Driving Elements of Enterprise Digital Transformation Based on the Perspective of Dynamic Evolution

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Abstract: Under the current setting of a booming digital economy, digital transformation (DT) has become the only strategy available to enterprises for their development; however, it has also become a common concern in domestic and foreign academic circles. Focusing on the specific process of enterprise DT, this study builds a theoretical research framework that comprises input (I)–process (P)–output (O), and creatively divides process into three evolution stages (i.e., informatization, datafication, and intelligentization) in a dynamic manner. It selects Ping An Group, Suning Group, and Midea Group for case analysis. Through a dynamic comparison of the DT processes of the three enterprises from different fields, this study probes into the driving elements of their DT at different stages. The following differences were found: crucial driving elements originate from the technical and environmental levels during the informatization stage, the technical and participant levels during the datafication stage, and the technical and organizational levels during the intelligentization stage, with the technical driving element running through all the stages of enterprise DT. From the perspective of multiple cases, this study discusses the driving elements of enterprise DT and proposes a theoretical framework of dynamic evolution as a theoretical reference for practices in enterprise DT.

Keywords: digital transformation; I–P–O evolution model; driving elements; dynamic evolution

1. Introduction

The scale of China’s digital economy reached RMB 39.2 trillion yuan in 2020 (i.e., an increase of 3.3 trillion yuan from the previous year), accounting for 38.6% of the gross domestic product and registering a year-on-year increase of 2.4 percentage points. The vigorous development of the digital economy has enabled it to become a major economic pillar in China and a new driver of its high-quality economic development. Traditional enterprises that aim to ensure their own competitive force are in urgent need of changing their own model to achieve digital transformation (DT) and upgrading.

The so-called “enterprise DT” refers to the transformation process that involves the all-round remodeling of the core business, strategies, organizational structure, and business model of an enterprise by utilizing digital technologies (e.g., the Internet, artificial intelligence (AI), and big data) on the basis of digitalized conversion and upgrading to build a value creation system with data as the core driving factor [1]. For a traditional enterprise, the DT strategy plays a crucial role in maintaining its competitive edge. Meanwhile, with the gradual increase in the proportion of the digital economy in the national economic system, enterprise DT has become a trending issue of study in the current field of strategic management. Existing studies on DT in the academic circle have focused on three aspects. First, they explore the value creation of DT in traditional enterprises from the perspective of the market economy’s development [2–4]. For example, a systematic review of the literature conducted by Ivanir et al. [5] (2022) on the basis of the preferred reporting items for systematic reviews and meta-analyses method determined the degree of contributions made by DT technology to the sustainable development of a company. Ada et al. [6] (2022) identified four public values of DT by investigating the specific methods of digital strategy.
formulation and implementation. Second, they explore the development trend and progress path of DT from the perspective of its course of transformative development [7–10]. For example, Joan et al. [11] (2022) summarized the development trend of intelligent integration of digital pathology (DP) and artificial intelligence (AI) by retrieving a number of patent reports. And Ren [12] (2020) summarized the application status of sensory interaction and analyzed the future development trend of digital art. Third, they explore the influencing factors of DT upgrading from the perspective of the transformative development results of DT [13–16]. Zhang et al. [17] (2022) built a mechanism of action (MOA) model on the basis of a resource-based view and resource dependency theory to study the success factors and influencing mechanism of the DT of Chinese enterprises. Inhye et al. [18] (2022) used the systematic literature review method in analyzing driving elements related to existing research on DT and economic growth.

At present, enterprise DT is still in its infancy for all industries, and most enterprises lack complete practical experience in DT. How to further implement DT has become a major conundrum in enterprise DT. Existing studies have become aware of the significant benefits of the DT strategy for the development of enterprises, and they have begun to analyze the value created by the activation and implementation of enterprise DT [19–21]. However, these studies have failed to delve sufficiently into how to drive and operate the DT process, and only a few of them can provide practical or theoretical reference to enterprises.

On the basis of the preceding analysis, we intend to leverage theory of dynamic analysis to discuss the specific driving elements of enterprise DT from the perspective of dynamic evolution. In the selection of cases, we selected three enterprises with outstanding characteristics during different stages of DT as our research objects in accordance with the features of the study model to investigate the general evolution laws of enterprise DT. Our study aims to enrich relevant theories about the driving principles of enterprise DT and provide a reference for enterprises in their DT practices.

