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Research on the Performance Evaluation Path of State-owned Asset Management in Colleges and Universities Based on Big Data

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Abstract: With the rapid development of information technology, the application of big data has gradually deepened in various fields, bringing new opportunities and challenges to the management of state-owned assets in colleges and universities. Currently, colleges and universities generally face problems in the performance evaluation of asset management, such as insufficient attention, lack of indicators, low efficiency caused by reliance on manual operations, and distortion of basic data. These issues make it difficult to meet the requirements of modern governance. Therefore, it is necessary to rely on big data technology to build a performance evaluation platform that integrates data collection, processing, analysis, and feedback, establish fair, transparent, and traceable evaluation principles, and form a closed-loop management process. Based on this, this paper analyzes the necessity of applying "big data" management to state-owned assets in colleges and universities, identifies the problems existing in the performance evaluation of state-owned asset management in colleges and universities under the thinking and technology of big data, and expounds the path of constructing the performance evaluation system for state-owned asset management in colleges and universities from the perspective of "big data", so as to realize the intelligent management of assets in colleges and universities.

Keywords: Big data; Colleges and universities; State-owned asset management; Performance evaluation

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1. Introduction

Against the background of the rapid development of higher education, the scale of state-owned assets in colleges and universities has continued to expand, and the types of assets have become increasingly complex. The traditional management model can no longer meet the needs of modern governance. In recent years, the state has continuously strengthened policy guidance and system construction for the management of state-owned assets in colleges and universities, emphasizing the improvement of asset utilization efficiency, the prevention of asset loss, and the realization of value preservation and appreciation. The Ministry of Education and relevant competent authorities have successively issued documents, requiring colleges and universities to establish and improve asset management systems, promote informatization construction, and strengthen performance evaluation mechanisms. However, in actual operation, some colleges and universities still remain in the stage of information account management, lacking systematic data integration

capabilities and scientific performance evaluation methods. This leads to unreasonable resource allocation, idle waste, and the long-term inefficient operation of some assets. The performance evaluation model built based on big data can break down information silos, integrate multi-dimensional data such as finance, equipment, scientific research, and teaching, form objective, quantifiable, and comparable evaluation results, and promote the transformation of asset management from "emphasizing quantity" to "emphasizing quality".

2. The Necessity of Applying "Big Data" Management to State-owned Assets in Colleges and Universities

2.1. Big Data Drives Data-driven Asset Management Decisions

Given the continuous increase in state financial fund investment in the field of higher education, the scale of state-owned assets held by colleges and universities has also expanded accordingly[1]. Against this backdrop, improving the utilization efficiency of state-owned assets in colleges and universities has become an increasingly urgent task, and thus the implementation of state-owned asset performance management is particularly crucial. Guided by the core needs of asset performance management and making full use of big data concepts and advanced processing technologies, it is possible to achieve accurate capture, systematic organization, and in-depth analysis of asset data and information in colleges and universities[2]. This is of significant benefit to supporting management decisions, as such decisions will rely more on data and in-depth analysis rather than mere empirical judgments or intuitive speculation, thereby ensuring the timeliness and accuracy of decisions.

2.2. Big Data Analysis Facilitates Process Monitoring

In the era of big data, the continuous evolution of information technology has made it possible to obtain the whole-process data of assets throughout a series of links, from allocation, accounting, reimbursement, maintenance to disposal. At present, various asset management processes have basically established synchronized digital operation standards[3]. With the help of big data and the Internet of Things (IoT) technology, it is possible to achieve refined management and statistics of information related to the quantity, value, and location of various assets. This can fully record all types of asset information, covering multiple dimensions such as their acquisition channels, usage status, depreciation accrual, current value, and even final disposal. It forms a whole-process dynamic record and strict supervision of the life cycle of all assets, ensuring that every asset record is traceable. In turn, this provides a solid and effective basis for the rational allocation of assets, the optimal distribution of resources, the scientific formulation of financial budgets, the accurate support for management decisions, and the objective implementation of performance evaluation[4].

2.3. Big Data Provides Channels for Multi-stakeholder Participation in Evaluation

The whole-life-cycle management of state-owned assets in colleges and universities, from their initial allocation to the final disposal stage, inevitably involves the collaborative operation of many functional departments. Under the traditional management model, each department often establishes independent data standards, data platforms, and management processes based on its own management needs[5]. However, in the era of big data, building a unified asset information management platform can effectively break down information barriers between departments and realize data sharing among various departments. This makes the whole-process data flow and information flow clearly visible to all relevant departments, thereby providing a new operation model for asset performance management. Through the data sharing mechanism, a diversified evaluation system that combines self-evaluation, inter-departmental evaluation, and expert evaluation can be realized in a timely manner.

