The Influence of Digital Transformation on Company Performance in the Chinese Baijiu Industry: Mediating Role of Servitization

Minghai Liu

Dissertation presented to Rajamangala University of Technology Phra Nakhon
as part of the study of the Doctor of Business Administration Program
Academic Year 2024

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ABSTRACT

In the context of the global economic recession, China's Baijiu industry is facing a decline in output and an increase in sales revenue and profits among leading enterprises. This phenomenon highlights the essential need for digital transformation in enhancing performance. This research examines the correlation among digital transformation, servitization, and company performance, presenting a theoretical framework comprising four assumptions. This study collected data from 515 employees in 50 Baijiu companies in Sichuan Province, each with an annual output value exceeding $2.85 million. This study performed reliability and validity assessments, confirmatory factor analysis, and regression analysis using SPSS and AMOS software to validate the proposed model.

The results indicate that digital transformation enhances enterprise performance by boosting efficiency and reducing costs, while servitization plays a mediating role, amplifying these benefits. These findings suggest that Baijiu companies should prioritize service-oriented strategies alongside digital innovations to achieve long-term success. By leveraging the synergies between digital transformation and servitization, enterprises can strengthen competitiveness and navigate economic challenges effectively. This study provides a strategic roadmap for Baiiiu companies to optimize their performance in an increasingly digitalized market environment.

Keywords : Digital Transformation, Company Performance, Servitization, Chinese Baijiu Industry

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Chapter 1
Introduction

This chapter examines "the Influence of Digital Transformation on the Performance of Chinese Baijiu Companies," detailing the research background and relevance, objectives, and scope.

1.1 Background and Significance of the Problem

Over the past four decades, China's economy has experienced rapid growth, and the development of companies has consistently advanced. Chinese Baijiu companies are significant contributors to China's economy, facilitating high-quality growth (CIIC, 2022). In 2022, China had 963 Baijiu companies classified as above-defined size, possessing total assets of 163.8 billion US dollars and generating sales revenue of around 92.4 billion US dollars (Sina, 2023). The Baijiu industry holds a significant role in the Chinese national economy.

As of January 1, 2021, Chinese officials altered the English designation of Chinese Baijiu from "Chinese distilled spirits" to "Chinese Baijiu." Alongside brandy, whiskey, vodka, rum, and gin, it is recognized as one of the world's six distilled spirits (Qiancheng, 2021).

Prominent brands of high-end Baijiu include Moutai, Wuliangye, Luzhou Laojiao, Fenjiu, and Jiannanchun. As the representative of Chinese Baijiu from Guizhou and Sichuan, its market share exceeds fifty percent of the Chinese Baijiu market (Li & Zhang, 2022). China's premium Baijiu has transcended its product characteristics, amalgamating consumer goods, luxury items, and financial instruments. In April 2020, the market capitalization of Kweichow Moutai Baijiu on China's A-share market approached 220 billion US dollars. At that time, Coca-Cola's market capitalization was approximately 210 billion US dollars. Kweichow Moutai stock attained the highest market capitalization among global food and beverage stocks (Chen, 2020).

In recent years, the rise of artificial intelligence, blockchain, cloud computing, big data, and the Internet of Things has been bringing changes to the world economy (Rosenbloom, 2000; Sia et al., 2016). Digital transformation can decrease product costs by 17.6% and augment revenue by 22.6% for manufacturing companies, diminish product costs by 34.2% and enhance revenue by 33.6% for logistics services, and lower product costs by 7.8% while boosting revenue by 33.3% for the retail sector (Fatorachian & Kazemi, 2021). Through digital transformation, Baijiu companies have reduced product costs by optimizing supply chain management, improving production efficiency, and predictive maintenance (Chidozie et al., 2024).

Using the Chinese Baijiu company as a case study, according to the data from the National Bureau of Statistics of China, the total output of Baijiu produced by large-scale enterprises will decline by 5.58% year on year in 2022. However, sales revenue increased by 5%, and profits increased by 9.64% (Zhang, 2023). Amidst diminishing production capacity, both sales income and profits are rising. Insiders assert that, in recent years, numerous leaders in the Chinese Baijiu industry have attained precision marketing, personalized service, and brand promotion via digitalization within China's marketing innovation, thereby enhancing brand awareness and market share (Li, 2025).

In light of the swift expansion of the digital economy and ongoing efforts to achieve profound integration with traditional enterprises, the study of enterprise digitization and performance has emerged as a prominent subject of academic interest (Ravichandran & Liu, 2011). From the standpoint of organizations, digital technology serves as an operational resource. Digitization serves as both a foundation for innovation and entrepreneurship and a beneficial factor in enhancing organizational performance (Lusch & Nambisan, 2015; Nambisan, 2013; Nambisan et al., 2019). This improvement is due to digital technology's capacity to facilitate intelligence collection, decrease expenses, and broaden service objectives. By utilising sophisticated technologies, like big data and the Internet of things, organisations may more accurately predict equipment breakdowns and improve consumer engagement, thereby expanding their reach to a broader audience (Patil et al., 2024; Wang, 2021). Despite digitization not being a novel phenomenon, it persists in evolving and

transforming the interactions and value exchanges between enterprises and consumers (Yadav & Pavlou, 2014). To address the demands of enhancing skills in the digital era, these objective realities have compelled organizations to increasingly focus on the development of digital competencies throughout digital transformation (Yu & Moon, 2021).

Research indicates that the coordinated advancement of digital infrastructure and digital application capabilities is a crucial element for organisations undertaking digital transformation (Li et al., 2021). The establishment of business digital infrastructure is the essential physical prerequisite for executing digital transformation and serves as the fundamental foundation for the advancement of the digital economy. Digital infrastructure encompasses both novel information systems and certain conventional physical infrastructures that have undergone digital transformation. Digital infrastructure underpins various innovative enterprises, including the sharing economy, social media, and mobile information services (Greenstein, 2019). For manufacturing company, the digital infrastructure capabilities of the corporation serve as the fundamental assurance for executing various operational tasks, including online marketing, product promotion, and sales services.

Digital application capability denotes an enterprise's proficiency in utilising information and digital technologies to enhance product development, delivery, service improvements, and user engagement while leveraging the current digital infrastructure (Arkhipova & Bozzoli, 2018). Robust digital application capabilities significantly enhance manufacturing organisations' production efficiency, service efficiency, innovations in service formats, and value creation. Manufacturing organisations can use digital tools to obtain and analyses customer data, product status data, and market data, enhancing interactions with service network partners and improving organisational performance (Heredia et al., 2022). In the marketing strategies of Chinese Baijiu companies, digital application capabilities have enabled these companies to accurately assess product conditions and market data, facilitating effective consumer engagement and enhancing company performance.

Simultaneously, digital transformation has enhanced the service quality of manufacturing companies, significantly augmenting their operational, research and development, and consulting services through better digital application capabilities. The current market is dynamic, particularly due to environmental shifts in technical advancements and consumer demands, resulting in uncertainty for existing industrial enterprises. The extent of digital transformation in manufacturing companies directly influences service quality (Gao et al., 2023). Chinese Baijiu companies have achieved notable outcomes in the digital transformation, particularly in refining the supply chain, optimising production processes, raising product quality, improving consumer services, and broadening market channels.

China strongly supports and encourages the deep integration of the digital economy with traditional business. At the same time, businesses are strongly inclining towards digital transformation. It is important to address the need to improve the quality and efficiency of this transformation. How might the augmentation of digital capabilities influence, and in what manner will it impact, company performance? Chinese Baijiu industry, as a traditional industry, it is crucial to study how digital transformation affects company performance to promote the development of the Baijiu industry.

The point of this study is to use structural equation modelling to examine "the influence of digital transformation on performance in the Chinese Baijiu Industry" and intermediary role of servitization. This study will test the research hypothesis through quantitative research.

1.2 Objective of the Research

Digital transformation is a fundamental trend in the evolution of global organizations, particularly in light of the burgeoning digital economy, shifts in customer behavior, and rapid technology advancement. The organizations can streamline operational procedures, elevate service quality, and enhance overall performance through digital methods. Digital transformation is essential for Chinese Baijiu

enterprises. This research primarily examines digital transformation, servitization, and company performance.

The research objectives are mainly four aspects: the influence of digital transformation on the company's performance, the influence of digital transformation on servitization, and the influence of servitization on company performance. Servitization plays a mediating role in the relationship between digital transformation and company performance.

1.3 Research Hypothesis

This study presents the subsequent research hypothesis, grounded in the available literature and research content.

H1: Digital transformation has a positive influence on servitization.

H2: Digital transformation has a positive influence on the performance of Chinese Baijiu companies.

H3: Servitization has a positive influence on the performance of Chinese Baijiu companies.

H4: Servitization plays an intermediary role between digital transformation and company performance.

1.4 Research Framework

A novel generation of information and communication technologies, encompassing cloud computing, big data, the Internet of Things, artificial intelligence, and mobile Internet, is instigating a new wave of industrial revolution and transformation. An increasing number of countries regard the digitalization of manufacturing as a crucial means and foundation for advancing the transformation and enhancement of conventional industries. The Chinese government places significant emphasis on the advancement of manufacturing digitalization. The "Guiding Opinions on Deepening the Internet Advanced Manufacturing" emphasize the necessity of expediting the digital transformation of the manufacturing sector,

fostering the profound integration of advanced information and communication technologies with the real economy, and facilitating the transition of Chinese manufacturing into a new era of high-quality development. Nonetheless, the phenomenon of the "digital paradox" suggests that certain manufacturing companies' digital investments may not yield optimal returns. McKinsey's poll, conducted in September 2018 among 1,773 corporate leaders globally, indicates that over 80% of the surveyed companies had undertaken digital transformation in the past five years; yet, just 14% have realized sustained performance enhancement, this represents only 3% of the company's overall successful performance (Gebauer et al., 2020).

While numerous scholars have explored the challenges of digital transformation from perspectives such as leadership style, corporate culture, and business model development, empirical research examining the performance outcomes of digitalization in industrial firms remains relatively limited (Kharlamov & Parry, 2021). In the evolving sales environment of Chinese Baijiu companies, implementing digital transformation to improve service quality has become a critical strategic consideration. The goal of digital transformation is to embed digital technologies into a firm’s business model and to utilize digital tools to gather real-time market data, thereby supporting stakeholder decision-making and ultimately influencing enterprise performance (Andriole et al., 2017; Gray & Rumpe, 2017; Valdez-de-Leon, 2016). Servitization is a business strategy through which companies enhance customer value by increasing the service components of their offerings, thereby aligning products more closely with user needs (Barnett et al., 2013; Weeks & Benade, 2014). As firms adopt service-oriented models, management responsibilities evolve to accommodate new service objects and value creation activities, necessitating enhanced managerial capabilities to respond to external changes (Lin et al., 2012). The widespread adoption of digital technologies has enabled service diversification and accelerated service innovation, allowing firms to better understand and fulfill customer expectations while significantly reducing the marginal costs associated with servitization (Blichfeldt & Faullant, 2021).

Therefore, this study develops a conceptual model illustrating the relationship among digital transformation, servitization, and company performance in Chinese Baijiu companies. This in-depth empirical study looks at how digital transformation and servitization affect company performance, as well as the role that servitization plays in mediating the relationship between digital transformation and company performance (Figure 1.1).

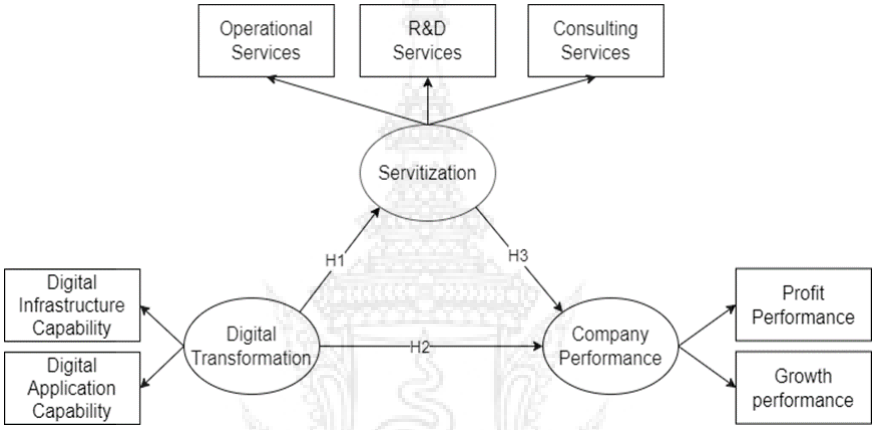

Figure 1.1 Theoretical framework

1.5 Scope of Research

China classifies companies with an annual income of 20 million yuan (about 2.8 million US dollars) as companies above designated size. This study focuses on Baijiu companies of designated size in Sichuan Province, China. The Chinese Sichuan Province is a significant production region for Chinese Baijiu. In 2022, there are 963 large-scale Chinese Baijiu companies, with 294 located in Sichuan Province, representing 30% of such companies in China.

1.6 Definition of Terms

1.6.1 Digital transformation

Digital transformation entails the application of novel digital technologies to effectuate significant enhancements and alterations in business operational, including the improvement of customer experience, the streamlining of processes, or the creation of innovative business models (Fitzgerald et al., 2014; Piccinini et al., 2015). It can also foster organizational process innovation through the application of knowledge, serve as a mechanism to fundamentally transform company performance, and deliver value to customers (Nwankpa et al., 2022; Westerman et al., 2014). Gartner, the preeminent IT research and advisory group globally, describes digital transformation as the advancement of digital technology and supporting capabilities to establish dynamic digital business models (Horlach et al., 2016). The 2021 White Paper on China's Digital Transformation characterizes digital transformation as the profound integration of emerging technologies, including artificial intelligence, cloud computing, and big data, into traditional sectors(Bhatti et al., 2021).

This study defines digital transformation as comprising two dimensions: digital infrastructure capability and digital application capability. Digital transformation is denoted as "DT", digital infrastructure capability as "IC", and digital application capability as "AC".

1.6.2 Servitization

Servitization refers to the transformation of enterprises from merely supplying products to offering supplementary services associated with those products. This concept was first introduced by Vander Merwe and Rada in 1988 and subsequently referred to as the "servitization of manufacturing" by Lightfoot and Smart in 2013. Numerous manufacturing companies are offering supplementary product services in various forms. Servitization pertains to the sale of a product's functionality or services, rather than the product itself (Kanatlı & Karaer, 2022). In the evolution and advancement of service-oriented organizations, there is an increased emphasis on the utility of products and services, with a continual effort to generate utility throughout the product lifecycle (Tao & Qi, 2017).The ongoing evolution of business models

facilitates the transition of organizations from transaction-oriented frameworks (solely offering items) to relationship-oriented frameworks (delivering functions) (Baines et al., 2012). The extensive use of digital technology has facilitated the diversity and accelerated progression of servitization. Chinese Baijiu companies can achieve greater consumer loyalty and enhanced economic advantages through the use of service strategies.

This study defines servitization as comprising three dimensions: operation services, research and development services, and consulting services. Operation services are defined as "OS," research and development are defined as "RD," and consulting services are defined as "CS."

1.6.3 Company performance

Performance is a management term comprising two facets: efficiency and effectiveness (Robbins & Coulter, 2007). Company performance measures how well and efficiently an organization meets its goals within a set time frame. It is an important thing to look at when judging operational outcomes (Mohamad et al., 2017). Company performance not only reflects the company's operational status in a certain period but also reflects the company's progress in achieving long-term strategic goals (Kogan & Pristavka, 2020). Company performance is a multifaceted and intricate variable that poses measurement challenges (Brush & Vanderwerf, 1992), and varying measuring methodologies yield disparate outcomes (Sapienza & Grimm, 1997). The complexity of the company's performance evaluation arises from factors such as financial position, market competitiveness, and future expansion. No solitary indicator can encompass these dimensions. Consequently, no solitary metric can thoroughly and precisely assess the company's performance (Jobira & Mohammed, 2021; Kotane, 2016).

This study defines company performance as comprising dimensions: profit performance and growth performance. Profit performance is represented by “PP”, and growth performance is represented by “GP”.

1.7 Expected Benefits

The ongoing advancement of information technology has increasingly garnered the attention of the academic community regarding studies on digital transformation. This research creates a research framework that looks at digital transformation, servitization, and company performance. It also comes up with four hypotheses to help explain how digital transformation affects service-based business and company performance. This study is different from others because it uses a quantitative research method and uses servitization as a mediating variable between digital transformation and company performance. This fills a gap in the academic literature by studying digital transformation, servitization, and company performance.

Simultaneously, digital transformation has garnered increasing attention from manufacturing companies and has emerged as a new catalyst for company performance enhancement. This study focuses on Chinese Baijiu companies, aiming to elucidate the relationship between digital transformation, servitization, and corporate performance, which is crucial for understanding how these companies can leverage digital transformation and servitization to enhance company performance.

If the hypothesis of this study is validated and the research objectives achieved, the findings could provide valuable insights for Chinese Baijiu companies in their digital transformation and servitization, thereby enhancing market competitiveness. Additionally, it may offer relevant recommendations for manufacturing companies to improve company performance. Concurrently, government agencies can leverage the research findings to formulate pertinent policies that more effectively correspond with the changing market dynamics in the Baijiu industry and other manufacturing sectors, thus promoting superior economic and social progress.

