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A Preliminary Study on the Impact of Digital Transformation on Enterprise Competitive Advantage

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Abstract. With the rapid development of digital technologies such as big data and cloud computing, more and more enterprises are participating in the wave of digital transformation. Although many scholars have explored the impact of digital transformation on corporate performance, the improvement of performance does not mean that enterprises can gain a dominant position in market competition, and the relationship between digitization and corporate performance is complicated, and the relationship between the two is still controversial. Competitive advantage is the antecedent of performance. Focusing on competitive advantage research is not only conducive to further understanding the impact of digital transformation on enterprises, but also helpful to reveal the complex relationship between digital transformation and performance. On the basis of expounding the connotation of enterprise digital transformation and competitive advantage, this paper discusses the influence of enterprise digital transformation on the source of competitive advantage from two aspects: exogenous and endogenous, combined with industrial organization theory and resource-based theory. From the perspective of optimizing internal conditions, responding to external environment, adjusting competition and cooperation relationship, demand response and product innovation, this paper discusses the ways in which enterprises can gain competitive advantage through digital transformation.

Keywords: Digital transformation; Competitive advantages; Theory of industrial organization; Resource-based theory

1. Introduction

Emerging digital technologies represented by artificial intelligence, blockchain, cloud computing, and big data are causing an all-round change around the world. The party and the state attach great importance to the development of the digital economy. According to the ' China Digital Economy Development Report (2022) ' released by the China Communications Academy, China 's digital economy scale reached 45.5 trillion yuan in 2021, accounting for 39.8 % of GDP. In fact, the development of digital economy has also brought a high degree of uncertainty to the business environment of enterprises, and the challenges that enterprises need to face are becoming more and more complex. In this context, many enterprises choose to carry out digital transformation. The survey results of ' 2022 Accenture China Enterprise Digital Transformation Index ' show that nearly 60 % of enterprises will increase their investment in digitalization in the future. Digital transformation has become an inevitable trend. What kind of impact can digitization bring to enterprises has become the focus of common concern in the industry and academia. At present, many scholars have focused their research perspectives on the relationship between digital transformation and performance. However, the relationship between the two is more complex. The advancement of digital transformation does not mean that enterprises will be able to achieve higher performance, [1] and some enterprises will even face the dilemma of ' transition to death, non-transition to death ' .[2]

In fact, when exploring the impact of digital transformation on enterprises, we should not only focus on enterprise performance. The improvement of performance does not necessarily mean that enterprises can be more competitive in the market. [3] Digital transformation is a means rather than an end to help enterprises develop their own business.[4] Its purpose is to enable enterprises to have a greater competitive advantage.[5] Therefore, it is necessary to look at the impact of digital

transformation from a more macro perspective. Competitive advantage is the core of strategic management research. How to obtain and maintain competitive advantage is the focus of enterprises. For enterprises, no matter what kind of competitive environment they are in, it is difficult to continue to make profits,[6] especially in today 's competitive environment characterized by technological progress and digitization. [7] The market position of enterprises has been greatly challenged, and the development of digital technology may impact the original competitive advantage of large enterprises. [8] For the original enterprises with higher market position in the industry, they may lose their market leading position due to the lack of competitive advantage. Similarly, the original enterprises with lower market position may occupy a larger market share due to the acquisition of new competitive advantages. Under the background of digitalization, the source and creation mode of enterprise competitive advantage may change,[9] and the source of competitive advantage has always been the focus of academic attention. This paper focuses on two questions : First, how has the source of competitive advantage changed in the digital context ? Second, how to help enterprises achieve competitive advantage through digital transformation ?

2. Theoretical basis

2.1 Enterprise Digital Transformation

Although the concept of enterprise digital transformation has not been unified, the important position of digital technology in the process of transformation has been affirmed. At the same time, the scope of digital transformation has also reached a consensus, that is, digital transformation is not only the transformation of business processes, but also includes organizational structure, business model, competition and cooperation. First of all, as far as the concept of digitization is concerned, scholars have summarized the concept of digital transformation of enterprises from different perspectives. For example, Huang Lihua et al. (2021) [10] combed the concept of digital transformation, emphasizing the characteristics of digital transformation from three aspects : nature, content and means of realization. They believe that in the context of the digital age, enterprises carry out digital transformation. It is an inevitable requirement to conform to the characteristics of the times. In the process of transformation, it is necessary to reconstruct the organizational structure, business processes, and corporate strategies, and this series of changes cannot be separated from the support of various digital technologies ; zhu Xiumei and Lin Xiaoyue (2022) [11] expounded the concept of digital transformation from the perspectives of subject, tool, type and result. They believed that the subject of digital transformation is enterprises, the tool is digital technology, the type of transformation includes products, models, organizations, etc., and the result of transformation is to help enterprises establish competitive advantages. Secondly, in terms of the scope of digital transformation, the digital transformation of enterprises is no longer limited to the transformation of product services and business processes, and the organizational structure, business model and cooperation model of enterprises will also be affected.[12]

