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Whither Information Science in France?

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Abstract

Information science (IS) in France forms part of an inter-discipline named 'Information & Communication Sciences' (ICS), officially recognized as an academic discipline in the French higher education system in 1972. There is a diffuse belief among its academic community that the Anglophone conception of IS is very different from theirs because it is supposedly rooted in Shannon's mathematical theory of communication while the French conception is more rooted in the social sciences and humanities, owing to the literary origins of its founding figures (Robert Escarpit, Roland Barthes, Jean Meyriat). However, a review of the international literature shows that there are no profound distinctions in theories and paradigms underlying research in IS whether undertaken by French or by Anglophone researchers. The differences that do exist are surface level, due mainly to political and institutional factors.

These factors also account for the poor state of IS in France today. Indeed, the institutional recognition and development of the field was not grounded upon the foundational works of the pioneers of documentation and IS in the late 19th and early 20th centuries (Paul Otlet, Henri Lafontaine, Suzanne Briet).

Another factor which has had a lasting impact on the French IS landscape were the inconsistent government policies implemented from the early 1970s till the late 1990s which led to a narrowing down of focus of IS to Scientific and technical information (STI) only, thus orienting the field towards a technological agenda. This in turn affected the direction higher education training and research took in the first three decades.

Finally, but not the least adverse factor, the cohabitation of IS with communication science in the same inter-discipline has made it more difficult for the former to affirm its identity and exist as a recognized academic field in France.

A word on methodology

Our study is based mainly on literature reviews and on our personal knowledge of the field's dynamics. Haven first been a PhD student in the early nineties, then an associate professor since the late nineties, we have had the chance to witness first-hand how the field is evolving in France. This paper is also a contracted and modified version of two publications to appear (Ibekwe-SanJuan 2012a and Ibekwe-SanJuan 2012b).

1. Information Science as an instrument of the cold war era

Palermi & Polity (2002) and Salaün (1991, 1993) gave accounts of how the French IS landscape was shaped in its first two decades of existence (1974-1994). We will update these studies to the current period (2012) and look at other criteria such as governance and research assessment which have become significant factors in shaping the landscape and future of IS in France.

Information science (IS) as an academic discipline emerged officially in many western countries in the period following WWII. IS was seen by many governments (USA, France, Germany, UK) as a strategic tool with which to gain scientific, technological and military supremacy.

Fayet-Scribe (1997) observed that *“After the end of World War I, in fact, there was an awareness in France of the necessity for a national effort in the realm of what we now call technical and scientific information. Thanks to its wealth of bibliographies, German science had created a monopoly situation, and closure of the borders had halted the flow of publications, a penury that brought home the importance of access to information (Gablou, 1991).”*

Indeed, scientists, especially chemists, enjoyed privileges in the period preceding the Nazi regime in Germany and some were closely associated with the Nazi's rise to power. In the United States, the launching of Sputnik in 1957 by the ex-USSR spurred the federal government to boost research on information technology. The conference on Information science held in Washington in 1958 launched IS as a field of training and research in the US. Ten years earlier (1948), a similar conference had been organized in London by the Royal Society also calling for specific efforts to handle STI, this laid the grounds for the Washington conference of 1958. Federal agencies (NSF, NHS, Library of Congress) and industries became involved in research and development of infrastructures to handle STI (Burke, 2007).

In France, the public policy on STI in the post-WWII period (1960 - up to the early 1990s) was geared towards developing national information and communication infrastructures (telecommunication networks, servers) which will enable France to

gain information independence from other nations. Several state agencies bearing the suffix "*Information scientifique et technique*" (Scientific and technical information) were created. The telecommunications, the nuclear energy industry (CEA¹) and the Defense ministry were closely involved in policy making for STI while the academic community was largely held at bay.

The competition between government agencies and expert groups tendering advice on STI policy was not helped by another political factor: the change of power at the very top of the French state brought by elections.

1.1 Impact of successive governmental policies on IS in France

Between the mid-sixties and the mid-nineties, three successive governments from different political parties governed France, each with its own ideas and “grand plan” for STI and for information and communication technology (ICT). Since these two concepts are assimilated with IS in the public's mind, the policies implemented impacted the evolution of the field in its first three decades of existence. The table below summarizes the focal points of these policies.

Period	Party	President	Information & communication policy
1959 - 1969	Gaullist	Charles de Gaulle	' <i>Plan calcul</i> ' (Grand plan for computation)
1969 - 1974	Gaullist	Georges Pompidou	Boutry report on dissemination of STI
1974 - 1981	Centrist	Valéry Giscard D'Estaing	' <i>Plan téléphone</i> ' (development of telecommunications infrastructure). The Nora-Minc report of 1978 launched the concept of “information society”, popularized by the media. Information was equated with grey petrol and energy, a precious physical matter to be transported. Influence of Shannon-Weaver's Mathematical Theory of Communication (MTC). This was also the period immediately following the official recognition of ICS as an academic discipline in the French higher education system (1972).
1981 – 1995	Socialist	François Mitterand	Focus on democratization of access to ICT, emphasis on scientific communication (publication) by the academic community. PARUSI ² program designed to boost research in information science (IS) within the ICS (Information & Communication Science) inter-discipline.
1995 - 2007	Gaullist	Jacques Chirac	From here onwards, the development of IS is governed more by the dynamics of the academic community than by explicit government policies.

Table 1. Successive government policies and impact on IS between 1960-1995.

In the reconstruction of the nation and the economy after WWII, the Gaullist³ party that ruled for fifteen years devised a “*plan calcul*” (a grand plan for computation). The “*Rapport Boutry*” of 1964 laid the foundations of a national policy on the dissemination of STI at a time when we were witnessing a growth in document production but without adequate storage and retrieval facilities. Not unlike the reaction of the US federal government following the launching of the Sputnik satellite by the ex-USSR, the Gaullist⁴ government in France saw STI as a tool with which to advance its political agenda and gain independence from the two superpowers – the ex-Soviet Union and the USA. In the post-WWII context of star wars, where countries were focused on arms building and nuclear power, the government set out to encourage the technical development of the STI sector. As Salaün (1991) pointed out, this had the advantage for the Gaullist government that it prevented any real debate since STI was presented as an issue of national sovereignty. Some of the earliest documentation centers were housed within the ministry of defense (CEDOCAR⁵) and the center for atomic energy (CEA). This signified the shift of focus from “documentation” to STI and from the humanities to technology and industry.

