

E-commerce Platform Data Governance Environment: Concepts, Elements and Implications

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Abstract: Multi-agent participation in data governance is the future trend of data governance research. However, multi-agent participation increases environmental uncertainty for enterprises to implement data governance activities to a certain extent, and the externalities generated by data governance activities still need to be studied. Taking E-commerce platform as an example, this paper aims to explore the conceptual elements of data governance environment and provide practical guidance for promoting multi-subject participation in the data governance process. By using the methods of literature research and theoretical deduction, this paper defines the concept of data governance environment for the first time, defines the core elements of data governance environment, and defines the data governance environment of E-commerce platform as an interactive system composed of data governance participants such as government, platform and users based on system theory and stakeholder theory. It is the space for data and information exchange during data governance activities, and it is the sum of factors that can directly or indirectly affect the data governance process of each participant. E-commerce platform data governance environment is mainly composed of government-level environment, platform-level environment and user-level environment. The environmental elements at the government-level include data policy and industrial policy; the environment at the platform-level consists of data environment and non-data environment; and the environment at the user-level includes personal cognitive ability, personal data literacy and personal privacy awareness.

Keywords: E-commerce platform, Data governance, Data governance environment.

1. Introduction

With the popularization of the Internet around the world, we have entered a new era -- the era of big data. Data governance has become a hot issue in current academic research. DAMA believes that data governance is a collection of activities exercising power and control over data asset management[1]. Although the research on data governance first originated in enterprises, later many researchers extended the idea of data governance from enterprises to other fields, including government departments, libraries, commercial banks and so on. However, there is not a deep research on the data governance of E-commerce platform enterprises at present. E-commerce platform are enterprises that build bilateral or multilateral markets on the basis of modern information technology to facilitate all commercial activities for profit[2]. E-commerce platform is a form of business generated based on the development of big data. It holds a large number of diversified data, including not only the data generated in daily business activities of E-commerce platform, but also the data collected from other departments and individuals. The advanced information technology in the E-commerce platform provides benefits for its data accumulation. At the same time, E-commerce platforms have the responsibility to protect users' data privacy rights from infringement. However, this responsibility has not been well fulfilled by E-commerce platforms. The dominant position of E-commerce platforms in data is easy to cause the "moral hazard" behavior of E-commerce platforms, and it is difficult for users to clearly understand how E-commerce platforms use their data. These behaviors have seriously damaged the legitimate rights and interests of consumers, resulting in consumers' distrust of platform enterprises, reducing the effectiveness of data governance, and thus hindering the process of multi-agent governance[3]. Therefore, it is

necessary to introduce new governance subjects, endow users with the right of data governance, weaken the data monopoly position of E-commerce platforms, and maintain the stable operation of the market.

In order to reduce the information asymmetry between consumers and platform enterprises and avoid the "moral hazard" behavior of platforms, public participation in data governance has become a trend. Chen Rongchang defines data governance of network platforms as a collaborative governance process in which multiple subjects such as the government, network platforms, network industry associations, non-governmental organizations, news media and netizens regulate various data on network platforms under the constraints of laws and rules[4]. Therefore, the platform needs to break through the single platform autonomy framework and introduce external forces to intervene in governance[4]. Xiang Ting and Ye Yun, based on the method of literature analysis, also point out that in the data governance of platform enterprises, the governance of relevant data resources can be strengthened through organic collaboration among the government, enterprises and individuals[5]. However, although some scholars have begun to pay attention to the necessity and importance of introducing multi-agent participation in the platform data governance, few scholars have clarified the path of multi-agent participation in the platform data governance and how to analyze the platform data governance environment. Therefore, this paper intends to take the E-commerce platform as an example, bring the government, platform and users into the scope of E-commerce platform data governance, respectively discuss the path of multi-agent participation in platform data governance from the perspective of the government, platform and users, and classifies its participants into an organic system to extract the concept of data governance environment. The framework model of data

governance environment of E-commerce platform is analyzed and constructed from the perspective of multi-agent, and the components of data governance environment are pointed out.

