The quest for umbrella terms in information science. Tracking the origins of informatology and informatics

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Abstract

Introduction. *We report in this paper on our quest to track the ownership and different conceptions of two umbrella terms, informatology and informatics suggested as more adequate names for the field of Library and Information Science between the 1960s-1980s.*
Method*. Our method consisted in gathering bibliographic materials of written publications which pointed to the earliest occurrences of these terms and reading them in order to identify the priority claims about the paternity of these two terms.*
Analysis*. We carried out content analysis of the written documents we found which helped inform our understanding of how these two terms were perceived. Our method of analysis is thus hermeneutics, i.e. based on our personal perception of what the authors had written. Our quest took us all over Europe and to the United States.*
Results*. Our main findings are that despite efforts to promote the two umbrella terms, they failed in supplanting information science or library and information science as the preferred name for the discipline. A possible reason may be that scientific fields are in horizontal rather than hierarchical relation with one another and umbrella terms suggest some sort of hierarchy. Also, 'library economy/science' and 'documentation' had become unfashionable as computer technology was being developed and the information community was seeking for new methods and tools capable of handling machine readable information.*
Conclusions*. Our quest also brought home the difficulty of establishing the ownership of concepts and ideas with an absolute degree of certainty.*

Introduction

The field now commonly known as Library and Information Science (LIS) has always struggled to delineate its object of inquiry and position itself with regard to other well-established social sciences and humanities fields. It has struggled with two types of dilemma: the ontological question (what it is about and what it should call itself) and the epistemological question (what sort of academic or scientific field information science is and if indeed it is a science). These debates have produced a huge amount of literature. Ibekwe (2019) carried out a comparative history of LIS in Europe in which a chapter was devoted to the problem of how the field is perceived and named by pioneers in different countries. A significant amount of the material used in this paper was gathered during her study which relied on written and oral sources (interviews of European colleagues two of whom are co-authors of this paper).
The earliest names of the field was known were derived from its library root. The first recorded occurrence of *Bibliothekswissenschaft* (*Library science*) appeared in a textbook written by the German librarian Martin Schrettinger (1808-1810, 1829). In 1886, a Professor position in Library Science, was created at the University of Göttingen in Germany as an auxiliary discipline (Kirchner, 1951).
In the United States, Melvil Dewey created the first *School of Library Economy* at Columbia College in 1887. In Latin Europe, the field was also known as *Library economy: bibliothéconomie* in France and *biblioteconomía/biblioteconomia* in Spain and Italy.

The choice of *Library economy* rather than *Library science* reflected a widely held view that managing libraries required practical skills, not scientific inquiry.
Where 'library science' was the chosen name, it was not because '*any kind of truly scientific method was applied to the study of libraries*' (Wellish (1972: 159), rather it was because of the 'scientism' current sweeping across the academic disciplines at the time. Attaching the word science to any activity lent it prestige but as Wellisch (1972: 160) pertinently observed, librarians stopped short of calling themselves '*library scientists*'. Eventually, Library science was dropped in favour of the more realistic name of Librarianship.

With the founding of the *Institut International de Bibliographie* in 1895 by Paul Otlet and Henri La Fontaine in Belgium, the focus shifted to the study of other types of documents (aside from books) and their contents. As different media for recording knowledge artefacts were developed and bibliographic storage devices were being invented in the early 20th century, the term "documentation" began to gain traction as a *niche* field within the bibliography universe. This was helped in large part by Paul Otlet's celebrated 1934 treatise which was explicitly titled *Traité de documentation. Le livre sur le livre. Théorie et pratique*. Subsequently, the *Institut International de Bibliographie* became the *Institut International de Documentation* in 1931 and in 1938 was renamed the *Féderation Iternationale de documentation* (FID). Documentation came to designate "*the study of conceptual as well as physical aspects of recorded knowledge and its utilization (particularly in science and technology)*" (Wellisch 1972: 160). Several European countries, in particular France, Spain and Portugal began to offer documentation degrees alongside the more traditional degrees in librarianship. In 1937, the *American Documentation Institute* (ADI) was founded in the United States (Williams 1997: 775). After World War II, Samuel C. Bradford's 1953 book entitled *Documentation* helped to further legitimise this subfield and the new horizons it opened up.

As documentation became widely used, its meaning became ambiguous. In the US, it was used in a narrow sense of '*the technology or the hardware*' for handling documents, thus excluding the intellectual study of the content of documents which was part of its original broader European sense (Wellisch 1972: 161). A new name for the field thus had to be found. As computers emerged in the mid-twentieth century and books and journals ceased to be the sole media for recording and disseminating knowledge, emphasis shifted to the mechanisation of the processing the contents of publications, hence information. The term *Information Science* (IS) became prevalent from the 1960s upwards, gradually supplanting or existing alongside Documentation, Library science and Library economy in many countries. It is noteworthy to observe that although Paul Otlet and Suzanne Briet used the term documentation and not information science, they are considered as the founders of information science because of their wide conception of documents. Hjørland (2000: 27) considers Otlet's *Traité de documentation* as one of the '*first information science textbooks*'.

This terminological evolution did not happen without strife. An intense rivalry opposed proponents of a Library science and those of the emerging Information Science during the Cold War era (1950-70s) in the United States (Buckland, 1996: 72). The former was championed by a group of influential social scientists at the Graduate School of Librarianship in Chicago founded in 1928, who formed the Chicago Library school. This school vigorously defended a 'non-technological, social science-oriented paradigm in library science' (Buckland 1996:74). However, the launching of the Russian satellite Sputnik in 1957 tipped the balance towards the development of information science programs and research. The efficient management of Scientific and Technical Information (STI) became a matter of national security and sovereignty as the United States sought to dominate the stars. Funding for STI projects became fashionable, thus bringing a new generation of professors from the sciences into the field who embraced information technology as a means of addressing the STI problems that the traditional librarianship was ill-equipped to handle. Information was seen by many as a more scientific or academic object of inquiry, capable of legitimising the field

where Library science/economy, Librarianship and Documentation had failed. The *American Documentation Institute* became the *American Society for Information Science* (ASIS) in 1968 and in 2000, a T was added to make it the *American Society for Information Science & Technology* (ASIS&T) thus recognising the importance of technology in the field. Likewise, the bibliographic database *Library Science Abstracts* was renamed the *Library and Information Science Abstracts* in 1969 (Hjørland 2000: 27).
Gradually, library schools in the United States became schools of *Library and Information Science* (SLIS) and later, some schools dropped the L to be known now as *Schools of Information* or iSchools.