2. Study Design

2.1. Study Method

For a systematic study of the driving forces of enterprise DT, we use the “input (I)–process (P)–output (O)” theoretical model framework to divide the content of the study into the three levels: input, process, and output. For the input level, we examine the environment of driving elements in the process of transformation; for the output level, we summarize the MOA of driving elements during the transformation process; for the process level, we divide the process into three stages, namely, informatization, datafication, and intelligentization, in accordance with the development characteristics of the DT process. On this basis, we conduct a case analysis of the study objects. Such a method is selected in this work because the study of DT is currently in its initial stage; in particular, the interpretation of many phenomena that arise in the DT process is still insufficient [22–25]. Our study uses dynamic evolution as the core benchmark, and the development course as the time axis in examining enterprise development status at different time nodes. They can help explain the dynamic logic and laws of enterprise DT from a time-omniscient perspective to provide a reference for the perspective value in the study of such issues. Meanwhile, in accordance with the theoretical definition of digitalization [26], the processing of target information is known as informatization, the computing conducted on the basis of information is known as datafication, and the understanding and utilization of these data is known as intelligentization. Accordingly, the process of a case study is divided into three stages. The dynamic analysis of cases provides a clearer look into the inherent laws of the enterprise DT process.

2.2. Selection of Research Objects

After comprehensive consideration of the characteristics of the issues being studied, the purpose of the study, and the availability of data, we selected Ping An Group, Suning Group, and Midea Group, three Fortune 500 enterprises belonging to the industries of
financial service, retail, and manufacturing, as the objects of the case study. The reasons for their selection are as follows. First, the driving elements of the stages of enterprise DT that are investigated here fall within the study of a dynamic process. The industries of financial service, retail, and manufacturing exhibit typical representativeness in economic industries; hence, the selection of study objects from different industries for a horizontal comparative analysis imbues the findings with higher persuasion and universality. Second, all three enterprises have successfully implemented the DT strategy. As early as 2013, the Ping An Group presented its “technology leading finance” strategy, and it became the pathfinder of the digitalized development of the industry. The Midea Group started to implement its “632 Project” in 2012 to launch a series of operation reforms in enterprise DT. It achieved marked results in the customized services of digital intelligentization. The Suning Group has persisted in combined online/off-line development. It introduced its “Cloud Business” development plan in 2013, which involves the all-round use of technologies to empower physical retail. The group also created the digitalized platform of “Suning.com” for the expansion of its business market.

2.3. Data Collection and Processing

In accordance with the principle of triangulation, we collected the data necessary for case analysis by using different methods for hierarchical cross-verification to ensure that data are reliable and complete. The selected data fall into two categories: data from interviews at multiple stages and data from multiple channels. The two types of data exhibit satisfactory complementation. The truthfulness and creditability of the data were improved through mutual verification.

(1) Data from interviews at multiple stages. These data include those collected from interviews with relevant managerial staff members of the three enterprises in two stages: Stage 1 includes interviews that cover the growth process, development experience, business structure, and business model of the three enterprises. These interviews investigate whether the selected cases dovetail with the direction of the study. The subsequent feedback and analysis are based on the content of the interviews to deepen the understanding of the issues being studied and optimize and adjust the process of subsequent interviews. Stage 2 involves separate interviews with the aforementioned staff members conducted in a hierarchical manner to probe deeply into the different nodes of the transformation processes of enterprises with regard to the issues and core targets of this study, obtaining the targeted deep-layer data.

(2) Data from multichannel panels. These data include 2D data from the dimensions of time series and cross section in the transformative development process of enterprises. We sorted out data available on public platforms, including the websites of the companies, articles in the official accounts of China National Knowledge Infrastructure and WeChat, video excerpts, new reports, and the report forms of enterprises to extract valid relevant data. Then, data information was classified for analysis, arrangement, and storage by using processing software, e.g., Microsoft Excel and SPSS.

(3) Data processing. The collected data were processed and operated in accordance with the principle for the scientific, reasonable, accurate, effective, and pertinent processing of data. Step 1: irrelevant data were eliminated with the theme of the study as core. Step 2: on the basis of the dynamic process of the transformative development of enterprises, the DT data of the three aforementioned enterprises were divided into three stages (informatization, datafication, and intelligentization) for classification and integration. Step 3: the data and themes of each stage were compared and corrected, focusing on the degree of consistency among data and themes. This addition/deletion operation was repeated to ensure the accuracy and pertinence of the data.

2.4. Data Encoding

In the data collection process, interview data underwent multilevel encoding and were divided into Levels 1, 2, and 3 codes on the basis of the condensed content of interviews.
Level 1 codes involve the labeling process of the obtained original data from the interviews for classification and summarization in accordance with the general categories of the data. Level 2 codes involve the extraction and summarization of the data on the basis of the classified Level 1 codes to achieve copolymerization from the original data. Level 3 codes involve further concentration and extraction of the data on the basis of Level 2 codes to obtain labels at the summarization level. The specific code structure is illustrated in Figure 1.

Figure 1. Data code.

3. Theoretical Framework

On the basis of the I–P–O model and the theoretical framework of dynamic capability [27–29], we examined the existing DT driving elements of enterprises and divided the case analysis into three levels: input, process, and output. The specific theoretical framework is illustrated in Figure 2.

