

Research on Integrating Data Assets Into Accounting Discipline System

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As data is incorporated into production factors, the Accounting discipline should intensively study the new data asset. Starting from the analysis of the value attribute, right attribute, and relationship attribute of the data, it is found that under certain conditions, the data has complete Accounting attributes and can be included in the assets. The Accounting discipline shall establish the research direction of Data Asset Accounting and focus on the research, including the recognition and measurement of data assets, the value evaluation of data assets, information disclosure, and Data Asset Accounting standards. Data assets are facing the major challenge of integrating into the Accounting discipline. We can carry out the Accounting professional reform and textbook construction facing the practice of data assets management from the aspects of theoretical construction, talent training, and industry research cooperation.

Keywords: data assets, Accounting discipline, Accounting attribute

Introduction

The continuous iterative development of communication technology has driven human society into the digital economy era, and big data has become more and more important in social life. In 2015, the State Council of China issued the Action Plan for Promoting the Development of Big Data, which clearly stated that data has become a fundamental strategic resource for the country, indicating that big data has risen to become a national development strategy. On April 14, 2015, the first big data exchange in China and even the world, Guiyang Big Data Exchange, was officially listed and put into operation. In 2019, the Fourth Plenary Session of the 19th Central Committee of the CPC regarded data, labor, capital, land, and technology as factors of production, which was the first time in the world. On December 19, 2022, the Central Committee of the Communist Party of China and the State Council issued the “Opinions on Building a Data Infrastructure System to Better Play the Role of Data Elements” (referred to as the “20 Articles of Regulation on Data”), indicating the high importance that the Central Committee of the Communist Party of China and the State Council attach to data assets. On August 21, 2023, the Chinese Ministry of Finance formulated and issued the “Interim Provisions on Accounting Treatment of Enterprise Data Resources” (referred to as the “Interim Provisions”), which will come into effect on January 1, 2024, and the entry of data assets into the balance sheet will be officially implemented.

From the perspective of national strategy and policy regulations, the importance of data has been fully recognized. However, understanding the laws of data as a new asset and fully releasing data value still requires a lot of practical exploration and theoretical research. In recent years, a large number of scholars have explored

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the concept and characteristics of data from both technical and management perspectives, and the Accounting community has also conducted research on the basic issues of data assets, making some important progress. Deeply understanding the Accounting attributes of data assets, discovering scientific Accounting and exploring the content of data asset research, and evenly incorporating data asset management into the current Accounting education system are a major challenge facing the current Accounting discipline, which requires practical experts and scholars in the Accounting field to conduct in-depth research.

Accounting Attributes of Data

As an important strategic resource, data not only plays an increasingly important role in enterprise operations and socio-economic development, but also creates more and more value. What Accounting attributes the data has is the primary issue in studying whether data should be treated as an asset in Accounting. This paper studies the Accounting attributes of data assets from three aspects: value, rights, and relationships. For the convenience of writing, this paper takes enterprises that collect, use, and manage data as an example for research. Accounting entities such as governments and public institutions can refer to this paper for research.

The Value Attribute of Data

Any asset must have value, and whether data has value is one of the prerequisites for Accounting to include it in asset management. The value of data can be analyzed from both cost and benefit perspectives.

Generally, almost all data collection needs cost, and in this sense, data has value. However, from the perspective of Accounting entities, any data that is not related to organizational value creation activities within a foreseeable spatial and temporal range is of no value. Organizations often do not need to pay direct costs when using public data, such as government released statistical data, public data displayed on websites, etc. They may not need to consider their cost or value, and of course, they do not need to be included in the Accounting system.

Apart from public data, there are generally two sources of data used by organizations: self collection and processing, or external acquisition, including procurement or denoting. Various organizations need to pay for equipment, materials, and labor costs to collect and process data on their own. For example, most organizations have data or information departments, digital transformation of enterprises often requires the installation of sensors to collect equipment operation and maintenance data, and the processing of big data requires strong computing power protection. The procurement or development costs of data gifted by external procurement or other entities are often clear, so the historical cost of such data is also objective. From a cost perspective, data is often the crystallization of various costs, which is the basis for the value of data.

