

Research on Construction of Mobile Library-New Media Dual Core System from the Perspective of Ecological Informatics

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Abstract: In China, university libraries embed mobile library into new media platform (WeChat), which can promote information integration between the two systems and improve library services and influence. This study originally combines mobile library with new media as a whole unit under the frame of the theory of Ecological Informatics. The research was determined to sort out the operation process of mobile library-new media dual core information ecosystem, and to design the evaluation index system with the purpose to optimize construction strategy by using the Analytic Network Process. Taking library of Wuhan University of Technology as an example, the results show the evaluation index system guides and benefits its management and operation of mobile library-new media dual core information ecosystem.

1. Introduction

In recent years, new media is more and more popular on campus. The library service provided via WeChat account has entered into a new era by embedded mobile library into WeChat [1]. Many scholars have carried out research in these two fields separately of mobile library and new media, and some cross-field research [2-5]. Other scholars carried out research separately on mobile library and new media from the perspective of ecological informatics [6-8]. Practice and research have proved that the integration of mobile library and new media is the mainstream of library mobile service. However, few scholars have paid attention to importance of a highly coordinated, balanced and stable information ecosystem formed by the two systems. The construction of dual core information ecosystem benefits in the coordination and information integration of the two systems and improve the efficiency of the whole information ecosystem of library, which will improve the quality of library services and library influence.

This paper based on the ecological informatics theory, taking the library of Wuhan University of Technology as an example, constructs mobile library-new media dual core information ecosystem, studies the basic operation process, analyzes the key factors that affect the strategic evaluation of the ecosystem construction, develops the evaluation index system, and finally choose a strategy to constructs a high-performance dual core information ecosystem by the Analytical Network Process (ANP).

2. The Construction

2.1 Construction Basis

Ecological informatics theory puts forward the concept of "information ecological community", which refers to the organization form, similar to ecological community in nature, formed by information and information person under information technology and information environment. The formation process of information ecological community reflects the mutual merger and inclusion between communities, that is, two or more communities adapt to each other and merge, and then form a new community. The evolution of the information ecological community is the result of the interaction of the five mechanisms: social communication, domination, coordination, interaction and mutation. Among them, the interaction mechanism and coordination mechanism realize the optimization of information [9]. According to theory, mobile library and new media can

be regarded as two information ecological communities. Under the current information technology and information environment, they spontaneously interact and develop together to form a new ecological community, "mobile library-new media" which can be regarded as a dual core ecosystem.

2.2 Constituent Elements

Information ecosystem consists of four parts [9]: information, information person, information technology and information environment. As for mobile library-new media dual core information ecosystem, information includes information in mobile library platform, in new media and in physical space. Information person includes information producer, information transmitter, information decomposer and information consumer. Information technology includes Internet technology, network security technology, database technology, data mining technology, artificial intelligence technology. Information environment includes network environment, social environment, legal environment, cultural environment. The structure is shown in Fig. 1.

