

Discussion on Library Management in Academic Teaching and Research from the Industrial Engineering Perspective

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Abstract. To find out a more effective library management system, academic research library management is chosen as the target for the discussion. In the process of carrying out the study, the characteristics of the status of library management and the drive behind the optimization of library management in academic research at home are taken into consideration. Methods like procedure reconstruction, human factors engineering, Therblig analysis and others in industrial engineering are used. It is also on the shoulders of the predecessors in the study of this area that an optimization analysis on library management organization, operation, service quality, business operation, space distribution and techniques. The result shows that the study can serve as a reference to the management of library using industrial engineering methods.

1. Introduction

In this era of knowledge economy, information management is moving toward a digital, globalized, informationalized, networked, and intelligent direction. The future of the library should have a whole set of standards [1], a high level of service [2], and high-calibre staff to meet the readers constantly changing reading habits [3]. However, library management is faced with the problem of informatization without training and modelling, which results in the failure of its management system to play its due functions in the era of information and industrialization. Because industrial engineering can achieve the goal of improving library management efficiency by improving library management, industrial engineering is a necessary for the scientific management of libraries in China [4]. The research at home and abroad shows the introduction of industrial engineering method in the process of management has technical feasibility, economic feasibility and social feasibility [5,6]. To solve the problem of library management, it is necessary to improve the quality of library service by introducing industrial engineering.

Through the management characteristics of teaching and research of university library, motivations of library management optimization are analysed and discussed in this study. Through business process reengineering, the introduction of industrial engineering of therbligs analysis, human factors engineering service quality improvement tools and other methods, we analysed library business process and organization structure, business operation, library reading environment, the quality of service and information technology. It is hoped to be able to effectively improve the management ability and level of teaching in university library, and gradually improve the theoretical system of library service ability and efficiency.

2. Methodology

This paper analyses and discusses the management of the teaching and research type library from the angle of industrial engineering. First of all, based on the current library management system theory, this paper expounds the characteristics of the management of teaching and research library in China, and puts forward the demand for the management optimization of our teaching and research library. Then according to the requirements, methods in industrial engineering, including, the process of restructuring, human factor engineering, therbligs analysis and quality improvement tools and

other methods are used for the optimization analysis. The analysis covers: organization of teaching research libraries in China, business processes, service quality, business operation, space layout and information technology and other aspects. At last, the theory of optimization analysis is used to carry out specific management optimization and practice analysis for a university library management, and suggestions for improving library management put forward.

Based on the literature research, methods adopted in carrying out the study includes: literature research and practical investigation method, list method, case analysis method. Reference background is the management characteristics of teaching and research of university library and the need to optimize it. Summary of domestic and foreign scholars to the university library organization is also made. Their views include: library arrangement, business process operation and management standards, environmental design, service level the literature. Bearing all this in mind, the research ideas and related research were put forward. Through the field investigation of library, data of library management status were collected, analysed and compared. The example of a university is taken to make a conclusion after detailed investigation and analysis.

3. Results and Discussion

3.1 The Management Characteristics and Optimization Motivation of the Teaching and Research Type University Library

Teaching and research university library is a guarantee system and teaching information center for their institutions. It provides services for the purpose of teaching and research, so the main features of this kind of library are: teaching and research, emphasizing both graduate and undergraduate education, uneven development among disciplines. In the background of the pluralistic development of information technology, the traditional way of library work shows the lack of adaptation to the current development needs. Such outdatedness is reflected in: borrowing is done after manual retrieval in library; without the introduction of new equipment; outdated work philosophy; reference service limited to simple answers, lack of depth to the information service in libraries and schools; lack of communication in scientific research organizations.

The traditional library management model has not adapted to the current development, so it should be adjusted according to its own characteristics to meet the changing needs of the readers. The main motivation to optimize teaching and research libraries in China is to continue to expand in the performance of the service functions of library. Teaching library needs to transform; in an informationalized environment, the traditional business process appears rigid, needs to be adjusted to meet the needs of teaching and research reality; voluntary operation, needs to establish a standardized system to achieve a unified management; service quality should be improved; the layout is not reasonable and needs to be adjusted; needs to provide better services to improve the management level of automation construction.

