

# A Preliminary Exploration of the Opportunities and Challenges Faced by the Digital Library in the Era of Big Data

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**Abstract:** With the advent of the digital age, the network academic resources are developing faster and faster, and gradually begin to move towards the direction of replacing the digital library. The digital library also ushered in great opportunities and challenges. In this situation, in order to promote the development of the digital library, it is necessary to set up the big data thinking as soon as possible, and coordinate the resources of the digital library, and expand the depth and breadth of the resources, and process data library resources in multiple ways. At the same time, the data analysis technology should be applied to improve the retrieval ability. In the service, it should combine the actual construction characteristics of the library to promote the initiative and individualized development under the service mode, form a new service concept, optimize the service quality, change the service mode and form of communication, and promote the development of the digital library.

**Keywords:** Big data era; Digital library; Opportunities and challenges; Countermeasures

## 1. Introduction

With the rapid development of information science and technology, human society has gradually entered the "big data era" from the "small data era". The so-called "big data era", also known as "the era of full data," generally refers to data that exceeds the processing power of traditional database systems, which is characterized by massiveness, diversity, high-speed, and variability. In the era of big data, all kinds of data are expanding rapidly in scale, and have penetrated into all walks of life and various business functional areas. They have become important production factors and have profoundly changed the social production pattern. Accordingly, the excavation and application of massive data indicates the arrival of a new wave of productivity growth and the consumer surplus.

## 2. Construction of Digital Library Resources

In the era of big data, the ideas for the construction of emerging digital library resources should be changed. We should expand the coverage of the resources of the emerging library, integrate digital library resources with Internet resources, and allow the digital library to rely on the development of the Internet.

### 2.1. Expanding the field of digital library resources

As the name suggests, a digital library is a library that relies on digital resources. Digital resources are the basis

of its existence, and the number of digital resources is the standard of service quality and service level. From the perspective of the long-term construction of the library, managers of the library attach great importance to the construction of library resources, which are only limited to literature resources such as books, periodicals, newspapers, dissertations, conference papers, patents, standards, and technological reports, etc. In this era of big data, we must develop our own thinking. The construction of digital libraries requires not only the storage of some documents and digitized documents or the expansion of database resources, but also the collection of some public sector information, social hotspot information, and online news information. Even the behavioral information of users using digital libraries and search networks needs to be used as collection resources for digital libraries. In addition, it is necessary to increase the production, collection and storage of renewable resources, including various types of comprehensive data formed through association and mining analysis, so as to truly expand the field of data resources in the digital library.

### 2.2. Increasing the breadth of integration of digital library resources

The characteristic of large data is that the data is massive and complex. The pure literature information can no longer satisfy the needs of digital library users. The resource integration method based on document services will inevitably develop towards the integration of resources based on integrated information services. In or-

der to get the favor of most users, we need to integrate the document information, government information, social information, network information and user information, namely, the integration of the digital library resources and social public resources, and combine the digital library resources with the social and public resources, especially the social resources that the public concerns. On the other hand, it is also necessary to strengthen the integration of resources on the resources of major complex issues. In the background of large data, users' expectations of digital libraries are not limited to the requirements of literature resources. They pay more attention to whether digital libraries can help themselves to solve the real problems in life and work, and expect the resources of digital libraries to help them to eliminate the difficulties. Therefore, the way of information integration based on simple accumulation and simple classification is faced with great challenges under the demand of new users. Therefore, only from an overall perspective, resource integration for difficult and complex issues can truly meet the users' inner expectations.

### **2.3. Enhancing the depth of integration and processing of digital library resource**

The reorganization of resources is the process of re integration and sorting of resources. The result of reorganization and integration is the development and rediscovery of resources. In the digital library, the bibliographic structure of the library itself has a great ability to express knowledge, but this performance is basically concealed inside the digital library. Under the background of large data, we should activate our thinking, and make efforts to link the internal resources of the digital library with the external imagery resources to build the structure of the digital library resource organization which has rich resources and is oriented to all users. In addition, when digging into the vertical aspects of digital library resources, it should shift from the existing development model of library structure to an unknown model and create its own unique model for the development of digital libraries, which is the thought of the integration, processing and development of the digital library in today's society.

