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Research on Entering Data Resources onto the Financial Statements to Facilitate Enterprise Digital Transformation and the Global Digital Economy Development

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Abstract: *In order to leap over the digital divide and develop the digital economy, countries around the world are constantly accelerating the pace of enterprise digital transformation. Whether in developed or developing countries, enterprise digital transformation and national digital economy development generally face issues and challenges such as data globalization difficulties, data management issues, and data assetization challenges. This article aims to address these three issues and challenges, analyze the-state-of-the-art of data as assets entering financial reports, and then try to explore the basic ideas and methods of entering data resources onto the financial statements to facilitate enterprise digital transformation and the global digital economy development.*

Keywords: *digital economy; digital transformation; data assets; financial statements; data silo*

1. Introduction

In 1996, American scholar Don Tapscott published his book "Digital Economy: Prospects and Risks in the Age of Network Intelligence"[1], which marked the birth of the concept of digital economy. In 2002, Beomsoo Kim, an American scholar, defined the digital economy as a special economic form in which goods and services are traded in the form of information[2]. In September 2016, the G20 Digital Economy Development and Cooperation Initiative adopted at the G20 Summit in Hangzhou defined the digital economy as a series of economic activities with the use of digital knowledge and information as key production factors, modern information networks as an important carrier, and the effective use of information and communication technologies as an important driving force for efficiency improvement and economic structure optimization[3]. During the more than 30 years since 1990s, worldwide countries have been accelerating the digital transformation of enterprises and the development of digital economy in order to leap over the digital divide and develop digital economy. The United Nations[4], the European Union[5], Britain[6], the United States[7], China[8], international academic groups and professional institutions have all carried out in-depth and extensive theoretical exploration and practice in the aspects of data resources assetization, marketization, accounting treatment, and data resources entering financial statements[9]. However, due to the differences in culture, law, system and economic development level among countries or regions, especially in the current situation of strong regionalized economies, the digital transformation of enterprises and the development of digital economy are generally faced with many problems and challenges such as management of data resources, accounting treatment of data resources, and globalization of data resources, etc. In order to deal with these problems and challenges, this paper aims at the main problems and challenges faced by enterprises digital transformation and global digital economy, and tries to explore the basic ideas and methods to help enterprises' digital transformation and digital economy development through data resources entering the financial statements, so as to provide theoretical reference and practical suggestions for improving the scale and quality of digital economy, accelerating the digital transformation of enterprises and enhancing the international competitiveness of the data resources entering financial statements framework.

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2. The current situation of data resources entering financial statements

2.1 Theoretical development situation of Data resources entering financial statements

From a theoretical perspective, the data resources entering financial statements must contain digital information with business value. Because data resources, combined with important factors of production in today's economic development, such as technology, organization, management, labor, etc., can provide new assistance for the production process. It can be seen that data resources have an important informational value through their indirect participation in social production activities in a non-physical form. Therefore, the essence of data resources entering financial statements is the process of taking data or information implied in data resources as an important factor of production today. In this process, data resources is the basic condition, data productization is the main starting point, and data assetization is the ultimate objective [10]. In a word, the way of data resources entering financial statements can be concluded as the following three steps: data to data resources, data resources to data products and data products to data assets.

2.1.1 From data to data resources

As a factor of production, data has resource characteristics. According to the definition of on-balance-sheet assets, data must be resources that can bring economic inflow to enterprises. Therefore, the scope of data resources that can enter the financial statements must be economic resources that can bring economic benefits to enterprises. The characteristics of economic resources are value and scarcity, so data resources also have these two characteristics. Specifically: (1) the scarcity of data mainly refers to the degree that it is difficult to obtain and edit. Therefore, the scarcity of data is directly related to its confidentiality. (2) The value of data is based on the scarcity of data, and also depends on the business scene at that time, people's ability to use data and its importance to different enterprises. Because the definition of on-balance-sheet assets requires that they must be resources controlled by enterprises, enterprises need to distinguish data property rights. (3) The property right of data is directly related to the upper framework of data, including the legal framework of data and the ethical framework of data. It mainly concerned with the allocation weights and coordination of power such as data possession, privacy and ownership, so as to form a power system that meets the demand of data production element today.

