Review on the Data Elements Valorization Creation Mechanism

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Abstract. Against the backdrop of the rapid development of digital technology, data elements have increasingly become indispensable production factors. To provide systematic references and understanding for data researchers and producers and maximize data elements valorization, this paper uses the literature research method to sort out and summarize existing literature. Based on a large number of data element literatures, this paper proceeds along the mechanism of data elements valorization. Firstly, it clarifies the relevant concepts and characteristics of data elements. Secondly, it summarizes the connotation and influencing factors of the data elements valorization mechanism. Finally, it analyzes and studies the driving mechanism and sustainable mechanism of data elements valorization, conducting a relatively comprehensive literature review. This paper's review of the research on the mechanism of data elements valorization, on the one hand, is conducive to summarizing the laws of data elements valorization, providing a starting point for data elements valorization research. On the other hand, it is beneficial to providing new ideas for the current research and application of data elements valorization, promoting digital transformation and upgrading.

Keywords: Data elements worth creation, data elements valorization, data application.

1. Introduction

With the rapid change and development of digital technology, the requirements of economic development for the data elements valorization are increasing day by day [1]. The National Data Administration proposed to vigorously promote the value of factors marketization in the symposium on cultivating the national integrated data market held by the State Data Administration [2]. In the development of digital economy, the value release of data elements requires more technological innovation, efficiency, strategic pertinence and security. As the foundation of the development of digital economy, data elements valorization has become a hot topic in recent years. Papers on the data elements valorization have emerged in an endless stream, but its fragmentability is difficult to provide systematic reference and understanding. Therefore, this paper uses the literature research method to sort out, analyze and judge the existing literature research by taking the dynamic process of data elements valorization as the main line. On the one hand, it provides a reference for the current and future research on the data elements valorization, and on the other hand, it provides a reference scheme for promoting the digital transformation of industry and economic development.

2. Data elements valorization mechanism

2.1. Data factor valorization and related concepts

2.1.1 Concepts and characteristics of data elements

With the development of digital economy and big data, data factors emerge as new production factors. Terms and concepts in emerging fields can be interpreted differently, and it is of great significance to clarify their concepts for the study of the valorization mechanism of data elements [3]. Therefore, in order to provide accurate concept reference as much as possible, this paper summarizes and explains on the basis of existing research. Since data and information are closely related, on the one hand, starting from information, on the basis of analyzing the concept of information, we gradually analyze and summarize the basic components of data. After clarifying the components of

data, the data elements and digital elements are compared and analyzed, and finally the core concept of data elements is the product of digital processing of production factors [4].

The concept of data elements is the first step to study the data elements valorization in this paper, and the characteristics of data elements are the core for us to master the law of value creation of data elements, because only by combining their characteristics can we better release data elements valorization. For the existing research on the characteristics of data elements, it will be found that their characteristics are constantly changing and improving along the time line.

Table 1. Development and improvement of characteristics of data elements

2021	2022	2023	2024
Increasing returns to scale, non-competitiveness, negative externalities of privacy, and the immediacy of transmission beyond geographical distance.	Attributes such as externality, non-excludability and non-rivalry, as well as the private and shared nature of data elements.	The era's characteristics of non-competitiveness, non-exclusiveness, decreasing marginal cost, increasing marginal benefit, dematerialization, non-physical state, non-finiteness, and non-scarcity.	Non-competitive, heterogeneous, increasing returns to scale effect and ambiguous property rights.

It can be found that the characteristics of data elements are constantly developing and changing, and are highly susceptible to the development of digital economy. Therefore, the current characteristics of data elements still lack unity, and the research on the characteristics of data elements must be combined with the development of the digital economy at that time, rather than applying its past characteristics to emerging fields with fixed thinking, otherwise it will limit the release of the data elements valorization (see Table 1).

