The database industry in Catalonia: a ten year overview[1]

MARIA JOSEP RECODER*
ERNEST ABADAL**

Abstract Reviews growth in database production in Catalonia (ASCII, videotext, CD-ROM) over the past decade, with particular attention to the level of development, classification of producers, distribution, users and language. Examines the principal problems affecting the Catalan context: the lack of an information and documentation policy, deficiencies in distribution of databases, the special situation in telecommunications, insufficient financial resources and the lack of specialized personnel.

1. Introduction

All over the world, the electronic information[2] industry is experiencing spectacular growth that is particularly due to the rapid advances in the underlying technology (computers, telecommunications and optical technology) and to the growing demand for this type of product by its users (business, public agencies and individuals), who find in electronic information services the solutions to problems such as:

* the need for physical space in which to store information
* the difficulties in finding specific information quickly and precisely when needed
* the need to obtain information that is constantly updated

* Universitat Autònoma de Barcelona (Autonomous University of Barcelona)
** Escola Universitària "Jordi Rubió i Balaguer" de Biblioteconomia i Documentació ("Jordi Rubió i Balaguer " University School of Librarianship and Documentation)

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2. We understand by electronic information those information services that are stored and distributed using magnetic or optical supports and later read by computer (Abadal/Recoder, 1991: 13).

* obtaining profit from one's own information (i.e., generated by a company or institution), that might be useful to others who are willing to pay for it.

Although this study is limited to the geographical area of Catalonia, in referring to electronic information or the database industry it is necessary to keep in mind certain market characteristics that affect its development all over the world. These characteristics are:

- The electronic information market encompasses the world's industrialized countries and all those interested in obtaining information. National borders have no significance because telecommunications permit someone in Catalonia to receive information directly from databases located in Italy, Japan or Canada.
- Information is obtained for a fee, but prices are subject to free competition and each producer-distributor can set prices considered appropriate.
- Generally, each database distributor (host) advertises the type of information offered so that potential users know what they are getting. Furthermore, the contents of each database can vary, not only in the subjects treated but also the amount of information offered on each subject (databases can be bibliographic, factual or full text).

The last ten years have been of fundamental importance for the database industry in Catalonia, just as they have been for the evolution of other aspects of the Catalan library and information environment. Regarding our specific topic, we shall consider only the three types of databases best known today and of importance in Catalonia:

- The ASCII[2] and videotext online databases share the common feature of transmitting data over telecommunications networks, but differ in several ways, both technically and in content. This affects the type of public receiving one or the other.
- CD-ROM databases that use laser technology to engrave information on an optical support.

While there has been considerable growth in this sector in the United States, Japan and Western Europe, the same cannot be said of Catalonia, due to a series of factors that will be referred to in this article and may be summarized as follows:

* lack of a policy on information and documentation
* deficient distribution of databases
* deficient telecommunications infrastructure
* lack of financial resources in organizations interested in creating and distributing databases.
* lack of training of specialized personnel.

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2. This is the name by which the first databases that appeared in the early 1970s in the USA are known. They are thus distinguished from videotext, which are also databases and transmitted through telecommunications networks, althought they each have distinct technical specifications.

2. Database production in Catalonia during the 1980s

2.1. Comparative description of the sector

Few research studies have taken an inventory of the databases in Catalonia. We are using data presented in the paper by Pepa Piñol and Isidre Canals[3] (1986) and from the book by Ernest Abadal and Maria Josep Recoder (1991). It is possible to make a quantitative evaluation of the growth in this sector on the basis of the information they provide.

In tracing the sector's origins in Spain, it is worth recalling that the first telecommunications centers began operation in 1973, and the first ASCII databases were created in the early 1980s (1980-83). Videotext did not begin its experimental phase until 1982, on the occasion of the World Cup football games held in Spain that year. It was not until 1989, however, that expansion of videotext was promoted, and consequently the creation of specific databases by public agencies and private companies. Finally, it was not until the end of the decade, in the period 1989-1991, that the first products in CD-ROM format were produced in Spain.

