Digital Consumption and Manufacturing Industry's Digital Transition

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Abstract: *As a form of consumption based on the digital content and traits of goods and services, digital consumption is characterized by a strong dependence on the digital technology infrastructure, precise identification of consumer demand, adaptability to new business modes, swift consumer feedback and response, and great market potentials. Under the dual driving forces of technology empowerment and consumption upgrade, China's digital consumption has been growing rapidly, digitalization is empowering traditional sectors of consumption, and the consumption of digital content is expanding. Consumer potential for digital consumption is being unleashed in low-tier cities, and new-generation consumers are gaining influence. With an increasing number of digital consumers, new consumption modes and services have proliferated thanks to the improving digital infrastructure. Growing digital consumption has created an increasing demand-pulling effect that spurs product and service innovation, corporate internal process digitalization, and changes in corporate organization and decision-making. Driven by digital consumption, industrial chain upgrade and restructuring and business mode innovations will improve user experience and firm efficiency, contributing to the quality, efficiency, and dynamism of the manufacturing industry. Amid surging digital consumption, the digital transition of manufacturing is still faced with some problems and challenges. It is important to deepen the user-centric concepts and modes of value creation, create a differentiated service system, optimize digital resource allocation, enhance digital brand management, and scale up R&D and innovation of products and services.*

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The digital economy is going gangbusters. With their extensive applications in the real economy, digital technologies have become new drivers of economic growth and market operations. Consumption of digital products and services, or "digital consumption" for short, has shown robust growth potential in China, contributing to consumption growth and presenting new opportunities to supply-side businesses. In this context, we should expedite industrial digitalization, improve industrial quality, efficiency and dynamism, and fully leverage the role of digital consumption in catalyzing product and business innovations, as well as in the improvement of internal processes, organizational structure, and industrial chains.

1. Implications and Characteristics of Digital Consumption

The rapid development of new-generation information technologies has engendered iterative

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innovations of business modes and transformed the ecosystem of consumption. Digital technologies such as internet, big data and cloud computing have been widely applied in everything from consumers' search for information, comparison and payment to logistical supply chains, manufacturing and new product development based on consumer psychology and demand generation. More and more digital elements have been embedded in products and services. Unlike traditional consumption, digital consumption derives from the digital elements and traits of products and services, which have transformed consumer habits, behaviors and lifestyles.

1.1 Heavy Dependence on Digital Technology Infrastructure

Technology is the bedrock of digital consumption. From marketing to platform development, branding and consumer services, every link is highly dependent on the digital technology infrastructure. Businesses create customer portraits and demand forecast models using digital marketing networks and data mining to tap into consumer demand. As an important channel linking supply with consumption, digital platforms not only address multitiered and diverse consumption demand, but help reduce supply-side costss and encourage R&D input. Concerning branding, digital consumption provides an immersive, experiential and interactive customer experience, allowing branding to be more targeted according to the size and purchasing power of various consumer groups. Concerning consumer service, digital consumption enables universal marketing through online and offline integration, supports professional services in various stages of consumption, and further improves consumer experience using third-party supervision and tracing.

1.2 Easier Consumer Demand Forecast

The data factor can be used as a tool to forecast and guide consumer demand. First, recommendation algorithms play a big role. Individualized push, search ranking and filtering algorithms address differentiated consumer demand for information and help businesses precisely match users with information. Second, digital immersion and interaction enable better consumer experience. Virtual reality (VR), for instance, allows consumers to experience and try products and services via shopping platforms for a more realistic and pleasing experience. In addition, some online platforms feature social network services and other interactive services to bring consumers in touch with other users who share similar hobbies. Third, digital technologies are consumer-centric and provide individualized services. Big data analysis and internet technologies match supply with differentiated consumer demand. Platform analysis allows businesses to evaluate supply chain capabilities, reduce inventory risks, and forecast consumer demand for the provision of more targeted products and services, contributing to a consumer-centric business mode with efficient decision-making.

1.3 Stronger Adaptivity and More Flexibility of New Business Modes

Not only has digitalization transformed consumption and the way products and services are delivered, but it has also led to the emergence of new business modes like online shopping, live commerce and digital culture, which represent a large share of the consumer market. Online and offline integration has created adaptive and flexible modes of digital consumption. Unlike traditional modes of consumption, digital consumers may choose their ways of shopping. Easier access to information gives businesses greater flexibility and convenience to improve quality, service and supply modes.

