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Analysis of frame construction of risk management mechanism of intellectual property in digital libraries and intelligent management of risks

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ABSTRACT

With the development of computer technology, the issue of risk management of intellectual property in digital libraries is becoming increasingly acute. But so far, the study of this issue is still in the primary stage. Therefore, it has practical implications to put forward the frame construction of risk management mechanism of intellectual property in digital libraries and the analysis of intelligent management of risks in this research. The research of this issue is a heavy and hard job because it is still in its infancy for library professionals. Now the research of risk management of intellectual property has been integrated into the plan of digital library construction by relevant departments to improve scientific nature and stability and further promote the social influence of libraries in China. Firstly, the research introduces the overall process of risk management of digital libraries and sets a frame of China's risk management of intellectual property in digital libraries by studying theoretical frame of similar industries. Secondly, the research puts forward a risk identification model of intellectual property in digital libraries and describes risk analysis and evaluation methods in detail and introduces risk strategies and ways of risk decisions. Risk identification is the basis and precondition for risk management of intellectual property in digital libraries. Hierarchical Holographic Modeling (HHM) is used in this research to analyze the frame construction of risk management mechanism of intellectual property in digital libraries and the intelligent management of risks, proving to be effective in practice.

KEYWORDS
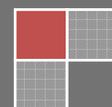
INTRODUCTION

The development of computer technology and prevalence of electronic publications have brought users great convenience. Users can search electronic books or magazines through the Internet. With the lasting decline of the prices of computer hardware, prevailing computers and Internet and rising computer technology make computers really widespread as an indispensable tool in the daily life[1].

In universities, laboratories are the place for experiments, or the the base of scientific research and the cradle of technology development, so the investment of laboratories is relatively large, particularly computer laboratories which develop fast in recent years. In order to meet the demands of studying and working, various computer laboratories have emerged with much clearer categories, making further demands on the management of computer laboratories. Except for the management of devices in laboratories, classification analysis of various files should be made on the basic of the optimization of computer resources to provide evidence for managers to put forward long-term guidelines[2]. But so far, taking manual operation as a main way, the management method of computer laboratories is comparably backward in most universities, which brings heavy work for laboratories managers. Therefore, it is necessary to develop a management platform for computer laboratories managing laboratories scientifically and normally and freeing managers from heavy work. It can also offer the reference in some sense, so risk management of intellectual property in digital libraries will be a hot topic and focus among library professionals.

Now as a hot topic and focus, the intellectual property in digital libraries has been the key factor influencing the building of digital libraries. Some computer laboratories has developed some similar systems in China, such as integrated management system which can realize automatic management for computer laboratories designed by Qinghua University and information management system on the basic of Web for computer laboratories which can make rational use of devices and Internet resources and realize automated management developed by Central South University of Technology. At present, there are not only management systems for computer laboratories designed by universities, but also preliminary idea of open laboratory management. There is also developed business software. However, most of the software focuses on companies. The unsuitable software can only provide some references for computer laboratories in universities[3].

FRAME CONSTRUCTION OF RISK MANAGEMENT OF INTELLECTUAL PROPERTY IN DIGITAL LIBRARIES

The model of risk management process

Wang Xiaoqun divides the basic process of risk management into risk identification, risk evaluation, technology choice of risk management, risk management effect and so on in his book Risk Management[4]. At president, investment of infrastructure and hardware equipment in computer laboratories has been increased in most universities. What is more, computer and Internet technology is developing fast, so the development of software has fallen behind compared with hardware. With the problem, some universities has started the research and development of management software in existing computer laboratories and made some achievement. However, there are still a lot of troubles in this respect in many universities. Manual operation brings heavy work and lower efficiency. Mistakes are prone to appear with a large number of archives and inquiries. The data can't be presented to decision-makers with the main method of manual operation, so scientific foundation can't be provided for laboratories' development and decision.


Figure 1 : The model of risk management process

The building of digital libraries can be divided into 3 parts including information collection, information processing and information dissemination. Risk management of intellectual property in digital libraries can start with these 3 phases, integrating other factors in daily management into the platform to form normalized operation flow and present it in the form of files. In this way, the information of libraries can be shown conveniently. What is more, it contributes to standardized management of the information in libraries and data sharing of different electronic files. Above are archival management of laboratories. Because of real-time performance, this platform can track and analyze all of processes in the experiment, which is good for maintenance in time. What is more, it generates historical data managers can turn to easily if a problem occurs, then help digital libraries monitor the execution results of these decisions.