The value of data should be thought from the perspective of benefits; it is necessary to analyze and evaluate the value added to the organization by using data. Through data collection, cleaning, analysis, and mining, data can help organizations improve their management level, enhance equipment operation and maintenance level, and thus enhance overall efficiency. For example, a company in Yunnan Province discovered that the efficiency of a certain cigarette packaging machine unit in producing a fixed brand of cigarettes is significantly higher than that of others. Based on this phenomenon, Meilin (Meilin Data Technology Co., Ltd.) proposed that cigarette brands can be reasonably matched with the most suitable cigarette packaging machine by collecting and analyzing relational data, so production scheduling optimization can be carried out to improve overall efficiency. In fact, after collecting data, the service team designed and analyzed the actual algorithm, and finally determined the

most suitable cigarette packaging machine for each brand of cigarette, as a result, production efficiency is greatly improved.

From a macro perspective, the value of data is related to its application scenarios. Some data may not have much value for Company A, but its value for Company B is very high; meanwhile, a large amount of data can be reused and create value in the same or similar scenarios. Therefore, as a factor of production, the value of data lies in its effective circulation, and its value can only be fully unleashed through openness, sharing, and trading. In short, from the perspective of value attributes, data is a new kind of asset and will bring economic benefits to all organizations. Accounting must attach importance to the management of data assets.

Property Right Attributes of Data

From Accounting perspective, data becoming an asset of an organization also requires property right attributes. The property rights attributes of data are different from those of traditional assets, which poses challenges for the definition of data assets.

In the Accounting sense, assets must be “owned or controlled by the enterprise” in order to enter the Accounting scope of the Accounting entity, because the rights of traditional assets are generally exclusive. Even assets obtained through financing leases have been included in the enterprise asset account based on the principle of substance over form. In fact, the current accounting system no longer distinguishes between leasing forms. For data, there are some peculiarities. If the data is generated internally within the organization, it certainly satisfies the ownership attributes of the assets. But if the collection of data involves external entities, there is a gap in the organization’s “ownership or control” rights over the data. According to data security laws, the rights and interests related to “individuals, organizations, and data” are protected. The “20 Articles of Regulation on Data” proposes a structural separation of data property rights, which means that organizations can enjoy rights such as “ownership rights”, “processing and use rights”, and “product operating rights” of data resources, which differs from the traditional concept of assets.

In fact, the ownership or control rights of traditional assets are often difficult to separate from the use rights, but data has characteristics such as easy replication and dissemination, so the “ownership”, “processing and use rights”, “product operating rights”, and use rights of data can be easily separated, which requires Accounting systems to handle how to recognize data assets when organizations only have the aforementioned rights. This paper believes that the right attributes in the concept of assets can be appropriately relaxed, that is, any data that has one of the “holding rights”, “processing and use rights”, or “product operating rights” can be recognized as an asset and accounted for in the Accounting system. Based on a certain right on the data asset, the organization can obtain corresponding benefits. This means that one may not necessarily have all or most of the rights on the data to recognize it as an asset. For example, if an e-commerce company sells declassified transaction data to other enterprises through compliant means, the enterprise obtains the legal right to process and use the data, but in reality can only use the data to create value, without the right to dispose of or resell it.

The property of data rights has its particularity, and how to correctly analyze and handle the rights attached to data is an important issue for the Accounting system. Data, as an important factor of production, needs to be circulated in order to fully create and release value. If data is only accounted for according to the rights attributes of traditional assets, a large amount of data cannot be recognized as assets, which will greatly limit the circulation of data. Correctly defining the rights and attributes of data requires in-depth exploration based on fields such as Accounting and law.

Relationship Attributes of Data

The relationship attribute in Accounting sense is that assets must be formed by past transactions or events of the enterprise, but is the traditional relationship attribute a necessary Accounting attribute for data recognition as assets? The White Paper on Big Data Management Practice (4.0) released by the China Academy of Information and Communications Technology does not clearly define data assets as formed by past transactions or events of enterprises, and removes the requirement for data relationship attributes. However, from an Accounting perspective, relationship attributes are still necessary, but their meanings need to be further extended.

On the one hand, there are deficiencies in the “past” in the relationship attributes. Traditional assets generally require transactions or events to be confirmed only after completion, such as procurement or construction activities. However, the data used by organizations often has continuity, and a large amount of data is continuously obtained, making it difficult to clarify the “past”. Only through continuous use can create value. In this way, “past transactions or events” become principles that cannot be followed when processing data. Data transactions or events that are occurring or are determined to occur should be recognized as assets. On the other hand, data may be ubiquitous, but not all data is related to an organization’s value creation activities. Therefore, data that is not related to an organization’s value creation activities within a foreseeable spatial and temporal range should not be recognized as assets. Therefore, the relational attributes of data assets can be defined as the data resources formed by transactions or events of organizations.