1.4 Quicker Consumer Feedback and Swift Response

The rapid development of internet applications has led to diversification in the channels and modes of consumption, and consumer feedback is pivotal for firms to improve service and become more competitive. In the context of digitalization, businesses may promptly obtain consumer feedback. Efficient after-sales service and low-cost online communication ensure a better consumer experience.

Businesses may avail themselves of digital technologies to improve user experience, efficiency and cost-effectiveness. Data element analysis may reshape supply-demand links, allowing businesses to provide consumers with the right products and services based on user attributes and recommendation algorithms. User satisfaction and swifter response to meet customer expectations will sharpen product and service competitiveness.

1.5 Great Market Potential from Digital Consumption

Digital technology has penetrated every facet of life, giving rise to digital consumption potential. Data mining and resource processing allow firms to serve niche markets more effectively and address heterogeneous consumer needs in a fiercely competitive market. In the context of digital consumption, businesses are better positioned to offer targeted and differentiated products and services according to consumer attributes and behaviors to maximize market potential and create customer value. With its unique strengths, digital consumption has engendered more consumption channels and modes, prompting a shift from traditional brick-and-mortar stores to online shopping, from consumer search to pushed recommendations with images and videos and by influencers. This has stimulated consumption demand and increased consumption potential.

2. Current Status and Trends of China's Digital Consumption

New technology applications led by internet, cloud computing and artificial intelligence (AI) have proliferated in the consumer sector. Technology empowerment and consumption upgrade have spawned new business modes, use cases and services. With robust innovations, growth dynamism and adaptability, such emerging modes of digital consumption have become key drivers of consumption growth.

2.1 Rapid Growth in Digital Consumption

During the COVID-19 pandemic, new modes of digital consumption led by online shopping, video streaming, digital culture, and telemedicine have developed from strength to strength. Digital consumption as a share of total consumption has increased swiftly and become a key driver of China's economic growth.

By June 2022, China's internet users reached 1.05 billion, internet penetration rose to 74.4%, and access to mobile internet hit 99.6%.[1] Internet has become part of people's life. By December 2021, China's internet users spent an average of 28.5 hours online each week, up 2.3 hours from the previous year. The number of online shoppers has increased steadily. By December 2021, China's online shoppers reached 842 million, up 59.68 million, or 81.6% of all internet users. Online meal delivery and ride-hailing apps have registered the fastest growth of users, which numbered 544 million and 453 million, up 29.9% and 23.9% from the previous year, respectively.[2]

In 2021, China's online sales volume totaled 13.1 trillion yuan, up 14.1% from the previous year, and the online sales of physical goods accounted for 24.5% of total retail sales volume of consumer goods. E-commerce has played an increasingly positive role in digital consumption growth, bridging manufacturing with consumption, online with offline, cities with the countryside, and domestic market with overseas markets.

2.2 Digitalization Empowers Traditional Consumer Sectors

In promoting consumption and addressing differentiated consumer demand, a key step is to strengthen and invigorate traditional consumption by applying digital technologies. Traditional shopping

[1] China Internet Network Information Center (CNNIC). *50th Statistical Report on Internet Development in China*, http://www.cnnic.net.cn/n4/2022/0914/c88-10226.html.

[2] China Internet Network Information Center (CNNIC). *49th Statistical Report on Internet Development in China*, http://www.cnnic.net.cn/n4/2022/0401/c88-1131.html.

centers and commercial businesses have employed digital, IT and other mobile applications to create immersive, experiential, and interactive environments and new business modes like smart shops, smart restaurants, contactless delivery, and situation-based consumption as part of their intelligent renovations.

Judging by the four pillars of traditional consumption of home appliances, furniture, automobiles and catering, digital empowerment is expected to unleash greater potential. With the help of virtual reality (VR) technology, internet platforms provide consumers with an immersive shopping experience. This has greatly facilitated car buying, for instance. Online consumption of furniture and home appliances has become common. In addition to a wide range of choices, merchants provide consumers with door-to-door installation and after-sales services at the time convenient for consumers. Restaurants have collaborated with meal delivery, e-commerce and video streaming platforms to broaden online sales channels, situationize dining behaviors, strictly control the quality of food ingredients, deliver better consumer experience, and speed up the digital transition.