The main current theoretical framework of risk management is ERM framework based on COSO. Firstly, On the basis of the improvement of efficiency[5], working process can be more standardized, so this platform must be stable and reliable. Secondly, the platform should be open in order to run in universities, thus laying a good foundation for the management of other specialized laboratories in the future. Thirdly, humanized design should be added into this platform

because there are plenty users in the platform. The platform should be easy to operate and convenient for users. Finally, this platform contains a mass of archives information in the database and can be connected through the network, so confidentiality and security measures are of great importance. Specialized person should be authorized to access and modify data information in the progress of storage. The frame construction of risk management mechanism of intellectual property in digital libraries should be combined with the internal process of digital libraries and the issue of intellectual property related to digital libraries, as shown in Figure 2.
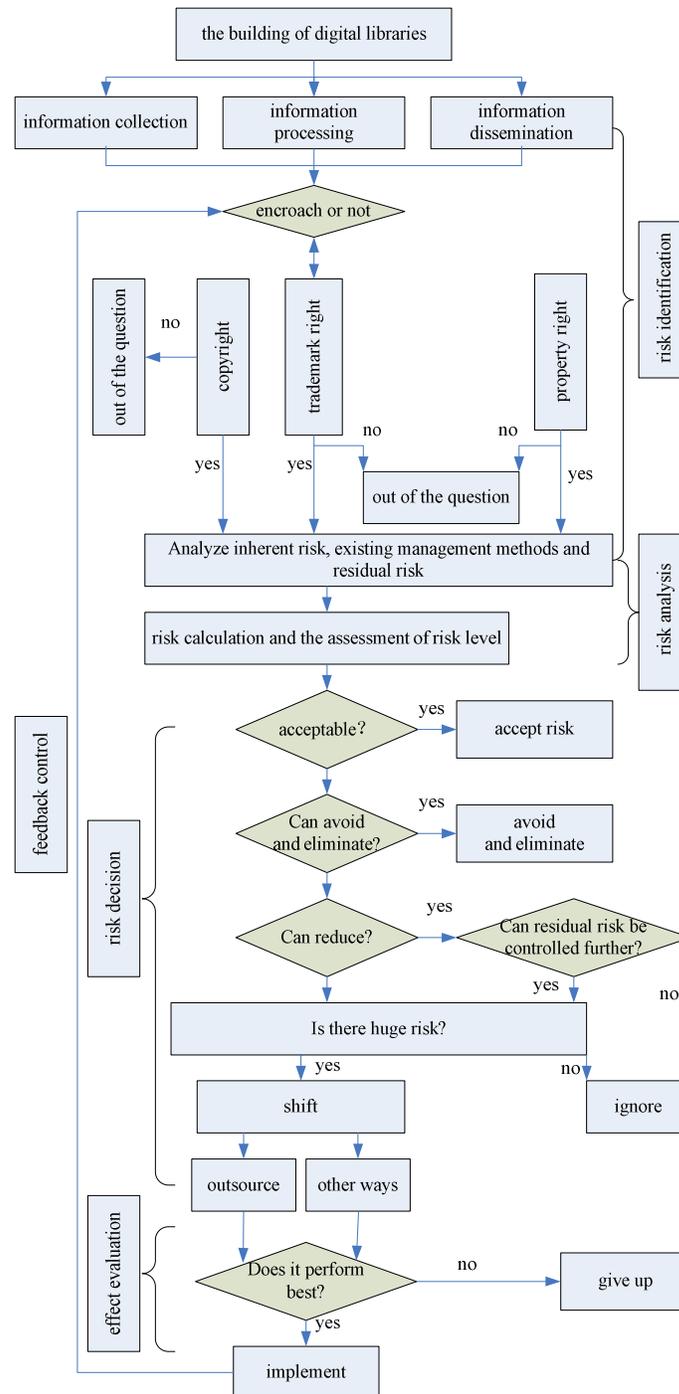
Figure 2 : The risk management progress of intellectual property in digital libraries

The first module is attendance management, including functions of registering, statistics and querying, which can be typed in by laboratories managers largely. The information of persons who attend can be set and accomplished in the system module[6]. The second module is experiment teaching including the submitting, statistics and querying of experiment plan. Platform managers compare the schedule of laboratories and experiments with experiment plans submitted by teachers. If there is no conflict, experiments can go on as planned, or the experiment plan must be modified by teachers. The third module is laboratory report including laboratory report submitting of students, laboratory report comments of teachers and