In summary, with the development, data has become an increasingly important factor of production. Data that satisfies value attributes, property rights attributes, and relationship attributes should be treated as assets for Accounting purposes. This is the theoretical basis for the recognition of data assets according to the Provisional Regulations. Here is the concept of data assets in the sense of corporate Accounting entity: Data resources that are owned or legally held, used, and operated by enterprises due to transactions or events, and can bring future economic benefits to the enterprise, are called data assets. The emergence of data assets has to some extent expanded the connotation of assets.

The Content of Data Asset Accounting

The absorption of data assets into the Accounting discipline system has a historical inevitability. In fact, there are already some universities, institutions, and scholars conducting theoretical research and teaching reforms. This paper believes that current research should first start from the perspective of financial Accounting, and in the future, on the basis of mature research on Data Asset Accounting, data asset management should be promoted to Accounting disciplines such as Corporate Finance and Auditing.

Recognition and Measurement of Data Assets

The Accounting attributes of data resources can support data assetization, and academic research in the world has basically reached a consensus. However, data assets have different characteristics from traditional assets, and there are some special characteristics in the recognition, initial measurement, and subsequent measurement of data assets. There are still different understandings in academic area. Li Ru (2017) believes that both in practice and theory, data should be recognized as assets. Shangguan Ming and Bai Sha (2018) believe that the big data creates value for enterprises and should be recognized as an asset. Zhang Junrui, Wei Yanlin, and Song Xiaoyue (2020) believe that data assets can be directly accounted for by setting up a primary account for data assets. Qin Rongsheng (2020) believes that in terms of ownership, data assets are an abstract expression

of data that has already been capitalized. Li Haijian and Zhao Li (2021) reveal that data assets have both usage value and value. Only through circulation and exchange in the market can better realize the value of data, and the premise of data asset circulation is the recognition and measurement of data assets.

Now, the measurement attributes of assets include historical cost method, fair value method, present value method, net realizable value method, replacement cost method, etc. However, not all measurement methods are suitable for the measurement of data assets. Liu Yu (2014) and Li Ru (2017) believe that data assets can be measured separately by type, and purchased data should be initially measured based on the actual purchase price or membership fee paid to the big data exchange; for self-developed data assets, capitalization and expensing should be distinguished, and capitalized expenses should be carried forward to “data assets” when the data assets reach their expected usable state. Zhang Junrui et al. (2020) divide data into self use data assets and transaction use data assets. The former should be measured at actual acquisition cost as its initial measurement cost, while the latter should be measured at fair value. For both purposes, the estimated proportion of the purpose should be weighted average.

The subsequent measurement of data assets is also very important. There are currently two main views on amortization. Li Yaxiong and Ni Shan (2017) and Tang Lu (2021) believe that data assets cannot be reasonably estimated and therefore cannot be amortized in its life cycle. For data assets with a determined useful life, they should be amortized based on the inflow of economic benefits they bring to the enterprise. For example, Tang Li and Li Shengsi (2017) believe that data assets with specific production limits can be amortized using the production method. Scholars generally believe that it is necessary to extract impairment provisions for data assets. Zhang Junrui et al. (2020) believe that both self use data assets and transaction data assets should be subject to impairment testing when necessary and provision for impairment should be made when impairment occurs. There are currently few scholars paying attention to the disposal of data assets, as data assets have not yet become formal Accounting elements and their disposal issues have not been put on the agenda.

This paper believes that the recognition and initial measurement of data assets should not only consider the three attributes that assets should possess, but also follow the principles of importance and prudence. The data purchased by the organization and the data specifically collected, developed, or processed by the organization for specific purposes can be recognized and measured using reasonable methods due to objective costs, clear objectives, and predictable future value creation. For data naturally generated in organizational operations, such as various necessary reports, record tables, etc., although they also contribute to creating value for the organization, they are not specifically developed and should not be classified as data assets for processing. This is similar to the self generated goodwill of an organization. If an organization is allowed to recognize operational data as assets, there is a possibility of blindly expanding asset size, leading to a decrease in information quality. The measurement attributes used for initial measurement of data assets should not be limited to existing methods. Apart from historical cost, other measurement attributes have obvious shortcomings in measuring the value of data assets. Therefore, exploration and innovation can be carried out based on the characteristics of data assets.

