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CASE STUDY

Value Chain Reconfiguration Mechanisms in Corporate Digital Transformation: A Longitudinal Case Study of Huawei and Midea*

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Abstract

The mechanisms by which value chains are reconfigured during corporate digital transformation have attracted growing attention from both academia and industry. Drawing on technology empowerment theory, we conduct a longitudinal dual-case study of Huawei and Midea to explore the dynamic evolution mechanism of value chain reconfiguration during digital transformation. Specifically, this study aims to find the pathways through which value chain reconfiguration occurs, analyze the mechanisms of value transmission, and examine the similarities and differences in reconfiguration mechanisms between infrastructure-oriented and application-oriented enterprises. The findings reveal that digital technologies serve as the engine and driving force of value chain reconfiguration by empowering resource combinations that integrate data and traditional resources to enhance resource reconfiguration capabilities, innovating resource leverage approaches, and driving value chain reconfiguration. Based on these insights, we develop a research framework of "digital technologies → resource orchestration → value chain reconfiguration." Furthermore, the mechanism of value chain reconfiguration evolves across three stages, namely, digitalization, networking, and intelligentization. Given their different starting points, motivations, and depths of digitalization, infrastructure-oriented and application-oriented enterprises exhibit distinct mechanisms of value chain reconfiguration at different stages of digital transformation. These findings enrich the understanding of value chain reconfiguration in digital transformation and provide managerial implications for practitioners.

Keywords digital transformation; digital technology; resource orchestration; value chain reconfiguration

1 Introduction

According to the *China Digital Economy White Paper 2021* released by the China Academy of Information and Communications Technology, in 2020, the volume of industrial digitalization reached 31.7 trillion yuan, accounting for 80.9% of the digital economy and 31.2% of GDP in China. Digital transformation has shifted from an optional choice made by leading enterprises in certain industries to a must across diverse sectors and enterprises,

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with more than half of Chinese enterprises regarding it as their next development priority. In the Chinese context, the manufacturing sector, which acts as a stabilizer for Chinese economy, yields numerous successful cases of digital transformation (e.g., Huawei, Midea, and Haier), thus providing abundant case data for study. Practically, these enterprises have evolved from initial exploratory efforts to digital-driven value chain operations and extended their digitalization from an individual part or industry to a comprehensive mapping of all value chain activities. They have continuously leveraged digital technologies to reconfigure the value chain and accelerate cross-sector integration and collaboration with external multiple stakeholders. Value chain reconfiguration, which is defined as the creation of new value through continuous optimization of business portfolios, serves as the cornerstone for sustainable competitiveness. How to reconfigure the value chain thus represents both a key challenge in corporate digital transformation and a critical theoretical issue. Therefore, in this study, we conduct an in-depth inquiry into the mechanisms of value chain reconfiguration in corporate digital transformation.

Research on the mechanisms of value chain reconfiguration in corporate digital transformation covers both digital transformation and value chains. However, these domains have yet to engage in a thorough dialogue, and studies seldom address value chain reconfiguration in the context of digital transformation. As a result, existing theories fall short of explaining practices in several aspects. First, the extant literature on value chains does not account for changes in value chain composition in the context of digital transformation. To date, only a few scholars have examined value chains in a digital context. For example, Shao (2019) argues that the primary objective of digital and intelligent transformation is to reconfigure the corporate value chain and proposes that enterprises internalize technology across every value chain activity to enhance their efficiency. Zhang et al. (2021) construct a "big data resources → dynamic capabilities → incremental and disruptive reconfiguration" framework to map value chain reconfiguration pathways in the big data era. Second, most existing studies focus on changes within individual value chain activities or segments rather than adopting a holistic, end-to-end perspective. Current research on digital transformation has primarily explored the key drivers and dynamic mechanisms of value chain reconfiguration in the context of product and service digitalization (Nambisan, 2017; Nambisan et al., 2017), intelligent manufacturing (Lü et al., 2019), digital marketing (Caliskan et al., 2021), digital business model innovation (Li, 2020), and organizational digital transformation (Schwarzmüller et al., 2018). To fill in these gaps, this study aims to answer the following questions: (1) What stages does corporate digital transformation involve? (2) Which factors drive value chain reconfiguration in this context? (3) How are these factors logically interrelated? (4) How do these factors and their interrelationships evolve across different stages of digital transformation? (5) In what ways do the reconfiguration mechanisms of infrastructure-oriented enterprises differ from those of application-oriented enterprises? By answering these questions, this study aims to find the underlying mechanisms of value chain reconfiguration in corporate digital transformation.

This study employs a longitudinal dual-case study approach involving two of China's leading enterprises that have successfully undergone digital transformation, namely, Huawei Technologies Co., Ltd. (hereafter "Huawei") and Midea Group (hereafter "Midea"), to uncover

how infrastructure-oriented and application-oriented enterprises reconfigure their value chains. First, we divide corporate digital transformation into three stages: digitalization, networking, and intelligentization, and explore the core characteristics of each stage. Second, we identify the key drivers of value chain reconfiguration and develop a "digital technologies → resource orchestration → value chain reconfiguration" research framework in light of the "technology → behavior → outcome" logic of technology empowerment theory. Third, through detailed case analysis of Huawei and Midea, we reveal the evolutionary patterns of value chain reconfiguration mechanisms across the three stages and compare how these mechanisms differ between infrastructure-oriented and application-oriented enterprises. Finally, we propose a theoretical model and a set of research propositions.

2 Research Framework and Theoretical Foundation

2.1 Development of the Research Framework

The critical role of digital technologies, resource orchestration, and value chain reconfiguration in corporate digital transformation has been widely acknowledged. However, existing studies have typically examined these elements in isolation from various perspectives, resulting in three key shortcomings. First, there is a lack of understanding of how these factors manifest or expand across dimensions in the context of digital transformation. Second, an in-depth discussion of the organic interrelationships among these factors is scarce. Third, the dynamic evolution of value chain reconfiguration mechanisms has received little attention. To address these gaps, this study develops a research framework linking digital technologies, resource orchestration, and value chain reconfiguration. We systematically review the pertinent literature and conduct a preliminary analysis of digital transformation stages, digital technologies, resource orchestration, and value chain reconfiguration, thereby laying the groundwork for the subsequent case analysis.

Drawing on technology empowerment theory, digital technologies and resource orchestration are crucial factors driving value chain reconfiguration in corporate digital transformation (Vial, 2019). Digital technologies function as the primary impetus for digital transformation. They not only furnish enterprises with technical tools and capabilities but also empower them to activate or enhance their survival and innovation capacities and spawn new digital business models. Therefore, they are an indispensable precondition for value chain reconfiguration (Gao et al., 2021). Moreover, resource orchestration represents the principal pathway to reconfiguring the value chain (Amit & Han, 2017). This is because digital technologies enable enterprises to acquire and utilize more diverse resources and employ data analytics to devise innovative orchestration approaches that boost resource deployment efficiency (Zhang & Hua, 2020). In turn, this markedly improves the exchange, bundling, and integration of resources across all value chain activities; attracts external partners to co-create value (Amit & Zott, 2012); and thus drives comprehensive value chain reconfiguration and upgrade. Accordingly, we develop a "digital technologies → resource orchestration → value chain reconfiguration" research framework in light of the "technology → behavior → outcome" logic (see Figure 1).

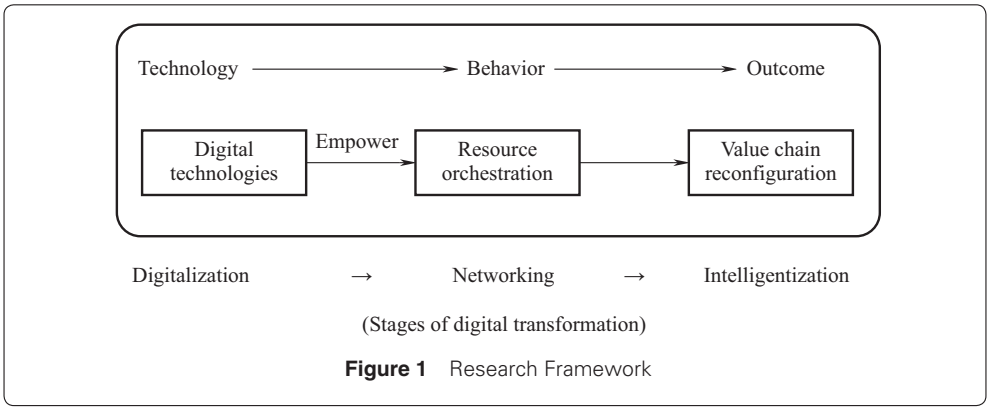

Figure 1 Research Framework

2.2 Stages of Corporate Digital Transformation

Research on the evolution of corporate digital transformation primarily focuses on the delineation of its stages and their defining characteristics. Zhou et al. (2018) argue that the transformation and upgrading of manufacturing enterprises unfold through three fundamental paradigms: digitalization, networking, and intelligentization. Soluk and Kammerlander (2020) further suggest that the digital transformation of small and medium-sized enterprises proceeds through three phases: process digitalization, product and service digitalization, and business model digitalization. Similarly, Verhoef et al. (2021) propose that digital transformation comprises three stages: datafication, digitalization, and digital transformation.