2.3 Extension of Digital Content Consumption

Driven by the tide of digital consumption, China has witnessed rapid development in online health services, online entertainment, online fitness, online tourism and other "Internet+ service" business modes, and consumer demand for digital services and products has increased steadily. Telemedicine, for instance, saw the fastest growth of users, which reached 298 million by December 2021, up 38.7% from the previous year. Cloud computing has enabled new ways of entertainment and consumption such as virtual travel, virtual exhibitions and virtual pets. Emerging sports activities like smart fitness, virtual events and virtual sports have found popularity among the public, who benefit from smarter fitness amenities.

During the COVID-19 pandemic, online queueing, live commerce and remote work have become a way of life. Big data analysis of consumer preferences has improved consumer experience. An increasing abundance of digital products and services has brought consumers a brand-new interactive experience unlike in traditional brick-and-mortar stores, offering dynamism for tapping into market potential and spurring consumption upgrades. New business modes, broader consumer coverage and impetus to urban and rural consumption upgrades stemming from digital consumption have underpinned China's digital transition.

2.4 Digital Consumption Potential Unleashed in Low-Tier Cities

Amid China's economic development and urbanization, low-tier markets have shown unprecedented consumption potential thanks to improving infrastructure and logistics and rising household disposable incomes. In the first half of 2022, China achieved the goal of "connecting every county to 5G internet" after having connected "every administrative village to broadband internet" in the previous year. By June 2022, China's rural netizens reached 293 million, and rural internet penetration stood at 58.8%.[3] Urban and rural internet penetration gap narrowed from 36.1% by the end of 2012 to 21.6%, representing a sharp decrease in the urban and rural "digital divide".

By the end of 2021, China's rural road length exceeded 4.46 million km, up 84,000 km from the end of the previous year. 82.2% of townships were connected to Grade 3 roads and above, up 1.4 percentage points. The number of rural parcel delivery service outlets increased by over 30%, and over 98% of townships were covered by parcel delivery services.[4] More than 1,300 counties were covered by e-commerce, and over 2,000 county-level e-commerce distribution and delivery centers were built. During 2014-2021, China's rural e-commerce sales volume jumped over tenfold from 180 billion yuan

[3] China Internet Network Information Center (CNNIC). *50th Statistical Report on Internet Development in China*, http://www.cnnic.net.cn/n4/2022/0914/c88-10226.html.

[4] Department of Comprehensive Planning, the Ministry of Transportation. "Making New Achievements on the New Journey of Turning China into a Transportation Powerhouse: Review of Statistical Communiqué on Development of Transportation Industry in 2021." *Finance and Accounting for Transport*, 2022(6): 96-97.

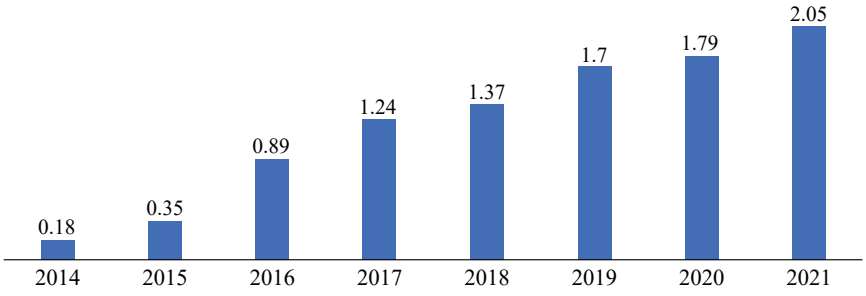

Figure 1: Rural E-Commerce Retail Sales Volume, 2014-2021 (in trillion yuan)

Source: The Ministry of Commerce.

to 2.05 trillion yuan, and its share in national e-commerce sales volume grew from 13.6% to 15.7%. The emergence of online education, telemedicine, video entertainment and other service consumption in the countryside has vastly enriched the cultural life of rural residents and spurred the extension of rural digital consumption from material to service consumption.

