Chapter 2

The Tao of the Digital Library:
A Library Without a Librarian?

"Thirty spokes share the wheel's hub. It is the center hole that makes it useful" [Tao-te-Ching, Book I, 11].

The image of a wheel that turns around an empty space could represent the digital library of the future – a virtual space, a portal that allows access without mediation, a platform of information, a tool for users who are far away from the actual library. It is an efficient tool, a wheel that turns a vehicle which moves. But what is to be found at its center?

"It is the center hole that makes it useful." The conclusion of Laozi's *The Book of the Way and its Virtue* could be the ancestor of marketing strategies published by STM editors and suppliers of content management systems. What is their main argument when promoting their products? Their latest products and services are directed towards the end-user, i.e. researchers in front of their computers. In their eyes the actual space of a library and the work of librarians is rather unnecessary and will disappear sooner or later; to them it is a niche in the market.

The center hole, i.e. an empty space, is currently being created. Libraries will first be transformed into a virtual space and later into learning centers, i.e. multimedia resource centers. They will become a feature of education and teaching, just as e-learning is an accessory to traditional teaching methods [BEN 04]. With the

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"hyperelectronification" of campuses [ARN 03], information has now moved from inside the library to the outside world.

The librarian is called an information officer, or even facilitator, and finally becomes a technician specialized in the field of troubleshooting or carries out rather simple tasks at the helpdesk. Following this logic of relocating traditional tasks, the next step would be to replace libraries with call centers located in Morocco or India!

Debates at conferences often call into question the librarian's professional identity. Where are we going? Do we know where to go? Do we want to go there? Is it only a simple image problem as Bernat [BER 03] suggests? Is the disappearance of the library as we know it not simply a very negative and unrealistic outlook on the future?

"Is there a future for librarians now?" In 1990 Dick Fletcher (New Media) asked this question on the occasion of the 13th conference of the UK Serials Group and even now it is a relevant question since it has still not been answered.

At the beginning of 2004 Bruce Heterick from JSTOR ended his report on the future of libraries with the ironic statement: "There are three types of people in the world: those who make things happen, those who watch things happen, and those who don't know what hit them." [HET 04].

Let us try and understand what he meant with "those who don't know what hit them". Let us take a look at some aspects of the transformation that the job profile of librarians and other library staff has undergone. Where does the concept of a digitized library come from and what is the driving force behind it? What kind of impact has this revolution had on the library's professions and the skills of those professionals? How can this revolution be accommodated by activities within the field? Which direction should we move in? What should we do if we do not only want to "watch things happen"?

2.1. The technological supremacy of the concept of the "digital library"

The concept of the digital library appeared in the middle of the 1970s but only gained increasing popularity 15 years later, i.e. at the end of the 1980s. At the beginning, this concept was entirely based on IT and had nothing in common with the library as a work environment where people study and carry out research in order to broaden their knowledge.

After analyzing the publications of scientific journals since 1990 (a sample of 1,086 articles that appeared in 13,000 journals was used) the following figures were

established. 75% of all articles published in digital libraries appeared in IT journals, 15% in journals that focused on humanities and social sciences, and only 5% in journals specialized in documentation and the organization of libraries.

When checking the year of publication it becomes evident to what extent technology dominates the concept of digital libraries. 75% of all articles on digital libraries published in the field of human science appeared in the last five years, which shows a large gap between human science and the field of technology. Librarians are even further behind when it comes to addressing the subject. Most studies on the organization and human resources of digital libraries (e.g. positions, training, recruitment) only appeared in 2002 and 2003.

When the human factor becomes the object of scientific studies this implies the following questions: to what extent does the user accept new services and functions and how does the interaction between humans and a machine work (system, ergonomics)? Studies that focus on professional librarians as the main players and not simply as a technical operators are recent and relatively rare.

At the beginning of digital libraries there was technology, engineering, as well as the development and the installation of tools. Professional librarians who are directly concerned by this new technology ignored this development for too long. Studies on how, where and by whom these technologies could be used, as well as research on the impact on human resource management, only appeared 5 to 10 years after those carried out on computer science. On this point, the digital library had already become a reality in the field of IT. At the occasion of the 3rd congress of French information officers, *Le Monde* stated that "technological developments were a step ahead of attempts to solve problems between humans" [DEG 79]. This asymmetric development has had an impact on the library professions up until now.

