. *Cloud and Fog Computing, Software as a Service* (SaaS), *Platform as a Service* (PaaS), and *Infrastructure as a Service* (IaaS) constitute the new bases for establishing ecosystems on the Internet and to gear relational law. They set a challenge, as the latter three types of service models have yet to be fully implemented, and transactions and exchanges of information occur through M/M interfaces.

12. Stemming from classical anthropological visions (from Malinowski, Gluckman, Schapera and Pospisil), I contend that relational law on the IoT and LOD encompasses at least the elements of: (i) *reciprocity;* (ii) *authority*; (iii) and *social cohesion*. It is my contention that these are not only functional elements of tribal or non-Western law (or "primitive" law), but components of the law on the Web of Data as well. This is close to the logical-historical perspective of the *vindicatory law system* recently set forth by Terradas Saborit (with the nuances I made explicit at the end of Part I). I advanced sixteen points to ground on legal anthropology the bases of law as dialogue, legal governance,

the metarule of law, and the causal models elaborated in the second part of the Dissertation.

13. The important points are: (i) the separation of three dimensions to address the anthropological bases of LOD and IoT (linguistic, social and legal); (ii) the separation between legal validity and legal validation; and the identification of the theoretical problem about law and legal relationships that we are facing in the digital age: *What are the social conditions that we should take into account to model, put in place, and eventually implement sustainable legal ecosystems?*

14. To properly describe such computerised systems means to set up them, i.e. *the descriptive and normative side of law must be constructed alike.* This is a civilisation change, in which normative systems are being replaced with *legal ecosystems* or, better, *sociolegal ecosystems*, because their normative forms are turned into normative patterns. Finding out the conditions to build up such ecosystems, preserving citizens' rights, and allowing social transactions and interactions to develop and grow, constitute the subject matter of the second part of the present Dissertation.

15. *Legal Governance* is the general term I used in a different sense than 'legal system'. Legal governance encompasses the toolkit and mindset to regulate Artificial Intelligence and Law or, better, Law through computational means. It has several components: The metarule of law, the metamodel to be reused and instantiated into specific regulatory models and the causal validation model set forth to calculate the degrees of legal compliance of websites, platforms, and applications in the IoT (and cloud and fog services).

16. In the second part, I figured out (i) a general scheme for the metarule of law, (ii) a metamodel, (iii) and a causal model for legal validation. I designed the general frame for the toolkit of the Metarule of Law. I defined two axes (vertical: binding power, horizontal: social dialogue), three dimensions (social, legal, and computational), four clusters (hard law, policies, soft law, and ethics), and four cornerstones (multi-stakeholder governance, anchoring institutions, the binomial trust/security, and institutional strengthening) All these elements are components of the regulatory system lifecycle under digitalised law.

17. (i) *Hard law*, refers to legally binding obligations, either in the national or international fields, under regulations that can lead to adjudication court processes; (ii) *Soft law* consists of legally non-binding rules, best practices, protocols, standards and principles that facilitate the governance of networks, organizations, companies, and institutions; (iii) *Policy*, which usually defines a (binding) plan that has been officially agreed by a business organization, a corporation or a government agency; and finally (iv) *Ethics*, which primarily refer to morals, social mores, values and principles that can infuse ethical codes and professional practices, and can also be incorporated into laws, policies, standards, best practices, and governance structures.

18. Legal Compliance through Design (LCtD), *legal compliance*, holds several features that make it different from *regulatory or business compliance* (Compliance by Design, CbD) and are related to the conditions fostering legal ecosystems. Among them: (i) intermediate, (ii) semi-automated (iii) hybrid (as semi-automation entails the activation of hybrid intelligence, between humans and machines); (iv) modular; (v) adaptive and scalable (dynamic not static, to accommodate legal changes); (vi) partial); (vii) adjustable (viii) and flexible.