For the subsequent measurement of data assets, this paper believes that a relatively flexible approach can be adopted for processing. The uncertainty in the digital economy era is greater than before, so the amortization of data assets can consider the accelerated method, using the fastest possible method within a reasonable range. The impairment testing of data assets is also the same, estimating as much as possible the value reduction caused by factors such as data asset obsolescence, iteration, and changes in data sources. The disposal of data assets can be divided into two situations: One is the scrapping of data assets, and the other is the sale of data assets.

When data assets need to be scrapped due to damaged storage media that cannot be repaired, or environmental changes that cause data to no longer function effectively, the data assets should be written off as soon as possible; when selling data assets, Accounting can refer to the disposal method of intangible assets. Due to the characteristics of data assets, there is a significant subjective operational space for subsequent measurement. Therefore, it is particularly important to develop detailed Accounting standards or guidelines based on the characteristics of data assets.

Value Evaluation of Data Assets

Whether measurement in Data Asset Accounting, or trading or financing decisions of data assets, a common issue is evaluating the value of data assets. The value of data assets is different from that of traditional assets, so the method of value evaluation also needs to be improved.

The valuation methods used include cost method, market method, and income method, which are widely used in the valuation of intangible assets. Some research on data asset valuation has improved these three methods. The income method is to estimate the present value of the future benefits that data assets can bring to the enterprise as the evaluation value. The market rule uses the market price of data assets with similar functions as the standard and makes appropriate adjustments to obtain the data assets value, while the value under the cost method is the sum of all costs incurred in the production and processing. Zhang Zhigang, Yang Dongshu, and Wu Hongxia (2015) proposed that data asset value = $S_p + S_\mu$. Among them, S_p is the total score of data asset cost evaluation indicators, and S_μ is the total score of data asset application evaluation indicators. Zhai Lili and Wang Jiani (2016) proposed an evaluation method for data assets in mobile cloud computing alliances based on an option model, while Huang Le, Liu Jiajin, and Huang Zhigang (2018) proposed a platform data evaluation method that comprehensively considers factors such as platform activity coefficient, number of platform users, market adjustment coefficient, data operating cost, data operating cost, network node distance, and data commodity cost. Hu Yaru and Xu Xianchun (2022) proposed a measurement method for the value of data assets from a statistical perspective, and proposed a perspective on the value of enterprise data assets from three aspects: data quality, production costs, and economic benefits of data.

The key to evaluating value of data assets lies in the different ways in which data assets create value compared to traditional assets. Except the highly reusable scientific data, other data assets often cannot work independently and need to be closely integrated with research and development, operations, or business model development. This means that evaluating the value of “data” alone poses great risks and requires the use of a holistic evaluation approach to evaluate data assets, for example, using edge devices to monitor the operation of equipment and obtain a large amount of data, analyzing and mining these data to achieve predictive operation and maintenance of the equipment, greatly saving operation and maintenance costs. In this process, the value of the data needs to be comprehensively evaluated to determine the value generated by the equipment operation and maintenance. For example, commercial data formed based on user profiles may have different values in different application scenarios, and specific evaluations need to be made according to the application scenarios. Therefore, there is a process of evaluation and adjustment for the value of data assets, and it is increasingly necessary to establish a dynamic value evaluation model for data assets based on their usage scenarios.

Information Disclosure of Data Assets

Data has become an important strategic resource for organizations, profoundly influencing the overall value evaluation of the organization. At the same time, it has a significant impact on the decision-making of external

stakeholders and internal decisions of the organization. With the increasing importance of data assets, information disclosure of data assets has become urgent.

Scholars have studied the information disclosure of data assets and believe that in addition to disclosing Accounting elements such as assets, liabilities, owner's equity, income, and expenses involved in data asset transactions in the balance sheet and income statement items, detailed information of data assets should also be presented in the notes to the financial statements. Tang Wei (2016) holds the view that enterprises should reflect information such as the acquisition method, bidding method, acquisition amount, and effective period of data assets in the notes to financial statements. Li Shi et al. (2021) hold that while disclosing data assets on the balance sheet, they should also disclose them off the balance sheet. They have constructed an off balance sheet information disclosure framework for data assets by combining the value chain scoreboard, Deloitte's "fourth report", and the intangible resource reporting framework. From the perspective of the purpose of information disclosure, disclosing data assets can better provide a basis for investors to make decisions. However, given the significant uncertainty in the value evaluation of data assets, it is worth exploring which characteristics and quantities of data assets should be disclosed.