According to the enterprise life cycle theory, value chain reconfiguration serves as a critical indicator and core outcome of corporate digital transformation, and it evolves as enterprises advance through successive stages of digital transformation and upgrading (Wang et al., 2020). The core digital technologies deployed by enterprises that successfully undergo digital transformation are, in sequence, a unified IT architecture, the industrial internet, and artificial intelligence, an order that mirrors the evolutionary progression of digital technologies. Drawing on the stage classification proposed by Zhou et al. (2018), this study divides corporate digital transformation into three phases: digitalization, networking, and intelligentization, and refines the defining characteristics of each stage based on the functionality of digital technologies (see Figure 2). Specifically, the digitalization stage involves enterprises building unified, standardized, and interoperable digital platforms to digitally describe, analyze, decide, and control relevant activities. In this stage, digital technologies provide datafication, connectivity, and information-visualization functionalities. The networking stage, often termed the "industrial internet + manufacturing" stage, sees enterprises leveraging the industrial internet + to enhance intra- and inter-enterprise collaboration and facilitate social resource sharing and integration. During this stage, digital technologies function for linkage and data transparency. In the intelligentization stage, next-generation intelligent technologies accelerate the emergence and integration of new technologies, new products, new business formats, and new models; digital technologies at this stage further incorporate simulation-prediction and deep-learning capabilities.

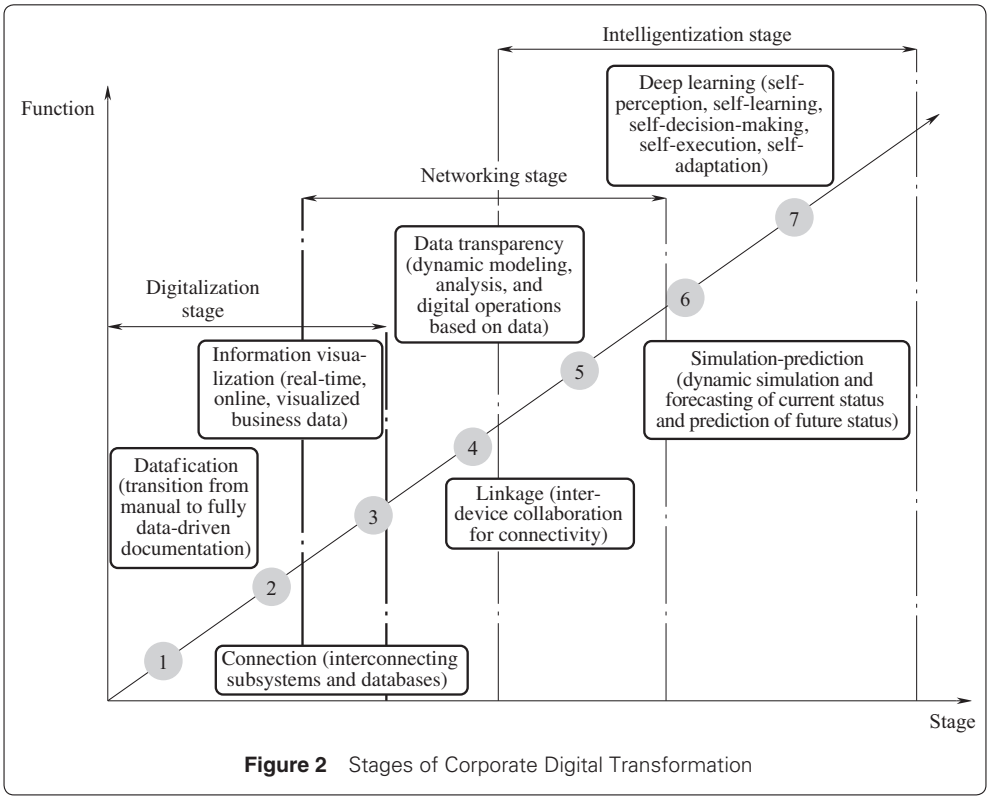

Figure 2 Stages of Corporate Digital Transformation

2.3 Digital Technologies and Empowerment

The assemblage of digital technologies marks the starting point of corporate digital transformation (Rymaszewska et al., 2017). Holmström (2018) posits that digital technologies, which are autogenetic, convergent, and recombinable, can enable the re-nesting of resource elements to form new resource configurations. Cai et al. (2019) further identify two core properties of digital technologies: content attributes (editability and scalability) and structural attributes (openness and interconnectedness). From a technological standpoint, digital technologies can be classified into three categories: single-point digital technologies, distributed digital technologies, and intelligent technologies. To elaborate further, single-point digital technologies refer to the technologies that support data processing and manipulation for specific activities on a single computing device, which include IT architectures and mobile platforms. Distributed digital technologies refer to the technologies that enable multiple computing devices to coordinate via communication networks to execute large-scale information-processing tasks, such as cloud computing and the Internet of Things (IoT). Intelligent technologies, which leverage robust data infrastructures and algorithmic advances to simulate, extend, and augment human intelligence, include technologies such as machine learning and computer vision.

Technology empowerment refers to the process by which enterprises absorb disruptive technologies to activate or enhance their own and system-level survival capabilities (Gao et al., 2021). Scholars have not yet reached consensus on the scope of empowerment (Luo et

al., 2017), and research on technology empowerment largely remains at the level of technical practice and application without systematically examining its operational logic, underlying mechanisms, and influence pathways (Guan et al., 2019). According to digital empowerment theory, empowering resources lies at the heart of digital technology empowerment, which can ensure that resource ownership and control are truly vested in their rightful holders (Hu & Lu, 2018). Indeed, as digital technologies advance, data emerges as a novel resource that, under conditions of technology empowerment, can achieve increasing returns through positive feedback mechanisms (Gong et al., 2020) and even combine with traditional resources to reshape value creation and capture logic.

2.4 Resource Orchestration

Resource orchestration has its roots in resource management and orchestration theories, which assert that resource value depends on the way resources are orchestrated. It emphasizes how enterprises in dynamic environments construct, integrate, and deploy critical resources to generate new value, thereby opening the "black box" of how resources and capabilities translate into value and competitive advantage (Sirmon et al., 2011; Zhu et al., 2020). In the era of big data, shifts in resource types, attributes, and processing methods produce resource combinations of data and traditional resources, thus triggering changes in the objects, contexts, content, and mechanisms of orchestration. As outlined by Sirmon et al. (2007) and Xie et al. (2019), resource orchestration comprises three processes:

(1) *Resource structuring*: Enterprises assemble resource bundles through acquisition and control. Different configurations determine the upper bound of the potential value creation of an enterprise at any given time (Reinartz et al., 2019). This includes the processes of deep, broad, and deep + broad resource structuring.

(2) *Resource bundling*: Enterprises reassemble resources to build or modify capabilities, which reflects the coordinated deployment of organizational resources to execute collaborative tasks (Lichtenstein & Brush, 2001; Sirmon et al., 2007). This includes stabilizing, enriching, and pioneering bundling processes.

(3) *Resource leveraging*: Enterprises deploy their capabilities to create value for customers and generate wealth for owners (Lichtenstein & Brush, 2001). This involves processes such as business leveraging, environmental leveraging, platform leveraging, and human-machine leveraging.

2.5 Corporate Value Chain Reconfiguration

Porter (1985) originally defines the value chain as the set of interrelated activities, such as production management, R&D, assembly, sales, and after-sales service, through which enterprises deliver products and services to customers. These interconnected operational activities form a dynamic chain of value creation. Existing research on digital transformation has predominantly examined the reconfiguration of individual value chain activities, such as intelligent manufacturing, product and service digitalization, digital marketing, digital business model innovation, and organizational digital transformation. For example, Lü et al. (2019) explore the implementation models for intelligent manufacturing in Chinese

enterprises and the associated platform development and governance; Nambisan (2017) and Nambisan et al. (2017) argue that digitalization challenges underlying assumptions about products and services and necessitates a reevaluation of the scope, characteristics, and value of product-service digital transformations; Caliskan et al. (2021) assess the influence of Industry 4.0 impact on marketing-mix strategies; Li (2020) contends that digital transformation in creative industries iteratively refines and extends business model frameworks via recursive learning; and Schwarzmüeller et al. (2018) identify four themes of organizational digital transformation, namely, employee well-being management, ICT utilization, performance and talent management, and organizational hierarchy. In reality, digital transformation entails not merely incremental "quantitative changes" but fundamental "qualitative shifts," thus warranting a holistic perspective of value chains. As scholarship advances, researchers recognize the pivotal role of multiple stakeholders in strengthening interactivity linkages and creating new value chain segments (Chatain, 2011). Therefore, the relationships and structures between enterprises and distributors, suppliers, service providers, and users have become integral components of value chain research (Shao, 2019). Thus, corporate value chain reconfiguration encompasses both the reshaping of individual chain activities and the reconfiguration of multi-stakeholder relationships.