With the birth of personal computing and the introduction of TSI in Germany, big university servers were declared to be part of the "computer scientist's tasks as they are part of IT". Information officers and librarians suddenly found themselves in the role of the end-user which inversed the ratio between supply and demand. This trend is similar to what happened in other industrial sectors where technical progress determined behavior and therefore new requirements that also had to be satisfied.

On the one hand, IT sets out a framework that determines the structure for the content and the tools to be used. On the other hand, people use these technologies to create and distribute a certain content or access it (peer-to-peer). The first digital archives were set up by researchers and computer scientists, not by librarians. This sometimes leads to the disagreeable impression that librarians are only used as beta testers of new IT systems.

2.2. TSI's influence on the market

The recent increase in the speed required to access information online is not the only driving force behind digital libraries. In the context of a financial and economic crisis, another factor has an increasing impact on the development of libraries: it is a commercial strategy of companies that create and publish scientific information. After heavily investing in the field of research they seem to have decided that mediation by other professionals such as agencies or libraries is no longer required.

It was not that long ago that people had to enter a library in order to access resources. Searching a database required specific skills catered for by professionals working in the field of documentation.

Those times have changed. After studying behavior and requirements the producers of TSI developed services that directly address the end-user. The functions of these services are simple and intuitive, a Google effect can be observed. With the emergence of a search function that combines research and access to information in one single function, every other type of search engine ends up with a marketing problem [ARN 04]. Search engines like Google and Scirus are integrated into a portal or platform. This link enables everybody to find the required information without having to consult a professional.

From a professional point of view, this form of research does not necessarily guarantee the quality of the sources given, neither their relevance nor how thoroughly they address the respective topic. Baltz, for example, states that information officers should not be frightened by the "scary amount of autodocumentation" since there will always be a place for them in between IT and the communication of ideas [BAL 03]. From a user's point of view, this argument remains theoretical because, due to the ever-increasing performance of research tools, this type of autodocumentation corresponds to his/her needs. The success of a portal with a simple appearance, such as VASCODA which provides access to multiple German TSI resources, seems to back up the user's point of view which is mentioned above.

Currently TSI's producers still need professionals that sell their products. The supplier-client relationship is currently changing. Large TSI companies (Wolters Kluwer, Reed, Thomson, etc.) see themselves as education companies. Their client is not the library but the scientific community. Alternative editors such as BiomedCentral or IOP are directly financed by researchers/authors or their institution without having to rely on the acquisition budget of libraries. Integrating the costs of TSI into the budget of research organizations is a leitmotif of the open access movement. Only very recently have STM editors also taken an interest in this

new concept. What is happing to the library as a center that purchases new publications?

When an editor like Elsevier organizes a seminar for librarians, content and services are no longer discussed. Instead, new functions are presented and explanations are given on how to promote these products in the respective community. In this context, a "good librarian" is someone who manages to increase the use of these resources and secure the loyalty of the client. The library is transforming into a commercial platform of TSI producers. The competition of the "best advertising" which was introduced by an important STM publisher is an example of the negative aspects of this transformation.

2.3. The virtualization of a document's function

Traditional scientific and technical information has only one aim when integrating information technology and telecommunications: to improve, research, exploit and evaluate the information received and transmitted by the researcher. The entire problematic of the function of documentation can be resumed in the two prepositions by and for. Is there a link between the supplier and the end-user of information? If yes, what kind of link is this?

Without a doubt some scientific circles need databases, catalogs and a personalized service. But who manages the technical features of common access, technical support and the development of protocols? Who decides upon and co-ordinates the acquisition of resources? Remote access and developing efficient tools (e.g. search engines that search several databases and mulitprotocols via portals) shift the focus onto the user's needs when it comes to documentation services. However, who controls access, who decides who uses what and how?

Shifting the focus to the user's needs is generally not a bad choice for libraries, but when analyzing the situation in great detail, it becomes evident that if service providers are responsible for creating libraries, these libraries only consist of marketing strategies. If the needs of scientific circles are addressed by the suppliers of information, the library transforms into an additional service of the TSI industry without having any added value to it.