Chapter 2
Theory and Related Document and Research

This chapter examines the influence of digital transformation on the performance of Chinese Baijiu enterprises, focusing on relevant concepts and theories pertaining to digital transformation, servitization, and company performance, alongside both domestic and international research. This study proposes research hypothesis and conceptual frameworks based on literature research.

2.1 Technical Innovation Theory

In 1912, Joseph Alois Schumpeter proposed the innovation thesis centered on technology, articulating that technological innovation facilitated the evolution of economic structures (Mrz, 1965). The idea demonstrates that innovation is a dynamic process, and technical advancement signifies the creation of a new economic growth paradigm (Zawdie, 2010).Throughout the majority of the 20th century, the Keynesian Revolution and its neoclassical framework in macroeconomics predominated the discourse of mainstream economics, whereas innovation theory assumed a heretical position (Davidson, 1996). As science and technology assume a more significant role in economic development, the notion of technical innovation has become increasingly acknowledged by researchers, entrepreneurs, and government officials. Schumpeter's innovation theory has been elaborated upon and refined by Nobel laureate Robert Solow and others and has been further enhanced in the "national innovation system" thesis introduced by British economist Freeman in the 1980s (Yoshida, 2004). Schumpeter and his adherents emphasize "innovation" in technological advancement, concentrating on the mechanisms of sustained economic growth and technological progress. In contrast, Keynesianism focuses on studying and controlling short-term changes in the economy (Hulten & Nakamura, 2017).

This study posits that digital transformation is the developmental paradigm of innovative technology companies specializing in big data, artificial intelligence,

blockchain, and cloud computing. Fundamental data and user information furnish the organization with the necessary facts and technical foundation to achieve technological innovation. Digital transformation is a prominent focus of contemporary policy and investment. Digital transformation can serve as a "signal" in the marketplace. The automatic monitoring feature enables corporate digitalization to avert executives from intentionally obstructing or postponing accurate information (Saunders & Brynjolfsson, 2016). Enterprises engaged in digital transformation will garner increased attention from policymakers and investors, facilitating financial support for technical innovation. In summary, the theory of technological innovation offers a robust theoretical foundation for this investigation.

2.2 Dynamic Capabilities Theory

The dynamic capabilities theory is a management framework established in the 1980s, highlighting that a firm comprises a set of resources and that its competitive advantage derives from the resources it holds, including its inherent capabilities (Foss, 1997). A corporation comprises a set of capabilities, with its competitive advantage mostly derived from its core competences (Xie, 2021). This perspective asserts that the sustained accumulation of core competences derived from internal knowledge is essential for a company's distinctive competitive advantage; nevertheless, these competencies become unsustainable in a dynamic environment due to their prolonged development and accumulation. To reach the strategic goal of dynamic capabilities in a market and technology environment that is always changing, it is important to efficiently acquire, allocate, integrate, and improve the skills, experience, and knowledge needed for value creation activities across a wide range of internal and external organizational resources (Teece, 2023; Wataru et al., 2015; Zollo & Winter, 2002). Dynamic capability theory shows that the external environment of an enterprise is dynamic, and its own capabilities are also dynamic (Eisenhardt & Martin, 2000; Morgan et al., 2009). Enterprises must constantly adapt to the dynamic business environment and enhance their market competitiveness through novel alternatives and conversion of available resources (Eriksson, 2014; Makadok, 2001).

2.3 The Concept

2.3.1 Digital Transformation

Patel and McCarthy (2000) were among the initial proponents of the concept of digital transformation. The current study indicates that scholars concentrate on two aspects of the definition of digital transformation. One perspective highlights the auxiliary function of digital technology, asserting that digital transformation constitutes an enhancement and evolution following the advancement of information technology. The objective is to integrate digital technology into the enterprise's business model and to intelligently gather market information via digital technology to support decision-making for stakeholders, ultimately influencing the enterprise's performance (Andriole et al., 2017; Gray & Rumpe, 2017; Valdez-de-Leon, 2016). The alternative perspective highlights the organizational modifications generated by digital transformation. Academics assert that digital transformation involves the implementation of digital technologies by organizations to fundamentally alter existing business models, organizational frameworks, and management practices; hence, establishing new business models to enhance production efficiency (Singh et al., 2020).

Digital transformation is a strategic decision for firm advancement in the context of the high-quality development of the digital economy in the contemporary day. Digital transformation is predominantly characterized in studies as the utilization of technology to enhance the innovative practices of organizations, reconfigure and optimize production resources via digital means, and reveal new value functions (Acemoglu, 2003). In this study, digital transformation refers to the capacity to enhance the development and delivery capabilities of products and services. It is categorized into two dimensions: digital infrastructure capability and digital application capability (Lenka et al., 2016).

(1) Digital infrastructure capability

The dynamic capability theory says that improving a company's performance depends on both having a lot of resources and being able to effectively allocate, exploit, and use those resources. Dynamic skills help companies deal with

problems in a complicated and uncertain world, and they stay ahead of the competition for a long time by constantly coming up with new ideas and improving old business models (Khaligh et al., 2020; Lin & Tsai, 2016). For companies to be able to adapt to a changing environment and show off their competitive advantages in the digital transformation, they need to use information technology, especially new technologies (Alanudin, 2024). This argument and the theory of dynamic capabilities say that a company's digital infrastructure capability shows how well it can build digital technology infrastructure that meets business needs and strategic goals. It is an important skill for digital transformation and data acquisition (Nwankpa & Roumani, 2016).

(2) Digital application capability

Studies indicate that the integration of digital technology into corporate processes might yield increased market intelligence, thereby improving organizational competitiveness (Sambamurthy et al., 2003). By integrating digital technology into the sales process of its products, the company may swiftly adapt to alterations in the competitive landscape and effectively respond to market fluctuations (Bharadwaj, 2000). This study defines digital application capability as a company's proficiency in utilizing information and digital technologies to improve product offerings and delivery (Wielgos et al., 2021)

2.3.2 Servitization

The incorporation of supplementary services into products originates from the principle of 'everyone is in service' (Levitt, 1972). In 1988, Vandermerwe and Rada (1988) coined the term 'servitization', which later transformed into the 'servitization of manufacturing' concept.

Servitization originally denoted the transformation of manufacturing companies' business structures from an "integrated package" of products and services to a "comprehensive package" encompassing a variety of components, including products, services, and information (Vandermerwe & Rada, 1988). The progression of the service-oriented process is elevating the significance of supplementary services within the "comprehensive package," thus facilitating the company's transition to

a service-oriented model (Schnürmachera et al., 2015). This transformation is a business model for the company to enhance customer value by increasing service content, making its products more in line with user needs (Barnett et al., 2013; Weeks & Benade, 2014).During the service-oriented expansion, service-oriented objects were added to the company's management tasks. This meant that management practices had to be improved to keep up with changes in the outside world (Lin et al., 2012). This evolution progressively disseminates a service-oriented approach throughout the entire value system of the company, leading to the establishment of an internal service system (Alghisi & Saccani, 2015). Initially, the innovation of "comprehensive packaging," aimed at manufacturing the company's products and services (Kowalkowski, 2011), progressively shifted toward addressing client wants, hence enhancing the company's market competitiveness (Nasirov & Castaldi, 2025).

In summary, servitization is a strategic transformation process enabling manufacturing organizations to attain competitive advantages, enhance organizational capabilities and process innovation, and transition from selling items to offering product-service systems (Kowalkowski et al., 2017). The extensive use of digital technology has facilitated the diversification and rapid transformation of services, enabling a better understanding and fulfillment of consumer expectations while significantly lowering the marginal costs associated with the company's servitization efforts. This study defines servitization as encompassing operational services, research and development services, and consulting services (Partanen, 2017).

(1) Operational services

Operational services refer to the internal management and operational activities associated with servitization, including enhancements in internal management, modifications to the service network, implementation of service plans, and advancements in service technology. The purpose of these actions is to enhance service in the new market environment (Ambroise et al., 2016; Momeni, 2021; Reim et al., 2019; Sholihah et al., 2020).

Operational services play a crucial role in service-oriented development, and research indicates a profound internal relationship with digital

transformation. A holistic service-oriented strategy would be negated in the absence of diverse digital technologies, which would prevent data collection, inventory analysis, and product Operational applications. Efficient data analysis and user experience can deliver fundamental services for firm products and enhance customer value by optimizing product utilization (Ardolino et al., 2018; Kohtamäki et al., 2019; Martín-Peña et al., 2019).

(2) Research and development services

The research and development services are very important to the company's service implementation. This is most clear in the way that research and development services has changed over time from focusing on products to including more service-related content, such as internal innovation and the creation of service products (Kohtamäki et al., 2013). Other research shows that research and development services in servitization can become more efficient by working together across departments. This can also help make the service model more flexible so it can adapt to changes in the outside world and user needs (Kohtamäki, Einola, & Rabetino, 2020; Sánchez-López et al., 2024).

The objective of research and development services is to create new or enhanced goods that address the specific and individualized requirements of customers. This is a crucial aspect for assessing the quality of service-oriented services (Partanen, 2017).

(3) Consulting services

The consulting services are a crucial component of the service implementation process. It primarily offers clients strategic assistance, business consulting, technical consulting, and related services. Its objective is to assist users in resolving difficulties, overcoming challenges, or optimizing product utilization. (Kohtamäki, Einola, & Rabetino, 2020).

The consulting services are crucial for broadening the scope of service-orientated offerings. During the implementation of service-orientated services, consulting can effectively clarify and present product performance to consumers, as well as offer guidance on product-related business matters. (Partanen, 2017).

2.3.3 Company Performance

The economic community lacks a comprehensive consensus on the definition of company performance. Some academics say that company performance is a market force that uses financial indicators to figure out how much a company can charge, and the input-output ratio to figure out how efficient a company is with its inputs (Pratama, 2014; Ranjan & Nayak, 2024). that performance is the outcome of a company's endeavors to attain its objectives (Wau, 2021). Another approach focuses on the process of company performance, saying that performance is an observable process and an external manifestation of the practical actions of employees, with different causes having different effects on the results (Campbell, 1990). From this viewpoint, the efficacy of company performance is a behavioral phenomenon. Differentiating between performance and conduct is crucial. Certain researchers assert that organization performance encompasses the integration of business procedures and outcomes, whereas behavior refers to the acts undertaken by people to fulfill duties, acting as the conduit for the organization to attain results. Consequently, company performance must encompass both behavioral and outcome dimensions, and the realization of outcomes necessitates dependencies (Abdel-Basset et al., 2020).

Company performance is a notion manifested through several dimensions or indicators (Dess & Lumpkin, 2005). Experts have systematically researched company performance, defining it as the effectiveness of company operators and the efficiency of operations throughout a specific operational period (Suzan & Ardiansyah, 2023). Certain experts contend that company performance can be assessed through aspects such as customer happiness and loyalty, market share, brand equity, and sales growth, among others (Obafemi et al., 2023; Sugiat & Sudirman, 2024; Vikranof, 2024). Certain experts contend that the assessment of company performance may need to be subjective, including two dimensions: market performance and managerial performance. The former include metrics like market share, sales growth rate, and profitability, whereas the latter comprise indices of service quality and the development of new products or services (Delaney & Huselid, 1996; Yusuf, 2002).

Certain analysts assert that company success encompasses profitability, profit margin, service quality, and other factors. Profitability encompasses two aspects: the profit aspect and the growth aspect. The profit dimension comprises three relative indicators: fixed asset return rate, investment return rate, and sales profit rate; the growth dimension encompasses three absolute indicators: increase in employee numbers, profit growth rate, and sales growth rate (Yusuf, 2002). Certain researchers contend that a company's reputation, product innovation, profit margin, and market growth rate serve as metrics for assessing its performance (Dowlatshahi & Cao, 2006). This study posits that company performance is indicative of a firm's operational efficacy, with profit performance and growth performance collectively comprising overall company performance (Covin & Slevin, 1993; Yusuf, 2002). This study will utilize the primary research findings of both local and international researchers and assess company performance through two dimensions: profit performance and growth performance (Hogan & Coote, 2014). This study will employ subjective evaluation methods to assess company performance in relation to data collection in the interim.

(1) Profit performance

The indicators of a company's profit performance, such as return on fixed assets, return on investment, market share, profit margin, and cash flow, offer precise guidance for corporate decision-making and reflect the company's primary operational and financial conditions over a brief period (Covin & Slevin, 1993; Yusuf, 2002).

(2) Growth performance

The growth performance indicators of a company, such as sales growth, employee count, market share expansion, and profit increase, signify market size, market expansion, and long-term trends that facilitate sustained development (Covin & Slevin, 1993; Ireland et al., 2005; Kaplan & Norton, 2004; Venkatraman & Grant, 1986; Wiklund, 1999; Yusuf, 2002). Certain researchers contend that growth performance serves as the most effective predictor of both long-term and short-term fluctuations inside a corporation (Hoy et al., 1992). In conclusion, growth indicators are more

precise and readily accessible for assessing corporate success, hence they are widely utilized by scholars (Wiklund & Shepherd, 2005).

2.4 Related Research and Hypothesis

2.4.1 Digital Transformation and Servitization

Manufacturing servitization is a strategic change whereby manufacturing companies enhance their organizational capabilities and processes to transition from selling commodities to offering product service systems, hence securing a competitive advantage (Kowalkowski et al., 2017). This service-oriented transformation is heavily dependent on the support of emerging technologies such as the Internet of Things, cloud computing, and big data. The widespread adoption of digital technologies has significantly accelerated and diversified the process of servitization. On one hand, it has expanded opportunities for service innovation within manufacturing firms and broadened the scope of service business models. For example, China's Sany Heavy Industry Group has embedded sensors and location modules into its machinery, enabling real-time monitoring of operational conditions by the company's headquarters. Through data analysis, the company provides predictive maintenance services for clients and even supports governmental economic decision-making through big data insights. On the other hand, digital technologies facilitate the development of new service offerings, promote a shift from transactional to relational customer engagements, and enhance the processes of value proposition, value delivery, and value capture (Kharlamov & Parry, 2021). Similarly, China's Wuliangye Baijiu Group has established a global data platform that enables real-time, unified management and analysis of internal and external data resources. This allows the company to accurately identify consumer preferences and behavior. For instance, customers can verify product authenticity instantly by scanning a code, which in turn enhances brand trust and loyalty. This service-oriented digital transformation enhances client engagement and value creation in the service domain. Moreover, digital platforms built on big data technologies have improved firms' capabilities to acquire, process, analyze, and operationalize data (Kohtamäki et al., 2019). Reliable

and comprehensive data support enables firms to better understand and meet customer needs, while simultaneously reducing the marginal costs associated with expanding service-oriented business models. This study proposes the following hypothesis:

Hypothesis1 (H1): Digital transformation has a positive influence on servitization.

2.4.2 Digital Transformation and Company Performance

Digital transformation is a strategic approach through which organizations leverage digital technologies and capabilities to innovate their business models and restructure corporate ecosystems, thereby promoting business innovation and sustainable growth. Its core lies in the application of digital technologies and the reconfiguration of enterprises processes, structures, and organizational frameworks (Ritter & Pedersen, 2020). Within the digitalization paradigm, firms can achieve competitive advantages through various mechanisms: enhancing process efficiency via modular division of labor, fostering technological innovation through open collaboration, and improving product functionality by means of cross-industry integration. Digital technologies support enterprises in adopting scalable production techniques, increasing operational efficiency, and reducing costs. Simultaneously, they enhance customer experience, improve responsiveness, and enable precision marketing through personalized customization and service extensions. These strategies address the increasingly diverse and individualized demands of consumers, allowing firms to deliver value at reduced costs and thus improve overall business performance (Buchi et al., 2018). Moreover, digitalization strengthens organizations' capabilities in knowledge acquisition, information processing, and learning. It enhances flexibility, agility, and adaptability, enabling companies to respond more effectively to dynamic environmental changes. This, in turn, facilitates the rapid integration of internal and external resources, accelerates the adoption of new technologies, and expedites product development—ultimately reinforcing competitive advantage (Rialti et al., 2019). By fostering innovation in both organizational processes and product offerings, digital transformation improves collaboration across the business

ecosystem, enhances the integration of innovative activities among partners, and enables firms to swiftly meet individualized customer needs, thereby achieving differentiated competitive positioning. Recent empirical studies have confirmed a strong positive relationship between digitalization and firm performance. Therefore, this study proposes the following hypothesis:

Hypothesis2 (H2): Digital transformation has a positive influence on the performance of Chinese Baijiu companies.

