

Exploration on the Path of Digital Intelligence Transformation Empowering Enterprise's Statistical Modernization Reform

——Based on the Thinking of Natural Gas Upstream Enterprises

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ABSTRACT

The rapid development of digital technology obviously marks the coming of a new wave of scientific and technological revolution, which brings great convenience and severe challenges to the statistical management of enterprises. How to show the leading position of digital intelligence technology in the statistical information architecture has become the focus of industry attention. Generally speaking, as an important link in the whole industrial chain, the modernization reform of natural gas upstream enterprises' statistical work is of great significance for improving management level, optimizing resource allocation and promoting the sustainable development of the industry. The purpose of this paper is to discuss the present situation of the statistical modernization reform of upstream natural gas enterprises, analyze its current challenges, and put forward corresponding countermeasures and suggestions in order to provide reference for the statistical reform of upstream natural gas enterprises in China.

KEYWORDS

Digital transformation; Statistics; Reform; Path

1. INTRODUCTION

Since the implementation of the "Fourteenth Five-Year Plan", China has entered a new stage of development, showing the characteristics of informationization, digitalization and intelligence in all fields. Report to the 20th CPC National Congress of the Communist Party of China has also clearly proposed to speed up the construction of digital China, make it stronger and better, and cultivate and expand the core industries of digital economy [1]. Natural gas plays an important role in the national energy strategy [2]. Oil and gas is not only an important strategic resource, but also an important part of a country's energy system. It occupies an important strategic position in the world economic structure and has a direct relationship with a country's industrial base, people's living standards and the overall layout of economic development. Promoting the informatization, digitalization and intelligent development of natural gas industry, especially paying attention to the upstream exploration and exploitation industry of natural gas, is of great significance for promoting the digital and intelligent transformation and modernization development of energy industry. Under the background of "double carbon" goal, it is of strategic significance for China to promote the sustainable development of energy, economy, society and environment to promote the modernization and transformation of energy industry and adapt to the new development trend of international energy industry.

Enterprise statistics is a very important work, which is of great significance to decision-making, planning and evaluation. A very important task in the natural gas industry is to measure whether

natural gas meets the national standards. It is inevitable to use various statistical methods in the measurement work, and the gas consumption of users can be accurately recorded through statistical measurement [3]. In natural gas upstream companies, statistics is an important work for company management, but the traditional statistical work has obvious disadvantages, and there are obvious shortcomings in the company's production operation and daily management. Promoting the modernization of enterprise statistics is not only the strategic layout of the country, but also the urgent need for enterprises to face practical problems. At present, the modernization development path of natural gas upstream enterprises' statistics is facing new challenges, new opportunities and new forms, which requires us to consciously integrate into the overall situation of national development, explore and innovate, take new quality productivity as the leading direction, and promote the modernization and transformation of enterprise statistics. Therefore, starting from the research on the status quo of the statistical modernization reform of natural gas upstream enterprises, this paper analyzes four problems existing in the statistical modernization reform of natural gas upstream enterprises, such as barriers to statistical technology innovation, shortage of statistical professionals, obstacles to the reform of statistical organizations and lack of statistical system standards, and finally puts forward corresponding suggestions and measures from four aspects: technology, talents, organization and system.

2. PRESENT SITUATION OF STATISTICAL MODERNIZATION REFORM OF NATURAL GAS UPSTREAM ENTERPRISES

As an important national energy industry, the natural gas industry has a relatively complex internal enterprise structure and a large enterprise volume, ranking among the top 500 in the world all the year round, with a large economic scale. According to China's statistical laws and regulations, the natural gas industry has a great statistical responsibility and a lot of work. For a long time, various statistical work has become a habit, and the requirements of national ministries and commissions for its management are getting higher and higher. Therefore, enterprises pay more and more attention to data statistics. In natural gas companies, according to the classification of different industrial chains, different types of companies usually have their own regulations for statistical work, and some companies will also establish a relatively complete statistical work mechanism, and there is no unified standard system framework. In the course of development in recent years, the companies in the upstream natural gas industry have continuously strengthened the training of statistical personnel, and gradually formed a group of high-quality statistical personnel. However, with the development of modernization of natural gas statistics, the existing talents, systems and standards have not met the needs of the development of statistics. Expand the depth and breadth of the statistical work of the upstream natural gas industry, build an internal statistical index system and an external statistical evaluation system that meet the development needs of different types of companies, build information, digitalization and intelligence in stages and types, and discuss the automatic analysis of statistical reports.