2.5 Growing Influence of Generation Z

Generation Z consumers refer to those born between 1995 and 2009 and grown up in the internet era. According to the National Bureau of Statistics (NBS), China's newborn population during 1995 and 2009 stood at some 260 million, accounting for 18.4% of its total population in 2021. Unlike other consumer groups, Generation Z consumers have the following distinctive consumer characteristics: First, they have a passion to consume and derive joy from consumption more than they do from the utility of the goods they purchase. Their consumption is driven by not just the satisfaction of needs but more importantly, the pursuit of lifestyle. Second, they attach great importance to the social networking dimension of consumption, which reinforces their self-awareness and identity unique to their social circle and gives them a sense of psychological resonance and belonging. Third, their consumption behaviors are more individualistic, distinctive, and diversified. They seek to demonstrate their personality by buying and consuming different products as part of their persona. Obsession with cultural diversity has led to the emergence of subcultures. "Subculture is mass culture" is a vivid reflection of such consumer psychology. Fourth, they put a greater premium on the cultural connotation and value proposition of commodities in making a buying decision and are willing to try new things and pay for the cultural value of products. As Generation Z consumers enter the workforce and climb up the career ladder, their consumption potential are increasingly unleashed. Generation Z consumers are digital natives, who not just contribute to the growth of digital consumption but upend the structure of the consumer market with their distinctive and diversified consumer behaviors.

In general, China's digital consumption is characterized by a large number and diverse backgrounds of consumers, refined new consumption modes, deepening consumption services, and improving infrastructure. Penetration of digital technology will be accompanied by a broader scope of consumers, rapid growth of market volume, and coordinated supply- and demand-side development. By taking part in product innovation and service design, users are heavily involved in creating brand value, contributing to growth potential for digital consumption and expediting digital applications in traditional industries.

3. Mechanism and Pathway for the Digital Transition of Manufacturing Driven by Digital Consumption

A new round of technological revolution and industrial change has not only created many fast-

growing emerging technologies and industries but presented new opportunities for China's digital transition of manufacturing. Under the digital economy, digital consumption is extending in more directions with a strong demand-pulling effect. Data empowerment propels product and service innovations in the manufacturing industry to enhance user experience and firm efficiency and transform the quality, efficiency, and dynamism.

3.1 Propelling Digital Product and Service Innovations

Digital consumption has unleashed individual consumers' demand and market potential. Consumption of digital content as part of firms' value creation serves as an external impetus for industrial change and innovation. Rapid growth in digital consumption, retail network development and improving online payment systems have enabled and propelled digital product and service innovations. First, data element analysis can be used to tap into consumer demand. Modern information analytics based on big data and cloud computing helps manufacturers improve user experience and develop innovative products. Moreover, it takes a shorter time for firms to create value. With the help of digital applications, commercial value can be derived from each business process, allowing firms to maximize returns with cost reductions and boost product and service innovations. Third, digital consumer feedback may speed up firm innovation and R&D and cheapen the cost of collecting information.

3.2 Expediting Internal Business Process Digitalization

Digital consumption has turned individualized and differentiated demand from implicit to explicit with greater economic value and economies of scale. In facilitating the digital transition of all internal processes, firms apply digital technologies in R&D, design, manufacturing, processing, marketing and after-sales services. Integration of business processes is followed by business coordination throughout the value chain via whole-process data analysis for greater firm efficiency. In addition, process technology is the fundamental manifestation of overall manufacturing performance and competitiveness. Breaking free from barriers to digital process upgrades is conducive to creating a reliable supply system. Digital consumer behaviors and data analysis provide the direction and foundation for achieving breakthroughs in process technology. Digital applications facilitate process renovation, process optimization and high-quality product output. Digital tracing is a basic assurance that guides enterprise quality management, monitoring, inspection, operation and maintenance forecast.

3.3 Inducing Corporate Organizational Restructuring and Change of Decision-Making Model

Digital consumption is a bridge linking digital industries with industrial digitalization, as well as an important tool for fostering new-type consumption and spurring domestic demand. In the context of digitalization, the corporate organizational structure has evolved from the traditional pyramid structure to a more efficient management mode compatible with digital development. Organizational restructuring has changed the labyrinth hierarchy and complexity of traditional command chains, making it easier to transmit information in an efficient and truthful manner.

Digital thinking, skills and data management competencies at various management hierarchies help firms develop integrated digital management platforms, enable data-driven smart decision-making, and complete the digital transition. In combination with online and offline data resources, enterprises make strategic decisions with the help of digital analytics in line with future trends. Management decisions are made according to standards formulated with digital technology and subject to monitoring and evaluation to ensure targeted decision-making. By tailoring business decisions to digital consumers, companies are in a better position to tap into consumption potential and stay competitive.

