The Function and Structure of Ecological Services System to Meet Demands of Library Users

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Abstract — The issue of library user demand has been a focus content in the field of library and information. Scholars have been aware of the importance of this problem. Libraries have been focused on the construction, technology development and application of system on user demand, but the study of user requirement has not been rarely implemented. This paper establishes the ecological services system of library user demand, studies the components and function of the system based on the perspective of ecology. Finally, this paper carries out empirical research on the ecological services system of library user demand on the basis of model assumption and verified through the system’s feasibility.

Keywords — Library; User demands; Ecological service system

I. INTRODUCTION

A. Research background

With the development of the society, knowledge economy has gradually become a new economic form, which also proposes new requirements on the work of the library. The globalization of knowledge economy makes great changes in the library environment, and library users are no longer just within the scope of a region [1]. the scope of the users is no longer restricted by space-time, and the computer technology and network technology accelerated the process of implementation [2]. The high level of smart structure of users under the knowledge economy determines the high technology content of library services, which objectively requires to provide corresponding information service and knowledge service and a series of value-added services according to users’ requirements, or they may choose other ways to meet their needs after comparing. At the same time, the environment of knowledge economy makes libraries gradually become a more open environment from a relatively close environment, which inevitably make libraries face the competition and challenges [3]. Industrialization will accelerate the competition between each library, no matter from the view of the development trend and development strategy of the library, or from the perspective of the dissipative structure of library, the future competition between libraries is actually a competition for the user and user demand of resources [4]. Only pay attention to library user needs, and constantly mining, developing, expanding, guiding the user requirements, obtaining user requirements in time, accurately and comprehensively, also, meet and exceed customer demands, the library will be able to seek development in the fierce competition [5].

II. THE STRUCTURE OF ECOLOGICAL SERVICES SYSTEM OF LIBRARY USER DEMAND

A. The conceptual model of ecological services system of library user demand

The conceptual model of ecological services system of library user demand as shown in Figure 1.

(1) The base layer

The base layer provides the most basic architecture for the operation of ecological services system of library user demand, including many basic elements of the system, namely, the physical space for user information activities, the information space for information transfer, basic ecological service concept and institution which guide the library providing ecological services, supporting and guaranteeing the operation technology for ecological services system, participating and providing all kinds of library talents of ecological services [6]. The base layer is responsible to set a tone of the ecological services of
libraries, and determine the congenital conditions of a library for providing ecological services, such as the recognition level of user requirements, the largest ecological capacity of libraries, ecological services concept and core value of libraries, the library institution, the combination of library various technologies and so on.

(2) The data layer

The data layer is responsible for the storage, definition and management of the information in the ecological services system of library user demand, the establishment of the basic mapping relationship between information and user needs, the realization of the information transfer and the information construction based on customer demands [7].

The data layer should belong to the category of base layers, but in order to facilitate the research the relationship between information and library user demand, and highlight the logical relationship between transport layer, processing layer and data layer, therefore taking the data layer as a separate layer [8]. In fact, the data layer is rooted in the base layer, we can regard it as the extension and expansion of base layer.

(3) The processing layer

The processing layer is responsible for filtering, screening, excluding, absorption the information and so on. It is responsible for data analysis, mining and transformation of the library user demand, and realizing the user needs by internalization and externalization. Under the effect of externalization, it integrates information, knowledge, the library institution, library core values and concept, ecological service concept, information technology into the library services and the information products, and it gives guidance to information structure, knowledge structure, resource integration, learning and training, knowledge innovation, the demand analysis work, in order to improve the service ability for library user demand [9].

Under the influence of externalization, it conveys the ecological service concept and service purpose of library user needs, and constructs the ecological space and service mode of library user needs to provide users with ecological service and information products. To put forward library service innovation based on the user demands, and proceed demand production, knowledge production, knowledge integration, knowledge innovation and other work. It will store the processed information to the data layer, on the other hand, transport it to the application layer through the transport layer. In summary, in fact, the main work of processing layer is processing, producing, innovation and transformation [10].

(4) The transport layer

The transport layer is responsible for the identification, collection of library user requirements, and passes the user demand information to the processing layer, then transports the processed information to application layer [11]. Also, it can establish network and channels required by information transfer, optimize the network and channels of information transfer, makes the key node play a role of information transfer, reduce the noise interference in the process of information transfer, reduce the pollution and destruction to the ecological service environment of library user demand, and form the ecological information transfer mechanism.

(5) The application layer

The application layer is responsible for the interaction between the user and the system, and provide services for the interaction among users, librarians and other subjects in the system [12]. Also, it allows library users to express demands, access to the library ecological service and information, submit feedback. It can monitor and evaluate the services information products, the status of library user requirements provided by the system. According to the maximum number of the library ecological capacity, it will timely guide our users demand to spillover.