With the election of Valéry Giscard D'Estaing from the centrist party in 1974 came another change of policy on STI. The “*plan calcul*” promoted by the former Gaullist government was abandoned in favour of a “*plan telephone*” (a grand plan for

¹ Commissariat à l'Energie Atomique. (The Commissary for Atomic Energy).

² “Plan d'Aide à la Recherche Universitaire en Science de l'Information. » (Programme of Aid towards Scientific Research in Information Science).

³ The name of the political party built by Charles de Gaulle.

⁴ Political ideas assimilated with Charles de Gaulle's republican party.

⁵ Centre de DOCUMENTATION des Armées (The documentation center of the army).

telecommunication infrastructures). This change was made popular by the landmark “Nora-Minc” report of 1978, entitled “*L’informatisation de la société*”⁶ and destined for the president of the Republic. In this report, information was compared to energy, a resource of which the society was in dire need. Information was not being projected as something which had content, meaning and could be analyzed but rather as something which could be transported, whose volume could be measured, and whose influx can be observed. This view of information was heavily influenced by the Shannon-Weaver theory of mathematical communication which then became the basic theory of information and of IS, thus severing the links with library and documentation which until then had been the historical roots of the discipline. The progress encountered in computer science at that time made information processing more accessible. It was also in this report that the neologism “*télématique*”, a contraction of “*télécommunications*” and “*informatique*” (informatics) was coined. Salaün (1991:15) observed that “*With this report, information gained a higher status and acquired its “lettres de noblesse*”⁷”. However, its role was never clearly defined. The telecommunication industry which, owing to its development of telephone lines in rural France, suddenly became a prominent actor in the information sector in the late seventies, entertained the confusion between informatics and information. Databases, servers and big documentation centers were being compared to grey petrol (*pétrole gris*). Information was being assimilated with informatics and “*telematics*” and presented as a means to overcome the economic depression of the mid-seventies. Hence, information became an industry and the term ‘Information Society’ (*société de l’information*) became popular and “*passé partout*”⁸ from the 1980s.

The arrival of the socialist government to power in 1981 with François Mitterand as president of France signaled yet another change in focus. Efforts were deployed towards the democratization of informatics and towards scientific communication. Jean-Pierre Chevènement, the then socialist minister of research and industry, convened a national conference in 1982 with the scientific community where the publication of scientific results became an obligation for the first time.

The PARUSI plan was devised by the government to try and balance the “*rapport de force*”⁹ between information science and communication science within the new inter-discipline of “information and communication sciences” (ICS) but as history has showed, it failed.

The fact that governmental policy on information was reduced to an instrumental and technical approach was also due to a small group of influential men from the sciences who were the thinkers and implementers of these policies such as Pierre Aigrain (nuclear physicist), Jacques-Emile Dubois (chemist) and Jacques Michel (chemist). Efforts were made towards creating bibliographic databases in physics and chemistry in order to gain independence from the American monopoly in these areas (Chemical abstracts, Inspec).

The inconsistencies in policy owing to power shifts affected the epistemological and conceptual emancipation of the field negatively. The result, as Palermi & Polity (2002) aptly observed, was that management of the IS sectors by the different French government displayed an unfortunate characteristic trait of the French administration: “*a jacobine*”¹⁰ *centralization, a policy of “pré-carré” undertaken by the different government agencies and a general absence of coordination between the different government bodies*”.

IS was delivered to special interest groups who influenced government policies for about forty years.

1.2 Impact on professional associations

Fayet-Scribe (1997, 2000), and later Palermi & Polity (2002) had observed that before WWII, library and documentation associations enjoyed a fruitful collaboration. Historic figures like Suzanne Briet, Eric and Georgette de Grolier were first librarians who became interested in other means of accessing bibliographic contents and making written material accessible to end users. They thus promoted the emergence of documentation from the more conservative and elitist librarianship¹¹. They were instrumental in effecting a “*rapprochement*”¹² between the two professional bodies – librarians and the new documentalists. Despite their efforts, a breach appeared between librarians and documentalists in the post WWII period regardless of the fact that both professions had common roots and relied on the same fundamental concepts for designing and maintaining knowledge organization systems. The cause of the breach is institutional: librarians are state-employed civil servants, trained by special schools. They are guaranteed a job placement after their graduation whereas documentalists are technicians destined to work in the private sector.

⁶ The computerization of the society.

⁷ Its official recognition.

⁸ Became a household concept.

⁹ Power ratio or power share.

¹⁰ This refers to the “*concept of a centralized Republic, with power concentrated in the national government, at the expense of local or regional governments*” Source: [http://en.wikipedia.org/wiki/Jacobin_\(politics\)](http://en.wikipedia.org/wiki/Jacobin_(politics)).

¹¹ The French term for state trained and qualified librarians is “*conservateurs*” (conservatists), thus they are very reluctant to embrace changes especially those that involve relinquishing some of their protected turf to the public or to other professions.

¹² A coming closer, akin to a reconciliation.

When IS emerged as an academic field in the early seventies, only the documentation sector was somewhat associated with its constitution, thus leaving out archivists, librarians and museum curators who did not feel concerned by this academic discipline.

A similar situation has been described by Buckland (1996) in the USA. He recalled the influential role played by the Chicago School of Library in orienting the development of the field towards librarianship rather than to IS in the mid-20th century. Williams (1997) also alludes to the rivalry between the American Library Association (ALA) and the Special Libraries Association (SLA) movement (the American counterpart of European documentation) in the 1930s-1960s. SLA finally lost the battle to be recognized as a distinct profession with special needs in training and in services to the public. The reason was that they were not proactive enough in the face of technology and in subject indexing despite the fact that a figure like Mortimer Taube, father of modern indexing techniques, was a prominent member of SLA. The so-called special librarians eventually became like general librarians. In fact, they received the same training since the ALA refused to implement specific teaching curricula in library schools for SLA (Williams, 1997).

1.3 Impact on higher education training

Unsurprisingly, the incoherent government policies trickled down into the higher education system. Although, training programs for librarians, archivists and documentalists existed prior to the emergence of the ICS discipline, they were not integrated into the emerging IS field.