Catalonia's situation is closely linked to this generic framework, and is only now in the early stages of these three options (ASCII, videotext, CD-ROM). Nevertheless, videotext is a significant presence in Catalonia (number of databases, producers and distributors), far ahead of the ASCII and CD-ROM formats.

Table 1. The database industry in Catalonia
Comparative figures 1986-1991

	ASCII		Videotext		CD-ROM	
	1986	1991	1986	1991	1986	1991
No. databases	22	37	1	95	–	1
No. producers	*[4]	15	1	80	–	1
No. distributors	*	9	1	23	–	–

As can be seen, this five year period witnessed considerable growth in the creation of ASCII databases. The percentage increase was on the order of 90%, although the criteria for the inclusion of databases in the Canals-Piñol inventory were not as strict, since they also included databases of exclusively internal use.

3. This paper, although not offering a complete description of the existing databases, makes a very lucid analysis of the present situation.
4. There is no exact breakdown on number of producers and distributors.

In the case of the videotext databases, though, the increase was spectacular. This expansion has been quite recent, getting off to a timid start in 1987 and becoming especially pronounced beginning in 1989. If the current figures are compared with those of Canals-Piñol, the difference is abysmal:

Table 2. Videotext databases in Catalonia

	Catalonia	Spain
1986	1 (Barcelona-Informació)	?
1991 (March)	70	118
1991 (September)	95	210

The increase of videotext databases in 1991 was enormous throughout all of Spain, too, going from 118 databases in March, 1991, to 325 in November of that year, shortly before this article was submitted.

Among other reasons, this can be explained by the push given by the Spanish telephone company, Telefónica de España, S.A., to this telecommunication service; the decreasing cost of a videotext terminal or a board to adapt a personal computer, and the start of operation of the 031 and 032 dialup services, permitting fee based consultations. A further potential influence in the use of videotext is the ability, since October of 1991, to connect with 036, the French "Teletel" system that "hooks" more clients, since France is the world's leading country in the number of videotext databases.

In the case of CD-ROM, it must be realized that in 1986 it did not exist as the fully achieved reality it is today. The first world prototypes had just appeared that year and this format was in an even more embryonic stage of development than videotext. That is why it is not possible to make any kind of comparison. Growth has been very moderate in this area, though, and can in no way be compared with the two other types.

2.2. Analysis of the current situation

— Level of development

The level of development of ASCII databases is quite low numerically as well as in specific content, since they all contain very few records (Abadal/Recoder, 1991: appendices), ranging from the 200 records in an IEC databases (Courses and Fairs) to the hundred thousand contained in the BEITEC/BEDEC database. Also, their growth is very uneven.

The case of CD-ROM is even more significant, since only one optical disk has been created in Catalonia. Called "La Llum", it is a catalog of the lamps produced by the Barcelona Design Center Foundation, which plans to produce other design and furniture catalogs in this format.

In contrast, there is a substantial number of videotext databases in Catalonia. Of the total 210 videotext databases in Spain in September of 1991, 95 were produced in Catalonia — 45.2% of the total.

— The producers

Table 3. Origin of producers

	ASCII	Videotext	CD-ROM
Public agencies	7 (46.6%)	15 (18.7%)	–
Non-profit institutions	7 (46.6%)	8 (10%)	–
Private sector	1 (6.8%)	57 (71.3%)	1 (100%)

With the exception of the single database on an optical disk, there is a larger number of databases than of database producers, indicating there are producers with a certain degree of specialization in the creation of databases.

One of the most active information producers is the Generalitat, the autonomous government of Catalonia. In many cases, moreover, the producers are agencies with ties to the public administration, e.g., the Catalonia Statistics Institute, the Department of Culture, the Parliament of Catalonia, and the Center for Mass-Communication Research (ASCII databases) and in the case of videotext, a number of city councils.

As shown in Table 3, 93.2% of the producers of ASCII databases are either public agencies or non-profit organizations. Thus, they are preparing the data more as a service to the country rather than as a profit making information business. The same may almost be said of the sole private company, Alcatel (in conjunction with the 1992 Barcelona Olympics Organizing Committee, COOB92), which created a large number of databases related to the Barcelona Games as one of the sponsoring companies. We believe this absence of private companies in the sector is one of the explanations for the lack of development of this segment of the electronic information industry in Catalonia.