2. What is in a name?

As proponents of library economy/science, documentation and information science tried to promote their preferred term as the best candidate name for the field, debates raged about just what each term encapsulated. Each name reflected a shift in focus from material information bearing artefacts (books for library science, librarianship and library economy; documents for documentation) to the intangible content of these artefacts (information for information science). Therefore, the choice between library, information or document as the central concept and object of the discipline was not simply a matter of following trends. As Hjørland (2000: 30) observed, '*The meaning of a scientific concept is always determined by theoretical assumptions. Concepts have no meaning in themselves apart from theories or theoretical assumptions*'.

The choice of information science as the name of the field has given rise to a lot of criticisms. Hjørland (2000) observed that the name 'information science' was problematic because of the underlying assumption that the field is dealing with information and not with documents which entails a further assumption that a content (facts, ideas) can be evaluated without taking into account its medium, hence the document from whence it came and without situating it in space and time. These assumptions are closely associated with the information technology paradigm which dominated the field from the 1960s. The resulting objectivist view of information is reminiscent of Otlet's positivist assumptions that facts can be extracted from books like peas from pods and can standalone in bibliographic systems without their context or source. Otlet accused books of being "messy" and of mixing up facts and non-facts.

A second issue which gives rise to recurrent debates is what sort of academic or scientific field information science is and if indeed it is a 'science'. An inventory carried out by Schrader in 1984 showed an astonishing diversity of perceptions, with no consensus in view. More than two decades later, Robinson (2008:580) revisited this debate with the same results! She listed the a kaleidoscope of conceptions, with some authors suggesting that the field be considered '*a social science*' (Roberts, 1976; Wersig and Windell, 1985; Dick, 1995; Cronin, 2008), others a "*meta-science*" (Bates, 1999; Mezick and Koenig, 2008), yet others an '*inter-science*' (McGuirk, 2002; De Beer, 2005), or an '*interface science'* (Maricic, 1987), a '*postmodern science*' (Wersig, 1992), a "*superior science*" (Curras, 1985), a '*rhetorical science*' (Capurro, 1992), a '*nomad science*' (De Beer, 2005), a '*liberal art*' (Arms, 2005), an '*interdisciplinary subject*' which should be renamed '*knowledge science*' (Zins, 2006), and a subject which may assume the role once played by philosophy in mediating science and humanism (Schoenly, 1983).'
Weighing into this debate, Bates (2007) and Furner (2010) referred to the discipline in the plural, calling it the '*information disciplines*' or '*information studies*' or '*information sciences*', thus reflecting their belief that it is an orthogonal and meta discipline, serving other sister disciplines (Bates 1999). In the same vein, Williams (1987) likened the field to medicine because both are amalgamates of other disciplines.

3. The quest for umbrella terms

Attempts to grasp the essence of the field led to coining "higher level" umbrella names that would avoid the perceived limitations of the three historic names (library science, documentation, information science) each judged to be too narrow. In the rest of this paper, we will render an account of our quest to track the origins of two such umbrella terms, informatology and informatics, suggested in the 1960-80s as adequate names for information science. At that time, there was a worldwide effort to coin new names whose suffix ended in *–logy*, to signify scientific discourse on the object of the suffix, in an attempt to legitimise the field in question.
In line with this tradition, the first chapter of Paul Otlet's 1934 *Traité de documentation* was entitled *La bibliologie ou documentologie*. Robert Pagès, a contemporary of Suzanne Briet and one of her first students in her new course on documentation wrote a Master's thesis in 1948 entitled *Transformations documentaires et milieu culturel (Essai de documentologie)*. The choice of *documentologie* at the time appeared logical since *bibliologie* (bibliology) was being promoted as the name of the field devoted to the study of printed documents, primarily books (material bibliography). It followed then that the study of documents as a whole (including books) should be called documentology.

Our quest to trace the origins of informatology and informatics as umbrella terms for the field took us from Western Europe to the United States and then back to Eastern Europe.
The two tables hereafter summarise the trajectory of these two terms and the shifts observed in their significations in the decades following their coinage.

INFORMATOLOGY			
Year	**Country**	**Catalyst**	**Conception**
1962	Sweden	First known occurrence of *informatology* in a report of a committee appointed by the Royal Academy of Engineering Sciences recommending a new course to train documentalists from 1970. Björn Tell's name is linked to this report.	Narrow, processual
1965	Sweden	Björn Tell's article describing the creation of this new course on Information Transfer delivered at the Royal Institute of Technology in Stockholm (KTH) in the fall of 1964 and which comprised a module on *informatology*.	Narrow, processual
1965	United States	P. Atherton's *'Letter to the Editor'* publicising Tell's 1964 informatology course published in the *American Documentation*.	Narrow, processual
1969	Yugoslavia	Božo Težak chose *informatology* to name the field in his country and as the name of the journal he created which serves as a publication and communication channel to legitimise the (L)IS field.	Narrow, processual
1970	United States	Otten & Debons suggested that IS needed a metascience and that this should be called '*informatology'*, seen 'as the study of the fundamental principles underlying the structure and use of information.' Quest for unifying laws and languages	Broad, metatheoretical.
1981	France	Jean Meyriat proposed '*informatology'* as an appropriate name for a science of information and 'documentology' as the general science of all the specific fields devoted to scientific discourse on different types of documents	Broad, theoretical
2003	Croatia	An undergraduate and graduate program in *Informatology* was created in Osijek, leading to BA and MA in Informatology. Graduates from this course were called Informatologists.	Narrow Processual
2011	Poland	'Bibliology and informatology' was chosen by ministerial decree as the new name of the field in	Broad, interdisciplinary

		Poland which they felt conveyed the idea of an interdisciplinary field encompassing various subfields in LIS.	