19. In Chapter 5, I explored some aspects of the notion of legal governance that are meaningful in the new digital environment. I progressed some of the work done on the metarule of law, and I have complemented the SMART middle-out perspective with an inside-out approach to digital regulatory systems. I made a few specific points, such as identifying (i) the need for an empirical approach to explain and validate legal information flows and the hybrid agents' behaviour, (ii) the interest of a phenomenological and historical approach to legal and political forms, and (iii) the utility of separating enabling and driving regulatory systems.

20. Chapter 6 reconstructs the history of *legal isomorphism*, i.e. the supposition that 'there should be a one-to-one correspondence between the rules in the formal model and the units of natural language text which express the rules in the original legal sources'. This has been the main assumption of AI & Law scholars for more than thirty years now. I could identify three stages of development (i) inception: 1986 -1996; (ii) refinement and argumentation: 1995/96 – 2005/06, (iii) deployment of Web representation languages (scalation, interoperability, information retrieval and, eventually, legal implementation or enforcement purposes): 2005/6 – to present.

21. The thesis summarises the list of requirements for rule interchange languages. Legal isomorphism has been assumed and adapted according to the needs and tools being developed in the last stage (iii) for legal compliance and web services. I have carried out a balance of these approaches, pointing out the unsolved issues (especially rule extraction) and challenges (starting with the expressivity of formal languages). Setting the conditions for legal ecosystems to emerge requires an empirical approach to the regulatory tasks. It entails the construction of interpretative conceptual models at the pragmatic level.

22. I put the examples of the proof of concept for modelling the Australian spent convictions scheme, and the regulation of SPIRIT, a LEA's platform for tracking identities on the Internet to fight organised crime. Semantic reasoners are a component of regulatory models, implementable into regulatory systems, but they cannot be at the same time a drive chain and the origins of 'valid' norms or 'legal' ecosystems. Legal documents matter, but so do legal behaviour and behavioural patterns.

23. An empirical cognitive approach does not emphasise isomorphism from legal sources to applications (legal sources are not just resources) but (i) the abstract construct of the knowledge-base and (ii) the reusability of solutions (ontologies, design patters and ontology design patterns). The way we structure, handle, manage and use legal knowledge depends on the way we collect, aggregate and interpret data, i.e., on our theoretical constructs.

24. To build sociolegal ecosystems, (i) I distinguished between four different types of interoperability, (ii) I described the insights of cognitive science on how agency and action can be coordinated to attain collective goals, (iii) I merged legal and political governance (now in separate silos), (iv) I re-conceptualised regulatory and legal compliance according to these guidelines, (v) and finally, I figured out two metamodels to bringing all these elements together.

25. Chapter 7 positions the theories of epistemic and linked democracy, i.e. (i) the need to refer to the production and distribution of knowledge to define democracy as a set of institutions producing social beneficial effects; (ii) as a coordinated and shared use of

knowledge through linguistic (and behavioural) means. In this regard, I explained and developed several political forms of legal governance: (i) Responsive regulations, (ii) Smart regulations, (iii) Better regulations, (iv) Network governance, (v) IT governance, (vi) Functional governance, (vii) algorithmic Governance, (viii) Smart data, (ix) Multi-stake holder governance. The Chapter describes four types of interoperability, cognitive ecology, socio-cognitive systems, legal ecosystems. I drew a figure to encompass the three dimensions of the rule of law as a general framework of legal relations on the Internet of Things.

26. Chapter 8, finally, introduces an empirical methodology to test the 'validity' (or 'legality') of interaction, exchanges, contracts, transactions… made through normative systems or regulatory models. It is worth noticing that it contains a material criticism of the definition of an institution as 'X counts as Y in context Z'. This cannot explain the emergence of social systems, contexts and environments, i.e. how institutions are created and in fact work to be effective. It takes legal meaning for legal sense, i.e. the pragmatic side of institution building processes. *Validity* and *validation* should be kept analytically separated as different type of processes The first part of the Chapter includes a thorough discussion of what 'legal validity' means from the jurisprudential, philosophical and (deontic) logical perspective.