Drawing on Wang's (2020) framework and based on the structure of activities and tightness of relationships between activities, this study categorizes the reconfiguration of value chain activities into four dimensions: digital regeneration (existing structure, connection), digital augmentation (new structure, connection), digital twinning (existing structure, binding), and digital emergence (new structure, binding), as shown in Figure 3. Among them, digital regeneration refers to the use of data to represent and manage key nodes within the value chain. By applying unified data standards, enterprises achieve end-to-end connectivity and visualization across activities, thereby eliminating data stovepipes and data silos. Digital augmentation builds on this foundation by adding new value chain activities or novel digital value activities in digital form, thereby transforming the value chain structure. Digital twinning involves constructing an identical digital replica of each physical value chain element to integrate online and offline resources and enable seamless interconnection of data,

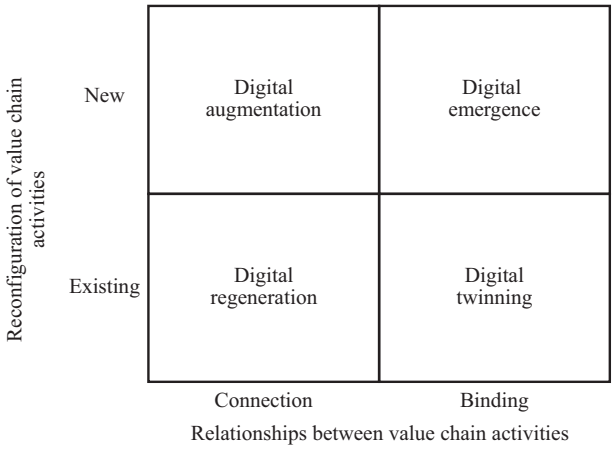

Figure 3 Reconfiguration Dimensions of Value Chain Activities

people, machines, and materials throughout the entire process. Digital emergence, based on digital twinning, arises from the introduction of additional value chain activities, which in turn drives further structural reconfiguration of the corporate value chain.

When it comes to the reconfiguration of multi-stakeholder relationships, enterprises shift their external orientation from competitive logic to symbiotic logic, and the value chain evolves from centralized development to an ecosystem-based model that forges tighter network circles with a broader and more diverse set of partners, users, and other stakeholders. Based on the degree of relational tightness among enterprises, their partners, users, and other stakeholders in value creation activities, the reconfiguration of multi-stakeholder relationships can be divided into digital co-advancement, digital co-creation, and digital co-evolution. Digital co-advancement occurs when multiple stakeholders pursue value creation activities in the same direction, thereby forming relatively loose yet stable collaborations centered on digital products and services. Digital co-creation denotes the continuous, reciprocal interactions among stakeholders arising from complementary cooperation and joint value creation, which generate incremental value for each participant and collective relational outputs. Digital co-evolution involves in-depth, multidimensional interaction among stakeholders as they jointly explore new businesses and models, ultimately driving the mutual evolution of the value creation ecosystem.

3 Research Design

3.1 Research Method

This study adopts a longitudinal and exploratory dual-case research design for three reasons. First, it addresses "how" and "why" questions concerning the mechanisms of value chain reconfiguration in corporate digital transformation, which aligns with the case study methodology (Yin, 2014). Second, because infrastructure-oriented and application-oriented enterprises exhibit distinct mechanisms of value chain reconfiguration, a dual-case approach is necessary to capture these differences. Finally, the study covers three clearly defined temporal phases: digitalization, networking, and intelligentization, making a longitudinal dual-case design the most appropriate choice.

3.2 Case Selection

In this study, we select Huawei and Midea as the two focal cases according to three criteria.

(1) Principles of theoretical sampling and typicality. Huawei operates in the ICT industry, the backbone of the third information revolution, and enjoys first-mover advantages in digitalization, networking, and intelligentization. Throughout its digital transformation, Huawei's IT operations have evolved from a decentralized to a centralized model and from isolated systems to full connectivity. Huawei has then advanced to an IT 2.0 stage, driven by cloud computing and big data, built the FusionPlant industrial internet platform, and adopted an all-scenario intelligence strategy. Meanwhile, under the leadership of Chairman Paul Fang, Midea began its digital transformation as early as 2012, initiating a comprehensive overhaul of its corporate IT systems. The company has successively implemented its IT 1.0

and IT 2.0 strategies, culminating in the launch of M.IoT—China's first integrated industrial internet platform combining manufacturing expertise, software, and hardware capabilities. This enables Midea's metamorphosis from "manufacturing" to "intelligent manufacturing," cementing its position as a home-appliance leader across China. Both enterprises thus exemplify representative and influential cases of successful digital transformation in China.

(2) Case comparability. Infrastructure-oriented enterprises such as Huawei spearhead the digital economy by focusing on foundational R&D and the diffusion of core digital technologies. They play a crucial role in accelerating and elevating digital transformation across industries by providing technologies, products, services, and solutions that empower and drive the transformation of traditional enterprises. Accordingly, Huawei is classified as an infrastructure-oriented enterprise. In contrast, application-oriented enterprises like Midea belong to traditional sectors and apply next-generation information technologies developed by infrastructure-oriented enterprises to their core operations. Their transformation objectives center on using digital technologies to strengthen the competitiveness of existing products and services and to expand market share. Therefore, Midea is categorized as an application-oriented enterprise in this study.

(3) Data availability. Both Huawei and Midea are internationally renowned enterprises, thus ensuring ready access to their detailed and reliable information.

3.3 Data Collection

Data for the case analyses are sourced from reliable materials, including enterprise documents, industry reports, and government policies, and are collected as per the principle of triangulation.

(1) Primary data are gathered through multiple field visits to Huawei and Midea, arranged via the research team's contacts within the two enterprises and third-party intermediaries. Each visit involved two to six team members and comprised semi-structured interviews with two to four mid- to senior-level managers.

(2) Secondary data are obtained from the enterprises' official websites and WeChat accounts, the China National Knowledge Infrastructure (CNKI), and Toutiao[1]. The development timelines for Huawei and Midea are presented in Figure 4.

3.4 Data Analysis

We employ the grounded theory methodology for data coding, including open coding, axial coding, and selective coding, to ensure a rigorous dialogue between the empirical findings and the extant literature.

(1) Open coding entails decomposing, examining, comparing, conceptualizing, and categorizing the raw data. We begin by assigning initial codes to the transcripts; next, we abstract these codes into higher-level concepts and classify them, yielding 69 preliminary concepts; and finally, we group core concepts with shared attributes and discard those unrelated to our research focus, resulting in 61 initial categories.

[1] Toutiao (Today' s Headlines) is a leading AI-powered news and content platform developed by ByteDance.