2.4.3 Servitization and Company Performance

Servitization is the primary method for manufacturing companies to enhance their profit margins and achieve sustainable competitiveness in the setting of the Internet. The servitization of manufacturing must be accomplished using advanced service systems (Baines et al., 2013). In recent years, numerous manufacturing companies have embraced a service-oriented strategy, transitioning from a product-centric approach to a customer-centric one, and evolving from transactional interactions to collaborative partnerships. The service-oriented transformation of manufacturing companies has emerged as the most dynamic catalyst for enterprise value enhancement (Kowalkowski et al., 2017). Manufacturing companies can leverage the unique service qualities that are challenging to replicate to provide consumers high value-added services, including remote Operational and maintenance, as well as system solutions. By establishing distinct advantages via "product service," they can improve their business performance and market competitiveness. Secondly, in the realm of service-oriented development, value creation has transitioned from a primary focus on companies to a collaborative effort with customers. During product design, research and development, production, and after-sales support, companies and customers can engage in communication and collaboratively create value. Consumer goods manufacturing companies, including those producing domestic appliances, furniture, and Baijiu, may precisely discern customer wants and deliver customized items through the utilization of big data, the Internet of Things, and modular technology. Conversely, it can also reduce response time to user demands, swiftly address customers' personalized requirements with cost

efficiencies, enhance the shopping experience, and secure customers as a vital scarce resource and a sustainable source of competitive advantage for enterprises. Ultimately, servitization enhances the buildup of social capital within manufacturing companies. Manufacturing companies implementing a service-oriented strategy should evaluate resource utilization and environmental effects of products across their full lifecycle, encompassing research and development, design, production, recycling, and usage. By diligently adhering to corporate social responsibility, they can enhance client loyalty, securing more economic advantages and attaining sustainable firm development. Subsequent scholars employed empirical methodologies to examine the positive effects on business performance. Using 247 Chinese manufacturing companies as examples, researchers looked at the relationship between service innovation strategies and dynamic capability theory. They came to the conclusion that improvements in service strategy can lead to better market performance (Lilong et al., 2017). This study proposes the following hypothesis:

Hypothesis3 (H3): Servitization has a positive influence on the performance of Chinese Baijiu companies.

2.4.4 Servitization Intermediary Role

The process theory model posits that information technology investment must progress through three phases: technology transformation, technology application, and market competitiveness, prior to being converted into enterprise performance (Soh & Markus, 1995). The initial stage involves transforming information technology investments into enterprise information assets; the subsequent stage sees information technology functioning as a productive information asset; the final stage pertains to information technology's impact on company performance. The effective utilization of information technology and its comprehensive application in the second stage is crucial for companies to gain competitive advantages through information technology investments (Soh & Markus, 1995). Certain scholars assert that digitalization must generate value for customers to yield appropriate returns, and service-oriented information technology is both a crucial method for enterprises to create and acquire value and the most efficient means to harness the potential of

information technology (Kohtamäki, Parida, et al., 2020). As the utilization and sophistication of digital technology in organizations expand, the variety and complexity of service innovation models in manufacturing companies will progressively increase. Service-oriented models that prioritize efficiency, flexibility, and innovation can be aligned and integrated with diverse digital technologies, enhancing customer collaboration and value co-creation. This step makes it easier for companies to switch to IT-based services, pure digital services, and a focus on digital services. This way, companies can offer customers low-cost, on-time, convenient, and personalized digital product service packages that give them a competitive edge and improve their overall performance. Relevant studies have also validated similar intermediary pathways. Researchers have determined that digital selection tactics influence service levels and organizational performance via the service-oriented pathway (Coreynen et al., 2017). Digital technology offers fundamental support and prospects for service-oriented transformation, allowing manufacturing companies to derive greater added value (Ardolino et al., 2018). This study proposes the following hypothesis:

Hypothesis4 (H4): Servitization plays an intermediary role between digital transformation and company performance.

Chapter 3
Research Methodology

The initial two chapters outline the research objectives and present a comprehensive introduction to the pertinent studies on digital transformation, servitization, and company performance. this chapter will employ a questionnaire survey methodology to thoroughly delineate the research strategy, data collection methodologies, and data analysis methods. A thorough examination of the pilot questionnaire survey results was performed to assess its reliability and validity, establishing a basis for the formal study and research.

3.1 Population and Sample

3.1.1 Population

This study delineates its research scope to encompass Chinese manufacturing Baijiu companies. The Chinese Baijiu industry has seen dismal sales in recent years due to the impact of COVID-19 and the global economic situation. The Research Report on the Digital Transformation of the Chinese Baijiu Industry in 2024 indicates that in 2023, Baijiu companies classified as above designated size in China (those with an annual output value exceeding $2.85 million) will generate sales revenue of approximately $108 billion, with a total profit of $33 billion, reflecting a year-on-year increase of 7.5%. Digital technology has become an important part of improving product quality and sales service quality in the Chinese Baijiu industry while also lowering operational expenses. Digital transformation has also become the main reason why Baijiu companies have seen a decrease in market output and an increase in profits (Zhang, 2023).

To thoroughly evaluate the distribution of Chinese manufacturing Baijiu companies and guarantee that the research findings are applicable and representative. The questionnaire survey was conducted in Sichuan Province, China. Sichuan Province, situated in southwestern China, is the preeminent region for Baijiu

production. In 2022, China have 186,500 Baijiu enterprises, with 32,100 located in Sichuan. There are 963 Baijiu companies of recognized size and 294 Baijiu companies located in Sichuan Province. The revenue and production of these 294 Baijiu companies constitute 52% of the nation's total. Consequently, Baijiu enterprises in Sichuan Province are notably indicative in terms of both quantity and production value throughout China.

Manufacturing Baijiu companies in Sichuan are predominantly located in Chengdu, Yibin, and Luzhou. Chengdu is the most populous city in Sichuan Province, hosting the highest concentration of Baijiu enterprises. Yibin City is the site of the renowned Chinese Baijiu Wuliangye, which commands a substantial market share nationwide. Luzhou City is renowned for its distinguished Chinese Baijiu, Luzhou Laojiao and Langjiu, and commands a substantial market share in Sichuan Province. A sampling survey in these regions can more accurately represent the influence of digital transformation on the performance of Chinese Baijiu companies.

This study aims to guarantee the representativeness and scientific rigor of the data. The participants are employees of Baijiu Company, aged between 18 and 60 years. In China, employment is restricted to individuals aged 18 and above, with retirement age set at 60 years. The studied population comprises professional technical and management workers from the technology, finance, and marketing departments, with educational qualifications spanning from university to doctoral levels. Employees from these departments possess a superior comprehension of the company's digital transformation and service-oriented dimensions. Taking these factors into account, the collected samples can give more detailed information about the performance and trends of Baijiu companies in different places, as well as useful information for their efforts to go digital.

3.1.2 Sample

This study primarily analyzes the influence of digital transformation on the performance of Baijiu companies and investigates the mediating role of servitization. The survey data originate from employees of manufacturing Baijiu Company located in Sichuan Province, China. Researchers have thoroughly examined hypotheses

pertaining to sample size in data analysis (Hair, 2010). The sample size for factor analysis should typically exceed 100. Research indicates that a sample size of 50 yields very poor results in factor analysis, 100 results in poor outcomes, 300 produces good results, 500 yields very good outcomes, and 1000 results in exceptionally good findings (Table 3.1). Consequently, this survey uses the stratified sampling approach to improve the precision of the samples. Fifty Baijiu companies are randomly chosen from a total of 294 Baijiu companies. Employed individuals between the ages of 18 and 60 make up the participants.

Table 3.1 Number of samples and suitability

Number of samples	Suitability
50	Not worth it (Very poor)
100	Too little (Pool)
200	Medium
300	good
500	very good

This study and evaluation were conducted with the support of the Sichuan Baijiu Industry Association. The Baijiu Industry Association is a non-profit social entity voluntarily formed by Chinese Baijiu companies, keeping strong connections with local Baijiu enterprises. Before distributing the official questionnaire, relevant professionals from the Sichuan Baijiu Industry Association will clarify the material to the designated representatives of the selected enterprises to guarantee thorough comprehension among all entities. To successfully reduce the impact of respondents' collaboration on survey outcomes and other variables, while acknowledging their genuine constraints, the Baijiu company's office personnel selected 10-12 exceptionally cooperative employees as respondents. The respondents must comprise normal employees, administrative personnel, technical specialists, middle management, and senior executives of the Baijiu organization.

3.2 Study Design

According to the suggested statement, the theoretical model being used in this study is based on the ideas of digital transformation, servitization, and company performance. This study measures these variables through the use of questionnaires and related maturity scales. A large number of Chinese and English-related literatures, as well as mature scales that are already in existence, are combed through in order to produce the basic items of variables. This study then combines these variables with the research object, research purpose, research content, research theory, and research hypothesis included in this work. The procedure is as described below: The first step was for the academic team, which was made up of postgraduates and tutors, to have a detailed discussion about the logic, operability, and precision of each variable measurement item, ask for their opinions, and change and adapt the language. Next, this study did on-site interviews with the management of five different baijiu companies to adjust and add to some of the variable elements. Finally, based on what was said in the academic team discussion and the enterprise field interview, scholars who are excellent at translating between English and Chinese are asked to translate the scale in two directions, fix any sentences that don't make sense or aren't clear, and make the first scale and questionnaire. For the purpose of this study, the Likert scale and the 5-point scale scoring system will be utilized to examine the subject's subjective grasp of the topic. Depending on the current state of affairs at your Baijiu firm, please choose one of the following numbers: 1, 2, 3, 4, or 5 to receive a score. The meanings of the numbers 1 through 5 are as follows: 1 indicates Strongly Disagree, 2 indicates Disagree, 3 indicates Neutral, 4 indicates Agree, and 5 indicates Strongly Agree.

3.2.1 Questionnaire

The survey instrument for this study comprises five sections and a total of 37 measurement items. The initial segment comprises the explanatory section of the survey questionnaire, detailing the research aims, methodologies, and expressions of gratitude to the respondents.

Part 1: The first part of the questionnaire is the explanation section, which provides information on the objectives of the research, the procedures that were used, and the sentiments of gratitude to the individuals who participated in the survey.

Part 2: Fundamental information regarding the Baijiu companies associated with the research subjects, encompassing four measurement criteria: type of enterprise ownership, year of establishment, staff count, and geographical region.

Part 3: Digital transformation Scale. The digital transformation of this study primarily refers to the capacity of the company to make use of information and digital technologies in order to improve product service, in addition to product development and delivery (Parida et al., 2019). The competence of digital infrastructure and the capability of digital applications are the two dimensions that this study has identified as being associated with digital transformation. The capability of digital infrastructure is evaluated using three Items (Li et al., 2021). whereas the capability of digital applications is evaluated using five Items (Khin & Ho, 2019). This questionnaire consists of two dimensions and eight items pertaining to measurement (Table 3.2).

Table 3.2 Digital transformation scale and source of literature

Dimensions	No.	Items	Source
Digital infrastructure capability	IC1	Our company has a digital technology infrastructure that responds to current business needs.	(Li et al., 2021)
	IC2	Our company has a flexible digital technology infrastructure that can quickly support digital transformation.	
	IC3	Our company has the infrastructure to seamlessly integrate digital technology services across the entire company.	

Table 3.2 Digital transformation scale and source of literature (continued)

Dimensions	No.	Items	Source
Digital application capability	AC1	Our company can acquire important digital technologies.	(Khin & Ho, 2019)
	AC2	Our company can identify new digital opportunities.	
	AC3	Our company can respond to digital transformation.	
	AC4	Our company is mastering state-of-the-art digital technologies.	
	AC5	Our company is developing innovative products, services, andprocesses using digital technology.	

Part 4: Servitization Scale. Some researchers say that service is a strategic transformation process that manufacturing companies use to encourage process innovation and improve organizational competency, which gives them a competitive edge (Kowalkowski et al., 2017). The rapid development of services and the diversification of their offerings have both been made possible by the widespread adoption of digital technology. Strong and consistent data support has the potential to improve insights and satisfy customer expectations, all while considerably reducing the marginal costs of service-oriented companies for manufacturing organizations. In accordance with the product life cycle, the Baijiu company considers the impact that its products have on the environment and the resources that are available to them throughout the entire process of research and development, design, production, and customer service. While doing so, they adhere to a strategy that is focused on providing service. Make progress toward the organization's long-term goals in a sustainable manner. A scale consisting of three dimensions and twenty-two measurement items was utilized in this research (Partanen et al., 2017) (Table 3.3).

Table 3.3 Servitization scale and source of literature

Dimensions	No.	Items	Source
Operational services	OS1	Our company has maintenance functions for managing customers.	(Partanen et al., 2017)
	OS2	Our company provides usage services for products.	
	OS3	Our company provides customers with services for product usage steps.	
	OS4	Our company provides outsourcing services.	
	OS5	Our company's products provide performance guarantees.	
	OS6	Our company has excellent marketing services.	
Research and development services	RD1	Our company has the ability to design prototypes.	
	RD2	Our company can develop prototypes and test them.	
	RD3	Our company has the ability to design products.	
	RD4	Our company has the ability to develop products.	
	RD5	Our company can analyse a product's manufacturability.	
	RD6	Our company has factory design capabilities for products.	

Table 3.3 Servitization scale and source of literature (continued)

Dimensions	No.	Items	Source
	RD7	Our company can design product processes.	
	RD8	Our company is research and development-orientated.	
	RD9	Our company can conduct feasibility studies.	
Consulting services	CS1	Our company provides technical consulting services.	
	CS2	Our company provides business consulting services.	
	CS3	Our company provides process-orientated consulting services.	
	CS4	Our company provides training services for product users.	
	CS5	Our company provides product demonstration services.	
	CS6	Our company provides customer seminar services.	
	CS7	Our company provides writing, informal material services.	

Part 5: Company Performance Scale. Company performance encompasses two dimensions: Profit performance and growth performance (Hogan & Coote, 2014). Profit performance comprises four measurement items, while growth performance consists of three measurement items (Table 3.4).

Table 3.4 Company performance scale and source of literature

Dimensions	No.	Items	Source
Profit performance	PP1	Our company has a high market share.	(Hogan & Coote, 2014).
	PP2	Our company has a high profit margin.	
	PP3	Our company has ample cash flow.	
	PP4	Our company has a high net asset return rate.	
Growth performance	GP1	Compared with other companies, the number of employees in our company increased rapidly.	
	GP2	Compared with other companies, our company's sales have grown rapidly.	
	GP3	Compared with other companies, our company's market share has grown rapidly.	

3.2.2 Pilot Study

The measurement items of all variables are derived from existing mature scales. It has been demonstrated in practice that the same scale may fluctuate. In order to establish whether or not the research methods, processes, and plans were appropriate, an evaluation was carried out prior to the official beginning of the primary study (Baker et al., 1994). A pilot study is defined as an initial, limited-scale investigation that is carried out with the purpose of facilitating bigger research undertakings.

The sample size for the pilot study questionnaire should be three to five times the number of items that are included in the questionnaire, according to the recommendations of relevant experts (Comrey, 1988; Wallston et al., 1978). Five to ten representative Baijiu enterprises will get the anticipated quantity of questionnaires that will be distributed by the personnel of the Baijiu industry association. In total,

there were 37 test questions included in this study, and 155 questionnaires were distributed, retrieved, and validated as authentic.

3.3 Reliability

The reliability coefficient reflects the consistency, stability, and reliability of the measurement data, ensuring that the test produces consistent results over time and across different conditions. Internal consistency is often used to indicate the reliability of the test, measuring how well the items on a scale are correlated with one another. The higher the reliability coefficient, the higher the consistency, stability, and reliability of the measurement results. This study uses SPSS software to measure the Cronbach's Alpha coefficient to assess the reliability of the scale. When Cronbach's Alpha > .7, indicates that the internal consistency is acceptable, suggesting that the scale (Kennedy, 2022).

Table 3.5 Presents the findings of this prior study

Independent variable	Cronbach's alpha	Number of questions
Digital infrastructure capability	.799	3
Digital application capability	.880	5
Operational services	.890	6
Research and development services	.932	9
Consulting services	.912	7
Profit performance	.846	4
Growth performance	.790	3
Digital transformation	.823	8
Servitization	.926	22
Company performance	.815	7
Total	.933	37

Table 3.5 shows the results of the reliability analysis. The Cronbach's Alpha and total scores for digital transformation, Servitization, and company performance are all greater than 0.8. This means that the scale data is reliable and stable, making it suitable for further effectiveness analysis.

3.4 Validity

Validity reflects the degree of consistency between the measured results and the content to be examined. The variables involved in this study are relatively common in domestic and foreign research. Therefore, this study uses the principle of repeatedly verified domestic and foreign mainstream scales in the selection of scales. Based on the preliminary survey, the items that are difficult to understand and do not conform to Chinese language habits are adjusted without changing the original content to ensure that the measurement results are highly consistent with the content to be examined.

Table 3.6 KMO and Bartlett's Test

	KMO	**.889**
Bartlett's Test	Approx. Chi-Square	3479.761
	df	666
	Sin	0

Table 3.6 shows the results of the KMO test and Bartlett sphericity test for analysing whether factor analysis can be performed.

If the KMO test is passed (KMO>.6), it means that there is a correlation between the item variables, which meets the requirements of factor analysis:

If the Bartlett test is passed: P<.01 or P<.05, which is significant, factor analysis can be performed.

The KMO test results indicated a KMO value of .889. The Bartlett sphericity test yielded a significant P value of .000**, indicating statistical significance.