For the digital transformation of enterprises, if from the micro level, it can be regarded as an act to promote the implementation of innovation and change activities to improve the performance of enterprises, and if from the macro level, digital transformation can make profound changes in society and industry.[13]Most of the current research focuses on micro-enterprise performance, and the research on macro-level such as industry and competitive advantage is relatively weak. On the one hand, talking about the impact of digitization on enterprises, many scholars have explored the relationship between digital transformation and performance. For example, Li Qi et al. (2021) [14] confirmed that digital transformation has a significant effect on corporate performance, and the promotion effect is more obvious in large enterprises, state-owned enterprises, mature enterprises and non-manufacturing (service) enterprises ; yi Luxia et al. (2021) [15] found that the digital transformation of enterprises has significantly improved the performance level of the main business, and this driving effect has a better performance in state-owned enterprises. For example, Luo Binyuan and Zhao Shuaiheng (2022) [16] focused on the impact of digital transformation on innovation

performance, and found that digital transformation can improve the innovation performance of manufacturing enterprises. However, the relationship between digital transformation and enterprise performance is still controversial. The digital transformation of enterprises does not necessarily promote the improvement of enterprise performance. For example, Qi Yudong and Cai Chengwei (2020) [17] found that although digitization affects corporate performance through two paths : management activities and sales activities, the impact of these two paths will offset each other, eventually leading to the overall impact of digitization on performance is not significant, and it is confirmed that enterprise scale and digital support subsidies will affect the relationship between digitization and performance. Therefore, digital transformation is still controversial about whether it can effectively improve corporate performance. The factors affecting digital improvement of corporate performance are diverse, and the relationship between the two is more complicated.

On the other hand, the impact of digital transformation is not limited to corporate performance. It needs to be further explored from a more macro perspective, such as how digital transformation affects the market position of enterprises and the number of competitors,[12] and how digital transformation affects the number and diversity of competitors in an industry. [8] Although some studies have focused on the relationship between digital transformation and market position and market competitiveness, for example, Wang Yu and Zhang Zhanbin (2022) [3] believe that compared with enterprise performance, market competitiveness can reflect the impact of digitization on enterprises from a more comprehensive perspective, and then study the relationship between digitization and enterprise market competitiveness. However, research on the impact of digitization on corporate market competition is currently weak.

2.2 Competitive Advantage and Its Sources

Competitive advantage is the core content of strategic management, which can reflect the market competitiveness of enterprises. [18] Since competitive advantage is the antecedent of performance, [19] the discussion focusing on competitive advantage can not only understand the impact of digital transformation on enterprises from a more macro perspective, but also help to further understand the complex relationship between digital transformation and performance. Although the concept of competitive advantage was put forward earlier in strategic theory, the specific definition of competitive advantage is not clear.[18] This article refers to Ma Hongjia et al. (2014) [20] ' s point of view, that the competitive advantage is the enterprise in the internal operating environment and external market environment show some characteristics better than competitors, such as internal innovation speed, product quality, external market performance, etc., the definition emphasizes the source of enterprise competitive advantage, such as the enterprise 's internal environment and external environment, and competitive advantage acquisition way, such as product innovation or improve product quality, etc.

The theoretical research on competitive advantage is very rich, including industrial organization view, resource-based view, capability-based view, dynamic capability view and so on. These theories explain how enterprises obtain competitive advantage from different perspectives, and one of the core issues of these theoretical debates is the source of competitive advantage. For example, from the perspective of industrial organization, the competitive advantage of enterprises comes from the choice of industry; from the perspective of resource base, the competitive advantage of enterprises comes from the resources owned by enterprises. From the perspective of competence-based view, resources alone are not enough to achieve competitive advantage, and enterprises need to have core competence and competitiveness. From the perspective of dynamic capabilities, the competitive advantage of enterprises not only comes from the integration of internal resources and capabilities, but also includes the response to the external environment.[19]

