Digital Management Methods and Case Studies of Enterprises Based on Emerging Information Technology

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Abstract. Emerging information technologies include artificial intelligence, big data, blockchain, Internet of Things, BI, etc. The gathering of emerging information technology has brought an excellent opportunity for managing enterprise digital transformation. The essence of enterprise digital transformation is to use the advantages of digital technology in data collection, network transmission and analysis and calculation to complete the optimization and upgrading of enterprise business model, management model and business model. The fundamental goal of enterprise digital management is to maximise the benefits of the enterprise. This paper examines the problems and challenges encountered by traditional enterprise management models in the digital era. It analyses classic cases of digital transformation management in pillar industries of the national economy based on emerging IT technologies. It is concluded that through the use of modern digital information technology and digital management mode, enterprises can gradually create a supervisory mechanism with fast communication, clear division of labour, responsibility, quick response, timely solution and efficient operation, and comprehensively improve their operation level to achieve the goal of digital, standardised and refined enterprise management.

Keywords: Business management, digital transformation, emerging information technology, enterprise data management.

1. Introduction

The application of new information technologies in the production and management of enterprises is gradually gaining ground and providing a good opportunity for the change of management concepts, the innovation of management theories, the upgrading of management methods and the renewal of management tools. The theoretical basis for this is the transformation of modern information technology in business management from the perspective of management technology and tools. A digital management system is an essential tool for enterprise management, and the demand for change in enterprise management is driving the construction of digital management systems. In the context of today's information era, transforming the traditional management mode of enterprises into an information management mode can improve the management efficiency and management quality of enterprises, and it is also of great help to enhance the core competitiveness of enterprises, to ensure that enterprises can achieve stable and sustainable development. At present, China's traditional enterprises are gradually promoting information management, while China's enterprise information management is still in the early stages of construction, facing many challenges in the construction process, greatly hindering traditional enterprises from achieving the digital transformation process.

2. Current challenges

The traditional enterprise management model is difficult to adapt to the information age in some aspects, which makes it difficult for enterprises to develop efficiently and for a long time.

2.1. Backward processing of traditional business management data

To survive in the information age, enterprises must achieve multidimensional connectivity, that is, they not only need to achieve internal connectivity and smooth communication among various departments, but also to achieve connectivity with goods, users, and upstream and downstream of the industrial chain. Enterprises also need to achieve rapid production, rapid sales, rapid service, rapid

return of market information, rapid adjustment, and decision-making. Under the traditional enterprise management mode, the internal data resources of the company are scattered in various business systems, which is reflected in the large amount of data, the low concentration ratio of data, and the low degree of attention people pay to data, which makes it impossible for technical personnel to conduct "big data" correlation analysis. The huge amount of data requires the support of high-speed information transmission capabilities, and for unstructured and low-density valuable data, faster analysis and higher processing capabilities are required. This can easily lead to the emergence of "data silos", and data cannot become effective support for enterprise management decisions. Under the traditional enterprise management model, the integration of enterprise and external data is low, and it is not possible to timely and comprehensively obtain the distribution and updates of data from the market, customers, and suppliers. The application of data is still in its infancy, and it is not possible to conduct predictive and decision-making analysis of business. The potential value of data assets cannot be reflected.

2.2. Traditional enterprises produce a single product and lack innovation [1]

Under the traditional enterprise management model, the speed of data collection is slow and not comprehensive enough, which leads to the inability of product development personnel to fully understand the needs of customers for products in the new era, and subsequently leads to the inability of enterprises to produce diversified and personalized products. In this context, enterprises can only improve work efficiency by organizing large-scale production, thus reducing Unit cost and expanding profit space. This production mode prevents enterprises from investing too much cost for innovation, which hinders the development of enterprises' innovation.

2.3. Traditional business management lacks innovation awareness [1]

Before the advent of the information age, without the support and promotion of emerging information technology, enterprise managers did not feel that they needed to cultivate innovative awareness and improve their management models. For typical traditional construction enterprises, as an important force in real estate construction, construction enterprises have large output value, low information technology content, high construction requirements and short construction period. In order to complete the task progress of construction more efficiently, Digital transformation of construction enterprises is imminent. Based on the intelligent application of BIM technology, enterprise digitization has evolved from simply recording key information related to production and management to reflecting the dynamic process of business management in real-time. In order to achieve online management of engineering projects and on-site progress, each participant has built a visual model platform for real-time interaction. However, the online connection and mutual understanding of human-machine materials on the construction site, as well as the mapping between digital buildings and physical buildings, cannot be accurately achieved with current technology.

2.4. Traditional business management concepts and forms are outdated [1]

Firstly, compared to the current information age, the complexity of the survival environment for traditional enterprises is relatively low; The level of productivity is not high; Producers and managers often focus on production factors such as equipment and raw materials, with outdated management concepts; Consider single and one-sided issues; The formation process of enterprise production and management decision-making lacks democracy and scientificity, and is mostly determined based on the industry experience of production operators; The development strategy formulated by the enterprise does not follow market demand and consumer habits, but rather is based on the enterprise's own development willingness and profitability, resulting in low market adaptability.[1]

Secondly, traditional enterprise management overly focuses on the allocation of goods and neglects the adjustment and transfer of human resources. The unreasonable composition of personnel organization leads to a lack of vitality and competitiveness in the enterprise.

