Design of digital business center of enterprise project management system based on Information Technology

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Abstract: Under the current network economy and e-commerce environment, the market competition is increasingly fierce, and the customer demand is increasingly diversified. The traditional enterprise project management system digital business center is difficult to achieve efficient enterprise project management. Therefore, this paper proposes the digital business center design of enterprise project management system based on information technology. The data processing structure of project management business center is designed, and the overall framework of enterprise level project management system is constructed. The enterprise digital management mode and decision-making steps are optimized through the division of enterprise level project information management level, and the enterprise level project management business category level is classified. Finally, the design of enterprise level project management system digital business center is realized. Experimental results show that the proposed method can solve the problem of information transmission between enterprises, and make corresponding linkage adjustment quickly according to the changes of market environment, ensure the smooth, flexible and rapid response of enterprise supply chain, and can timely and quickly find and meet customer needs, and achieve efficient project management.

Keywords: information technology; enterprise project; project management; digitalization

Introduction
As a special social and economic system, enterprise level project management aims to achieve the company's goals. Every enterprise has different goals, and one enterprise will have multiple goals. However, there is always a certain gap between the goals of the enterprise and the reality of the enterprise. This gap is the potential difference to promote the operation of the enterprise system, that is, the power of the operation of the enterprise system. The goal of enterprise management is how to
promote enterprises to operate according to scientific laws. The gap between the business situation consistent with scientific laws and that of enterprises is the potential difference of enterprise management. Enterprise digital management is a kind of management mode that makes the enterprise conform to the operation law of modern enterprise system under the condition of modern information technology and network economy. It is the gap between the scientific operation of modern enterprise and the current situation of enterprise. It is the "potential difference" of enterprise digital management. It is further decomposed to form the system power factor that promotes enterprise digital management. This is the system power factor to answer the problem of enterprise digital management. The change of enterprise management mode caused by the application of modern information technology in enterprise management and the change of enterprise business activities under the environment of network economy are the system power factors of enterprise digital management. Under the condition of modern information technology, digital management of enterprises is the return to the essence of information activities of enterprise management, which is the internal requirement of enterprise management. Under the condition of modern information technology, the reasonable distribution and flow of information in enterprise organization is one of the driving factors of digital management. The pursuit of profit is eternal. The maximization of profit depends on the "export-oriented" growth led by resource investment and the "internal" growth led by improving quality and efficiency. Informatization reduces the management cost of the enterprise, fine management improves the quality and efficiency, and makes the enterprise obtain the competitive advantage, which is another system power factor of digital management.

1. Design of digital business center of enterprise project management system

1.1 Data processing structure of project management business center

In the era of market-oriented knowledge economy, marketing with e-commerce as its main feature is the core activity of an enterprise, and also the focus of enterprise management activities. The object of enterprise management is a series of activities such as product sales, production and raw material procurement. As an important part of enterprise digital management, e-commerce is the starting point and end point of digital management activities. All digital management activities are market-oriented and aim to obtain the market. It is not only a simple business activity, but also a way to connect enterprise supply chain and customers based on the digital management of enterprise supply chain. Therefore, the environment of e-commerce requires that the management of enterprises must be digital. The company's supply chain is a demand supply chain with the core enterprise as the center and composed of suppliers, producers, distributors and customers. Logistics, capital flow and information flow among supply chain enterprises, in which information flow controls the movement of logistics and capital flow, can represent capital flow, to a certain extent, it replaces logistics. The flow of information among enterprises requires the unification of interfaces and information standards among enterprises. The digital enterprises establish a connection with XML as the standard language. Therefore, the supply chain management of enterprises must be digital management. On this basis, the data processing structure of the project management business center is optimized as follows:
In order to adapt to the changes of the external environment, the connection between the internal units of the enterprise, that is, the internal demand chain, must also be able to adapt to the needs of the external connection, so as to gradually realize the digitalization. Digitalization among the internal units of an enterprise can not only make the resource allocation within the enterprise more efficient and cheap, but also make the enterprise integrate into the external digital ecological environment\[6\]. Digitalization within the company is not only the result of the company's pursuit of profits, but also the result of the company's response to external pressure. The company's digital management is a step-by-step process, which consists of points (various information collection points), lines (various production, business and management processes), areas (integration, induction and analysis of enterprise level information, generation of information to assist decision-making), chains (digital management of inter enterprise supply chain, and supply chain and price composed of upstream suppliers, enterprise itself, downstream distributors and customers Value chain and information chain carry out effective digital management, so as to improve the competitiveness of supply chain, and then enhance the core competitiveness) and E-commerce Oriented chain (E-Commerce Oriented, supply chain oriented enterprise digital management) constitute\[7\]. Corresponding to this, digital management includes enterprise informatization, enterprise informatization management, decision-making level digital management, supply chain digital management and enterprise digital management facing e-commerce and supply chain. These five levels reflect the five different levels of enterprise digital management from low to high, which is the only way for enterprises to implement digital management\[8\]. Based on this, the enterprise level project information management level is further planned as follows:

**Figure 1.** Enterprise level project management system
Business information activities are based on information infrastructure and realized by means of information technology. Every leap of information technology promotes the change of the depth and breadth of information application. So far, it has gone through five leaps: language, text, printing, telephone and telegraph, computer and network digital (referred to as modern information technology for short)[9]. Especially modern information technology, such as computer and network, has a far-reaching and extensive impact on the application of enterprise informatization, which is more revolutionary than telephone[10]. Five revolutions make the application of information technology in enterprises become the mainstream, and enterprises also play an important role. At the same time, information technology in enterprises also changes with the development of social economy[11]. The enterprise level project management information is integrated and recorded as follows:

**Table 1.** Enterprise level project management information

| Project                        | Technology                              | Ability                                      |
|-------------------------------|-----------------------------------------|----------------------------------------------|
| Information storage capacity  | Large capacity, high-speed magnetic and optical storage technology based on GB and TB: RAID technology, NAS, San technology, multimedia technology, etc | High speed and large capacity data storage: fast access and retrieval of multimedia information |
| Computing power               | CPU technology (manufacturing process, instruction set, multimedia processing, file), data processing technology (SMP, parallel processing) | Super operation and processing speed parallel data processing capacity data processing automation |
| Communication and network capabilities | Networking products and technology; data communication technology; Internet technology: protocol standard | High speed data transmission ability eliminates the isolated resource sharing of data in time and space |
| Data organization ability     | Database technology; access technology; data distribution | Data integration data sharing; high performance mass data |
Modern information technology corresponds to enterprise value activities. Modern information technology plays an important role in all aspects of enterprise production and management, especially in the information activities of enterprise management[12]. The trend of digitalization is more obvious. Modern information technology plays a leading and supporting role in enterprises.

1.2 Business center project processing level division

To study the enterprise digital management system, first of all, it is necessary to analyze the organization structure, business process and information content of the enterprise, summarize the organization structure, business process model and information structure of the digital management, and then draw the digital neural system diagram of the enterprise by using the digital means such as information network diagram; and then, through the enterprise The digital management software realizes the functions of the enterprise digital management and applies it to the enterprise organization construction. Digital management system (MIS) is the carrier of enterprise digital management[13]. The difference is that the MIS construction discussed in this paper is carried out under the guidance of the enterprise digital management thought, and it is applied to the enterprise digital management to realize the organic combination of management and technology. Here are the details:

![Diagram](image)

**Figure 3.** Optimization of enterprise digital management mode

Information flow describes the process of enterprise activities from the perspective of enterprise activity flow; describes the flow path of information between different positions from the perspective of organization management; as a node in the process of information flow, the personnel in the enterprise, especially the managers, not only play the role of information intermediary, but also constantly process and make decisions on information[14]. In the process of transmission, it is not immutable, but constantly compressed and squeezed. In the process from operation level to management level, information is constantly compressed and squeezed. On the contrary, information is constantly decompressed and interpreted[15]. As one of the three elements of an organization, information dissemination is inherent, which is a necessary condition for the survival and operation of an organization. The information flow process within an organization is the unity of the activity
process and organization process of an enterprise. Based on this, the decision-making steps of project management are optimized as follows:

![Diagram of project management decision steps](image)

**Figure 4.** Optimization of project management decision steps

In order to meet the strong support of project management for enterprise strategic management, as well as the economic, effective and flexible macro needs, the project management system architecture based on cloud platform realizes the control and authentication of user rights under the cloud platform mode, as well as the communication needs of external system interfaces, which can provide data analysis and query support for enterprise decision-making. The core function of the system is enterprise project management, which includes project portfolio management and resource capacity planning management scheme used by strategic layer, project opportunity management used by operation layer, project management, resource management, working hours management used by collaboration layer, cost management and file management. The PMO is responsible for collecting all relevant information, while the senior management is responsible for collecting the objectives of the strategic decision-making layer into the portfolio database of that year. At the same time, the project management system collects the information related to human resources from the human resources system, such as the number of people, the total working hours; and collects the response information of competitors from the database of competitors, all of which are stored in the project management system.