First, in accordance with theory of sociotechnical system [30], driving elements at the input level were sorted out to analyze the elements that triggered changes in the process of enterprise DT and the degree of their relevance to economic development for the ultimate establishment of the four driving elements (technology, organization, participant, and environment) and some units of the driving elements. Second, the informatization, datafication, and intelligentization stages were analyzed in turn using the system of driving elements as foundation [1] at the process level of enterprise DT. Three representative enterprises from different fields were selected to match the transformation stages for separate analysis and to determine the general laws of the enterprise DT process. Lastly, summarization was implemented at the output level to elaborate the MOA of different driving elements in the transformation process.
Figure 2. Theoretical framework of enterprise DT.

4. Case Analysis and Discussions

4.1. Input Elements of Enterprise DT

In accordance with the theory of sociotechnical system, we sorted out and summed up the input elements (I) of existing enterprise DT from four levels—namely technology, organization, participant, and environment.

4.1.1. Input at the Technical Level

Input includes the Internet of things (IoT), big data, AI, Internet+, cloud computing, and other emerging digital technologies. Given the continuous innovations and development of network technology, most enterprises have gradually introduced advanced external technologies to change their business model and realize their upgrading as an enterprise [31–34]. Digital technologies (e.g., AI, big data, cloud computing, and blockchain) have improved the operation and management efficiency of enterprises [35,36], reformed their organizational structure and business model in an innovative manner [37], and greatly promoted the sustainable development of the industry [38].

4.1.2. Input at the Organizational Level

Input includes organizational resources, culture, and strategy. First, the innovation and integration of organizational resources play a foundation-laying role in enterprise DT [39,40]. According to Raffatovich et al. [41] (2020), in the age of the digital economy the transformative development of the management mode of enterprise resources exerts
a supporting effect on overall digitalization. Second, the integration and innovation of organizational culture have a driving effect on enterprise DT [42–44]. Lastly, the rapid development of the digital economy enables innovations in organizational strategy to play a guiding role in enterprise DT [45–47]. In the digital age of fierce competition, the Internet has endowed enterprises with the capability to expand at high speed and low cost. The strategic decision of an organization frequently influences the overall development plan of an enterprise within a short period.

4.1.3. Input at the Participant Level

Input includes the decision-making of leaders, awareness of employees, diversified innovation of teams, and demand of consumers. First, the decisions made by the leaders of an enterprise play a dominant role in the DT process [48]. Anne et al. [49] (2021) believe that leaders must develop DT thinking in the application of digital technology. Second, the awareness and competence of employees, which plays a crucial driving role in the digital change of enterprises, is an important factor that determines whether DT management measures can succeed [50–52]. Whether an enterprise can achieve digitalization depends on the help and commitment of its employees [53]. Horvath et al. [54] (2019) discovered that the passive attitude of employees seriously hinders the introduction of digital technology. In addition, the diversified innovation of teams has created opportunities for DT. Organizational resources, capabilities, and structure are reallocated through innovation in an organization, while efficient integrated digital management is achieved through innovation in management [55–57]. The combination of the two boosts enterprise DT. Lastly, the demand of consumers also plays a guiding role in DT [58]. Consumers gain access to information about enterprises via the Internet for selective consumption. Accordingly, enterprises can communicate with consumers through multiple media channels to implement DT.

4.1.4. Input at the Environmental Level

Input includes environmental changes, policy support, and legal regulation. At present, the international environment is becoming increasingly complex and economic globalization has encountered a backwash; thus, seeking breakthroughs has become necessary for digital development [59,60]. For purpose of their DT, enterprises must clearly recognize the development trend and strengthen their market shares [61], improve their hardware and infrastructure [62], make innovations in the development of their business mode [63], and advance industrial integration. Under the current backdrop of the digital economy, the uncertainty of policy changes has brought the possibility of increased digital innovations to enterprises [64]. The corresponding policy support exerts a significant incentive effect on enterprise DT [65,66]. Meanwhile, during the DT age that covers the economic and social fields, laws continue to stably act as the moderator of the social economy and other social processes [67] to ensure the stability of transformation activities.

4.2. Process of Enterprise DT

In accordance with the aforementioned model and theoretical framework, we analyzed the DT stages of three representative enterprises, i.e., Ping An Group, Suning Group, and Midea Group, to study their digitalization targets and their specific driving elements at different stages of transformation. We determined a path for the generalized development of enterprise DT from informatization to datafication and then to intelligentization.