A correlation existed between the variables. The factor analysis was efficient, and the extent was suitable.

3.5 Data Collection

Researchers employed primary and secondary data collection approaches in their study. Moreover, this data can provide beneficial frameworks for researchers to develop their investigations.

The specific data collection methods are as follows:

(1) During the research process, Wenjuanxing's online questionnaire collected the main data from the target responses.

(2) Prior to the distribution of the formal questionnaire, the pertinent personnel from the Sichuan Baijiu Industry Association briefed the responsible individuals of the selected enterprises. Upon verifying that all organisations comprehended the questionnaire's substance, the office personnel of the chosen Baijiu company selected 10 to 12 employees as respondents. The participants should comprise ordinary workers, administrative staff, professional and technical personnel, middle-level managers, and senior management of the Baijiu company, after which the questionnaire QR code should be distributed for responses. The response time is approximately 10 minutes. Respondents must scan the QR code on their mobile devices within two days to complete the survey. The team will finalize the answer statistics within two days.

3.6 Data Analysis

The study's procedures required the researchers to carefully review the collected data, as well as the questionnaire responses that were provided by each of the working groups. They also made certain that the material contained in the questionnaires was accurate and helpful. Following an examination of the information obtained from the questionnaires, the researchers assigned numerical values to each questionnaire and put the results of the study in a format that was coded.

A total of 518 questionnaires were collected as a result of the formal collection. Following a comprehensive review, this study determined that 515 of the surveys were valid. In order to carry out a statistical analysis of the information obtained from the questionnaire, this study will make use of SPSS 21.0 and AMOS 21.0 programming languages. The structural equation model's fitting index uses the following criteria (Table 3.7).

Table 3.7 Standards for alignment between model and empirical data

Fit Index	Criteria	Reference
Chi-Square	P≥ .05	(Kline, 2023)
Chi-Square/df	<2-3	(Kline, 2023)
Tucker-Lewis Index (TLI)	>.90	(West et al., 2012)
Goodness of Fit Index (GFI)	>.90	(West et al., 2012)
Normed Fit Index (NFI)	>.90	(West et al., 2012)
Comparative Fit Index (CFI)	>.90	(West et al., 2012)
Root Mean Square Error Approximation (RMSEA)	<.08	(West et al., 2012)
Root Mean Square Residua (RMR)	<.05	(West et al., 2012)

Chapter 4
Data Analysis Result

This chapter analyses and discusses the statistical data (N=515) concerning the influence of digital transformation on the performance of the baijiu industry. This study begins by presenting the demographic data to build a basis for understanding the sample. Subsequently, descriptive statistics will elucidate the primary attributes of the data. This study will then perform reliability and validity analyses to determine the robustness of the study tools. Confirmatory factor analysis will validate the suggested theoretical framework. This study will use correlation analysis to investigate the correlations among various variables. Path relationship analysis will reveal the causal links between digital transformation and the performance of the Baijiu company. The analysis of mediating effects will further investigate the intermediary mechanisms. The summary of hypothesis testing outcomes will yield definitive conclusions. Please read the section description for specific content.

4.1 Demographic Data

The demographic data were sourced from large-scale Baijiu companies in Sichuan Province, China, encompassing respondents of various positions and ages. The specifics are presented in Table 4.1.

Table 4.1 Demographic summary

Name	Options	Frequency	Percentage (%)
Your gender	Male	268	52.04
	Female	247	47.96
Your age	18-25	137	26.60
	26-35	222	43.11
	36-50	110	21.36
	46-55	46	8.93

Table 4.1 Demographic summary (continued)

Name	Options	Frequency	Percentage (%)
Your educational background	Below bachelor's degree	146	28.35
	Undergraduate	275	53.40
	Master's degree student	84	16.31
	Dr	10	1.94
Your positions	Ordinary worker	248	48.16
	Administrator	89	17.28
	Professional and technical staff	139	26.99
	Middle management	32	6.21
	Senior management	7	1.36
Your department	Technical department	120	23.30
	Management department	186	36.12
	Financial department	82	15.92
	City marketing department	60	11.65
	Other	67	13.01
Your years of service	1-3	114	22.14
	4-7	193	37.48
	8-11	124	24.08
	11-20	70	13.59
	21 and over	14	2.72
Nature of the company	Government owned	129	25.05
	Privately run	350	67.96
	Other	36	6.99

Table 4.1 Demographic summary (continued)

Name	Options	Frequency	Percentage (%)
Founding Years	Under 5 years	90	17.48
	5-15	281	54.56
	15 and over	144	27.96
Number of employees	Under 300	149	28.93
	300-2000	272	52.82
	2001 and over	94	18.25
Shore	Chengdu	155	30.10
	Yibin	160	31.07
	Luzhou	150	29.13
	Other	50	9.71

This study retrieved 515 valid samples, examining background variables including gender, age, education, position, and department. The results, presented in Table 4.1, indicate that 52.04% of employees are male and 47.96% are female, reflecting a relatively balanced gender ratio. The age distribution of employees predominantly falls within the 26-35-year range, comprising 43.11%, followed by the 18-25-year range at 26.60%, and the 36-50-year range at 21.36%. Employees aged 46–55 constitute a modest percentage—merely 8.93%. This indicates that the company's workforce predominantly comprises youthful and middle-aged individuals. Education: The majority of employees possess a bachelor's degree or higher, with 53.40% holding a bachelor's degree and 16.31% holding a master's degree. Conversely, employees with less than a bachelor's degree and those with a doctoral degree comprise 28.35% and 1.94%, respectively. The workforce composition consists primarily of ordinary workers, who represent 48.16% of the total employees, followed by professional and technical personnel at 26.99% and administrative staff at 17.28%. Middle management constituted a modest 6.21%, while high management accounted for 1.36%. The management and technical departments are the largest, with 36.12%

and 23.30% of the total workforce, respectively. The finance department, marketing department, and other departments represent a comparatively minor share. The distribution of employees' work experience is broad, with the majority possessing 4–7 years of experience, or 37.48%. Those with 1-3 years and 8-11 years of experience follow, making up 22.14% and 24.08% of the total, respectively. Employees with 21 years or more of work experience constituted a relatively minor fraction. The company is mostly composed of private entities, which constitute 67.96%, while state-owned enterprises represent 25.05%, and other types of companies comprise a minor share. Years of Establishment: Enterprises established between 5 to 15 years constituted the largest share at 54.56%, followed by those established for 15 years or more at 27.96%, while enterprises with less than 5 years of establishment represented a comparatively minor proportion. The employee distribution within the company predominantly falls between 300 and 2000, comprising 52.82% of the total. Companies with fewer than 300 employees make up 28.93% of the total, while those with more than 2001 employees make up a smaller fraction. Region: The company's workforce is dispersed across various regions, with Yibin City and Luzhou City housing 31.07% and 29.13% of employees, respectively, while Chengdu City comprises 30.10%. The remaining regions represent a comparatively minor percentage.

Overall, there was no abnormality in the distribution of the surveyed population.

4.2 Description Statistics

This study uses descriptive statistics to scrutinize the entire data set, characterizing its distribution through metrics like mean or skewness. In a normal distribution, a higher absolute value of kurtosis signifies a steeper data profile, and when the absolute value of kurtosis surpasses 3, it indicates significant deviation from normality (Blanca et al., 2013).

Table 4.2 indicates that the absolute value of kurtosis is below 3, and the kurtosis and skewness values adhere to the principles of normal distribution.

Table 4.2 Descriptive statistics

Variable name	Min	Max	Mean	SD	Skewness	Kurtosis
Digital infrastructure capability	1.000	5.000	3.642	.981	-.890	-.490
Digital application capability	1.000	5.000	3.516	.994	-.676	-.993
Operational services	1.330	5.000	3.533	1.003	-.679	-1.078
Research and development services	1.560	4.780	3.620	.913	-.839	-.910
Consulting services	1.430	4.570	3.536	1.006	-.662	-1.175
Profit performance	1.000	4.750	3.463	1.010	-.648	-1.016
Growth performance	1.000	5.000	3.460	1.052	-.654	-.808
Digital transformation	1.500	4.630	3.563	.876	-.728	-.931
Servitization	1.860	4.550	3.570	.820	-.784	-.929
Company performance	1.290	4.570	3.461	.910	-.611	-1.130

The descriptive statistics of the variables are presented in Table 4.2. The average values of all indicators range from 3.460 to 3.642, indicating a relatively concentrated and consistent distribution, this means that the overall performance of the companies surveyed is pretty good, with no scores that are too high or too low.

The average scores for digital infrastructure capability are 3.642 and those for digital application capability are 3.516. These two elements are fundamental to digital transformation and offer robust assurance for the ensuing digitization process.

The average values for operational services, research and development services, and consulting services are 3.533, 3.520 and 3.536, respectively, all just exceeding the general mean. This information indicates that organisations excel in operations, research, development, and consulting, enabling them to deliver high-quality services to their clients.

The mean values for profit performance and growth performance are 3.463 and 3.460, respectively, which are a little below the overall average. This suggests

that organizations possess potential for profitability and expansion; however, there is still room for enhancement.

The average values for digital transformation, servitization, and company performance are 3.563, 3.570, and 3.461, respectively, this signifies that organizations are excelling in digital transformation, Servitization, and company performance. Enterprises must persist in augmenting their investments in these domains to facilitate transformation and enhancement and thus improve their overall competitiveness.

In summary, the examined Chinese Baijiu companies exhibit a commendable level of digital transformation and associated services; nonetheless, there remains potential for enhancement. The company must persist in fortifying its digital infrastructure, augmenting its digital application capabilities, optimizing operational services, enhancing research and development innovation, providing consulting services, improving profitability and growth metrics, and advancing digital transformation and service-orientated strategies to comprehensively elevate the company's performance. By implementing these strategies, the organization can augment its capabilities and service quality, thereby achieving sustainable development.

4.3 Reliability and validity analysis

4.3.1 Reliability Analysis

In reliability analysis, the Cronbach coefficient is crucial because it measures how consistent a measuring tool is within itself. Its value ranges from 0 to 1, with elevated values signifying enhanced reliability (Namdeo & Rout, 2016). Cronbach's alpha values greater than .7 indicate acceptable reliability; greater than .8 indicates good reliability; greater than .9 indicates excellent reliability; values between .6 and .7 indicate fair reliability; and values less than .6 indicate low reliability (Setyaedhi, 2024).

This study examined the Cronbach's alpha between 7 latent variables and observation items, this test was done to verify the internal consistency of the scale and the correlation between items, as shown in table 4.3.

Table 4.3 Reliability statistics

Variable	Item	Corrected item-total correlation	Cronbach's alpha if item deleted	Cronbach's alpha
Digital	IC1	.587	.741	.783
infrastructure	IC2	.648	.675	
capability	IC3	.628	.697	
Digital	AC1	.687	.829	.861
application	AC2	.670	.834	
capability	AC3	.676	.832	
	AC4	.671	.834	
	AC5	.687	.829	
Operational	OS1	.729	.873	.894
services	OS2	.706	.877	
	OS3	.706	.877	
	OS4	.720	.874	
	OS5	.711	.876	
	OS6	.719	.875	
Research and	RD1	.696	.904	.914
development	RD2	.694	.905	
services	RD3	.737	.901	
	RD4	.677	.906	
	RD5	.741	.901	
	RD6	.711	.903	
	RD7	.66	.907	
	RD8	.674	.906	
	RD9	.707	.904	

Table 4.3 Reliability statistics (continued)

Variable	Item	Corrected item-total correlation	Cronbach's alpha if item deleted	Cronbach's alpha
Consulting services	CS1	.715	.897	.910
	CS2	.723	.897	
	CS3	.726	.896	
	CS4	.719	.897	
	CS5	.758	.893	
	CS6	.728	.896	
	CS7	.719	.897	
Profit performance	PP1	.681	.808	.847
	PP2	.646	.823	
	PP3	.701	.799	
	PP4	.712	.795	
Growth performance	GP1	.657	.695	.793
	GP2	.611	.743	
	GP3	.636	.716	

Table 4.3 indicates that digital transformation comprises two observed variables: digital infrastructure capability and digital application capability. The digital infrastructure capability comprises three items, IC1 to IC3, with a Cronbach's alpha of .783, signifying a high degree of internal consistency among the components. The digital application capability comprises five items, AC1 to AC5, with an overall Cronbach's alpha of .861, signifying a high degree of internal consistency among the individual elements. Servitization comprises three observational variables: operational services, research and development services, and consulting services. The operational service comprises six items, OS1 to OS6, exhibiting an overall Cronbach's alpha of .894, signifying a very high internal consistency of this variable. The research and development services comprise nine items, labelled RD1 to RD9, exhibiting an overall

Cronbach's alpha of .914, the highest among all variables, signifying exceptional internal consistency of the research and development services variable. The consulting service comprises seven items, CS1 to CS7, with a total Cronbach's alpha of .910, signifying exceptional internal consistency of the variable. Company performance encompasses two observed variables: Profit performance and growth performance. The aggregate Cronbach's alpha for profitability performance is .847, while for growth performance it is .793. The internal consistency of these two variables is comparatively high, yet marginally lower than that of other variables.

Cronbach’s alpha values for the seven latent variables exceed .7, signifying strong internal consistency among all variables.

4.3.2 Validity analysis

The Kaiser-Meyer-Olkin test and Bartlett’s test of sphericity are significant indicators of validity. The KMO test assesses the adequacy of correlation among variables for factor analysis suitability. The KMO value spans from 0 to 1. It is widely accepted that a KMO value between .8 and .9 is appropriate for factor analysis; Bartlett's Test of Sphericity is used to detect whether the variables are completely independent. If P < .05, it means that the Bartlett test is significant and factor analysis can be performed (Shrestha, 2021).

Table 4.4 Kaiser-Meyer-Olkin and Bartlett's Tests

	KMO	Chi-Square	df	P
Digital transformation	.884	1687.493	28	.000
Servitization	.962	6497.185	231	.000
Company performance	.872	1497.806	21	.000

Following evaluation, the KMO value for each variable exceeds .8, and the P value is below .05, satisfying the criteria for factor analysis and permitting its application in research, As shown in Table 4.4.

4.4 Correlation Analysis

The Pearson correlation coefficient quantifies the extent of linear association between two variables. The nearer the absolute value is to 1, the more robust the association; the nearer the absolute value is to 0, the more tenuous the correlation. A positive correlation coefficient indicates that the two variables are positively connected. A negative correlation coefficient indicates that the two variables are inversely connected. A correlation value of 0 indicates an absence of a linear relationship between the two variables (Cohen et al., 2009).

From Table 4.5, it can be shown that from the measurement of Pearson correlation coefficient and probability value, all r>0 indicate a positive correlation between all seven latent variables, and all p<.01 indicate a significant association between the seven latent variables. It can be seen that there is a significant positive correlation between the latent variables of this measurement scale.

Table 4.5 Pearson correlation

	IC	DC	OS	RD	CS	PP	GP
IC	1						
AC	.539**	1					
OS	.487**	.268**	1				
RD	.421**	.330**	.571**	1			
CS	.309**	.277**	.530**	.614**	1		
PP	.397**	.353**	.346**	.428**	.335**	1	
GP	.333**	.341**	.286**	.472**	.293**	.563**	1

Note: ** p<.01.

4.5 Confirmatory Factor Analysis

Construct validity, convergent validity, and discriminant validity are three essential components in the assessment of model validity. Collectively, they offer researchers a method to ascertain the validity of the model's measurement outcomes. A model can only be deemed viable and suitable for further research and application when it possesses strong construct validity, convergent validity, and discriminant validity (Henseler et al., 2015). This study employs AMOS 21.0 software to assess the validity of digital transformation, servitization, and company performance, utilising the maximum likelihood method to evaluate the model's parameters and investigating the interrelationships among variables and dimensions to confirm that the measurement model satisfies validity criteria.

Construct validity pertains to the efficacy of a measurement instrument in effectively reflecting the theoretical framework it aims to assess. Confirmatory factor analysis was used in this study to find seven indicators that show how well the model fits: CMIN/DF, GFI, NFI, IFI, TLI, CFI, and RMSEA.

Convergent validity assesses whether several indicators represent the same construct by evaluating the correlation among many variables of the same latent variable. Factor loadings, composite reliability (CR), and average variance extracted (AVE) typically articulate convergent validity, with the benchmarks being factor loadings > .7, AVE > .5, and CR > .7 (Cheung & Wang, 2017).

Discriminant validity assesses the distinctions among several latent variables to confirm that different constructs may be accurately differentiated. The often utilised metric is the square root of the Average Variance Extracted, It is said that a latent variable has good discriminant validity if the square root of its Average Variance Extracted (AVE) is higher than the highest correlation coefficient with any other latent variable (Rönkkö & Cho, 2022). The criterion for evaluation is that the diagonal value exceeds the correlation coefficient with other variables.