3.4 Digital Consumption Propels Industrial Chain Upgrade and Restructuring

China's manufacturing industry is faced with daunting challenges and risks losing its traditional

advantages. Diminishing demographic dividends and rising factor costs have presented obstacles to the traditional manufacturing industry. Technological advancement for critical links of the industrial chain has become vital for industrial transition and upgrade. Digital consumption creates an impetus for manufacturing enterprises to upgrade the value chain from R&D to sales and from internal equipment to operational management.

First, digital technology offers a tool for cost reduction. Big data and AI applications, for instance, have sharply cheapened the cost of intermediate products, creating dynamism for industrial and supply chain optimization and upgrades. Second, digital technology contributes to industrial chain digitalization. Digital applications may effectively improve the quality, stability and reliability of industrial products and meet individualized and differentiated consumer demand. Third, digital technology contributes to industrial and supply chain resiliency. Advanced digital applications have enhanced production line flexibility, allowing for adjustment to industrial and supply chains according to consumer demand. The result is faster firm response to market changes and efficient and low-cost industrial and supply chain operations. By bolstering domestic manufacturing competitiveness, digital technology keeps manufacturing enterprises from relocating elsewhere, builds upon the strength of traditional product exports, and supports enterprises in exploring international markets.

3.5 User Participation and Value Co-Creation Promote Business Mode Innovations

In the context of digitalization, business modes have shifted from product- and service-centric to user- and consumer-centric. Only those products and services that increase user participation and satisfaction will meet individualized and differentiated consumer demand. Consumer demand analysis with the help of digital tools may create new value for users and businesses. Instead of passively receiving products and services, consumers take an active part in the design and delivery of products and services, which gives them a sense of self-realization. Such a unique experience will greatly increase user stickiness. For manufacturers, user participation in the design, development and manufacturing of products and services to some extent helps bring down corporate operational costs. User participation and value co-creation contribute greatly to corporate competitiveness, openness and innovation. Such a business mode that reflects and meets consumer demand is more holistic and systemic. It is also harder for competitors to emulate and thus more competitive.

4. Challenges for Manufacturing Digitalization Driven by Digital Consumption

With the advent of the digital era, digital transition has become a natural choice for Chinese manufacturers to cope with the rising cost of production, ramp up innovation for better product and service quality, and jettison factor-driven growth and low-cost competition models. In the face of strong digital consumption growth, challenges exist in China's manufacturing transition.

4.1 Lack of Digital Awareness and Top-down Design

Some traditional manufacturing enterprises are ill-informed about and underprepared for digital transition. Without a clear clue about consumer-centric innovation, they struggle to meet differentiated consumer demand in the digital era. The imminence and game-changing nature of the digital transition are not well understood. With an ostrich mentality, some manufacturing enterprises have refused to embrace digital transition and therefore lost market share. Another problem is the lack of adaptability. Traditional manufacturers often find it challenging to re-purpose their existing resources and innovation capabilities to develop products and services for the digital consumer market. Their slow response to an ever-changing market, coupled with supply-demand uncertainties, makes it hard for them to seize market opportunities. At the national level, despite the great importance attached to developing the digital economy and supporting manufacturing digitalization, the government has yet to identify clear

goals, requirements, pathways, and implementation steps for digitalization. The lack of clarity about the future of digital transition makes it hard for manufacturing enterprises to make determined steps towardsdisruptive digitalization under a long-term plan with clear goals and directions. What is also missing from the scene is overall strategic planning and a clear approach for transition. In the absence of central coordination, various business systems operate in isolation and cannot share resources and information with each other. In addition, constant improvements should be made to the top-down design. The digital transition should move ahead along the path of the latest technological and market developments. There should be key requirements for the overall progress.

4.2 Manufacturing Industry Remains Ill-Prepared for Digital Transition and Ill-Equipped to Make the Most of Data

China's manufacturing enterprises are ill-prepared for digital transition despite its importance to competitiveness and business diversification. The first shortcoming is their ineptitude to identify digital market. In a fast-changing digital consumer market, those enterprises are incapable of capturing front-end consumer demand and seizing opportunities from new consumer concepts and diverse consumer demand. Second, manufacturing enterprises are clumsy when it comes to applying digital technologies. Long used to traditional business modes, those enterprises are less adaptive to digital applications for management and innovation. Besides, there is little experience and guidance to follow for digital technologies to be swiftly deployed across heterogenous manufacturing sectors. The third problem relates to inexperience to integrate digital information. Instead of being confined to only a few types of resources as in the past, traditional manufacturers have yet to develop capabilities to integrate digital information and extract useful information to stay competitive in the era of digital consumption.