2. E-commerce Platform Data Governance Concept

2.1. Concept and characteristics of E-commerce platform

With the rapid development of Internet big data, E-commerce has become a more and more important transaction mode in modern trading. E-commerce platform has the dual characteristics of E-commerce and platform enterprises: E-commerce is the unity of capital flow, logistics and information flow, E-commerce platform has the characteristics of transaction virtualization and low cost. Transaction virtualization means that the E-commerce platform, based on the Internet technology, builds a transaction platform for users that is not limited to time and space, virtualizes the traditional transaction process, and greatly improves the convenience of transactions. Low cost means that the E-commerce platform reduces the transaction costs of both buyers and sellers, saves the time and energy costs of both buyers and sellers, and improves the efficiency of information transmission. As a two-sided market that gathers users for trading, E-commerce platform has three characteristics: demand complementarity, cross-network externality and non-neutrality of price structure[6][7]. Demand complementarity means that the demands of suppliers and consumers of E-commerce platforms exist at the same time, and the demands of suppliers and consumers must match each other, otherwise there is no value of the existence of E-commerce platforms. Cross-network externality means

that the increase of user demand of one side of the E-commerce platform may lead to the increase of user demand of the other side, and then the transaction volume of the platform will rise. At the same time, the reduction of user demand on one side will also lead to the reduction of user demand on the other side, and then the transaction volume of the platform will decline. The non-neutral price structure means that the trading volume of the platform will change with the change of the price structure.

Users constitute the main user of the operation of E-commerce platforms, and are also the main source of income of E-commerce platforms. The agglomeration of a large number of bilateral users leads to the agglomeration of their personal data. At the same time, in order to effectively coordinate the needs of bilateral users, rationally allocate the existing resources of the platform, and realize the value of platform governance, it has become an inevitable direction for E-commerce platforms to conduct user data governance and attract users to participate in data governance.

2.2. E-commerce platform data governance concept

Data governance is a newly emerged academic term in recent years, but until now there has not been a unified standard definition. Various scholars have expounded their views on data governance from different perspectives, and the definitions of data governance applied to different fields are also different. Based on the literature query of academic paper databases of journals such as Web of Science, CNKI etc. This paper takes "data governance" and "E-commerce platform" as search keywords to collect a number of Chinese and English literatures, and takes them as the main analysis basis.

Table 1. Related concepts of data governance

Research level	Definition	Literature source
Technology-level	Data governance is the management of an organization's data as a strategic asset. It requires a complete set of mechanisms from data collection to processing and application, with a view to improving data quality, realizing extensive data sharing, and ultimately maximizing data value[10].	Wu Xindong et al.[10]
	Data governance is based on the concept of "big data as a technology that can solve the problems of national and social governance"[11].	Li Feng and Zhou Zhou[11]
Management-level	Data governance is the collection of rights and control activities over data assets and is the entirety of decision rights and responsibilities related to data asset management in an organization[1].	DAMA[1]
	Data governance is a holistic and ongoing approach to defining and monitoring the rights and corresponding responsibilities associated with data asset decisions for the purpose of governing data as an enterprise asset[12].	Verweij[12]
Cognitive-level	In essence, data governance is a process that people manage and control data in the environment through cognitive ability, so as to improve the value of data[3].	Jiang et al.[3]
Comprehensive-level	Data governance is the business process, business policy, business standard and related technical support means formulated to meet the internal information use needs of enterprises and improve the level of enterprise information service[13].	Sun Zhongdong[13]
	Data governance is a set of efforts around data assets that aims to serve decisions at all levels of the organization and involves a collection of technologies, processes, standards, and policies related to data management[14].	Zhang Ning and Yuan Qinjian[14]

In retrospect, the previous researches on the definition of data governance concept by experts and scholars can be divided into two levels, one is on the technical level, the other is on the management level. Xu Feng et al. pointed out that data resource management is not only a technical management problem, but a dual attribute of both technology and management[8]. Song Suxuan et al. also believe that data governance should have both physical and social attributes, in which physical attributes serve by technical elements while social attributes are supported by management elements[9]. In addition, a few scholars have also made a reasonable interpretation of the concept definition of data governance from the cognitive level. By integrating relevant literature, this paper summarized the previous data governance concepts into four levels: technical level, management level, cognitive level and comprehensive level, and made a simple summary of the current academic definitions of data governance (see Table 1).