In the case of the videotext databases, it is often the case that the producers also serve as distributors of the information, although this is a situation more frequently found in the private sector than in the public agencies, although there is a little of everything. At present, videotext is mainly being used to offer information

services to the public, and as was noted there has been a considerable increase in the number of databases. The principal services are providing information on municipal and university related subjects, along with information of interest to tourists and leisure activities (restaurants, cultural events), and also information useful in a work-related context (the BOE —a legislative bulletin—, economic data), which are beginning to charge for information.

Private sector businesses become interested in this area when it becomes possible to profit from information provided. An accurate reflection of this is the fact the 71.3% of the videotext databases have been produced by private companies, while only 28.7% are public agencies or non-profit organizations.

— The vendors

As noted previously, the lack of a consolidated vendor is one of the serious problems confronting the ASCII databases. In the case of videotext, there is also a large number of service centers. One of the service centers with the largest number of databases in Spain, Telecom Vallès, is located in Catalonia. However, many of the service centers limit themselves to distributing only the information they produce.

For the optical disks in Catalonia, there are several businesses providing technical assistance for the production of CD-ROM (e.g., Micronet for "La Llum"), and also distributing, promoting and selling both Spanish and foreign optical disks (e.g., DOC-6).

— The users

Those consulting the CD-ROM and ASCII databases share a similar profile, since they are professionals searching for specialized information that helps them in their work and research. Videotext, on the other hand, because it is simple to use and the information is free, is aimed at the general public wishing to obtain information, entertainment or handle transactions and communications via this format. The fact that there are fee-based services using CD-ROM implies the appearance of more specialized users (from the business sector, in particular), who are willing to pay in order to obtain information that will be of benefit to their work.

In the Catalan case, at present the users' problem does not consist of the price of the information, but rather in finding the needed services via videotext. In the case of the ASCII databases, it is the difficulty in consulting the Catalan databases. The fact they are not online constitutes one of the fundamental problems delaying expansion in this sector.

— Language

English is without doubt the dominant language of the ASCII databases, and also of a substantial proportion of the optical disks marketed from abroad. As the language of science used in the majority of cases (conferences, articles, abs-

tracts, journals), English has also become predominant in the world of electronic information, and not just in North America but also in the majority of European countries producing some of their databases in English as well as in their own language (Abadal/Recoder, 1991: 75-83).

With videotext, on the other hand, each country uses its own language since the information is aimed at a mass audience wishing to obtain information in the native language. This is not as much the case with the "professional" users of the ASCII or CD-ROM databases, who realize that English will be the most probable language of the bibliographical references or statistical data provided.

In Catalonia there is a notable use of Catalan, in both the ASCII and videotext databases. The reasons may be the large number of institutions involved in database production, which makes it possible to select the native language as one more way to achieve cultural normalization. With videotext, it may also be because many are in Castilian as well as Catalan, in order to simplify access for those from other parts of the Spanish speaking world.

3. The Catalan context and its problems

3.1. Lack of a policy on information and documentation

The underdevelopment of the database industry in Catalonia and the rest of Spain in comparison with other Western countries is in part due to the absence of a policy to promote the information and documentation sector. Such promotion could be provided through the legislative process, passing laws and setting out directions for action, or through practical measures such as the creation of official agencies that would work toward achieving growth in the sector. Unfortunately, however, and as we shall see below, the rate of activity in these two areas is quite slow.

3.1.1. Promoting databases from the public sector

The right to information is one of the basic rights of every individual, as is the right to an education. But while both Spain's central government and the autonomous government of Catalonia have Ministries, Councils, Secretariats and Departments to regulate, mandate and promote advances in the education of the individual from kindergarten through the university, ensuring that all citizens receive the legally required seventeen years of schooling, this same zeal is not found in regard to the right to information.