2.1.2 From data resources to data products

The practice that data resources can be included as assets in financial statements in reality is to put them into production, that is, productization. Only in this way can data be integrated with production at the realistic level and become a genuine factor of production: (1) In terms of use, data products can be divided into data products provided or prepared to be provided to other market entities, and data products reserved for final consumption or capital formation; (2) In terms of service life, data products should include data products with no exact service life and data products with specific service life. Different purposes and years of use determine the accounting treatment and accounting classification of data that ends up in the financial statements.

2.1.3 From data products to product assets

Data assetization is the key step for data to realize its value, and it is also the final step for data to enter financial statements. Meanwhile, the confirmation, measurement and presentation methods of data assets are related to today's asset financial system. Data assetization can help enterprises to reflect the real economic value of data after it is put into production through specific financial figures, and can also present the economic value of data on statements to release data value as asset in real business, for example, recognize more value of asset and profit through the growth of data that can enter into financial statements, thus contributing to the financing of enterprises. Only when the enterprise can put the value of data into the financial statements can it truly become its own value.

2.2 Practical framework development situation of Data resources entering financial statements

From a practical point of view, foreign governments, research institutes, professional institutions, etc. mainly formulate the practical framework of data resources entering financial statements from policies, laws, accounting standards and other aspects. For example, FASB of the United States issued Accounting Standards Update-Intangible Assets, Goodwill and Other Encrypted Assets 350-60, namely ASU 2023-08; On April 26, 2016, New York State promulgated Law A9910A "Amendment of Property, Power and Trust Law Related to Digital Asset Management"; In July 2019, in Wyoming, the

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Digital Assets Current Law came into effect; On July 23, 2020, the United States Pennsylvania revised the Unified Trust Access to Digital Assets Act. In addition, there are Russian Federal Regulation Law on Digital Assets (Draft) (2018), Bermuda's Digital Assets Business Law (2018), and Thailand's Digital Assets Business Emergency Ordinance (2018).

China plans, promotes and realizes the practice of data resources entering financial statements with policy as the guidance, policy implementation as the support, legislative argumentation as the guarantee and professional institutions as the main body. In 2022, "Opinions of the Central Committee of the Communist Party of China and the State Council on Building a Data Basic System to Give Better Play to the Role of Data Elements" clarified the right to hold data resources, the right to data processing and the right to operate data products; In August 2023, the Ministry of Finance of People's Republic of China (PRC) issued the Interim Provisions on Accounting Treatment of Enterprise Data Resources. From January 1, 2024, all enterprises applying the Accounting Standards for data should abide by the Interim Provisions, so as to standardize the accounting treatment of data resources and disclose relevant accounting information. These domestic policies and measures have laid a solid theoretical foundation for data resources to enter financial statements, provided a strong policy guarantee and an operable practical guide.

3. Issues faced by enterprises during digital transforming

3.1 Data silo effect: issue faced by the globalization of enterprise data resources

The issue of globalization of enterprise data resources is mainly manifested in the silo effect of data resources. Data resources, especially data resources as production factors of enterprises, whether internally generated data resources or externally acquired data resources, must flow to create value. However, due to economic localization, data localization, fragmentation of data supervision system and other reasons, the extent of countries competition and the degree of regional economies have become more severe. Thus, countries are not willing to share data, leading to data silo effect between countries; At the same time, the willingness of enterprises to share data is extremely low, which leads to the data silo effect between enterprises. The data silo effect between enterprises and countries are often interrelated or intertwined, which brings great challenges to the digital transformation of enterprises and the development of global digital economy, and also provides convenient conditions for some enterprises to avoid supervision.