Table 1: Evolutions in the conceptions of *informatology*.

Year	Country	INFORMATICS Catalyst	Conception
1957	Germany	Karl Steinbuch, German engineer, attributed with coining *Informatik* although this a written trace could not be found.	?
1962	France	Philippe Dreyfus, French Computer scientist suggested the French *informatique,* a contraction of *'information + automatique',* at a Meeting of the French Association for Computing and Information Processing.	Narrow, computer processing of information
1965	USSR (Russia)	Mikhailov, Chernyi and Giljarevski chose the new term *informacija or informatika* suggested by J.G. Dorfman, the reviewer of their handbook '*Fundamentals of Scientific Information' in lieu* of information science or documentation *'as the name of a science which deals with the basic ideas, methods and means of collecting, processing, storing, retrieving and disseminating any one type of information*.	Broad, information science: theory and application
1966	USSR (Russia)	Publication of the article '*Informatika: new name to the Scientific Information Theory*' in the journal *Naucno-tekniceskaja informacija by* Mikhailov and colleagues.	Broad, information science: theory and application
1967	Japan	At the 33rd general conference of the FID in Tokyo, Mikhailov defended the use of the neologism in his paper entitled '*Informatics: a new scientific discipline*'.	Broad, information science: theory and application
1968	USSR (Russia)	2nd edition of the handbook '*Fundamentals of Informatics*' which became the first treaty bearing this term seen as 'a new scientific discipline'.	Broad, information science: theory and application
1969	Yugoslavia	Božo Težak, Yugoslavian LIS pioneer considered and rejected informatics in the Russian sense, as an umbrella name for 'information sciences and services.'	Broad, information science
1970	United Kingdom	The English LIS scholar, D.J Foskett published an article in Journal of Documentation simply entitled "*Informatics*" supporting the Russian endeavour to promote "informatics" as the new name for LIS because in his view, the Russian definition of the term opened up new horizons which made it a new discipline rather than simply a computer-induced improvement of librarianship.	Broad, information science: theory and application
1971	USSR (Russia)	Mikhailov and Giljarevski published a UNESCO and FID guide entitled '*An introductory course on Informatics/Documentation*'.	Broad, methods, laws of Information Science
1972	United Kingdom	The Austrian-born LIS scholar, H.H Welisch published an article in *Journal of Librarianship* entitled "*From Information science to informatics: a terminological investigation*" also strongly supporting the Russian endeavour to promote "informatics" as the new name for LIS for similar reasons to Foskett (1970).	Broad, information science: theory and application

Table 2: Evolutions in the conceptions of *informatics*.

3.1 Informatology as information processing or informatics

The first occurrence of informatology is generally thought to have appeared in the report of a 1962 committee appointed by the Royal Academy of Engineering Sciences in Stockholm, Sweden, recommending the creation of a '*comprehensive training program'* for documentalists that covered all university levels, from graduate to doctorate' (Tell, 1965, 41). The Swedish librarian, Björn Tell who was involved in the creation of this new course with some computer science colleagues explained that the new course was aimed at not only acquiring traditional cataloguing skills but also computing skills that would enable trainees to manage scientific and technical information efficiently, using the most up-to-date technology. Because emphasis was laid on '*information'* and '*the analytical aspects in the use of computers for information handling*', it was decided to avoid the term documentation which '*connotes attention to documents*', hence the choice of the word informatology. As Tell, (1965, 43) wrote:

> *The word "**informatology**" was coined to denote the research field within information processing which combines intuitive and algorithmic procedures. Computers are used merely as a supplement to the human intellect. Informatology will handle both those subsets of the information process which are not dependent on intuition or knowledge and those in which it is a prerequisite that intuitive procedures are included. The purpose is to arrange the procedures in such a way that the intuitive subsets are distinguished from those which might be formalized, and that the two kinds of subsets are regarded as well-defined components in a total system.*

Concerning what informatology meant, Tell's article offered more clarity. Steeped in computer science and artificial intelligence, informatology was perceived by his group as that field of teaching and inquiry concerned with determining when human intellect and input is needed to perform a given information processing task and when it is not required and the tasks can be wholly automated. Informatology does not deal with either one of these cases but with both. Logically, people endowed with such expertise whose task it is to model intellectual activities such that computers can be used to simulate them are 'informatologists':

> *The treatment of subsets of intellectual activities which do not depend on intuition is in the domain of the "informatologist". He studies an activity like classification, which generally do not presuppose the use of computers or formal logical methods, in order to analyse its intuitive character and ascertain whether this activity (a series of intuitive sets) can be formalised and defined as subsets of the larger system, which would then employ computers* (Tell, 1965, 43-44).

The dominance of the information processing paradigm in the Swedish scholars' conception of informatology is further revealed in the 'Informatological aspects' of this course which include:

> *Codes and error correction etc,*
> *Neural network,*
> *Self organization and automata*
> *Uncertainty theories, "redundant information", etc;*
> *Learning and problem solving, etc.*
> *Theory of automata,*
> *Linguistic problems in information retrieval*. (Tell, 1965, 44).

Tell's informatologist is therefore synonymous with modern day's computer scientist, i.e., a translator of human needs into formal machine language. Tell and his colleague's initiative was brought to the attention of an international audience by the American information science scholar Pauline Atherton in her '*Letter to the Editor'* published in the April issue of *American Documentation* in 1965, informing readers about this 'new 100-hour course named

informatology which had been created at the Royal Institute of Technology (KTH) in Stockholm.
As the Yugoslavian pioneer Božo Težak was building the new discipline of LIS in his home country in the late 1960s, he considered different umbrella terms amongst which informatology and informatics, finally preferring the former. Quoting Atherton's 1965, *Letter to the Editor*, Težak wrote:

> *The very name of INFORMATOLOGY is meant to designate theory and practice of emission, transmission, accumulation, selection and absorption of information (the so-called e-t-ac-s-a complex) and is wider and more exact than terms such as informatics, information sciences and services* (Težak, 1969).