3. Problems Existing in the Performance Evaluation of State-owned Asset Management in Colleges and Universities

3.1. Insufficient Attention to Performance Management and Unsatisfactory Evaluation Feedback

In the process of state-owned asset management, colleges and universities mostly limit their work to account registration and physical inventory checks, lacking a scientific evaluation mechanism and a feedback path for continuous improvement[6]. In practical operation, the division of responsibilities for asset management is vague, coordination between departments is poor, and there are phenomena of overlapping management or management gaps. Links such as asset purchase, allocation, use, and scrapping are managed by different functional departments, with no unified coordination mechanism. This leads to information fragmentation and responsibility shirking, and even situations where the ownership of the same asset is unclear and the user entity is ambiguous, resulting in insufficient supervision. Due to the lack of a clear responsibility chain, asset managers lack motivation for management, and their work initiative is restricted, which further exacerbates the lax management. At the same time, the feedback channels for performance evaluation are unsmooth, and there is a breakdown in information transmission. After the evaluation is completed, the results are mostly circulated only among the management level and fail to be timely communicated and interpreted to asset-using units. Grassroots units are unaware of specific problems in their own performance and cannot obtain improvement suggestions, making the feedback lose its guiding significance[7]. Although some colleges and universities have established feedback mechanisms, the content is vague and lacks targeting and operability, failing to help using units identify management shortcomings and take corrective measures. The evaluation closed loop has not been truly formed, making the entire performance management system show a tendency of "emphasizing evaluation while neglecting application"[8].

3.2. Segmented Management of Platform Construction Among Departments, and the Phenomenon of "Information Silos" Remains Unbroken

Multiple functional departments, such as finance, asset management, procurement, auditing, and scientific research, independently develop or introduce management systems based on their own business needs. These systems lack unified technical standards and data interfaces, and asset management-related data are stored separately in the information platforms of different departments. For example, in some colleges and universities, asset procurement information may only exist in the procurement system, while asset recording and depreciation data are controlled by the finance department, and the actual usage status of physical assets is recorded in the account books of the asset management department. Data across these links cannot be automatically connected, forming isolated information loops. Due to the lack of top-level design and overall planning, the construction goals of each system are limited to meeting the short-term management needs of the department itself, ignoring the data linkage requirements for the entire asset management process[9]. Although some colleges and universities have deployed asset management systems, their functions are only limited to simple registration and query, and fail to connect with key links such as budget formulation, contract management, and project implementation. When performance evaluation requires the integration of multi-dimensional data (e.g., asset allocation, usage efficiency, and maintenance costs), problems such as inconsistent data sources, incompatible statistical standards, and time mismatch arise, which seriously affect the accuracy and timeliness of analysis results[10].

3.3. Superficial Management and Distorted Basic Data

In some colleges and universities, key links such as asset purchase, update, maintenance, allocation, and donation lack mechanisms for timely information registration and financial recording, so changes in assets cannot be reflected in the management system in a synchronized manner[11]. The actual usage status of fixed assets is difficult to track; asset transfer, idleness, or damage may occur without approval, while the relevant account books remain unadjusted for a long time. What is worse, after equipment scrapping or building demolition, the account write-off procedure is still not completed, resulting in a large number of "zombie assets" remaining on the books and inflating the total asset volume. Some colleges and universities have outdated management systems and lack interface designs between systems, making it impossible

to achieve cross-departmental data sharing and automatic verification. This leads to frequent occurrences of duplicate data entry and missed registration. Asset status changes require multi-level approval, with cumbersome processes and inadequate implementation, which further delays the speed of data updates[12]. In such an environment, the information obtained by the management is obviously delayed and one-sided, which is difficult to support scientific decision-making. As a result, work such as asset usage efficiency evaluation and allocation optimization analysis also loses a reliable basis.

4. Construction Path of the Performance Evaluation System for State-owned Asset Management in Colleges and Universities Based on Big Data

4.1. Integrating Performance Evaluation Indicators Based on Big Data Technology and Building a Performance Evaluation Platform

The construction of the performance evaluation system for state-owned asset management in colleges and universities relies on big data technology to integrate multi-level and multi-dimensional evaluation indicators, forming a systematic and structured indicator framework. The sources of indicator data cover multiple functional departments, with the State-owned Asset Management Office taking the lead and coordinating the participation of departments such as the Equipment Management Office, Academic Affairs Office, Finance Office, Audit Office, and Information Technology Center. Basic data, such as asset ledgers and depreciation information, is provided by the asset management department; process data mainly includes asset transfer-in and transfer-out records, equipment reservation and usage logs, laboratory opening records, and maintenance work order circulation status, which are primarily obtained from the equipment management system and experimental operation system; performance data is acquired through channels like teaching task matching analysis, statistics on scientific research project support, and audit inspection results. To ensure data integrity and consistency, a unified big data aggregation platform is established, integrating database interfaces of various business systems to realize automatic cross-departmental data capture and real-time synchronization[13]. The platform is equipped with standardized data cleaning, transformation, and storage processes to eliminate format differences, duplicates, and redundancies, thereby improving data quality.