2.1.2 Value of data elements and its influencing factors

Data elements valorization is mainly reflected in the role of data elements in improving the traditional economic development model and social production and life, promoting industrial transformation and upgrading, and improving quality and efficiency. Data elements valorization can also be understood as the product of the dynamic process of the data elements valorization. Therefore, in order to study the data elements valorization, it is necessary to trace back to the source and fully analyze and understand the process. The value of data elements can be divided into three stages, namely, data resource, data asset and data capitalization Fragmented data are collected and integrated into data resources by digital technology; Data resources are fully marketized to form data assets in circulation transactions; Data assets circulate to various production links and application scenarios and play a role in them to realize value appreciation. This process transforms data assets into data capital [5]. Therefore, the factors that affect the realization of the three stages are the factors that affect the value of data elements. Data resources require the collection and integration of fragmented data. Therefore, data capacity, data diversity, value density and other basic characteristics of data determine the effectiveness of data resources. Data resources can only be transformed into data assets through circulation transaction, so circulation transaction attribute is the necessary condition for data resources to be data assets, which requires data to have non-competition and non-excludability of public goods. Therefore, the economic property of data affects the extensiveness of data resource circulation and transaction. Data assets to capital conversion need the data for practical application in the specific production process, on the one hand to the intrinsic attributes of the data of the basic characteristics and the economic properties of the data as a basic implementation conditions, on the other hand need external technical conditions of blessing, namely digital technology maturity and ability to use, and a large number of digital skill talent [6].

2.2. Driving mechanism of data elements valorization

The economic driving mechanism generates demands, the institutional driving mechanism provides guarantees, and the technological driving mechanism realizes value. The vitality and demands of the economic driving mechanism guide the direction of institutional design and technological innovation; the policies and plans of the institutional driving mechanism offer an environment and support for technological innovation; the innovative achievements of the technological driving mechanism further stimulate economic vitality and improve institutional design, thus forming a virtuous circle. The policy protection mechanism provides external protection for the data elements valorization, while the incentive sharing mechanism stimulates all parties from within to explore the value of data elements. The two mechanisms complement each other, making the value creation of data elements more stable and sustainable.

2.2.1 Economic driving mechanism

In the context of economic globalization, all walks of life are competing for transformation and upgrading to explore new economic development models and growth points. As an emerging economy in recent years, digital economy, with its unique vitality, has injected new development vitality into all walks of life, which is the key to transformation and upgrading [7]. At the same time, the process of global digital transformation and transformation is also accelerating, and the international digital competition is increasingly fierce, which is not only limited to the country's economic development, but also includes national security. Driven by various aspects of digital economy, as the main factor of production, the value creation and value appreciation of data are given higher requirements. Therefore, the data elements valorization is not only related to the development of all walks of life, but also of great significance to the development of the country and society. This also reveals that the research on the data elements valorization mechanism should be in line with economic development, and the real research and understanding of today's economic development needs can provide powerful reference for economic development.

2.2.2 Institution-driven mechanism

The Global Digital Economy Development Report (2024) emphasizes that under the background that the development of digital economy has become the core focus of the development of various countries, the UK, Germany, the US, Australia and other countries have issued relevant strategic plans to release the data elements valorization and promote the development of digital economy [8].

The Overall Layout Plan for the Construction of Digital China issued by the CPC Central Committee and The State Council [9] points out that a coordinated and powerful integrated promotion pattern should be built for the construction of digital China. On the one hand, it is necessary to strengthen the construction of digital systems and mechanisms, play the synergistic and linkage role of various departments, efficiently integrate data resources, expand data scale, improve the quality of data resources, and meet the needs of economic development. On the other hand, it introduces financial support for digital development, creates a good digital atmosphere for the whole society, improves the vitality of data elements, excavates the data elements valorization, and effectively releases the value of data elements.