querying of experiment scores finally. In this part, platform managers authorize different rights to different users which can ensure the operation of laboratory report module. These three modules mainly accomplish the first part of archival platform of computer laboratory management, which is the record of business process of experiment teaching from the point of administrators and teachers. Therefore, the two factors of time and situation during risk management of intellectual property in digital libraries.
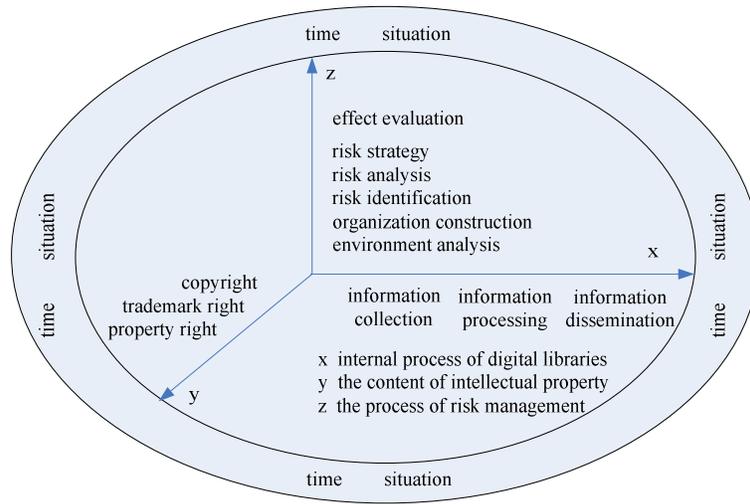
Figure 3 : Frame of risk management of intellectual property in digital libraries

RISK IDENTIFICATION OF INTELLECTUAL PROPERTY IN DIGITAL LIBRARIES

Risk identification is the basis and precondition of risk management. Taking attendance record in attendance module as example, the four classes include register service, register check, database statements generation of register and objects of register data[7]. Among these parts, register service is the interface of data base including of three properties which can access the database and invoke other three classes. Register check also provide four methods which is used to check service rules encapsulated in register service. The four ways provided by database statements generation of register return generated database statements as character string to register service. Objects of register data is new and intensive virtual tables with virtual data. It is used to store data temporarily. The table includes field corresponds to the database table. What is more, table properties can be added at any time according to demands of register objects. Risk identification focuses on risk source and risk stratification.

Risk identification has 3 methods including qualitative identification, quantitative identification and combination of qualitative and quantitative identification. Because of the intangibility of intellectual property in digital libraries, managers can statistic and inquiry the use of all devices according to historical data. There are not only dailies and reports, but also the function of maintenance and appointment. Using this function, teachers can appoint needed software in teaching and students can report device troubles in time which is convenient for managers to maintain devices and install and update software. The module of management and maintenance of devices is mainly used to accomplish the first part of archival platform of computer laboratory management, which is the support of management service of experiment teaching. It's best to combine several ways to identify the problem of intellectual property in digital libraries, which can bring better effect. Risk types and factors of intellectual property in digital libraries have been summed up in TABLE 1 and TABLE 2.

TABLE 1 : Summary of risk types and factors of intellectual property in digital libraries

Risk types		Risk factors
Copyright	Moral rights	publication right, authorship right and right to keep the integrity of a work
	Economic right	Copyright, publishing right, information network spreading right, adaptation right, translation right and collection right
	Neighboring right	Format design right for publishers
Trademark right	Trade mark of production	Right to exclusive use, right of transfer, right of using and licensing, right of succession, extension right and right to use registered mark
	Trade mark of service	
Intellectual property of digital production	Computer software	Publication right, authorship right, use right, right to get payment, copyright, patent(invention patent)
	Database	Publication right, authorship right, right to keep the integrity of a work, copyright, publishing right, information network spreading right, adaptation right, translation right and collection right

TABLE 2 : Matrix of risk identification of intellectual property in digital libraries

Building process	Risk of intellectual property in digital libraries
Information collection Risk of collection of printed books Risk of collection of internet resource Risk of procurement of electronic resources	Risk of copyright: publication right, authorship right, right to keep the integrity of a work, copyright, publishing right, Information network spreading right, adaptation right, translation right and collection right Risk of neighboring right: format design right for publishers Risk of trademark right: name
Information processing Risk of information processing Risk of information organization Risk of digitization of information resource	Risk of copyright: publication right, authorship right, right to keep the integrity of a work, copyright, publishing right, information network spreading right, adaptation right, translation right and collection right Risk of neighboring right: format design right for publishers Risk of properties(computer software, metadata and database): risk of copyright, patent(invention patent) and trademark right
Information transmission Risk of resource sharing Risk of personalized service	Risk of copyright: publication right, authorship right, right to keep the integrity of a work, copyright, publishing right, information network spreading right, adaptation right, translation right and collection right Risk of trademark right: name and domain name

