

THE CHOICE AND ACCUMULATION OF DECISION-MAKING DATA IN ENGINEERING PROJECT MANAGEMENT¹

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ABSTRACT

There are massive amounts of process data in the usual course of doing engineering. How to choose and accumulate these data to provide reference for newly-built projects in designing and building is a question that project superintendents face. We propose to construct a knowledge management platform for engineering project management to realize the potential of the accumulated decision-making data and study data classification and knowledge management, using architectural engineering data as an example.

Keywords: Engineering project management, Knowledge management, Data choice, Data accumulation, Engineering data

1 THE MEANING OF THE KNOWLEDGE MANAGEMENT PLATFORM'S SETUP

The knowledge economy is an economy based on knowledge as well as an the economy set up for the production, distribution, and use of knowledge. In the era of knowledge-driven economy, knowledge is the most important strategic resource of an enterprise. The arrival of the knowledge economy places information management at the core of what guides organizational management. At the same time, people realize more and more that knowledge capital is a kind of asset that needs to be managed, and the kind of asset that can provide an investment return.

In the middle period of the 1980's, Peter Drucker, an authority on organization and management, used the concept of "Knowledge Management" for the first time. Now, some universities, such as the University of California, are offering knowledge management courses for doctors.

Knowledge management is the process of managing the knowledge resources of an organization. How to discern, obtain, develop, resolve, store, and transmit knowledge to make each member of the organization not only contribute his or her accumulated knowledge to the maximum extent, but also to enjoy others' knowledge, realize the goal that knowledge sharing is information management. With the rapid development of database and Internet technology and the wide application of management information systems and Internet data centers, technology for accessing, inquiring, and describing data has already become better and approaches perfection day by day. Fast and convenient data deposit and withdrawal has not lightened the burdens of enterprises. What enterprises really need is an information management system that can produce the knowledge they need and decisions favorable to them, which is called a Knowledge Management Platform (KMP).

The goals of the knowledge management platform are to manage all the knowledge resources that engineering project management enterprises have, to analyze real cases, to realize an understanding of how to obtain, develop, resolve, store, transmit engineering project management knowledge or information, to promote the accumulation and sharing of relevant knowledge, and to offer decision support for improving the key competitiveness of the enterprises.

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2 KNOWLEDGE PLATFORM FRAMEWORK OF ENGINEERING PROJECT MANAGEMENT

2.1 Engineering project management

Engineering project management (EPM) refers to the enterprise engaged in managing an engineering project (hereafter refer to as an engineering project management enterprise), which is entrusted by the owner, or on behalf of the owner according to the contract agreement, to implement all or some management and service for the engineering project. The EPM enterprise not only deals directly with the project primary contractor enterprise to design and supply goods but also may, according to the contract agreement, assist the owner and oversee the general contract performance. The EPM approach has responsibility as agreed by the owner and the EPM enterprise in the contract.

2.2 Knowledge platform framework of an engineering project management

The knowledge platform framework of engineering project management is the infrastructure of knowledge management of the EPM enterprises; its function is to utilize information technology to transmit the proper information to the proper people at the proper time to succeed in finishing the engineering project (See Figure 1).