3.2 Optimization and Analysis of Library Management in Teaching- and Research- Oriented Colleges and Universities

The core of the current information age is the readers. Therefore, a reader centered business process of library should be built, reflecting the requirements of the people-oriented and reader centered era, so as to meet the changing needs of readers. This paper applies industrial engineering method to optimize and improve the management of teaching and research university library. We need to follow the principle of people-oriented, feasibility, timeliness and continuous improvement.

This paper details its optimization from the following aspects: optimize the organization of library restructuring; reader centered; establish streamlined business processes, in order to adapt to the flat organization changes in the external environment; process management theory and method of the use of industrial engineering in the restructuring of the workflow; business operations are standardized, reduce manpower waste, improve efficiency; enrich resources quality, improve the quality of librarians, optimize the environment of library; combine modern information technology to transform the work flow.

3.3 The Practice of the Optimization of Library Management in the Teaching and Research Type University

The specific practice object of this study is a comprehensive university covers the study of literature, science, medicine and engineering. The university is a comprehensive university with focus on undergraduate education. With the expansion of the scale of school, the library has 21 storeys, and the management system used is a foreign language management system with high degree of automation in China. Although the library is gradually optimizing management and has achieved some results, there are still some problems. From the personnel structure, master degree only accounted for 10% of the total number, suggesting the lack of high level talents; a lack of library resources relative to that of the readers' growing needs; need to expand the library space as much as possible and add large number of seats; achieve 24 hours of service in order to meet the requirements of readers as much as possible.

The present organizational chart of the university library is illustrated in Figure 1.

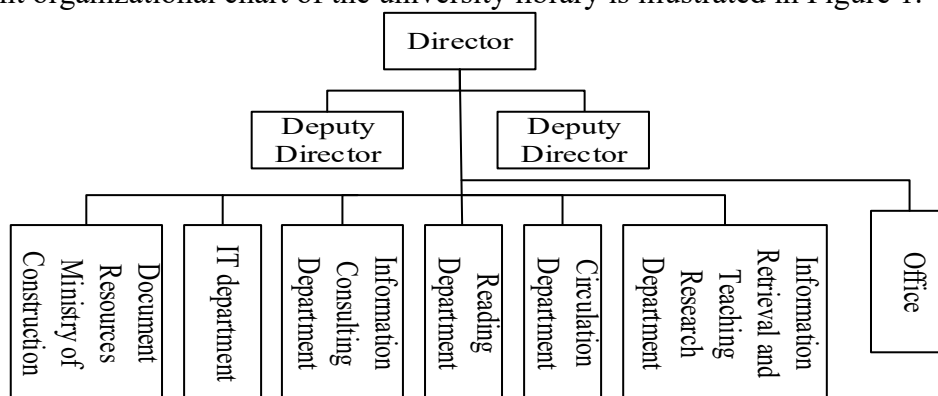


Figure. 1. Organization chart

This is a typical linear functional organization structure, which is relatively rigid and inelastic, not conducive to collaboration, and difficult to mobilize the enthusiasm of members of the organization. It is also not conducive to the diversified development of organizations. In combination with the teaching research goals of the university, the university library should establish a subject oriented flat enterprise organization structure, as shown in Figure 2. This type of organization can adapt to the requirements of the specific development stage and development level of the library, and it is scientific and reasonable.

