



Research on the Big Data Collection Mechanism of University Economic Management

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Abstract. In order to explore the school's economic management big data collection mechanism, build a school's economic management big data integration platform to provide innovative ideas. This article forms a collection content system from the four aspects of service object, service process, operation support, and external contact. At the same time, it uses data dictionary table design method, data flow table design method, and correlation method to show the collection methods of university economic management big data. Strive to give full play to the value and role of the school's economic management big data integration platform, expand the depth and breadth of data collection, and form a panoramic data view. It is of great significance to improve the efficiency of university service economic behavior, form data-driven agile decision-making, and promote the sustainable development of the school economy and the implementation of the national big data strategy.

Keywords: University · Economic Management Data · Collection Content · Collection Method · Collection Path

1 Introduction

The economic management data of colleges and universities comes from a decentralized system. How to integrate these scattered, fragmented, and different types of data, and collect, store and transmit according to certain rules, and then generate different analysis tables according to different needs, Analysis graphs and forecast reports, etc., to promote the formation of data to support decision-making and realize value creation and value-added is the core value of university economic management big data.

With the deepening of informatization in work and life, and adapting to the advent of the information age, this article intends to use universities as the research object to explore the university's economic management big data collection mechanism in order to build university economic management big data (hereinafter referred to as UEMBD). The integrated platform provides new ideas.

2 Collection of UEMBD

UEMBD comes from various information systems of universities and colleges. It is the first data storage collector of UEMBD, and it also provides a data interface for the construction of the integrated platform of UEMBD. Therefore, comprehensively considering

Table 1. Student information system and UEMBD collection content

Information system	UEMBD collection content
Student status information management	student name, Home address, identity number, student ID, Admission time, Photo information, Student status and other related information.
Dormitory Information Management	Student dormitory location, Roommate composition, Basic information management of corridor workers, Information Management of Entry and Exit of Dormitory Buildings, etc.
Evaluation and Management of Students' Comprehensive Quality	Students' physical fitness, mental health, cultural literacy and other information.
Scholarship Management	Grade point, Social activity score, Get honors, etc.

the difference between UEMBD collection and the service objects of the information system, the collection content of UEMBD can be divided into four categories: service objects, service processes, operation support, and external contacts [7].

2.1 Service Object

The core function of universities is to train specialized talents, develop scientific knowledge, and serve the society. The internal service of colleges and universities is for teachers and students of the whole school.

2.1.1 Student

The student information system includes student status information management, dormitory information management, student comprehensive quality evaluation management and scholarship management [8] (Table 1).

2.1.2 Faculty

Teacher data includes basic information management, comprehensive management, teaching information management, salary and performance management of faculty and staff (Table 2).

2.2 Service Process

The data generated in the service-oriented process is reflected in teaching and research data, including undergraduate education, graduate education, overseas education, continuing education, education and teaching quality, scientific research management, scientific research bases, industry-university-research cooperation, etc. [3] (Table 3).

Table 2. Faculty information system and UEMBD collection content

Information system	UEMBD collection content
Staff Information Management	Name, age, gender, identity number, Job number, Degree, Contact information, Home address, job title, Mobilize historical circumstances, Employment and retirement, etc.
Comprehensive management of employees	Travel information, Meeting information, Reimbursement information, Official document information, Signature information, etc.
Teaching information management	Professional training program, Teaching calendar, Teaching schedule management, Teaching material information, Timetable information, Student performance management, Teaching assessment, Graduation thesis (design) information, etc.
Performance and salary management	Attendance information, Class time information, invigilation and other performance information, job salary information, union welfare information, bonuses, provident funds, etc.

2.3 Operations Support

Internal operation data is generated from the school's internal operation management of "people, finances, and things", scattered in the management information system of various functional departments, mainly including budget management data, accounting data, procurement management data, asset management data, and project management data, Contract management data, report management data, dynamic monitoring data and financial service data [2] (Table 4).

Budget management system. This subsystem needs to have functions such as budget preparation, control, and assessment. It is an operating platform for implementing comprehensive budget management and dynamically monitoring the execution process of the budget.

Accounting system. This subsystem needs to have functions such as income and expenditure management, reconciliation management, bill management, online reimbursement, etc., and is an operating platform for daily accounting.

Procurement management system. This subsystem is an operating platform for procurement management. Through this system, the school's procurement work is connected with government procurement affairs, and the procurement work is controlled by informatization, which can greatly improve the school's procurement management level.