The platform construction breaks the traditional fragmented management model based on administrative divisions, eliminates information silos, and enables interconnection of data across all links in the entire asset life cycle. Managers can dynamically track changes in asset status, promptly identify idle, inefficient, or over-serviced assets, and enhance the scientific nature of resource allocation. The evaluation process no longer relies on ex post data reporting and manual aggregation; instead, it shifts to proactive monitoring and intelligent early warning, which strengthens the timeliness and feedback capability of performance evaluation. The platform supports multi-dimensional query and visual display, improves management transparency, and facilitates supervision and decision-making. Driven by data, the entire system operates in a standardized and refined manner, providing strong support for the efficient utilization of state-owned assets in colleges and universities.

4.2. Establishing a Circular Evaluation System Based on the Performance Evaluation Principles for State-owned Asset Management on the Platform

Supported by the big data platform, the evaluation process should adhere to the principle of attaching equal importance to physical management and value management. Physical management focuses on the standardization and integrity of links such as asset allocation, use, and disposal, while value management emphasizes the economic benefits generated during asset use and the efficiency of resource utilization. The coordinated advancement of the two not only prevents asset loss and idle waste but also enhances the service capacity and value-added potential of assets[14].

In terms of evaluation methods, a combination of indicator evaluation and comprehensive evaluation is adopted to enhance the comprehensiveness and flexibility of the evaluation. Indicator evaluation relies on objective data collected by the big data platform to conduct standardized scoring on quantifiable elements such as asset utilization rate,

maintenance frequency, depreciation status, and budget execution rate, thereby forming preliminary evaluation results. Comprehensive evaluation, on the other hand, incorporates qualitative analysis and supplements management details and actual effects that are difficult to cover by quantitative indicators through methods such as expert review, comments from functional departments, and satisfaction surveys of service recipients. These two methods verify each other, avoiding deviations caused by a single evaluation model. The entire evaluation process covers multiple links including material review, compliance inspection, opinion feedback, on-site review, and expert evaluation, forming a complete closed-loop mechanism.

After the evaluation, the results should be promptly incorporated into the big data platform and visualized reports generated to provide a basis for subsequent improvements. More importantly, the problems identified in the evaluation must be converted into rectification tasks and assigned to the responsible departments, which shall implement rectification measures within a specified time limit and be tracked and verified in the evaluation of the next cycle. This process realizes a dynamic cycle of "evaluation-feedback-improvement-re-evaluation", transforming asset management from static recording to dynamic optimization. The circular system not only strengthens the supervision and accountability mechanism but also enhances the sense of responsibility and initiative of management entities, promoting the continuous development of state-owned asset management in colleges and universities towards refinement and intelligence.

4.3. Fully Developing and Promoting the State-owned Asset Management Performance Evaluation System

Management departments shall collaborate with finance, audit, and teaching units to formulate standardized operating procedures, ensuring that the performance evaluation mechanism covers all asset categories and usage scenarios. On this basis, a regular training mechanism shall be established to conduct special lectures, case studies, and practical drills for managers at all levels and frontline faculty and staff, so that the awareness of asset performance can be integrated into daily work. By regularly releasing asset usage reports and performance rankings, the sense of responsibility and competitiveness of various departments can be enhanced, prompting asset users to proactively optimize resource allocation methods.

The results of performance evaluation shall be linked to key links such as budget allocation, project application, and equipment procurement, forming a binding incentive and accountability mechanism. For assets that have been idle for a long time or have low utilization rates, allocation or disposal procedures shall be initiated in a timely manner to avoid resource stagnation. The asset operation status of various colleges, laboratories, and research centers shall be displayed through visual dashboards to improve information transparency and promote cross-departmental collaboration and sharing. An efficiency-oriented asset management culture shall be fostered within the campus, making "making good use of every asset" a common consensus[15].

During the promotion process, attention shall be paid to the usability and compatibility of the information platform, ensuring that users with different technical levels can access system functions conveniently. A technical support team shall be set up to respond to user feedback in a timely manner and carry out function iterations. At the same time, the concepts and achievements of performance evaluation shall be disseminated through multiple channels such as the campus network, official WeChat public accounts, and internal office systems, typical examples shall be released, advanced collectives shall be commended, and positive guidance shall be strengthened. The performance of asset management shall be incorporated into the annual assessment index system of the unit, with clear division of responsibilities and effective implementation.

5. Conclusion

To comprehensively standardize and improve the management level of state-owned assets in colleges and universities, enhance information-based management, ensure the safety and integrity of state-owned assets, and improve the efficiency of state-owned asset utilization, big data-based management serves as a powerful approach to further advance the performance evaluation system for state-owned asset management in colleges and universities, and it is also a future trend.

For state-owned asset management to achieve better development in the future, more exchanges and communication among colleges and universities are required to continuously optimize the management system and enhance management capabilities.

Disclosure statement

The author declares no conflict of interest.

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