2.2.3 Technology-driven mechanism

It is mentioned in 2.1.2 that the value of data elements requires not only the basic characteristics and economic attributes of numbers as necessary conditions, but also the promotion and support of technology, so technology is both the driving mechanism and the realization mechanism of the worth creation of data elements [10]. From digital technology and the data elements, the relationship between the two is interaction, data elements need to rely on digging the potential value of digital technology, release the economic vitality, at the same time digital technology need through the analysis of the potential value of the data elements, to predict the trend of economic development, grasp the economic development trend, finally realizes the development of digital technology, The

development of digital economy. Therefore, technology is both the driver and the beneficiary of the data elements valorization.

2.3. Sustainable mechanism of value creation of data elements

The development process of new things is tortuous, full of risks and challenges. Data elements as emerging factors of production are the aspects of technology, policy and system support, but there are still data element value is difficult to fully release, the problem such as data privacy and confidentiality is weak, And moral debate also emerge in endlessly data great ormond, in addition to risk and challenge to also have no to standardise. In order to create a good atmosphere for data elements, the government, enterprises and society take different measures to promote the sustainable development of value creation of data elements.

2.3.1 Policy protection mechanism

Data elements to the whole value creation has the profound influence of the global economic and social development, meanwhile data element value creation in resource capitalization, capitalization and three stages faced with various challenges, so countries will be released in full data element value rise for the national strategy, Measures have been taken to solve problems such as difficult resource utilization, low degree of asset capitalization and large capitalization obstacles, and coordinate and guide the allocation of data elements in the market. In addition, the potential risk of value creation for data elements exist and the negative effects of countries by building a legal framework, introduced the relevant legal provisions, To protect data copyright, data privacy and databases. Thus, to achieve the sustainable development of the data elements value creation, the state of the system, policy, legal, set up the protection network, balance technology innovation and moral responsibility, to create the protection mechanism against the risks related to policy.

2.3.2 Incentive sharing mechanism

The wide application of data element value creation in various industries to explore new economic development models and enhance product recognition cannot be achieved merely through external protection mechanisms provided by national policies. More importantly, it relies on the inherent appeal of data element value creation, which brings more possibilities for the development of various fields. This is the key to the sustainable development of the data element value creation mechanism. The financial and accounting industry is at the forefront of data element value creation. Therefore, this article starts with the financial and accounting industry to analyze the incentive and sharing mechanism of data element value creation. Taking the application of Robotic Process Automation (RPA) in the financial field as an example, traditional financial institutions consume a large amount of human, material and financial resources on some time-consuming and low-difficulty tasks. However, RPA technology has the ability to operate continuously for 24 hours, helping banks handle repetitive and mechanical tasks, actively responding to customer demands, and greatly improving the operation of banks while ensuring the timeliness of information. For instance, over 70 domestic and overseas branches of Industrial and Commercial Bank of China have piloted RPA digital labor, implementing 800 scenarios at the head office and branches, with an average of over 700 robots online daily and about 30,000 tasks executed daily, saving over 1,300 person-years of work. In addition, AI large models adopt innovative strategies such as federated learning and privacy computing, model integration, and multimodal data fusion to analyze potential fraud risks and improve the timeliness and effectiveness of anti-fraud measures in financial institutions.

3. Conclusion

This article is based on a large number of literatures and summarizes the dynamic development process of the value creation mechanism of data elements. On the one hand, it is a literature review on the data elements valorization creation mechanism. On the basis of the summary, it conducts analysis and research, and digs out new ideas from experience to provide certain references for

application in new fields, which to a certain extent helps the digital transformation and upgrading of industries and promotes the construction of a digital society and a digital power. However, this article also has certain limitations. In terms of literature, its scope needs to be expanded and broadened. The perspective of literature should be extended to various industry fields to make the literature organization more systematic. In the future, further practice and improvement will be carried out. The research on the data elements valorization creation mechanism will be further broadened in practice. The research on data elements value will be combined with specific industries, and cross-industry comparative analysis will be conducted from the perspective of industries. Empirical research will be further applied to make the literature review more convincing and implement it in industries.

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