According to the last opinion poll carried out by JSTOR covering 7,000 teaching fellows and researchers in the field of human science [HET 02, HET 04], the actual location of the library was the last point mentioned when being asked about carrying out research. It was far behind search engines and other specialized services (portals, databases, etc.).

American researchers and teachers consider the function of the library as still being important, especially when it comes to buying resources (budget), but less so when it comes to access (gateway) and archiving. However, all of them stated that their research was not very dependent on the library, especially if they were not working on large campuses. Generally, they estimated that the importance of a library will decrease in the next five years. "In fact, many faculties can foresee a future in which they will never actually go to the library" [HET 02].

Researchers and teaching staff often only give the library a polite nod when it comes to researching information [ARN 04]. What is important to them is access to electronic resources and the guarantee of durability for that access. They require an archive. However, in the electronic era this archive does not necessarily need to be in the library or on the university's campus. In the words of Tao-te-Ching, it could also be in the center hole.

2.4. Development and changes to job profiles in the CNRS directory 1982–2002

The Tao also says not to pity feel sorry for yourself if you want to endure [Book I, 22]. Let us now see how this idea can be applied to the professions of a library. Several approaches have been chosen for a better understanding. The development of professions in the CNRS, France's biggest research organization, and those of the INIST, as well as changes in training programs in the UK will be analyzed.

For more than 20 years the professions and positions within the CNRS have been regularly subject to formalized studies which are published in a directory. When comparing the directories of 1982, 1991, 1998 and 2002 the following question arises. What is the impact of new technologies on libraries and documentation centers?

From 1982 onwards job profiles in the CNRS reflected the way laboratories used information and documentation services. This phenomenon could be observed on all possible levels, from the simple controller who updated a computer-based catalog to a documentation engineer who managed the entire system and adapted it to new technologies. Another job profile could be found in the directory of 1982 indicating a librarian who was "specialized in the automatic organization and management of collections".

In the middle of the 1990s the informatization of the workplace as well as activities and skills became increasingly important. Knowledge of documentary IT and the know-how to create project specifications and choose the required tools became one of the indispensable skills of category A library staff. Only in 2002 did the CNRS's directory become similar to the REFERENS, the directory for higher

education [HIC 04] and indicated that the digital library had become a reality. There are three examples of this trend:

– simple controllers and technicians need to know how to convert printed documents into digitized documents;

– engineers need to know how to create electronic content management systems;

– from the level of engineering assistants onwards (a diploma of higher education being a prerequisite) a good knowledge of the legal environment is required. We will come back to this later.

This adaptation can be subdivided into three different levels:

1) The amount of IT used for different activities is now affecting more job categories. IT that was previously only used by job category A (engineers, assistants) is now also used by categories B and C (technicians, controllers). The knowledge and skills in the usage of IT which were part of the job profiles of engineers in the 1980s were suddenly also part of technicians' job profiles. In other words, around 10 to 15 years later technicians needed to have the same skills and knowledge that was expected of engineers in the 1980s. Furthermore, the level of the required qualification has been increasing as Christian Lupovici observed [LUP 04]. We must add that this process is still not being reflected in the salary structure.

2) New technologies make the old boundaries between documentation and the organization of libraries obsolete. Studies on job profiles within the CNRS from 1995 to 1997 have shown that the fields of technicians and assistant engineers have been merged. The human resource department was not brave enough to actually merge the job profile of engineers and researchers even though studies showed that in reality these two fields were already starting to integrate. In 1998, on the other hand, a new type of position, a hybrid between the fields of documentation and IT, was created – an engineer and administrator of databases in documentation. In 2002 the traditional three fields of information officers, librarians and archivists were losing their importance due to this newly created position.

3) Technology's rapid evolution demands skills that are not part of initial job training. 2002's directory not only contains the introduction of new technologies, but also states that TSI professionals need to "take part in regular training sessions in order to remain up to date with new technologies in their field". In other words, keeping up with technological innovations, which was already mentioned in 1998, and continuous training has become a principal part of their work, as this is vital for the organization as a whole.

