

Research on Countermeasures for the Refine Management of Scientific Research Assets in Colleges and Universities

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ABSTRACT

Scientific research assets in colleges and universities are crucial resources for scientific research innovation and teaching development in higher education institutions, and their management efficiency directly affects the quality of scientific research work and the efficiency of resource utilization. Defining management goals and planning to establish a refined management system can provide value orientation and institutional foundation for management practice. Strengthening process management and rigorously implementing standards for procurement acceptance as well as routine use and maintenance can facilitate the implementation of information-based dynamic tracking and pave the path of refined management. Establishing a multi-dimensional assessment and evaluation system through efficiency evaluation and optimization can continuously elevate management capacity, promote the standardized and refined development of scientific research asset management in universities, and thereby provide a strong guarantee for the high-quality development of scientific research.

KEYWORDS

Colleges and universities; Scientific research assets; Refined management

1 Introduction

With the rapid development of research research in colleges and universities, the scale of scientific research assets has been continuously expanding and their types have been increasingly diversified. The traditional extensive management model can no longer meet the management requirements of the new era, and problems such as unreasonable asset allocation, low utilization efficiency, and non-standard management processes are prominent, which hinder the full realization of the value of scientific research resources. In contrast, refined management, as an important way to improve management efficiency, plays an increasingly significant role in the management of scientific research assets in colleges and colleges, and serves as a key means to solve the existing problems in current scientific research asset management. Proceeding from the characteristics and practical management situation of scientific research assets in colleges and universities, and aiming to build a closed-loop management system, a refined management framework is established from three dimensions: objective planning, process control, and efficiency optimization. Such a framework can consolidate the management foundation, pave the implementation paths, and form integrated management forces through continuous iterative optimization to promote the transformation of scientific research asset management from extensive to refined, thereby improving the utilization efficiency of scientific research resources and providing strong support for the enhancement of universities' research innovation capabilities and sustainable development.

2 Clarify Management Objectives and Planning and Construct a Refine Management System

2.1 Sort out Existing Scientific Research Assets in Colleges and Universities and Establish a Management Value Orientation for Management

Scientific research assets serve as a crucial guarantee for the normal teaching, research, and operation of colleges and universities^[1]. Establishing a value orientation for management can clarify the priority of asset allocation, optimize the efficiency of resource allocation, and provide a solid foundation for the improving teaching quality and achieving sustainable development in colleges and universities. To strengthen the management of scientific research assets in colleges and universities and improve operational efficiency, it is necessary to comprehensively sort out the inventory, distribution, utilization, and attrition of existing scientific research assets, such as instruments and equipment, experimental materials, and data documentation. It can utilize the means of on-site verification, ledger verification, and coordinated statistics of all departments to fully ascertain the asset base, and accurately grasp the in-use status, idle condition, and aging degree of various types of assets, in order to eliminate the concealment, loss, and duplicate registration of assets. At the same time, it should determine the value orientation of management in light of the characteristics and development needs of scientific research in colleges and universities. During this process, it is essential to abandon the traditional concept of emphasizing procurement over management and possession over efficiency, and to take asset utilization efficiency, research support capacity, and cost control effectiveness as the core management

objectives. This approach can not only ensure the smooth progress of scientific research projects and provide stable asset protection for teaching and research activities, but also prevent resource waste and maximize the utilization efficiency of assets, thus enabling the management work to serve the overall development direction of scientific research innovation, talent cultivation, and discipline construction in colleges and universities, and laying a solid foundation for the subsequent construction of a refined management system.

2.2 Improve Full Life-cycle Management Standards and Consolidate the Foundation of the Management System

The refined management of scientific research assets in colleges and universities not only requires precise allocation and efficient utilization of such assets, but also emphasizes the implementation of full life-cycle management of assets, so as to improve the quality of research outputs, and reduce research costs^[2]. In the procurement phase, requirement review, bidding procedures, quality acceptance and other aspects shall be regulated, and suppliers shall be selected rationally based on the actual needs of research projects to avoid blind procurement. In the warehousing phase, it should standardizes registration procedures to ensure clear records of asset numbers, specifications and models, storage locations, and responsible persons, so that accounts are consistent with physical assets. In the utilization phase, it should implement registration for receiving and return to track the usage of assets, and prevent private use, misappropriation, or long-term idleness. In the maintenance phase, regular inspection and maintenance plans shall be formulated to promptly resolve malfunctions and extend the service life of assets. At the same time, based on the actual management conditions in colleges and universities, it is necessary to optimize the management system, simplify cumbersome procedures, and clarify management responsibilities of each department and position to assign responsibilities to specific individuals and avoid the shirking of responsibilities, thus ensuring that each management task is carried out in accordance with rules and evidence, and providing a strong institutional guarantee for refined management.