Asset management system. This subsystem is an operating platform for asset management, such as the management of fixed assets. The asset management system has functions such as purchase and storage, asset classification, depreciation and withdrawal, and asset information management. Through the establishment of related databases, it

Table 3. Service process-oriented information system and example of UEMBD collection content

Information system		UEMBD collection content
education	Undergraduate Education	Course information, educational administration management information, student status management information, etc.
	Graduate study	Training and teaching, subject construction, degree and tutors, academic activities, etc.
	Study Abroad Education	
	Continuing Education	Self-study exams, adult education, education training, rules and regulations, etc.
	Education and teaching quality	Teaching supervision, teaching evaluation, professional certification, quality management, etc.
Scientific research	Scientific research management	projects, results, scientific research bases, policies, etc.
	Research base	National level, Provincial, City level, school-level key points.
	Industry-University-Research Cooperation	International-level collaborative innovation, provincial-level collaborative innovation, school-site co-construction of research bases, school-enterprise co-construction of research bases.

can realize the information management of asset allocation, use, and disposal processes, and dynamically track assets [6].

Project management system. This subsystem is an operating platform for various project management, such as infrastructure construction, scientific research, etc. It mainly has the functions of project application, project budget approval, project budget execution, capital operation management, etc., which can further improve the utilization efficiency of project funds.

Contract management system. This subsystem is an operating platform for contract information management, which records complete records of contract information such as engineering projects, procurement, and bidding, as well as real-time dynamic monitoring of contract fund payment.

Report management system. The main function of this subsystem is to connect with other subsystems, so that the unit’s various financial tasks can be integrated [1].

Dynamic monitoring system. This subsystem is an operating platform for unit system supervision and management control, which integrates into a set of index systems in an embedded way to monitor internal control rules and regulations, financial information disclosure systems, etc.

Table 4. Operational support information system and UEMBD collection content

Information system	UEMBD collection content
Budget management system	Budget preparation (budget indicators, centralized departments); budget control (execution, adjustment, analysis); budget assessment (assessment, feedback data, budget analysis report).
Accounting system	Income and expenditure management (currency income and expenditure, material income and expenditure, other income and expenditure); reconciliation management; bill management (title, amount, accounting vouchers).
Procurement Management System	Procurement budget (department, category, amount, quantity); compilation of procurement requirements; change management of procurement methods; review of procurement contracts; payment of funds.
Asset Management System [4]	Purchase and storage (warehousing time, category, code, etc.); asset classification (current assets, long-term investments, fixed assets, intangible assets, deferred assets, other assets); depreciation (depreciation period, depreciation method, annual depreciation rate, Residual value, etc.); asset information management (such as: building code, name, number of floors, floor space, building area, usable area, building age, property ownership, property certificate number, building structure, land occupation, courtyard, Building pictures, and corresponding fixed asset codes).
Project management system	Relying on various projects, such as infrastructure, scientific research, etc. Including project application; project budget approval; project budget execution; capital operation management.
Contract management system	Contract information (complete records of engineering projects, procurement, bidding, etc.); contract payment (payment progress); contract management (payment reminder, over-limit warning, due reminder).
Report management system	Based on the data of other related information systems, financial statements, summary tables, and index analysis reports are automatically generated to integrate various financial tasks of the unit.
Dynamic monitoring system	System supervision (internal control rules and regulations, financial information disclosure system, economic responsibility system, etc.); management control (dynamic monitoring, early warning analysis, etc.).
Financial Service System	Information query and search.

Financial service system. The main function of this subsystem is to timely disclose the financial situation of the unit, provide information query and search services. Be able to search for all kinds of information after logging in to the relevant portals to provide a basis for school leaders to make decisions; provide financial services (salary, social security, etc.) for faculty and staff personal matters; Provide financial services for students (tuition fees, miscellaneous fees, accommodation fees, registration fees for grade examinations, payment status of college students' medical insurance, etc., status of scholarships and grants, etc.). Ensure employees' right to know.

2.4 External Contact

The development of information technology and the continuous deepening of educational reforms have made the economic activities of colleges and universities more and more closely related to the external environment. These external environmental related parties mainly include supervisory departments, banks and other financial institutions, directly affiliated units, and off-campus cooperative enterprises. This development trend puts forward new requirements for the collection of UEMBD.

2.4.1 Regulatory Authorities

The economic activities of colleges and universities are mainly closely related to the supervision departments such as the education sector, the financial department, the price department and the tax department (Table 5).

Table 5. Content collected by regulatory authorities and UEMBD

External related party (Regulatory authorities)	UEMBD collection content
Education sector	Basic information of the school, information about the establishment of the college, the number of staff and students, etc.
Financial department	Higher education financial investment, government education expenditure and its proportion in total fiscal expenditure, total higher education expenditure and its proportion in GDP, etc.
Price department	Charge items (tuition fees, miscellaneous fees, accommodation fees, medical insurance for college students, etc.), higher-level price policies, school price management systems, price adjustment files, inspection and monitoring of price implementation, handling of violations, etc.
Tax department	The name of the taxpayer, account number, tax base, tax rate, period, taxpayer, quantity, amount, tax compliance, timeliness, violation handling, etc.

2.4.2 Banks and Other Financial Institutions

Collection content includes: Account name, account amount, account number, basic information (name, gender, age, ID number, contact information, address, etc.) of the bank-school cooperative business card issuing user, etc.