Težak also named his flagship journal which served as a publication and a publicity platform for all his LIS related endeavours '*Informatologia Yugoslavica*'.

Informatology resurfaced in the writings of the French information science pioneer Jean Meyriat in the 1980s as he sought to legitimise the information-documentation branch within the Information and Communication Sciences discipline in which it is embedded in France. Meyriat (1981a) tried to promote the neologisms 'documentology' and 'informatology' as the two branches of information science. For him, 'documentology' was the general science of all the specific fields devoted to scientific discourse on different types of documents such as 'bibliology, iconology, filmology, discology, etc'. He argued that it was a more adequate name than documentation since it was concerned with the scientific study of information bearing artefacts (documents). By analogy, he promoted 'informatology' as an appropriate name for a science of information:

> *informatology seeks to give an account of all systems of transfer of useful information, whether primary or secondary. It studies also information systems that do not have recourse to documentary medium. In particular, it focuses its attention on the processing of information itself, regardless of its medium*. Meyriat (1981b, 18).

Furthermore, Meyriat's documentology appears to have a much broader scope than his informatology. Whereas the former encompassed the study of all types of documents, the latter was only concerned with information useful for teaching, research and the industry. Information science was to be only concerned with scientific and technical information (Meyriat, 1981a, 62).

What the above authors have in common is their narrow processual conception of informatology and therefore of information science which is rooted in the information technology paradigm. In this sense, informatology would be synonymous with a narrow restrictive sense of informatics today.
However there are some nuances. Meyriat (France) and Težak's (ex-Yugoslavia) informatology is less machine-reliant than Tell's (Sweden). For Meyriat and Težak, the focus of informatology is on the whole information management cycle, whereas Tell and his colleagues emphasised the computer programming and AI dimensions. Meyriat also suggested calling *informatologist* (*informatologue*) a person who makes a scientific discourse on information and *informatist* (*informatiste*), a person that implements the results of this discipline and practises the transfer of information. Hence Meyriat's *informatologist* does not quite equate to Tell's informatologist who is more of a computer programmer-analyst. Yet, the two were using the same terms in near synonymous but not quite the same way.
A plausible explanation of why we observe drifts in meanings can be explained by the national institutional contexts in which these pioneers found themselves evolving. Tell and his colleagues in Sweden were clearly operating within an applied sciences setting (engineering, computer science) where the IT paradigm was prevalent. On the other hand, the Information and Communication Sciences (ICS) discipline within which the information-

documentation field is embedded in France was founded by a trio of humanities scholars: Roland Barthes, a reputed literary theorist, philosopher, critic, and semiotician; Robert Escarpit, a literary scholar and a journalist who wrote satirical articles for the French daily *Le Monde* and is considered as one of the founders of communication science and lastly Jean Meyriat who was a political scientist that later came to documentation and helped establish that branch of the ICS discipline. These humanities scholars clearly wished to distance the new discipline from Artificial Intelligence and computer science. Hence, it would not have been of "*bon ton*" or acceptable to them and their humanities peers to cast the ontological and epistemological roots of the new field prominently on information technology.
For similar yet somewhat different reasons, Bozo Tezak's conception of informatology is not quite as computer-reliant as Tell's. Tezak was operating in an interdisciplinary context. A chemist by training, he founded a very broad library and information science centre at the University of Zagreb in 1964 as an interfaculty and interdisciplinary programme run by the Faculties of Philosophy, of Natural Sciences, of Medicine and of Electrical Engineering. Hence while he does not completely obfuscate the human dimension of the new field in his conception of informatology, the processual dimension is very prominent in his definitions (see Ibekwe 2019: p. 59-78 for a discussion).

3.2 Bibliology and Informatology as book and information science

Before the fall of Berlin wall in 1989, in countries belonging to Eastern European block, information science developed in parallel to librarianship. Poland and the Soviet Union had a very strong research tradition on bibliology (book science). There was intense rivalry through 1970-80s between two traditional fields (librarianship and bibliology) that provided training programmes and the emerging field of information science. Valuable assistance to develop information related practices and research came from the Unesco and the Fédération Internationale de Documentation (FID). For a while, the three fields—librarianship, bibliology and information science, existed side by side, each focusing on different topics and developing its own scientific and professional terminology. To overcome the borders erected around each field and unify them under an encompassing umbrella term, several names were suggested amongst which '*documentation, documentology, informatology, infology, informology, informatorics, informantics, infoscientistics, ichneutics, emmorphosis, epistometrics'* and few others. The most popular names were *'documentation, informatology and informatics'*. At times '*documentation*' and '*informatology*' were employed synonymously (Dembowska, 1965: 25; Mikhailov, Chernyi and Gilyarevski, 1967; Wersig and Meyer-Uhlenried, 1970; Wellisch, 1972: 177-178; Sengupta, 1992: 90-91).
By the 1970s, informatics was firmly established in the former Soviet Union, in East Germany and in many East European countries (Wellisch, 1972: 177-178). In ex-Yugoslavia, there were discussions about which term better expressed the new discipline: will it be 'informatology' in the sense proposed by Težak (1969) or 'informatics' in the computer science sense in use in France and West Germany (Wellisch, 1972: 177). Finally, it will be neither! The University of Zagreb became the first institution of higher learning to recognise the new discipline under the name of 'Information Sciences' in 1983 (Pehar and Aparac, 2012).

Interestingly, in Poland, attempts to designate the discipline with the *–logy* suffixes met with more success. While 'information science' gained prominence at the turn of the 20th and 21st centuries, a reversal of fortune occurred in 2011. By ministerial decree, '*bibliology and informatology*' was chosen as the new name for the discipline. The rationale behind the choice of not one but two terms with the *–logy* suffix, linked by a coordination, was to convey the idea of an interdisciplinary field that is concerned not only with the scientific study of the printed book but with all the subfields that are usually found under information science programs such as information behaviour, reading literacy, uses of ICT, book history, tegumentology, information policy and ethics, etc. Poland thus appear to have returned to umbrella terms of the 1970s which many countries had rejected (Sosińska-Kalata, 2013: 19).