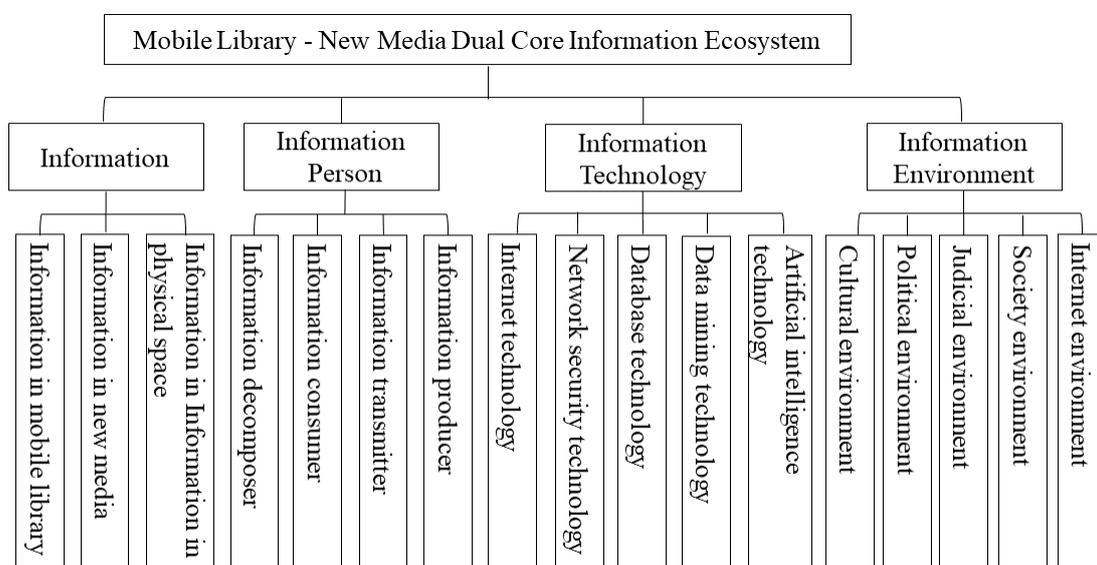


Figure 1 Mobile library-new media dual core information ecosystem elements.

2.3 Operation Process

Information flows in mobile library-new media dual core information ecosystem completes the process including information production, ordering, transmission, consumption and decomposition.

Information producer: patrons, mobile library management team, new media operation team, and management unit and evaluation unit

Information transmitter: coordinate unit (library service quality process control group cross department and level) and mobile library-new media dual core information ecosystem

Information decomposer: management unit and evaluation unit

Information consumer: patrons

Management unit collects information from patrons, delivers the collected information to the mobile library management team and the new media operation team. The two teams select, classify and process information, and add processed information into coordinate unit. Coordinate unit inputs the processed information into dual core ecosystem. Evaluation unit judges the current ecosystem utilization rate, feedback the information to coordinate unit, revise the current strategy and plan, coordinate and reallocate the service resources, change the information production process and the orderly transmission process, and promote to recycle the information of the whole information ecosystem. The operation process is shown in Fig. 2.

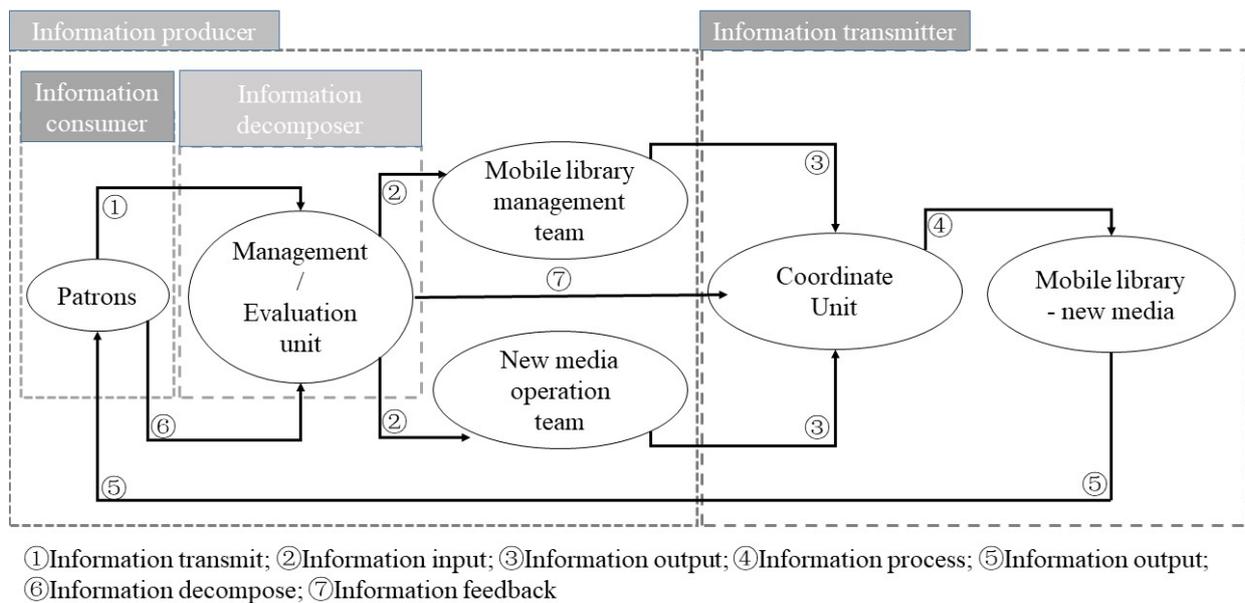


Figure 2 The operation process of mobile library-new media dual core information ecosystem.