Undoubtedly, with the development of the digital economy, the types and quantities of data assets will rapidly expand, and their importance in internal business management decisions and external investment decisions will gradually increase, even playing a decisive role. This paper argues that embedding existing reports for disclosure cannot meet decision-making needs, and it is only a matter of time before data assets are disclosed separately. In other words, a separate "data asset table" should be designed for information disclosure of data assets, in order to provide decision-makers with more complete and accurate information. Based on the Accounting information and other characteristics of data assets, the data asset table should report at least two types of information: financial and non-financial. Financial information should cover the financial attributes of all data assets, such as historical cost, amortization and impairment, net value, transactions and their financial results, and associated liabilities and obligations. Non-financial information of data assets includes the source, nature, scale, continuity, rights attributes, risk characteristics, etc. Of course, as there is no unified Accounting standard for data assets yet, a temporary solution is for companies to voluntarily disclose relevant information. It can be expected that in the future, the data asset table may become another major report for organizations to disclose information, even on an equal footing with the traditional four major reports.

Accounting Standards for Data Assets

Currently, an urgent task facing the Accounting discipline is to develop Accounting standards for data assets. In August 2023, the Chinese Ministry of Finance issued the "Interim Provisions on Accounting Treatment of Enterprise Data Resources", which provides a detailed explanation of the accounting treatment of data assets. It requires that relevant data resources be recognized as intangible assets or inventory in accordance with the relevant provisions of the existing enterprise Accounting standards. However, the Accounting treatment of data resources that do not meet the recognition conditions for assets under the existing Accounting standards but are not recognized as assets is not described in detail.

There are various types of data, and further research is needed to determine whether all data has intangible asset or inventory characteristics and can be treated using existing Accounting standards. Static data may be applicable to Accounting standards such as intangible assets or inventory to a certain extent, while dynamic data such as data flow may differ significantly. At the same time, using the cost method to measure data assets also

has certain irrationality. The technical characteristics of data assets indicate that their value may far exceed the actual costs incurred, which may lead to significant deviations between initial and subsequent measurements.

Due to the lack of specific Accounting standards to regulate the recognition and measurement of data assets, a large number of enterprises or other organizations have not timely and scientifically accounted for data assets in practice, which may lead to systematic deviations in financial reporting and other information. However, the Accounting treatment of data assets is a very complex activity, and Accounting standards should cover the Accounting and information disclosure of the vast majority of data assets. Therefore, before formally formulating and issuing of Accounting standards for data assets, we should focus on studying data assets of the technical characteristics, rights attributes, and value attributes exhibited in data generation, collection, processing, storage, application, and existence cycle, and clarify the process and rules of data asset management from a technical perspective, so that the Accounting standards for data assets are both scientific and forward-looking. At present, in addition to discussions by scholars in the field of Accounting, institutions such as the National Asset Management Standardization Technical Committee and the China Academy of Information and Communications Technology have also studied accounting treatment methods for data assets from some aspects. Given the interdisciplinary nature of data asset management, the development of Accounting standards for data assets can be jointly studied and formulated by multiple disciplines.

The Programme for Integrating Data Assets Into Accounting Discipline

With the development of the society, data assets will become an important driving factor for value creation. It is both necessary and urgent to integrate data assets into Accounting discipline system, which is conducive to promoting the Accounting discipline to keep up with the development trend of the digital economy, and also conducive to the cross integration with disciplines such as data science and information technology. Thereby, we can construct and improve the Accounting discipline system oriented towards the digital economy. This paper elaborates on the programme for integrating data assets into the Accounting discipline system from three aspects: theoretical construction, talent cultivation, and social services.

Theoretical Construction of Data Asset Accounting

The prerequisite for constructing any disciplinary system is to have a scientific methodology, and the primary task of integrating Data Asset Accounting into the Accounting discipline is to construct one theoretical and methodological system.