This is especially applicable to the legal environment (e.g. authors' rights, copyright, legal obligation when keeping documents, intellectual property) which,

according to 2002's directory, should be part of the skills for positions within category A. When it comes to technological developments and the know-how of professions linked to a library, the library as an actual place, i.e. a physical space, seems an outdated idea that is no longer relevant. Recently, Didier Frochot claimed that the professions of IT documentation were "not very well informed on legal questions" or even "completely ignorant towards them" as they lacked serious and thorough training. He particularly accuses the institutions that provide training for these jobs of only focusing on technical aspects while ignoring organization and management. Moreover, he states that before actual changes in the profession will take place, the librarian's employers should organize the acquisition of this knowledge. ISIDROIT is an example of how this criticism could be taken on board. This interdisciplinary network comprises the CNRS's information officers and is subdivided by region. In the Rhône-Alpes province it is called ISIDORA.

2.5. Supporting professions – the INIST approach

With 350 TSI professionals, 100 of whom work at the library, the INIST (Institute of Scientific and Technical Information of the CNRS) is directly affected by all technological developments [SCH 03]. From 1998 onwards the INIST has produced reports on the challenges of new technology and online information. With the help of a large number of its employees, the INIST 2000 project set out the main standards for the acquisition, management, storage and distribution of electronic resources, as well as transforming its products and services in order for them to be able to enter the Internet era [INI 99].

In order to observe and anticipate the development of job profiles and skills of TSI, the INIST introduced a permanent training program known as "compétences métiers" in 2002. This project is directed by a committee which consists of human resource managers whose chairman is also the director of the INIST. This procedure avoids problems that have been observed elsewhere, i.e. the "absence of any form of management, no defined positions, no idea of future developments nor the existence of acquisition strategies" [BEN 04]. Instead, a decent support for the staff involved with the project should be guaranteed. This approach is carried out in three steps:

– creating a directory of skills and professions the INIST currently requires. This directory is based on that of the CNRS and is enriched by the ADBS's directories (ECIA);

– an impact study on current developments in the field of TSI is carried out on the basis of this directory;

– suggestions which should function as guidelines in decision-making processes, as well as scenarios on the development of skills required by certain professions will be made in the immediate future (3 to 5 years).

Developments in IT and telecommunications, users' needs, products and services of the INIST must be observed. Furthermore, all players need to be interconnected during all steps of the project, i.e. there has to be good internal communication between all parties. This project is being carried out for all professions in the fields of documentation, library, IT and communication.

Job descriptions in the directory are discussed in all of the INIST's departments and are then put together as a coherent document. This writing process goes hand in hand with discussions in the individual departments which will then define possible development scenarios. Every scenario will need to state the skills the department needs to acquire in the future. Once this work is completed and put into one document, it will serve as a decision-making tool as it allows for the visualization of current skills that will help to determine training or recruitment.

This is a long-term project which is closely linked to TSI developments within the INIST and the CNRS. It also increases the quality of libraries and advertises the concept of the digital library. Questioning traditional methods and activities (e.g. cataloging, periodical subscription purchase and renewal) sometimes leads to negative reactions, but on the other hand opens up new perspectives for departments as well as for individuals. It leads to the merging of several activities, changing of procedures and opening up towards the outside world.

The project is also based on an exchange with other public organizations (e.g. INSERM, CEMAGREF, INRA, INRIA, CIRAD, IRD). The aim is to prepare the staff to take on different responsibilities in a new and often complex environment, or give them responsibility for other tasks. The think-tank, in co-operation with the CEMAGREF, focused mainly on the relationship between the researcher in the field of documentation and the management of knowledge.

Every project in a digital library has its own "biography" [GRE 02]. That of the INIST's library follows several directives:

– instead of creating new structures, new activities and skills are integrated into acquisition, management and production services;

– a limited number of new positions is created. These pilot positions are created to co-ordinate the development of activities and skills for all functions (e.g. editors of electronic magazines, researchers responsible for licensing, digitization operators). This development goes hand in hand with the employment of interns from local universities (from 2nd year students up to students studying postgraduate courses). They work on specific issues such as managing electronic magazines, analyzing user statistics and the creation of databases with open access;

– new training requirements (e.g. legal environment, TSI, IT and telecommunications market) are analyzed in the individual departments and

integrated into the annual planning for training. As external training cannot be provided, part of the training is provided internally or is carried out by the employees themselves (e.g. electronic magazines, copyrights, managing licenses, statistics, the production of catalogs);

– the transformation process of the library's function is spearheaded by different projects which are carried out by specialists in the respective fields (e.g. producing catalogs, delivering documents in PDF format, managing access authorizations).