What is also crucial to the digital transition is the data factor, which manufacturing enterprises must learn to use. China's data market is imperfect, and access to such information as data rights and prices is incomplete, creating obstacles to data applications. Another problem is the lack of awareness to make use of data, which is vital to tapping into consumer market potential. Chinese manufacturing enterprises are ill-informed about the value of data and ill-equipped to use data in creating products and services. Their use of data remains insufficient for adapting to heterogenous consumer traits and steering the course of digital transition and upgrade.

4.3 Imperfect Support System for Industrial Digitalization

For traditional enterprises, digital transition entails all-round development throughout the industrial chain to raise the level of digitalization in each link and bring about an improvement of total factor productivity (TFP). Concerning R&D, the lack of consumer data empowerment makes it hard for R&D to move in the correct direction, resulting in a loss of market opportunities. Intelligent and digital applications are essential to improving the traditional manufacturing process, which is important to address the overcapacity of medium- and low-end products and quality gaps. Closed internal processes present grave challenges to business operation and management. In pursuing the digital transition of manufacturing, businesses should beef up their competence to integrate whole-process data and information, speed up digital office, and smart monitoring, among other applications.

The digital transition is underfunded for most firms. First, firms have yet to plan for the financial input for whole-process digital transition and develop a clear-eyed view of overall costs. Second, special government funds are granted on an ex-post basis and too sporadic to concentrate fiscal resources to accomplish major undertakings, nor have such funds catalyzed private investment. Finally, the long investment cycle means a lack of return in the short run, which makes firms hesitate to invest in the digital transition.

4.4 Talent Shortage for Industrial Digitalization

Shortage of digital talent has become a common problem facing the digital transition of many

sectors. Knowledge about information technology is far from enough. What businesses need the most are cross-disciplinary professionals with insights into industrial reality and able to think outside the box. The talent shortage facing China's manufacturing industry in its digital transition is threefold: First, there is a talent mismatch for the digital transition of manufacturing. The multitude of manufacturing sectors with distinctive characteristics and different goals and methods of transition require a diverse range of professionals to complete the digital transition for each sector, but the problem is that such professionals are in short supply. Another problem is the exorbitant cost of digital talent cultivation. Most manufacturing enterprises must choose from digital professionals without industry experience and experienced industry experts without a knack for digital technology. Either way, talent cultivation is costly for enterprises. The risk of job hopping has also deterred enterprises from investing in human capital. Third, manufacturing enterprises are run by industry insiders who know little about digital technology and thus cannot come up with a suitable plan for digital transition. Fourth, digital talent cultivation involves a long cycle. When partnering with universities for joint education programs, businesses should consider the long cycle of educating digital professionals with the right skills.

5. Countermeasures and Policy Recommendations for Promoting Digital Consumption and the Digital Transition of Manufacturing

The nature of the digital transition is to create new value for users. Digital consumption steers the course of product and business innovations by forcing enterprises to make the most of data to perceive changes in demand and engender new business modes. In propelling industrial digitalization, businesses should deepen the user-centric concept and value creation mode and elevate product and service R&D and innovation through whole-process smart digital upgrades.

5.1 Enhancing New Product R&D with Digital Technology Empowerment

Manufacturing enterprises should employ digital applications to enhance digital R&D, develop more competitive products and services, and increase brand influence. The priority is to increase the number of innovative products. Manufacturing enterprises should explore the value of data to precisely identify consumer demand and employ digital technologies for new product development. Vigorous support should be extended to coordinated industrial chain innovation, intellectual property service platform development, and smart product development and application. Second, progress should be made in digital R&D. The government should expedite information coordination across digital industrial chains, encourage the indigenous development of innovative products, establish a database of creative elements and digital resources, promote new business modes such as coordinated innovation and user participation, and set up a public service platform for digital design to support the efficient use of digital resources. Third, businesses should reshape the mode of product development and manufacturing. Production- and consumption-side data resources should be integrated to link supply with demand. Under the innovative mode of collaborative manufacturing, businesses should tap into differentiated consumer demand, create a consumption-driven organizational mode, and explore new modes of individualized production and supply for digital technology to empower product and service consumption. Fourth, businesses should promote integrated green product design and manufacturing, develop green products with the support of digital technology, increase the supply of green products, and develop "Internet+" and "smart+" recycling and shared service modes.

