Research on the Improvement of Management and Control Ability of Large-scale Power Grid Enterprises under the Condition of Emerging Technologies

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Abstract. The new round of information technology revolution represented by Big data, Cloud computing, Mobile Internet, IOT, AI and national policies on technology development provide technology and policy environment for the application of emerging technologies in the collectivized management of power grid enterprises. This paper deeply analyzes the influence and function of emerging technologies on power grid enterprises, further explores the problems in the application of emerging technologies in power grid enterprises, and puts forward the direction and path for the improvement of the management and control ability of power grid enterprises by emerging technologies, which is to take digitalization as the basic policy and to advance orderly according to the path of "two fusion and four strengthening".

1. Introduction
The future operation and development of power grid enterprises have an inevitable demand for management reform. In the future, the breakthrough development of energy also fundamentally requires the effective transformation of power grid enterprises to adapt to the large-scale power production, configuration, operation and management. With the rapid change of the external environment and the development and application of emerging technologies, the development and management mode of power grid enterprises will be greatly affected, and the management changes will be revolutionary.

2. The impact of emerging technologies application on the control of power grid enterprise groups

2.1 It is conducive to deepening the degree of "intensification, flattening and specialization" and improving the operation ability of collectivization
The application of emerging technologies is conducive to reducing costs and increasing efficiency, improving the level of optimal allocation of resources, realizing lean management and ensuring the safety of power grid. Firstly, resources are becoming more intensive. The application of emerging technologies makes the management of human, financial and material resources of power grid enterprises more intensive. Big data technology manages a small amount of internal and external data of enterprises, excavates deeply, realizes the effective coordination and management of resources, and analyzes the potential saving and allocation methods. In the management of global resources, artificial intelligence technology can effectively make use of enterprise operation data and dynamic mode, make analysis and judgment, allocate resources quickly and responsively, and study and judge the running state. The effective combination of various emerging technologies provides technical support for the
rapid allocation and efficient utilization of power grid enterprise resources.

Secondly, the structure is more flat. The application of emerging technologies will inevitably transform the organizational structure of power grid enterprises and make them tend to develop flat in the future. On the basis of traditional information system, the development and application of cloud platform and mobile Internet enable enterprise information to be transmitted and shared at different levels, instead of top-down or bottom-up report, thus greatly reducing the level of enterprise organizational structure. Cloud platform enables information to be fully shared. Mobile Internet technology makes organizational information transparent and concise. Under the influence of mobile Internet, employees can communicate quickly and conveniently. The information system of power grid enterprise is optimized and improved, and a matrix project team is formed with the help of network platform to form an unprecedented professional team and promote the cooperation of enterprise positions. The application of emerging technologies has changed the way of communication between the upper and lower levels of the enterprise, between departments, and between the organization and the outside in the original hierarchical organizational structure. It has the advantages of agility, flexibility, rapidity and efficiency, and has accelerated information feedback, communication, decision-making and action.

Thirdly, the business is more specialized. The application of emerging technologies will inevitably promote the professional development of power grid business. The development of the Internet of things and the rise of induction technology have created an information network that can closely connect many things in physical space. The Internet production based on CPS will drive specialized operation and intelligent production. With the development of big data analysis technology, especially the development of predictive analysis, combined with the extensive application of Internet cloud, the formation and synchronization of physical space and virtual information space, enterprises have a large number of data analysis basis.

2.2 It helps to improve the standardization of process, the precision of decision-making and the innovation of operations

The first one is the standardization of process. The application of emerging technologies will help to promote the standardization of the operation process of power grid enterprises. The standardization system, using ERP system tools such as, on the basis of the use of cloud platform will be more fully integrate enterprise information and resources, form a multi-level resources, multiple interface integration of unified service platform, integrated group each grid enterprise, form a unified standard operation process, and provide a full range of solutions for child grid enterprises. In different voltage levels of power grids, especially in the planning, construction, operation and maintenance direction of transmission and distribution grids, there are big differences in the required professional knowledge and skills. Therefore, based on big data statistical analysis, it is necessary to constantly improve the implementation standard and gradually form the corresponding mechanism.

Secondly, the precision of decision-making. The application of emerging technologies will inevitably lead to the precision of decision-making and improve the effectiveness of decision-making. In IOT are widely used, on the basis of enterprise to master a lot of equipment information and operation information, these information through the cloud platform integration, by adopting the technology of large data, the analysis and mining depth, powerful computing power, can recognize more implicit information associated with the artificial intelligence based on the analysis of the auxiliary, realizes the human difficult to finish the huge amounts of data mining and decision analysis, which makes the control of the management of the enterprise more refinement, a more accurate prediction of data management. On this basis, decision-makers can play a more scientific and rational role in decision-making. Big data helps enterprises to achieve the accuracy of demand prediction in production. For example, in terms of resource allocation and financial management, big data may be used for analysis and coordination, and be arranged quickly through cloud service platform. Accurate management is the key requirement in the future action of energy Internet. Every decision of large-scale projects has a huge impact, and massive data must be processed by artificial intelligence to achieve rapid response. Data - based and in-depth
analysis and decision-making ability is an indispensable and important capability for power grid enterprises in the future.