Looking into aspects of legislation covering information and documentation, and databases in particular, we discover that although there is no specific legislation in this sector, there are several elements that have had an influence on its development over the past ten years and continue to affect its future. Furthermore, legislation on the creation and/or operation of databases corresponds to the cen-

tral government, as jurisdiction in this matter has not been transferred to the autonomous governments. Some of the more important elements are:

a. The "Law on the Organization of Telecommunications" (LOT) and the regulations issued in the area of telecommunications. Legislation on the infrastructure and development of networks is basic for the growth of electronic information services.
b. The National Plan for Research and Development. In 1989 a "National Program on Information for Scientific Research and Technological Development" was created within the "National Plan for Scientific Research and Technological Development" (PLANICYT). The Program was to support the research activities included under the National Plan and one of its main objectives was promotion of the production, maintenance and distribution of the databases that would disseminate knowledge of the documentation produced in Spain. This Program approved various projects, the majority of which focused upon the creation of databases by sectors.

The same thing occurs when we examine the organizational structure responsible for promoting documentation and scientific information. The lack of a clear organizational chart has had a negative effect on its development. We thus find that there is no Ministry or Council dedicated to information and documentation, and instead there is a veritable scattering of official agencies related in one way or another to this area. In general, the clearest jurisdictions are those covering libraries and archives. This is not the case in the field of documentation, and even less so for databases.

In Catalonia we also find that it is the library field where activities are the clearest (Library and Bibliographic Heritage Service within the Department of Culture). In contrast, activities for the production and distribution of databases are also found to be scattered across other agencies under the Generalitat, such as the interdepartmental agency CIRIT, the Catalonia Institute for Statistics (IEC), and the General Administration for Universities. (In addition, there is a "Central Service for Information, Communication and Documentation" in the General Administration for Interdepartmental Affairs within the Department of the Presidency).

Nevertheless, the Spanish government has been concerned with promoting proposals for action on policy. The various agencies involved have called together experts on the subject in order to design the basic outlines for action in the field of documentation and scientific information. Although their observations have been interesting, their practical utility is more debatable because the rigidity of Spain's administrative structure and the scattering of jurisdictions among the various Ministries have made it difficult, if not impossible, to carry out the proposals for action.[5]

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5. Some of these reports: "Esquema para el pre-planeamiento de un Servicio Nacional de Información Científica y Técnica" (1968) by Carlos V. Penna and L. Sánchez Belda.
- "Informe OCDE" (*Examen de la política de información y documentación científica y tecnológica*, 1974)

More recently, the past decade saw the appearance of guidelines for a national action plan, the *Directrices para un plan nacional de actuación 1983-1986 en materia de documentación e información científica* in 1983, prepared by a commission of experts organized by the State Secretariat for Universities and Research under the Ministry of Education and Science. This was an information policy document whose objective was to present the status of the information and documentation sector in Spain and propose courses of action to improve it. The Commission on the Plan was divided into eight working groups coordinated by the General Office for Documentation and Scientific Information. One of the groups dealt with the creation and distribution of databases. The Plan was distributed to a limited extent, appearing in two volumes containing the reports on the sectors and all the recommendations made by the working groups.[6]

Documents as broad in scope as the above Plan have not yet been prepared in Catalonia. However, mention should be made of the report by the Catalonia Association of Industrial Engineers written in 1978 by M.T. Abella and P. Piñol. This report, titled *La informació i documentació científica i tècnica a Catalunya*, presented a view of information and documentation planning in Catalonia. Mention can also be made of the report, *Informació i documentació: INFODOC 1989-1992*, which gives the basic, specific actions that need to be taken for Catalonia to be able to advance in the field of documentation. This proposal for research programs, along with nine more, was presented from Catalonia by CIRIT to the Interministerial Commission on Science and Technology for inclusion in PLANICYT.[7]

What is worth noting about INFODOC regarding this subject is that it emphasizes the need to take action on the creation, maintenance and operation of Catalonia's own databases, e.g., one that would encompass all scientific activity of a multidisciplinary nature carried out in Catalonia, and also the preparation of other specialized databases.

Catalonia has some unfinished business in regard to the preparation of a policy on documentation and scientific information. Up until now, a great deal of attention has been given to fields such as libraries, but decisive action encompassing the entire electronic information industry is needed.

3.1.2. The most important promotional agencies.

Although it does not have research organizations such as the Higher Council

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– "Informe ASLIB" (*Líneas directrices para un plan nacional de actuación en materia de servicios de información y bibliotecas 1979-1981*) of 1978.