Since the development of the information age, enterprises can explore the synchronization of digital intelligent management and supervision of project quality, safety, progress, green construction, etc. through the construction of digital platforms such as production management systems, video monitoring systems, and labor management systems. At present, enterprises can obtain more comprehensive, real-time, and accurate information through digital means, combined with new technologies such as cloud computing, big data, the Internet of Things, intelligence, and mobile internet. However, the application research based on the analysis of these data to assist management, supervision, and provide data support to decision-makers is not yet in-depth enough.

2.5. Digital marketing in traditional business management is lagging behind [1]

Traditional enterprises may encounter many problems in marketing, such as difficulty in retaining customers, long lead conversion cycles, etc., resulting in high product marketing costs and low sales profits. Traditional enterprises urgently need to find digital marketing methods and try to use them in the context of informatization.

3. A digital approach to project management for engineering and construction companies based on emerging information technology and case studies

Building Information Model provides a three-dimensional solution for construction enterprises, including job-level professional application, project-level exemplary management and enterprise-level intensive operation.

Utilize the collaborative application of BIM and enterprise digital management platform to digitize and upgrade all elements of the construction industry, and promote the circulation and sharing of data and resources throughout the entire project process. This measure effectively aggregates various stakeholders in the engineering project, including suppliers, designers, construction parties, operation and maintenance parties, and owners, to achieve horizontal end-to-end and full industry chain participation capacity collaboration, and vertically connect professional collaboration throughout the entire lifecycle of construction projects.[4]

By utilizing BIM, not only can intelligent interactive digital models be established, but for enterprises, it can also achieve business data integration with other parties such as company procurement, human resources, finance, etc., forming multidimensional data aggregation, and thus serving scientific and efficient project decision-making.[5] In the process of engineering project construction, project model information is associated with project management. Through the collaborative application of BIM and enterprise digital management platform, management and information are organically combined, and the effectiveness of management work is reflected through data information. BIM will also assist construction enterprises in establishing their own component library and forming their own personalized big database. After the completion of the project, the complete project data model can be archived within the enterprise and also delivered to Party A, achieving efficient digital construction operation and maintenance, making construction enterprises have greater core competitiveness.

Through the integration of BIM software and industrial internet technology, with the help of the industrial internet's modelling, software, standardisation and encapsulation of industrial technology, manual experience and past practice, deeply combined with the industrial internet platform, the industrial internet's various network infrastructures are used to achieve interconnection and interoperability between different places, different masters and heterogeneous data subjects, breaking data silos,[4] to connect construction progress information and refine construction Management work. Through the time information dimension of the BIM model, technical simulation can be used to simulate the real construction progress information of engineering projects. Management personnel can view the actual progress on site in real-time through the 3D model view, which is conducive to targeted work arrangements for management personnel, especially for cross operations and the entry of new subcontractors. This will truly achieve dynamic management of engineering progress. This

measure has achieved phased management of safety, quality, materials, and cost information, improved the precision of management work, and effectively strengthened the coordination of management work at all levels.

4. A data asset management platform for power and energy-based enterprises based on emerging information technology

With the further deepening of the national strategy of promoting the integration of digital economy and real economy, traditional power generation enterprises have begun to carry out Digital transformation, which has led to significant changes in their production and management models. A unified data platform is the key to optimizing the digitization and informatization of production management and unit operation. The unified data platform provides secure, efficient, and reliable data support for the intelligent application system of digital power plants. Among them, whether to carry out data asset management has become an important standard for measuring whether a power enterprise has the level of digital development.[6]

The data management of power energy enterprises is divided into six fields: data service, data production, data integration, data fusion, data operation, and data governance. But currently, enterprises are unable to achieve institutionalized management of data management, which leads to data being unable to effectively support the business needs of the enterprise. In addition, the power grid system is complex and vast, with a wide variety of types and scattered data, which is easily affected by factors such as incompatible data structures and frameworks between different systems. So many power supply enterprises have some common problems, specifically manifested as: data management work is just starting, only guiding data management work in scattered forms such as guidance or solutions; Data is scattered across various systems and cannot be recorded in a timely, complete, and accurate manner, resulting in unclear overall data and incomplete reflection of business operations; The standards in each system are independent of each other, lack a unified data collection standard, and are not updated and maintained in a timely manner, resulting in data redundancy; Insufficient data control efforts and lack of a systematic data control system have resulted in low data quality and insufficient practicality.

Currently, there are still many enterprises that have not attached great importance to the construction of data asset management. Although some enterprises have established data asset management platforms, there is still a significant gap between the operational results and the predetermined goals. Therefore, the power enterprise data platform needs to be added based on the data asset management of the unified data platform in the power industry.