Further, the source of competitive advantage mainly includes exogenous factors and endogenous factors, that is, the exogenous theory of competitive advantage and the endogenous theory of competitive advantage. The former emphasizes that the competitive advantage of the enterprise comes from the external factors of the enterprise, such as the market structure of the industry and the

choice of the industry. Choosing a correct industry is the key for enterprises to gain competitive advantage. The latter focuses on the accumulation of internal resources and capabilities of enterprises.[21]The exogenous theory of competitive advantage means that the competitive advantage of an enterprise is mainly determined by some variables outside the enterprise.[22]From the perspective of industrial organization theory, the competitive advantage of enterprises comes from the external market structure, market opportunities, etc. Michael Porter applies the theory of industrial organization to the enterprise level, emphasizing the choice of industry and the market structure of the industry.[21] He believes that enterprises create competitive advantages by choosing which activities to engage in and where to engage in these activities. [23] The research of McGahan and Porter (1997) [24] confirmed that the industry effect has an important impact on the change of profitability of specific business, and there is a close relationship between the choice of industry and the competitive advantage of enterprises. However, the view of industrial organization overemphasizes the influence of external factors on competitive advantage and ignores the internal factors of enterprises. The resource-based theory focuses the source of competitive advantage on the internal factors of enterprises and gradually develops into the theoretical pillar of the endogenous theory of competitive advantage. Valuable, rare, difficult to imitate and irreplaceable resources are closely related to the competitive advantage of enterprises. [25] The resources of enterprises have become an important source of competitive advantage. With the deepening of research, the concept of " resource " in the resource-based view has been expanded, and concepts such as knowledge, ability, and dynamic ability have emerged. [26]The digital transformation of enterprises affects not only the internal conditions of the enterprise itself, but also the external environment of the enterprise. In the digital context, how the source of competitive advantage of enterprises is affected and how to obtain competitive advantage through digital transformation need to be further explored.

3. The impact of enterprise digital transformation on the source of competitive advantage

3.1 The Impact of Digitization on Exogenous Competitive Advantage

The development of digital technology has not only spawned a large number of emerging industries, but also brought a huge impact on the external competitive environment of enterprises. When discussing the source of competitive advantage, scholars of industrial organization school emphasize the influence of external factors on competitive advantage. The analysis of industrial structure, market opportunity and competitive environment is closely related to the competitive advantage of enterprises.[22][24]Therefore, when discussing the impact of enterprise digital transformation on competitive advantage, it is necessary to consider the impact of digitization on exogenous competitive advantages such as industrial structure, market opportunities, and competitive environment. Specifically, it includes the change of industrial structure, the blurring of industry boundaries, and the formation of dynamic competitive scenarios.

First, the digital transformation of enterprises has gradually changed the industrial structure outside the enterprise. The digital transformation of enterprises promotes the development of the digital industry, and the industrial advantages are gradually emerging. The digital transformation of enterprises is the micro foundation and key link to promote the development of digital economy, and it is also promoting the upgrading of industrial structure. [27]Driven by digitalization, the scale of digital industries such as software and information technology service industry, Internet and service industry, and telecommunications industry has been expanding, [28] and has gradually become the leading industry driving economic growth.[29] Enterprises affiliated to the digital industry have industry advantages over non-digital enterprises. The research of Du Yong and Lou Jing(2022) [30] confirms that although non-digital enterprises can obtain transformation dividends through digital transformation, enterprises in the digital industry are more likely to obtain digital transformation dividends. Of course, although enterprises in the digital industry have industry advantages, this does not mean that leading enterprises in some non-digital industries will lose their dominant position. Through digital transformation, enterprises in non-digital industries can play a digital enabling role

in demand creation, business design, value co-creation, etc.[31]promote the development of industrial digitization, transform and upgrade traditional industries with the help of digital technology, realize the innovation of industrial model[32], and gain competitive advantage with the innovation of industrial model. Industrial digitization is also one of the cores of digital industry. [33]

Second, the wave of digital transformation has brought more market opportunities to enterprises. Driven by digital transformation, the industry boundary is gradually blurred, and enterprises have more market opportunities to build their own competitive advantages. The development of digital technology has not only triggered a new round of scientific and technological revolution, spawned many new industries, [29] but also made the industrial boundary more blurred, and the competition scope of enterprises gradually exceeded the industry boundary. For example, Master Kong instant noodles should not only pay attention to the competitive behavior of their counterparts, but also not ignore the impact of the rapid development of the take-out industry. [34] Therefore, enterprises cannot obtain advantages through accurate industry positioning, and the traditional industrial organization theory has been challenged. However, from another perspective, the blurring of industry boundaries also makes it easier to achieve cross-border competition and brings more market opportunities to enterprises. In the digital context, enterprises can expand their business to new industries outside the industry, achieve cross-border competition, and shape multi-dimensional competitive advantages. The rapid progress of digital technology has also laid the foundation for enterprises to achieve cross-border operations.[35] The use of digital technology has increased the opportunity for enterprises to enter new markets, helping enterprises to copy and promote the core competitiveness brought by their own digital technology to new entry industries.[36]