The whole industrial chain of natural gas can be divided into four key links: upstream exploration and exploitation, midstream storage and transportation, downstream distribution and wholesale, and terminal consumption. As the primary link of the industrial chain, natural gas upstream enterprises focus on natural gas exploration, development, production and other activities, and their statistical work not only covers the core contents such as output, reserves, cost and sales, but also directly relates to the smooth operation of the entire industrial chain. As the cornerstone of the whole energy industry, the stability of natural gas upstream enterprises' operation directly affects the balance of supply and demand in the energy market and the future sustainable development of the industry. On the one hand, the external competition in the energy market is increasingly fierce, and the demand for natural gas is unpredictable, which requires upstream enterprises to quickly and accurately capture market dynamics and flexibly adjust production strategies. On the other hand, the wide application of digital technology has brought revolutionary changes to statistical work, making data collection, processing

and analysis more efficient and accurate, but it also puts forward new requirements for enterprises. In order to adapt to the new situation and requirements and successfully realize the goal of digital intelligence transformation and upgrading, upstream natural gas enterprises must speed up the pace of statistical modernization reform, thereby improving statistical efficiency and quality and supporting the continuous innovation and development of enterprise statistical work.

In 2020, the National Pipe Network Company was established, forming a new industry pattern of multi-channel supply of natural gas upstream, unified pipe network transmission and distribution in the middle and full competition in downstream market sales [4]. With the reform of natural gas production, supply, storage and marketing system, the market competition has intensified, the internal and external environment has become increasingly complex and changeable, and the international situation is turbulent, which has had a tremendous impact on the upstream industry and import and export business of natural gas, and the competition has become increasingly fierce. The management system reform, investment system reform and internal management system reform of natural gas enterprises have undergone important changes, and there are some challenges and shortcomings in statistical modernization: barriers to statistical technology innovation, scarcity of statistical professionals, obstacles to statistical organization reform and lack of statistical system standards.

3. THE TRANSFORMATION OF DIGITAL INTELLIGENCE EMPOWERS THE CHALLENGES EXISTING IN THE STATISTICAL MODERNIZATION REFORM OF NATURAL GAS UPSTREAM ENTERPRISES

3.1. Barriers to Statistical Technology Innovation

In recent years, frontier technologies such as big data, cloud computing and artificial intelligence have developed rapidly. Traditional statistical methods may not be perfectly integrated with emerging intelligent technologies such as big data analysis and machine learning, and they have gradually failed to meet the rapid decision-making needs of modern enterprises, resulting in low efficiency in data collection, processing and analysis. How to apply these advanced technologies to statistical work and improve the intelligent level of statistical work has become the key to enterprise transformation. Therefore, in the process of digital intelligent transformation, the statistical reform of natural gas upstream enterprises must rely on advanced technical tools and innovative platforms to cope with the increasing complexity of the industry and the challenges of statistical data processing. By introducing avant-garde data processing, analysis and storage technology, enterprises can process and analyze a large number of statistical data more efficiently, provide strong support for statistical decision-making and support the smooth implementation of statistical modernization reform. However, the development speed of these technologies and platforms is remarkable, and the frequency of upgrading is extremely high, which brings great challenges to enterprises. Once emerging technologies or platforms emerge, old technologies and platforms are often quickly seized of competitiveness or even eliminated because of insufficient performance, high cost or single function. For natural gas upstream enterprises, this rapid technological change means that they need to constantly pay attention to market dynamics and technological development trends, and timely understand and evaluate the potential and advantages of emerging technologies or platforms. At the same time, it is necessary to have the ability to adapt and adopt new technologies quickly in order to stay ahead in the highly competitive market.

