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Exploration of University Data Asset Management

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Abstract: With the advent of the digital and big data technology era, data is developing at an unprecedented speed and scale. It has become a consensus that data assets are an important resource for the development of enterprises and institutions. Universities are not only data consumers in the digital economy but also data producers. They generate massive amounts of data in teaching, research, and administrative management. Transforming this data into data assets and managing these new types of assets has become an urgent challenge for university managers. This paper explores the definition and value attributes of university data assets, analyzes the challenges in their management, and proposes corresponding strategies.

Keywords: Data Assets; Management System; Management Strategy

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1.Introduction

In the era of digitalization and big data technology, data is developing at a scale and speed that surpasses the evolutionary patterns of traditional assets. The significance of data is increasingly prominent, gradually becoming a critical source of wealth for various enterprises and institutions. With the development of digital and big data technologies, the concept of data assets has evolved from information assets and digital assets to a new type of asset form. Data assets are now a strategic resource driving the construction of a digital China and the acceleration of the digital economy.

At present, the informatization construction of Chinese universities has developed from scratch and entered the era of "three smart campus platforms" (data platform, portal platform, and authentication platform), with data resource services generally popularized. However, in the actual management of university data, problems such as inconsistent data standards, uneven data quality, complex data sharing, unsound management mechanisms, unclear management boundaries, and lack of data asset ledgers persist. Therefore, data asset management and governance are of great practical significance for university development. Faced with massive data, universities urgently need to address how to manage data as assets to support teaching, research, and operations.

2.Definition and Scope of University Data Assets

The earliest academic description of data assets can be traced back to the statement by Viktor Mayer-Schönberger, the "father of big data": "Including data assets in the balance sheet is not a matter of possibility but of time."[1] Currently, the core data (master data) of universities mainly refers to basic data shared by multiple systems and operational data. These massive data sources are scattered, with prominent data silos, insufficient interoperability between platforms, low integration, and poor quality, leading to the accumulation of data in individual systems without effectively realizing their value.

Based on relevant research, the authors define university data assets as follows: University data assets are important data resources generated, collected, stored, and used in educational, teaching, research, and management activities. They are controlled and owned by the university, quantifiable over their full lifecycle, and expected to generate future benefits, value, and even drive educational, research, and management transformations. They cover multiple aspects, including but not limited to:

（1）Student data: Personal information, academic records, course selection, scholarship evaluations, etc.

（2）Faculty data: Personal information, teaching assignments, research achievements, academic participation, etc.

（3）Teaching resource data: Course materials, teaching slides, question banks, teaching videos, etc.

（4）Research data: Research project information, research results, experimental data, academic papers, etc.

（5）Management data: Financial data, personnel data, equipment asset data, campus security data, etc.

Among these massive data, master data is the most critical. [2] Therefore, master data management is the foundation of data governance and management in universities. Establishing an effective master data management system, conducting in-depth data mining and analysis, and continuously improving data quality are key to realizing the value of data assets. [3]

3.Value of University Data Assets

In the era of big data, data assets have become an indispensable part of university development. Faced with the growing volume of generated data, universities must first address how to realize the value of these assets to support teaching, research, and management.

3.1 Enhancing Teaching Quality

Analyzing student learning data through modeling can reveal learning progress, difficulties, and preferences, providing references for personalized teaching and course popularity analysis. Integrating and sharing teaching resource data can enrich teaching content and improve resource utilization efficiency.

3.2 Promoting Research Innovation

Accumulating and analyzing large datasets helps identify emerging research hotspots and trends, providing insights for researchers. Cross-disciplinary data integration also fosters interdisciplinary innovation and the development of cutting-edge scientific achievements.

3.3 Optimizing Management Decision-Making

Data assets support evidence-based decision-making for administrators, improving resource allocation efficiency. For example, financial data analysis can optimize budget distribution, while personnel data analysis can rationalize faculty deployment. Additionally, universities can use data assets to enhance their social service functions, aligning talent training with societal needs.

4.Challenges in University Data Asset Management

While bringing significant value, university data assets face multiple management challenges.

4.1 Clarifying Ownership and Inventorying Assets

The primary challenge is inventorying data assets and clarifying ownership. Similar to tangible assets, data assets require regular inventorying, which is a prerequisite for effective management. Confirming and authentic right ing data assets (especially those generated internally) requires institutional frameworks.

Ownership is complex, involving the university, faculty, and students. Defining the full rights holder among these parties remains a critical issue.