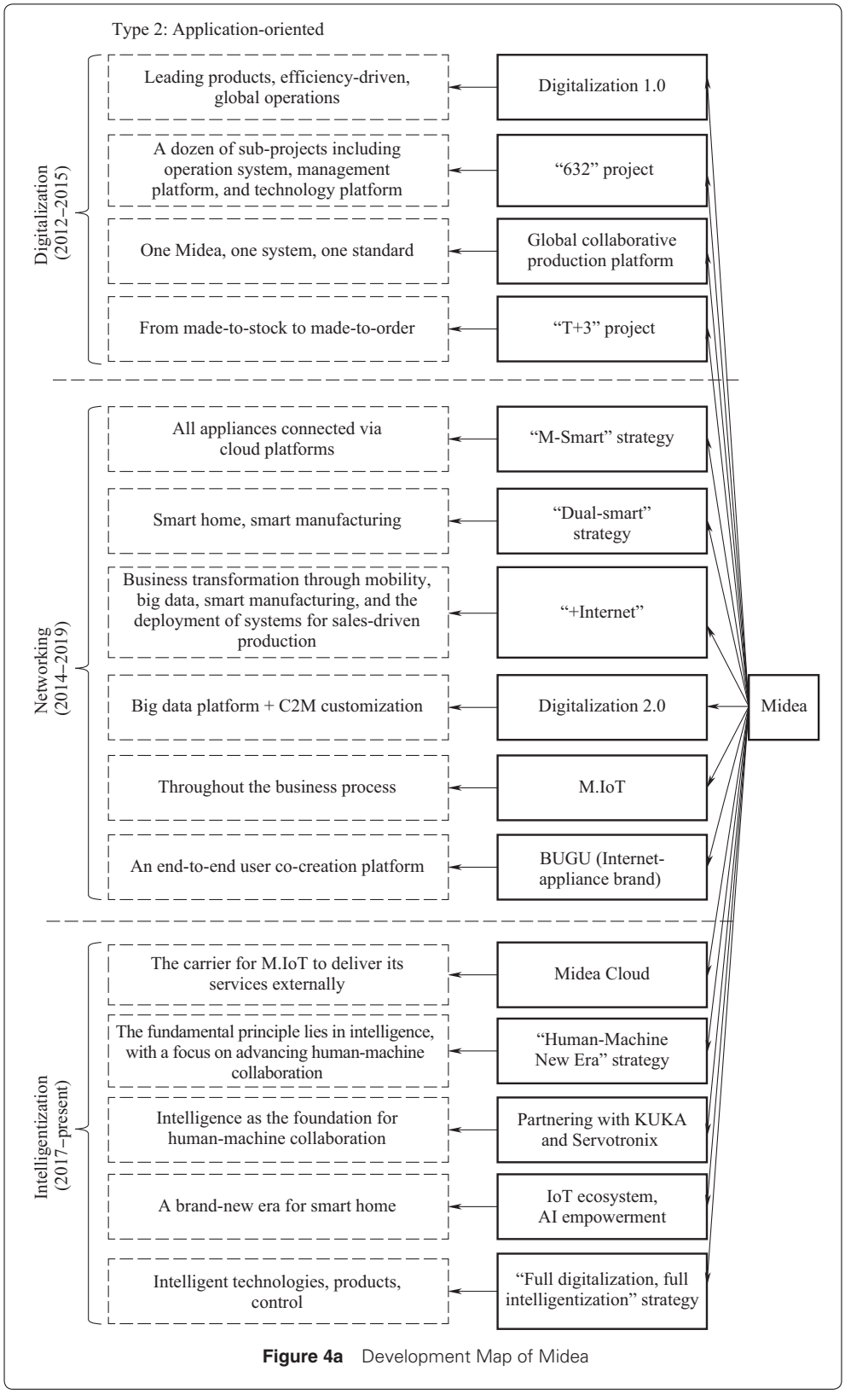

Figure 4a Development Map of Midea

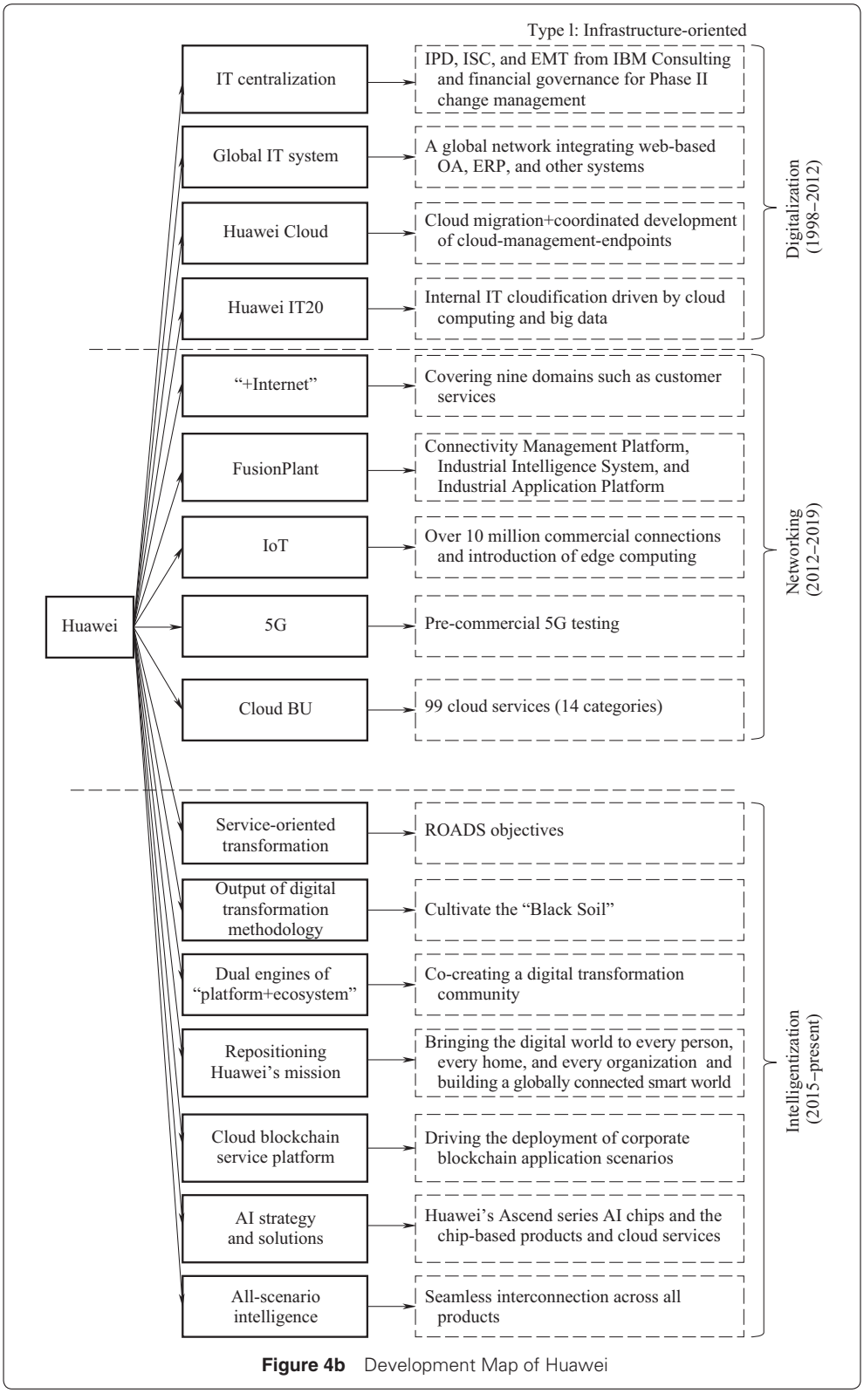

Figure 4b Development Map of Huawei

(2) Axial coding constructs the relationships between lower-order and higher-order categories through a combination of inductive and deductive reasoning. By consolidating the 61 zero-order categories, we derive 19 first-order categories, such as single-point digital technologies and deep structuring, and further synthesize these into six second-order categories: digital technologies, resource structuring, resource bundling, resource leveraging, reconfiguration of value chain activities, and reconfiguration of multi-stakeholder relationships (see Table 1).

Table 1 Axial Coding Results

Second-order category	First-order category	Zero-order category
AA_1 Digital technologies	A_1 Single-point digital technologies	a_1 IT architecture; a_2 Desktop; a_3 Mobile
	A_2 Distributed digital technologies	a_4 Big data technologies; a_5 Cloud computing; a_6 IoT; a_7 Industrial internet; a_8 5G; a_9 Blockchain; a_{10} Edge computing
	A_3 Intelligent technologies	a_{11} Machine learning; a_{12} Computer vision; a_{13} Speech technologies; a_{14} Natural language processing
AA_2 Resource structuring	A_4 Deep structuring	a_{15} Accumulating data resources; a_{16} Uncovering existing resources; a_{17} Enhancing resource productivity
	A_5 Broad structuring	a_{18} Acquiring new resources; a_{19} Resource coordination and sharing; a_{20} Connectivity; a_{21} Unrestricted data flow
	A_6 Deep + broad structuring	a_{22} Optimizing innovation; a_{23} Data-driven; a_{24} Developing deep industrial resources; a_{25} Iterative data growth
AA_3 Resource bundling	A_7 Stabilizing	a_{26} Incremental improvement of existing capabilities; a_{27} Stabilization strategies
	A_8 Enriching	a_{28} Extending current resource capabilities; a_{29} Resource multiplication effects
	A_9 Pioneering	a_{30} Creating brand-new capabilities; a_{31} Exploratory activities; a_{32} Disrupting resource interactions; a_{33} Stimulating resource innovation capacity
AA_4 Resource leveraging	A_{10} Business leveraging	a_{34} Core business initiatives; a_{35} Exploring cross-domain businesses; a_{36} Driving business growth
	A_{11} Environmental leveraging	a_{37} Adapting to external environment; a_{38} Clear market awareness
	A_{12} Platform leveraging	a_{39} Leveraging industrial internet platforms; a_{40} Connecting internal and external resources; a_{41} Networked collaborative manufacturing; a_{42} Mass customization; a_{43} Improved production line yield; a_{44} Product interoperability
	A_{13} Human-machine leveraging	a_{45} Human-machine collaboration; a_{46} Human creativity; a_{47} Efficient machine operations

(*To be continued*)

(*Continued*)

Second-order category	First-order category	Zero-order category
AA_5 Reconfiguration of value chain activities	A_{14} Digital regeneration	a_{48} Digital representation of activities; a_{49} Activity connectivity; a_{50} Activity visualization
	A_{15} Digital twinning	a_{51} Digital twin entities; a_{52} Coordinating physical entities
	A_{16} Digital emergence	a_{53} Added activities; a_{54} Innovative value chain
AA_6 Reconfiguration of multi-stakeholder relationships	A_{17} Digital co-advancement	a_{55} Loose yet stable relationships; a_{56} Multi-stakeholder collaboration
	A_{18} Digital co-creation	a_{57} Continuous reciprocal interactions; a_{58} Joint partnerships
	A_{19} Digital co-evolution	a_{59} Joint exploration of new models and businesses; a_{60} Deep integration; a_{61} Reciprocal interactions

(3) Selective coding builds on axial coding by examining the interrelationships among the major categories to form a coherent storyline and build the overarching theoretical framework. This phase further refines three core categories: digital technologies, resource orchestration, and value chain reconfiguration. They capture how enterprises employ digital technologies to orchestrate resources through structuring, bundling, and leveraging in order to reshape both activity-level configurations and multi-stakeholder relationships within the value chain. Guided by the "technology → behavior → outcome" logic, selective coding culminates in the theoretical model presented in Figure 1.

