

Practice Exploration and Necessity of the New-Quality Productivity Driving the Intelligent Development of Libraries—Taking University Libraries as an Example

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Abstract: *Relying on the strong support of underlying core technologies, new quality productivity promotes the intelligent development of libraries in all aspects. Under the framework of new quality productivity, it is necessary to accelerate the development of university libraries and promote the technologicalization of knowledge and the intellectualization of technologies. The integration of the new quality productivity and the intelligent development of university libraries will drive the intelligent and high-quality development of libraries, and the transformation of its theoretical value into an application empowerment effect has practical significance.*

Keywords: New Quality Productivity; Smart Library; Practical Effect; Necessity.

1. INTRODUCTION

New quality productivity relies on the use of cutting-edge technologies such as modern information technology, artificial intelligence, and green energy. Innovation-driven is the most prominent feature of new quality productivity. It also has remarkable characteristics of dynamism, foresight, sustainability, and greenness [1]. New quality productivity takes scientific and technological innovation as the core driving force and continuously conducts management innovation, model innovation, and production innovation. For example, library management systems and AI, medical image processing and related engineering technologies and AI, automated laboratories, and gene editing create and give birth to new economic growth points in multiple dimensions, such as concepts, technology, and production modes, with the goal of carrying out comprehensive innovation and transformation.

New-quality productivity strongly emphasizes the deep integration of knowledge and technology, focuses on organically combining various knowledge resources with advanced technologies, and involves the construction of an innovation system covering all fields, all-round, and multilevel business models and management concepts to increase productivity potential and achieve the technicalization of knowledge and the knowledgeization of technology. This integration not only promotes the transformation and upgrading of industries but also encourages and drives the efficient development of emerging industries. Looking at the future development trend, it lays a solid foundation for the sustainable development of the economy and society.

2. THE RELATIONSHIP BETWEEN NEW-QUALITY PRODUCTIVITY AND LIBRARIES

The relationship between new-quality productivity and libraries is as follows: Libraries support the theoretical research and practical exploration of new-quality productivity by providing high-quality information resources [2], and libraries improve the public's understanding and application ability of new-quality productivity through education and training. The relationship between new quality productivity and libraries is shown in Figure 1.

3. PRACTICAL APPLICATIONS OF NEW-QUALITY PRODUCTIVITY IN THE INTELLIGENT DEVELOPMENT OF LIBRARIES

3.1 Data-driven Construction of Smart Libraries

Big data technology is crucial in the construction of smart libraries. Readers' retrieval records and browsing histories are collected through websites and mobile applications, and readers' behavioral trajectories during digital resource access, footfalls in different areas, seat occupancy, etc., are understood. After the collected data are cleaned and preprocessed, data analysis algorithms are used to deeply mine the potential laws and values behind the data, providing comprehensive and detailed materials for library management and services. For example, the library management system records readers' borrowing behaviors, including information such as the categories of borrowed books and borrowing and returning times; through association analysis, the combinations of books that readers often borrow are identified, providing a basis for adjusting the layout of the collection resources; and using clustering analysis, readers are classified according to their reading interests and behavioral patterns to provide personalized services for different groups.

In terms of precise service push, whether it is the push of relevant topic literature, new book recommendations, or notifications of specific activities, they can accurately reach the target group ^[3] on the basis of the reader profile. On the basis of the data analysis results, the library can achieve a reasonable allocation of resources. In accordance with readers' borrowing needs and resource usage frequencies, the collection structure is reasonably adjusted, the procurement volume of popular resources is increased, the storage locations of resources are optimized, and the accessibility of resources is improved. Moreover, on the basis of the predicted footfalls at different times, the staff and opening areas are reasonably arranged to improve service efficiency.

3.2 Intelligent Service Innovation and Application Expansion

Intelligent retrieval is an important application of artificial intelligence in library services. With the help of natural language processing (NLP) technology, intelligent retrieval can accurately locate relevant resources in a vast amount of literature by asking questions in natural language and having the system understand the semantics. For example, when "The latest research results on artificial intelligence in the field of medical image diagnosis" is entered, the intelligent retrieval system can quickly provide academic papers, research reports, and relevant books, with high retrieval efficiency and accuracy, saving the time and effort of readers in searching for resources.