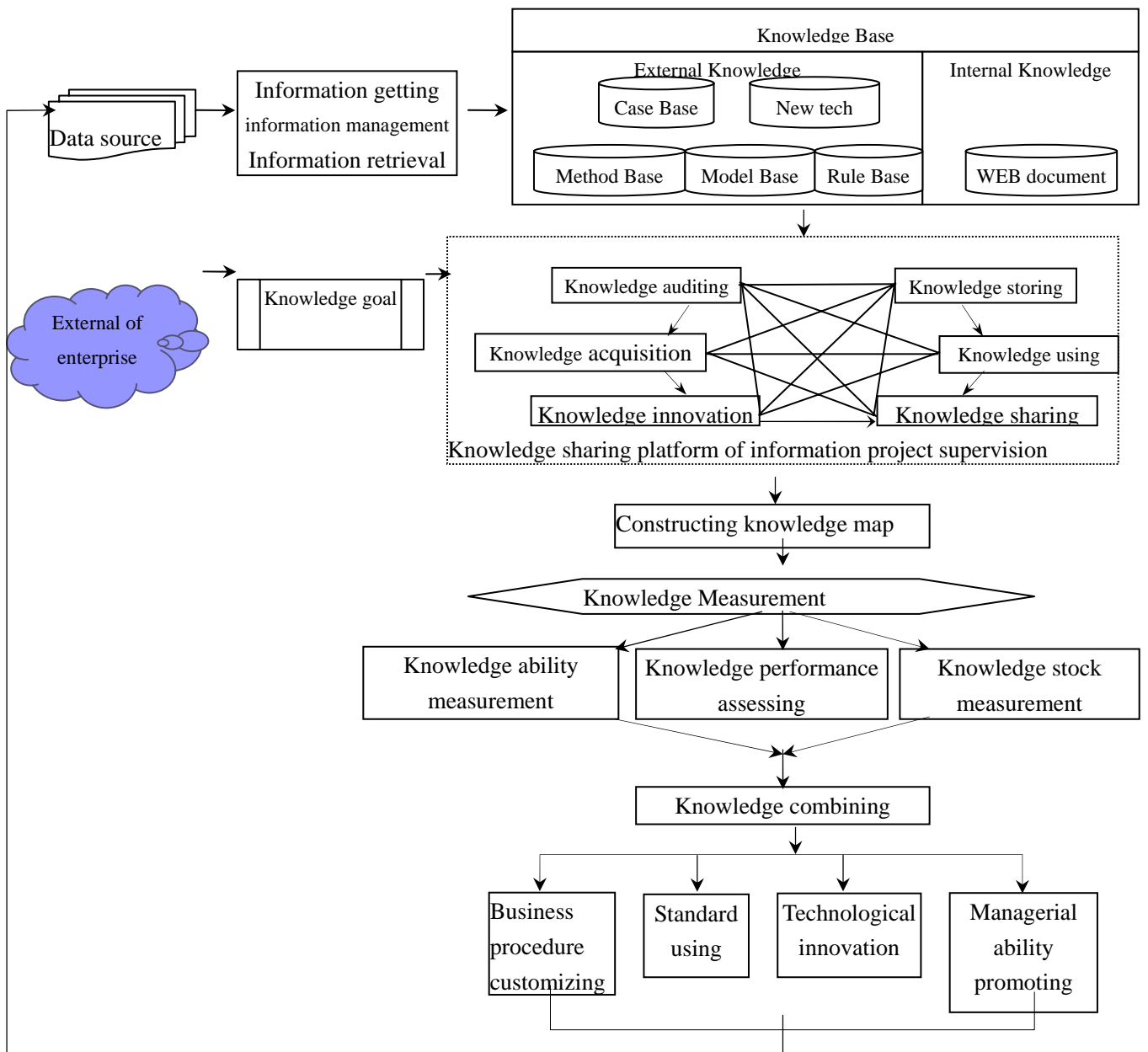


Figure1. The Knowledge platform of engineering project management on the basis of knowledge management

3 MAIN CONTENT AND METHOD

- (1) Data source: The various kinds of data sources that engineering project management enterprise demand, including internal data and external data.
- (2) Knowledge base: Aggregation of different knowledge. The knowledge base includes three main aspects.

A. External knowledge: Mainly storing knowledge relevant to engineering project management obtained from an information network; comprises mostly information on some data types and fact types, such as system integration and software development. The technology and management of this content are comparatively complicated.

B. Structurization knowledge: This kind of knowledge can be stored by using relational database systems and include information on national and sector standards. For example, take the knowledge library of an architectural engineering project management company. Its structural knowledge divides into five kinds:

policy laws and regulations; construction programs; control systems; engineering construction standards; and tender documents and models for painting. For engineering construction data standard classification, see Table 1.

C. Internal unstructured knowledge: This kind of knowledge is natural language description of accumulated knowledge. Its purpose is to transfer engineering project management knowledge in the head of members of an EPM enterprise to the knowledge bases to accelerate the socialization of knowledge

Table1. Engineering construction data standard classification of an architectural engineering project management company

According to overall classification	Engineering construction national standards
	Engineering project construction standards
	City construction project profession standards
	Architectural engineering profession standards
	China Engineering Construction Standardization Association standards
	Construction industry product standards
	Engineering construction national standards
According to specialized classification	The engineering construction standard compulsory articles
	Engineering project construction standards
	City and countryside planning
	Project reconnaissance surveys
	CitIES' mass transit
	Roads and bridges in towns
	Water supply and drainage
	Cities' fuel gas
	Heating and ventilation
	A city's appearance and environmental sanitation
	Scenery and botanical gardens
	Earthquake resistance
	Fireproof construction designs
	Architecture designs
	Construction ground
	Foundation engineering structure
	Architecture construction
	Construction maintenance and reinforcement
	Construction indoor environment
	Information technology
	Industrial architecture
	Transportation
	Railway engineering
	Energy
	Flood prevention and hydraulic engineering
	Chemical industry
	Mine projects

(3) Knowledge goal: The direction for the knowledge management of engineering project management. It is the knowledge that for the EPM enterprises improves competitiveness, working efficiency, scientific decisions, and service ability both to the owner and the performing group. Being dynamic, knowledge goals of the different EPM projects are different.