4.5.1 Confirmatory Factor Analysis of Digital Transformation Model

(1) Construct Validity

Table 4.6 shows that the fitted values of all indicators of the two latent variables of digital transformation are within the specified range. CMIN/DF is 1.605, which is less than 2, indicating that the model fits the data perfectly. RMSEA is .034, below .08, denoting excellent fit;

GFI is .986, exceeding .9, indicating excellent fit; and NFI is .982, surpassing .9, showing excellent match. The IFI is .993, exceeding .9, signifying a good fit; the TLI is .990, surpassing .9, denoting a good fit; the CFI is .993, exceeding .9, indicating a good fit. The research results show that the two latent variables of digital infrastructure capability and digital application capability have a good fit with all factors.

Table 4.6 Model fit summary for digital transformation

Fit Parameters	CMIN/DF	GFI	NFI	IFI	TLI	CFI	RMSEA
Value	1.605	.986	.982	.993	.990	.993	.034
standard	<2	>.9	>.9	>.9	>.9	>.9	<.08

There exists a robust association between the variables of digital infrastructure capability and digital application capability, as well as a significant correlation between these factors and the question items. This model has a strong fit and robust structural validity (Figure 4.1).

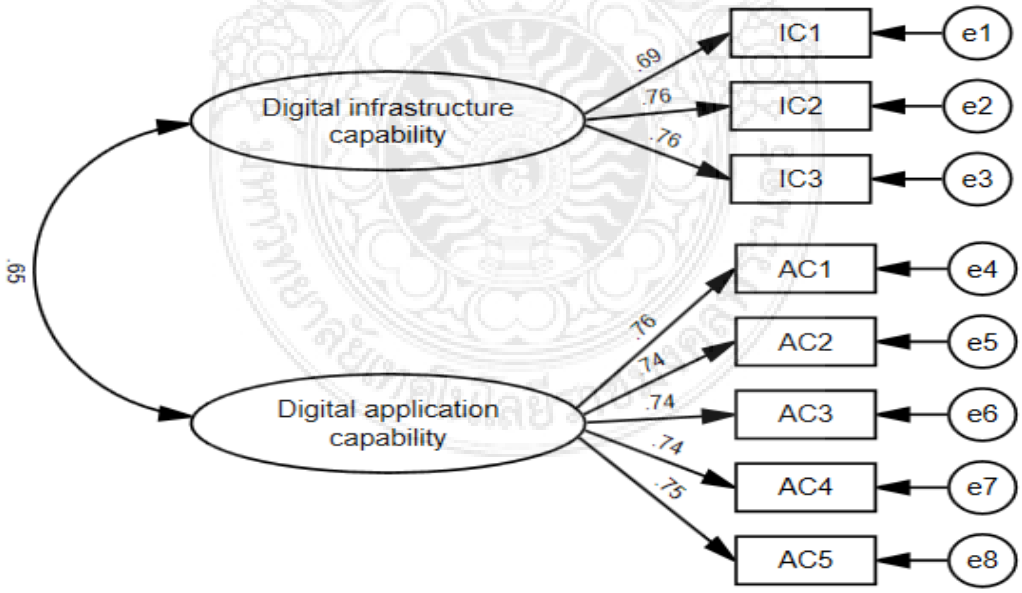

Figure 4.1 Measurement model of digital transformation

(2) Convergent Validity

This study employed confirmatory factor analysis and average variance extracted to test convergent validity.

Table 4.7 demonstrates that the absolute values of the standardized factor loadings between all latent variables and measurement indicators in digital transformation exceed .5 and are statistically significant, signifying a robust econometric relationship and a strong correlation among the variables and factors.

Table 4.7 Table of factor load factors of digital transformation

Factor	Items	Factor Loading	Std. Error	CR	p	Std. Estimate
Digital	IC1	1.000				.693
infrastructure	IC2	1.170	.085	13.765	***	.760
capability	IC3	1.166	.084	13.801	***	.765
Digital	AC1	1.000				.755
application	AC2	.911	.057	16.097	***	.735
capability	AC3	.918	.057	16.164	***	.738
	AC4	.967	.060	16.163	***	.738
	AC5	.963	.058	16.468	***	.752

Note: *** p< .001.

Table 4.8 Convergent validity of digital transformation

Factor	AVE	CR
Digital infrastructure capability	.548	.784
Digital application capability	.553	.861

Table 4.8 demonstrates that the AVE values for the two latent variables are .548 and .553, both over .5, while the CR values surpass .7, signifying that the digital transformation model has strong convergent validity.

(3) Discriminant Validity

Table 4.9 Discriminant validity of digital transformation

	Digital infrastructure capability	**Digital application capability**
Digital infrastructure capability	.740	
Digital application capability	.539	.744

The digital infrastructure competency has an AVE square root value of .740 exceeding the threshold of .539 for the absolute inter-factor correlation coefficient, hence suggesting strong discriminant validity. Digital application capability square root of the AVE is .744, exceeding the threshold of .539 for the absolute inter-factor correlation coefficient, indicating strong discriminant validity. The two latent variables have strong discriminant validity (Table 4.9).

The confirmatory factor analysis data from the above three parts indicate that the digital transformation model has excellent validity.

4.5.2 Confirmatory Factor Analysis of Servitization Model

(1) Construct Validity

Table 4.10 indicates that the fitted values of all indicators for the two latent variables of digital transformation fall within the prescribed range. CMIN/DF is 1.098, below 2, signifying excellent fit; RMSEA is .014, below .08, denoting excellent fit; GFI is .963, exceeding .9, indicating excellent fit; and NFI is .966, surpassing .9, showing excellent match. the IFI is .997, exceeding .9, signifying a good fit; the TLI is .996, surpassing .9, denoting a good fit; the CFI is .997, exceeding .9, indicating a good fit.

Table 4.10 Model fit summary for servitization

Fit Parameters	CMIN/DF	GFI	NFI	IFI	TLI	CFI	RMSEA
Value	1.098	.963	.966	.997	.996	.997	.014
Standard	<2	>.9	>.9	>.9	>.9	>.9	<.08

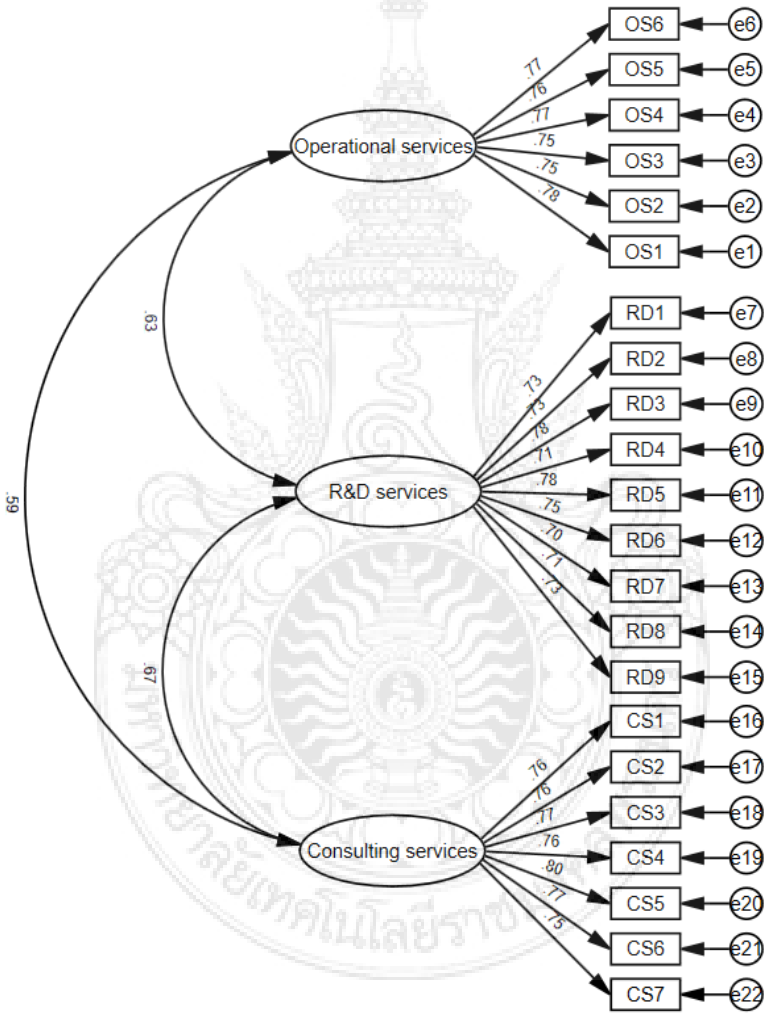

Figure 4.2 Measurement model of servitization

The variables of operational services, research and development services, and consulting services exhibit a robust association, and there is a significant correlation between these factors and the questions. This model has a strong fit and robust structural validity (Figure 4.2).

(2) Convergent Validity

Table 4.11 demonstrates that the absolute values of standardised factor loadings between all latent variables and each measurement indicator in a servitization exceed .5 and are statistically significant, signifying a robust econometric relationship and a strong correlation between the variables and the factors.

Table 4.11 Table of factor load factors of servitization

Factor	Items	Factor Loading	Std. Error	CR	p	Std. Estimate
OS	OS1	1.000				.780
OS	OS2	.938	.053	17.694	***	.751
OS	OS3	.968	.055	17.743	***	.753
OS	OS4	1.005	.056	18.096	***	.766
OS	OS5	.979	.055	17.964	***	.761
OS	OS6	.976	.053	18.359	***	.775
RD	RD1	1.000				.729
RD	RD2	1.027	.063	16.232	***	.728
RD	RD3	1.146	.066	17.367	***	.777
RD	RD4	.987	.063	15.775	***	.708
RD	RD5	1.159	.066	17.550	***	.784
RD	RD6	1.065	.064	16.731	***	.749
RD	RD7	.987	.063	15.583	***	.700
RD	RD8	.952	.060	15.795	***	.709
RD	RD9	1.019	.062	16.358	***	.733
CS	CS1	1.000				.761
CS	CS2	.988	.055	17.833	***	.764
CS	CS3	1.000	.056	17.907	***	.767

Table 4.11 Table of factor load factors of servitization (continued)

Factor	Items	Factor Loading	Std. Error	CR	p	Std. Estimate
CS	CS4	.999	.056	17.736	***	.760
CS	CS5	1.067	.057	18.838	***	.801
CS	CS6	1.006	.056	17.983	***	.769
CS	CS7	.992	.057	17.556	***	.753

Note: *** p< .001.

Table 4.12 Convergent validity of servitization

Factor	AVE	CR
Operational services	.584	.894
Research and development services	.542	.914
Consulting service	.590	.910

Table 4.12 demonstrates that the AVE values for the three latent variables are .584, .542 and .590, both over .5, while the CR values surpass .7, signifying that the servitization model has strong convergent validity.

(3) Discriminant Validity

Table 4.13 Discriminant validity of servitization

	OS	RD	CS
OS	.764		
RD	.571	.736	
CS	.530	.614	.768

Note: OS = Operational services; RD= Research and development services; CS= Consulting services.

Table 4.13 demonstrates that the average variance extracted (AVE) for operational services is .764, which is higher than the highest absolute value of .571 for the inter-factor correlation coefficient. This indicates that the discriminant validity is strong. Similarly, the square root of the AVE for research and development services is .736, surpassing the maximum inter-factor correlation coefficient of .614, which also signifies strong discriminant validity. The AVE square root of the consultation service is .768, above the maximum absolute value of the inter-factor correlation coefficient of .614, indicating strong discriminant validity. From this, it can be seen that the three latent variables and factors of operational services, research and development services, and consulting services have strong discriminant validity.

The confirmatory factor analysis data from the above three parts indicate that the servitization model has excellent validity.

4.5.3 Confirmatory Factor Analysis of company performance Model

(1) Construct Validity

Table 4.14 demonstrates that the fitted values of all indicators for the two latent variables of company performance fall within the prescribed range. CMIN/DF is 1.508, below 2, signifying excellent fit; RMSEA is .031, below .08, denoting excellent fit; GFI is .989, exceeding .9, indicating excellent fit; and NFI is .987, surpassing .9, showing excellent match. The IFI is .996, exceeding .9, signifying a good fit; the TLI is .993, surpassing .9, denoting a good fit; the GFI is .996, exceeding .9, indicating a good fit.

Table 4.14 Model fit summary for company performance

Fit Parameters	CMIN/DF	GFI	NFI	IFI	TLI	CFI	RMSEA
Value	1.508	.989	.987	.996	.993	.996	.031
Standard	<2	>.9	>.9	>.9	>.9	>.9	<.08

There exists a robust association between the variables of profit performance and growth performance, as well as a significant correlation between these factors and the question items. This model has a strong fit and robust structural validity (Figure 4.3).

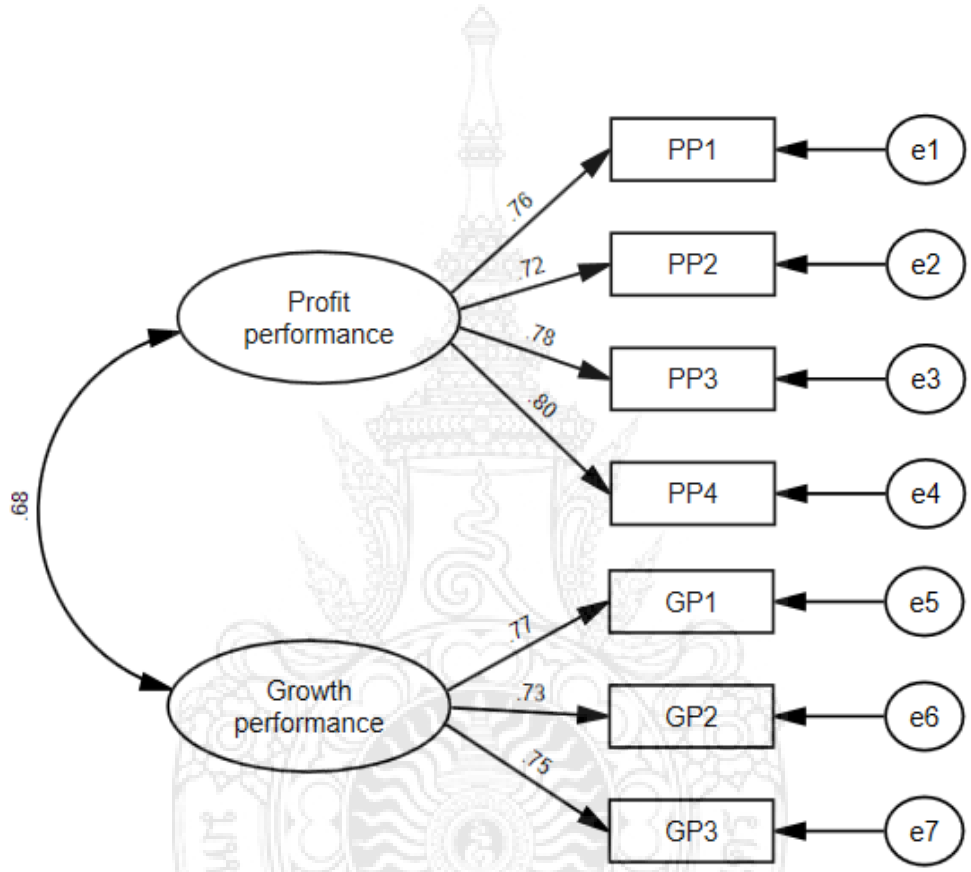

Figure 4.3 Measurement model of company performance

(2) Convergent Validity

Table 4.15 demonstrates that the absolute values of standardised factor loadings between all latent variables and each measurement indicator in a company performance exceed .5 and are statistically significant, signifying a robust econometric relationship and a strong correlation between the variables and the factors. Overall, the factor load coefficients are relatively high, indicating that there is

a strong correlation between the two latent variables of company performance and the observed indicators.

Table 4.15 Table of factor load factors of company performance

Factor	Items	Factor Loading	Std. Error	CR	p	Std. Estimate
Profit	PP1	1.000				.756
performance	PP2	.954	.061	15.671	***	.723
	PP3	1.006	.060	16.802	***	.776
	PP4	1.018	.059	17.248	***	.799
Growth	GP1	1.000				.767
performance	GP2	.994	.068	14.731	***	.733
	GP3	1.020	.068	14.936	***	.749

Note: *** p< .001.

Table 4.15 demonstrates that the AVE values for the two latent variables are .584 and .562, both over .5, while the CR values surpass .7, signifying that the digital transformation model has strong convergent validity.

Table 4.16 Convergent validity of company performance

Factor	AVE	CR
Profit performance	.584	.849
Growth performance	.562	.794

(3) Discriminant Validity

Table 4.17 demonstrates that the precise match for discriminant validity exceeds the threshold of .679 for the absolute square root of the AVE, indicating robust discriminant validity. The Profit performance competency has an AVE square root value of .764, exceeding the threshold of .679 for the absolute inter-factor

correlation coefficient, hence suggesting strong discriminant validity. Growth performance square root of the AVE is .750, exceeding the threshold of .679 for the absolute inter-factor correlation coefficient, indicating strong discriminant validity. These test results verify the validity of the two latent variables in the company performance model, profit performance and growth performance have strong discriminant validity.

Table 4.17 Discriminant validity of company performance

	Profit performance	Growth performance
Profit performance	.764	
Growth performance	.679	.750

The confirmatory factor analysis data from the above indicate that the company performance model has excellent validity.