Up until the year 2000s, it was difficult to find complete curricula in IS, i.e., going from undergraduate through graduate and post-graduate studies. Most IS diplomas are technically-oriented. The “Diplôme Universitaire de Technologie” (DUT) is a two year undergraduate diploma delivered by Institutes of Technology¹³. Some universities offered a one year Masters’ degree course to students holding a Bachelor’s degree in any other discipline. The earliest of such one year Master’s degree was created in Grenoble in 1970 (*Certificat de maîtrise d’informatique et documentation littéraire*) and in Bordeaux in 1971. Bordeaux was also one of the rare universities to offer a complete university degree in ICS, going from undergraduate to post-graduate and doctoral studies (Tétu, 2002). Before the emergence of the ICS inter-discipline, IS courses were typically hosted by humanities departments (Literatures, History, Arts, Languages).

Higher education curricula in IS are mostly focused on producing information professionals for the private sector. These professionals (mainly documentalists) in return make up of half of the teaching staff as adjunct professors, who bring the ‘on-the-field’ experience for future professionals.

The results are rather unfortunate in terms of educational coherence and epistemological emancipation: IS was saddled with bits and pieces of courses gathering students from other disciplines. Each training was constructed as a beginner course in some IS specialty (Palermi & Polity, 2002). However, this is not unique to IS in France. In other countries, it is also common for IS scholars to have majored in some other discipline before joining the field. This can foster interdisciplinary approaches but more often, constitutes a barrier to communication as we do not have the same conceptual approaches to common research problem nor do we employ the same terminology.

Under pressure from the Bologna process¹⁴, the French ministry of education instigated a series of reforms to put France’s higher education structure in conformity with the European system. This gave rise to the L-M-D¹⁵ reform put in place since 2002 which aligned all higher education degrees so as to fall into the three levels ‘Graduate-Masters-Doctorate’. The Institutes of Technology (IUTs) are still in place and delivering the two-year undergraduate technical diploma to students who afterwards have to apply to a university department to pursue a third year in order to obtain their bachelors’ degree and from there go on to a two-year masters’ degree.

As IS rarely exists alone as a distinct specialty in its own department, it is difficult to say how many courses or departments offer courses in IS in France. With the notable exception of the ENSSIB¹⁶ in Lyon which is really a school for librarians, and the INTD¹⁷ in Paris, there are no such things as “Schools of Information Science” (iSchools) in France.

2. Influence of the systems-oriented paradigm in information science

The consequence of the instrumentalization of IS by the successive government policies was that IS was seen as a field

¹³ Institut Universitaire de Technologie (IUT).

¹⁴ A series of agreements signed in 1999 in Bologna aimed at aligning the European Higher Education system in each member country. More details at http://en.wikipedia.org/wiki/Bologna_Process.

¹⁵ Licence-Master-Doctorate.

¹⁶ Ecoles Nationale Supérieure des Sciences de l’Information et des Bibliothèques.

¹⁷ Institut National des Techniques Documentaires.

whose aim was to find technological solutions for processing STI. Salaün (1993) described this shift of focus from bibliography and documentation to STI in the following terms: “*Whereas at the beginning of the century, our forebears clung to the prefix “biblio-”, thereby emphasizing that a pluridisciplinary analysis was being applied to documents, the abuse of suffixes ending in “STI” heralded a technocratic approach and a change of object. The result was not the building of a science but of (infra)structures, which dealt not with documents but with information*¹⁸.”

Moreover, the precise nature of STI which was to be the focus of the new field was never clearly defined although it seemed to be mostly limited to “documentary information”, i.e. units already extracted, analyzed and entered into databases which have acquired a certain degree of autonomy from their source (context of creation). Organizing documentary information became the *raison d’être* of IS, hence the field was seen first and foremost as serving the scientific community. The technological development of the field (databases, indexing and storage techniques) was not accompanied by a conceptual and epistemological study on the field’s objects, paradigms and methods.

2.1 The transition from manual bibliographic analysis to formal content analysis: 1950-1970

In order to fully account for the current state of IS in France today, it is necessary to look at the figures which made the transition from the pre-mechanized era in which Paul Otlet, Henri La Fontaine and Suzanne Briet’s worked; and the era of mechanization (automation), which dates roughly from 1950 upwards.

We owe this transition to a group of researchers mostly from the CNRS¹⁹: mainly Jean-Claude Gardin, Eric de Grolier and Robert Pagès²⁰. Their works signaled a shift in focus, from the form or container (documents, books) to the contents (indexing and retrieval). The study of the former was relegated to library economics (*bibliothéconomie*) and to librarians, while the latter was the hobby-horse of the new batch of scientists with a more formal background.

Robert Pagès and Jean-Claude Gardin were social scientists faced with knowledge organization problems in their own disciplines. Eric de Grolier was one of the transitional figures to hail from documentation.

Pagès (1955) was critical of the logic underlying universal classification languages (Otlet’s Universal Decimal Classification (UDC) and Dewey’s Decimal Classification (DDC)), whereby objects are only seen from one dimension. He advocated an *n*-ary dimensional analysis of contents (documents). He saw “documentation” as a larger specialty subsuming library management because the latter was about books whereas the former was about documents, a category that subsumed books. Pagès wanted to study the relation between documents, books and experiences and called for the introduction of psychology into the study of documents. His idea was that documents are made of signs and symbols that are subject to interpretation. These symbols acquire meaning outside of their context of production. Thus a document is an instrument for accumulating symbolic activity. He studied other types of symbols like mathematical language and advocated the grounding of documentary classification languages on a formal scientific basis. This led him to create an analytic representation code for documents called “coded analysis” (*analyse codée*) or CODOC, which went into operation in 1954. The CODOC system was inspired by the functioning of natural language, symbolic logic and algebra. The idea was to design an extensible grammar and a lexicon that would enable the creation of new and unexpected classes, thus giving an infinite possibility for subdivision while being easy to memorize (mnemotechnical faculty). However, the result was an artificial language for indexing and classification that was inhospitable to memorization. Pagès worked on the normalization of specialized classification languages. Clearly, for Pagès, the focus was on analyzing and retrieving content, not organizing books. His idea of the nature of a document was not far removed from Briet’s own wide conception.