3.2 Informatology as a metascience of Information Science

A second strain of meaning, distinct from Björn Tell's and all his borrowers is the one referred to in a 1970 article entitled '*Towards a metascience of information: informatology*' by Klaus Otten and Anthony Debons, published in the *Journal of the American Society for Information Science* (JASIS). In this article, the authors used the term in a much broader sense than the narrow processual ones discussed above in Europe.

Klaus Otten and Anthony Debons claimed that information, the object of the field, was a fundamental phenomenon of the universe similar to matter and energy and that it required other operations involving other fundamental phenomena. They further argued that '*the body of knowledge describing these phenomena and relations will evolve as the subject of a new science which will unify existing concepts while 'deriving formalistic descriptions*'. They then contended that the need for a metascience arises when existing bodies of knowledge become hyperspecialised and their focus narrower and narrower (Otten and Debons, 1970: 89). They therefore proposed that a metascience of information that will unify under a common language, the theories, models and concepts of all the contributing sciences to IS be called informatology:

> *As metamathematics evolved in response to the divergence and growths of specialized mathematical disciplines, similarly, we anticipate the evolution of a metascience of information in response to the need for a critical reevaluation of the foundation upon which many information disciplines and technologies are based. This anticipated metascience can be viewed as the science of information (or informatology). Informatology can be defined as the study of the fundamental principles underlying the structure and use of information. (...) Thus, the metascience of information has two focal points: the phenomena of information and man's relation to the phenomena.* (Otten and Debons, 1970: 92).

It is noteworthy that Otten and Debon's conception of information appear contrary to the highly cited aphorism by Norbert Wiener's that '*information is information, it is neither matter nor energy*' (Wiener, *Cybernetics*, 2nd edition, p. 132). Otten and Debons further specified that their conception of a metascience of information is not meant to be an all inclusive science as some definitions of information science have tried to be, claiming that IS '*deals with all aspects of information*'. For them, '*the metascience of information is a very specific science, concerned only with the foundations of information-related sciences and technologies and not concerned with the content of these specialized disciplines. Any claim for all-inclusiveness*', they argued, '*would lead to superficiality and therefore would not serve any purpose*.' (Otten and Debons, 1970: 94).

In this second broad sense, Otten and Debons's informatology can be assimilated to the study of the theories and foundations of IS. Their focus was on the quest for a common language, unifying theories and principles underlying the study of information. This was also a fashionable trend in the second half of the twentieth century where many scholars sought for unifying laws and principles to legitimise their fields.

However, attempts to make a field a metascience of another field are doomed to failure because as Sercar (2000) observed, disciplines are in interaction with one another, thus in a horizontal relation whereas a metascience suggests a hierarchical one.

To sum of the voyage of informatology that we found: our quest took us from Western Europe (Sweden) to the United States and then back to Europe (Yugoslavia, France). We found two main conceptions:

- One narrow and processual, linked to the computer processing of data which is the lineage started by Björn Tell's 1965 article, amplified in P. Atherton's *Letter to the Editor* in American Documentation the same year, quoted by Bozo Tezak still in its processual narrow

conception, then reappearing under Meyriat's writings in 1981, it shifted slightly and lastly appearing in Poland in 2011 in the new name for an interdisciplinary field on information.

- the second much broader sense is located in the United States as a metascience of IS by Anthony Debons and Klaus Otten in 1970.

3.3 Informatics: the physical paradigm of Information Science

Around the same time that '*informatology'* was being promoted as an umbrella term for information science, informatics was being promoted for the same purpose. Sercar (2010: 282) wrote that:

> *The term informatics was first used by Ph. Dreyfus in 1962, and the same year B. Tell introduced the term "informatology" in Sweden. The term "informatology" was also supported by P. Atherton (1965). Starting with 1965, A.I. Mihaijlov, A.I. Cerni and R.S Giljarevski spoke in favour of the term "informatics".*

While this passage shed more light on the ownership of informatology, it opened two trails on that of informatics: a French and a Russian one.

3.3.1 Informatique as computer science: the French trail

An Internet search showed that the 'Ph Dreyfus' referred to in Sercar's quotation was most likely the French computer science pioneer Philippe Dreyfus who was Director of the National Computing Centre of the company Bull in the 1950s. Dreyfus was credited with being the first to translate the term *informatik*, apparently coined by the German engineer Karl Steinbuch in 1957, into its French version in 1962. We were however unable to locate this first German occurrence in any publication and to muddy the trail even further, Samuelsson (2006, 197) attributed its first appearance to the French *informatique* and not to the German *informatik*:

> *The name informatics is adapted from the french "informatique" and frequently used in translations to European languages (Informatik, informatikka).*

If indeed the French '*informatique'* is the first occurrence of informatics, then that is problematic for the field since this term has come to designate the entire field of computer science discipline whereas the English *informatics* has a more restricted meaning:

> *Informatics is Information Science and Technology (IT) for multidirectional information flows through and between living systems: individuals, groups and organizations, foremost international knowledge transfer and retrieval, in behavioral harmony with matter-energy flows.* (Samuelson 2006, 197).

It is probable that in the early years of the emergence of computer science, its frontiers were still unclear and it was not as broad a field as it is today. Dreyfus's first use of *informatique* in 1962 may therefore have been in a more restricted sense of 'computer processing of data' only which would have been closer to its English variant 'informatics' at the same time. This is only a conjecture at this stage for which we lack hard evidence.
Foskett (1970), Wellisch (1972) and later Abadal (1992: 96) also tried to trace the origins of "informatics". They also attributed to Ph. Dreyfus the coining of the French version *informatique* as a contraction of *information* + *automatique* in 1962 at a Meeting of the French Association for Computing and Information Processing (*Association Française de Calcul et du Traitement de l'Information*, AFCALTI) to name the new domain related to computers. Dreyfus was also credited with giving the linguistic versions of the term in five other languages.