STRATEGIES ON INTELLECTUAL PROPERTY IN DIGITAL LIBRARIES

After the identification and assessment of intellectual property in digital libraries, corresponding strategies should be chosen to solve existing risks. To meet the need of management, the following requests should be meet to keep the system run steadily. Firstly, the design of platform should free mangers from manual operation to make the process more standardized on the basic of a higher efficiency. Therefore, the platform must be stable and reliable. Secondly, the platform runs in universities, so it must be open to lay a good foundation for the management of other specialized laboratories in the future. Thirdly, humanized design should be added into this platform because there are plenty users in the platform. The platform should be easy to operate and convenient for users. Finally, this platform contains a mass of archives information in the database and can be connected through the network, so confidentiality and security measures are of great importance. Specialized person should be authorized to access and modify data information in the progress of storage. When risks can't be identified, out of control after identification and in the endurance of libraries, they can be accepted and the results brought by risks should be taken.

### Influencing factors of risk decision

Among the four strategies on risk including risk control, risk transfer, risk aversion and risk acceptance, investment of infrastructure and hardware equipment in computer laboratories has been increased in most universities. What is more, computer and Internet technology is developing fast, so the development of software has fallen behind compared with hardware. With the problem, some universities has started the research and development of management software in existing computer laboratories and made some achievement. However, there are still a lot of troubles in this respect in many universities. Manual operation brings heavy work and lower efficiency. Mistakes are prone to appear with a large number of archives and inquiries. The data can't be presented to decision-makers with the main method of manual operation, so scientific foundation can't be provided for laboratories' development and decision. Against this background, it is meaningful to design a progress aiming at computer laboratories which shows archival platform of computer laboratory management with convenient and easy-to-operate interface and generated reports.

Starting from the management of computer laboratories, the uppermost point of this platform is to realize standardized management of experiment files. This management includes data recording and establishment of management documents. The former mainly refers to the real-time tracking and recording of data produced in each link of computer management. The latter refers to the generation of files of standardized management, and on this basis other management measures are chosen or new management measures are added. Progress of risk strategy choice is shown in Figure 4.

(2) The progress of risk decision

In particular, this platform aims to make laboratory management archiving, which can collect normalized management files mentioned above. This platform can't only meet demands of work, but also generate normalized management files according to the recorded data. Different demands of different users must be considered during the design of this platform. Managers of devices in laboratories need to track the initial information and use situation of devices and monitor in real time if the computer hardware is damaged or the software need to be updated. Teaching managers request experiment plans provided by teachers, experiment marks of students and attendance rate of students. Teachers and students

need experiment plans, laboratory analysis report and output of final marks. Meeting these differ demands, a clear impression can be gotten to collect above demands of information and integrate these demands into daily management in the form of files, building archival platform of computer laboratory management. From the above demand analysis, this platform is a combination of devices, teaching and platform management. Except for hardware information of devices, the information of maintenance and scrap is also needed in the process of device management. During teaching management, laboratory information and projects corresponding different laboratories must be definite. Teachers and students can land to search experiment plans, type in marks and upload laboratory analysis report. Different users should be authorized different rights in platform management in order to keep security and stability of this platform. Experience and lesson should be summarized constantly to make risk management go well.
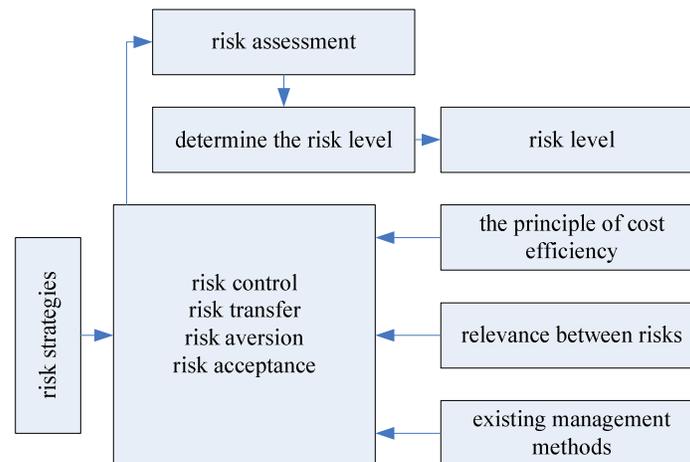
Figure 4 : Progress of risk strategy choice

CONCLUSION

IT has practical implications to put forward the frame construction of risk management mechanism of intellectual property in digital libraries and the analysis of intelligent management of risks in this research. The research of this issue is a heavy and hard job because it is still in its infancy for library professionals. Now the research of risk management of intellectual property has been integrated into the plan of digital library construction by relevant departments to improve scientific nature and stability and further promote the social influence of libraries in China.

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