Jean-Claude Gardin (1964) was a versatile scientist who majored in political economy, history of religions, linguistics, and archeology. He was confronted with the problem of sorting and comparing archeological objects referred to in scientific texts. Judging the analytic compilation of previous works to be an important component of scientific research, he sought ways to reduce their labor-intensive nature and to systematize the conceptual analysis of the contents of scientific communication. It was in this context that he designed SYNTOL (Syntagmatic Organization Language) in 1964, a sophisticated system for facet analysis, indexing, and IR.

The CODOC and SYNTOL systems share some similar traits: they were designed by two CNRS researchers from the social sciences interested in scientific information representation and retrieval. Both systems sought to provide formal languages for content representation. They signaled a shift from bibliographical analysis to content analysis. They aimed to provide a better access to contents of scientific publication by enabling a multidimensional and combinatorial approach to IR. This paved the way for research on formalisms to automate content analysis. Gardin and Pagès’s work also formed the basis for

¹⁸In the original text: “*Alors qu’au début du siècle nos acteurs s’accrochaient au préfixe biblio- pour marquer que l’on appliquait une réflexion pluridisciplinaire au document, l’abus des “-ist” témoigne à la fois d’une démarche plus technocratique et d’un changement d’objet. On ne construit pas une science, mais des structures. Celles-ci ne traitent pas des documents, mais de l’information* » Salaün (1993).

¹⁹ Centre National de Recherche Scientifique (The French National Center for Scientific Research which is the biggest research institution in the country).

²⁰ Palermi R. (2000) wrote a brief biography of these three transitional figures, which can be found at http://www.iut2.upmf-grenoble.fr/RI3/Mise_jour_06/TPS_precurseurs.htm.

some of the research on automating information systems conducted in the early 1990s by French computer scientists and first-generation IS scholars who came from the sciences.

2.2. First generation scholars and research themes: 1974-1994

One way to track the evolution of research themes in a field is to examine the doctoral dissertations defended in the field. Polity (2000) surveyed the production of doctoral dissertations in IS in its first two decades of existence (1974 – 1994). Not surprisingly, IS was not very productive with an average of two dissertations defended per year. And also not surprisingly, the author encountered difficulties in identifying doctoral dissertations that fell under the IS branch. When searching the national database for thesis, Polity (2000) found that some dissertations that should have been indexed under IS were wrongly labeled as dealing with “Sciences, techniques and applied mathematics”. There was clearly a lack of institutional and social legitimacy as well as ignorance of the very existence of IS.

In the first two decades, four universities were responsible for the majority of dissertations in IS. A team of researchers at the EHESS²¹ led by Jean Meyriat²² and Madeleine Wolff-Terroine produced the majority of the dissertations. Both figures were also prominent in the professional association of documentalists and information professionals (ADBS). The majority of the doctoral students were graduates from the INTD (National Institute for Documentation Techniques) which trained “engineers” in documentation.

The Pierre Mendès France University in Grenoble produced the second largest number of PhD dissertations in this period, under the directorship of Jacques Rouault - a computer scientist specialised in automated documentation and natural language processing (NLP). The focus of his research group (where the author of the current paper prepared her thesis) was on building a large coverage linguistic parser for the French language. The long term project of this research team was to ground automatic indexing and information retrieval (IR) tools on linguistic models. Hence, the focus was on formal language models and on information systems rather than on users or on theoretical aspects of IS.

The University of Bordeaux 3 came third in terms of number of dissertations produced for this period. They were done under the directorship of two of the founding fathers of the discipline – Robert Escarpit and Robert Estivals. The latter specialised on “*bibliologie*”²³.

The three Lyon universities came in the fourth position. Like the Grenoble group with whom they had a strong collaboration in the early eighties and nineties, the research focus in Lyon was also on NLP, IR and automatic documentation. Most of the dissertations were done under the supervision of Richard Bouché, a professor that also came from the sciences. The two campuses, Grenoble and Lyon had, for a period of time, co-accredited a doctoral program and helped trained a certain number of second generation scholars in IS who are currently professors in different French universities.

In the fifth, sixth and seventh positions were the universities of Aix-Marseille, the University of Paris 8 (Vincennes – Saint Denis) and Toulouse respectively. The dissertations in Aix-Marseille were done under the supervision of Henri Dou, an IS professor specialised on bibliometrics. Those defended in the universities of Paris 8 and Toulouse were on more heterogeneous topics and were done under the supervision of professors in computer science working on IR applications.

As was the case for graduate and post-graduate courses, students embarking on a doctorate dissertation in IS typically come from other disciplines, hence would be “beginners” in IS research with the result that “*there could not really be a progression in the content of the different diplomas and no “accumulation of knowledge”*” (Palermi & Polity, 2002).

The consequence for the epistemological maturity of a field is that IS in France has not been able to produce the much needed researchers who by accumulation of knowledge, would have helped the discipline mature its concepts, theories and methodologies.

3. The dance between a narrow and wide conception of Information science

This oscillation between the “hard” and the “soft” sciences is perceptible in the way scholars tried to define the discipline since its emergence in France.

3.1. At the beginning was a wide conception of Documentation and of Information science

The period 1950-1980 was marked by the development of information processing worldwide, and in France by the design of the first series of automated tools for content analysis and representation (SYNTOL, CODOC). However, the conception

²¹ Ecole des Hautes Etudes en Sciences Sociales (The School of Higher Studies in Social Sciences).

²² Jean Meyriat died on the 26th of December 2010 at the age of 89.

²³ The science of books.

that Jean-Claude Gardin and Robert Pagès (who authored these systems) had of 'automatic documentation' was of a social science whose roots should be grounded in the humanities.

Jean-Claude Gardin was particularly critical of the emerging fields of Natural Language Processing (NLP) and Artificial Intelligence (AI) and skeptical of the claim made by scholars therein that there could be a universal semantic representation of discourse. He argued that such methods could only work in very restricted domains with a well circumscribed terminology. History has since proved him right.

Robert Pagès was equally visionary in his defense of a 'science of documentation' that he called “documentology” which should be part of symbolic communications, grounded in the humanities and populated with “researchers-cum-documentalists”. This, in his view, would ensure that documentation would not be reduced to a set of techniques aimed at solving practical problems or functional issues. We note however that the theoretical discourse and aspirations of Gardin and Pagès were somewhat at odds with their attempts to create a formal language for representing contents in scientific publications in order to facilitate their retrieval through a computer program. The formalization of language ultimately leads to stripping it of the rich nuances which make up human language and therefore to a narrow conception of the indexing (interpreting) and retrieval processes.