2.4.3 Subordinate Units

Collection content includes: Organizational structure of the directly affiliated unit, job description, employee information, personnel information, information about the person in charge (leader of the directly affiliated unit), contact information, etc.

2.4.4 Off-Campus Cooperative Enterprise

Collection content includes: The name of the off-campus cooperative enterprise, bank account, account number, account opening bank, basic information of the enterprise, historical records of school-enterprise cooperation, funding, donations, etc.

3 UEMBD Collection Method

An important tool and method for constructing a UEMBD collection mechanism is the collection method of big data, which helps to solve the difficulties of data collection and integration of different sources, different structures, and different types of fragmentation and disorder. Through aggregation, conversion, storage, and analysis, a data warehouse and a data mart are formed, and a UEMBD integration platform is established, which ultimately serves the client.

3.1 Data Dictionary Table Design

The data dictionary is a data collection that describes the attributes and composition of each data in the database, and is the cornerstone of data collection and analysis. The types of UEMBD data dictionary tables include role definitions, department definitions, department information, personnel information, teaching projects, scientific research projects, operating systems, and related systems. Each type of data dictionary table usually contains indicators such as code, name, type, and status. Schools can supplement other indicators according to their own characteristics and management needs. Take the asset management system data sheet as an example (Table 6).

3.2 Data Flow Meter Design

If the data dictionary table is a collection of the original information of the data, then the data flow table is a collection of related information generated in the process of college economic management activities. Typical university economic management data flow table includes business income table (student tuition income table, student miscellaneous fee income table, scientific research project income table, government funding income table, social sponsorship income table, etc.), business expenditure table (salary

Table 6. Example of Asset Management System Data Table

Data table name	content
Coding	The code of the asset
Department	Attribution department information
User	Basic user information
Asset classification	Asset Classification Code
Asset attachment	Asset attachment information
Asset changes	Basic information about asset changes
Asset retirement	Coding of asset retirement
Asset loss	Basic information about asset loss
Asset application	Basic information of asset application
Assets pending announcement	Information about assets to be put into storage Official news

Table 7. Example of Student Tuition Income Statement

Data item	Instruction
Serial number	Primary key
Date	Statistics date
Faculty	Department classification code
Professional	Professional Classification Code
Price	Country price
Amount	Actual Amount/Amount Receivable
State	Paid (full/shortage)/not paid
Type	Tuition card payment/financial website payment/finance office payment/student source loan/tuition waiver

and welfare expenditure table, miscellaneous Subsidy expenditure table, unit insurance expenditure table, scientific research fund expenditure table, student fund expenditure table, fixed asset depreciation table, intangible asset amortization table, etc.), personnel dynamic information table, fixed asset dynamic information table and other information collection tables, etc. [5]. Take the student tuition income table as an example (Table 7).

3.3 Association Control Relationship Establishment [7]

The economic operation data of colleges and universities comes from various information systems. The establishment of the correlation relationship is a prerequisite for data interconnection, sharing and sharing, and it is also a key method for UEMBD collection

and construction of a UEMBD integration platform. Related correlation comparisons include: department code correlation control, person employee number (student number) correlation control, income item correlation control, expenditure item correlation control, accounting unit management control, fixed asset code correlation control, and other element code correlation control. The main purpose of various types of correlation comparison is to realize the smooth and effective collection of data from the economic operation management system to the business system.

4 UEMBD Collection Path

The collection path is a road map depicting the start, process, and end of UEMBD collection. Starting from various economic and business activities of universities, the source data of UEMBD is generated, which is generated in various information systems in the four aspects of service objects, service processes, operation support, and external contacts through data collection methods such as data dictionary tables and data flow tables. Data, store data, and then extract, integrate, summarize and save the data by means of association and comparison, etc., to form a UEMBD warehouse. And on this basis, according to the management needs of colleges and universities, the logical market method and the physical market method are adopted to gather all the data of a certain category together, establish a special data classification database, and form a big data market to facilitate data retrieval and Utilize, finally establish UEMBD integration platform [7].

5 Summary and Reflection

The university economic management big data platform and data analysis research is based on the timely and comprehensive collection of economic management big data, applying efficient analysis methods to realize the processing and refining of big data, forming highly integrated knowledge. So that managers at all levels can quickly make scientific and wise decisions in the face of complex data. This article discusses the collection mechanism of economic management big data related to the economic operation and management of universities around the collection content, collection method and collection path. In order to build the UEMBD integration platform provide innovative ideas and practical examples, provide information technology and reliable data support for the realization of university panoramic management, fully explore the value of the data integration platform built on the basis of UEMBD, optimize the allocation of educational resources, and improve the efficiency and efficiency of university service economic behavior, Form data-driven agile decision-making.

Although there is a long way to explore UEMBD-related research including collection mechanisms, the future is bright!

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