4.2 Measuring Value and Ensuring Quantity-Value Consistency

For data assets to be recognized as assets, their value and quantity must be measured, requiring a sound valuation system. Additionally, addressing value amortization and impairment for this new asset type is challenging.

4.3 Establishing Full Lifecycle Management Mechanisms

The value creation of data assets involves their full lifecycle: generation, use, computation, and disposal. According to the “Guidelines on Strengthening Data Asset Management” (Cai Zi [2023] No. 141) issued by the Ministry of Finance, data

asset management must adhere to the principles of "clear responsibilities, transparent processes, and controllable risks." This requires establishing a closed-loop management system covering legal compliance, dynamic maintenance, development, circulation, value reuse, and disposal. Supporting systems (e.g., asset ledgers, standards, valuation, and reporting) are essential.

4.4 Data Security and Quality

4.4.1 Security and Privacy Protection:

University data contains sensitive information (e.g., student IDs, contact details) and intellectual property (e.g., research results). Protecting data from theft, tampering, or deletion requires robust security measures: encryption, access control, multi-factor authentication (MFA), and regular backups.

4.4.2 Data Quality:

Data from diverse sources often suffers from incompleteness, inaccuracies, and inconsistencies, reducing usability and analytical reliability. Improving quality requires standardized collection processes and rigorous management of data capture, recording, and verification.

4.4.3 Data Sharing, Openness, and Application

（1）Low Sharing Efficiency: Data silos persist within universities and between universities and external institutions, limiting value realization.

（2）Weak Analytical Capabilities: Universities lack specialized data analysts and advanced tools, hindering the extraction of maximum value from data assets.

5.Management Strategies for University Data Assets

5.1 Strategies for Clarifying Ownership

5.1.1 User-Generated Data:

Data created by users (e.g., student papers, faculty courseware) should grant users partial ownership. However, universities may retain usage rights for management or service purposes (e.g., analyzing student learning records). User agreements should clarify rights and obligations under privacy protection.

5.1.2 Institution-Generated Data:

Data from administrative, teaching, or research activities (e.g., financial data, enrollment data) is owned by the university, which holds full rights to manage and use it.

5.1.3 Processed Data:

When data is processed by third parties or internal units, ownership depends on contractual agreements. For example, third-party analysis of student performance data may grant limited usage rights without transferring ownership.

5.1.4 Shared/Open Data:

When sharing data externally, ownership remains with the university, and recipients must adhere to usage limits and privacy obligations.

5.1.5 Intellectual Property Overlap:

For creative data assets (e.g., a-cademic papers, patents), intellectual property laws (e.g., patent law) further complicate ownership.

5.2 Strategies for Value Measurement

Data asset measurement includes initial and subsequent valuation.

5.2.1 Initial Measurement:

Self-generated data assets can be valued similarly to self-developed intangible assets. Purchased data assets use acquisition cost.

5.2.2 Subsequent Measurement:

Historical cost or fair value models can be applied.

5.3 Strategies for Full Lifecycle Management

5.3.1 Governance Structure:

Establish a university-level data governance committee (including data owners, managers, and department representatives) to formulate strategies, coordinate efforts, and set standards (data quality, security, etc.).

5.3.2 Risk Management:

Regularly assess risks (security, quality) throughout the data lifecycle and implement monitoring systems.

5.3.3 Training and Communication:

Train staff on governance concepts, policies, and operational skills. Establish communication channels to resolve management issues.

5.4 Strategies for Security and Quality

5.4.1 Security:

Classify and grade data to apply differentiated protection. Use MFA (password + dynamic codes/biometrics) for access control.

5.4.2 Audits and Monitoring:

Conduct regular security audits and quality checks. Address identified issues promptly.

5.4.3 Source Management:

Improve data collection quality through standardized processes.

5.5 Strategies for Sharing and Application

5.5.1 Promote Sharing:

Develop policies for data sharing (principles, scope, methods). Build a shared platform with query, download, and API access functions.

5.5.2 Collaborate Externally:

Strengthen partnerships with external institutions to jointly advance data openness and application.

6.Conclusion

In the era of big data, data assets are critical resources for universities. Managing these assets is a long-term, systematic project requiring top-level design, long-term strategies, and cross-departmental collaboration. By improving data quality, promoting sharing, and enhancing analytical capabilities, universities can fully realize the value of data assets, supporting talent cultivation, research, and management. This will contribute to high-quality development and societal progress.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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