## **3. Opportunities and challenges faced by digital libraries in the era of big data**

### **3.1. Challenges faced by digital libraries in the era of big data.**

#### **3.1.1. Independent management mode, backward service concept**

Under our current system, libraries, as a public resource, generally have the property of being managed by the public. In reality, there will be phenomena of lax management and "power arrogance", in which formalism is

more than practical. The way to manage the content of the library is mostly based on the document arrangement and information management, the objects to be preserved are mainly collections of journals, newspapers, and other collections that use paper as the main carrier. Management projects are also limited to the management and maintenance of paper documents and volumes. Under this management mode, we have a strong sense of "focusing on collection and library construction, ignoring the use and practice of books". The manager of the library often only regards the management of the library as a kind of maintenance, but lacks the consciousness of the public service. The library function of the public service is ignored, and even the library is only misunderstood as a symbol of culture, and eventually becomes a form that can not play its real role. In today's society, with the increasing demand for information and more attention to the source of information, the library, as a very strict source of information and important information carrier, has become a more popular source of information. In reality, as a traditional access of knowledge, the library is affected by the big data. Now many young people have gradually alienated from the library. They think that library information can be found on the Internet. Why do they go to libraries? In life, searching for answers through Internet is faster than that in libraries. It can be seen that many people have abandoned the library and pursue more convenient and fast Internet. The traditional library has also been greatly impacted and the digitalization of library is imminent.

#### **3.1.2. Insufficiency of library infrastructure and big data technology**

The library infrastructure directly determines the quality of library services. At present, the internal resources of the library are complex. If the traditional processing methods of using paper as the medium are still used, it will not adapt to the rapid development of the information in the era of big data and be far from meeting the requirements of the development of the times. Therefore, applying the idea of big data to library construction has become the only way for the library industry to rejuvenate. Nowadays, integrating libraries into big data must solve necessary construction of infrastructure, and there are still great challenges in building digital libraries.

Firstly, if libraries are digitized, their information increases greatly, which gives a great demand for the storage capacity of libraries' system. However, it is difficult to meet the requirement of big data era under the existing libraries' mode.

Secondly, with the growing of modern information technology, the variety of data and information is constantly diversified and the content of information is becoming more complex, which makes the daily management of

libraries more difficult and puts forward higher requirements for the technical level of the staff of libraries.

Thirdly, because of the limited funding of libraries, libraries will consider the cost of infrastructure, which delays the development of libraries and impedes libraries to provide users with better services. This has also caused many libraries to downgrade their services, which has caused great obstacles to the development of the library. Therefore, we can draw the conclusion that in today's current situation, the library's infrastructure can't meet the needs of the development of big data.

### **3.1.3. Lack of talents in digital library**

The arrival of the era of big data has had a great impact on the development of libraries. The development of libraries in our country still lacks many contents in adapting to the era. In terms of management mode, service mode, and service area, libraries only stay in the traditional stage of understanding. This cognitive mode of development has caused many obstacles to the development of libraries. To improve the competitiveness in today's rapidly developing society, it is necessary to recruit and cultivate talents that are more suitable for the development of the times in order to meet these challenges and impacts, and to combine the library with large data information in a more modern way. The survey shows that the US Library needs more than 14-19 million talents with research capabilities in this area, and its demand for talents who are proficient in big data knowledge has reached 1.5 million. Although China is constantly making efforts in this area and has reserved a certain number of relevant personnel, but it still lacks talents with isomerization-data analysis and big data mining capabilities. In the library field of lack of talent resources, the cultivation of talents is so important that it is also destined to the dilemma of the development of libraries in China today. Therefore, the difficulty in training talents for library management needs to be solved.

## **3.2. Opportunities for digital libraries in the era of big data**

### **3.2.1. Enriching the information resources of library**

In the era of big data, the digital library is a huge carrier of information and it provides enormous resources that other digital media cannot provide. Compared with traditional libraries where paper books are the main storage objects, digitalized libraries can provide users with better services. In today's society, with the continuous development of big data and the diversified development of online media resources, data-based information is gradually diversified and its breadth is becoming wider and wider. From the perspective of global trends, the total amount of the information industry has been continuously rising, and the information production can be doubled every three years. The information resources stored in the

form of a database accounts for 90% of the total. Therefore, as a carrier of information, libraries should also vigorously develop digitization of information resources, increase the proportion of digital information, and promote electronic storage as an important method for library information storage.