4.1. Data asset management for a unified data platform for the power industry

According to the actual application of data asset management, the data asset management of the unified data platform can be divided into four different sections: business system, functional requirements, core processes, and technical architecture. In the process of standardizing data asset management processes and methods in enterprises, these four sectors play an important role in achieving comprehensive data supervision.

4.1.1 Business system

Building a business system requires standardized data processing processes such as collection, processing, outbound, inbound, and security management. While meeting the requirements of basic data processing, the business system section can create applications for hierarchical data asset management.

4.1.2 Functional requirements

The functional requirements section will be conducted from two aspects: the early display of data asset management and the backend management. The former involves collecting preliminary data

and conducting classification planning to achieve data sharing, while the latter requires targeted management based on the actual situation of different data types and user needs.

4.1.3 Core processes

Core process: Users initiate requirements, information technology processes data, and data management is responsible for sharing data with users.

4.1.4 Technical architecture

The technical architecture mainly adopts the B/S mode. The B/S model is structured in three aspects: terminal access, system business, and system storage, which can directly handle different forms of data and is more in line with the targeted principles of data asset management.

4.2. Data asset management for Power and energy companies

At this stage, the country attaches great importance to digital development, putting forward higher requirements for network security, data governance, information services and other aspects. In response, the power grid company needs to pay more attention to wisdom empowerment, actively promote the in-depth integration of advanced information and communication technology, power control technology and energy technology applications, and with the help of mobile Internet, artificial intelligence and other modern information technology to achieve the interconnection of all things and human-computer interaction in all aspects of the power system, to create an energy Internet ecosystem, and constantly improve the power grid holographic perception ability, flexible control ability and system balance ability. Driven by digital transformation, the company has taken management and business change as the traction, digital technology upgrade as the foundation and guarantee, and solved business pain points as the core, and put forward higher targets in major business areas to promote the continuous deepening of the company's digital transformation construction. Specifically, the power grid company is making every effort to encourage digital construction with work requirements such as strengthening data empowerment, digital application innovation, enhancing technical control, promoting regional and local collaboration and improving security.

Build a two-wheel drive model of data governance and data operation to realise data value creation. Grid data assets have a large volume, high real-time, time-sensitive, and high social value. Four characteristics, for the analysis of social and economic trends, enterprise production, and personal consumption has a substantial reference value, and application prospects are extensive. In the data asset management system, the power grid company builds data governance and data operation in two-wheel drive mode, the massive amount of data collection, calculation, storage, and processing, to form a significant data asset layer, to provide efficient services for customers.

Regarding data collection, the power grid company should use "collection instead of entry", "a generation of multiple applications", and other new technologies, and new models to strengthen data governance, to ensure data quality. In terms of data audit, grid companies should develop data accountability standards and process specifications, such as through "check → input → audit" the complete process control, mutual supervision, to build a comprehensive, traceable data recognition, and accountability mechanism, to improve data quality, to ensure that the data is true, accurate, standard. In terms of data application development, the power grid company should develop innovative data applications based on the data centre. In terms of data sharing and opening, the grid company should actively explore data asset pricing methods, to build a data market price mechanism, to achieve a variety of forms of data open applications and external transactions, to construct a new business model of data external operations, to release the value of power energy data.

5. Conclusion

Traditional real estate and construction companies and power and energy companies are a vital part of the pillar industries of the national economy. They are characterised by their high importance,

high output value and unadvanced management processes, making the digital transformation of the management of traditional high-output value companies critical.

I explored the actual situation of the traditional construction industry and the power energy industry, and studied the Digital transformation methods and actual cases of these two types of enterprises. Research has shown that the rational use of emerging information technology tools can effectively improve the management efficiency of large enterprises. All aspects of enterprise management are supported and driven by data, which helps managers make precise decisions. In the process of Digital transformation, the products operated by enterprises will have higher output and better quality, and enterprises will improve the response speed to customer needs.

We suggest that traditional enterprises formulate scientific and practical policies, improve laws, regulations and institutional systems as soon as possible, accelerate the construction of new infrastructure, promote the deep integration of digital technology and the real economy, innovate regulatory means and enhance governance capabilities, to strengthen top-level design and strategic layout. Secondly, traditional enterprises need to focus on the long term, arrangement in advance, take the initiative to create market demand, lead and promote the digital transformation of enterprises, increase investment in technological innovation, enhance the inherent innovation capacity of enterprises, and must make every effort to encourage the application of digital technology to enhance the digital transformation capacity of enterprises. Third, each industry has to speed up the construction of a national integrated big data centre and strengthen the digital transformation experimental exploration, while organising and implementing the digital economy "Internet+" project to achieve the purpose of laying out a public support platform for industrial digitisation and continuously building a perfect digital ecosystem. Finally, improving the marketability of data elements, releasing growth potential, attaching importance to the development of talent resources, improving the quality of talent teams and deepening and expanding international industry chain cooperation are also indispensable steps for traditional industrial enterprises to achieve digital transformation.[9]

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