3.2 Great risks: issues faced by the management of enterprise data resources

The problems of enterprise data resources management are mainly manifested in the quality of human resources and the inherent risks of data. Data is born from commercial activities, and the inherent risks of commercial activities will affect the quality of data, which will greatly enhance the the risk of financial statements misstating the data value, which in turn affect the goal of digital transformation of enterprises. (1) The quality of enterprise personnel with respect of data is insufficient. ① Enterprise personnel are not competent. They lack awareness of the potential threats to data, good practices in data security and information privacy, and sufficient capacities for data utilization. These deficiencies lead to their insufficient support for data management within the enterprise. ② Enterprise personnel lack professional ethics. Their lack of relevant code of professional ethics leads them to be dishonest and nonobjective in data processing, to fail to fulfill their duty of diligence and to fail to abide by the principle of data confidentiality. (2) Insufficient internal control. ① Risk of data operation. The core problem of data operation risk is the security and privacy of data. Enterprise data always faces the risk of data leakage, including deliberate and accidental leakage. Enterprise data may also face the risk of loss due to technical problems, which may lead to the permanent loss of data or even the interruption of business activities. ② Data processing risk. Enterprises also have certain risks in data processing, which may hinder the realization of good data information quality goals. The core issue is the quality and usability of data information, which is mainly reflected in three situations: data input risk, process risk and output risk. Data input risks include inaccurate recording of detailed information, over-recording or omission of effective information, forgetting to save data information, etc. The process risk of data mainly includes the situation that data is not successfully transmitted into the system or transmitted accurately. The output risk is about the risk of accurate and safe output of information to data users.③ Data integrity risk. Enterprises have the responsibility and obligation to disclose information related to real data resources according to laws and regulations, which is the

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performance of enterprise integrity. The dishonest behavior of enterprise information is mainly manifested in two types: fraud and error. Data errors are mainly caused by unintentional mistakes, while data fraud is deliberate deception or financial fraud. These incorrect or fictional data are an important source of actual or potential economic losses to enterprises.

3.3 Significant difficulties in accounting processing: issue faced by assetization of enterprise data resources

The issues faced by enterprise data as assets can be mainly discussed from two aspects: the essence and attribute of data resources. From the attributes of data resources, according to Dr. Prashant Sausekar, “Though data as a commercial asset of enterprises provides enterprises with great competitive advantages, and it should be classified as intangible assets like patents, copyrights, customer lists, trademarks, brand names and logos, and listed on the balance sheet. However, as far as the attributes of data resources are concerned, data resources cannot be included in financial statements due to complex cost calculation, difficult depreciation estimation, different use values, unsuitable acquisition methods and variable attributes.” From the essence of data resources, data resources entering the financial statements needs to go through the process from resource to product, and then from product to asset. However, some data resources do not have a mature product form objectively (which can also be called data non-productization), which makes it difficult for data resources to be recognized as data assets and entered the accounting system[11] . Therefore, the financial comparability between different companies is low, and the inability to regard data as assets will make them appear as costs in the income statement, thus underestimating the assets and profits of enterprises, and exaggerating the profits and assets of enterprises with reduced data assetization. Moreover, the comparability between enterprises with different strategies is low. Because the same data happens differently for companies with different strategies, accounting recognition methods are different, some are capitalized and some are costed, the performance of these enterprises cannot be truly reflected. However, the main purpose of financial statements is to provide financial information of financial reporting entities and provide useful information for the decisions of potential equity investors and creditors. The data can't be assetized, which leads to the statements can't fully provide investors with useful information, so the economic value of data resources can't be released. In the era of digital economy, this is a huge obstacle that enterprises must overcome, and it is also the most essential problem of enterprise data assetization.