Self-service borrowing and returning equipment in libraries that rely on Internet of Things technology facilitates the provision of self-service borrowing and returning services. By placing the books in the designated scanning area, borrowing and returning books can be automatically completed by scanning mobile phone QR codes, facial recognition, and campus cards, which not only reduce the waiting time but also alleviate the work pressure of library staff, enabling them to devote more energy to in-depth services such as knowledge consultation and reading promotion.

RFID or 3D intelligent navigation systems are among the achievements of the application of Internet of Things technology. The layout of library spaces is complex, and readers may spend much of their time looking for specific books or areas. An intelligent navigation system provides real-time navigation services for readers by deploying sensors on bookshelves and key locations and combining them with indoor positioning technology [4]. When readers enter the target book or area on the terminal device, the system can plan the best route to guide readers to reach quickly, improving the efficiency of reader activities in the library.

In addition, service devices such as ITC intelligent voice and self-guided tours also provide more convenient reading guidance for readers. When readers wear intelligent voice devices and browse the bookshelves, the devices automatically identify the book information and introduce the book content, author background, etc., through voice, facilitating the ability of readers to quickly understand the general situation of the books and decide whether to borrow. Readers can obtain the required resources more independently and conveniently and enjoy a more personalized and intelligent reading experience.

3.3 Interdisciplinary Integration and the Upgrade of Knowledge Services

In academic research, libraries cooperate deeply with various disciplines. With respect to complex interdisciplinary research topics, they integrate knowledge resources from multiple disciplines and develop specialized knowledge service platforms. For example, in a cross-research project between biomedicine and artificial intelligence, the library, which is based on AI, uses NLP for text mining and collects cutting-edge research results, clinical case data, and algorithm model materials in related fields, providing researchers with a one-stop knowledge acquisition channel to facilitate the smooth progress of interdisciplinary research.

In terms of cultural inheritance and education, libraries collaborate with multiple disciplines, such as history, literature, and art. Through a variety of cultural activities and forms, such as holding historical and cultural lectures [5] and art exhibitions, they organically integrate knowledge from different disciplines and spread knowledge to students in a vivid and interesting way to enhance students' cultural qualities. Moreover, they cooperate with the discipline of education to develop interdisciplinary educational resources to support school teaching and cultivate students' comprehensive qualities and innovative thinking.

In addition, libraries cooperate with disciplines such as data science and information management, use advanced technologies such as data analysis and knowledge graph construction to deeply mine and integratively correlate knowledge resources, realize the visual display and intelligent push of knowledge, meet the diverse needs of users in research and work, and provide more professional and personalized knowledge services for different user groups in terms of learning.

4. NECESSITY OF DRIVING THE INTELLIGENT DEVELOPMENT OF LIBRARIES BY NEW-QUALITY PRODUCTIVITY

4.1 Optimizing Library Resource Management

New quality productivity enables precise procurement by deeply understanding readers' reading preferences, subject needs, and resource usage frequencies through big data analysis. By mining these data, the demand trends for different types of resources can be predicted, thus avoiding blind procurement in the procurement process and ensuring that the purchased resources highly match the actual needs of readers, thereby improving the utilization rate of procurement funds.

In terms of resource allocation, with the help of the resource management system, the library collection resources can be effectively adjusted dynamically and optimized according to resource usage, reader feedback, and the dynamics of subject development. For example, popular or highly demanded resources are placed in more accessible locations to increase the circulation rate of resources; for resources with low utilization rates, they are reasonably integrated, or the storage method is adjusted to free up more space for storing popular and urgently needed resources.

In terms of intelligent management, new quality productivity has led to major changes in library resource management. Internet of Things technology can monitor information such as the physical locations of library resources and borrowing status in real time, enabling visual management of resources. Moreover, artificial intelligence technology can automatically classify, retrieve, catalog, and inventory all resources, further improving management efficiency and reducing human error. In terms of these means, library resource management is more efficient and intelligent, better meets readers' needs and enhances the overall service level.