(6) The service layer

The service layer is respectively embedded in the base layer, data layer, processing layer, transport layer and application layer, and it runs through in the five aspects of the system. The service layer can realize the ecological combining ability of the ecological services chain of library user demand, namely, realizing the combination of users and demands, the combination of demands and services, the combination of services and the libraries, the combination of libraries and knowledge, the combination of the knowledge and users [13]. To keep the balance of the ecological services system library user demand by proceeding ecological services, that is to say, to realize the balance between internalization and externalization, the balance between the main bodies of the ecological services system of library users demand, the balance between user requirements and the concept, institution, core value of the library, the balance between the biodiversity of user needs and library services. It reflects the ecological features of ecological service system, keeps the ecological features of ecological service system and the ecosystem of the ecological service system and the biodiversity of user needs, improves and optimizes the relationship between each subject in the system, and reasonably guide the users demand spillover [14].

III. THE ASSUMPTIONS OF CONCEPTUAL MODEL

A. Research hypothesis

This article focuses on the influence of user requirements development ability, the user needs access ability and the user needs realization ability on the ecological services system performance of library user demand.

In the aspect of the influence factors of user requirements development ability, this thesis proposes the following hypothesis:

H1: The user needs development capability and the ecological services system performance of library user demand presents significant positive correlation. This assumption also contains three sub assumptions:

H1a: Learning ability and user demand development ability presents significant positive correlation.
H1b: User requirement analysis and mining capacity and user demand development ability presents significant positive correlation.
H1c: User motivation ability and user demand development capability presents significant positive correlation.

In the aspect of the influence factors of user needs access ability, this thesis proposes the following hypothesis:

H2: The user needs access capability and the ecological services system performance of library user needs presents significant positive correlation. This assumption also contains three sub assumptions:

H2a: Communication ability and the user needs access ability presents significant positive correlation.

H2b: The regularity of distribution of user requirements and user requirements access ability presents significant positive correlation.

H2c: User psychology and behavior regularity and user requirements access ability presents significant positive correlation.

In the aspect of the influence factors of user requirements accomplishment ability, this thesis proposes the following hypothesis:

H3: User demand accomplishment ability and the ecological services system performance of library user needs presents significant positive correlation. This assumption also contains three assumptions:

H3a: User demand transformation ability and user requirements accomplishment ability presents significant positive correlation.

H3b: User needs matching ability and user requirements accomplishment ability presents significant positive correlation.

H3c: User needs achievement ability and user requirements accomplishment ability presents significant positive correlation.

B. The function model of user requirements development

Development demands for library users is shown in Figure 2. There are differences between every library user demands, embodied in user demand quantity differences, intensity differences, content differences. Therefore, the development work of user needs is very important and imperative. Based on the ecological niche theory to analyze user demands, according to the analysis results to develop user demands, including unceasingly inspiring users, motivating users to proceed information activities, developing potential demands of users, increasing the demand strength of users whose demand intensity is wearing off, maintaining and further improving the demand strength of high strength of the user's needs, continuously expanding the demand width, enriching the user demand level to guide the library users to form the demand structure with good ecological structure [15]. By the further development of user needs, we can understand and grasp the user needs more thorough and comprehensive, at the same time, it also effectively promotes the library user requirements development work, which makes the double helix structure between library service and user requirements is more stable.

C. The function model of user requirements elicitation

The elicitation of library user’s requirements is shown in Figure 3. Taking a variety of ways and means and making full use of library human resources, system platform, network and computer equipment to widely acquire library user need. On this basis, strengthening the control of the timeliness, accuracy of user demand information reflects the efficiency first principle in the era of knowledge-driven economy [16]. At the same time, the obtained user demand maybe is not the final, the most satisfied and the most appropriate demand, therefore it’s necessary to embed the user scenes, analyzing the psychology and behavior of users to switch user needs in order to get the most suitable demand [17].
D. the function model of user demand accomplishment

Accomplishing the library user requirements is shown in Figure 4. On the basis of guiding users demands reasonably and fully accessing the user demands, giving play to the subjective initiative of the librarians, fully mobilizing the library human resources and information resources advantages, combining with the information technology and scientific method to get the restructure knowledge, knowledge production and knowledge innovation [18]. According to the needs of users to solve their problems, providing decision-making reference for the users, associating with the users on science and technology activities, achieving and exceeding customer demand to promote the library user requirements production. At present, because there are differences of information and ability between the library and users, maybe the users cognition cannot keep up with some theoretical research and practice research of library science, for example, the diversification and individuation of user needs make scholars realize they should provide knowledge services to users, but the users have no specific demand for library knowledge service [19]. This requirement is produced by the library through knowledge innovation and service innovation. Therefore, it is necessary to concentrate on the production of user requirements, according to users’ vague, directional demands, combining with the knowledge acquisition, knowledge construction, to knowledge innovation and service innovation to produce the real demand. Meanwhile, according to the service ability of ecological service system, under the combined action of genetic and variation demands, there is need to keep motivating, developing, converting the vague, directional demands to make users have more demands, which can keep the diversity of demand in the system.

IV. RESULTS

This article used AMOS18.0 software for the fitting inspection of structural equation.