4. Suggestions on data resources entering financial statements to facilitate enterprise digital transformation and global digital economy development

At the G20 Hanzhou Summit, the G20 defined the digital economy as follows: "A series of economic activities with digital knowledge and information as key production factors, modern information network as an important carrier, and effective use of information and communication technology as an important driving force for efficiency improvement and economic structure optimization." Furthermore, the digital transformation of enterprises is also committed to the two aspects under the background of digital economy: on the one hand, traditional production enterprises integrate with data resources, thus improving their economic structure and efficiency; On the other hand, enterprises turn data resources into production factors by integrating data technology into traditional industries [12]. Nowadays, worldwide countries have turned the data resources that can enter financial statements into important production factors, and realized that it is helpful to the development of global digital economy and the process of digital transformation of enterprises. From this aspect, it can be seen that it is of great value to explore the method of data resources entering financial statements to help enterprises’ digital transformation.

4.1 Promoting the globalization of data resources

The need of data resources that can enter financial statements for data circulation can help build communication bridges between countries, enterprises and within enterprises, thus helping enterprises to break the silo effect in digital transformation. The reason is that it is very important for enterprises to enter data resources into the financial statements. However, if enterprise wants to enter data into the statements, the most important thing is to be able to confirm its value. The confirmation of data value depends on the exchange and circulation of data resources, so as to provide evidence for the confirmation of its value [13]. Therefore, the entry of data resources into financial statements can

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enhance the willingness of data exchange among enterprises and countries, and within enterprises, thus urging the circulation of world data resources, and then alleviating the data silo effect. Furthermore, in order to smooth and standardize data exchange, the state should formulate and implement innovative and practical laws and norms internally to ensure the standardization of data circulation within the country; At the same time, countries should also look to the world to ensure convergence with international standards, thus facilitating data exchange with the world. In short, all countries in the world should take into account their national conditions, look at the world and be brave in data exchange.

4.2 Promoting the data resources management

The premise of data resources entering financial statements is to abide by the basic accounting principles, which can effectively alleviate the risks and deficiencies encountered by enterprises in the process of digital transformation, thus helping enterprises to make excessive progress in digital transformation. (1) Prudence principle: The data entry into the financial statements should comply with the prudence principle. In particular, the laws, regulations and guidelines for data resources entering financial statements are still immature. Opening data entering onto financial statements will easily lead to incorrect data accounting confirmation, data accounting measurement and data financial information presentation, and also greatly aggravate the inherent risks of business activities of enterprises, which will directly affect the information quality of financial reports, and then lead to misstatement of financial statements. On the other hand, some enterprises will speculate in a loose financial statement data entry system, so as to exaggerate assets and income and underestimate cost and expense, which is conducive to their financing and evasion of legal supervision. Therefore, enterprises can abide by the principle of prudence to guide their internal control, thus reducing the risk of data operation, data processing and data integrity of enterprises, and thus ensuring the authenticity, integrity and accuracy of financial statements. At the same time, prudent enterprise principles can also establish correct data professional ethics for enterprise personnel, and can reasonably control the data practice of enterprise employees. (2) Principle of relevance and reliability: Data resources entering financial statements also need to ensure the balance between relevance and reliability. If we pay too much attention to the reliability of the data resources entering financial statements and not enough to relevance, we may exclude the data that can enter financial statements, thus the financial statements lack completeness. On the contrary, paying too much attention to relevance and not enough to reliability may lead to the data entry financial statements not meeting the conditions for entering the statements, thus the financial statements lack validity and accuracy. However, the balance between the above two aspects can help enterprises reduce the risk of data integrity, and avoid error and fraud; At the same time, it can standardize the data processing flow of enterprises, thus reducing the data operation risk and data processing risks.

4.3 Promoting the transformation from data resources to data assets

Transforming data resources to data assets is the last link in the path of data resources entering financial statements, so as long as data resources can enter financial statements, data resources can be assetized, and vice versa. You can use the following steps to realize the assetization of data resources and then enter financial statements.