4 Case Analysis

4.1 Huawei's Value Chain Reconfiguration Mechanism in Digital Transformation

Huawei's value chain reconfiguration mechanism during digital transformation unfolds across three stages: digitalization, networking, and intelligentization, as illustrated in Figure 5.

4.1.1 Digitalization

In the digitalization stage (1998–2012), digital technologies manifested as single-point and distributed configurations. During this period, Huawei actively utilized IT architectures, desktop and mobile endpoints, big data analytics, and cloud computing to construct multiple integrated, end-to-end management systems aimed at achieving IT centralization. It also established its own data centers and an IT operations command system.

Resource orchestration in this phase was characterized by deep resource structuring. Digital technologies enabled the presentation, connectivity, and integration of vast data sets across Huawei's internal systems and business processes, thereby allowing the company to capture and accumulate data resources. In terms of resource bundling, Huawei engaged in stabilizing

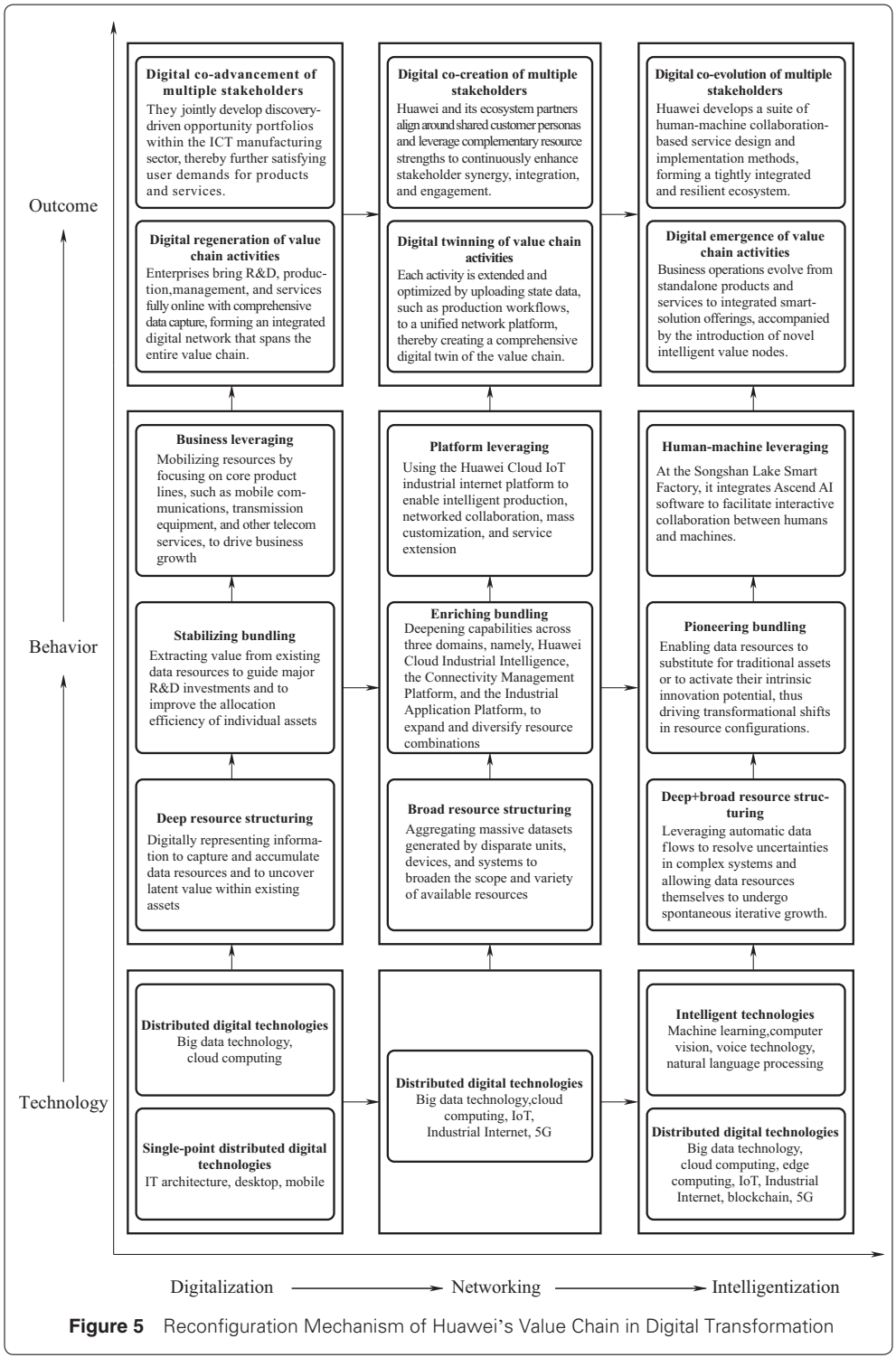

Figure 5 Reconfiguration Mechanism of Huawei's Value Chain in Digital Transformation

bundling by packaging these accumulated data resources with traditional resources and leveraging quantitative data to professionalize and standardize production management. It unlocked the value of existing data, guided major R&D investments, and enhanced both traditional resource allocation efficiency and reconfiguration capabilities. Resource leveraging was evident in business leveraging. As market demand for enabling services and terminal products grew, Huawei focused on its mobile communication, transmission, and telecom equipment businesses, refined its existing products, and expanded its business domains with digital capabilities.

At the activity level, value chain reconfiguration took the form of digital regeneration. Huawei transitioned R&D, production, management, and service activities online and implemented data collection across equipment, workshops, and logistics, thereby creating an online network that spanned its entire value chain. At the multi-stakeholder level, relationship reconfiguration was realized through digital co-advancement. Huawei and its partners collaborated on product and service initiatives, leveraged each other's strengths to co-develop opportunity portfolios, and fostered relationships of mutual progression.

4.1.2 Networking

In the networking stage (2012–2019), digital technologies manifested predominantly as distributed architectures. Huawei integrated big data analytics, cloud computing, IoT, the industrial internet, and 5G across every stage of its manufacturing lifecycle, including office operations, R&D, production, sales, service, and supply chain management.

Resource orchestration in this phase was characterized by broad resource structuring. By aggregating vast datasets from disparate units, devices, and systems, Huawei linked production factors, internal business units, and external partners to enable cross-enterprise, cross-regional, and cross-industry data flows, information exchange, and collaborative operations. Resource bundling unfolded as enriching bundling. Under the banner of "Cloud + AI + Connectivity," Huawei deepened its Huawei Cloud Industrial Intelligence, its Connectivity Management Platform, and its Industrial Application Platform, thereby accelerating data movement through the value creation process, improving the allocation efficiency of labor, capital, and technology, and markedly enhancing its capacity to reconfigure resources. Resource leveraging took the form of platform leveraging. The FusionPlant industrial internet platform supported intelligent production, networked collaboration, mass customization, and service extension. At Huawei's Songshan Lake Smart Factory, supply chain resources were rapidly consolidated on a project basis to meet market demand, thus enabling lean production and seamless resource integration. Moreover, Huawei leveraged this platform to deliver full-cycle services to its customers.

At the activity level, value chain reconfiguration was realized through digital twinning. Each value chain activity was extended and optimized, thus shifting the focus from standalone production and products to integrated "product + service" offerings. By uploading state data, including production workflows, business processes, and organizational structures, to a unified network platform, Huawei created a comprehensive digital twin of its entire value chain. At the multi-stakeholder level, relationship reconfiguration emerged

as digital co-creation. Under its IT 2.0 strategy, Huawei achieved effective collaboration and complementary resource sharing with partners and other stakeholders, uncovering new opportunities through joint learning and exploration. This deepened stakeholder synergy, integration, and engagement, ultimately enabling co-creation of value.

4.1.3 Intelligentization

In the intelligentization stage (2015–present), digital technologies manifest as both distributed digital technologies and intelligent technologies. Huawei leverages the Ascend AI chip–powered Atlas AI computing platform to build an end-to-end AI infrastructure across edge, fog, and cloud scenarios and strengthen its capabilities in machine learning, computer vision, speech technologies, and natural language processing.

Resource orchestration in this phase is characterized by deep + broad resource structuring. By enabling automatic data flows that reduce uncertainty in complex systems, Huawei acquires and develops deep industrial resources, thus allowing data resources to undergo spontaneous iterative growth. Resource reconfiguration appears as pioneering bundling. Huawei harnesses data resources to unlock the innovation potential of traditional resources and build robust capabilities for resource combination. Resource leveraging takes the form of human-machine leveraging. At Huawei's Songshan Lake Smart Factory, human-machine interaction optimizes material positioning, automated retrieval, equipment management, vehicle tracking, and remote diagnostics, enabling seamless circulation of services and applications among humans, machines, and scenarios.