2.3 Optimize Asset Allocation Planning and Define Phased Management Objectives

On the basis of clarifying the current situation and improving relevant systems, it is imperative to conduct systematic and forward-looking planning for the allocation of scientific research assets. This requires colleges and universities to closely align with their medium- and long-term scientific research development plans, key discipline layouts, and the construction needs of major scientific research platforms to scientifically forecast the demands for assets from different types and levels of scientific research activities in the coming period. The planning should determine the scale, structure, and spatial distribution of various asset allocations based on the principles of overall consideration, highlighting key points, resource sharing, and prioritizing efficiency. On this basis, the macro management objectives should be further decomposed into executable and measurable phased specific objectives. For example, objectives can be set for increasing the open sharing rate of large-scale instructions and equipment within a certain period, improving the equipment support level in specific research fields, or achieving specific growth indicators in the utilization rate of existing assets. Such phased objective design can provide clear guidance for subsequent budget formulation, procurement planning, and the determination of annual work priorities. Meanwhile, refined management can be advanced in an organized and step-by-step manner, so that asset allocation always serves the core strategy of the development of scientific research in colleges and universities.

3 Strengthen Process Control and Implementation and Pave the Path of Refined Management

3.1 Standardize Procurement and Acceptance Procedures and Strictly Control the Asset Quality at the Entry Point

With the integrated advancement of educational development, scientific innovation and talent cultivation in China, the investment in scientific research assets in colleges and universities has increased year by year^[3]. To avoid blind procurement and resource waste, the refined management of scientific research assets in colleges and universities should start from the source, and a scientific and standardized procurement and acceptance mechanism should be established. In the procurement phase, procedures such as demand demonstration, budget review, and bidding and procurement shall be strictly held to ensure the scientificity and transparency of procurement decisions. In the acceptance phase, an acceptance team consisting of user units, management departments and technical experts shall be established to verify contracts and technical parameters one by one, and assets that fail to meet the requirements should be resolutely rejected to ensure that the asset quality compiles with the requirements of scientific research. Moreover, a traceability mechanism for procurement and acceptance accountability should be established to clearly define the responsible entities at each link, and hold accountable those who fail to exercise strict control over the procurement and acceptance process and result in idleness, waste or quality problems of assets, so as to effectively keep a strict check on the asset

entry point.

3.2 Strengthen Daily Usage and Maintenance and Improve Asset Operational Efficiency

The key priorities of refine management for scientific research assets lie in the daily usage and maintenance phases, which requires the formulation of targeted maintenance plans in accordance with the characteristics of various types of scientific research assets. For instance, precision instruments and equipment must undergo regular calibration, dust removal and maintenance, as well as replacement of vulnerable components in compliance with operating procedures, so as to ensure their accuracy and stability. For experimental devices, a routine process covering daily cleaning and functional testing should be established. On this basis, designated personnel should be appointed as asset maintenance responsible persons to conduct routine inspections, file maintenance records, and coordinate fault repair services, in accordance with the maintenance principle of “who uses, who is responsible”. Meanwhile, regular training should be provided to scientific researchers on equipment operation specifications and basic maintenance knowledge to enhance their awareness of asset protection and their capacity for basic troubleshooting, and reduce the risk of equipment damage due to improper operation. The use and maintenance of assets can extend their service life, reduce operating costs, and improve their operational efficiency.

3.3 Promote Information-based Dynamic Tracking and Realize Management Data Sharing

The key to pave the path of refined management is to build an information system platform for scientific research asset management, in order to realize real-time and dynamic tracking of the status and circulation of scientific research assets. This platform administers the entire process including procurement applications, warehousing registration, usage records, maintenance and repair, as well as allocation and scrapping, and assigns a unique identifier to each asset to ensure complete documentation of both static information and dynamic trajectories. Moreover, it can efficiently complete asset inventory and status updates by using technologies such as barcodes, QR codes, or radio frequency identification. The primary value of the information platform is to break the data silos among departments, and enable the safe and efficient sharing of asset information among administrative departments, user units, and supervisory departments. Through this platform, managers can obtain important data such as asset distribution, utilization rate, and intact rate at any time to support decision-making, and researchers can conveniently inquire and reserve the equipment they need to facilitate equipment sharing. Information-based means enable the asset management to be visual, traceable, and analyzable, thereby improving management efficiency and decision-making capability.