Thirdly, the digital transformation of enterprises makes the competitive environment increasingly dynamic. Timely response to the external environment is an important way for enterprises to gain competitive advantage. According to Pi (2014),[37] the digital transformation of enterprises promotes enterprises to be in a dynamic competition situation from three aspects, that is, the dynamic competition environment, the dynamic competition interaction and the dynamic competition power. First of all, the development of new-generation digital technologies such as big data, cloud computing, and blockchain has had a significant impact on individuals, enterprises, governments, and other social levels, and the competitive environment of enterprises has shown a dynamic development trend. For example, Yoo et al. (2010) [38] found that the development of digital technology has derived a hierarchical modular structure, and the competition and cooperation between enterprises have become more complex. For two enterprises, it may be competitive in one field and cooperative in another industry. Apple 's iPad and Amazon 's Kindle compete directly at the device level, but Amazon provides an application for the iPad.From this perspective, the two are in a cooperative relationship. Secondly, enterprises do not exist as individuals. There is not only a competitive relationship between enterprises, but also learning, imitation and other behaviors. The arrival of the digital age makes the competitive interaction between enterprises more dynamic. Chen Qingjiang et al. (2021) [39] found that there is a significant peer effect in the process of digital transformation, that is, mutual imitation and learning among enterprises will lead to the consistency of the whole group behavior. Finally, the competitive power of enterprises presents a dynamic development trend. The arrival of the digital economy era makes it impossible for enterprises to rely solely on scale effects to gain competitive advantages. Enterprises need to meet consumers ' personalized consumption needs through continuous innovation. Chen Xiaoying and Qiu Guodong (2022) [40] found that in the era of digital economy, more and more enterprises upgrade their strategic thinking from product-oriented logic with ' product ' as the core to service-oriented logic with ' service ' as the core in digital transformation, and provide integrated and customized services on the basis of providing products to meet the value demands of the era of digital economy.

3.2 The Impact of Digitization on Endogenous Competitive Advantage

The competitive advantage of enterprises is not only affected by external factors. From the perspective of resource-based theory, the accumulation of internal resources and capabilities is an

important source for enterprises to gain competitive advantage. In the digital context, the existing resource-based theory has been challenged to a certain extent. [41] Chen Xiaoying and Qiu Guodong (2022) [40] believe that in the era of digital economy, the resource attributes that enterprises focus on have changed from objective resources (tangible, static and limited resources) to instrumental resources (intangible, continuous and dynamic resources).

For enterprises, the starting point of digital transformation is digitization, and data is the basis of digitization.[42] With the extensive development of digital transformation, data has become an important resource for enterprise value creation [43] and competitive advantage[44], and due to the uniqueness of data resources, the attributes and acquisition methods of resources in the digital context have undergone profound changes. [45] Based on the perspective of resource-based theory, this paper takes data resources as an example to explain the impact of digitization on endogenous competitive advantage.

Adner et al. (2019) [42] expounded the impact of digital transformation on the resource-based view from the value, rarity and irreplaceable aspects of data resources. Taking the value characteristics of resources as an example, the behavior of contacting data will form new data, and the generation of such ' self-generated ' data may be accidental, but it may also be of great value. Cai Li et al. (2019) [41] believed that in the digital age, enterprises pay more attention to co-creating value with users from the perspective of demand side, while the existing resource-based view emphasizes the value acquisition of enterprises from the perspective of supply side, and the data resources have the characteristics of massiveness, sharing and rapid growth, which challenges the resource-based view that relies on the inability of resources to flow among enterprises and difficult to replicate to obtain competitive advantages. Sun et al. (2021) [43] believed that the renewability, reusability and availability of data resources subvert the traditional resource-based view. Chen Dongmei et al.[9] took the acquisition of competitive advantage of multinational enterprises based on technological capital and human capital in the traditional internalization theory as an example, and discussed that in the digital context, the liquidity of the factor market has been improved, which challenges the resource-based view 's assumption that the factor market is not liquid.