6. The other working groups studied: primary publications; scientific and public libraries; training of specialists; research in information; raising awareness of the use of information; organization of information and documentation in the Autonomous Communities.

7. In this way, an attempt was made to develop and comply with Article 6 of the Law on General Promotion and Coordination of Scientific and Technical Research (Law 13/18 1986), which designed the mechanisms for cooperation between the central government and the Autonomous Communities in the area of scientific research.

for Scientific Research (CSIC), Catalonia had a very important agency, the Catalonia Consortium for Information and Documentation (CIDC), notable not only for the promotion and introduction of databases in Spain, but also for the training of specialized personnel.

CIDC was a result of the creation of the Documentation Center of the Joint Commission for Statistical Coordination in Barcelona in 1972. Its aims were, basically, to encourage greater cooperation in the information area among the various Catalan administrative bodies, and assist in the setting up of advanced information technology in order to improve efficiency in the field of information and documentation.

In 1987, the Parliament of Catalonia passed the "Law on Statistics", thus permitting the transfer of CIDC's statistical operations to the Catalonia Institute for Statistics (IEC), which became effective in 1990 when it was affiliated with the Generalitat's Department of the Economy and Finance. The Catalonia Institute for Statistics specializes is territorial statistics and planning. It has a Department of Documentation and Information and has carried out a pioneering task in the production and distribution of databases. Its most notable functions are: promoting the use of databases; studies and publications on the use of databases in Spain; relations among professionals in the sector; training courses and seminars. Unfortunately, at present the Department of Documentation is losing importance within the IEC, and it is only possible to find isolated projects in the field of information and documentation.

The Interdepartmental Commission on Research and Technological Innovation (CIRIT) would be another of the agencies that could aid in promoting the revitalization of the electronic information sector. CIRIT was created ten years ago for the purpose of promoting, improving and coordinating the activities carried out in Catalonia to support research, in accord with the decisions taken by the Generalitat of Catalonia. Although its area of action is limited to Catalonia, it maintains relationships with the scientific communities of the historically Catalan areas of southern France, Valencia and the Balearic Islands. CIRIT is the coordinating entity of Catalan science and technology and has filed a petition to have the central government's Law on Science declared unconstitutional, considering that the Generalitat has complete jurisdiction in all areas of public policy and does not have to abide by the central government's directives in this field. Electronic information in Catalonia falls within this area of the promotion of scientific activities, and has not been a sector receiving very much attention. Perhaps this is because of the lack of resources, human and financial, and the unresolved conflict with the central government, that CIRIT has, up until now, has spent its time patching up holes rather than establishing priorities for various fields.

3.2. Deficient distribution of databases

Another of the problems hampering growth of the database industry in Catalonia is the lack of a well established distributor. At present, only the Catalonia

Institute for Statistics is acting as a genuine database host, even though this is not its function. Knowledgeable people in the sector (Baiget, 1989) believe that if there were a database distributor that was multidisciplinary in character, had sufficient financial resources, a good computer system and specialized personnel, it would be able to market the databases produced in Catalonia and Spain effectively.

The IEC has been working on the "Spanish Online Database Distributor Project" (DEBDO), which is subsidized by the STAR program under the European Economic Community's General Directorate XIII (Telecommunications). The research phase ended in the fall of 1991, and encompassed the preparation of a report on the technical, financial and legal aspects of distributing online ASCII databases in Spain together with a pilot project involving actual users, training and promotional activities. The Catalonia Institute for Statistics has worked on this project. The results of this study may help indicate a direction in which to move toward potential ways and means of solving this problem.

3.3. The telecommunications situation

The telecommunications market in Spain is on a level with the most advanced countries, providing the latest services carried over support networks such as the telephone switching network, Iberpac and Ibercom networks, and the Digital Integrated Services Network. These networks are used for data transmission and carry information stored in databases to the end user.