4.2.1. Strategic Explorations in the Informatization Stage

In the informatization stage of DT, enterprises must develop a multidimensional perception of the current environment [68] to determine the general development trend of their industries in consideration of multiple influencing factors and the start of the DT process with digital technology. The development course of the digital information of the Ping An Group matches this stage well, because the enterprise came up with its DT
concept and implemented its strategic layout as early as 2006, becoming a trailblazer on the DT road of Chinese enterprises and successfully achieving its DT. Under the effect of the rapid development of the Internet 2.0 technology and the policies introduced by the state to support the digital economy, the Ping An Group started to implement the digital reform of its enterprise as its major development strategy in 2006, unveiling the informatization stage of DT. The digital economy was rising at that time when the state released its strategic plan for DT development. The managers of the enterprise became keenly aware of the direction of economic development and introduced digital technology into the development of their enterprise. The combination of digital technology with business management has effectively enhanced business efficiency and promoted business innovation and development. The use of multiple digital computing tools in an attempt to achieve digital computing in traditional business has improved overall work efficiency. The analysis of big data has led to the summarization of the development laws of the industry and decisions made on the strategic direction of the enterprise. Table 1 lists the specific codes.

Table 1. Typical citations of the DT informatization stage of the Ping An Group.

<table>
<thead>
<tr>
<th>Level 3 Coding</th>
<th>Level 2 Coding</th>
<th>Level 1 Coding</th>
<th>Introduction to Typical Evidence</th>
</tr>
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<tbody>
<tr>
<td>Digital Management</td>
<td>Digital technologies manage enterprise business processes</td>
<td>“I think Internet technology can be used to manage and innovate existing business processes, which can promote business development”</td>
<td></td>
</tr>
<tr>
<td>The dividend of digital innovation</td>
<td>“Technological innovation brings enterprise management-innovation, technological innovation brings enterprise operation innovation”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology Innovation</td>
<td>Complete business data calculation with digital tools</td>
<td>“Complex business data calculation with the help of network tools, can effectively improve the efficiency of our work”</td>
<td></td>
</tr>
<tr>
<td>Big Data Application</td>
<td>Use big data to decide the strategic direction of the enterprise</td>
<td>“Through big data analysis, summarize industry development rules, identify market opportunities and challenges, and make correct decisions in advance”</td>
<td></td>
</tr>
<tr>
<td>Development of Internet of Things</td>
<td>Strengthen the combination of digital technology and business application</td>
<td>“It is of great significance to apply some technologies to our various businesses and form business networks to strengthen business processes for the development of various businesses.”</td>
<td></td>
</tr>
<tr>
<td>National Policy Guarantee</td>
<td>Policies encourage digital transformation of enterprises</td>
<td>At that time, the state issued a strategic plan for digital transformation and vigorously supported enterprises to try to carry out digital transformation</td>
<td></td>
</tr>
<tr>
<td>Environmental Change</td>
<td>Digital social development environment changes</td>
<td>“Digitization is the basic project to promote social progress and productivity in the 21st century”</td>
<td></td>
</tr>
<tr>
<td>Transformation of External Environment</td>
<td>Digital market economy environment changes</td>
<td>As early as the end of the last century, the development trend of economic globalization has become a foregone conclusion. In the future, enterprises have to face diversified and complicated global market fluctuations.</td>
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</tbody>
</table>
Keeping up with the development trend of the industry and guided by environmental perception and economic development, the Ping An Group introduced digital technology, integrated its online/off-line business and resources, and coordinated its overall distribution strategy under the initiative “Ping An Digitalization 1.0” from 2006 to 2016, gradually realizing the combination of digital technology with traditional financial business. First, the Ping An Group created a digital strategic plan, which regarded AI, blockchain, and cloud computing as the three core technologies in the future development of the enterprise. Second, the group developed basic digital technology and received support from physical technology. In 2008 and 2013, the Ping An Group set up Ping An Technology and Ping An Cloud, respectively, to provide DT to its subsidiaries with support in IT planning, development, and operation services. It propped up its cloud products for a huge business volume and pushed forward the process of Ping An digitalization. Then, the Ping An Group explored the development of innovative digital technology to provide continuous power for its subsequent DT strategy. In 2014 and 2016, it exerted itself in the AI field by joining the Blockchain Finance Development Alliance and initiating research on Ping An AI to develop its digital technology continuously. Meanwhile, it partnered with more than 40 financial institutions around the globe in jointly exploring the application of blockchain to the financial service industry. Lastly, the Ping An Group achieved the extension of its business ecology by taking advantage of market vacancy dividends during the early period of transformation and leveraging digital technology in exploring the boundaries of broadened services. The specific development is illustrated in Figure 3.

The preceding analyses indicate that an enterprise in the early days of DT development (i.e., informatization stage) is influenced by two driving elements: technology and environment. During this stage, an enterprise tends to be influenced by changes in environmental factors, including the development of the market economy, policy support, and application of technologies before adjusting its own strategic development plan. An enterprise will first formulate a basic plan for digital construction in accordance with the characteristics of its own industry to create its core digital technology and support the
subsequent digitalization process. Then, on the basis of its existing digital construction, an enterprise will further expand the scope of its technical development for the vigorous research and development (R&D) of emerging digital technologies (e.g., AI, blockchain, and IoT) to achieve the dynamic updating of its digital technology. In the end, under the joint operation of business and digital technology, an enterprise will leverage digital technology to explore the boundaries of broadened services.