3.2. Statistics Professionals Are Scarce

The scarcity of digital talents is a big shortcoming faced by natural gas upstream enterprises in the process of digital intelligent transformation. In reality, digital intelligent transformation not only requires enterprises to have advanced technical tools and innovation platforms, but also requires

enterprises to have a talent team with both technical ability and practical experience. However, the supply of this kind of compound talents in the current market is far from meeting the needs of enterprises, which makes the transformation difficult to be promoted. The technical capabilities required for the intelligent transformation of natural gas upstream enterprises cover many fields such as big data analysis, cloud computing, Internet of Things and artificial intelligence. These technical fields not only require talents to have a solid theoretical foundation, but also need rich practical experience. At present, the talents with cross-disciplinary technical ability in the market are relatively scarce, not to mention the compound talents who need to deeply understand the knowledge and business processes of the natural gas industry. At the same time, the natural gas industry has its unique business characteristics and technical requirements, which require extremely high accuracy and security of data, as well as strict stability and reliability of technology. Therefore, talents who only master emerging technologies are not enough to meet the needs of upstream natural gas enterprises, but also need to have a deep understanding of business processes, safety standards, laws and regulations of the natural gas industry. This cross-disciplinary knowledge reserve and practical experience make it more difficult to cultivate and find compound talents.

3.3. Obstacles to the Change of Statistical Organization

The demand of intelligent transformation requires natural gas upstream enterprises to change their organizational structure and operation mode, because the traditional and rigid organizational structure and operation mode may not adapt to the process of intelligent transformation of enterprises, and barriers between departments, cumbersome decision-making processes and complex organizational levels will hinder the decision-making, planning and implementation of transformation to a certain extent, thus affecting the smooth implementation of statistical reform. Leadership and employees are one of the two key figures in the process of statistical reform, and they play a key role in the smooth transition. First, some leaders may have insufficient understanding of the importance and necessity of the modernization reform of statistical work, resulting in insufficient investment in statistical work in the intelligent transformation. However, the statistical reform often requires the cooperation and cooperation of employees from multiple departments. However, due to the conflicts of interests and work habits of various departments in the process of intelligent transformation, it is difficult to cooperate.

3.4. Lack of Statistical System Standards

In the wave of digital intelligent transformation, upstream natural gas enterprises need to re-engineer and optimize the existing statistical processes to adapt to new technologies and demands, which may involve process design, optimization and automation. With the update of statistical methods and the change of statistical technology, enterprises need to update relevant statistical systems and regulations to ensure the compliance and effectiveness of statistical work. However, there are still some shortcomings in the governance system of digital economy in China, and enterprises still lack effective institutional norms and constraints in the application of digital technology, data transaction and platform operation [5], which leads enterprises to face many challenges and risks in the process of digital intelligence transformation, such as data leakage, intellectual property infringement and unfair competition.

4. REALIZATION PATH OF STATISTICAL MODERNIZATION REFORM OF NATURAL GAS UPSTREAM ENTERPRISES EMPOWERED BY DIGITAL INTELLIGENT TRANSFORMATION

4.1. Promote the Integration of Statistical Technology

In the process of enterprise's intelligent transformation, the traditional statistical technology can't keep pace with the times and adapt to the requirements of the new environment. Therefore, it is necessary to promote the integration of statistical technology with modern information technologies such as the Internet, big data and artificial intelligence to improve the accuracy, real-time and analyzability of statistical data, thereby improving the statistical quality and better supporting the decision-making and operation management of natural gas upstream enterprises. Therefore, enterprises need to introduce advanced statistical tools and software to provide technical support for the integration of statistical technology. At the same time, integrate the existing statistical system and information technology platform of the enterprise, build a unified data standard and management system, ensure the consistency and comparability of data, and provide the efficiency and accuracy of statistical analysis. Secondly, it is necessary to establish a data sharing and exchange mechanism to realize data sharing and exchange between various departments within the enterprise and between the enterprise and external institutions, so as to provide support for the development of the company in the statistical field.