4.5.4 Confirmatory Factor Analysis of Overall Structural Model

(1) Construct Validity

The model fitting index's degree of fit is a crucial metric for assessing if the theoretical structural model satisfies the criteria, necessitating an evaluation of the overall structural model's adaptability. This study evaluated the proposed structural model, indicating that the overall model aligns effectively and all indicators fall within the recommended parameters (Table 4.18).

Table 4.18 Model fit summary for overall

Fit Parameters	CMIN/DF	GFI	NFI	IFI	TLI	CFI	RMSEA
Value	1.138	.934	.935	.992	.991	.992	.016
Standard	<2	>.9	>.9	>.9	>.9	>.9	<.08

Table 4.18 demonstrates that the fitted values of all indicators for the seven latent variables of the overall model are within the specified range. CMIN/DF is 1.138, below 2, signifying excellent fit; RMSEA is .016, below .08, denoting excellent fit; GFI is .934, exceeding .9, indicating excellent fit; and NFI is .935, surpassing .9, showing excellent match. The IFI is .992, exceeding .9, signifying a good fit; the TLI is .991, surpassing .9, denoting a good fit; the GFI is .992, exceeding .9, indicating a good fit.

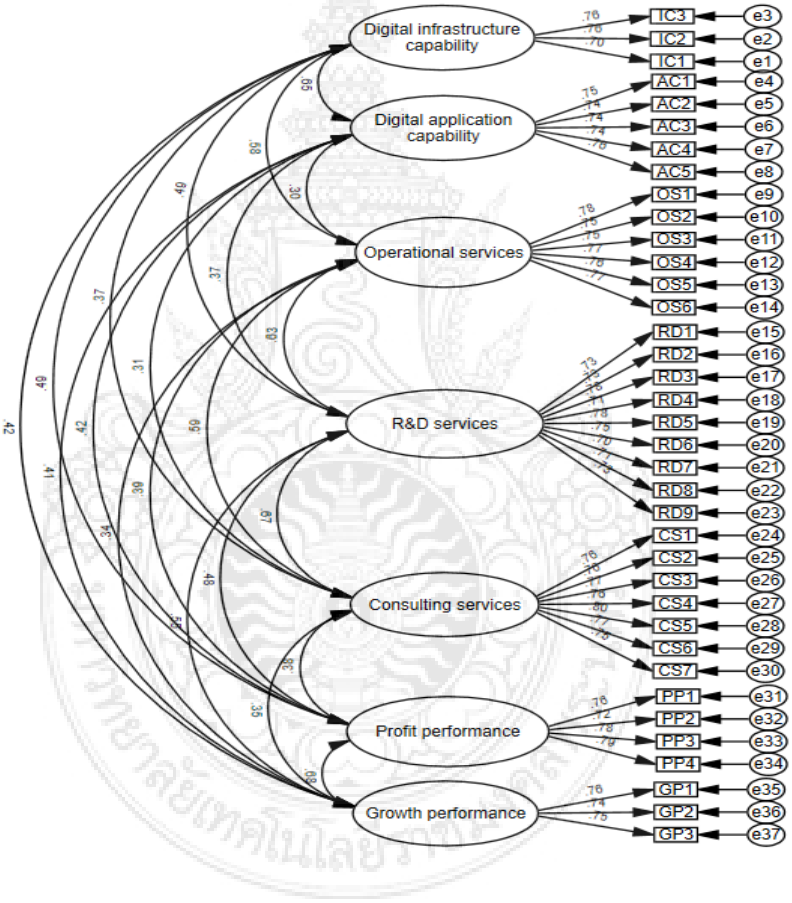

Figure 4.4 Measurement model of all variables

This shows a strong correlation between the seven latent variables and the factors; this model has strong fitting ability and robust construct validity (Figure 4.4).

(2) Convergent Validity

Table 4.19 demonstrates that the absolute values of standardised factor loadings between all latent variables and each measurement indicator in an overall model exceed .5 and are statistically significant, signifying a robust econometric relationship and a strong correlation between the variables and the factors.

Table 4.19 Table of factor load of all latent variables

Factor	Items	Factor Loading	Std. Error	CR	p	Std. Estimate
Digital infrastructure capability	IC1	1.000				.698
	IC2	1.160	.080	14.445	***	.759
	IC3	1.154	.080	14.477	***	.762
Digital application capability	AC1	1.000				.752
	AC2	.916	.057	16.082	***	.736
	AC3	.921	.057	16.108	***	.737
	AC4	.971	.060	16.134	***	.738
	AC5	.973	.059	16.534	***	.756
Operational services	OS1	1.000				.777
	OS2	.946	.053	17.771	***	.755
	OS3	.973	.055	17.738	***	.753
	OS4	1.010	.056	18.084	***	.766
	OS5	.984	.055	17.955	***	.761
	OS6	.977	.053	18.281	***	.773

Table 4.19 Table of factor load of all latent variables (continued)

Factor	Items	Factor Loading	Std. Error	CR	p	Std. Estimate
Research and	RD1	1.000				.728
development	RD2	1.029	.064	16.208	***	.727
services	RD3	1.150	.066	17.370	***	.777
	RD4	.988	.063	15.732	***	.707
	RD5	1.160	.066	17.502	***	.783
	RD6	1.072	.064	16.780	***	.752
	RD7	.992	.064	15.608	***	.702
	RD8	.954	.060	15.771	***	.709
	RD9	1.023	.063	16.361	***	.734
Consulting	CS1	1.000				.761
services	CS2	.987	.055	17.812	***	.763
	CS3	1.000	.056	17.904	***	.767
	CS4	1.000	.056	17.744	***	.761
	CS5	1.067	.057	18.818	***	.801
	CS6	1.007	.056	18.000	***	.770
	CS7	.993	.057	17.562	***	.754
Profit	PP1	1.000				.758
performance	PP2	.951	.060	15.812	***	.723
	PP3	1.007	.059	17.049	***	.779
	PP4	1.009	.058	17.364	***	.794
Growth	GP1	1.000				.759
performance	GP1	1.008	.067	15.049	***	.736
	GP2	1.035	.068	15.304	***	.753

Note: *** p< .001

Table 4.20 demonstrates that the test results for the seven latent variables are AVE > .5 and CR > .7. The values of CR and AVE exceeded the reference standard, indicating that the internal consistency and reliability of the model were high, and the interpretive ability was also strong. The data analysis indicates that the scale possesses strong structural validity, convergent validity, and discriminant validity, aligning with the predicted research findings.

Table 4.20 Convergent validity of all latent variables

Factor	AVE	CR
Digital infrastructure capability	.548	.784
Digital application capability	.553	.861
Operational services	.584	.894
Research and development services	.542	.914
Consulting services	.590	.910
Profit performances	.584	.849
Growth performances	.562	.794

(3) Discriminant Validity

To ensure the reliability and efficacy of the AMOS confirmatory factor analysis results, this study assessed the AVE square root values of all latent variables. A test is said to be discriminantly valid when the square root of the Average Variance Extracted (AVE) is higher than the correlation coefficient between the latent variables and all the other latent variables.

This study examines seven latent variables, including digital transformation, which encompasses digital infrastructure capability and digital application capability; servitization, which covers operational services, research and development services, and consulting services; and company performance, which covers profit performance and growth performance (Table 4.21).

Table 4.21 Discriminant validity of all latent variables

	IC	AC	OS	RD	CS	PP	GP
IC	.740						
AC	.539	.744					
OS	.487	.268	.764				
RD	.421	.330	.571	.736			
CS	.309	.277	.530	.614	.768		
PP	.397	.353	.346	.428	.335	.764	
GP	.333	.341	.286	.472	.293	.563	.750

Note: IC= Digital infrastructure capability; AC= Digital application capability; OS=Operational services; RD=Research and development services; CS= Consulting services; PP= Profit performance; GP= Growth performance.

The AVE square root values for digital infrastructure capability and digital application capability are .740 and .744, respectively; both exceed the correlation coefficient of .539 between the two latent variables, thereby demonstrating strong discriminant validity for the two constructs. The AVE square root value of operational service is .764, above the maximum correlation coefficient of .571, for research and development services and consulting services, the AVE square root values are .764 and .768, which are both higher than the maximum correlation coefficient of .614, this shows that these three latent variables have strong discriminant validity. The AVE square root values for profit performance and growth performance are .764 and .750, respectively, exceeding the correlation coefficient of .563, demonstrating that the two latent variables possess strong discriminant validity. Consequently, based on the test findings, the latent variables in this study exhibit strong discriminant validity (Table 4.20).

Therefore, it is clear from the test results that this study's latent variables have strong discriminant validity.

4.6 Path Relationship Analysis

For this study, we need to use multiple model fit indices made by Amos software to check if the derived model is good enough and if the hypothesis-driven model meets the necessary criteria. This study primarily concentrates on specific fitting index parameters related to structural equation modelling, including CMIN, DF, CMIN/DF, RMSEA, GFI, NFI, IFI, TLI, and CFI. and presents their corresponding values for discrimination. The goodness-of-fit graph of the structural the equation model generated by Amos 21.0 is presented below.

Figure 4.5 shows the causal path diagram created using structural equation modelling (SEM). It shows how the different variables are related to each other and their path coefficients (standardised regression coefficients), which show how much each variable affects the others. The findings indicate a robust association between digital transformation and servitization, digital transformation and company performance, and servitization and company performance. Digital transformation and servitization positively influence company performance without adverse effects.

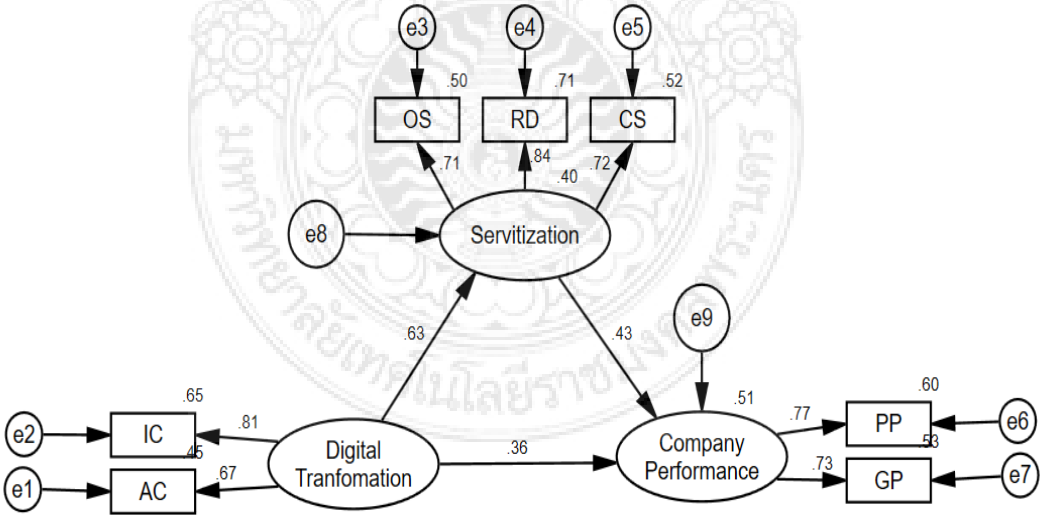

Figure 4.5 Path analysis

Table 4.22 Model fit summary for SEM

Fit Parameters	CMIN	DF	CMIN/DF	GFI	NFI	IFI	TLI	CFI	RMSEA
Value	66.351	11	6.032	.965	.947	.956	.914	.955	.099
Standard			<2	>.9	>.9	>.9	>.9	>.9	<.05

One common way to judge how well a structural equation model (SEM) fits data is to look at the ratio of chi-square to degrees of freedom (CMIN/DF). A ratio greater than 5 is considered a signal of poor model fit, indicating that there may be problems with the model and that it needs to be modified. The modification indices in AMOS software can be used to guide model modification and add new paths to the model to improve the goodness of fit of the model (Schumacker, 2006).

This study confirmed the adequacy of the structural model encompassing all latent variables and employed Structural Equation Modeling (SEM) to evaluate the proposed conceptual framework. Initial model fit indices revealed that the CMIN/DF and RMSEA values exceeded the recommended thresholds, indicating the need for model modification. In the initial measurement model, all seven latent variables demonstrated standardized factor loadings above .60, suggesting acceptable item reliability. Although the model met the criteria for incremental fit indices, the overall model fit required improvement. Given that the factor loadings were acceptable, the Modification Index (MI) was examined to further refine the model fit. Based on the MI results, measurement errors were sequentially correlated to improve the model fit. Specifically, covariances between the error terms e2 and e3, as well as e4 and e7, were added to the model. To maintain model parsimony and avoid overfitting, only two error covariances were introduced, and unnecessary parameters were restricted accordingly. The revised structural model is presented in Figure 4.6.

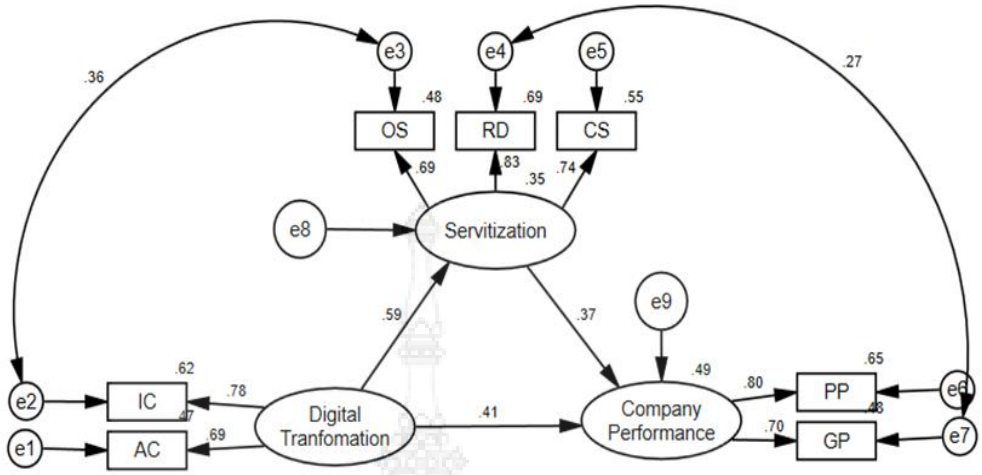

Figure 4.6 Revise Model Path Analysis

Table 4.23 Model fit summary for initial SEM and final SEM

Fit Parameters	CMIN	DF	CMIN/DF	GFI	NFI	IFI	TLI	CFI	RMSEA
Initial SEM	66.351	11	6.032	.965	.961	.956	.914	.955	.099
Final SEM	11.719	9	1.302	.994	.991	.998	.995	.998	.024
Standard			<2	>.9	>.9	>.9	>.9	>.9	<.05

The CMIN/DF and RMSEA values met the standard for model fit indices after the structural equation model was improved. The GFI, NFI, IFI, TLI, and CFI values also fell within the set reference range, this shows that the revised structural equation model has a good fit (Table 4.23).

The research results indicate that digital transformation has a significant positive impact on the improvement of the servitization level, and the standardised path coefficient is .590, indicating that digital transformation can effectively promote the servitization. Servitization has a significant positive impact on company performance, with a standardised path coefficient of .370, this finding confirms the important role of servitization in improving company performance.

Table 4.24 Structural model path analysis results

	Path		Estimate	S.E.	C.R.	P	β
Servitization	<---	Digital transformation	.598	.073	8.166	***	.590
Company Performance	<---	Servitization	.433	.083	5.213	***	.370
Company Performance	<---	Digital transformation	.491	.087	5.650	***	.414

Note: *** p< .001.

It is worth noting that digital transformation not only has an indirect impact through servitization but also has a strong direct positive effect on company performance, with a standardized path coefficient of .414. All standardized path coefficients showed statistical significance, and the validation results of this model revealed the mechanism by which digital transformation affects company performance through both direct and indirect pathways (Table 4.24).

4.7 Mediating Effects Analysis

The Bootstrap mediation effect test rule is a method based on the non-normal distribution of the sample distribution of the mediation effect. This method estimates the distribution of the indirect effect by repeated sampling and calculates the confidence interval and P-value based on this distribution (Tofighi & Kelley, 2020).

Table 4.25 Results of the mediation effect test

Mediation path	Effect type	Estimate	Lower	Upper	P value
Digital Transformation →Company Performance	direct effect	.491	.298	.697	.000
Digital transformation →Servitization→ Company Performance	indirect effect	.259	.153	.397	.000
Digital transformation →Company Performance	total effect	.750	.598	.910	.000

This study applied the bootstrap technique utilising Amos 21.0 software to assess the mediation effect, with a sample size of 5,000 iterations and a confidence level of 95%. Bias-corrected confidence intervals were employed to evaluate the upper and lower limits of the confidence intervals. The lack of 0 in the bias-corrected confidence interval shows the presence of a mediation effect. The results of the final mediation effect test are summarised in Table 4.25.

Digital transformation indirectly affects company performance through servitization, with a direct effect of .491, an indirect effect of .259, and a total effect of .750, which is highly statistically significant (P< .001). This indicates that servitization plays a mediating role between digital transformation and company performance, and its overall impact is significant and positive (Table 4.25).