3.3.2. Informatika as the science of *scientific information: the Russian trail*

Several sources (Foskett, 1970; Wellisch 1972) attribute the ownership of the Russian version '*informatika'* to Mikhailov, Txernii and Giljarevski (1965) who co-authored a handbook entitled '*Fundamentals of Scientific Information'* (*Osnovi Nauknoi informatsii*). This was three years after Dreyfus's coinage of the French *informatique*. Mikhailov and his co-authors were looking for a less controversial term than information with which to name the new field concerned with scientific information management. They considered and rejected the term 'scientific information' used in the title of their handbook because it referred more to an object of study than to an area of knowledge. They equally rejected the term 'documentation' because it appeared to restrict scientific information activities to documents only. A brand new term had to be found. At this point, a reviewer of their handbook, J. G. Dorfmann suggested the term '*informacija*[1]*'*:

> *It would be more reasonable to use informatics as the name of a science which deals with the basic ideas, methods and means of collecting, processing, storing, retrieving and disseminating any one type of information.* Mikhailov (1967, 72) quoting Dorfman, J.G.'s review of the book '*Naucno-Teknicekaja informacija',* (1966, 7, 46).

'Naucno-tekniceskaja informacija' is the latin transliteration of the Cyrillic Russian alphabet of '*Научно-Техническая Информация'* which means 'Scientific and technical information'. In 1966, Mikhailov, Chernyi and Gilyarevskii published an article entitled '*Informatika: new name to the Scientific Information Theory*' in the journal *Naucno-Tekniceskaja Informacija* which was republished in English in 1967 in Fédération International de Documentation's (FID) journal.
At the 33rd general conference of the FID in Tokyo in September of 1967, Mikhailov defended the use of the neologism in his paper entitled *Informatics: a new scientific discipline*. In 1968, the second edition of their handbook was published under the title *Fundamentals of Informatics* (*Osnovi Informatiki*) thus making it the first treaty bearing this term. *Informatika* was related to the scientific information primarily and tied to linguistics, computer technology, philosophy, economy and history (Mekhtiev *et al.,* 1977).

In 1971, Mikhailov and Giljarevski published a UNESCO and FID guide entitled *An introductory course on Informatics/Documentation*. Their explanatory note on the cover page however bore this text '*This draft text for an introductory text in documentation science is reproduced as a working document in the English language submitted by the FID*'. The hesitation between 'informatics' and 'documentation' in the title indicated that the authors were unsure about the acceptance of the new term 'informatics' and thought it prudent to accompany it with the more widely used and established term of 'documentation'. As to what informatics meant, the authors wrote:

> *Informatics is a scientific discipline which investigates into the structure and properties (and not the specific contents) of scientific information as well as the regularity of scientific information work, its theory, history, methodology and organization.*
> *The purpose of informatics consists in developing optimal methods and means of presentation (recording), collection, analytical-synthetic processing, storage, retrieval and dissemination of scientific information. Informatics deals with logical (semantic) information, but is not involved in qualitative estimation of this information. Such an estimation can be carried out only by specialists in the*

[1] *'Informacija'* is the Lithuanian version as Lithuania at the time part of the USSR (United Soviet Socialist Republic).

> *particular fields of scientific or practical activity*. - Mikhailov and Giljarevski (1971, 14).

The emphasis on the structure, properties and regularity suggests that the focus of '*informatika'* is on the laws that govern scientific information seen as a system. In this sense, the Russian '*informatika'* encompasses in part the metrics fields (biblio/sciento/infor-metrics).
The second part of their definition echoes Harold Borko's 1968 definition for information science and Težak's conception of informatology by its processual dimension with the notable difference that Mikhailov and Giljarevski's informatics appears to be restricted to scientific information only. However, Foskett (1970: 341) observed that Mikhailov and his colleagues were careful not to limit informatics to the purely technological aspect of information handling but emphasised its theoretical and social dimensions, thus solidly entrenching it within the social sciences. Mikhailov and colleagues use of informatics and of scientific information is broader in scope than that of the Swedish scholars'. This is perhaps not so surprising given that the word 'scientific' in the Russian and in continental European referred to '*the whole of knowledge and is not used in the narrow Anglo-Saxon sense of the natural sciences*.' (Foskett, *ibid*.: 343)

The first part of the definition of informatics given by Mikhailov and Giljarevski (1971, 14) was later taken up the Yugoslavian information science pioneer, Bozo Težak when he was seeking a candidate name for the new interdisciplinary information field he was building:

> *The term INFORMATICS was almost simultaneously or somewhat later defined as "a new scientific discipline dealing with structure and properties (but not with concrete contents) of scientific activities, their theory, history, methodology and organization." (Težak, 1969, II).*

Težak (1971) further wrote that '*informatics'* was the common term for the field of information sciences and services while '*informatology'* concerned the whole complex of '*emission, transmission, accumulation, selection and absorption of information*.'
Thus, Težak use of informatics is in line with the Russian conception rather than the French and the Swedish computer science sense of the term. Also, Tezak's use of informatology is closer to the French and Swedish use of informatics by its focus on the information processing stages rather than on the structure or laws governing the production and dissemination of information.

3.3.3. English echoes of Informatika: the case for a new scientific discipline

The Russian efforts to craft a new and encompassing name for the field caught the attention of many scholars in Europe, some of whom were convinced by the arguments developed by Mikhailov and his colleagues in their successive publications.
In an article simply entitled *Informatics*, the English scholar, J.D Foskett (1970) attributed the coining of informatics solely to the Russian scholars (Mikhailov, Chernyi and Giljarevski, 1966). Foskett wrote at length about the naming dilemma that has beset the field before going on to defend the choice of *informatika* as an adequate name for the field. According to him, as defined by the Russian colleagues, informatics did not simply denote the improvement of existing information practices and services but represented a new discipline, because, '*for the first time, people are now studying the behaviour of information itself and the properties, or 'morphology', as Fairthorne puts it, of information flow*'. (Foskett, 1970: 343-4)

Foskett was however sceptical about the success of this term in supplanting the more entrenched names for the discipline owing to its conflicting uses across its different linguistic versions:

> *It is quite possible that the term 'Informatics' itself will not eventually prove to be the*