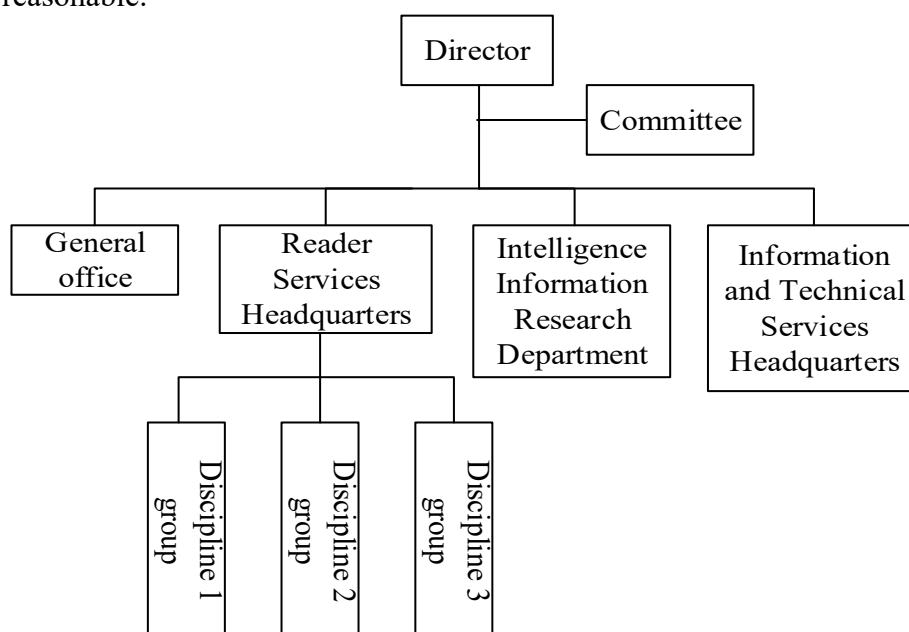


Figure. 2. Flat department system

The library business process includes resource acquisition, integration and service to users. Take the library procurement business as an example, it is found that information collection in the

procurement in the university is largely arbitrary; the procurement processes complex; responsibilities of each personnel not clearly state; lack of unified scheduling; low business processing efficiency; In view of these problems, it is suggested to put more effort in the two steps: bidding and expert certification.

In this paper, we use the five factors of the fishbone diagram of the industrial engineering to analyze the service quality. The five factors are the following: the librarians, bookshelves, books, reference and environment. From the analysis, the following conclusions are drawn, as shown in Figure 3:

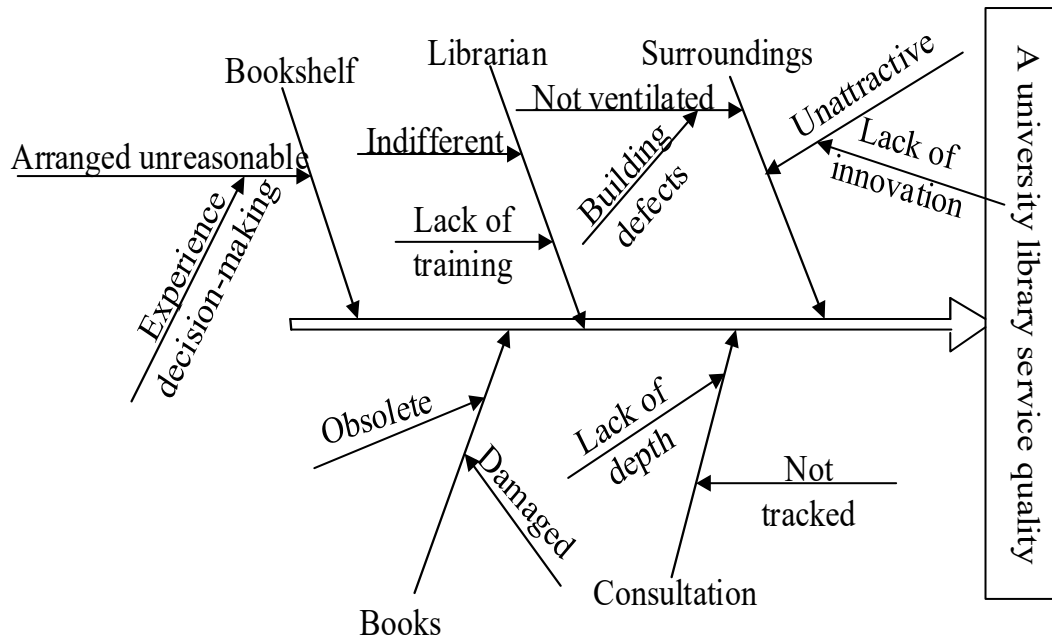


Figure. 3. Fishbone map.