27. I use *legal linked data ecosystem* or *legal ecosystem* meaning all processes, interactions and exchange of information involved in the social and legal linked data ecosystems referring to the rule of law, including its design, monitoring, and users' compliance and behaviour. *Ecological validity* refers to the extent a normative system or regulatory model is socially anchored and institutionalised in a digital data environment to generate a sustainable legal ecosystem. In this sense, it relates to the way that abidance, accordance, conformance, and congruence with norms—the four properties of hard law, policies, soft law and ethics—are effectively materialised and the affordances that the regulatory system puts into play and offers to (human or artificial) agents, depending on how it has been designed.

28. I contend that legal ecosystems are not just generated from the enactment of laws. In IoT and WoD, legally valid ecosystems originate from a set of conditions amongst human and technical interactions, including the requirements of artificial systems and the individual and collective behaviour of their users. *Ecological validity* is a notion that can contribute to the understanding of how the practice and experience of law, either for professionals, citizens, and lawmakers, is evolving towards a more flexible plural order of legal governance, operating through technological means.

29. The second part of Chapter 8 addresses the problem of legal compliance from an empirical approach and offers a theoretical explanation for the methodology that has been constructed. I define and differentiate CbD / CtD from other types of business compliance (e.g. by detection). The Chapter refers to the surveys that we have carried out during the last years. It offers a summary of empirical approaches to the rule of law (e,g, using indicators), pointing out that the lack of agreement among them actually reflects the division on understanding the rule of law at national and international level. It creates a legal quadrant, a compass that can be used as a spring point to measure legal concepts and the compliance of legal systems. It is not necessary at that stage to go deeper into argumentation chains. It just defines and measures the framework to carry out a legal compliance

checking that entails a set of functional and non-functional requirements referred to the four quadrants of the legal compass.

30. It is my contention that to sustain an empirical approach to legal sources and its relation to norms and the emergence of legal ecosystems, we should be able to reconstruct their *causal chains* (including computer *and* human behaviour). Hence, I figured out a methodology in three steps to validate legal governance models, i.e. to validate the results of conditions, and the interrelationship among the conditions, selected to generate legal ecosystems in the convergence of the LOD and the Internet of Things (IoT). The first step is the application of the metarule of law scheme. I put several examples of indirect strategies in data protection. The second step is the implementation of the metamodel for legal governance. The third step is the construction of a middle-ground causal theory for legal validation, i.e., focusing on the validation process in an empirical chain, which cannot be equated to the current theories of sociolegal or legal validity.

31. There are degrees of compliance, and degrees of regulatory validity as well. Chapter 8 offers specific examples of how the conceptualisation and calculations can take place in practice, stemming from the D2D CRC, SPIRIT, OPTIMAI, and OntoRopa Projects. Each phase or stage of the methodology has also been designed and plotted on a precise diagram. This is a method that combines metrics, axioms, and qualitative (coordinated, collective) decisions to take responsibility for the results and possible impacts. Objections of most legal anthropologists (i.e., S.E. Merry or J. Comaroff) to statistic indicators and quantitative methods do not apply, as the methodology has been designed to evaluate the performance of specific platforms in specific contextual environments. What is actually evaluated are *the conditions to produce a sustainable and fair legal ecosystem.* So, it is a method for the legal governance of regulatory ecosystems.

32. The legal validation method is: (i) mixed, (ii) dialogical, (iii) with fine-grained assessment results, (iv) proactive and reactive (participatory), (v) self, co- and hetero-decision oriented (provides a rationale for decisions), (vi) independent (from legal validity), (vii) based on a causal-chain mechanism epistemic theory. This involves constructing the causal-loop models learning and defining the degree of relationships, inter-dependence between various components of the regulatory ecosystem impacting the validity (positive or inhibitory effects) and modelling deeper (three-tier) levels of complexity of interactions in the legal governance model.