On the other hand, although from the perspective of resource-based view, when enterprises have an element that is difficult to imitate, they can create greater competitive advantages. The digital technology capabilities of enterprises are core intangible resources that are difficult to imitate and cannot be replaced.[46], but due to the spillover and sharing characteristics of digital technology, imitation between enterprises becomes easier.[47] The traditional resource-based theory believes that when an enterprise 's value creation strategy is not implemented by existing or potential competitors, the enterprise can be regarded as having a competitive advantage.[25] However, in the digital context, imitation learning between enterprises is beneficial to the development of the entire peer group. Ni Kejin and Liu Xiuyan (2021) [48] found that when multiple enterprises in the same industry in the same city implement digital transformation, enterprises can achieve better growth from digital transformation ; li Qian et al. (2023)[49] analyzed the influencing factors of enterprise digital transformation based on the perspective of peer effect, and found that the digital transformation of other companies in the same industry can significantly promote the company 's digital transformation.

4. The impact of enterprise digital transformation on the way of competitive advantage acquisition

The development of digital transformation affects not only the internal organizational structure and operation management of the enterprise, but also the external environment of the enterprise and the change of competition and cooperation relationship. Combined with the source of competitive advantage, enterprises need to focus on the internal conditions of enterprises from the perspective of resource-based view, the response of enterprises to the external environment from the perspective of dynamic capability view, and the cooperation between enterprises and stakeholders from the perspective of digital platform ecology. [50] At the same time, although digitization has a profound

impact on the internal conditions and external environment of enterprises, the key to enterprise competition is still around the needs of consumers. The competition of enterprises will eventually be reflected in the level of products or services. [18] The focus of enterprises is to provide products (services) that can meet the needs of consumers, meet the needs of consumers, and create value for consumers. Digital enterprises have certain advantages in demand response and product innovation. Therefore, this paper expounds the ways for enterprises to obtain competitive advantages through digital transformation from four aspects : the optimization of internal conditions, the response of external environment, the adjustment of competition and cooperation relationship, as well as demand response and product innovation.

4.1 Optimization of Internal Conditions

Digital transformation is a powerful means for enterprises to optimize internal conditions. Enterprises can use digital optimization to optimize organizational management, reduce costs and increase efficiency, and then gain competitive advantage. First of all, the impact of enterprise digital transformation on organizational management is reflected in the improvement of organizational communication efficiency and the change of organizational structure, both of which can help enterprises better create value and gain competitive advantage. On the one hand, digital transformation can promote information transmission within the organization, improve communication efficiency,[51] help enterprises achieve integration and deployment of resources, and reduce coordination costs.[17] Zeng et al.(2018)[45] believed that companies that can obtain more value from data usually actively break the data barriers within the organization, collect data from multiple departments and systems, and strengthen the integration of internal data. On the other hand, digitization can reshape the organizational form of enterprises. Digitization not only affects the efficiency of information dissemination, but also changes the value creation process of enterprises and creates new task requirements for enterprises.[52] Therefore, the organizational form needs to be adjusted to adapt to this change. Based on the perspective of empowerment, Luo Chi Mao et al. (2020) [53] believe that digital empowerment realizes the top-down release of management rights and helps enterprises build more agile teams. Wu Haoqiang and Hu Sumin (2023) [54] take Haier 's flat organizational structure as an example to illustrate that digital transformation can break the phenomenon of " information island " between the components of the value chain and help enterprises build a new organizational form that can co-create and share value.

Secondly, digital transformation runs through all aspects of production and operation activities such as design, research and development, production, manufacturing and organization of enterprises, and is an important means for enterprises to achieve cost reduction and efficiency increase. [55] With the increasing intensity of competition in the industry, enterprises are facing greater competitive pressure. It is an inevitable choice for enterprises to obtain competitive advantages by using digital transformation to achieve cost reduction and efficiency increase. [56] Zhang Chen (2023) [57] takes Sany Heavy Industry as an example, and finds that enterprises can achieve cost reduction and efficiency increase, improve profit level and increase market share by means of digital transformation. Under the empowerment of digitization, enterprises that achieve cost reduction and efficiency gains through digital transformation have higher productivity.[58]