Compared to Greenstein's and Thorin's [GRE 02] "biographies", the Institute's digital library project is still in the start-up phase and therefore of an experimental, competitive, manager-based, dynamic and innovative nature. This project is attempting to find the ultimate solution known as the "killer application" that will allow for a reduction in the complexity of IT systems and all the problems linked to them, as well as being a cheap alternative to traditional methods.

However, this project is currently stabilizing. Today's digital libraries are complex and consist of different modules, such as several archiving systems both internal and external (e.g. CCSD, the CNRS's service) and an architecture that comprises online services which are based on several different applications (e.g. content management systems for libraries, platforms for archiving and distribution, online databases and portals). For librarians it is not always easy to keep up to date with the rapid developments in IT systems and sometimes training is a reminder of the story of the race between the tortoise and the hare – there is no point in running, you just have to leave early enough… The library of the INIST is trying to address this problem by re-defining the heart of the librarian's profession and defend its functions, i.e. analyzing users' needs, selection and acquisition of content, cataloging, management and archiving of resources.

2.6. A new job profile is emerging – the e-serials librarian

At the end of the 1990s a new job profile emerged in the libraries of anglophone universities known as an e-serials librarian or an electronic resources librarian. Often the creation of these new jobs went hand in hand with the merging of teams responsible for new resources with teams managing existing resources.

After analyzing the life cycle of an electronic journal, the INIST's library team responsible for this project determined the boundaries of this new role. These boundaries are rather wide. They include the development of an e-strategy for the library, evaluation of the editorial offer, negotiation of licenses, training of colleagues and users, management of links and access authorizations, technical assistance and troubleshooting, analyzing user statistics and the promotion of new services.

Some functions were specified and subdivided into special tasks. These are market research of TSI online (e.g. keeping up with technological innovations, observing prices and economic models), analysis of client needs, i.e. needs of clients of the INIST and the scientific community of the CNRS, negotiating and analyzing contracts, creating a licensing system and evaluation scales for reading, managing the relationship with editors and agencies, ordering documents with and without a mediator, saving and administrating access and controlling usage with the acknowledgement of recommendations, i.e. COUNTER [BOU 05].

Some functions are taken over by other structures within the INIST, such as the IT department (e.g. access management via a proxy server), a new department in charge of portals (e.g. creating portals, analyzing problems, information on access authorizations) or the technical support unit. In order to make things work, responsibilities have to be negotiated and good co-ordination and communication between the individual services is required.

At the same time, the INIST's council of internal documentation, the acquisition committee, has started to integrate electronic resources into their work and discussions in order to develop a coherent strategy when it comes to the acquisition of electronic as well as paper-based resources.

This work on the profile of e-serials librarians has led to the creation of several new positions in the library and will have an impact on the way services are presented. However, this job profile introduces certain problems:

– the technical level: how much knowledge in IT is required? This question becomes especially relevant when web applications such as virtual libraries are created, or electronic resources are integrated into information systems. How can the power struggle between IT and the library be won by the library when it comes to analyzing requirements, defining tasks within a project or defining functionalities? Do we need "second class" IT consultants whose training is inferior to their colleagues but who still have a good knowledge of technology? The interface between the user and the library also remains to be invented;

– legal knowledge and skills: is the librarian in charge of licensing still a librarian or are we moving towards a job profile based on administrative or legal tasks, with no degree in this field?;

– relationship with the reader: if the library is transformed into a portal, what is the link between the librarian and the reader/user? Who manages and filters communication? How can this be organized? Last, but not least, who actually is the user? Is it university researchers and teaching staff, individual users that define their status via licenses, a network of information officers in their laboratories or scientific administration?;

– the level of decision-making: who summarizes the analysis of requirements and decides which negotiations are carried out? Financial interests and a national co-ordination of acquisition limit the decision-making power of librarians as 50% of the budget is spent on acquisition, i.e. the decision is made on a political level far from the actual library.