### 1.3 Implementation of enterprise level project management business

This paper expounds the overall architecture of enterprise digital management system from the perspectives of system structure, application system construction, composition and operation mechanism of enterprise digital management system, aiming to realize the functions required by digital enterprise management, and the realization of technical level will be described in the following chapters. Generally speaking, the construction of enterprise digital management system mainly includes three parts: enterprise digital management information system, digital manufacturing system and digital marketing system. With the support of various environments and conditions, the enterprise digital management system has been formed, including hardware environment, software environment, network, technology development, infrastructure, service application, policy making, social environment, etc. Specifically, the architecture of enterprise digital management system consists of two parts: internal environment and external environment. The internal environment includes three types of enterprise digital management application service project portfolio: new project portfolio that can be completed in one year, project portfolio that can be completed in the same year left over from the previous year and project portfolio that can be completed in more than two years. These three categories correspond to three different situations to be considered in budgeting, some of which need
to be found in the database of the previous year, and then enter the plan of the next year.

Table 2. business category level of enterprise level project management

| Item 1                              | Item 2                                      | Item 3                              |
|-------------------------------------|---------------------------------------------|-------------------------------------|
| Project management customization    | Project management resource management      | Portfolio management project set    |
|                                     | management man hour and expense management  | management financial management     |
| Key requirements                    | Opportunity analysis / value analysis       | Business workflow integration       |
| report form                         | database task allocation planning database  |                                    |
|                                     | integrated project planning                 |                                    |
|                                     | process business system / tool integration  |                                    |
|                                     | details improvement                         |                                    |
| report form                         | Resource change item, time, cost center    | Advanced strategic report           |
|                                     | accounting                                 | advanced analysis report            |

Furthermore, the application service architecture and corresponding support system of enterprise digital management are analyzed. It can be seen that the outline and operation mechanism of enterprise digital management, and also can be found that digital enterprises have more advantages than traditional enterprises. In fact, digital enterprises can use data technology to effectively integrate various enterprise information systems and realize the internal management of enterprises Physical and chemical, integration, integration and digitalization lay a solid foundation for enterprises to carry out digital management. In this way, the enterprise can get out of the dilemma that the internal information system cannot be effectively integrated, and the external supply chain cannot be effectively managed and digitally managed, so as to provide support for the enterprise to carry out collaborative business in the network environment, and at the same time provide support for enterprise innovation, knowledge sharing of employees, learning and exchange. Informatization is the driving force of enterprise process reengineering. With the development and application of information technology, enterprises can break the old system, create a new process model, and achieve the great goal of enterprises. Specifically, the enterprise digital management system consists of three parts, namely, the enterprise digital management innovation system, the e-commerce system, the enterprise digital management network and the digital platform, as follows:
Figure 5. enterprise level project management system management platform

2. Analysis of experimental results

Through the test environment of WinXP professional SP2 database, the design effect of digital business center of enterprise project management system based on information technology is compared and tested to verify that the test environment specification of the test tool is java 1.4.2, and the database is Oracle 8. L.7 in Chinese. Experimental machine: p43. Oghz, 512 MB memory, 80 GB hard disk; development platform: Microsoft. Net framework 4.0; development tool: Microsoft Visual Studio 2010 ultimate; development language: C ×; Web server: Microsoft iis7.5; database server: Microsoft SQL Server 2012; operating system: Windows Server 2008R2 project management system needs to interact with enterprise core business system, other auxiliary systems and client tools. Some exchanged information needs to be transmitted through the Internet, so it needs to be encrypted. In view of the pressure and cost problems faced by VPN, users with different roles need to have different permission restrictions and content views, and do role-based authentication management and permission management. Carry out the comparative experiment according to the above environment and steps, and record the test results, as follows:

Figure 6. comparison test results

Through the comparative analysis of the above test results, compared with the digital business center in the traditional enterprise project management system, the enterprise project management system based on information technology in different levels of enterprise project management, its effect
is significantly better than the traditional enterprise project management system, fully meet the research requirements.