4.2 Meeting the Needs of the Times and Developing Innovative Models

Readers hope that libraries can provide a one-stop knowledge acquisition platform to integrate various digital resources, breakdown the barriers between different databases and resources to achieve cross-platform and cross-domain information retrieval. Moreover, readers' demand for mobile reading and access to information anytime and anywhere is also increasing. They expect libraries to provide mobile service applications so that they can access library resources at convenient times and locations.

In addition, readers also desire that libraries can offer personalized knowledge recommendation services. By analyzing data such as readers' reading history and interest preferences, books, articles, and research reports that meet individual needs can be accurately pushed to save readers' time and energy in screening information. Thus, they can quickly and accurately obtain personalized knowledge resources and seek a more efficient, intelligent service experience.

4.3 Enhancing Library Service Quality

In terms of personalized services, big data technology is the key support. By collecting multidimensional data, including readers' borrowing records, retrieval history, and stay time, a reader service platform is built using big data mining algorithms to efficiently respond to users' knowledge needs and readers' interest preferences, including services such as providing personalized book recommendations to readers and formulating suitable

reading plans. For example, for a reader who frequently borrows history books, the system automatically pushes materials such as the latest research results in related fields and interpretations of popular historical events, facilitating this reader to improve the accuracy and satisfaction of obtaining multifaceted historical knowledge.

AI empowers intelligent customer service to answer readers' inquiries and questions at any time. Intelligent customer service can aid in understanding natural language, quickly respond to readers' questions, and provide accurate information and solutions. With respect to complex problems, it can also transfer to human customer service in a timely manner to achieve an efficient service mode of human-machine collaboration. Moreover, with the help of machine learning algorithms, intelligent customer service continuously learns and optimizes answer strategies, and the service level continues to improve.

New quality productivity also helps libraries expand service channels. For example, libraries broaden the development of service platforms such as mobile applications and WeChat official accounts, and readers can access the library's digital resources, handle borrowing procedures, reserve seats, etc., anytime and anywhere through their mobile phones. In addition, libraries use social media platforms to carry out online activities, such as expert live lectures, reading discussion meetings, AI retrieval courses, paper writing courses, etc., attracting more readers to participate, overcoming the limitations of time and space, expanding the service coverage and influence of the library, and enhancing readers' sense of identity and dependence on the library.

5. CASES OF THE NEW-QUALITY PRODUCTIVITY DRIVING THE INTELLIGENT DEVELOPMENT OF LIBRARIES

5.1 Practical Application in University Libraries

Taking the university library as an example, it has rich collection resources. As an important local cultural dissemination hub, the library covers various academic fields, and its service scope not only serves the students of the university itself but also radiates to the whole city and surrounding areas.

At the technical level, big data technology is the core support. From borrowing records to the browsing duration of digital resources, from search keywords to participation in activities, etc., through in-depth data analysis, a precise reader profile is outlined, providing a solid foundation for personalized services. Moreover, an intelligent service system is built with the help of artificial intelligence technologies such as DeepSeek and Chat-GPT. Intelligent customer service can answer readers' inquiries in real time, and its natural language processing ability enables it to understand complex questions and provide accurate answers [6]; an intelligent recommendation system, which is based on the reader profile, pushes books and information that match each reader's interests, greatly increasing the probability of readers discovering their favorite resources. Internet of Things technology is also widely used in the physical space management of libraries to achieve device interconnection. Sensors such as RFID on the bookshelves monitor the location of books in real time to ensure quick positioning; lighting, air conditioning and other devices are automatically adjusted according to the number of people in the library to optimize energy use.

In terms of implementation strategies, the service process is reengineered. The borrowing procedures are simplified, and readers can complete operations such as reservation, borrowing, and renewal through the mobile terminal. Moreover, service channels are actively expanding, and an online service platform is vigorously developed. A mobile application with rich functions is launched, covering functions such as digital resource reading, online lecture viewing, and online reservation activity registration, allowing readers to enjoy library services anytime and anywhere. The acquisition department purchases resources on the basis of the analysis of readers' needs, the circulation department optimizes resource allocation, and the technical department provides professional equipment and knowledge support, forming an efficient operating service chain to jointly promote the intelligent development of the library.