The denomination "documentology" would be unsuccessfully taken up later by Jean Meyriat (1981a), one of the founding fathers of IS in France, in his attempts to find an adequate name for the discipline.

3.2 Midway came Artificial Intelligence, systems-driven paradigm and a narrow conception of Information science

Unfortunately, Pagès's vision did not come to fruition. The majority of works carried out in the IS field following the official recognition of the field in 1972 were largely rooted in the system-driven paradigms which characterized research in IR and in cognitive science. Very little space was accorded to psychology and to sociology.

The period between 1980-2000 was indeed marked by an alliance between IS, Computer Science and Artificial Intelligence (AI). Like other social sciences, IS was influenced by the wave of enthusiasm generated by AI and its promises, in the early 1970s, of automating knowledge intensive activities like automatic translation, knowledge representation and reasoning via expert systems. This period coincided on the political level with marked government policies on STI and ICT (cf. §1.1), and on the educational level with the very technically-oriented curricula offered in institutions of higher learning (cf. §1.3).

As the field of computer science grew worldwide and programs were developed to automate some human activities, the first batch of professors in IS in France who came mostly from the sciences turned to their native disciplines to borrow models and methods and apply them to 'knowledge' representation and automating documentary processes.

Also, the quest for scientific legitimacy led IS scholars to seek alliances with the hard or experimental sciences. The overarching goal was to devise technological solutions to information processing problems. Hence, the first generation scholars relied on advances in Natural Language Progressing (NLP) and statistics for automatic indexing, information retrieval, automatic translation, expert systems, bibliometrics and scientometrics; and to cognitive psychology for designing man-machine interface and studying information seeking behavior. Palermi and Polity (2002) pointed out that in the first two decades of its existence, the strategy for the development of IS in France rested on individuals rather than on a coherent scientific policy. About ten professors were responsible for the early development of IS at the doctoral and research level.

Definitions given of the object of IS in that period naturally linked it to communication science since both are merged in the inter-discipline of information and communication sciences (ICS): information was largely perceived as the tangible part of the communication act. Witness the definition given by Robert Escarpit (1991), one of the founding figures of ICS: "*Information is perceived as a product of an act called communication*". Similarly, Jean Meyriat (1981b) perceived information as the "*cognitive content of an act of communication*". Witness also the parallel between the processual definition of IS given by Harold Borko (1968) and that of Yves Le Coadic (1994), one of the first generation IS scholars in France.

Borko (1968): "*[Information science] is concerned with that body of knowledge relating to the origination, collection, organization, storage, retrieval, interpretation, transmission, transformation, and utilization of information. This includes the investigation of information representations in both natural and artificial systems, the use of codes for efficient message transmission, and the study of information processing devices and techniques such as computers and their programming systems.*"

Yves Le Coadic (1994 : 28) :"*[Information science is] the study of the general properties of information (nature, genesis,*

*effects), of processes and systems for creating, communicating and using this information.*²⁴”

These definitions bear traces of Shannon's mathematical theory of communication (MTC) and the desire to align IS with the physical sciences, hence, the conception of information as a measurable entity, or in economical terms, as a precious mineral to be extracted and transported. The "Nora-Minc" report of 1978 had set the stage for what will become "La société de l'information" (Information society) in France. The focus in this period was clearly on obtaining official recognition for the field in the academic and political circles, hence little attention was paid to questions of its underlying epistemology and to social and cultural aspects of human-information search behaviour. There was no research on public or university libraries nor on knowledge organization (classification theories, models and schemes) which had been the mainstay of bibliography and documentation in the early 20th century.

One can speak of a disconnect (*rupture*) on the one hand, between the theoretical foundations laid down by Otlet in the early 1900s, the wide conception of documentation defended by Briet in the 1950s (as encompassing all testimonies, not just scholarly documents, and under all their forms, not just written, and destined to all types of public), the social sciences aspirations of Robert Pagès; and on the other, the systems-driven paradigm which dominated IS between 1980-2000.

3.3 The return of Information science to its humanistic origins: the new wave of social scientists

As AI has largely failed to keep its promises coupled with the retirement of the first generation of IS professors who championed the system-oriented research paradigm, the dream to build large coverage parsers in order to derive semantic representations of natural language discourse vanished. The research teams championed by the first generation of IS scholars such as information processing, automatic indexing, knowledge representation and information retrieval have now been abandoned to computer scientists.

From the year 2000 onwards, IS in France is witnessing a swing back to the social science and humanistic roots of the late 19th and early 20th centuries. Yet contemporary IS scholars do not claim explicit affiliation to Briet and Otlet. Although these historic figures are known in France, their contribution to IS has not been widely recognized. The worldwide recognition which Otlet and Briet enjoy as founders of IS is largely due to Anglophone scholars like Boyd Rayward (1994) and Michael Buckland (1996) who have extensively studied Otlet and Briet's contribution to IS. Other Anglophone scholars who have popularized Briet's contribution to the emergence of documentation and to IS are Day & Martinet (2006), Maack (2004).

Although the failure of AI to keep its promises has understandably disillusioned IS scholars from embracing the systems-driven paradigm like their predecessors, a more compelling reason explains the total abandon of research in systems design to computer scientists. The dynamics of the cohabitation with communication science scholars who are several times more numerous in the ICS (Information and Communication Sciences) has compelled professors wishing to make a successful career to cast their research themes in a more social and humanistic light, so as not to go against the mainstream conception of ICS as a social science and humanities discipline.

But how is ICS defined? More to the point, is there a unique conception of ICS and what its object of study? Since ICS is a merging of two disciplines (information science and communication science) that exist separately in other countries, one can imagine that this task is near impossible. Since its official recognition and up to the present day, the definition of ICS has oscillated from one disciplinary axis to another. Definitions that revolve mainly around one discipline tend to be self-serving, aimed at legitimating the place of their authors within the field. The center of gravity at a given time, in terms of the discipline towards which ICS is leaning, depends on the "*rapport de force*" (power dynamics) within the ruling body – the National Council of Universities (CNU) for the ICS – rather than on any scientific proof of the superiority or adequacy of one epistemological approach over another. The current center of gravity is very much in favor of theories, paradigms, and methods derived from the social sciences and humanities (except linguistics) and very much in disfavor of computer science and the sciences.