4.8 Hypothesis Test Results

The theoretical framework and research strategy guided the formulation of a series of hypothesis in this study, which we then assessed through data analysis and model validation. This section offers a detailed account of the results of the hypothesis testing performed in this study.

H1: Digital transformation has a positive influence on servitization.

The results of the data analysis demonstrate that digital transformation significantly positively impacts servitization, as indicated by a standardised path coefficient of .590 ($p < .001$). This evidence indicates that digital transformation can effectively enable enterprises to migrate to servitization and enhance their service capabilities and market competitiveness.

Hypothesis results: support.

H2: Digital transformation has a positive influence on the performance of Chinese Baijiu companies.

The results of the data analysis reveal that a standardized path coefficient of.414 ($p < .001$) signifies that digital transformation significantly improves company performance. This value signifies that the company's performance markedly improves as its digital transformation progresses.

Hypothesis results: support.

H3: Servitization has a positive influence on the performance of Chinese Baijiu companies.

The data analysis results demonstrate that servitization significantly enhances company performance, as indicated by a standardised path coefficient of .370 ($p< .001$). This indicates that organisations may improve customer happiness and increase brand impact through the move to servitization, hence boosting total company performance.

Hypothesis results: support.

H4: Servitization plays an intermediary role between digital transformation and company performance.

The data analysis results demonstrate that servitization serves as an indirect mediator between digital transformation and company performance, with an estimated standardized indirect effect of .259 ($p < .001$). The overall effect of digital transformation on company performance is .750 ($p < .001$); this indicates that servitization plays a partial mediating role between digital transformation and company performance.

Hypothesized results: support.

The test results of this chapter indicate that the research process aligns with the anticipated research design, the data collection and methodologies draw upon established practices from existing studies, and the outcomes of hypothesis testing validate the proposed theoretical hypothesis. Table 4.26 presents the outcomes of hypothesis validation.

This study indicates that digital transformation directly enhances company performance and indirectly influences it by facilitating servitization change. Servitization, a crucial element of digital transformation, directly enhances company performance and serves as a significant mediator between digital transformation and company success. These findings enhance theoretical studies in digital transformation and servitization while offering significant references and direction for organisations to implement these transformations in practice.

Table 4.26 Verification results

Hypothesis	Content	Verification results
H1	Digital transformation has a positive influence on servitization.	support
H2	Digital transformation has a positive influence on the performance of Chinese Baijiu companies.	support
H3	Servitization has a positive influence on the performance of Chinese Baijiu companies.	support
H4	Servitization plays an intermediary role between digital transformation and company performance.	support

Chapter 5
Conclusions, Discussions, and Recommendations

This study shows a link between digital transformation, servitization, and the performance of Chinese Baijiu companies. This supports the research hypothesis that was put forward in the second chapter. Subsequently, this study shall elaborate on the research findings in five components. The first part summarizes the research conclusion, and the second part evaluates and discusses the research results; the third section offers recommendations derived from the findings, the fourth section addresses the study's limitations, and the last section emphasizes future potential for this research.

5.1 Conclusion

5.1.1 There Is a Significant Positive Correlation between Digital Transformation and Servitization.

This study indicates that digital transformation has a statistically significant effect on servitization, the standardised path coefficient is .590, H1 was confirmed. This means that more digital transformation leads to better servitization implementation. Organizations can leverage digital technologies, such as the Internet of Things, to streamline corporate processes, improve product functionality, and elevate service systems (Zancul et al., 2016). Organizations may adopt digitization to improve service-oriented performance (Coreynen et al., 2017). In promoting digital transformation, Chinese Baijiu improved service quality.

5.1.2 Digital Transformation has a Significant Positive Impact on Company Performance.

This study indicates that digital transformation has a statistically significant effect on company performance, the standardised path coefficient is .414, H2 was confirmed. This suggests that an increase in the amount of digital transformation correlates with improved company performance. Conversely, a diminished level of

digital transformation correlates with inferior company performance. There is a consensus that the Chinese Baijiu industry may enhance company performance via digital transformation. For China's sizable Baijiu enterprises, a greater extent of digital transformation correlates with enhanced company performance. The digital transformation of the Chinese Baijiu industry is not only an advancement in digital technology but also a comprehensive initiative that encompasses the development of the company's organisational culture.

5.1.3 Servitization has a Significant Positive Impact on Company Performance.

This study indicates that servitization has a statistically significant effect on company performance, the standardised path coefficient is .370, H3 was confirmed. The significance of this coefficient suggests that an increased degree of servitization correlates with improved company performance. The Chinese Baijiu industry can improve product and service quality and promote service upgrades through operations, research and development services, and consulting services, thereby increasing consumer loyalty to Baijiu products. This is not only a crucial strategy to bolster the competitiveness of the Baijiu company, but also a significant method to respond to evolving market demands in the subsequent phase.

5.1.4 The Mediating Role of Servitization in the Impact of Digital Transformation on Company Performance.

This study suggests that servitization partially mediates the impact of digital transformation on company performance. The total effect of digital transformation on company performance is .750, the intermediary role of servitization and the indirect effect of digital transformation on company performance are .259, H4 was confirmed Digital transformation directly affects company performance and indirectly improves it by improving service levels and encouraging companies to prioritize customer needs and service quality.

In addition, this study surveyed employees across various genders, ages, education levels, positions, departments, and years of experience, revealing that higher education and positions correlate with more attention to digital transformation. Company size and regional disparities are not significant influences on digital

transformation. The influence of education, gender, age, and other variables on servitization is negligible. Highly educated and high-ranking personnel are more likely than others to enhance firm success. Employees' work experience and departmental distinctions exhibit differing opinions about digital transformation, servitization, and organisational success; nonetheless, their influence on these factors is negligible.

In conclusion, digital transformation, servitization, and company performance are all strongly linked and improve each other. Digital transformation improves a company's performance right away by making technology better and operational more efficient. It also improves performance indirectly by making servitization processes easier. Servitization is an important link between digital transformation and company performance that makes it easier for digital transformation to have an effect on business results. Companies need to understand how important digital transformation and service-based thinking are for improving performance and take the right steps to move these ideas forward.

5.2 Discussion

This study gives important new information about the link between digital transformation, servitization, and company performance. It does this by focusing on a few key aspects that are similar to other research while also expanding the study's scope.

5.2.1 Alignment with Existing Literature

(1) Digital transformation can effectively improve company performance.

Digital transformation can prompt companies to adopt digital management of essential operations and processes, reinvent business models, and improve their agility and capacity to adapt to market fluctuations (Mikalef & Pateli, 2017). Digital technology facilitates the acquisition of real-time production data, thereby enhancing and ensuring production efficiency (Porter & Heppelmann, 2015). As digital transformation progresses, data has increasingly emerged as a critical aspect of production. Different production connections inside organisations can exchange

dynamic information in real time, facilitating the sharing and connectivity of industry chain data and, hence, significantly lowering transaction costs for companies (Chalotra & Dubey, 2016; Sugito & Kusrini, 2023). Demand forecasting, product design, inventory management, and other tasks made easier by digital transformation improve Operational efficiency (Bajari et al., 2019). It also keeps products from becoming obsolete (Teller et al., 2018). Regarding the user experience, organisations can visually analyse extensive data to intuitively monitor consumers' behavioural traits, habits, preferences, and potential demands (Simsek et al., 2019). In forthcoming manufacturing endeavors, companies may enhance and refine product designs according to consumer requirements and maybe offer customized services for users (Tao et al., 2018). Upon acquiring individuals' consumption patterns using digital technology, companies can dynamically modify product pricing (Abrardi et al., 2022). The researchers' findings demonstrate that digital transformation can significantly enhance organisational effectiveness. These research findings align with the outcomes of this investigation.

(2) Digital transformation drives companies to implement servitization strategies.

During the digital transformation of manufacturing companies, technology will be utilised across multiple domains, including research and development design, product architecture and production, marketing, and after-sales support. Modern enterprise information systems facilitate data exchange and sharing between external markets and internal systems, enabling real-time information processing and prompt customer demand feedback and thereby mitigating information transmission barriers (Rocha et al., 2024; Skoumpopoulou et al., 2024; Vogelsang et al., 2018). The use of digital technology makes it easier to get quick feedback through new technologies and services. This helps different corporate departments adapt to change, create value, and keep customers (Barišić et al., 2021). Many digital technologies, such as the Internet of Things, big data, cloud computing, and user interfaces, are essential for achieving comprehensive servitization, digital tools can enhance customer service quality and augment the value derived from

products by increasing product efficiency (Eloranta et al., 2021; Martín-Peña et al., 2024; Rabetino et al., 2021). The researchers' findings suggest that digital transformation compels organizations to adopt service-oriented strategies and improve their service levels. These research findings align with the outcomes of this investigation.

(3) Implementing a servitization strategy can help improve company performance.

Scholarly research has demonstrated that servitization boosts a business's profit margin and encourages the selling of tangible goods (Resta et al., 2015). Servitization positively impacts the company's revenue (Abou-Foul et al., 2021). Operational services, for instance, have a favourable effect on business performance if they are of high quality. This is due to the close relationship between Chinese Baijiu's operational services and the purchasing intentions and experiences of its consumer food, offering services for goods with significant service requirements might increase a customer's reliance on product service providers and, consequently, their loyalty (Koay et al., 2022; Saputro, 2023).

In addition to encouraging customers to make more purchases, offering services can help manufacturers provide customers with goods or services that better suit their needs by boosting user interactions (Malleret, 2006; Mathieu, 2001). For instance, the well-known Chinese Baijiu Wuliangye generated over 7.2 billion US dollars in revenue in the first half of 2024, representing an 11.30% growth from the previous year. Of these, home store sales and internet direct sales made up 41%, a rise of 11.01% over the previous year(Qin, 2024). This demonstrates that the operational services of the Baijiu business in China has grown to be a significant aspect of the company's performance. Accordingly, offering services can encourage customers to buy the product again, which helps product companies better understand their wants and create more individualised products by giving them more opportunities to engage with them (Rane et al., 2023). In the meantime, the service components linked to the main product have a favorable impact on consumers' decisions to buy (Bismo & Gunawan, 2021; Suwarno, 2022). This suggests that

a favourable effect on business performance increases with the level of research and development services provided. This could be due to the intense competition in the Chinese Baijiu market, which is a consumer food market. The modernisation of Baijiu production machinery, the improvement of Baijiu flavour, and the digitalisation and modernisation of sales services have all emerged as key markers to boost market competitiveness. Wuliangye, Yanghe, and Luzhou Laojiao are the top three research and development expenditures in the Chinese Baijiu business in 2022, according to sources from Chinese media. Among these, Luzhou Laojiao Baijiu's research and development costs rose by 49.77%, Which helped the company's product sales quota rise (Daily, 2023). Furthermore, compared to rivals, servitization can help companies provide greater value for clients (Viitamo et al., 2016). The quality of the Consulting services has a positive impact on the company's performance. This is due to the fact that the user experience of consumer items can be enhanced with the quality of consulting services rendered. The study concludes that a service-oriented approach can boost business performance. The results of this study are consistent with these studies.

5.2.2 Theoretical Contributions

The results of this study show that digital transformation has greatly improved the servitization and company performance of Chinese Baijiu companies. Servitization plays a part in mediating the relationship between digital transformation and company performance. This result enhances the current theoretical research framework in three dimensions.

(1) This study enhances the theoretical framework about the correlation between digital transformation and company performance.

Research indicates that digital transformation enhances company performance by augmenting resource integration capabilities and refining business procedures (Verhoef et al., 2021). Prior research on digital transformation and company performance has primarily concentrated on the effects of digital transformation on company performance (Jardak & Ben Hamad, 2022), the correlation between digital transformation and company performance (Nwankpa & Roumani,

2016), the influence of digital transformation on the performance of manufacturing companies (Wang et al., 2023). Researchers frequently employ environmental elements, supply chain dynamics, and human capital as moderating variable (Feroz et al., 2021; Marchiori et al., 2022; Stroumpoulis & Kopanaki, 2022). Some researchers also use digitalisation, innovation, and creativity as mediating variables (Liu et al., 2023; Vilkas et al., 2022).

No pertinent study has been identified on the utilisation of servitization as a mediating variable between digital transformation and company performance. This study includes servitization as a mediating variable in the examination of digital transformation and company performance. The emphasis on the bridging function of servitization has enhanced the theoretical framework for the conversion of digital transformation into economic value (Kowalkowski et al., 2017) . The research findings suggest that digital transformation indirectly benefits company performance by facilitating servitization, and an elevated level of servitization further amplifies the beneficial effects of digital transformation on company performance. Servitization has served as a mediating factor in the digital transformation and company performance of Chinese Baijiu enterprises.

(2) This study expands the applicability of servitization in manufacturing enterprises.

The servitization of industrial companies has garnered significant attention (Baines et al., 2017). Researchers primarily concentrate on the interpretation of servitization concept and definition (Kowalkowski et al., 2017) , its influence on the commercial value of products (Vandermerwe & Rada, 1988), and the study of manufacturing servitization (Neely et al., 2011); however, investigations into the Chinese traditional Baijiu industry remain sparse. This study systematically examines the digital transformation, service, and company performance of the Chinese Baijiu industry, including a targeted survey of Baijiu enterprises in a specific region. The study's conclusions are more aligned with the particular context of Chinese Baijiu Baijiu producers. This study's findings indicate that, even within the Baijiu business, which emphasises product sales, service can augment company performance,

contributing to the ongoing discourse on the relevance of service theory (Coreynen et al., 2017).

(3) This study offers pertinent recommendations to address the servitization paradox.

Some researchers say that manufacturing companies that are becoming more like service-based companies don't do as well in the real world as companies that only sell goods (Neely, 2008). Case studies in manufacturing companies show that service-orientated strategies can sometimes hurt business performance (Gebauer et al., 2005), which shows the paradox of servitization. This study's findings demonstrate that the implementation of a servitization plan can directly augment consumer loyalty, enhance product operational efficiency, and positively impact company success. At the same time, servitization is a connective tissue between digital transformation and corporate success. It requires smart use of digital tools to improve service quality, increase product sales, and make customers' consumption experiences better, which ultimately improves company performance.

5.2.3 Application Contribution

The empirical results of this study provide practical guidance for the digital transformation practice of Chinese Baijiu companies and a scientific basis for the development of enterprises, governments, and industries.

(1) Leverage digital transformation to facilitate alterations in business models and enhance company performance.

The company digital infrastructure competence underpins digital transformation, while digital application capability serves as an effective means to enhance the company's performance. Chinese Baijiu companies must not only manufacture superior Baijiu goods but also excel in their marketing efforts, as this is crucial for enhancing their performance. Figure 4.6 illustrates that the path coefficient linking digital infrastructure capability to digital transformation is .78, while the path coefficient connecting digital application capability to digital transformation is .69, signifying that both digital infrastructure capability and digital application capability are pivotal in facilitating the digital transformation of Baijiu companies. The correlation

coefficient between digital transformation and firm performance is .41, indicating a substantial association and suggesting that enhancing digital transformation is a crucial strategy for improving company success. The fundamental rationale is that digital transformation uses big data to assess client preferences, create tailored products, and execute "private customisation" brewing services to improve user experience and loyalty (Zhang & Xiong, 2023) . Thus, Baijiu companies can increase capital investment, strengthen digital infrastructure and application capabilities, and innovate business models, thereby improving company performance.

(2) Leverage digital transformation to refine servitization approach and consequently elevate company performance.

Research demonstrates that the widespread adoption of digital technology has improved organisational production efficiency and augmented service capabilities. Figure 4.6 demonstrates that the correlation coefficient between digital transformation and servitization is .59, indicating a robust relationship between the two variables. Operational services, research and development services, and consulting services are three latent variables linked to service orientation, with path coefficients of .69, .83, and .74, respectively, indicating their significance in improving service quality. Therefore, the service-orientated digital transformation of Baijiu companies must prioritise the enhancement of product operational services, research and development services, and consultation services. For example, Baijiu's anti-counterfeiting traceability is facilitated by blockchain technology to enhance consumer trust; artificial intelligence is employed to optimize inventory management and mitigate inventory backlogs and losses; and the quality of after-sales service is enhanced through an intelligent customer service system. All these factors can significantly enhance consumers' brand loyalty by improving service quality so as to enhance the market competitiveness of enterprises(Kohtamäki et al., 2019).

(3) Leverage servitization transformation to enhance product and service innovation, thus elevating company performance.

In the conventional model, Baijiu enterprises mostly depend on sales to enhance performance; however, in the digital age, they can augment revenue

streams through service innovation. For instance, several Baijiu companies have attempted to offer value-added services, like personalized tasting experiences and premium customized winery tours, to broaden consumer demographics through online live broadcast marketing. This business model, which integrates digitisation and services, offers additional profit opportunities for organisations (Bentalha et al., 2020).

(4) The results of this study can provide a reference for the government to promote the development of the Baijiu industry.