4.2.2. Strategic Expansion in the Datafication Stage

During the datafication stage of DT, an enterprise must continue the expansion of business and services on the basis of its development during the informatization stage and take more targeted reform measures to boost the digitalization process further [69]. As the flagship of China’s retail industry, the Suning Group is highly representative of this stage. During its DT process, this group made vigorous innovations in targeted business, gradually integrated digital technology into business services, and set up a network for in-depth relations between the enterprise and its customers to realize high relevance of business data. Meanwhile, the Suning Group enthusiastically mobilized the awareness of its employees and the diversity of its teams in guiding the development of organizational culture. Starting in 2007, the Suning Group arranged its digital strategic layout and went into continuous and deep-going cooperation with IBM to innovate its IT management and application. In 2015, the group indicated the desire to continue upgrading its off-line business through the Internet and IoT technology to promote the digitalization of business. Compared with other enterprises, the Suning Group can make a digital calculation of existing operation data to create a digital value, realize the integrated management of its digital platform, and use technology to empower innovations in its business model. In addition, the Suning Group continuously adjusts its organizational structure to adapt itself to the dynamic digital management mode, use its leaders’ decision making to guide the overall development of the enterprise, and take advantage of the unique participant’s influence effect. Table 2 provides the specific codes.

To keep up with technical developments in the age of Internet 3.0, the Suning Group made daring decisions and innovations to satisfy the consumption needs of the time, developed its diversified teams, and realized datafication innovations based on a platform. In a period of 6 years (2010–2016), the Suning Group initiated Suning Digitalization 1.0 and then successfully upgraded it to 2.0 in its move toward a new age of digitalization. First, the Suning Group expanded the basic advantages of IT and facilitated the platform-based development of data. In 2010, it launched a new business model of innovative interaction on the digital consumption platform of “Suning.com,” preliminarily achieving the integrated management of online/off-line business. Thereafter, the Suning Group stepped up the deep-going integration of data and introduced high-tech digital technology to help in business implementation. In 2015, the group launched Suning 2.0 to complete the integration of big data gradually and achieve a deep-going integration of online/off-line business. On the basis of its existing platform, Suning introduced IoT technology to cement the interconnection of data. Finally, the Suning Group invested heftily in the R&D of a smart system to accelerate its entry into the age of smart services. In 2016, it developed the smart supply chain system as part of its preparations for its future “Smart Retail” services. The specific development is illustrated in Figure 4.

The preceding analyses show that the development of an enterprise during the datafication stage of DT is influenced by two driving elements: technology and participants. During this stage, the leaders of an enterprise must promptly adjust its development strategy in accordance with its development needs, vigorously innovate in the application of digital technology, and build a targeted team of diversified driving. First, an enterprise undergoing DT must expand early deployment advantages in its IT infrastructure and accelerate the integration of online/off-line business to achieve platform-based management. Second, it must strengthen the deep-going integration of data to achieve integrated business management and introduce emerging technologies (e.g., IoT) on the basis of its
existing Internet platform to achieve a high degree of data interconnection. Lastly, it must implement the innovative development of a smart digital system, move closer toward more advanced intelligentization, and succeed in the basic construction of subsequent “smart business”.

Table 2. Typical citations of the Suning Group during the datafication stage of DT.

<table>
<thead>
<tr>
<th>Level 3 Coding</th>
<th>Level 2 Coding</th>
<th>Level 1 Coding</th>
<th>Introduction to Typical Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Application of Digital Technology</td>
<td>Digital technology layout of innovative management</td>
<td>“In 2007, Suning cooperated with IBM and launched the “Blue Deep Plan” to establish close cooperation in various fields of enterprise digital management.”</td>
</tr>
<tr>
<td>Technology Innovation</td>
<td>Science and technology innovation enabling business innovation</td>
<td>“When Suning was determined to carry out digital transformation, it began to introduce a large number of scientific and technological talents to enable business model innovation with science and technology.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The digital development trend of consumer market arrives</td>
<td>“Today’s retail industry is developing towards the direction of digitalization, interconnection, and intelligence. Consumers pay more attention to experiential consumption, and the era of smart retail has arrived.”</td>
<td></td>
</tr>
<tr>
<td>Internet of Things Applications</td>
<td>Internet of Things technology promotes business digitization</td>
<td>“Since 2015, we have continuously upgraded offline business through Internet technology and Internet of Things technology to further promote the development of digital business transformation.”</td>
<td></td>
</tr>
<tr>
<td>Diversified Team Innovation, Consumer Demand</td>
<td>Innovation of products and services based on consumer demand</td>
<td>“For the upgrading of consumption, we mainly consider the three aspects of diversification of channels, meeting diversified needs and taking service as the core to continuously innovate and develop.”</td>
<td></td>
</tr>
<tr>
<td>Participant Impact</td>
<td>Leader Decision Making</td>
<td>The role of the leader in guiding the overall development of the enterprise</td>
<td>“During the period from 2009 to 2015, we carried out several rounds of organizational structure adjustment internally. A more successful ‘large enterprise’ transformation.”</td>
</tr>
<tr>
<td></td>
<td>Enterprise Employee Consciousness</td>
<td>Employee unit consciousness plays an important role in the implementation of enterprise strategy</td>
<td>“With the deepening of the transformation, Suning’s various business segments are like a ‘joint fleet’, the headquarters is a flagship, and each independent business unit below is like a warship fighting independently.”</td>
</tr>
</tbody>
</table>
4.2.3. Fulfillment of Strategy in the Intelligentization Stage