2.4 Construction Strategies

The status or importance of the two cores in mobile library-new media dual core information ecosystem is not always the same. Different libraries have different actual conditions and different needs in different stages, so they will inevitably pay different attention to the two cores. Therefore, there are three construction strategies for Libraries: ① mobile library as the main and new media as the auxiliary; ② new media as the main and mobile library platform as the auxiliary; ③ mobile library and new media balanced. Therefore, it is necessary to evaluate different construction strategies, select the best among the best, and further improve the construction of the system.

3. The Evaluation of the Construction Strategies

3.1 Index Design

From the perspective of ecological informatics, the construction strategy evaluation of the dual core information ecosystem should not only consider the service performance indicators of the two platforms, such as visit, browse, download, user satisfaction, but also consider those equally important ecological indicators, the four components, information, information people, information environment and information technology. The design of ecological indicators makes reference to the Wang Wei's research [7] and the design of service performance indicators is based on Wei Qunyi's research [5]. See Table 1 for specific indicators.

3.2 Evaluation Process based on ANP

ANP (Analytic Network Process) which is the suitable method for the evaluation of this study. ANP method, based on AHP (analytic hierarchy process), divides the system into the elements of progressive hierarchy, and takes the feedback and dependence among the elements into account. It is more in line with the characteristics of ecological informatics and better solves the complex dynamic feedback system problem [10]. In order to obtain the influence weight of each dimension on the target, the evaluation process based on ANP in this paper goes through the following steps:

1) Through the consultation and discussion of the experts in the library of Wuhan University of Technology, the dependence and feedback relationship among the indicators in Table 1 are determined.

2) According to the results of expert discussion, the network hierarchy is established in Superdecision, as shown in Fig. 3.

Table 1 Evaluation index of construction strategy of dual core information ecosystem

| Target level | Criteria level | Network level |
|---|---------------------------------|----------------------------------|
| The evaluation of the construction strategy of dual core information ecosystem | Information | I1 Information accuracy |
| | | I2 Information promptness |
| | | I3 Information richness |
| | | I4 Information safety |
| | | I5 Information convenience |
| | Information person | P1 Human resource adequacy |
| | | P2 Data management capabilities |
| | | P3 R&D capability |
| | | P4 Leadership |
| | Information technology | T1 System stability |
| | | T2 System convenience |
| | | T3 System adoption |
| | | T4 System security |
| | | T5 Feedback mechanism perfection |
| | Information environment | E1 Leadership commitment |
| | | E2 Library cultural atmosphere |
| E3 Library rules | | |
| Service performance indicators | S1 Number of visit | |
| | S2 Number of browse | |
| | S3 Number of search | |
| | S4 Number of download | |
| | S5 Conversion rate of publicity | |
| | S6 Patron satisfaction | |