> *accepted one; in France and West Germany for example 'L'informatique' and 'Informatik' are not used in the sense of Mikhailov et al., but in some publications are used in the sense in which we use the term 'information theory', in others as a collection of disciplines which relate to the automatic processing of information, (Poly and Poulain, Arsac, Demarne). Arsac, for example, claims that Informatics is concerned only with the transfer of marks denoting information and not at all with the message carried by the information; this clearly would exclude Informatics from the area of the social sciences. Demarne widens the scope of the field, but in the same direction, by stating that it is concerned with everything to do with the design, production, and use of computers.*
> *East Germany, on the other hand, has followed the Russian lead, and has re-named the journal ZIID-Zeitschrift as Informatik. The East German translation of Mikhailov et al. is called Grundlagen der Informatik, while that issued simultaneously in West Germany is called Grundlagen der wissenschaftlichen Dokumentation und Information. In his Foreword to the latter, however, Professor Dr Adolf Adam comments on this terminology and gives the opinion that the Soviet usage is preferable: to use 'Informatik' as merely meaning computer science is too restricting*. - Foskett (1970: 342).

Two years later, the Austrian-born information science scholar Hans Wellisch (1972) published an article entitled *From Information science to informatics: a terminological investigation* in which he also discussed at length the terminological dilemma facing the field. After analysing 39 competing definitions, he concluded on the absence of a single unifying concept in the definitions except for the word "information" which is highly ambiguous. Almost 50 years later, Wellisch's observations are still relevant today: the Library and Information Science community worldwide has neither agreed on a unique name for the field nor on its centre of gravity and borders. Wellisch then went on to discuss attempts by his predecessors to find a new distinctive name (an umbrella concept) for the field amongst which he cited '*Documentistics (Wersig, 1970), Documentology (Wersig, 1970), Epistemo-dynamics (Kochen, 1969), Informantics (Wersig), Informatology (Otten & Debons, 1970), Information and documentation science (Koblitz, 1970), Informology (Wersig, 1970), Social epistemology (Shera, 1965)*." (Wellisch, 1972:176). Of all these attempts, he considered the by the Russian scholars Mikhailov *et al.* (1966) to call the field 'informatics' as the most convincing because of the careful way in which its definition was couched, not limiting its scope to only technological aspects of information procession and to the natural sciences but to all scholarly endeavour. For Wellisch, the fact that the term was '*firmly established in the Soviet Union, in East Germany and in many East European countries*' was an encouraging sign. Furthermore, he argued that 'informatics' satisfied several criteria as the name of a new discipline because:

> '(i) it consists of one word only;
> (ii) it implies the central topic of the discipline;
> (iii) it cannot be confused with any other name;
> (iv) it will be readily understood, because the stem is familiar to everybody;
> (v) other terms can be derived from it, such as Informatician for a person who is engaged in activities in this field (equivalent to mathematician, statistician, etc.) and the adjective informatical, to describe the attributes of the field.
> (vi) It has already been used in several English-language publications, including the 1970 *Guide for an introductory course on informatics/documentation'* published by Mikhailov and his colleagues on behalf of Unesco'. - Wellisch (1972,177)

Needless to say that many of Wellisch's assertions above are controversial, especially claims (ii-iv) above.

Informatics gained some traction as an umbrella name for information science and began to appear in the names of journals in the late 1960s. In 1967, the journal *Informatika: Časopis za teoriju i praksu naučnih, tehničkih i ekonomskih informacija i dokumentacije* ('Informatics: Journal for the theory and practice of scientific, technical and economic information and

documentation') appeared in ex-Yugoslavia. The same year, the journal *Informatika* was created in Hungary. In 1969, the journal '*Informatik: Information und Documentation in Wirtschaft*, *Wissenschaft und Technik* (Informatics: Information and Documentation for Economy, Science and Technology) appeared in the German Democratic Republic and in the Soviet Union (USSR), the journal *Naučno-tekničeskaja informacija* was renamed *Informatika* in 1970.

However, despite these concerted efforts to establish informatics as the new umbrella term for information science, the international community remained unconvinced. Part of the reason being the prior claims laid to this term by the field of computer science and the semantic shifts observed in its different linguistic versions:
- the French *informatique* coined in 1962 by Ph. Dreyfus and the German '*Informatik*' have come to signify the entire field of computer science;
- the Russian *informatika* appeared to be concerned with finding the laws ad structures governing scientific information only, not the other types of information;
- the English *informatics* is an interdisciplinary field of information processing that draws on computer science and statistics to build systems for specific application areas (bioinformatics, medical informatics, etc).

4. Concluding remarks

We attempted to track the origins and conceptions of informatology and informatics championed in the 1960s as umbrella terms that were capable of encompassing the diversity of topics and fields subsumed under the interdisciplinary field of Library and Information Science. The meanings ascribed to these two umbrella terms evolved under the pens of different authors, swinging from a narrow physicalist conception as information processing to a broad conception as a science concerned with the fundamental laws governing the creation, management, storage and dissemination of information.

Our account is not meant to be exhaustive. It did not show conclusive evidence about the ownership of these terms (especially of informatology for which some doubt persist about who actually coined the term) nor did it cover the whole spectrum of usage of these two terms as they were borrowed and repurposed from country to country, sometimes across continents, by different scholars and pioneers, to suit their national agenda of building and legitimising a new academic field on information. What our quest highlighted is the fact that tracking the origins of an idea, of a concept and of any intellectual construct is an enterprise fraught with difficulties and pitfalls. It is indeed difficult to establish beyond all reasonable doubt who first invented what, who borrowed what, from whom and who was inspired by whom? An observation already made by Buckland:

> *A caveat: Claims concerning who really had priority in any field are hard to establish with confidence and should be treated with caution. They may have been early contributors rather than the very first. No guarantees are offered!* – Buckland (2017b, p. 49)

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References

Abadal, E. (1992). Orígens i desenvolupament de la informació i documentació a l'estat espanyol: El problema de la denominació. Bellaterra: Publicacions de la Universitat Autonoma de Barcelona: Spain. (University of Barcelona Ph.D Dissertation). http://www.tdx.cat/TDX-0414108-153554.

Atherton, P. (1965). Letter to the Editor. *American Documentation*, April, p. 126.