Thirdly, the innovation of operation. The application of emerging technologies will help achieve operational innovation. The extensive application of the Internet of things, big data and artificial intelligence technologies will greatly save manual statistics and simple analysis, and enable personnel to focus on more advanced analysis and decision-making, which will be more innovative. At the same time, the in-depth analysis of big data and artificial intelligence will also provide new improvement directions for the operation of power grid enterprises and expand their innovation points. The wide application of new energy technology and distributed power supply technology will provide a new business model for the production and sales of electricity. Due to the different regional development level, resource allocation and territorial management resources of sub-grid enterprises, complete standardization in operation still cannot give full play to their full capabilities, and they need to develop corresponding business models and development goals in line with local conditions. With the specific resources of sub-grid enterprises, the situation of specific grid enterprises should be comprehensively analyzed on the basis of big data and the processing ability of artificial intelligence, and customized decisions should be determined on the basis of standardization. With the wide application of emerging technologies, the transformation of power grid enterprise operation will continue to appear. Whether to cope with and seize the opportunity of reform will be of great importance to the future development of power grid enterprises.

3. Problems existing in the application of emerging technologies in power grid enterprises

At present, the management and control of large power grid enterprise groups at home and abroad generally have problems such as slow transmission speed of organizational structure, lengthy business process, and low application of professional management technology. It is urgent to deepen the application of emerging technologies to solve these problems.

Firstly, the top-level design system is not strong. Power grid enterprises have insufficient understanding of the strategic value of technology application and have not established a clear application direction, framework, implementation route and application strategy. On the one hand, the overall understanding of the strategic significance, functional positioning and potential value of new technology application is insufficient. It is urgent to establish clear technical application direction and frame thinking and put forward systematic methodology guidance. At the same time, it is urgent to study and judge the application scenarios of the technology systematically, and establish the implementation route and application strategy in stages.

Secondly, the management mechanism to adapt to technological development has yet to be established and improved. The development of technology needs supporting management mechanism to adapt to it, in order to better play the role of technology in promoting management. At present, power grid enterprises have not yet established an operational mechanism matching the development of technology in terms of performance assessment and employment mechanism. On the one hand, it has not yet formed an assessment mechanism conducive to the development of emerging technologies. The management of new business continues the practice of the main business of power grid, but it is faced with the assessment requirements of market profit, and the management system and assessment requirements need to be further connected. On the other hand, the core team has not been formed to promote the development of emerging technologies. The research iteration speed is slow and the development operation and maintenance cost is high. Constrained by the employment mechanism, there is no new business development of the core r & d team. At present, power grid enterprises mainly rely on business outsourcing for research and development, with long approval process of demand change, slow iteration and high cost.

Thirdly, the application of technology is scattered and inefficient. The existing information platforms of power grid enterprises are the management mode of stripes and blocks, and the data are managed separately according to the business and stored in multiple places, which is easy to form barriers. The whole process management of technology application is lack of unified coordination organization and
organization at the level of power grid enterprises, which limits the development of emerging technologies and innovation in management and application of power grid enterprises. The technology application platforms are segmented, the management responsibilities of the departments are overlapped and missing to some extent, and the allocation and management of data resources are not unified and coordinated. Data resources, user resources, channel entrance distribution scattered, integration and utilization of certain difficulties. Power grid business data and supplier data of power grid enterprises are scattered in various departments, and there is a lack of management organization to integrate and utilize all kinds of data resources. The business development is scattered, the business setting and the layout of channel entrance are overlapped and duplicated to some extent, and there is no overall planning.

Fourthly, insufficient data sharing. The cost of communication between departments is high, the implementation of sharing is difficult, and there is no data sharing mechanism between specialized departments. Due to unclear data requirements, internal data confidentiality and other factors, communication costs between departments are high and sharing implementation is difficult. There is no effective data sharing mechanism between departments, which makes the coordination between different departments difficult and the coordination procedure complicated. Due to the pressure of performance evaluation, the inauthenticity of the data is prominent. At the same time, the supervision and punishment for the problem of data inauthenticity are insufficient. At present, due to the large volume of some data or the short time limit requirements, there are insufficient entry time, early entry, artificial entry error and other phenomena for artificial filling data. The unified data standard system has not been effectively implemented, and the standards and interfaces of the underlying data are inconsistent and non-standard.

4. The direction and path to improve the management and control ability of power grid enterprises based on emerging technologies

4.1 Two fusions
Two fusion. Emerging technologies such as Big data, Cloud computing, Mobile Internet, IOT, AI are characterized by intensive, sharing, real-time, online and intelligence, which can effectively make up for the problems such as delayed information transmission and poor coordination in the management and control of power grid enterprise groups. Firstly, it is integrated with the technical characteristics of power grid. Based on the characteristics of network economy, scale economy and technology intensive, the emerging technologies are fully applied to the transmission, distribution and sale of power grids. Secondly, it is integrated with the characteristics of power grid enterprises. Based on the network attribute, platform attribute, public utility attribute and other attributes of power grid enterprises, the emerging technologies are fully applied to the whole process of power grid production, operation and management, so as to improve the group's control ability and give better play to the service level of customers.