5.2 Case Results and Value

This case provides important inspiration for the intelligent development of other university libraries. First, it is necessary to attach importance to the introduction of technologies, such as new technologies such as the Internet of Things, big data, and artificial intelligence, to provide technical support for intelligent development. Through technical means to collect and analyze data, the personalization of services and the intelligentization of resource management can be achieved. Second, it is crucial to adhere to the concept of putting readers first. Starting from readers' needs, service processes should be simplified, service channels should be expanded, and a convenient and

efficient service experience should be provided. Third, cross-departmental collaboration and resource integration are key. Define departmental barriers, achieve data sharing and collaborative work, and form an efficient service chain. In addition, continuous innovation and exploration are important factors in intelligent development.

6. CHALLENGES AND COUNTERMEASURES FACED BY THE SMART DEVELOPMENT OF LIBRARIES DRIVEN BY NEW-QUALITY PRODUCTIVITY

6.1 Challenges

Driven by new quality productivity, although technologies such as big data and artificial intelligence support the intelligent development of libraries, the pace of technological update and iteration is extremely fast, making it difficult for libraries to always keep up with the forefront. For example, although natural language processing technology has been applied to intelligent retrieval and customer service, problems with low accuracy still exist in the face of complex semantic understanding and multilingual interaction scenarios. The compatibility and integration between different technology systems are poor. When existing management systems, digital resource platforms, etc., in libraries are integrated with new technologies, situations such as inconsistent data formats and mismatched interfaces often occur, resulting in poor information circulation and affecting the coherence and efficiency of intelligent services.

In terms of funds, purchasing advanced technical equipment, building high-performance servers, introducing professional software systems, etc., all require a large amount of capital investment. Subsequent system maintenance, upgrades, and data storage also continuously generate costs. However, most libraries have limited funds and rely mainly on financial allocations, making it difficult to meet the long-term investment needs of intelligent development. This has made it impossible for some advanced technologies and projects to be successfully implemented.

Talent shortage is also a major challenge. The intelligent development of libraries requires compound talent who understands both library operations and advanced technologies. However, in reality, such talent is scarce. On the one hand, the traditional talent team in libraries is composed mainly of library and information professionals, whose ability to master and apply new technologies is insufficient; on the other hand, professional talent with technical capabilities such as big data analysis and artificial intelligence development often prefer high-paying fields such as internet companies, and it is difficult for libraries to attract and retain such talent. The lack of talent has led to numerous difficulties for libraries in the application of new technologies, system maintenance, and the development of innovative services, restricting the pace of intelligent development.

6.2 Countermeasures

Faced with the challenges associated with the intelligent development of libraries driven by new quality productivity, effective countermeasures should be taken in multiple aspects. Technologically, libraries should strengthen cooperation with research institutions, technology enterprises and schools. By establishing an industry–university–research cooperation mechanism, joint efforts should be made in technology R&D and innovation, and frontier technologies should be introduced into the library field in a timely manner. With respect to the issue of technology compatibility, a dedicated technical team should be established to evaluate and transform existing systems, actively participate in the formulation of industry technical standards, and promote the standardization and normalization of library intelligent development technologies. To ensure seamless docking of different technical systems, unified data interfaces and standard specifications should be formulated to achieve smooth information exchange and sharing.

In terms of funding, libraries should broaden the channels for raising funds. Actively strive for the government to increase financial investment in the intelligent development of libraries. Explore diversified sources of funds, such as carrying out multiparty cooperation with enterprises and research institutions and obtaining funds through means such as corporate sponsorship and donations.

In terms of talent cultivation and introduction, libraries should formulate long-term talent cultivation plans, provide regular technical training and further education opportunities for existing employees, encourage everyone to actively learn new technologies such as artificial intelligence and big data analysis, and enhance their

professional capabilities. Cooperate with various universities to carry out customized talent cultivation projects, offer professional courses or training programs related to the intelligent development of libraries, and cultivate compound talent that is proficient in both library operations and advanced technologies. In terms of talent introduction, the working environment should be improved, a flexible employment mechanism should be established, and the salary levels and welfare benefits of technical personnel should be increased to attract technical talent and experts and provide intellectual reserve support for the intelligent development of libraries.

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