Step 1: Clarify the legal control right of enterprise data. According to the accounting definition of assets, the resources that an enterprise can enter the statements must be the resources with economic value owned and controlled by the enterprise, so making clear the control right of data resources is the basic premise for enterprise data as assets to enter the financial statements. At the same time, considering the needs of data circulation, in order to ensure the privacy and related interests of enterprises, it is also very important to obtain control of data in accordance with legal channels.

Step 2: Clarify the category of enterprise data: Classifying data is beneficial for enterprises to finally put data resources into financial statements. Because the source of data and the final production target are varied, only when the final category of data is clarified, such as whether it becomes inventory for sale as a product or intangible assets as a knowledge product of an enterprise, can the accounting category and accounting treatment of data that later enters the financial statements be clarified.

Step 3: Formally accounting the data: (1) Confirm the data assets. First of all, according to the accounting definition of assets, it is clear whether they have economic value before they can exist as assets. (2) Accounting measurement of data. Accounting measurement is divided into initial

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measurement and subsequent measurement. The initial measurement needs to be in accordance with accounting standards. There are two main conditions need to be met. One is that future economic benefits are likely to flow into the enterprise, and the other is that the value of data resources can be measured reliably. These two points can be satisfied by clearing the well-defined business model of the enterprise and having objective evidence to prove the existence of this model [14]. Because a clear business model can make it clear that the data resource can be successfully put into production, and can also help to clarify the inflow mode of economic benefits, and then carry out initial accounting measurement; On the other hand, the reliability of the previous point can only be confirmed because of the verification of historical evidence, and it means that enterprises have a good data governance foundation to help reliably measure the value of data. If there are data resources that have not been productized, it is impossible to accurately estimate their economic flow and reliably measure them, so it is impossible to assetize them. At this time, we can learn from "Better Information on Intangible Resources: What's the Best Method (Discussion Draft)" published by the European Financial Reporting Advisory Group (EFRAG) in 2021, and treat this kind of data resources as expenses first, and then confirm them as assets after meeting the assetization conditions. Subsequent measurement mainly considers the appreciation and depreciation of data assets. At this time, it is necessary to specify the service life of assets for amortization. But if the service life of assets cannot be determined, it is not necessary to amortize, and impairment test should be carried out in time, and evaluation models and institutions should be introduced [15]. (3) Presentation of data assets. The last step of data assetization is to present it in financial reports. Assets that can be reliably measured are presented in the financial statements, and in case of important data resources that cannot be assetized, they can only be disclosed in the notes of financial report to supplement the statements.

5. Conclusion

With the advent of the fourth industrial revolution and the emergence of various new technologies, data resources have become an important factor of production, and as a result, countries around the world today have categorized data as a strategic national resource. While managing data as a valuable national asset, they have also sworn data sovereignty over highly strategic data resources. As one of the largest, most important and special economic organizations, the optimization of production factors for the development of productive forces is the most basic and important function of an enterprise. In the era of digital economy, how enterprises can fully utilize data resources to develop new quality productivity concerns both the digital transformation of enterprises and the development of digital economy. The core goal of enterprises is to maximize economic benefits. Nowadays, enterprises in the context of the digital economy are faced with the challenge of how to turn valuable data resources into their own economic benefits, which is also a problem faced by all digital transformation enterprises. Therefore, enterprises should actively explore ways to release the value of data in the process of practice, and the state should also support the exploration of enterprises at the policy level. Every country in the world attaches great importance to the digital transformation of enterprises, and different state departments and professional organizations have studied and discussed the laws, regulations and technical problems related to the digital transformation of enterprises. However, the digital transformation of enterprises is still in the initial stage, the relevant laws and regulations are still immature, and the related technical problems, such as the problem of entering data resources into the financial statements, need to be further understood. Therefore, countries and enterprises around the world need to have a better understanding of today's economic forms, a better grasp of new technology, and sufficient motivation to satisfy new business needs.

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