4 Conduct Efficiency Evaluation and Optimization and Form a Closed Loop of Refined Management

4.1 Establish a Multi-Dimensional Evaluation System to Scientifically Assess Asset Utilization Efficiency

In recent years, with the rapid expansion of higher education in China, the quantity of assets owned by colleges and universities has been increasing, the composition of assets has become increasingly complex, and the difficulty of management has also been growing^[4]. Against this backdrop, it is crucial to establish a management standard system covering the entire life cycle of scientific research assets. The evaluation system should include quantifiable and comparable indicators such as usage efficiency, research output, and operational cost-effectiveness. From the perspective of efficiency, the utilization hour rate, proportion of shared service hours, user satisfaction survey results, and other data can reflect the activity level and service coverage of assets. The contribution of research output can evaluate the degree of support provided by assets for core research activities from the aspects of tracking important research projects, high-level paper publications, and achievement transfer. The operational cost-effectiveness can coordinate the full life-cycle costs covering equipment depreciation, energy consumption, maintenance and labor, and compare them with the aforementioned output benefits. The evaluation should be conducted regularly, and methods such as data collection, on-site verification, and questionnaire surveys should be adopted to ensure that the evaluation results are authentic and accurate. By integrating quantitative and qualitative indicators, a dynamic database can be established for asset utilization efficiency, and high-performing assets and idle or low-efficiency assets can be clearly identified, thus providing a reliable data foundation for subsequent optimization decisions, and transforming management from experience-based judgment to precise data-driven governance.

4.2 Implement Rectifications Based on Evaluation Results to Address Pain Points and Difficulties in Management

It is necessary to classify and sort out the results of efficiency evaluation to accurately identify the pain points and difficult issues in management, and create a rectification ledger to clarify rectification responsibilities, rectification measures, and completion deadlines, thereby ensuring the effective implementation of problem rectification. In response to the problems of low asset utilization and severe idleness, a sound inter-departmental redistribution mechanism should

be established, a list of idle assets should be released for other departments to use, and the procurement budget for inefficient assets in the following year should be reduced accordingly. For the problems of inadequate maintenance and frequent failures, the maintenance cycle should be extended or adjusted according to the actual usage situation, the maintenance team should be improved, and a rapid response channel should be set up to shorten the time required for problem resolution. At the same time, to optimize the procurement review process supporting asset and research needs, it is necessary to strengthen the pre-connection mechanism between research teams and asset management departments to ensure that the procured assets can be put into practical use effectively. In addition, to avoid the drawback caused by the absence of cost management, it is essential to refine the standards for expense verification and write-off, standardize approval procedures, and prevent uncontrolled increase in unnecessary expenditures. Through regular inspections during the rectification process, phased verification, and supervision and accountability for departments and individuals with ineffective rectification, various problems can be addressed, management shortcomings can be remedied, and the level of refinement can be elevated.

4.3 Summarize Management Experience and Continuously Improve to Promote the Spiral Upgrading of Management Quality

The refined management of scientific research assets is a dynamic and continuous process of improvement. Upon the completion of each cycle consisting of planning, implementation, evaluation, and rectification, a systematic review and summary should be conducted to sort out the effective management measures, technical means, and collaboration models adopted in the current cycle, and to solidify them into standard procedures or best practices for further promotion. Meanwhile, it is necessary to candidly analyze the problems that remain unresolved after rectification, the inherent limitations of the evaluation system itself, and the new issues encountered in the implementation process. Furthermore, based on experience and reflection, the management objectives, institutional standards, workflow procedures, and technical platforms for the next stage should be adjusted and improved. Through such periodic summarization, reflection, and re-planning, valuable knowledge derived from practice can be transformed into an internal enhancement of management capabilities, and the scientific research asset management system can obtain the evolutionary abilities of self-learning and self-improvement, thus enabling the management quality to continuously advance to a higher level in the cycle of practice, cognition, and re-practice, and forming a sound development trend of spiral upgrading.

5 Conclusion

The refined management of scientific research assets in colleges and universities aims to establish a closed-loop system with clear objectives, controllable processes, and continuous improvement, and achieve a transformation from extensive management to scientific management. By clarifying the value orientation, consolidating the institutional foundation, enhancing the full life-cycle control and information-based support, and relying on efficiency evaluation to achieve the spiral upgrading of refine management of scientific research assets in colleges and universities, it can effectively solve issues such as resource allocation, utilization efficiency, and management responsibilities, provide solid resource support for the improvement of scientific research innovation capabilities and core competitiveness of colleges and universities, and boost the high-quality development of scientific research in colleges and universities.

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