These questions are neither theoretical nor conceptual; they have a practical impact on the career of library staff (e.g. entrance exams, development within the individual's career, mobility).

In the long run, training, experience and skills will provide answers to these questions. Answers will also be provided by professional librarians working at the INIST's library, by TSI strategies of the CNRS and by a national body that will comprise all universities and research bodies and provide access to electronic information.

2.7. Developments in training requirements – the UKSG workshops 1990–2004

Another way of observing developments in job profiles is through studying training and education in the field. With the emergence of the Internet in the 1990s new requirements within training also appeared. In France the ADBS (Association des professionnels de l'information et de la documentation), a professional association for information officers and library staff, provided new materials and a greater diversity in the training offered by co-operating with INTD-CNAM [GIC 03] from 1994 onwards.

In this chapter a very different body will be analyzed – the UK Serials Group (UKSG). For 25 years it has united librarians, editors and intermediaries and technology vendors in the UK and in other countries. Once a year the UKSG organizes a conference that comprises up to 600 professionals from a range of different fields. The papers, debates, product reviews and workshops from these conferences give an excellent overview of current questions and projects. We have studied the content of 183 workshops from the conferences that took place between 1990 and 2004 in order to obtain a better understanding of the training requirements in the field of digital libraries [SCH 04]. Some of the results that were established during the analysis are as follows.

First observation: the number of workshops and sessions has continually increased. At the beginning of the 1990s five to ten workshops took place at each conference. During the latest conferences 15 to 20 workshops with up to three sessions took place. This not only proves the success of this type of exchange and

training, but also reflects the increasing need to obtain further training and to stay informed about recent developments.

When comparing the content of these workshops to the functions of JSTOR-based research without making a difference between paper and electronic resources, significant developments can be observed. The number of workshops on the library's role as a buyer has decreased from 50% down to 15% while their function as a gateway becomes increasingly important. The number of workshops on this topic has increased from 25% to 65% of all workshops. The third function of the library being involved in archiving only came into play from 1998 onwards. 5% of the workshops during the last three conferences dealt with this topic.

While the digital library only played a marginal role in the early 1990s, today 90% of all workshops deal with this topic. This proves that digital libraries now play an important role when it comes to further training for librarians.

Let us now analyze this phenomenon in greater depth starting with the way it is linked to "JSTOR functions". 15 years ago only one-third of workshops on acquisition dealt with the acquisition of electronic resources, while currently 70% of all workshops address this subject. Since the beginning of the 1990s the concept of access has been linked to the emergence of the digital library. Since then the percentage of workshops dealing with the library as a gateway has remained stable, ranging between 75% and 85%. Workshops on the function of archives now solely address the subject of electronic archiving (100%).

To end this analysis let us take a look at the content of 100 workshops on the topic of digital libraries. A third of these workshops offered training on programs and equipment such as developments in content management systems (e.g. organization of e-journals, automatization of the organization of periodicals), web applications (e.g. search engines, creation of websites), new logic solvers and, last but not least, digital rights (e.g. digital rights management – also known as DRM, access control). 16 workshops presented the editors and the products they currently have on offer and the market of electronic journals, a few of those workshops dealt in particular with the consortium NESLi. Others worked on electronic books, e-commerce, or on the impact the concept of open access has had on scientific editions. 15 workshops dealt with legal questions such as copyright and licensing.

Ten workshops dealt with developments in the field of catalogs (e.g. rules and standards, OPAC) and the format of documents and metadata (Dublin Core). Seven workshops, such as the COUNTER project, worked on the exploitation of user statistics.

However what about job profiles as a subject on its own? Before 1998 this topic was not covered at all. From 1998 onwards 15 workshops have examined several subjects linked to human resources (e.g. communication, ongoing training, and changing relationships with clients) and scenario planning, i.e. new forms of organization within the library.