During the intelligentization stage of DT, an enterprise must maintain the dynamic updating of organizational resources and structure to ensure that it can make a timely response to a rapidly changing environment [70] and ultimately achieve a value change for the enterprise. For this transformation stage, the Midea Group, a benchmark in China’s manufacturing industry, has good reference value for research. By using intelligentization technology (e.g., IoT and AI), this enterprise built an organizational system with the capability for smart operation and successfully realized the shift toward overall intelligentization. Since launching its DT in 2013, the Midea Group has gradually fulfilled the strategy for digital change from Digital 1.0 to Digital 2.0 and accumulated many products in the process of transformation, all of which have realized external output. By 2016, the Midea Group completed basic DT and was in urgent need of transitioning toward the intelligentization stage. Under such circumstance, it immediately started the new age of “Smart Midea” to strongly develop smart technology for innovations in products and services and the dynamic adjustment of its business and organizational structures to ensure the optimized utilization of resources. Table 3 provides the specific codes.

Holding onto the ideal of “smart” development during the intelligentization stage of DT, the Midea Group integrated intelligentization technology into its business and used intelligent algorithms in the customization of services to achieve the intelligentization process of its business. The Midea Group has achieved the physical output of its intelligentization services since 2016, and it is working toward full-scale digitalization and intelligentization. First, in 2016–2017, the Midea Group built an intelligent decision-making system on the basis of existing digital technology and set up the company’s “Midea Cloud”. In this manner, the use of an AI algorithm to drive a smart scheduling service (e.g., C2M customization) and output digital products and services that had been achieved became possible. Second, the Midea Group enhanced its industrialized Internet services by rebuilding the framework of organizational resources to increase value relevance among various professional jobs and realize value change of the enterprise. In 2018–2019, the group completed the creation of the Midea Industrial Internet, released Midea M.IoT1.0, and dynamically adjusted its organizational structure and communication channels by relying upon the revolutionary
technology of the industrial Internet to realize the exchange of information at various links. Lastly, the Midea Group started its long-term development strategy of “all-round digitalization and intelligentization.” That is, on the basis of existing digitalization, it will continuously use the emerging digital technology for in-depth integration of its data resources and drive the enterprise into a sustainable transformative development toward a data-driven technological group to achieve the innovations in its business model, which is fully digitalized and intelligentized. The specific development is illustrated in Figure 5.

Table 3. Typical citations of the Midea Group during the intelligentization stage of DT.