At the activity level, value chain reconfiguration is realized as digital emergence. Huawei's value chain transitions toward centralized digital solutions by transforming its digital transformation experience into products and services delivered via its digital platform. Meanwhile, intelligent control systems merge or streamline existing activities and introduce human-machine control activities, thereby altering the form and structure of the value chain. At the multi-stakeholder level, relationship reconfiguration takes the form of digital co-evolution. By leveraging AI applications to provide high-quality, efficient services and solve customer problems, Huawei works with carriers, customers, and partners to achieve "agility, intelligence, and wisdom," thereby forging a tightly connected ecosystem.

4.2 Midea's Value Chain Reconfiguration Mechanism in Digital Transformation

Midea's value chain reconfiguration mechanism during digital transformation also unfolds across three stages: digitalization, networking, and intelligentization, as shown in Figure 6.

4.2.1 Digitalization

In the digitalization stage (2012–2015), digital technologies manifested as single-point solutions. Confronted with numerous siloed systems, Midea standardized and digitized key manufacturing parameters and leveraged upper-layer IT architectures alongside desktop,

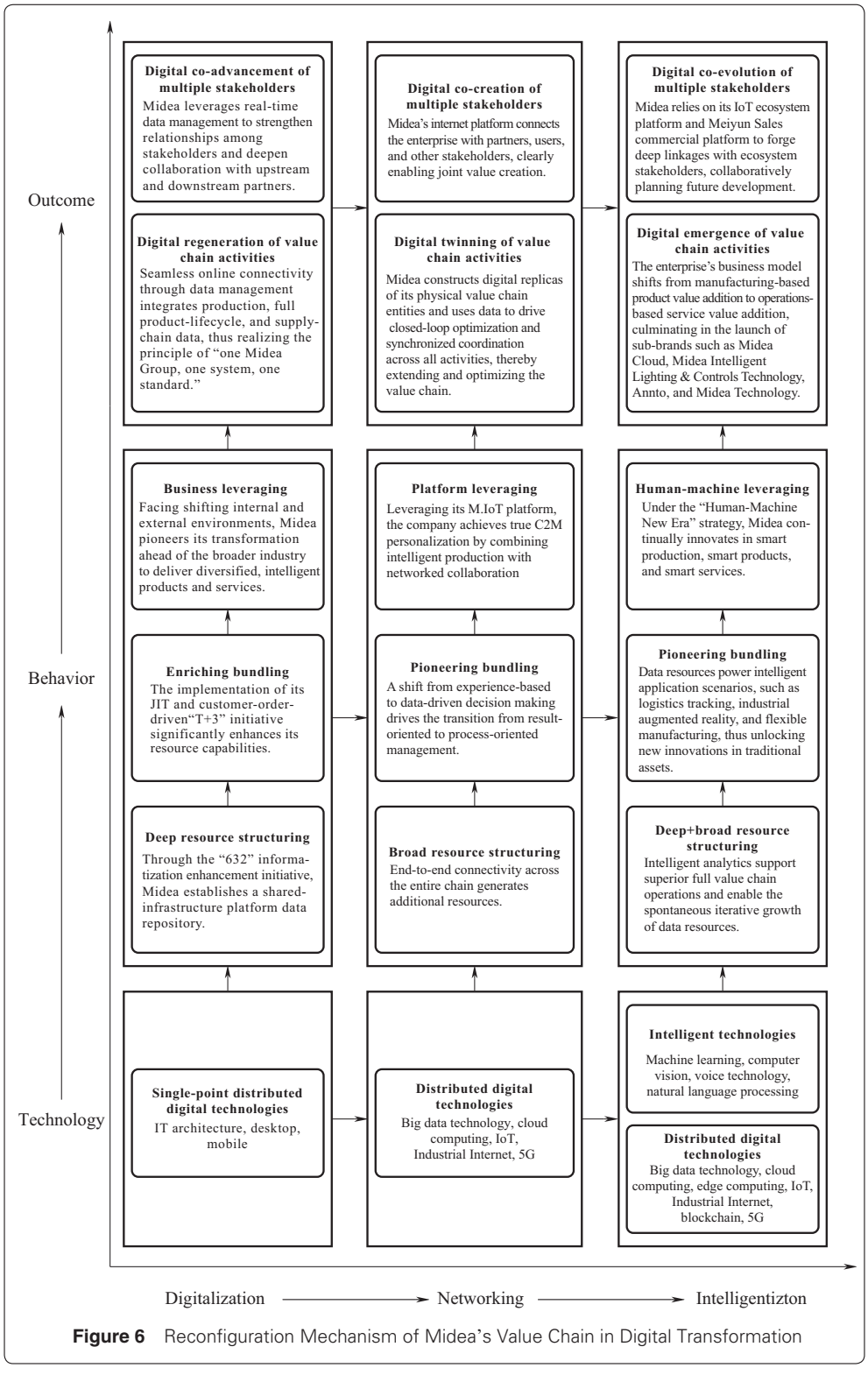

Figure 6 Reconfiguration Mechanism of Midea's Value Chain in Digital Transformation

mobile, and database connectivity technologies to integrate management processes across the enterprise. This effort yielded a horizontally integrated, vertically connected, group-wide management platform.

Resource orchestration in this phase was characterized by deep resource structuring. Midea launched the "632" digital transformation initiative[2] to build a shared-infrastructure platform and pooled data repository, through which information was digitally represented and managed. In terms of resource bundling, Midea undertook extensive automation and IT-system development. By continuously updating real-time data on task initiation, production progress, delivery schedules, and inventory, it coordinated traditional resource allocations and initiated a Just-In-Time (JIT), customer-order-driven "T+3" project, thereby strengthening its resource capabilities. Resource leveraging took the form of business leveraging. Faced with the decline of its traditional manufacturing model and shrinking gross margins, Midea proactively applied data-driven analysis, computation, and operational redesign to seize external opportunities and create new value.

At the activity level, value chain reconfiguration was realized through digital regeneration. Midea's real-time, online data-management capabilities linked production, product-lifecycle, and supply-chain data, thereby digitally reconnecting existing value chain activities and achieving "one Midea Group, one system, one standard." At the multi-stakeholder level, relationship reconfiguration emerged as a digital co-advancement. Midea leveraged data management to deepen collaboration with partners and jointly deliver diversified products and services to end users.

4.2.2 Networking

In the networking stage (2014–2019), digital technologies manifested as distributed architectures. Recognizing that single-point solutions could not meet end-to-end management requirements, Midea further adopted and developed distributed technologies, including big data analytics, cloud computing, IoT, the industrial internet, and 5G.

In terms of resource structuring, broad resource structuring emerged as the defining characteristic. Under its "+internet" transformation, Midea extended connectivity on the M.IoT platform beyond human users to include machinery, industrial products, and industrial services, thereby diversifying resource sources, types, and applications. Resource bundling appeared as pioneering bundling. Leveraging this expanded resource portfolio, Midea shifted its allocation logic from experience-driven to data-driven and used data to catalyze revolutionary fusion and fission of traditional resources, an evolution that demanded new reconfiguration capabilities. Resource leveraging took the form of platform

[2] The "632" digital transformation initiative of Midea Group represents its core architectural framework, comprising six operational systems, three management platforms, and two technological platforms. Specifically, it includes six systems: PLM (product lifecycle management), ERP (enterprise resource planning), MES (manufacturing execution system), SRM (supplier relationship management), CRM (customer relationship management), and APS (advanced planning and scheduling); three platforms: financial shared services platform, human resources platform, and big data platform; two technologies: cloud computing and industrial internet platform. Launched in 2012 and implemented in phases, the project completed its main construction by 2015. This integrated system eliminated information silos, achieving end-to-end digital connectivity from R&D to production and supply chain management.

leveraging. On the M.IoT platform, platformization, modularization, digitalized processes and simulation, smart logistics, and digital marketing became fully realized, thus enabling seamless interaction of data flows and workflows across the enterprise.

The reconfiguration of value chain activities was realized through digital twinning. Midea constructed a digital replica of its physical operations and used real-time data to drive closed-loop optimization and synchronized coordination across all activities. At the multi-stakeholder level, relationship reconfiguration manifested as digital co-creation. Midea leveraged its internet platform to connect with partners, users, and other stakeholders, jointly explored market opportunities, and co-create value. For example, its internet-appliance brand BUGU has established an end-to-end user co-creation platform.

4.2.3 Intelligentization

In the intelligentization stage (2017–present), digital technologies manifest as both distributed digital technologies and intelligent technologies. Partnering with global robotics leader KUKA and machine-vision hardware and algorithm-software provider Hikvision, Midea makes substantial investments in big data and AI research and innovation. Through a combination of external collaboration and in-house development, Midea has mastered intelligent technologies, including machine learning, computer vision, speech technologies, and natural language processing.