4.2 Response to the External Environment

The resource-based view cannot fully explain the source of competitive advantage. Resources alone cannot maintain sustainable competitive advantage. Therefore, on the basis of the resource-based view, there is the development of the capability-based view. However, the capability-based view ignores the influence of the external environment. Therefore, the dynamic capability theory that integrates the internal factors of the enterprise and the external environment has gradually become a research hotspot. [19] Under the digital background, the industrial structure, market opportunities and competitive environment outside the enterprise have undergone profound changes. Relying solely on industry positioning or the accumulation of resources and capabilities is not enough to help gain

competitive advantages. Enterprises need to build dynamic capabilities to respond to the external environment. Dynamic capability refers to the ability of an enterprise to integrate, establish, and reconstruct its internal and external capabilities in response to rapid changes in the external environment.[59] It can be understood as a lasting, unique ability that can quickly respond to changes in the external environment and bring sustainable competitive advantages to the enterprise.[60] For enterprises, improving their dynamic capabilities in the process of digital transformation can help them gain a competitive advantage. [8]

In the context of the digital era, the external environment of enterprises has undergone drastic changes, and the core of dynamic capability theory is to pay attention to the dynamic characteristics of the environment and the adaptive adjustment to cope with environmental changes.[61] This theoretical framework can well explain how enterprises respond to rapid changes in technology and market.[62], and thus become an important way for enterprises to gain competitive advantage. The digital transformation of enterprises can effectively help enterprises build dynamic capabilities. In the process of transformation, enterprises will adjust their organizational structure and corporate culture, which will be conducive to the improvement of dynamic capabilities.[63] Dynamic capabilities can not only help enterprises to complete the acquisition and distribution of data resources, meet customer needs and predict customer behavior, help enterprises to gain competitive advantages, but also help enterprises to carry out data-based native process development and digital upgrade based on existing processes, thus affecting the competitive advantages of enterprises. [64]

4.3 Adjusting the Competition and Cooperation Relationship

In the digital age, enterprises cannot focus on their own competitive advantages as in the past, and are limited to the acquisition of their own profits. They need to transform the competitive relationship with other enterprises into a cooperative symbiotic relationship. [31] Because companies alone are no longer enough to meet the needs of consumers, companies should work with stakeholders to create value and use group advantages to consolidate their own industry advantages.[52] Therefore, enterprises can adjust the competition and cooperation relationship outside the enterprise by building a digital supply chain and digital platform, and cooperate with stakeholders to achieve value creation and win-win cooperation.

As the competitive environment of enterprises becomes more and more dynamic, the relationship between enterprises becomes more and more complex, and the competition between individual enterprises gradually evolves into the competition between supply chains. The integration of the supply chain is complex, and digitization has a positive impact on the completion of many links in the supply chain.[14] At the same time, the digital transformation of the supply chain promotes the integration of enterprises and industries. The exchange of information between enterprises and competitors in the same industry, upstream and downstream of the supply chain will become more and more frequent. Enterprises can obtain more information in the industry, so as to be fully prepared to cope with various risks from the fierce competitive environment.[65] Wang and Xie (2022) [66] found that the upstream and downstream of the industrial chain reflect a symbiotic relationship, and its digital synergy is more worthy of attention than the digitization of individual organizations. For enterprises with higher market position in the industry, relying on richer resources, building a digital supply chain under the digital empowerment, and then becoming the core node enterprise, is the key to maintaining a competitive advantage.

At the same time, the rise of digital platforms has changed the competitive strategy of enterprises. The platform ecosystem can help enterprises form a competitive advantage based on network effects and provide a new path for enterprises to gain competitive advantage. [50] Through cooperation with other platforms or enterprises, enterprise platforms are conducive to obtaining synergistic advantages, [9] and more and more enterprises choose to participate in the construction of digital platform ecosystem. On the one hand, because the digital elements need high fixed cost investment to play a role, it is difficult for enterprises to complete the digital transformation alone, and actively seek cooperation with the core enterprises with strong digital strength ; on the other hand, even large

enterprises with rich resources are difficult to rely on the power of individual enterprises to achieve digital goals[67], and cooperation based on digital platforms can achieve win-win results. For example, Rococo Group is a leading enterprise in the field of industrial design. However, due to factors such as weak digital capabilities and lack of talents, the digital transformation process of the company is slow. However, the company has expanded its own cooperation network and achieved value co-creation through cooperation with nails. Rococo promotes digital transformation with the help of nails. The digital management workbench built by the two together not only helps Rococo achieve cost reduction and efficiency, but also helps nails enter new industry areas.[68]