<table>
<thead>
<tr>
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<th>Level 1 Coding</th>
<th>Introduction to Typical Evidence</th>
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</thead>
<tbody>
<tr>
<td>Fundamentals of Digital Technology</td>
<td>The existing digital infrastructure paves the way for the subsequent transformation</td>
<td>“The digital transformation of Midea has been gradually deepened in several stages since 2013. From 2013 to 2015, it was digitalization 1.0, realizing the implementation of one Midea, one system and one standard through 632-Project.”</td>
<td></td>
</tr>
<tr>
<td>Technology Innovation</td>
<td>Mature digital products continue to deliver value</td>
<td>“In the process of digital transformation, Midea has accumulated many products, all of which are exported through Midea Intelligence. It mainly includes intelligent manufacturing suite, digital marketing suite and PaaS (platform as a service) platform.”</td>
<td></td>
</tr>
<tr>
<td>Artificial Intelligence (AI) Technological Innovation</td>
<td>Digital technology provides a reference for enterprise decision making</td>
<td>“At present, intelligent technology has been able to replace manual to complete the independent judgment and decision of some work. With the help of these emerging technologies, it can provide reference for the future strategic decision of enterprises.”</td>
<td></td>
</tr>
<tr>
<td>Organizational Strategy Decision</td>
<td>Basic digital dividend will disappear, intelligent reconstruction is the new direction</td>
<td>“The digital growth dividend has become a thing of the past. We should seek to split the stock and reconstruct the three links of development, production, and sales intelligently.”</td>
<td></td>
</tr>
<tr>
<td>Integration of Organizational Resources</td>
<td>Dynamically adjust the organization’s business and structure to ensure optimal utilization of resources</td>
<td>“Start from the business side first, determine the optimal process and standard, then determine the data standard and system function construction, and then let the business process according to the determined optimal process to change.”</td>
<td></td>
</tr>
<tr>
<td>Organizational Culture Innovation</td>
<td>Technological progress drives organizational culture change</td>
<td>“In the future, we hope our employees can further strengthen the simple, efficient and pragmatic value orientation, and make progress together with the technological transformation of the enterprise, with open and innovative ideas.”</td>
<td></td>
</tr>
</tbody>
</table>
The preceding analyses indicate that the development of an enterprise during the intelligentization stage of DT is influenced by two driving elements: technology and organization. During this stage, the innovations of an enterprise for its own development remain driven by digital technology. Meanwhile, given the in-depth integration of intelligentization technology into business and services, reform innovations at the organizational level of the Midea Group have become an essential requirement. First, an enterprise undergoing DT must formulate an intelligent decision-making strategy under the support of earlier digital development to output intelligent products and service. Second, it must build its own Internet system by using emerging digital technologies (e.g., the Internet and IoT) to achieve exchange of information at all links. On this basis, the organizational architecture is dynamically reconstructed and adjusted. Lastly, the enterprise should formulate a long-term digital development strategy on the basis of the initial development of its existing digitalization and intelligentization. The innovative development of digital technology and reform at the organizational level jointly drive an enterprise to realize value change, which is the ultimate goal of DT.

4.3. Output Results of Enterprise DT

On the basis of the preceding studies, we summed up the output results of existing enterprise DT from four levels: technology, organization, participant, and environment.

4.3.1. Output at the Technical Level

Digital technology plays a direct driving role in enterprise DT and runs throughout the entire life cycle of DT. During the informatization stage, most enterprises are keenly aware of the environmental changes brought by the rapid development of digital technology, gradually launching their digitalization construction and implementing targeted organizational reconstruction to keep up with the development trend of digital technology. During the datafication stage, enterprises introduce digital technology, make innovations in digital platforms in consideration of their own business characteristics, create a smart system, and combine online/off-line data to achieve integrated digital management, therefore greatly
enhancing their management efficiency. During the intelligentization stage, enterprises deepen the application of digital technology, become fully digitalized and intelligentized, and develop a strategy for “intelligent” development on the basis of existing digital platform to further increase the potential of digital technology in enterprise management.

4.3.2. Output at the Organizational Level

Through DT, enterprises can achieve innovations in the digitalization process, organizational structure, business model, and overall operating efficiency. First, enterprises use digital technology to rebuild their organizational business process (including R&D, production, sales, and services), review the value of organizational business, improve circulation, enhance efficiency, and create innovations in organizational business. Second, they seek the in-depth integration of digitalization, develop digital and intelligent platforms, create the mode of online/off-line combination for the interconnection of data, and provide consumers with better products and services to achieve the digital innovation of their business model. Through the aforementioned measures for reform, enterprises have achieved innovation in the mode of organizational cooperation, enhancing their overall operation efficiency.

4.3.3. Output at the Participant Level

Changes that appear in an enterprise through DT include the shift of the decision-making focus of leaders, changes in the skills of employees, improvement of product and service quality, and transformation of consumer experience. First leaders start to actively explore the path toward digital changes, and the decision-making focus of leaders gradually tilts toward digital development. Second, with the digital strategic layout of enterprises replacing the traditional operation of employees, their work skills gradually lean toward a digital platform that is convenient and intelligent. Lastly, the new business model brought by enterprise DT has changed traditional production and service modes and made it possible to obtain consumers’ needs and feedback through the analysis of big data, effectively enhancing the quality of products and services and increasing their value. The extensive application of digital platforms has also considerably enhanced the experience of consumers.

4.3.4. Output at the Environmental Level

The diversification of the market economy and the appearance of the new business format of digital platforms are unique environmental characteristics manifested in the DT process. The extensive application of digital technology has overthrown the operation laws of traditional economy. Given the rapid development of multiple new economic sectors that are based on Internet traffic and digital technology, the market environment has gradually become complex and diversified. Furthermore, enterprise DT has enabled the appearance of a new business format (i.e., digital platforms), caused traditional e-commerce to branch out into multiple fields for cross-industrial integration, and created new business formats that combine multiple industries.