Resource orchestration in this phase is characterized by deep + broad resource structuring. Midea builds product-health models based on equipment and product status data and employs intelligent analytics to optimize operations across the full value chain, thereby enabling iterative growth of its data resources. Resource bundling takes the form of pioneering bundling. By deploying data-driven scenarios such as industrial control, logistics tracking, industrial augmented reality, and quality inspection monitoring, Midea drives innovation in traditional resources and significantly enhances its ability to recombine resources. Resource leveraging appears as human-machine leveraging. Under its "Human-Machine New Era" strategy, Midea entrusts humans with decision-making authority while granting machines greater autonomy and continuously innovates in smart production, smart products, and smart services.

At the activity level, value chain reconfiguration emerges as digital emergence. Leveraging its accumulated transformation experience and capabilities, Midea advances new products, services, and business lines and launches sub-brands such as Midea Cloud, Midea Intelligent Lighting & Controls Technology, Annto, and Midea Technology. This transition from product-based value enhancement in manufacturing to service-based value enhancement in operations optimizes the overall value chain structure. At the multi-stakeholder level, relationship reconfiguration manifests as digital co-evolution. By embedding its IoT ecosystem platform in home-appliance usage scenarios, Midea forges direct connections with end users' daily lives and leverages its Meiyun Sales commercial platform to integrate partners, retailers, and users across the value chain, thereby fostering collaborative development in enterprise AI and beyond.

5 Cross-Case Comparison and Research Propositions

5.1 Comparison of Value Chain Reconfiguration Mechanisms

Huawei and Midea both undergo value chain reconfiguration through three stages: digitalization, networking, and intelligentization, following the "digital technologies → resource orchestration → value chain reconfiguration" pathway. Their divergence stems from differences in the starting points, motivations, and intensity of digital transformation.

(1) With respect to digital technologies, whereas Midea relies solely on single-point solutions, Huawei also integrates distributed digital technologies. As an ICT manufacturer, Huawei therefore enjoys an inherent advantage in developing digital infrastructure.

(2) In terms of resource bundling, Huawei practices stabilizing bundling, whereas Midea adopts enriching bundling. When leveraging data resources to enhance the allocation efficiency of traditional resources, Huawei secures incremental improvements in its existing capabilities, while Midea must drive extensive changes across processes, technologies, organizational structures, and culture to achieve substantial capability upgrades.

(3) As for resource leveraging, Huawei employs business leveraging, whereas Midea emphasizes environmental leveraging. Huawei mobilizes resources around its core business operations, while Midea leverages resources to better adapt to external environmental shifts. Moreover, as both enterprises advance into the networking stage, their transformation trajectories converge. The principal distinction lies in the capabilities they develop. Huawei builds enriching bundling capabilities, whereas Midea develops pioneering bundling capabilities. When data resources drive improvements in the allocation efficiency of traditional resources, Huawei expands its resource deployment scope and markedly strengthens its reconfiguration capacity, while Midea elevates data resources into a strategic driver to construct its reconfiguration competencies.

5.2 Propositions

5.2.1 Value Chain Reconfiguration Mechanism during the Digitalization Stage

Infrastructure-oriented enterprises focus on foundational R&D of digital technologies and, based on their inherent advantages, deploy both single-point and distributed digital technologies as enablers of transformation, whereas application-oriented enterprises rely exclusively on single-point digital technologies during this stage.

Digital technologies facilitate the integration of data resources with traditional resources and enable the extraction of value from these new resource bundles. Resource structuring thus centers on an enterprise's resource-selection space. Enterprises procure inputs from factor markets, develop and divest nonessential resources, and combine data with labor, capital, and other traditional resources to form novel configurations that clarify integration and deployment priorities. As resources underpin the development of capabilities, enterprises must apply their resource-reconfiguration capabilities to market opportunities, coordinating and deploying capability bundles in order to translate resource value into competitive advantage (Lichtenstein & Brush, 2001). In the digitalization stage, infrastructure-oriented enterprises leverage data resources to guide the allocation of traditional resources, optimize resource capabilities through stabilizing bundling, and apply these enhanced capabilities in

the value-creation processes of digital products and services to achieve business leveraging. By contrast, application-oriented enterprises replace experience-based decision-making with data-driven decision-making. They combine data acquisition capabilities with existing competencies to execute enriching bundling, thereby adapting to external environmental shifts and continuously generating new value.

Data functions as an innovation engine, not only directly improving transaction-matching efficiency on the demand side and generating real-time feedback that flows back to upstream activities, but also guiding resource utilization on the supply side and substantially enhancing the allocation efficiency of traditional resources and total-factor productivity. Moreover, data provides enterprises with novel mindsets and methods for uncovering objective patterns and transforming society and nature, thereby catalyzing fundamental change. This quantitative accumulation of digital value through resource orchestration drives qualitative shifts at the value chain level, which gives birth to new value chain activities, reinforces linkages among existing activities, and ultimately reshapes the value chain structure and connectivity. During the digitalization stage, resource orchestration enables enterprises to digitally realize key value chain activities, such as R&D, production, and marketing, and, by applying unified data standards to achieve connectivity and visualization across these activities, overcomes information silos to achieve digital regeneration.

Data openness, sharing, and flow enable large-scale collaboration and cross-boundary integration among multiple stakeholders across the value chain and coalesce heterogeneous resource elements into an information/resource pool from which new opportunity sets emerge. Resource orchestration thus entails mobilizing these stakeholders to leverage complementary resources in the development of opportunity portfolios. Their shared objectives and collaborative logic drive information exchange and resource sharing and yield multiplier effects that far exceed individual contributions and deliver synergistic gains. In the digitalization stage, resource orchestration reconfigures multi-stakeholder relationships through digital co-advancement. By managing resources online, enterprises and their partners jointly develop discovery-driven opportunity sets to satisfy market demands, thereby establishing relatively loose yet stable co-advancement ties (see Figure 7).

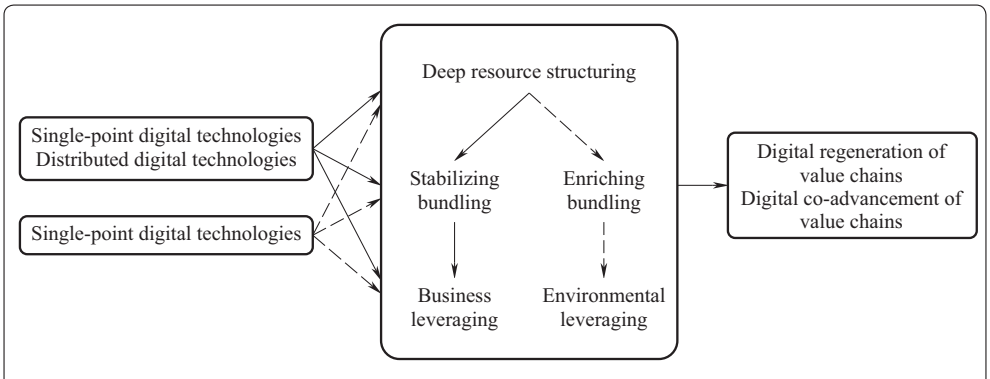

Figure 7 Value Chain Reconfiguration Mechanism in the Digitalization Stage

Note. Dashed lines denote differences between the two cases in the factors and their interrelationships; the same applies in Figure 8.

Proposition 1: In the digitalization stage, the value chain reconfiguration of infrastructure-oriented enterprises follows the sequence: single-point and distributed digital technologies → deep resource structuring → stabilizing bundling → business leveraging → digital regeneration and digital co-advancement of value chains. In contrast, application-oriented enterprises follow the sequence: single-point digital technologies → deep resource structuring → enriching bundling → environmental leveraging → digital regeneration and digital co-advancement of value chains.

5.2.2 Value Chain Reconfiguration Mechanism during the Networking Stage

By utilizing distributed digital technologies, such as the industrial internet, to support large-scale information processing, enterprises aggregate data across all production factors, the entire industry chain, and the full value chain, thereby enriching the sources, volume, and variety of their data resources. They acquire or uncover resources and recombine them into novel bundles, thus achieving broad resource structuring. As data flow accelerates throughout the value creation process, enterprises realize multiplicative effects on traditional resources, enhance overall allocation efficiency among heterogeneous resource types, and further strengthen their resource reconfiguration capabilities. Infrastructure-oriented enterprises coordinate resource allocation within their own operations and even across their industry chain based on data, resulting in significant enhancements to existing reconfiguration capabilities, i.e., enriching bundling. Conversely, application-oriented enterprises undertake exploratory activities that transcend existing knowledge and competencies, shift their allocation logic to data-driven decision-making, and build new reconfiguration capabilities to achieve pioneering bundling. Relying on these capabilities, enterprises mobilize internal and external resources via industrial internet platforms to enable intelligent production, networked collaboration, mass customization, and service extension. By integrating online and offline data streams, they create digital twins of physical entities at each value chain activity and comprehensively optimize the entire value chain. Meanwhile, deeper and broader data connections among multiple stakeholders enable co-creation around discovery-driven and creation-driven opportunity sets, thereby fostering digital co-creation relationships among multiple stakeholders (see Figure 8).