### **3.2.2. Improving the efficiency of the information service of the library**

The arrival of the big data era has greatly changed the way of information service in libraries. Libraries have always been characterized by full data, large information and high value. However, with the continuous development of modern information technology, the information transferring mode using paper of the library has become backward, so the digital library can not only provide more comprehensive information than the traditional library, but also transfer information to users at a faster speed.

### **3.2.3. Improve the technology of data collection, analysis and processing of the library**

The advancement of modern information technology and the development of big data have promoted the technological innovation of new digital libraries. The application of information technology in digital libraries makes library management more efficient in data collection, analysis and processing.

## **4. Strategies for the Library to Deal with the Big Data Age**

### **4.1. Introduction or development of technologies for library big data**

With the continuous progress of modern information technology and the continuous transformation of social economy and people's way of life, the operation mode of the social industry has also entered the era of big data. Similarly, As a service of information industry, the library will also change, and step into an efficient and fast digital era. Therefore, the database of digital library has been built up under the support of big data technology. The most important thing is that the application of big data technology in the library has solved the problems such as the expansion of book information, the slow search of information, the low efficiency of analyzing and retrieving data, and the poor practicality in the era of information explosion. The advantage of big data technology in library has gradually been concerned by most library builders. Besides, big data relies on its powerful database and has excellent information identification function. It can extract potential information hidden under the image from various and complex information through its efficient and intelligent ability to improve the efficiency of users' access. Nowadays, the society is still in the era of

rapid development, and the big data technology is constantly updated and perfected. The use of big data in the library is also a long way to go, and it is more necessary to rely on more advanced technology to improve big data in the library. To sum up, in order to develop digital library, it is imperative to introduce and develop library big data technology.

#### **4.2. Accelerating the training of talents for library big data**

Today, with the rapid development of information technology, libraries must set high standards for their management talents if they want to keep pace with the development of the times. Managers should not only understand the related knowledge of the user discipline and the library management, but also understand all aspects of the development of the information age, and provide an innovative, personalized and intelligent service in the management. From the present situation, we can conclude that the library lack of relevant management personnel, which has a great impact on the development of the library and limits the development of library digitization to a certain extent. In order to cultivate excellent library management personnel, it is necessary to update the concept, and then increase the investment, so as to cultivate talents suitable for the development of modern library.

#### **4.3. Strengthening the opening of data and the construction of data security**

In the information age, the development of libraries is faced with a great challenge, namely, data security. In order to further strengthen the security construction of library information, it is necessary to establish a perfect protection mechanism of personal information from all aspects of the library to protect the users' personal information, personal privacy, the information of books and the national security. We cannot neglect the most fundamental problem for the convenience of big data construction. In order to improve the protection of the library's personal information security, the following aspects should be done.

Firstly, it is necessary to strengthen the professional qualities and professional qualities of library staff and teach practitioners to protect the privacy of users.

Secondly, The relevant procedures must be developed to protect user data, and legal protection measures must be strengthened to counterattack the lawless elements who attempt to misuse user information. Ensure the reliability of the library's database and make users trust.

Thirdly, it is necessary to rely on relevant government departments to formulate relevant laws and regulations to increase the protection of personal information in libraries, and impose severe penalties on those who want to undermine the behavior of big data.

### **5. Conclusion**

According to the above, the development of digital libraries in the context of big data has opened a new chapter in library development. Based on the database of big data, the data resources of the library will be widened greatly, the efficiency of the digital library will be promoted and the service products of the digital library will be enriched. Libraries with new information technology based on big data have changed beyond recognition. In the era of rapid development of information, it is necessary to have a new perspective on digital libraries, think about many aspects such as resource framework, information technology, and services, and use big data to promote the transformation of digital libraries. Only in this way can the future digital library be able to interdependent and develop in the competition with academic resource builders in the big data environment.

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