4.2 Strengthen data resource intensification
Compared with other enterprises, data resources of power grid enterprises are characterized by huge volume, diverse types, multiple sources of channels, strong timeliness and great hidden value. Under the condition of emerging technologies, we should give full play to the value and role of data, constantly improve data quality and promote data sharing, and enhance the intelligent monitoring and monitoring of the whole process of power grid operation. Improve data acquisition quality and efficiency. On the source number, synchronous record, ensure access to the primary data first-hand. Directly capture the field fault data, gradually increase the data sensor equipment, increase the acquisition frequency and accuracy; Ensure that data is synchronized with records and not tampered with, deleted, or overwritten. Adhere to the efficiency principle of system simplification, can through online monitoring, automatic capture of the data no longer additional requirements statistics, avoid repeated data entry and the headquarters of the department of repeated collection, effectively reduce the burden and increase efficiency. Improve the internal data sharing mechanism. With the support of data information
integration and fusion, through compiling internal data sharing list, improving internal data sharing mechanism and standard system, the unified storage and sharing of full-service and full-type data can be realized. Give full play to the role of full service data center in promoting business integration, data management and professional advanced analysis application. We should pay attention to breaking the barriers between professional data management and technology, improve the internal open sharing mechanism with the focus on the evaluation of the degree of disclosure and the means of incentive assessment, and realize high-quality data, data sharing, operation monitoring and analysis and prediction, so as to serve the management of the whole process of power grid operation.

4.3 Enhance the agility of organizational structure
Through management reform, power grid enterprises have redefined functional positioning at all levels, unified all levels and business organizations, compressed organizational levels and simplified organizational Settings. However, grid enterprise management and control is faced with such problems as poor horizontal coordination among different majors and incomplete vertical information transmission between different layers. It is urgent to give full play to the comprehensive advantages of big cloud and other technologies and build an "Internet +" intelligent management system based on the technical means of "mobile terminal + Internet + big data". For example, horizontally, break down professional barriers to promote information sharing. The main network intelligent operation and inspection command platform will interconnect production management, geographic information, control operation and management and other information systems, so as to realize equipment status, process monitoring, multi-source information sharing and overall management of task organization. The distribution operation command platform realizes the integration and interaction of dispatching automation, electricity consumption information collection and other information systems, and promotes the overall and intensive management of control, distribution and marketing. Vertical, get through the hierarchy of restrictions, promote the link up, better service grassroots. To build a modern service system, we need to strengthen the power of authorization at the grassroots level. Therefore, it is urgent to build an appropriate information monitoring system and strengthen the monitoring of grassroots through data. Redefine functions at all levels. Headquarters as the helmsman, grasp the overall strategic direction of power grid enterprises, from the macro assessment of diagnosis and analysis of information, improve decision-making efficiency; Provincial power grid enterprises exercise management and supervision responsibilities, support the power grid enterprise strategy on the top, fully delegate power on the bottom, and do a good job of information monitoring. After the grassroots service personnel are fully empowered, they can freely integrate and carry out cooperation according to market demands and improve their competitiveness.

4.4 Strengthen the intellectualization of professional management
Power grid enterprises have realized professional centralized management, which has changed the problem of unclear interface of professional responsibility in the past. Next, in the stage of rapid development of emerging technologies such as big cloud, it is urgent to give full play to the characteristics of intensive, sharing and visualization of emerging technologies, replace the relatively backward manual work and low efficiency in the past, and improve the management efficiency and quality of various majors. Planning, for example, in view of the existing power grid enterprise comprehensive plan of the information technology is not high, do not have a unified data interface standard, for all kinds of data lack of whole process project information tracking and closed-loop evaluation problem, need through the management of comprehensive plan index quantitative analysis tool, and the integrated use of big data analysis and artificial intelligence technology, build a comprehensive plan to lean control platform, and further enhance the level of informatization and intelligent aided decision-making, enhance the precision of comprehensive plan management. Professional in operation inspection, through strengthening the development and application of intelligent control platform, mobile operation terminal and intelligent inspection equipment and technology, it realizes the real-time perception and monitoring of equipment status and transmission
channel environment, and improves the operation inspection efficiency and cost control level. Marketing professional, through smart sensors and information collection terminals connected to the power grid, relying on the comprehensive integration of the power grid, the Internet and the Internet of things, to achieve accurate perception of customer needs, to grasp the development trend of customer needs. Service response is more agile. By means of advanced technologies such as the Internet of things and the mobile Internet, we can shorten the space and time distance of customer service business and build an integrated online and offline intelligent interactive service system.

5. Conclusion
Aiming at the existing organizational structure of power grid enterprise group control conduction slow, business process problem of long and low professional management technology, based on the emerging technology of power grid enterprise ability to control the direction and path for realizing to upgrade to digital as a basic policy, according to the "two fusion, four strengthening" orderly path forward, constantly promote collectivize operation ability.

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