3. Conclusion

Global integration and networking are the mainstream of the world economic development. However, globalization means the gradual remoteness of economic activities. In order to solve the problems caused by the geographical location of economic activities, such as the inconvenience of transaction communication and the inability of credit guarantee, we must use digital means such as the Internet to realize the enterprise's remote management and remote business, while digital management can easily realize the enterprise management and business transactions across time and space. The main characteristics of e-commerce are to improve the efficiency of business activities, expand the scope of business activities, and play an increasingly important role in the world economy and trade. With the increasing proportion of e-commerce in the world trade year by year, e-commerce transaction will gradually become the main business transaction form of enterprises, and e-commerce environment will become the big environment of enterprise transaction, and form e-commerce barriers. The opportunities of transaction between enterprises that do not enter the big environment of e-commerce will decrease year by year, and tend to zero. With the continuous change of business environment, enterprises must adapt to this major environmental change as soon as possible and integrate into the e-commerce environment, which is both a challenge and a development opportunity for enterprises.

Reference

[1] De Vaujany F X , Fomin V V , Haefliger S , et al. Rules, Practices, and Information Technology: A Trifecta of Organizational Regulation[J]. Information Systems Research, 2018, 29(3):755-773.
[2] Lagoarde-Segot T , Currie W L . Financialization and information technology: A multi-paradigmatic view of IT and finance – Part II[J]. Journal of Information Technology, 2018, 33(1):1-8.
[3] Kroh J , Luetjen H , Globocnik D , et al. Use and Efficacy of Information Technology in Innovation Processes: The Specific Role of Servitization[J]. Journal of Product Innovation Management, 2018, 35(5):720-741.
[4] Wang H Y , Sigerson L , Cheng C . Digital Nativity and Information Technology Addiction: Age cohort versus individual difference approaches[J]. Computers in Human Behavior, 2019, 90(JAN.):1-9.
[5] Armstrong D J , Riemenschneider C K , Giddens L G . The advancement and persistence of women in the information technology profession: An extension of Ahuja's gendered theory of IT career stages[J]. Information systems journal, 2018, 28(6):1082-1124.
[6] Wimble M , Singh H , Phillips B . Understanding Cross-Level Interactions of Firm-Level Information Technology and Industry Environment: A Multilevel Model of Business Value[J]. Information Resources Management Journal, 2018, 31(1):1-20.
[7] Ma Y , Turel O . Information technology use in Chinese firms and work-family conflict: The moderating role of guanxi[J]. Telematics and Informatics, 2019, 41(AUG.):229-238.
[8] Al-Tmeemy S , Al Bassam B , Al-Attar T S , et al. An empirical analysis of the relationship between cost of control activities and project management success[J]. Matec Web of Conferences, 2018, 162.
[9] Turner R , Ledwith A . Project Management in Small to Medium-Sized Enterprises: Fitting the Practices to the Needs of the Firm to Deliver Benefit[J]. Journal of Small Business Management, 2018, 56(3):475-493.
[10] Cicmil S , Gaggiotti H . Responsible forms of project management education: Theoretical plurality and reflective pedagogies[J]. International Journal of Project Management, 2018, 36(1):208-218.
[11] Mavi R K , Standing C . Critical success factors of sustainable project management in
construction: A fuzzy DEMATEL-ANP approach[J]. Journal of Cleaner Production, 2018, 194(SEP.1):751-765.

[12] Iriondo I , Montero J A , Sevillano X , et al. Developing a videogame for learning signal processing and project management using project-oriented learning in ICT engineering degrees[J]. Computers in Human Behavior, 2019, 99(OCT.):381-395.

[13] Elzomor M , Burke R , Parrish K , et al. Front-End Planning for Large and Small Infrastructure Projects: Comparison of Project Definition Rating Index Tools[J]. Journal of Management in Engineering, 2018, 34(4):04018022.1-04018022.12.

[14] Saybani M , Hatami F , Heravi H . Prioritizing Risks and Proposing a Risk Management Model in Wind Farms Developments According to Project Management Standard[J]. Amirkabir (Journal of ence and Technology), 2018, 50 (4):249-252.

[15] Farashah A D , Thomas J , Blomquist T . Exploring the value of project management certification in selection and recruiting[J]. International Journal of Project Management, 2019, 37(1):14-26.