When taking a step back, the extent to which training is offered during these conferences shows the broadening of skills and the changes in job profiles Lupovici [LUP 04] describes. When looking at the topics of the meetings of the CNRS's staff and information officers between 1992 and 2004, the same queries, questions and requirements arise just slightly later than in the UK. Technical tools, conceptual and organizational models, developments on the TSI market and legal questions were also covered during these meetings. However, when analyzing plans regarding training of the INIST's library staff, two differences instantly spring to mind. These are an extremely high demand in further training in the use of computers, and the use of the English language.

The emergence of personal computing and programs used for administration leads to the need to understand and use tools that are required everyday in the librarian's work environment, such as word processing, spreadsheet applications and databases. Furthermore, it also has an important impact on the relationship between an information officer and the project manager who uses the given information.

English has become the lingua franca of the digital library. All manner of tasks such as analyzing the offers, contacting editors, negotiating licenses, managing online sources, carrying out research, opening download and print documents require different levels of English, especially when dealing with STM publications. Without any knowledge of the English language it is very hard, even impossible, to carry out all of these tasks.

2.8. "He who takes the longest strides…"

Let us now go back to the question asked at the beginning of this chapter: Is there a future for librarians? Google is currently starting to become the world's library. Is there still a role for the traditional library?

Developments in technology linked to the globalization of the market economy of TSI determine the virtualization process of documents.

We have analyzed the development of the librarian's job profiles in the context of TSI by looking at directories, task carried out in the field and the level of training.

It remains difficult to draw a conclusion from the analysis. However, is there only one conclusion? When reading studies on this subject we are torn between fear and feelings of optimism. Optimistic visions include broader skills and increasing responsibilities of the library's staff [LUP 04]. Others see a bright future for librarians. They will become information managers, webmasters, knowledge managers or researchers focusing on new developments within this field [BER 03]. They will manage and administrate systems [LUP 04] or even "turn into cartographers and pilots in the archipelago of knowledge" [BAL 03]. When looking at the down sides of this new trend, fears that the librarian will turn into a legal expert, computer scientist, accountant or negotiator are apparent. In other words, TSI-based professions will increasingly detach themselves from the actual content of information. Are we moving towards new horizons by creating hybrid professions in this field or are we about to commit professional suicide?

We know about the challenges awaiting us but do we also know how to react, how to control this subject which is ours? Do we know how to make things happen [HET 04]?

To escape marginalization, Arnold [ARN 04] suggests a political strategy which involves lobbying by professional associations, a proactive approach towards the scientific community and a strong involvement of committees and interprofessional work groups.

On the other hand, "he who takes the longest strides does not walk" [Tao-te-Ching, Book I, 24]. Blind activism will not be successful. In this case, acquiring knowledge and techniques of other professions will not be an advantage.

Let us start by establishing the features of a digital library. It is mainly a new form of technology that is becoming an increasingly frequent phenomenon [FRA 90] and is based on the subdivision of tasks and the argument that digital libraries are highly efficient and increase productivity (return of investment). It is a model of production without any external control.

To keep or regain the control over our work this new technology needs to be "tamed" and mastered in order for it to be used as a professional tool. Currently, the core tasks of a librarian i.e. cataloging, creating collections, referencing and mediation in research, are increasingly taking place outside the library [SIE 04]. The profession itself is taking a more technologically oriented outlook and moving away from traditional values such as close links with the community and public service. The development of digital libraries ignores problems it might cause for individuals and society as a whole.

Jean-Michel Salaün gives a realistic overview when he speaks of an uncertain future for librarians. However, he also states that librarians still have "very interesting cards" in their hand when playing this game [SAL 00]. Let us play those cards of know-how and traditional values and gain a critical distance from the technological revolution of the digital library that is taking over.

Let us finish this chapter with one last quote from Tao-te-Ching. "With enough practice you could walk without leaving any footprints" [Book I, 27]. We cannot know our future ahead of time; there is no such thing as a path already laid out for us. However, we can ask questions about how useful new technologies are, what impact they have on humans, and what the real interest in using them is.

Maybe we need time to let our cultural schemata adapt themselves to the current overbearing influence of technology. Virtual applications cannot be without any sense or content. "Thirty spokes share the wheel's hub. It is the center hole that makes it useful". Information officers need to fill this center hole in the digital library in order for it to make sense.

2.9. Bibliography

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