It can be seen from Table 1 that, from the technical level, data governance is based on big data technology and carries out technical operations such as cleaning, exchange and integration of original data in order to improve data quality, data security and data availability and understandability. From the management level, data governance is based on the data itself. It is a series of management behaviors taken by managers according to the data, containing but not limited to the distribution arrangement of data, personnel, and ownership of rights and responsibilities. The purpose is to give full play to the maximum value of data, so as to help realize organizational goals. Based on the above scholars' views and the specific characteristics of E-commerce platforms, this paper holds that E-commerce platform data governance is a process in which E-commerce platforms manage and control data and its related management elements with technical and cognitive abilities in order to maximize data value and improve data service quality in the interaction of relevant stakeholders.

3. Concept and Components of E-commerce Platform Data Governance Environment

3.1. E-commerce platform data governance environment concept

Environment generally refers to the space on which human beings live. It is a natural factor that can directly or indirectly affect human life and development. But the concept of environment has different definitions in different areas of application and in combination with different things. For example, in the field of philosophy, Marx believed that the historical environment was an important factor restricting the development of human society, and was determined to include geographical environment and social environment[15]. In management, management environment was first proposed by Stephen P. Robbins, a famous managerist. He defined management environment as a complex of material conditions for the survival and development of organizations, and an external institution or force that has a potential impact on organizational performance. Based on the background of archival data governance, Hu Xiaoqing believes that data governance environment is a combination of various factors affecting archival data governance[16].

Therefore, this paper refers to the definition of the environment in various fields and combines it with data governance. Thus, the data governance environment is defined in this paper as an interactive system composed of various data governance participants, a space for data and information exchange during data governance activities, and sum of factors that can directly or indirectly affect the data governance process of each participant. The data governance environment is affected by many factors, and the formation of the data governance environment is the result of the shared action of various relevant elements.

3.2. Elements of E-commerce platform data governance environment

Xu Yang and Hu Yue specifically analyzed the implementation dilemma of government data governance from the government, society and individual levels, which provided a thinking direction for this study[17]. In this paper, we plan to mainly study the core subjects of data governance of E-commerce platforms (government, platform and users), and determine the elements of data governance environment from this perspective. The government is the main operator of macro control and the regulator and guide of the whole platform data governance process. E-commerce platforms are the main implementers of data governance and providers of data services. Users are the main producers and providers of user data on the platform, and the social supervisors of data governance on the platform. Therefore, this paper refers to the research of Xu Yang et al., and distinguishes data governance environments based on different subjects. Government-related environments are called government-level environments, platform-related environments are called platform-level environments, and user-related environments are called user-level environments.

3.2.1. Government-level environment

The government-level environment is mainly an environmental factor that is constructed by the government and plays a significant role in multi-agent data governance. In this paper, we mainly construct the data governance environment at the government level from two aspects: data policy and industrial policy. Data policy mainly refers to a series of laws and regulations for data use formulated by the government in order to guide and standardize platform data governance. This policy mainly runs through the whole data life cycle and restricts the action direction of E-commerce platform data governance. Li Yongjian pointed out that the government should formulate more specific data collection rules and clarify the distribution of user data property rights to solve the problem of platform data monopoly[18]. Industrial policy mainly refers to the government's active intervention in the E-commerce platform industry, through the way of active support, to promote the coordinated development of E-commerce platform industry issued by the general term. Generally speaking, industrial policies involve government financial subsidies and tax incentives[19]. The policy guidance of finance and taxation can increase the importance of E-commerce platform industry to data governance and stimulate the innovation of enterprise data governance technology.

Data policy and industrial policy focus on different objects. Data policy focuses on data security, privacy and property rights in the data collection, processing, storage and application of E-commerce platforms. Industrial policy is

aimed at the E-commerce platform industry to promote industrial collaboration and stimulate the willingness of data cooperation and sharing between industries of E-commerce platforms or between platforms and the government. The nature and purpose of data policy and industrial policy are also different. Data policy is a punitive measure aimed at preventing the occurrence of violations on E-commerce platforms. As an incentive measure, industrial policy aims to help the E-commerce platform industry promote the innovation of data governance model and data governance technology, and encourage the interaction and cooperation among various industries, so as to realize the collaborative development of data governance in the platform industry.