Given the power dynamics within the ICS, current IS scholars in France have attempted to redefine IS in a more social science and humanistic light. IS is portrayed now as a field which concerns itself with the social and cultural dimensions of how people access, use and disseminate information and information resources. For ICS scholars, the act of communication is intentional—that is to say, triggered by humans and destined to other humans for a given goal. In this perspective, the object (or rather the purpose) of IS is to study the "*modalities and processes of this finalized communication*" and this should be done "*within a global approach, whether based on a device (tool) or on a social system*" (Fondin 2006). French

²⁴ In the original text: "*l'étude des propriétés générales de l'information (nature, genèse, effets), des processus et des systèmes de construction, de communication et d'usage de cette information.*"

IS scholars feel that this communicational approach to SI is unique to them and that it is different from the Anglophone one, seen to be mainly systems-driven. We have shown in Ibekwe-SanJuan (2012a) that such is not the case, that several Anglophone scholars also uphold a social and cultural approach to IS.

Jean-Paul Metzger (2002 : 19), one of the first generation scholars in IS who had worked on NLP models in the eighties also embraced this humanistic orientation later in his career, although he did not completely repudiate the necessity for IS to work on systems design. For him, « *information science is concerned essentially with the social elaboration and sharing of knowledge. [...] All types of knowledge are concerned, whether practical, technical, scientific, encyclopedic or other.*²⁵»

However, all these attempts to bring IS back to the humanities have not been entirely successful because they largely focus on the ontological question “what is information science?” Indeed, definitions that tent to start with “Information science is...” or “Information science deals with...” ultimately run into problems. Like communication, information is a universal and omniscient phenomenon, it transcends disciplines and professional sectors. Hence, almost any discipline can claim the right to study information from one angle or the other. Also, a little attention to the abundant literature on the history and epistemology of science quickly reveals to the reader a consensus shared by scholars across disciplines: scientific disciplines are not defined by ontological questions “what is it or what are its objects of investigation?”, but by the purposes and methods they apply to solve specific problems.

Popper (1963) reminded us that “*Disciplines are distinguished partly for historical reasons and reasons of administrative convenience (such as the organisation of teaching and appointments), and partly because the theories which we construct to solve our problems have a tendency to grow into unified systems. But all this classification and distinction is a comparatively unimportant and superficial affair. We are not students of some subject matter, but students of problems. Any problem may cut right across the border of any subject matter or discipline.*²⁶”

So until IS sets out what its objectives are and how it proposes to achieve them in a distinctive way from other disciplines, it will be difficult for it to gain recognition and acceptance from other fields of scientific inquiry.

3.4. Can IS afford to turn its back on system's design and technologically-oriented research?

What we have seen in the French IS landscape is an oscillation from one end of the spectrum (technologically-oriented IS) to another (purely humanistic one) with little or no space left to house research situated in the middle. Bates (1999) observed similar oscillations and a current swing back to the social sciences with regards to methods and theories within the Anglophone IS community.

Yet, IS needs to address three types of research questions: conceptual models and theories, user studies and systems design in order to meet its research questions. Therefore we ask: can IS as a scientific specialty in France afford to turn its back on information systems, leaving all questions related to their design, including theoretical and user-oriented ones to computer and cognitive scientists?

There are at least three researchers who do not think so: Marcia Bates (1999) who is North American and three French scholars. Palermi & Polity (2002) believe that information science is astride three platforms: theory, practice and technology and that one branch cannot live without the other two. The three need to be equally nourished.

Jean-Paul Metzger asserts that IS can really exist in France only if it organizes itself around three research poles: a pole on knowledge-bearing objects (*objet porteurs de savoir*), a second pole on human and social practices (*pratiques humaines et sociales*) and a third pole on modeling and computation (*formalisation et calcul*): “Each of these poles being irreducible to the others but all three being inter dependent like the “*three apexes of the triangle*” (tels “*trois sommets d'un triangle*”). Given that knowledge is being formalized and that its elaboration and sharing is being mechanized, we cannot turn our backs on modeling and computation; and as soon as we seek a specificity, we cannot ignore knowledge-bearing objects [...] *a priori*, I don't see any reason, except a contingent one that would render one pole more attractive than the other.” (Metzger, 2002 : 21-22²⁷)

Our literature review on this particular question has also shown that theory and practice are intertwined.

²⁵ In the original text: “*la science de l'information s'intéresse essentiellement à l'élaboration sociale et au partage du savoir. [...] Tout type de savoir est concerné, qu'il soit pratique, technique, scientifique, encyclopédique ou autre.*”

²⁶ Popper, K. R. *Conjectures and Refutations: The Growth of Scientific Knowledge*. New York: Routledge and Kegan Paul, 1963, p. 88.

²⁷ In the original text: “*Etant donné que les savoirs se formalisent et que leurs modalités d'élaboration et de partage se "mécanisent", poursuit Metzger, "nous ne pouvons tourner le dos à la formalisation et au calcul ; et dès lors que nous recherchons une spécificité, nous ne pouvons ignorer les objets porteurs de savoir, [...] et, a priori, je ne vois aucune raison, autre que contingente, qui rendrait un pôle plus attractif que les autres."*

Referring to Bateson's theory of self-regulating systems, Claude Nosal (2002 : 84), an ICS professor writes: "if you put your knowledge into practice, you also put your practice into knowledge. One cannot deduce action unilaterally from theory - theory is also enriched in action"²⁸.

Cronin (2008 : 471) also wrote « *Knowledge, tout court, emerges from practice; it is grounded in the material world.* »

One can then wonder why the current mindset in IS in France tends to consider any technologically-oriented research as falling outside the scope of the discipline. This is an age-old dialectic recalled by Saul Gorn (1983: 127) when he questioned: « Why did Plato consider the question of the usefulness of knowledge demeaning? Why have science and technology become so divorced when the bases of both are so interlaced, as we have already observed? ».