Firstly, both in practice and academia, data assetization has become a consensus. As a production factor participating in value creation, data will follow the evolution of the form of “data resources—data assets—data capital”. Through data rights confirmation, revenue recognition, and measurement, the assetization of data elements can be achieved, and then transactions can be carried out in the market to promote the market-oriented allocation of data assets, release data value, and achieve data capital appreciation, and achieve data capitalization (Du, 2020). The value of data assets has also been reflected in the capital market. For example, internet companies that generate a large amount of data have not fully explored their data asset utilization capabilities, which has become a factor affecting the serious deviation between their book value and market value.

The theoretical research on Data Asset Accounting is still in its early stages, and current academic research mainly focuses on four aspects: conceptual exploration, ownership recognition, value measurement, and information presentation. However, data assets have significant interdisciplinary attributes, high complexity, and

concealment in commercial applications. Therefore, the theory of Data Asset Accounting lacks systematic and in-depth understanding. For example, the concept interpretation of data assets is prone to generalization and confusion (Zhu & Ye, 2018); there is still controversy over the ownership and recognition of data assets, whether they are “shared owned” or “privately owned”; existing research on data asset valuation tools is overly theoretical and complex, with weak operability and the incremental value of data assets is difficult to reliably measure (Song, Zhang, & Zhao, 2021; Li & Zhang, 2018). The Accounting and reporting methods proposed by existing studies for data assets are difficult to reflect the characteristics of data assets, and most studies overlook the value inflation brought about by the network effect of data assets. In addition, both international Accounting standards and Chinese Accounting standards have not yet established clear standards for the treatment of data assets, which cannot provide a basis for the inclusion of data assets in Accounting. Therefore, the urgent work of integrating Data Asset Accounting into the Accounting discipline system is to construct a scientific theoretical framework.

The theoretical research on data assets requires joint efforts from both academic and practical communities. The Accounting discipline is a product of the development of social practice activities to a certain stage, and currently, the business practice of data asset management is ahead of the theoretical research of Accounting. The emergence of internet enterprises in the digital economy environment relies on the collection, analysis, calculation, and application of a large amount of user behavior information and other data, which has driven different business models, organizational structures, management systems, etc., compared to traditional enterprises. With the emergence of Industry 4.0, various data companies are setting up data asset management systems for large enterprises, especially manufacturing enterprises, allowing more and more data to participate in value creation at the industry level and form a full industry chain with data as the core element. With the popularization of digital transformation, data assets are almost applied by all enterprises for management decision-making, enhancing their strategic competitiveness and financial efficiency.

In the past two decades, mainstream Accounting research has mainly focused on empirical research based on mature theories and databases. However, for the emerging phenomenon of data assets, theoretical research, case study, and survey research methods are more applicable. For example, case studies can conduct in-depth research on enterprises with rich data assets and advanced data asset management experience, and systematically summarize the internal motivations of data governance in the process of data asset management. At the same time, the productization process of self-owned data, the processing methods for confirming, measuring, and evaluating data assets in practical applications, the transaction mode of enterprise data assets, and extract practical experience of data assets in accounting work can be abstracted the essential of Data Asset Accounting. With the basic establishment of the theoretical framework of Data Asset Accounting, multiple fields jointly formulate the draft of Data Asset Accounting Standards. After continuous revision and adjustment, they are applied in practice to guide the actual work of enterprises, thus completing the cycle of “practice—theory—practice” and continuously improving the theoretical system of Data Asset Accounting.

Talents Training of Data Asset Accounting

The widely application of data poses higher requirements for the cultivation of Accounting talents. In addition to having strong ideological and moral character as well as professional knowledge in economics, management, finance, and Accounting, Accounting talents must also master basic abilities such as data collection, analysis and retrieval, data analysis and mining in order to adapt to the requirements of data asset management.

Overall approach. As an accountant, Mr. Yu Yulin (2019) pointed out that disciplinary construction is an important carrier for cultivating high-level innovative talents and building a first-class teaching staff. The establishment and implementation of Accounting courses in universities is an important basis for the construction of the Accounting discipline system, as well as promoting and improving the quality of Accounting discipline, developing new contents, and formulating talent training plans suitable for the new era. Therefore, facing the demand for future talents, integrating data assets into the construction of Accounting discipline is an important step in cultivating innovative and versatile Accounting talents. Firstly, the concept of data assets should be introduced into existing courses in finance, Accounting, and auditing. In the future, independent related courses should be established, such as Accounting, finance, and auditing for data asset management. The cultivation of high-level and versatile Accounting talents who integrate data asset management will also help enterprises and other organizations further improve their data asset management capabilities, promote digital transformation, and achieve high-quality development.