3.2.2. Platform-level environment

Platform environment is mainly directly related to e-commerce platform, which is a platform industry factor related to data governance process constructed by e-commerce platform. It mainly includes data environment and non-data environment. Data environment refers to the environment composed of internal data resources of e-commerce platform, while non-data environment refers to the environment composed of factors other than data resources. Data environment is related to data, including data quality, data security and data standards; Non-data environment has indirect influence on the quality of data environment, including data strategy, governance mechanism, organizational structure, organizational culture, personnel quality, reputation, etc.

Data quality and data security are the main factors for building a platform data governance environment. Data quality is crucial to the effect of data governance, and the protection of user security and privacy is also one of the work contents of data governance[20]. Data standard refers to the standardization of data through the application of unified data definition, classification, conversion, coding[21]. Data strategy requires leaders to have a vision for development and take big data as a strategic resource for the enterprise. Governance mechanism mainly includes contract governance and relationship governance. Contract governance mechanism can make contracts to clarify the rights and obligations of stakeholders and restrict their behaviors, so as to improve governance performance[22]. Relational governance can strengthen the communication among various data governance stakeholders, improve the understanding of all parties to data governance projects, ensure the active participation of all stakeholders, and to a certain extent guarantee the implementation of platform data collaborative governance[23][24]. Organizational structure is mainly to solve the problem of how to divide, group and coordinate work tasks and how to allocate decision-making rights. Data governance is a complex process, which requires the division

of labor and cooperation among employees within an organization. Whether the division of labor is clear and whether the rights and responsibilities are properly arranged will affect the process of data governance in an organization. In addition, all activities within the organization need people to complete, so the initiative of people should also be taken into account in data governance. Reputation is one of the factors for e-commerce platforms to attract external users to cooperate in data governance. The higher the reputation of the platform, the more willing external users are to cooperate with the platform in data governance. Zhang Meijuan, taking home-sharing platform as an example, also found that platform reputation had a significant positive effect on collaborative governance intention through research[25]. Therefore, e-commerce platforms need to take into account the maintenance of their own reputation, so as to attract users to participate in data governance, to help platforms reduce governance costs and enhance data governance performance.

3.2.3. User-level environment

User-level environment is a personal characteristic factor that influences the data governance results in the process of data governance interaction between users and other subjects. Users are the supporting factors of e-commerce platform data governance, which requires users' active participation. This paper holds that the data governance environment factors related to users mainly include personal cognitive ability, personal data literacy and personal privacy awareness.

Personal cognitive ability refers to a single user's cognition of the importance of data and whether he or she has the thinking related to data use. The stronger an individual's cognitive ability of data is, the more complete and comprehensive the user's understanding of data governance will be, and the more likely the user is to participate in the process of data governance of the e-commerce platform. Personal data literacy refers to a single user's ability to process, analyze and apply data. The higher the user's data literacy, it means that the user has the ability to participate in the data governance activities, which can reduce the cost related to attracting user participation for the e-commerce platform. Personal privacy awareness refers to the importance users attach to their own data and information privacy. The stronger the privacy awareness of users, the more importance they attach to data security, the more motivation they may have to cooperate with e-commerce platforms for data governance, and thus help e-commerce platform data governance to build a user support environment. Based on the above theoretical analysis, this paper can obtain the components of the e-commerce platform data governance environment, the specific content is shown in Figure. 1.