We are in agreement with Machlup et Mansfield (1983 : 668) that the opposition erected between science and technology is unfounded and that the relation that exists between the two is one of '*genus- differentia*'. Technology is the most applied branch of sciences. Science formulates propositions and hypotheses that technology puts into practice but this putting into practice itself informs theory in return and may lead to formulating new hypotheses. And so the cycle continues.

4. Concluding remarks

Since the early 2000s, information & communication sciences (ICS) field as a whole has expanded with more faculty being recruited and more information-communication departments opening up in French universities. However, the picture of the IS landscape by Palermi & Polity in their 2002 remains largely true: the scientific community of IS is dwindling both at the training level (fewer courses, fewer students) and research level (fewer professors than in the 1980s and 1990s).

On a more practical and organizational level, it is difficult to obtain the number of IS scholars within the ICS field. There is no national database where faculty members can enter their profile and indicate the branch – information or communication to which their teaching and research primarily belong. Indeed, asking such a question will be deemed "*politically incorrect*" and could be interpreted as an attempt to demarcate between IS and IC (communication science) as we are all supposedly members of 'one big and happy family'. From some informal discussions we have had with colleagues, it would appear that only about 10% of the faculty conduct teaching and research which can be seen as falling under the IS field. This gives one an idea of the '*rapport de force*' in the ICS, between the information specialists and communication specialists.

Although there is a national association of the ICS discipline, SFSIC²⁹, this association is mainly led by communication scholars. It holds a bi-annual conference focused mostly on communication themes. A proportion of IS scholars and doctorate students gather under the French chapter of the ISKO³⁰ which is the national chapter of the international association. However, ISKO is yet to establish leadership as the representative association of IS scholars in France, unlike the ASIST in North America. Very few IS scholars are aware of the ASIST European chapter.

On a conceptual level, IS in France has achieved neither cognitive nor social institutionalization following the definition given in Whitley (1974³¹). Apart from a handful of professional journals and magazines, IS scholars lack a clear avenue for the dissemination of their research. There is no highly reputed journal that can disseminate research results in IS in France. Although, the journal *Documentaliste – Sciences de l'information*³² has published articles written by some IS scholars (Hubert Fondin, Yves Le Coadic, Jean Meyriat among others), it remains a professional journal edited by the ADBS – the association of documentalists and information professionals. Recent reshuffling of its editorial board has led to the inclusion of a few IS professors but the type of articles, their length and the reviewing process are yet to meet international standards of peer-reviewed journals. The result is that IS scholars often resort to publishing in communication journals or in journals deemed to be more in computer science (*Document Numérique*). Publications in English journals are few and far between, one of the reasons being the language barrier.

But the situation may change. The French higher education has up until now had a tradition of centralized government via the ministry of higher education. The government has been the main policymaker, giving accreditation for curricula in every field with the corresponding subsidy. The last Gaullist government led by Nicolas Sarkozy (2007-2012) instigated a series of reforms aimed at moving French universities towards autonomy and self-governance in a bid to push French higher education institutions higher up the ranks in international ranking systems (Shanghai or others). These reforms have come

²⁸ In the original text: "*si l'on met son savoir en pratique, on met également sa pratique en savoir. On ne déduit pas unilatéralement l'action de la théorie : on enrichit la théorie dans l'action.*"

²⁹ Société Française des Sciences de l'Information et de la Communication. Website: <http://www.sfsic.org/>

³⁰ International Society for Knowledge Organization. Website: <http://www.isko.org/>.

³¹ Whitley (R.), 1974, Cognitive and social institutionalization of scientific specialties and research areas, in *Social processes of scientific development*, Whitley R. (eds.), London, 69-95.

³² *Documentaliste – Sciences de l'information*.

under fierce criticisms by the scientific community. However, despite the avowed government goal to give French universities more autonomy and move them to self-governance (following the US model), the ministry of education still retains the rights to accredit courses, diplomas, research units and infrastructures. All regular university professors are civil servants, so state-employed. What we have here is a case of autonomy-on-a-leash.

A research assessment program, conducted by an independent evaluation agency, the AERES³³ has begun to evaluate research laboratories and training programs with the attendant notation which ultimately leads to rewarding “excellence” and punishing “mediocrity³⁴”. French university professors are now urged to “publish or perish”.

Individual researchers were also to be evaluated by a national committee for each discipline, the CNU³⁵ but this aspect of the reform has come under fierce attacks by faculty from all disciplines who perceive it as a neo-liberal maneuver, founded on the “anglosaxon” model, and a tool for managing human resources in the hands of Presidents of French universities. This would enable them to reduce recruitment of permanent faculty while increasing the teaching load of faculty members seen as under-performing in research. The recent election in May 2012 of a socialist government with François Hollande as President may put paid to such “anglosaxon” and “neo-liberal” tendencies.

On a more conceptual level, the change of orientation (or the return) to the humanities origins of IS has not brought about an increase in the visibility of its research in France nor a concerted effort to work on its theoretical and epistemological foundations. Consequently, and owing to other mitigating factors (the dwindling number of faculty members, the lack of institutional and peer recognition), the number of students wanting to pursue doctorate studies in IS has also steadily declined. Indeed potential PhD students, not having a clear view of what IS is really about nor what IS scholars are working on, would prefer to enroll with computer science professors if they are clearly interested in design of information systems or with communication professors if their focus is on social or human-related aspects of IS. What then is the object or the ‘specificity’ of IS in France? What place does it have or can it claim have in the French higher education arena?

If to some extent, we are in agreement with Jean-Paul Metzger (2002) when he says that information science in France, “is not constituted but is possible”, we insist on the reasons for its non-constitution or its disintegration: they lie mostly in the difficulties of cohabitation with communication science, in the mode of governance of scientific disciplines in France where the National Council of Universities play a major role in defining a discipline’s center of gravity. In the case of ICS, the center of gravity has been clearly focused on communication and disciplines upon which it draws such as anthropology and sociology.