Discipline reformation. Data assets have a strong interdisciplinary nature, involving multiple disciplines such as Accounting, computer technology, taxation, and law, etc. Introducing data assets into the construction of the Accounting discipline system, in addition to existing professional courses and basic courses such as mathematics, computer applications, economics, management, finance, and business law, courses related to data collection and analysis should also be appropriately added, such as database application technology, big data analysis and visualization processing, computer programming languages and algorithm design, etc. The addition of such courses will help Accounting students in the future screen data with a professional perspective, understand the value generation mechanism of enterprise data assets, accurately evaluate their value, smoothly cope with enterprise data security risks, fully leverage the value of enterprise data assets, and promote digital transformation of enterprises.

The teaching and guidance of Accounting practice is a prerequisite and necessary condition for cultivating applied Accounting talents. Data asset management cannot exist independently of a certain technological environment and trading scenarios. The security, stability, detectability of the technological environment, and the activity and stability of trading scenarios and markets will directly affect the recognition and measurement of data assets, thereby affecting the evaluation of their value. In order to improve the quality of talent cultivation, universities should cooperate with typical enterprises with abundant data resources and cutting-edge data asset management, dispatch teachers to conduct on-site research and learning, and ultimately cultivate students in the classroom through the integration of theory and practice. At the same time, universities can also invite professionals from the big data analysis industry or enterprises to give lectures, explaining practical application cases of data assets, helping students broaden their horizons, stimulate thinking, and achieve the implementation of theories and methods.

Textbook construction. The Accounting discipline system and the Accounting textbook system are interdependent and mutually developing. The construction of Accounting textbooks is crucial for cultivating Accounting talents. A series of Accounting professional textbooks aimed at data asset management are an important part of integrating data assets into the Accounting discipline system.

This paper believes that based on theoretical research and practical experience of data assets, combined with the integration of data assets into classroom teaching, textbook construction can be divided into two steps: The first step is to write an introduction textbook *Data Asset Accounting* that integrates financial accounting, financial management, management accounting, and auditing. The content should roughly include a general introduction,

the concept of data assets, the recognition and measurement of data assets, transactions of data assets, liability matters of data assets, information disclosure of data assets, Accounting standards for data assets, decision-making based on data assets, evaluation of management benefits of data assets, and auditing of data asset matters. The second step is to write textbooks such as *Data Asset Accounting* (including management accounting related to data assets), *Data Asset Financial Management*, *Data Asset Audit*, etc. based on previous experience and actual situation, which will be used as compulsory courses for accounting science students and elective courses for business administration students.

Industry-university-institute cooperation. The development of disciplines is closely related to industrial development, and disciplinary construction needs to be coordinated and mutually supported with industrial development. In order to promote the research of Data Asset Accounting, it is necessary to promote the joint training of graduate students by universities, well-known enterprises, research institutes. The aim includes accelerating the cultivation and development of the data element market, and meeting the needs of industry development and high-quality Accounting talents. It is important to encourage universities to establish industry colleges and establish “industry mentors”, allowing practical experts to participate in the entire process of talent cultivation, thereby strengthening the practical and innovative abilities of graduate students. So the graduate students may gain a deep understanding of the application of micro subject data assets, the marketization status of data asset elements; finding research directions and combining with reality, those measures can continuously enrich and improve data asset research.

At the same time, the country should set up major key projects, actively carry out major theoretical and basic research, provide various forms of social services such as technical training, lectures, and guidance, and leverage the triple helix relationship among universities-industries-governments. With the government policy supporting, the society and enterprises undergo digital transformation and achieve high-quality development based on high-level scientific-research achievement transformation.

Conclusion and Outlook

With the rapid development of the digital economy, data is showing exponential growth in scale and playing an increasingly important role in social and economic developing. How Accounting disciplines can respond to the challenge of data assets has become an urgent issue. This paper is the result of joint research by the interdisciplinary team of data assets. It conducts a preliminary study on the integration of data assets into the Accounting discipline system, explores the accounting attributes of data, the main content that Data Asset Accounting should study, and finally discusses the ideas and plans for integrating data assets into the Accounting discipline. Looking ahead to the future, there is a long way to go. The accounting community should embrace the digital economy era with an open attitude, conduct in-depth research on relevant issues of data assets, and establish a clear banner of Accounting in the theoretical and practical fields of data assets.

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