Bates, M.J. (2007). Defining the information disciplines in Encyclopedia development. *Information Science Research*, 12(4). Accessible à http://informationr.net/ir/12-4/colis/colis29.html

Bates, M.J. (1999). The invisible substrate of information science. *Journal of the American Society for Information Science & Technology*, 50 (12), 1043-1050.

Buckland, M. K. (2017a). Before the Antelope: Robert Pagès on documents, Proceedings of the Document Academy, 4(2). Retrieved from http://ideaexchange.uakron.edu/docam/vol4/iss2/6

Buckland, M. (2017b). Some European Contributions to Information Science. *ASIST Bulletin,* 43(3), 49-52.

Buckland M. K. (1999). Overview of the History of Science Information systems, In M.E. Bowden, T.B Hahn, & R.V. Williams (Eds.), *Proceedings of the 1998 Conference on the History and Heritage of Science Information Systems*, (pp. 3-7). Medford, NJ: Information Today.

Buckland, M.K. (1996). Documentation, information science, and library science in the U.S.A. *Information Processing & Management*, *32*(1), 63-76.

Dembowska, M. (1965. *Dokumentacja i informacja naukowa*. Zarys problematyki i kierunki rozwoju, Warszawa, SBP.

Dembowska M. (1979), Informacja naukowa w Polsce. Rozwój, stan obecny i perspektywy, *Przegląd Biblioteczny* z.3, p. 279-297.

Foskett, D.J. (1970). 'Informatics'. *Journal of Documentation*, 26 (4), 340-369, https://doi.org/10.1108/eb026504.

Furner J. (2010). Philosophy and Information Studies. *Annual Review of Information Science & Technology*, *44*, 159-200.

Hjørland, B. (2000). Documents, memory institutions and information science. *Journal of Documentation*, *56(1),* 27-41.

Ibekwe, F. (2019). *European Origins of Information Science*. London: Emerald Publishing. *Studies in Information 13*.

Kirchner, J. (1951). Bibliothekswissenschaft: Buch- und Bibliothekswesen. C. Winter: Heildeberg

Mekhtiev et al. (1977). Mekhtiev, D. M., R. K. Arakelov, S. P. Mellion and O.E. Kul'gavina. Using an indeks of cited literature to analyze the current state and trends of information science. *Automatic Documentation and Mathematical Linguistics*, 11(1): 46-59.

Meyriat, J. (1981a). Document, documentation, documentologie, *Schéma et schématisation*, 2e trimestre, *14*, 51-63.

Meyriat, J. (1981b). Information science soeur de la bibliologie », *Revue de bibliologie : Schéma et schématisation*, *15*, 9-19.

Mikhailov A.I., & Giljarevskij, R.S. (1971). An introductory course on informatics/documentation. Working document submitted by the FID to the UNESCO, 31 Aug. 1970, 208 pages. Retrieved from http://unesdoc.unesco.org/images/0000/000006/000676eb.pdf.

Mikhailov A.I., Chernyi A.I. Giljarevskij, R.S. (1967). Informatics: new name for the theory of scientific information. *FID News Bulletin*, 17(7), 70-74.

Otten, K. & Debons, A. (1970). Towards a metascience of information: informatology. *JASIS 21(1)*, 89-94.

Pehar, F. and T. Aparac-Jelušić. (2012). On the origins and development of Information Sciences as an academic and research field in Croatia. In: T. Carbo and T. Bellardo Hahn (eds). *International Perspectives on the History of Information Science and Technology*. Medford: Information Today: 74-82.

Robinson, L. (2008). Information science: communication chain and domaine analysis, *Journal of Documentation*, *65(4)*, 578-591.

Samuelson, K. (2006). Informatics and Information systems – including cybernetics and networks. In Bubenko J., Jansson C.G, Kollerbaur A., Ohlin T. & Yngström L. (Eds.), *ICT for people, 40 years of academic development in Stockholm* (pp. 196-200). University of Stockholm: Sweden.

Schrader, A. M. (1983). Toward a theoretical base for Library Science: PhD theses. Bloomington: Indiany University

Schrader, A. M. (1984). In search of a name: Information science and its conceptual antecendents. *Library and Information Science Research*, 6(3): 227-271.

Schrettinger, M. (1808-1810, 1829). Versuch eines vollständigen Lehrbuches der Bibliothek-Wissenschaft oder Anleitung zur vollkommenen Geschäftsführung eines Bibliothekärs. Volume 1 (Sections 1-3): 1808-1810; Volume 2 (Section 4): 1829.

Sengupta, I. N. (1992). Bibliometrics, informetrics, scientometrics and librametrics. Libri, 42(2):75-98.

Sosińska-Kalata B. (2013), Obszary badań współczesnej informatologii (nauki o informacji), *Zagadnienia Informacji Naukowej* z.2, p. 9-41.

Šercar, T. (2000). Toward an assessment of Bozo Tezak's contribution to the development of Information Science, *Invited Conference Paper*. Retrieved from http://home.izum.si/cobiss/cobiss_obvestila/2000_2/Html/clanek_01.html.

Tell, B.V. (1965). A Swedish Course in Scientific Information Transfer and Retrieval. *In* Proceedings of the 31st Meeting and Congress of the International Federation for Documentation, in cooperation with the American Documentation Institute, Washington, D.C., U.S.A., October 7-16, 41-47.

Težak, B. (1969). Introduction. *Informatologia Yugoslavica*, *1(1-4*), 1-2.

Williams, M. E. (1987/1988). Defining information science and the role of ASIS. *Bulletin of the American Society for Information Science, 14*(2), 17-19.

Wellisch, H. (1972). From Information Science to informatics: a terminological investigation. *Journal of Librarianship*, 4(3): 157-187.

Wersig, G. and K. H. Meyer-Uhlenried (1970). Versuche zur Terminologie in der Dokumentation III: Dokumentation. *Nachrichten für Dokumentation*, 22(1): 14-19.

Williams, R.V. (1997). The documentation and special libraries movements in the United States 1910-1960. *Journal of the American Society for Information Science*, *48(9)*,775-781.