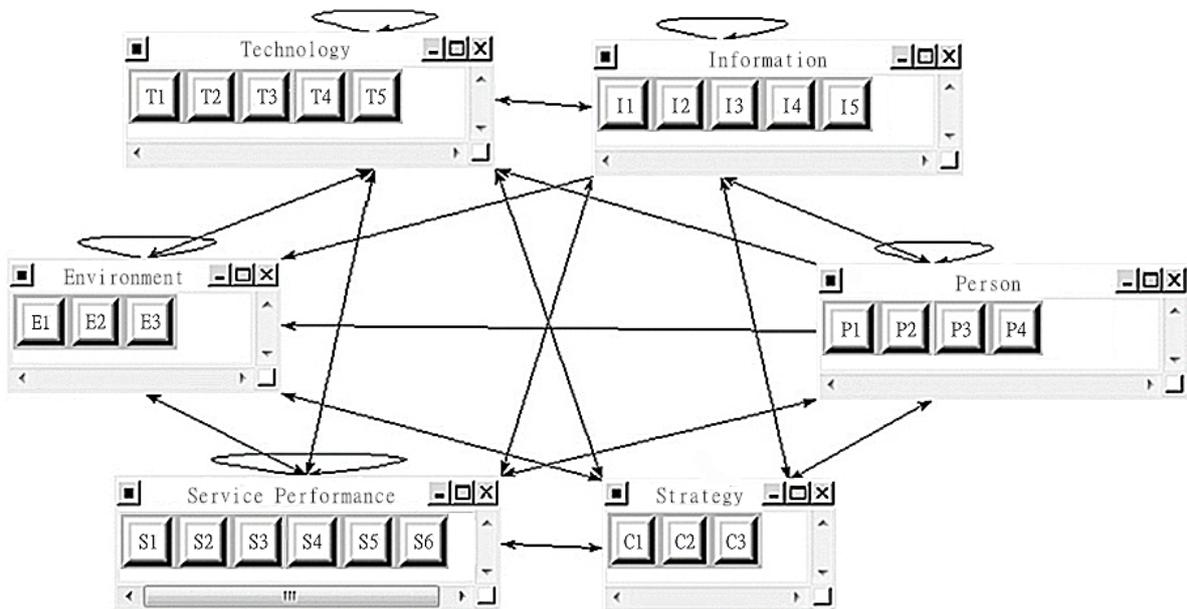


Figure 3 Interaction between indicators

3) The questionnaire (9-level scale) for the comparison of the Superdesicion formation indicators was handed over to the experts group for discussion, and all indicators are set in pair and compared.

4) Input the results of expert evaluation into Superdecision, generate limit super matrix, and determine the weight value of each indicator to the target.

3.3 Result and Suggestions

The weight of each criteria indicator and their values from the most to the least is, information person(0.381635)>information environment(0.180911)>construction strategy(0.165063)>service performance(0.134237)>information technology(0.074714)>information(0.063439).

The weight of each network indicator and their values from the most to the least is, P1(0.110085) > P3(0.107106) > E1(0.086833) > P2(0.085714) > P4(0.07873) > S1(0.06641) > E3(0.056007) > E2(0.038071) > T2(0.022703) > S4(0.02168) > I2(0.021246) > T1(0.021117) > S3(0.017432) > T4(0.01549) > I3(0.013188) > I5(0.01277) > T5(0.009685) > I4(0.008439) > I1(0.007796) > T3(0.005719) > S2(0.003394).

According to the results, the best plan for the library of Wuhan University of Technology is to choose the system construction strategy of both mobile library and new media, with a little more focus on mobile library rather than new media. The following countermeasures are proposed to optimize the mobile library-new media dual core information ecosystem:

1) Reallocate the organization, resources and two systems. It is suggested that the library of Wuhan University of Technology can pay more attention to the construction of mobile library, for example, WeChat account should pay more attention to menu functions and small program development and gradually transfers from the message-oriented subscription account to service-oriented service account, even comprehensive and advanced enterprise account in future.

2) Make rules and regulations to standardize and assess the operation process of mobile library and new media management. The index system can be used as an evaluation tool for library service process control. The library can regularly evaluate the service process according to the indicators and weight values. Through the evaluation, problems in the current service process can be found, and the transformation from afterwards accountability to in-process control can be realized.

3) Make capacity cultivation and development plan. For the construction of mobile library, it requires focus on improving the system R&D ability, increasing the patrons' loyalty of mobile library, and strengthening the human resource management on technical support team. For the construction of new media, it requires focus on the innovation ability of information publicity and marketing, in order to raise the interaction rate of WeChat patrons, and lead patrons to the mobile library eventually. The ultimate goal is to shift from media interaction to realization of service utilization.

4. Conclusion

In this paper, we constructs the basic elements and operation process of mobile library-new media dual core information ecosystem. We point out that the evaluation index system of construction strategy include two categories: ecological index and service performance index. Taking the library of Wuhan University of Technology as an example, we evaluate three different construction strategies and determines the primary and secondary relations of each system in the dual core ecosystem. In addition, the evaluation tools designed in this paper can help the library to identify the key elements of the dual core ecosystem, and take targeted improvement strategies to achieve service process quality control.

The integration and coordination between new media and mobile library still has a huge development prospect in the future, in the wave of new media. Building the dual core ecosystem between new media and mobile library can expand the scope of user groups on the one hand, and tap the service depth of existing user groups on the other hand. Future researchers can further study the pattern design of realization from propaganda to service utilization under the ecosystem of new media and mobile library.

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