4.4 Demand Response and Product Innovation

In the context of the digital era, simply meeting the basic needs of consumers is no longer enough to maintain the competitive advantage of enterprises. Digital technology releases consumers ' time. With the expansion of time dimension, consumers ' needs show a trend of personalized development.[31] Enterprises ' products (services) must always grasp market trends and meet consumers ' needs. Under the empowerment of digitalization, enterprises can realize the rapid reflection of market demand, and then gain competitive advantage. The use of digital technology can help companies fully grasp the data of consumers and accurately grasp the needs of consumers. [69] From the perspective of demand identification, enterprises use digital infrastructure such as the Internet of Things platform to collect and analyze large-scale real-time granular data, use analysis tools such as artificial intelligence to understand hidden information, and data analysis departments through data cleaning, screening, analysis, and finally sharing data information with other departments to identify untapped market demand.[70]

At the same time, efficient product innovation is conducive to enterprises to stand out in the market and help enterprises gain a competitive advantage.[71] Digital transformation can accelerate the speed of product upgrading and enhance the market competitiveness of products. [72] Wang and Jiang (2023) [71] believed that digital transformation can promote product innovation from the application of data, the improvement of collaborative efficiency, and the reduction of R & D costs. At the same time, the ability to use information technology will affect the company 's new product development process. [73] In the process of digital transformation, enterprises can use digital technology to realize the transformation and upgrading of production and sales mode, and gain competitive advantage through the development of new products. [17]

5. Summary and prospect

Technological change itself is not important, but if it can affect competitive advantage and industrial structure, it is very worthy of attention. [74] There is no doubt that the rapid development of digital technology has had a profound impact on the existing industrial structure, and the competitive advantage of enterprises is no exception. Therefore, when looking at this extensive and far-reaching change caused by the progress of digital technology, we should not only focus on the micro level such as enterprise performance, but also pay attention to it from a more macro perspective. Therefore, it is necessary to incorporate competitive advantage into the research scope when exploring the impact of digital transformation on enterprises. The impact of digital transformation of enterprises on competitive advantage is multifaceted. Based on the perspective of industrial organization theory and resource-based theory, this paper discusses the impact of digital transformation on the source of competitive advantage, and discusses the ways in which enterprises gain competitive advantage through digital transformation from the perspective of optimizing internal conditions, responding to external environment, establishing symbiosis concept, and demand response and product innovation. In general, the research framework of this paper is shown in Figure 1.