5.2 Digital and Intelligent Upgrades to Improve Quality and Stay Competitive

Digital consumption will drive the digital and smart transition and upgrade, contributing to better quality, performance, and user experience. The priority is to step up digital renovations. Businesses should be guided to digitalize their full business cycle from R&D to manufacturing, business

operation and management and market services, expedite intelligent upgrade and application of critical technologies, and enhance digital management by accessing cloud platforms for a swift digital transition. Second, businesses should develop a digital tracing system. Where applicable, they should employ digital technology for a quality tracing system encompassing various links from the supply of raw materials to product manufacturing, consumption and marketing. They should make full use of tracing data, provide smart monitoring and operational maintenance, and improve product quality to increase user stickiness, public recognition and consumer confidence. Third, businesses should deepen smart supply chain management. Specifically, they should accelerate the deployment of digital technology and equipment, integrate and share data in critical processes, and develop smart supply chain service platforms as part of their overall supply chain management system.

5.3 Strengthening Digital Brand Management for Integrated Design and Brand Development

Businesses should enhance data resource management and analysis, improve management procedures, and make synchronous progress in manufacturing, R&D and brand promotion to beef up brand influence and international competitiveness. First, they should leverage digital technology in brand development. Product design, cultural creativity and technological development should be embedded in brand development to explore the cultural value of brands. Second, digital marketing. Data factor should be fully utilized to create consumer portraits and demand forecasts and develop new brands that spearhead stylish consumption. Businesses should be guided to develop smart stores with diversified consumption occasions to meet various consumer demand, achieve precise brand orientation, and raise brand awareness and social value. Third, the government should increase the supply of public services for digital transition and create a favorable environment for brand building. Digital technology should be employed to assist brand development, improve brand management procedures, and realize online and offline coordination. Businesses can rely on cross-border e-commerce to increase their brand influence and explore market diversification. Fourth, digital marketing tools should be employed to increase brand influence and highlight distinctive strengths to promote brands with influence and product value-added.

5.4 Creating a Differentiated Service System to Assist Manufacturing Digital Transition

High-quality development cannot be achieved without digital empowerment of manufacturing products and services. Businesses should take the initiative to digitalize, explore the value of data resources, and meet differentiated consumer demand. First, they should make the most of the data factor. Data should be combined with product and service innovations to speed up data processing capabilities, achieve data interoperability throughout all processes, and identify and address user demand based on digitally collected information. Second, businesses should improve the level of digitalization across various links of their products and services. From product promotion to business transactions, they should enhance digital service concept, allow users to take part in R&D to increase their self-esteem, and establish social networking communities to increase user stickiness. It is also important to digitalize business transactions and broaden online after-sales channels to enhance user experience while addressing differentiated service needs. Third, businesses should develop safe and efficient service modes such as security management mechanisms for intelligent risk monitoring. Digital transition will bring consumers closer to the brand by letting them experience services for win-win cooperation, reduce corporate operational cost, and offer targeted services based on individualized attributes. Fourth, businesses should reward consumers for their feedbacks. Consumer demand and after-sales feedback data are key information for product and service innovations. Encouraging consumers to report their experience and demand will increase their sense of gain and user stickiness.

5.5 Improving Top-down Design and Digital Resource Allocation

A clear-cut development path is of vital importance to corporate digital transition. First, businesses

should establish a top-down design program for digital transition to communicate the goals, pathways and implementation steps to all staff. They should establish a complete system for talent recruitment, evaluation and improvement to foster digital professionals. Second, the government should focus its investment on core industries for digital transition to foster exemplary enterprises for digital transition. Third, the government should encourage enterprises to access cloud computing, apply information technologies, and concentrate corporate resources on cloud platforms. This will help improve productivity, managerial efficiency, business coordination and resource allocation to support data-driven new ecosystems. Fourth, businesses should implement digital transition in various links of the supply chain and integrate data, innovation, and industries throughout upstream and downstream supply chains. Moreover, they should fully access digital R&D resources from research institutions, universities and professional institutions and support the development of key laboratories and innovation platforms in the digital economy domain. Investment should be made in critical digital industries and bring about breakthroughs in key technologies.

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