References

- Bates, M.J. (1999). The invisible substrate of information science. *Journal of the American Society for Information Science*, 50 (12), 1043-1050.
- Borko, H. (1968). Information science: what is it? *American Documentation* 19(1), 3-5.
- Buckland, M., (1996). Documentation, information science, and library science in the USA. *Information Processing and Management*, 32(1), 63–76.
- Cronin B. (2008). The sociological turn in Information science. *Journal of Information Science*, 34(4), 465-475.
- Day R. E., Martinet L. (2006). Preface to, Suzanne Briet. *What is documentation*, Lanham, MD: Scarecrow Press.
- Fayet-Scribe, S., (2000). *Histoire de la documentation en France : culture, science et technologie de l'information (1895-1937)*, Paris: CNRS editions.
- Fayet-Scribe, S., (1997). The cross-fertilization of the U.S. public library model and the French documentation model (IIB, French correspondent of FID) through the French professional associations between world war I and world war II. *Journal of the American Society for Information Science*, 48(9): 782–793.
- Fondin H. (2005). *La science de l’information ou le poids de l’histoire. Les enjeux, 2005*. Accessible online at http://w3.u-grenoble3.fr/les_enjeux/2005/Fondin/home.html#intro.
- Gardin J.C., (1964), *Le Syntol : étude d’un système général de documentation automatique*, Presses académiques européennes, Bruxelles, 1964, 4 vol.
- Gorn S., (1983). Informatics (Computer and Information Science). Its ideology, Methodology, and Sociology. In Machlup F. & Mansfield U. (eds), *The Study of Information. Interdisciplinary messages*, NY: Wiley & Sons, 121-140.
- Ibekwe-SanJuan, F., (2012a). The French conception of information science. Une exception française? *Journal of the American Society for Information Science & technology*, Forthcoming, 20 pages.
- Ibekwe-SanJuan F. (2012b). Information science in France. Emergence, Evolution and Perspectives. In A. Spink, & J. Heinström (Eds.), *Library and Information Science Trends and Research. Europe*. UK, Emerald Library and Information Science Book Series. Forthcoming.

³³ Agence d’Evaluation de la Recherche et de l’Enseignement Supérieur (<http://www.aeres-evaluation.fr/>).

³⁴ Under this assessment program, every four years, research laboratories and specific courses are graded either A+, A, B, C or D. Those graded A+ and A are assured of being continued by their universities while C or D ones may simply be axed!

³⁵ Commission National des Universités.

- Le Coadic Y., (1994). *La Science de l'Information*. Paris : Presses Universitaires de France. 3^{ème} édition refondue 2004. Collection 'Que sais-je ?'
- Maack, M.N., (2004). The lady and the Antelope: Suzanne Briet's Contribution to the French Documentation Movement, *Library Trends* 53, Spring 2004. Retrieved September 15, 2008 from <http://www.gseis.ucla.edu/faculty/maack/BrietPrePress.htm>.
- Machlup F., Mansfield U. (1983). *Semantic Quirks in Studies of Information*. In Machlup F., Mansfield U. (eds.), *Studies of Information. Interdisciplinary messages*, NY: John Wiley & Sons, 1983.
- Metzger, J-P., (2002). Les trois pôles de la science de l'information. Proceedings International colloquium 'Recherches récentes en sciences de l'information : convergences et dynamiques', 21-22 mars 2002 (pp.17-28), Toulouse: éditions ADBS.
- 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.
- Nora S., Minc A., *L'informatisation de la Société*. Paris : La Documentation française, 1978, 162p. Available at http://books.google.gr/books?id=3ngLAQAAIAAJ&redir_esc=y.
- Nosal C., (2002). Un attracteur chaotique : le directeur de recherche. *Dynamiques paradoxales autoréférentielles*. Proceedings International colloquium 'Recherches récentes en sciences de l'information : convergences et dynamiques', 21-22 mars 2002, Toulouse, ADBS, 73-89.
- Pages R., (1955). Introduction à l'analyse codée, une technique documentaire en psychologie sociale et techniques documentaires, *Bulletin de l'Union Française des Organismes Documentaires*, avril-mai, 1-11.
- Palermi, R., Polity Y., (2002). Dynamiques de l'institutionnalisation sociale et cognitive des sciences de l'information en France. In Boure R. (ed.), *Les origines des sciences de l'information et de la communication : regards croisés*. Presses Universitaires de Septentrion, Villeneuve d'Ascq, 2002, 95-123.
- Palermi, R., (2000). Vers des précurseurs : Robert PAGES, Éric De GROLIER, Jean-Claude GARDIN. Communication au groupe de travail "Théories et Pratiques scientifiques" (TPS) de la SFSIC, mars 3 2000. Online at http://www.iut2.upmf-grenoble.fr/RI3/Mise_jour_06/TPS_precurseurs.htm.
- Pylyshyn Z.W. (1983). Representation, Computation, and Cognition, in Machlup et Mansfield (eds.), *The Study of Information*, Wiley & Sons, NY: 115-118.
- Polity, Y., (2000). La communauté scientifique des Sciences de l'information, Communication au groupe de travail Théories et pratiques scientifiques (TPS) de la SFSIC, mars 3 2000. Online at http://www.iut2.upmf-grenoble.fr/RI3/TPS_acteurs_SI.htm.
- Popper, K. R. (1963). *Conjectures and Refutations: The Growth of Scientific Knowledge*. New York: Routledge and Kegan Paul., p.88.
- Salaün, J.M., (1991). *La fin de l'IST ? Histoire des politiques publiques en information scientifique et technique*. Rapport de recherche CERSI-ENSSIB, 40p. Retrieved 12/12/2010 from <http://www.enssib.fr/bibliotheque/documents/travaux/salaun.pdf>.
- Salaün, J.M., (1993). *Les sciences de l'information en question*. Retrieved on 12/12/2010 from http://www.archivesic.ccsd.cnrs.fr/docs/00/06/20/53/RTF/sic_00000048.rtf
- Rayward, W.B., (1996). The History and historiography of Information science: some reflections. *Information Processing & Management*, 32(1): 3-17.
- Rayward, W.B., (1994). The International Federation for Information and Documentation (FID). In *Encyclopedia of Library History*, Wiegand W.A. and Davis D.G., Jr. (eds.), New York: Garland Press, 1994, 290-294.
- Tétu, J-F., (2002), Sur les origines littéraires des sciences de l'information et de la communication. In Boure R. (ed.), *Les origines des sciences de l'information et de la communication : regards croisés*. Presses Universitaires de Septentrion, Villeneuve d'Ascq.
- Williams, R.V., (1997). Documentation and special libraries movements in the United States, 1910-1960. *Journal of the American Society for Information Science*, 48(9): 775–781.