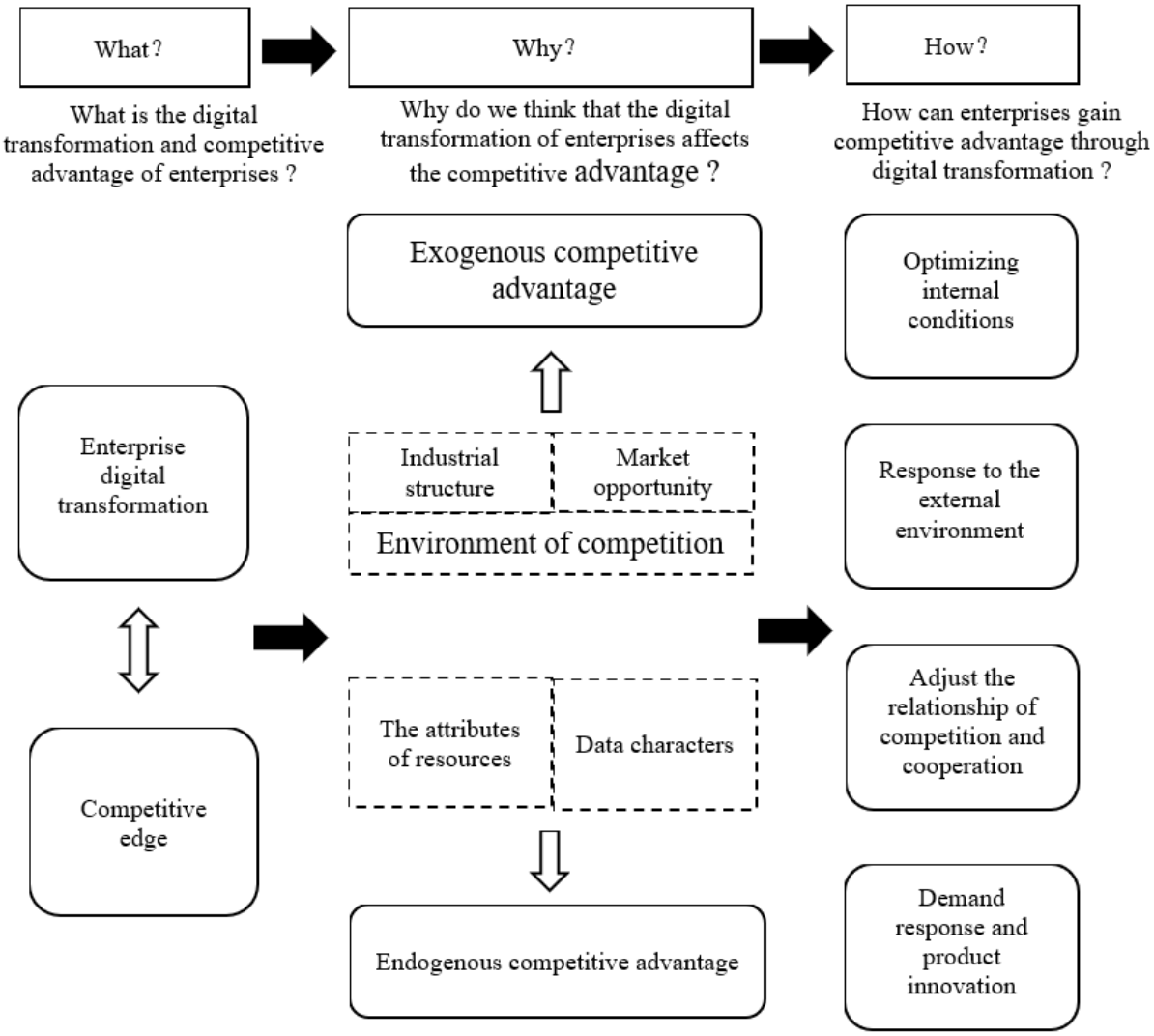

Figure 1. Study framework

The relevant theories of competitive advantage have been very rich, but the sources and acquisition methods of competitive advantage have changed greatly under the digital background. The existing research on this aspect is still relatively weak. In the future, we can further explore from the following three aspects:

First, when exploring the impact of digital transformation on competitive advantage, we can consider the impact of external environmental factors such as the market competition pattern and dynamic competitive environment of enterprises. Under the background of digitalization, it is not only enterprises that are affected, but also the industrial structure. The external competitive environment of enterprises has undergone tremendous changes. Therefore, when discussing the impact of digital transformation on the competitive advantage of enterprises, we should not only focus on the internal factors of enterprises, but also fully consider the impact of the external environment of enterprises. For example, the dynamic capability theory focuses on the changes in technology and the external market of enterprises, emphasizing the acquisition of competitive advantages in a dynamic environment. This paper summarizes the impact of digital transformation of enterprises on the external environment, as well as the impact of dynamic capabilities on competitive advantages, and demonstrates the importance of building dynamic capabilities. However, the mechanism of dynamic capabilities affecting competitive advantages remains to be further studied. At the same time, in the complex and changeable environment, the competitive advantage of enterprises is difficult to maintain for a long time. Therefore, how to use digital transformation to shape the dynamic competitive advantage of enterprises deserves further attention.

Second, as more and more enterprises integrate into the wave of digital transformation and the deepening of digital transformation, the relationship between cooperation and competition of enterprises has undergone subversive changes. When exploring the impact of digital transformation on the competitive advantage of enterprises, it is necessary to fully consider the competition and cooperation relationship of enterprises under the digital background. For example, the rise of digital platforms has changed the traditional value creation model. Enterprises need to pay close attention to changes in the external environment, build cooperative relationships with stakeholders, and create value together. However, while emphasizing value co-creation, digital platforms also need to focus on the rational distribution of value.[50] In the future, we can further study how the leaders and participants of the platform can give full play to their own capabilities to obtain or maintain competitive advantages.

Third, digitization challenges the theory of competitive advantage in strategic management. This paper explores from the perspective of industrial organization, resource-based view and dynamic capability view. In the future, we can further explore the impact of enterprise digital transformation on competitive advantage around these three theories. It can also expand the theoretical perspective and enrich the research content with other theories. For example, when exploring the impact of enterprise digital transformation on competitive advantage based on the resource-based view, this paper mostly looks at the challenges initiated by digital transformation from the perspective of data resources. Data resources are important, but the digital transformation of enterprises is also inseparable from digital technology, digital infrastructure and other necessary conditions. In the future, more in-depth research can be carried out in combination with the characteristics of enterprise digital transformation to reveal the impact of digitalization on competitive advantage. For another example, industrial organization theory and resource-based theory are the core contents of strategic management, especially resource-based theory. At present, many research contents such as dynamic capability view, dynamic resource view, knowledge-based view and resource arrangement have been derived, which provides more theoretical perspectives for exploring the impact of digitization on competitive advantage. In the future, these theories can be combined to further enrich the existing research.

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