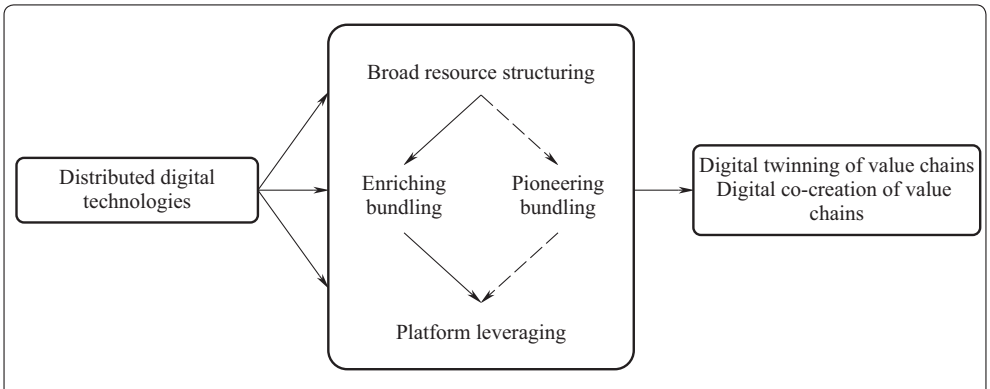

Figure 8 Value Chain Reconfiguration Mechanism in the Networking Stage

Proposition 2: In the networking stage, the value chain reconfiguration of infrastructure-oriented enterprises follows the sequence: distributed digital technologies → broad resource structuring → enriching bundling → platform leveraging → digital twinning and digital co-creation of value chains. In contrast, application-oriented enterprises follow the sequence: distributed digital technologies → broad resource structuring → pioneering bundling → platform leveraging → digital twinning and digital co-creation of value chains.

5.2.3 Value Chain Reconfiguration Mechanism during the Intelligentization Stage

With intelligent technologies, data resources drive the coupling, integration, and reconfiguration of factors across all manufacturing activities, thus enabling data to undergo spontaneous iterative growth. Enterprises acquire or uncover existing data resources to achieve deep + broad resource structuring. At this stage, data resources substitute traditional resources and become the primary source of value creation. The interactive relationship between traditional and data resources is fully upended, making a fully data-driven model possible. Enterprises then catalyze business transformation by reconfiguring business factors and revising their business models, thereby expanding their resource-reconfiguration capabilities. Drawing on pioneering bundling capabilities, enterprises develop human-machine collaboration that balances machine efficiency and flexibility with human creativity. This creative orchestration of resources enables enterprises to alter both the structure and enactment of their value chains. Through the addition of new value-chain activities or the introduction of novel intelligent value activities in an end-to-end linkage, enterprises generate entirely new value chains. The emergence of centralized digital solutions and full-lifecycle intelligent product-service offerings exemplifies this digital emergence of chain activities. Meanwhile, resource orchestration fosters deep, multidimensional connections among multiple stakeholders. Enterprises and their partners jointly explore creation-driven opportunity sets to develop new digital business models, thereby establishing digital co-evolution relationships among multiple stakeholders (see Figure 9).

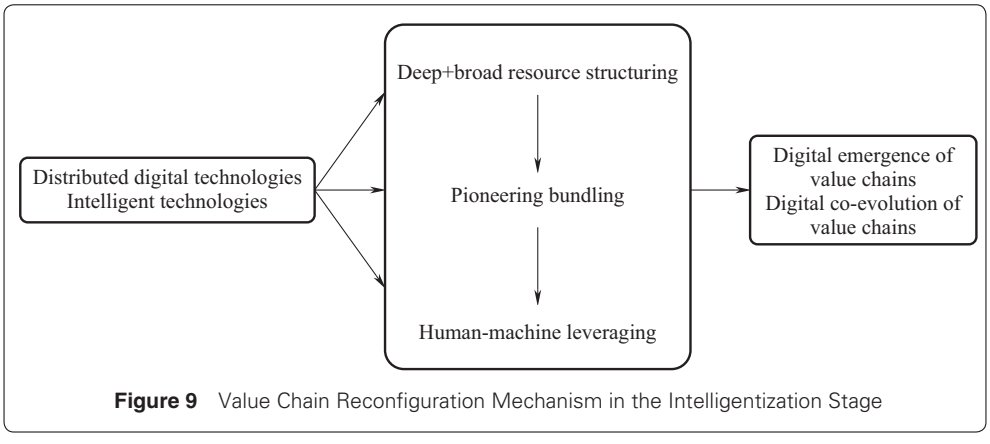

Figure 9 Value Chain Reconfiguration Mechanism in the Intelligentization Stage

Proposition 3: In the intelligentization stage, value chain reconfiguration in corporate digital transformation follows the sequence: distributed digital and intelligent technologies →

deep + broad resource structuring → pioneering bundling → human-machine leveraging → digital emergence and digital co-evolution of value chains.

6 Concluding Remarks

6.1 Conclusions

Drawing on longitudinal case studies of Huawei and Midea, this study shows that value chain reconfiguration in corporate digital transformation follows the "digital technologies → resource orchestration → value chain reconfiguration" pathway. Digital technologies act as the engine and primary driver that empowers enterprises to orchestrate resources, identify emerging demands and underutilized resources, and build resource-reconfiguration capabilities that innovate resource-leveraging approaches. Such novel resource applications inevitably reshape enterprises' value creation activities and thus trigger value chain reconfiguration. Furthermore, the specific dimensions of these variables and their interrelationships evolve across the stages of digitalization, networking, and intelligentization. Notably, infrastructure-oriented and application-oriented enterprises diverge in their deployment of digital technologies and their modes of resource orchestration during the digitalization and networking stages.

6.2 Theoretical Contributions

(1) This study integrates insights from value chain and digital transformation research and focuses on the mechanism of value chain reconfiguration in a digital transformation context. We develop a "digital technologies → resource orchestration → value chain reconfiguration" research framework, uncover the dynamic evolution patterns of reconfiguration mechanisms in infrastructure-oriented and application-oriented enterprises, and in so doing partially address gaps in the literature and promote a deeper integration of digital transformation and value chain research.

(2) Grounded in technology empowerment theory, this paper offers a novel explanatory framework for value chain reconfiguration in corporate digital transformation, thereby expanding the theory's applicable contexts and boundaries. Questions such as "What constitutes empowerment?" "How does empowerment operate?" and "What are its effects?" remain contested and lack empirical, in-depth dynamic studies (Luo et al., 2017). By following the "technology → behavior → outcome" logic, we demonstrate how digital technologies empower resource orchestration to drive dynamic value chain reconfiguration, thereby providing new interpretive lenses, case evidence, and directions for future validation.

(3) This study clarifies the definition and dimensions of resource orchestration in a digital transformation setting, responding to Zhang and Hua's (2020) call for case-based exploration of resource orchestration patterns in the big-data era. We show that technology-enabled resource orchestration alters the objects, contexts, content, and mechanisms of resource deployment, phenomena that traditional resource orchestration theory cannot fully explain. By examining the manifestations, dimensions, and evolutionary interrelationships of resource orchestration, we enrich its theoretical applications and provide a reference for better

addressing emerging challenges in the digital transformation context.

6.3 Practical Implications

(1) In the digitalization stage, enterprises should leverage big data and cloud-computing technologies to build a unified digital platform, achieve end-to-end process digitization, and expand the scope and application scenarios of data. By creating new resource configurations and using data to enhance the allocation efficiency of traditional resources, enterprises can establish digital connectivity across value chain activities and form relatively loose but stable digital co-advancement relationships with multiple stakeholders.

(2) In the networking stage, enterprises should deploy industrial internet technologies to secure extensive resources across all factors, the entire value chain, and the full industry chain. By applying keen data insights to improve resource allocation efficiency and relying on industrial internet platforms to enable intelligent production, networked collaboration, mass customization, and service extension, enterprises can innovate their value chain activities and forge deep, value-creation linkages with a broader set of partners.

(3) In the intelligentization stage, enterprises should harness AI technologies to access diverse data resources and cultivate truly data-driven capabilities. By combining the complementary strengths of humans and machines, they can upgrade to smart production and smart products, expand and optimize their value chain activities and structure, and achieve digital co-evolution among multiple stakeholders.

6.4 Research Limitations and Future Directions

This study adopts an enterprise-centric perspective to examine value chain reconfiguration in the context of digital transformation, without conducting an in-depth analysis of other stakeholders, such as consumers, partners, or government bodies. Enterprises, however, operate within complex networks of multiple actors, and their transformation processes are inevitably shaped by these relationships. Accordingly, future research could embrace a multi-stakeholder perspective to explore how the roles, positions, and capabilities of diverse actors influence the value chain reconfiguration of enterprises.

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