The government can enhance the industrial ecosystem by directing companies towards digital transformation and advocating for industry standardisation. The government can implement policies to promote the digital advancement of the Baijiu industry and offer tax advantages or targeted subsidies to assist small and medium-sized Baijiu enterprises in enhancing their digital competencies. Furthermore, industry associations can create standardised digital protocols to enable companies to adhere to established norms throughout digital transformation, minimise trial-and-error expenses, and enhance the overall digital maturity of the sector (Verhoef et al., 2021).

5.3 Recommendation

This study examines the Chinese Baijiu industry, validating the relationships of digital transformations and servitization, servitization and company performance, and digitalisation and company performance. Research indicates that the strategic implementation of digital transformations and servitization approaches significantly improves product market competitiveness and company performance. This study put out the following recommendations in light of the research findings.

5.3.1 The Baijiu Industry Should Strengthen the Construction of Digital Infrastructure and Improve the Application and Service Capabilities of Digitalisation. This study has confirmed the beneficial impact of digital transformation on the performance of the service and Baijiu industries. The standardised path coefficient of digital transformation on service is .590, while the standardised path coefficient of

digital transformation on company performance is .414, both exhibiting high statistical significance (P < .001). Consequently, the organisation must prioritise and refine the strategic framework of digital transformation, leveraging it to augment service capabilities and drive performance enhancement.

This study defines digital transformation as comprising two dimensions, digital infrastructure capability and digital application capability. The research concludes that Baijiu enterprises can enhance their digital transformation through these two areas to elevate product quality and sales environment. The corporation ought to augment its investment in digital hardware infrastructure, including the implementation of industrial Internet, intelligent manufacturing systems, and Internet of Things systems, to enhance production efficiency, oversee product quality, and manage production costs. The company must fortify the configuration of digital analytics software, augment digital application capabilities, attain equipment interconnectivity and data analysis within the manufacturing and service processes, and deliver more tailored and valuable products and services to enhance operational efficiency and customer satisfaction. Utilising big data to analyse consumer behaviour facilitates targeted marketing, thereby improving customer experience and engagement.

5.3.2 The Baijiu Industry Must Enhance the Quality of Operational Services, Research and Development Services, and Consulting Services to Elevate Company Performance.

This study has confirmed the beneficial impact of servitization on the performance of the Baijiu industry and established that servitization serves as a partial mediator in the relationship between digital transformation and company performance. Servitization exerts a substantial favourable influence on the company performance. The standardised path coefficient is .433 and exhibits significant statistical significance (P < .001), so offering empirical support for the Baijiu industry to enhance company performance through the improvement of service quality.

Servitization is a strategic change wherein manufacturing companies enhance their organisational capabilities and processes to transition from selling things

to offering product-service systems, so securing a competitive advantage (Kowalkowski et al., 2017). By using a service-oriented strategy, the Baijiu company can create service products that are closely connected to their Baijiu products, improve services that focus on the customer, and raise product recognition by implementing high-quality service standards and procedures. This approach fosters a robust and stable relationship between the company and its customers, thereby augmenting customer satisfaction and loyalty.

Therefore, in light of the "service paradox," the Baijiu corporation must implement a customer-centric strategy and enhance its service offerings in operational services, research and development, and consulting. The Baijiu company can emulate the premium wine sector by introducing "bespoke winery tourism," allowing consumers to engage directly in the distillation process; innovating and developing Baijiu products customised for diverse demographics to enhance personalised service capabilities; and utilising Internet technology to augment consumer engagement and reinforce the brand's cultural identity. The Baijiu Corporation may create collectible objects and implement a dependable Baijiu authentication and trading platform using blockchain technology to appeal to wealthy clients (Chen et al., 2023).

5.3.3 The Baijiu Industry Ought to Enhance the Synergy Between Digital Transformation and Servitization Development, As Well As Bolster Collaborative Creation of Digital Application Skills Across Various Sectors.

This study demonstrates that servitization positively influences company performance, while the "service paradox" remains unacknowledged. Digital transformation and servitization initiatives can enhance organisational effectiveness. Servitization partially mediates the relationship between digital transformation and company performance, with an indirect impact coefficient of .195. This study affirms that enhancing the digitisation and service skills of Baijiu companies is essential for augmenting company performance.

In executing a digital transformation strategy, the application of digital technology must enhance the utilisation of other resources. Baijiu companies can leverage digital transformation to enhance service quality when executing a service-

orientated approach. Simultaneously, they should enhance collaboration with other information and service enterprises, build an interdepartmental data-sharing framework, and avert the construction of information silos. Enhance collaboration with e-commerce platforms and logistics companies to collectively establish a digital ecosystem. Collaborate with e-commerce platforms like JD.com and Tmall to enhance online sales channels and jointly elevate company performance (Hoyer et al., 2020) .

5.3.4 The Baijiu Industry Should Strengthen Digital Transformation and Service-Oriented Talent Training to Improve the Overall Quality of Baijiu Practitioners.

The analysis of the background variables in this study reveals that the influence of age on servitization is primarily evident between younger and older employees. Employees aged 18 to 35 typically achieve excellent scores in service, particularly in operational and consulting services. This may be attributed to younger personnel placing greater emphasis on customer experience and service quality and their willingness to invest more effort in enhancing service levels. The influence of schooling on servitization is minimal. While highly educated individuals possess advantages in theoretical knowledge, they do not demonstrate a considerably superior level in practical service compared to their less educated counterparts. This may be due to servitization placing greater emphasis on actual experience and operational proficiency. The impact of age on company performance is mainly reflected in the comparison between young and older personnel. Young personnel typically achieve superior scores regarding corporate success, particularly in growth metrics. This may be attributed to the fact that younger personnel tend to be more innovative and attuned to market trends, yielding greater growth prospects and advantages for the organisation. Employees in various roles exhibit substantial disparities in organisational performance. The performance of middle-level managers and professional technologists is markedly superior to that of regular workers and administrators. This may be attributed to middle-level managers and skilled technicians shouldering more significant obligations and tasks in their roles, which can directly facilitate the company's business growth and enhance its income. There is no

substantial disparity in company performance among companies of varying types. This means that many different kinds of companies face similar challenges and opportunities in the market, so they need to keep improving their skills and coming up with new ideas to adapt to changes in the market.

5.3.5 The Baijiu Industry Should Promote Digital Transformation in Accordance with The Government's Overall Plan for The Liquor Industry and Seek Policy Support to improve Corporate Performance.

The government significantly contributes to advancing the digital transformation of Baijiu companies. Companies can engage with the government to pursue tax incentives, specialised funding, and other policy benefits. The Chinese government has implemented subsidy programs to facilitate the digital transformation of traditional sectors, enabling Baijiu companies to seek funding for technological research and development as well as people training. Moreover, companies can engage in industry forums and training initiatives hosted by the government to enhance their digital competencies.

5.4 Research Limitations

While this investigation yielded some results consistent with the anticipated hypotheses, it is not without drawbacks attributable to the limitations of the researcher's expertise and proficiency. This study's research constraints will be summarised below regarding the research object, research variables, and research methods, respectively.

5.4.1 Limitations of the Study Subject

This study used a convenience sampling strategy, focusing on 50 large-scale Baijiu enterprises in Sichuan Province. This constraint indicates that the study excludes Baijiu companies from other regions in China, hence imposing constraints on the interpretation and inference of the research findings. Future research should expand the geographical breadth of the sample by including Baijiu companies from

more provinces to acquire more thorough data and enhance the external validity of the study.

5.4.2 Limitations of the Study Variables

This study looks at how digital transformation and service-based business models affect company performance. It does not look at many other possible factors that might have affected performance. These elements include corporate environmental resources, competencies, organisational learning (Dörner & Rundel, 2021; Feroz et al., 2021). Future research may broaden the study variables to more thoroughly investigate the diverse aspects influencing company performance and yield more precise insights.

5.4.3 Limitations of the Study Methods

This study employed a questionnaire survey methodology to gather data. This method may be influenced by factors such as the subjects' honesty in their responses and the objective representation of their circumstances. Future study may employ many methodologies, including interviews and observations, to acquire more thorough and objective data. Moreover, due to the advancements in digital technology in recent years, digital transformation has limited references, and the scope of its content may lack comprehensiveness. Future studies may explore digital transformation more comprehensively to better understand and assess company performance in this domain. This will enhance the marketing landscape and product quality of the Chinese Baijiu company.

In conclusion, despite the limitations of this study, it provides valuable reference points and avenues for future research enhancement. By addressing these limitations, this study can enhance our comprehension of the relationship between company performance and associated factors, thereby forming more effective intervention strategies and policies to optimise company management.

5.5 Research Future

To enhance the comprehension of the relationship among digital transformation, servitization, and company performance, subsequent study may pursue several avenues for deeper insight. Below are few potential study avenues.

5.5.1 Expand the Scope of Research Subjects

This study primarily examines Baijiu companies in particular locations or provinces of China. Future research may encompass a broader range of subjects, incorporating Baijiu companies from many provinces and regions in China. This will make it easier to get more complete and varied data, which will help us learn more about the similarities and differences between digital transformation, servitization, and company performance.

5.5.2 Research on Adding Variables that Affect Company Performance

The current study included only three factors. Based on a review of the literature, future research may change intermediary variables, add moderating variables, and fully look at other factors affecting the Chinese Baijiu industry during its digital transformation in order to get a better picture of the many factors that affect the company's performance.

5.5.3 Conduct Longitudinal Research

In the future, longitudinal research may be used to make it easier to keep an eye on big Chinese Baijiu companies that have gone fully digital over time. This study can explain the long-term impacts of going digital on business performance and check if the role of servitization as a mediator has changed. This will help us come up with better ways to improve the quality and efficiency of China's Baijiu industry, which will lead to higher standards for both product quality and development. These studies will be highly significant in building a more consumer-preferred Chinese Baijiu industry.

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Appendix

Questionnaire

Dear Madam/Sir

Hello! Thank you very much for participating in this survey.

I am a doctoral candidate in business administration at Rajamangala University of Technology Phra Nakhon, Thailand. I am doing a doctoral thesis on the relationship between digital transformation and the performance of Chinese Baijiu company. This questionnaire is mainly intended to understand the relationship between digital transformation, service, and company performance of Chinese Baijiu company. I hope to provide some suggestions for Baijiu company in choosing digital transformation, enhancing their service capabilities, and then improving their company performance, so as to better serve the management practice of enterprise entrepreneurship. If you are interested in the results of this study, you can leave your email, and we will provide you with feedback on the research findings!

We will only use this anonymous survey questionnaire for academic research purposes, not for commercial purposes. There is no right or wrong answer to this questionnaire. The following questions only provide basic information about you and your company, and they do not involve personal privacy or internal company secrets. Therefore, please do not have any concerns and answer carefully and truthfully, as your answers will affect the accuracy of the research results. We deeply appreciate your support and cooperation.

Finally, I wish your company's business continued success! Wishing you success in your work!

Participant Information (Optional)

Part 1: Personal Basic Information (Mark "√" directly on "☐")

Q1-1 Your gender:

☐male; ☐female

Q1-2 Your Age:

☐18-25 years old; ☐26-35 years old;☐36-50 years old;☐51-60 years old;

Q1-3 Your education:

☐Less than a bachelor's degree;☐undergraduate;☐Master;☐Doctor

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Q1-4 Your position in the company:

☐General worker ☐Administrative personnel ☐Professional and technical personnel ☐Middle manager☐Senior management personnel

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Q1-5 Your department:

☐Technical department (including research and development, production) ; ☐Administrative department.☐Finance department ; ☐Market sales ; ☐Other

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01-6 How long have you worked in your company:

☐1-3 year ; ☐4-7 years ; ☐8-10 years ; ☐11-20 years ; ☐21 years and above

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Part 2: Basic Information of the Company (Mark "√" directly on " ☐ ")

Q2-1 The ownership nature of your company: ☐State-owned company; ☐Private Enterprise;☐Else
Q2-2 The company's establishment: ☐Not exceeding 5 years ☐5-15 years;☐15 years and above
Q2-3 The number of employees in your company: ☐Less than 300 people;☐300-2000 people; ☐More than 2001 people
Q2-4 The area where your company is located: ☐Chengdu; ☐YiBin; ☐LuZhou; ☐other cities

Part 3: Digital Transformation

The following questions are the characteristic description of the digital transformation of your company. Please make "√" on the corresponding score	**1 = Strongly Disagree, 2 = Disagree, 3 = Neutual, 4 = Agree, 5 = Strongly Agree**
Digital infrastructure capability	
Q3-1 Our company has a digital technology infrastructure that responds to current business needs.	1☐ 2☐ 3☐ 4☐ 5☐
Q3-2 Our company has a flexible digital technology infrastructure that can quickly support digital transformation.	1☐ 2☐ 3☐ 4☐ 5☐

The following questions are the characteristic description of the digital transformation of your company. Please make "√" on the corresponding score	**1 = Strongly Disagree, 2 = Disagree, 3 = Neutual, 4 = Agree, 5 = Strongly Agree**
Q3-3 Our company has the infrastructure to seamlessly integrate digital technology services across the entire company.	1☐ 2☐ 3☐ 4☐ 5☐
Digital application capability	
Q3-4 Our company can acquire important digital technologies.	1☐ 2☐ 3☐ 4☐ 5☐
Q3-5 Our company can identify new digital opportunities.	1☐ 2☐ 3☐ 4☐ 5☐
Q3-6 Our company can respond to digital transformation.	1☐ 2☐ 3☐ 4☐ 5☐
Q3-7 Our company mastering the state-of-the-art digital technologies.	1☐ 2☐ 3☐ 4☐ 5☐
Q3-8 Our company is developing innovative products, services, andprocesses using digital technology.	1☐ 2☐ 3☐ 4☐ 5☐

Part 4: Servitization

The following question is a description of the characteristics of your company's service-oriented development. Please mark "√" on the corresponding score	**1 = Strongly Disagree, 2 = Disagree, 3 = Neutual, 4 = Agree, 5 = Strongly Agree**
Operational services	
Q4-1 Our company has maintenance functions for managing customers.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-2 Our company provides usage services for products.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-3 Our company provides customers with services for product usage steps.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-4 Our company provides outsourcing services.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-5 Our company's products provide performance guarantees.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-6 Our company has excellent marketing services.	1☐ 2☐ 3☐ 4☐ 5☐
Research and development services	
Q4-7 Our company has the ability to design prototypes.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-8 Our company can develop prototypes and test them.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-9 Our company has the ability to design products.	1☐ 2☐ 3☐ 4☐ 5☐
4-10 Our company has the ability to develop products.	1☐ 2☐ 3☐ 4☐ 5☐

The following question is a description of the characteristics of your company's service-oriented development. Please mark "√" on the corresponding score	**1 = Strongly Disagree, 2 = Disagree, 3 = Neutual, 4 = Agree, 5 = Strongly Agree**
Q4-11 Our company has the ability of Analyses of product's manufacturability.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-12 Our company has factory design capabilities for products.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-13 Our company can design product processes.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-14 Our company is research and development -orientated.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-15 Our company can conduct feasibility studies.	1☐ 2☐ 3☐ 4☐ 5☐
Consulting services	
Q4-16 Our company provides technical consulting services.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-17 Our company provides business consulting services.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-18 Our company provides process-orientated consulting services.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-19 Our company provides training services for product users.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-20 Our company provides product demonstration services.	1☐ 2☐ 3☐ 4☐ 5☐
Q4-21 Our company provides customer seminar services.	1☐ 2☐ 3☐ 4☐ 5☐

The following question is a description of the characteristics of your company's service-oriented development. Please mark "√" on the corresponding score	**1 = Strongly Disagree,** **2 = Disagree, 3 = Neutual,** **4 = Agree, 5 = Strongly Agree**
Q4-22 Our company provides writing, informal material services.	1☐ 2☐ 3☐ 4☐ 5☐

Part 5: Company Performance

The following question is a description of the characteristics of the performance of your company. Please mark "√" on the corresponding score	**1 = Strongly Disagree,** **2 = Disagree, 3 = Neutual,** **4 = Agree, 5 = Strongly Agree**
Profit performance	
Q5-1 Our company has a high market share.	1☐ 2☐ 3☐ 4☐ 5☐
Q5-2 Our company has a high profit margin.	1☐ 2☐ 3☐ 4☐ 5☐
Q5-3 Our company has ample cash flow.	1☐ 2☐ 3☐ 4☐ 5☐
Q5-4 Our company has a high net asset return rate.	1☐ 2☐ 3☐ 4☐ 5☐
Growth performance	
Q5-5 Compared with other companies, the number of employees in our company increased rapidly.	1☐ 2☐ 3☐ 4☐ 5☐
Q5-6 Compared with other companies, our company's sales have grown rapidly.	1☐ 2☐ 3☐ 4☐ 5☐
Q5-7 Compared with other companies, our company's market share has grown rapidly.	1☐ 2☐ 3☐ 4☐ 5☐

Biography

Name Minghai Liu

Date of Birth October 1st, 1976

Domicile Nan'an West District, Yibin, Sichuan, China

Educational Record

Educational Qualification	Name of institution	Year of Graduation
Bachelor's degree	Sichuan Normal University	2000
Master's degree	Southwest University	2009

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