5. Conclusions

From the perspective of dynamic evolution, this study uses Ping An Group, Suning Group, and Midea Group as examples to make a transverse analysis of multiple cases to look into the driving elements of the DT stages of enterprises under the background of the digital economy.

(1) Enterprise DT is a dynamic evolution process with a strict logical relationship between transformation stages. DT is divided into the stages of informatization, datafication, and intelligentization to analyze the transformation driving processes during the stages from the perspective of dynamic evolution. The finding is as follows: all enterprises create certain preconditions during the aforementioned stages for the
subsequent stages by creating innovations in digital technology and fulfilling strategic plans.

(2) Enterprise DT relies on the driving elements at four levels (technology, organization, participant, and environment), with difference in the crucial driving elements at various transformation stages. The crucial driving elements originate from the technical and environmental levels during the informatization stage, the technical and participant levels during the datafication stage, and the technical and organizational levels during the intelligentization stage.

(3) Four input elements participate in driving the DT process, and an actual output value exists in the final transformation results. At the technical level, the driving elements run through the entire transformation process and continuously provide positive feedback output for the digitalization process of enterprises as the transformation driving foundation and core elements that lead development. At the organizational level, the driving elements are the primary supporting framework of enterprise DT. They fulfill the in-depth integration of enterprise digitalization through the innovation and reform of the organizational structure. At the participant level, the driving elements guide the overall digital development of an enterprise to effectively improve the quality of products and services and achieve the reform for a digital business model through innovations, including leaders’ decision-making focus toward digital development and the skill shift of employees. At the environmental level, the driving elements play a role in gestation and have spawned new business formats that combine multiple industries through an enterprise that embarks upon the DT process in a targeted manner on the basis of its environmental perception of the diversification of the market economy and the comprehensive consideration of the state of their own development.

6. Contributions of the Study

6.1. Theoretical Contributions

This study enriches research on the evolution of driving elements of the enterprise DT strategy. Its theoretical research implications are reflected in the following aspects.

(1) Exploratory study of the driving elements of the process of enterprise DT from the perspective of dynamic evolution. In accordance with the characteristics of the study, we innovatively built the I–P–O theoretical model, which divides the study process into three dimensions (namely input, process, and output) for separate exposition. From the perspective of dynamic evolution, this study has attempted to address issues arising in the DT process, enrich the existing theoretical foundation and research content of DT, and overcome deficiencies that are currently found in relevant research, e.g., limited visual angle and obscure definition of models.

(2) A three-stage model for the dynamic development of DT. This study divides enterprise DT into the informatization, datafication, and intelligentization stages. It investigates the DT process on the basis of a dynamic model and looks deep into the intrinsic links and evolutionary mechanisms during different transformation stages. Hence, it has value in providing theoretical methods for research on the enterprise DT process.

6.2. Management Implications

On the basis of the conclusions, the following management implications are proposed for DT being carried out by enterprises.

(1) Coordinating the overall DT strategy. Rather than the fulfillment of the traditional objective of an enterprise, DT is an evolutionary process of dynamic development. An enterprise should persist in all-round deployment, steadily move forward with DT, and pursue online/off-line integration to gradually achieve smooth transition from digital transformative development to intelligentization, and then plan the full-scale promotion of the strategic outline for enterprise DT.
(2) Pushing forward enterprise digital technology. The technical driving element runs throughout the entire process of enterprise DT. An enterprise should ensure the construction of its own technological foundation; strengthen the research and application of AI, big data, and other technologies; enhance its digitalization and intelligentization; reinforce the empowerment of the digital platform; intensify the digitalization of crucial business flows, including production, R&D, and management; and build a digital platform that is based on data integration and centered upon data driving to promote new transformation of an enterprise. Simultaneously, an enterprise should make reasonable use of Internet technologies (e.g., big data and cloud computing) to set up a virtual architecture of an organizational network that can ensure the efficient sharing of business information and optimize the management of its organizational business.

(3) Arranging the DT strategic plan reasonably on a stage-specific basis. Enterprises at different DT stages have varying crucial driving elements. They should comprehensively consider their own development conditions for the precise positioning of their DT stage, correctly understand their need for transformation, and rely upon driving elements as a guide for reform and development to boost the orderly transition of their digitalization process and steadily achieve enterprise DT.

7. Limitations and Prospects

7.1. Limitations

There are some deficiencies in our research at present. In the study of digital transformation, we selected the successful and representative enterprises as the research object and summarized the macro conclusion of the driving factors of digital transformation. However, there is still a lack of large-scale summary research on the digital transformation of small and medium-sized enterprises and insufficient interpretation of the actual transformation driving of small and medium-sized enterprises.

7.2. Future Prospect

Future research can improve the scope of application of the model and make a sample summary of the digital process of small and medium-sized enterprises to further increase the persuasiveness of the study. In addition, the driving mechanism can be studied based on the main driving factors to further deepen the research on digital transformation.

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