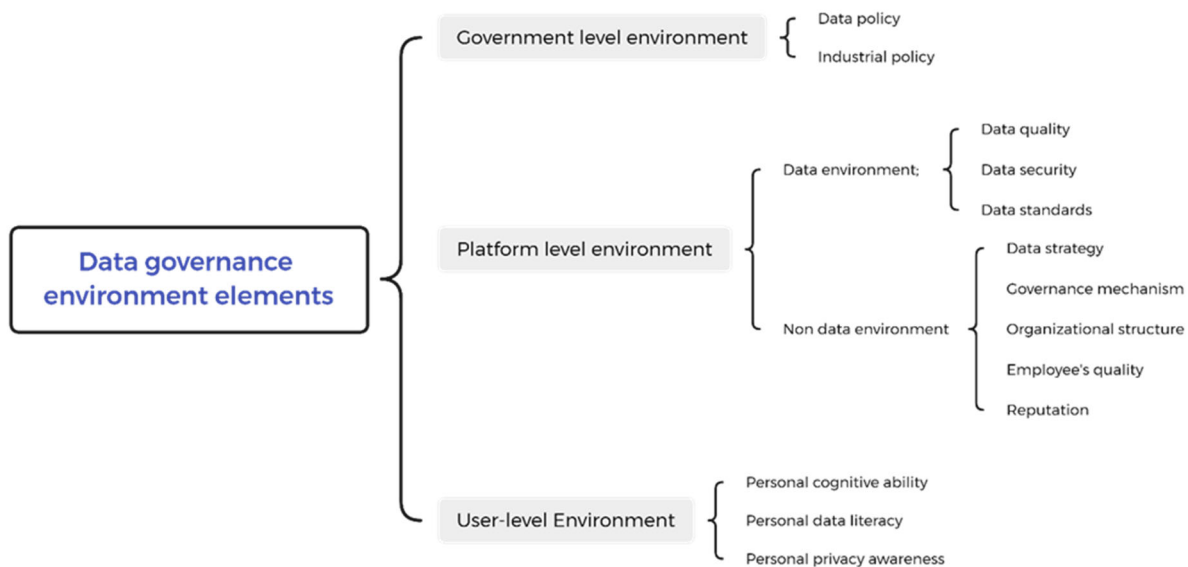


Figure 1. Data governance environment components

4. The Research Implications of E-commerce Platform Data Governance Environment

4.1. Theoretical Implications

This paper innovatively defines the concept and connotation of data governance environment for the first time, and actually applies the theory of data governance to the field of E-commerce platform, and conducts a systematic study on the data governance environment of E-commerce platform. Through the definition of E-commerce platform data governance concept, the components of E-commerce platform data governance environment are proposed, and the importance of environmental factors is confirmed. In determining the strategic direction of data governance and implementing data governance activities, E-commerce platforms need to consider the impact of the environment to better adapt to the changes of the environment. This paper enriches relevant theories of data governance environment, provides thinking directions and analysis tools for the analysis and research of the environment of data governance on E-commerce platforms, and provides certain theoretical support for the practice of data governance on E-commerce platforms.

4.2. Practical Implications

Data governance environment is one of the main factors affecting the performance of platform data governance. Meanwhile, the platform data governance environment can also evaluate the level of data governance to a certain extent. Therefore, the promotion and constraint conditions of data governance environment must be taken into account in the process of data governance for E-commerce platforms. From our multi-agent data governance environment model framework above, it can be seen that the data governance environment of E-commerce platform is mainly composed of government, platform and user factors, and data environment components including policies, data and cognition. Therefore, in practice, we can draw the following implications: (1) For

the government, the government needs to improve the policy system of platform data governance and draw legal boundaries for the data use of E-commerce platforms. The government has also the responsibility to help the platform build a complete data governance reward and punishment mechanism, pay attention to the constraints of data policies and support of industrial policies. (2) For platforms, they should not only attach importance to the role of data environment in data governance, but also should attach importance to the role of non-data environment. The guarantee of data quality and data security is the primary issue of data governance. The comprehensive matching of data organizational structure and data governance mechanism can also help improve the data governance capability of the platform, and the platform also needs to pay attention to the data literacy of managers and grassroots staff and the fulfillment of social responsibilities, cultivate the data culture atmosphere of the organization, enhance the sense of trust of users in the platform, so as to consolidate the continuous participation of users. (3) For users, they should focus on enhancing their cognitive ability and data ability, enhance their data control capability, so as to protect their data rights in the process of data governance, and have the capability to participate in the interaction and cooperation with the platform, and put forward reliable improvement suggestions for the firm. At the same time, users should also cultivate the awareness of privacy data protection to realize the data value co-creation between platforms and users.

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