4.2. Strengthen the Cultivation of Statistical Talents

Talent is an important driving force for innovating statistical methods and empowering statistical reform. At present, most statisticians in upstream natural gas enterprises adopt the traditional measurement mode, and the accuracy of data analysis is insufficient and the efficiency is low. At the same time, most internal statisticians in enterprises have not been trained by professional systems. Therefore, in the era when digital technology is prevalent, enterprises should strengthen the collaborative training of internal statistical technology and digital intelligent thinking, focusing on the integration of digital skills and intelligent technology, as well as the in-depth understanding and application ability of data-driven. We can also formulate a special talent training strategy and a scientific incentive assessment system, improve the internal training mechanism through school-enterprise cooperation and government-enterprise cooperation, enrich talent training services, ensure the diversified development of statistical talents in the company, provide a strong talent guarantee for the statistical modernization reform of natural gas upstream enterprises, and enhance their core competitiveness and environmental adaptability in the era of digital intelligence.

4.3. Optimize the Statistical Organization Structure

In order to meet the needs of digital intelligence transformation, enterprises must dig deep and match their unique business model and operating environment, build a brand-new organizational structure, and integrate data analysis and decision support systems into it to ensure the implementation of data-driven strategies. Differentiate the levels of statistical departments, clarify and adjust the functions of statistical departments, establish a long-term mechanism for optimizing statistical organizational structure, regularly evaluate and adjust statistical organizational structure, and constantly optimize statistical organizational structure to ensure that statistical work is consistent with corporate strategy and business objectives. At the same time, we should extensively strengthen exchanges and cooperation with the industry and outside, learn from advanced statistical organization structure and experience, constantly improve our statistical ability and level, and accelerate the progress in the field of enterprise statistics.

4.4. Standardize the Statistical System

No rules, Fiona Fang. Relying on the construction of statistical system and promoting the standardization of statistical work is a key link to ensure the smooth progress and effectiveness of the reform. First, we should improve the statistical standards and index system. Formulate or revise statistical classification standards for resource exploration, development and production to ensure the accuracy and comparability of statistical data. Optimize the index system reflecting the production and operation status of natural gas upstream enterprises, including key indicators such as output, sales volume, inventory, cost and profit, and green indicators reflecting the sustainable development ability of enterprises. The second is to promote the construction of basic statistical databases. Establish and improve the national statistical survey metadata standards, realize online metadata design, collection, management, storage and citation, provide standardized and standardized data support for the statistics of upstream natural gas enterprises, establish and improve the statistical investigation object database of upstream natural gas enterprises, and ensure the comprehensiveness and accuracy of statistical work. The third is to strengthen the supervision of statistical rule of law. It is necessary to strengthen the formulation and revision of statistical laws and regulations to ensure that statistical work has laws to follow and rules to follow. At the same time, strengthen the publicity and popularization of statistical laws and regulations, improve the awareness of statistical rule of law of upstream natural gas enterprises, and maintain the authority and credibility of statistical work.

5. CONCLUSION

Based on the analysis of the status quo of statistical modernization reform of upstream natural gas enterprises, this paper deeply discusses the four challenges faced by enterprises under the background of digital intelligence transformation. These challenges not only cover statistical efficiency, technological innovation, organizational structure and institutional system, but also reflect the urgent needs of upstream natural gas enterprises in the process of adapting to the changes in the digital age. In view of these challenges, this paper puts forward four targeted measures: promoting the integration of statistical technology, strengthening the cultivation of statistical talents, optimizing the statistical organizational structure and standardizing the statistical system. It is hoped that the upstream natural gas enterprises can gradually overcome the challenges in the process of statistical modernization reform, and promote the development of statistical work in the direction of digitalization, intelligence and standardization, thus improving the decision-making efficiency and operating efficiency of enterprises and realizing steady and sustainable development.

REFERENCES

- [1] Bai Xue. On the quality management of statistical source data of financial institutions [J]. Quality and Market, 2023, (18):232-234.
- [2] Wang Caiyou. Strategic position of natural gas in China's energy development [J]. Shanghai Energy Conservation, 2001, (02):6-8+19.
- [3] Ge Hao. On the application of statistics in the management of natural gas companies [J]. Management and Technology of Small and Medium-sized Enterprises (Mid-term Journal), 2019, (01):21-22.
- [4] Miao Jingwen. Strategies for improving statistical ability of natural gas enterprises [J]. Chemical Management, 2021, (35): 1-2.
- [5] Xu Xin. Discussion on the path of digital transformation to promote the modernization of enterprise statistical work [J]. Shopping Mall Modernization, 2024 (11): 106-108.