33. Finally, I contend that the empirical approach to ecological validity and causal validation can support the conceptual difference between normative Semantic Web Regulatory Models (nSWRM) and institutional Semantic Web Regulatory Models (iSWRM). The former are pragmatically oriented but focused on the building of regulatory models without a specific environment or community in mind; the latter are pragmatically-driven, intentionally built to be implemented in specific contexts, communities and organisations. However, this is not a discrete or absolute distinction, but a functional one. nSWRM can be instantiated into regulatory systems through social institutionally driven tools.

9.3 Final Comments

The Dissertation contains many different stories, explanations, threads, and suggestions that I deemed necessary to support the main theses. I can mention several pieces of intellectual history—the way how the concept of *legal isomorphism* played a paramount role in the origins of Artificial Intelligence and Law studies; or the evolution of the concept of *relational law*; or the history of *legal pluralism* and the internal legal structures adopted by classical legal anthropologists to face non-Western societies.

I had to dive in history to understand my own position, and to explain why it is now most required working from different angles at the same time to build regulatory models and to implement regulatory systems. And I also considered, stemming from our research in cybersecurity, OSINT, and organised crime, that structured data only operate a minimal part of the Internet activities. There are too many known unknowns. And it is always better not to assume that we possess the knowledge that it is necessary to resume this research on legal regulatory models and systems.

Only endorsing the practical view adopted by the builder from the inside and the outside I could gain some perspective over my own work. Again, from the middle-out and the inside-out. You should allow yourself to make mistakes and learning from them. This is happening all the time in law and technology research projects. Blind alleys, brilliant ideas that revealed themselves non-workable or even eventually useless, flawing models, non-computable representations.

Selecting the materials, designing the layout, figuring out regulatory models, turning them into regulatory systems, entail different tasks and require the coordination of different types of knowledge and the accumulated experience of different fields of expertise. The long journey to obtaining some results and findings that could be worth sharing with others is a collective one. In a way, free riding is too costly in this domain.

There are deep intuitions that were coming to my mind from time to time about this collective dimension when writing the Dissertation. G.H. von Wright's ideas on practical inference and his assertion that "logic, so to speak, has a wider reach than truth" (von Wright 1999, 31); Arne Naess' writings on agreements and disagreements; H.A. Simon's notion of bounded rationality; E. Ostrom's concepts of social ecological systems and pool

of common rights; A. Cicourel's inquisitive questioning about what does it really mean inferring social knowledge from social data; G. Bateson's insights on ethos and pathos in his 'wandering' elliptic way of thinking. Regarding regulatory systems and law, Bateson specifically warned that "in a functional study, we cannot afford to ignore the mechanisms involved, equating jellyfish with fish because they both swim" (1936, 97). These insights matter and are inspirational trends for addressing the problems to come.

The discourse around legal governance, legal ecosystems and ecological validity should be explored further with new use cases and specific models for the Internet of Things. The idea of causal validation systems should deserve much more attention, especially to develop metrics that could be useful in a few different settings and regulatory situations, scenarios, and environments.

I don't feel I have resolved the problem of setting the conditions for a legal ecosystem to emerge, and the very idea of emergence would need more work and clarification. So would need the main legal concepts (enforcement, effectiveness, efficacity…) used in the methodological proposal. Fleshing out the causal validation model into a deeper interrelated one focusing on the levels of relationships, attributes and values between legal concepts is the next challenge. I am taking it with my colleagues and friends of La Trobe LawTech Group and the UAB Institute of Law and Technology.

I will finish this Dissertation making another claim. The regulatory problems that must be faced in the convergence of the IoT, LOD, Industry 4.0 (and Government 4.0) are too complex to be left to a single researcher or even a single team. The so-called 'interdisciplinary research' is a too weak approach for the intertwined scientific knowledge that is required to catch up, e.g., with the regulatory issues of Coordinated Autonomous Vehicles or the so-called machine ethics at the practical level. More than ever, our idea of what a discipline consists of should change. As advanced (again) by H. A. Simon, schools are for fish, not for scientists. And many times, along this Dissertation I have had the feeling that, so to speak, I was hunting whales in a pond.

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