(4) Knowledge sharing platform of engineering project management: Technical support for knowledge sharing of engineering project management. It includes the following technological activities.

A. Knowledge auditing: Carrying out systematic, scientific investigations and assessments of the knowledge resources of EPM enterprises, proposing diagnoses, and predicting the knowledge state of the enterprises.

B. Knowledge acquisition: Obtaining important knowledge from domestic and foreign resources and obtaining potential knowledge by cooperating with other enterprises.

C. Knowledge innovation: Emphasizing the ability to develop knowledge that does not exist outside or inside of the enterprise.

D. Knowledge sharing: Establishing the foundation for using, propagating and popularizing knowledge, promoting an enterprise's knowledge management level, and strengthening the ability of EPM through changing isolated information and experience into the public knowledge in the course of engineering project management.

E. Knowledge utilizing: Guaranteeing that existing knowledge is really used for the benefit of EPM enterprises.

F. Knowledge storing: Choosing, storing and updating knowledge with potential value for the future, while including selectively, saving information, files, experience, and other various kinds of managerial knowledge also needed for EPM enterprises.

(5) Structure of knowledge maps: Visual description of a knowledge resource and carrier of EPM enterprises that shows the connection between them and creates an environment of knowledge sharing to promoting knowledge management to make members' study effective under the guidance of an organizing goal. This method utilizes the catalogue of a knowledge resource made with modernized information technology and synthesis of the relation between every knowledge item. It reflects the position and methods of storing information.

(6) Knowledge Measurement: What knowledge measurement studies is - an index of the value of the knowledge goods or the knowledge with attributes of the goods. It reflects the ability and potential to produce knowledge and reflects the competitive power of the organizing system. According to an analysis of knowledge management achievements, the content of knowledge measurement can be divided into three parts: Knowledge ability measurement, knowledge stock measurement, and knowledge performance assessment combining the characteristics of EPM trade.

A. Knowledge ability measurement: Aimed at passing innovation ability, coordination ability and test and assessment of the EPM engineers to implement personnel performance examined scientifically and to make reasonable management systems. Knowledge ability measurement can be divided into personal knowledge ability measurement and enterprise knowledge ability measurement. The manpower capital value of the EPM engineer lies in the knowledge and skill that the engineer has as well as in innovative thinking and ability to solve problems that the engineer carries. It is the individual intelligence service that an EPM engineer offers, and there are direct relations between the quality of engineering project management and the engineer's ability. Therefore, we can analyze the value of knowledge workers in engineering project management with cost-effective principles.

B. Knowledge stock measurement: The measurement of the static size of the knowledge; it means the measurement of the total amount of relevant knowledge resources in an organization or system in dealing with the stage of a certain specific knowledge goal. Knowledge stock measurement reflects the competitive power of organization. Knowledge stock has the characteristics of degree of staticness, timeliness, space, positiveness, increasing function with time, and fluctuation over time.

The main methods of knowledge measurement are: production function approach of the total amount, technological progress level, INEX SK, invisible assets assessment, regard knowledge as intangible assets estimation, etc.

Knowledge performance assesses carrying out effective assessment, feedback to the real performances of different knowledge in the knowledge sharing platform, and improving in time through constructing an evaluation system. The methods of the knowledge performance assessment in engineering project management are: Delphi, AHP, main composition analytic approach, DEA, neural network, etc.

(7) Knowledge combination: Integrating synthetically different sources, levels, structure, and contents of

knowledge using scientific methods as well as implementing reconstructing to combine and promote single, scattered, new or old knowledge and forming the new knowledge system.

Engineering project management enterprises use technological innovation and methods to perform a series of activities of engineering project management which will realize the economic worth of engineering project management, namely to enable an information engineering construction project to be finished smoothly within the planned amount of time, under reasonable cost, and with the required quality of products.

4 CONCLUSION

The knowledge resource of engineering project management is the important motivational force of wealth and development of engineering project management enterprises. Knowledge resources exist in the course of engineering project management in various forms, but they are difficult to achieve. In the face of fierce market competition, the engineering project management enterprises strengthen management innovation, improve the level of knowledge management, strengthen the learning ability of engineering project management, and promote knowledge sharing.

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