Despite the above, however, it is actually the case that telecommunications have also constituted an important obstacle to the consolidation of electronic information in our country. The problems lie in that connections with the databases are degraded by noise, interruptions and saturation of the networks. This is much like the case of normal telephone communication, where all too often it is exasperating to try to contact someone in the same city during office hours on any workday.These telecommunication problems mean that even when a database can be consulted online or on CD-ROM, many users choose to purchase an optical disk reader and subscribe to the disks they are interested in. That way, they do not have to "suffer" the problems of getting into the network and can offer better service to their end users.

3.4. Insufficient financial resources

There is also another factor that can be decisive when the time comes to take the decision referred to earlier —money. There are organizations and businesses in Catalonia that are interested in receiving electronic information but their budgets are limited. This means they must carefully calculate how to allocate their funds and sprovide the best services to users. Optical disks are by no means cheap, but it is always possible to drop the subscription if there is no money that year.

Those buying and using databases are not the only ones with financial problems, however. Potential producers experience them, too. Businesses and institutions may not have the necessary capital available, or be forced to do a lot of thinking before throwing themselves into the adventure of creating a product in CD-ROM format (e.g., Enciclopèdia Catalana and Planeta), because if the product does not sell well it can mean financial disaster (the case of the *Diccionario de medicina* published in CD-ROM format by Editorial Marín). Potential producers may also feel a little intimidated by the other deficiences in the Catalan environment.

3.5. Lack of specialized personnel

Training in computerized information retrieval, or documentation, is scattered across the various levels of programs in information science and documentation in Catalonia. At the university level, there is the "Jordi Rubió i Balaguer" University School of Librarianship and Documentation (University of Barcelona), the Faculty of Mass Communication (Autonomous University of Barcelona), where *Documentation* is taught as a second-year course, and the Diploma in Management and Public Administration (University of Barcelona and Pompeu Fabra University), both offering a course in *Administrative Documentation*. With the new programs of study that are to be available in the near future, courses in the Area of Librarianship and Documentation will be offered in the licentiate degree programs in Journalism, Advertising and Public Relations, Audio/Visual Communication, Political Science, Translation and Interpretation, and the Diploma in Management and Public Administration. The specific programs will be concentrated in the new diploma in Librarianship and Documentation (already approved) and the anticipated licentiate degree in Documentation.

There has not been much experience at the level of the Third cycle. The broadest is the Master's in Online and Compact Disc Documentation (MASDOC), organized by the Center for the Study of Patent Documentation (CEDP) in conjunction with the University School of Librarianship and Documentation of Barcelona and SOCADI. This program trains professionals specialized in selecting and searching databases. The official degree for this postgraduate course is granted by the University of Barcelona. Despite its applied character, the Course of Specialization in Medical Documentation may also be mentioned, organized by the Autonomous University of Barcelona's Area of Documentation and the Documentation Service at Sant Pau Hospital.

There have been some notable experiences outside the university context, such as the Course in Documentation Systems for Business. This is organized by the Catalan Institute for Technology and has been offered for the past eight years; also, the Postgraduate Course in Information and Documentation or the Course in Computerized Documentation, both organized by the Casp School of

Documentation. The continuing education courses periodically offered by the two Catalan professional associations (COBDC and SOCADI).

There is, however, an excessive dispersion of types of courses and contents, as well as the lack of specialization in database design and creation. This often means that it is hard to find well trained personnel, and on the job specialization is quite frequent.

4. Conclusions

Since information has become a strategic weapon and ownership of this information is at the source of a growing conflict, worldwide in scope, between governments and the private sector, it is essential that each country fight to promote its own databases.

It is in this sense that we believe that the Generalitat must promote, through regulations or the creation of its own agencies, the creation and development of databases in Catalonia that reflect the status of scientific production in the country and can be distributed around the world. This must be accomplished within a policy framework that integrates the sector's various facets and provides legislation appropriate to the needs of electronic information.

The problems in telecommunication must also be resolved, and the lack of access to the entire range of Catalan databases (online connection is required, along with the ability to search them from any location), in order for this industry to take off. You should not have to go to the source of the database in order to obtain information, but be able to receive it online and easily.

In sum, we note that an electronic information industry does not yet exist in Catalonia. Something has to be done to energize a sector that is capable of generating a large amount of money and belongs among the advanced European information-based industries. This is a task for public agencies and the documentation professionals.

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