At the same time, according to the 2015 readers' complaints, the Pareto map is thus obtained, as shown in Figure 4.

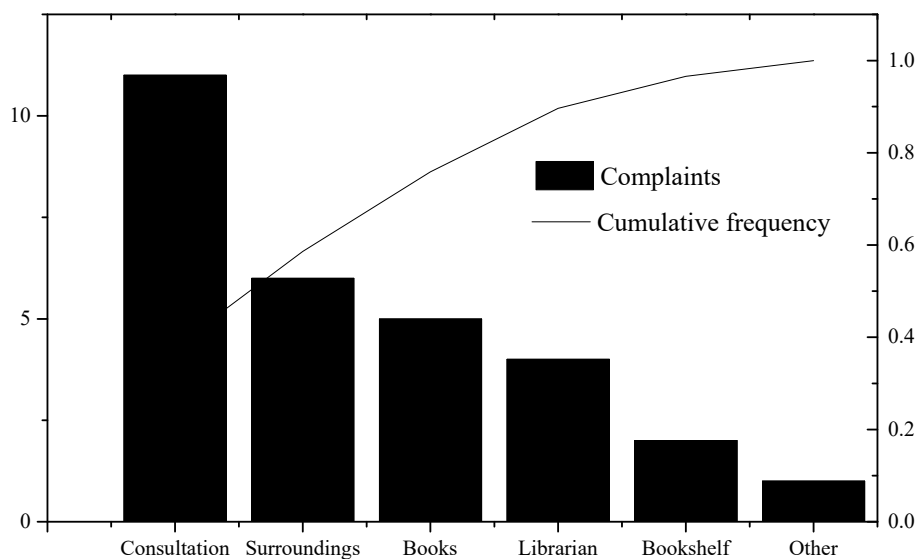


Figure. 4. Pareto map

From the figure, it can be obtained that problems and causes of which of the library: difficulty in finding the book, librarians are not familiar with the classification of the library and reading room, too many man-made factors, not immediate enough to return the book back to the shelf; librarian's

attitude is not warm enough, which are not appealing to students. Reasons for the lack of training are: low entry barriers; a need of high level talent; lack of librarian service consciousness; the lack of resources; lack of attraction for students. The reference and consultation results lack depth, the hardware service setting is not reasonable; the environment is not ventilated; the design is not innovative.

To the above problems, the following proposes are made: the introduction of RFID Technology, a self-service machine system which places books to their right places; interlibrary cooperation and other methods to achieve maximum efficiency in the use of funds and improve the quality of books; maintenance of the regular hardware inventory, set a feedback wall to process any problems; evaluate the indoor environment to see its ventilation and green coverage; strengthen the WIFI coverage, so that the reader's network is not limited, a variety of electronic equipment are supported in the library; use a variety of ways for library service publicity to attract readers.

In addition, the business operation optimization of the library is also analyzed. More in-depth analysis of every mobile agent needs to be made. Serious empirical research from the library is also needed to set up a set of standard business operations with strong feasibility. The use of space can be optimized from the following aspects: provide self-service bike service, reduce the inconvenience for remote; re-planning of the overall layout of the library and functional zoning; idle space should be supported for study and other learning behavior; strengthen the construction of digital library, reduce the use of space.

4. Conclusion

Based on the analysis of the current management characteristics of teaching and research library, this research studied the motivation of management optimization, investigated the current state of library management, and worked out the problems existing in library relationship at present. Problems exist in librarians, bookshelves, books, environment and consultation were discussed. Aiming at these problems, a series of optimization methods of library management were put forward by using process reengineering, reengineering and other technical methods. The current mechanism system should be innovated and reorganized, and advanced technology introduced. Try to draw high-level management personnel, increase investment in data purchase and improve the reading environment, so as to achieve the optimization of library management system. Through the practice of industrial engineering theory and method in the management of teaching and research library, it is found that this method can make up for some shortcomings of traditional management methods and promote the modernization and scientific construction of libraries.

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