(1) model 1

The concept model of the performance effect relationship between the influence factors of user demand development ability and the ecological services system of library user demand, as shown in Figure 5.

![Figure 4](image)

Figure 4 the accomplishment function of user requirement

<table>
<thead>
<tr>
<th>Table 1</th>
<th>THE OVERALL FITTING TESTING RESULTS OF MODEL 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured value</td>
<td>Reference</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>16.628</td>
</tr>
<tr>
<td>df</td>
<td>14</td>
</tr>
<tr>
<td>$\chi^2$/df</td>
<td>1.18</td>
</tr>
<tr>
<td>p</td>
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<tr>
<td>GFI</td>
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<tr>
<td>AGFI</td>
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<tr>
<td>NFI</td>
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</tr>
<tr>
<td>IFI</td>
<td>0.938</td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.0897</td>
</tr>
</tbody>
</table>

According to the fitting testing results above, model 1 in this article passed the fitting test.

(2) model 2

The concept model of the performance effect relationship between the influence factors of user’s demand access ability and the ecological services system of library user demand, as shown in Figure 6.

The overall fitting testing results of model 2 as shown in table 2.

According to the table 2, model 2 in this paper passed the fitting testing.

(3) model 3

The concept model of the performance effect relationship between the influence factors of users’ demand accomplishment ability and the ecological services system of library user demand, as shown in Figure 7.

The overall fitting testing results of model 3 is shown in table 3.
According to the fitting testing results above, the model 3 in this paper passed the fitting testing.

V. DISCUSSION

A. the development capacity of user requirements and library users demand ecological service system

In this paper, the research results show that the user needs development capability and library users needs ecological service system performance present significant positive relationship. This suggests that the stronger the library user requirements development ability is, the more directly can affect the effective operation of library user demand ecological service system. In many influence factors of user requirements development ability, the sort of influence degree from high to low is: user motivation, learning ability, innovation ability, the user needs development environment, analysis and mining capacity, the professional ethics of the librarians.

Supposing the significance level of the P value is 0.158 is greater than 0.001. Analyzing the reason, because the overall planning ability for a long time is not one of the basic abilities of library. The library has no specialized training on overall planning ability, as well as the lack of related research. Users keep putting forward new requirements to libraries, there is a larger difference between the shortage of funds, talents and resources scarcity in libraries. Besides some libraries have faced with the problem of user loss, but not able to take effective measures to change the status. Obviously, some libraries are insufficient in overall planning, how to embody the spontaneous, effective self adjusting ability of ecological service system to reasonably allocate the limited resources to provide quality, ecologic, competitive services. Although there is effect relationship between overall planning ability and the user requirements development ability, but this effect in the statistics of this paper is not significant.

B. user needs access capability and library users demand ecological service system

In this paper, the research results show that the user needs access capability and library users needs ecological service system performance present significant positive relationship. This suggests that the library user needs access to the stronger, the more can directly affect the effective operation of library user demand of ecological service system. In user needs access to many influence factors, the sort of influence degree from high to low is: user needs access to the network, communication skills, customer demand distribution, user psychology and behavior rule.

Supposing H2e significance level of the P value is 0.274 which is greater than 0.001. Analyzing its reason, the library and users have insufficient cognition of the security and privacy of user information. Although the library core value concept has been accepted by a lot of libraries, but in practical work, the concept is not blended into the service, also this work is not the key work in the library. All the security work about user demand information in the library from top to bottom has to be improved. In addition, the
library has no supporting mechanism for user demands security mechanism in the process of service, and some exist in name only. Therefore, the security ability and the support ability of the user needs access is insufficient.

C. user demand accomplishment capability and library users demand ecological service system

In this paper, the research results show that the user demand accomplishment capability and library users needs ecological service system performance present significant positive relationship. This suggests that the stronger the library user access ability is, the more directly can affect the effective operation of library user demand ecological service system. In many influence factors of user requirements access capability, the sort of influence degree from high to low is: user needs accomplishment ability, the ability to match the user demand, user demand transformation capacity, user requirements transcendence capacity.

VI. CONCLUSION

This article carried on the thorough analysis of library user demand and the demand of the library service from the perspective of ecology. The following conclusions is obtained by carrying on the empirical study on the library users demand ecological service system. The user needs development capability and library users needs ecological service system performance present significant positive relationship. The user needs access capability and library users needs ecological service system performance present significant positive relationship. The user demand accomplishment capability and library users needs ecological service system performance present significant positive relationship.

Any scientific research is progressive. Due to the limitation of subjective ability and objective conditions, this article research has certain limitation and insufficiency. The author believes that future research can develop and strive for a breakthrough from the aspects as following: From the ecology angle to study library service which is a new attempt, but the attempt is only a preliminary. More ecology theories should be introduced in the field of library science in the future. Using the ecology knowledge to solve the problems existing in the library service in order to service the user requirements better and realize the user requirements.

CONFLICT OF INTEREST

The author confirms that this article content has no conflict of interest.

REFERENCES