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Driving Factors and Critical Paths of Building Intelligent Financial Sharing Centers: Multi Case Study based on Grounded Theory

ZHANG Feng

Doctor of Management

Supervisors:
PhD Luís Miguel da Silva Laureano, Assistant Professor,
ISCTE University Institute of Lisbon
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UESTC - University of Electronic Science and Technology of China

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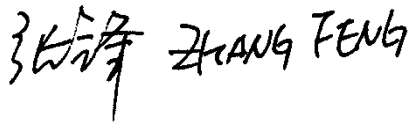
Declaration

I declare that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed:  Date: 2024.12.30

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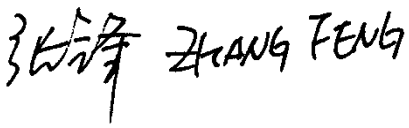
作者签名：  日期：2024.12.30

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Abstract

Chinese enterprises have continued to learn from western developed countries and leading enterprises, and adopted the financial management innovation model, including the construction of Financial Sharing Centers (hereinafter referred to as FSC), to better effectively allocate enterprise resources and to better meet the fierce market competition. The key question and pain point distilled in this thesis is how they can rapidly upgrade from the 1.0 automization stage and 2.0 digitalization stage to the 3.0 stage of intelligent FSC. Specifically, what are the driving factors and critical paths for constructing an intelligent FSC?

Based on a multi-case study and cross-case analysis, this research examines the background, development history, and influencing factors involved in the construction of FSCs across multiple representative Chinese enterprises. This research carried out in-depth interviews regarding to the case companies and the resulting data was coded and analyzed using Grounded Theory, enabling a summary of the driving factors and critical paths during its FSC's intelligent transformation. By integrating all research findings, a theoretical model was developed, leading to the final conclusions of the study.

Through research, it is found that building intelligent FSC was driven by three key factors including strategy-driven, business-driven and technology-driven, and building process was mainly integrated by four critical paths including organizational restructuring, process re-engineering, operational management and system upgrade. All four paths are also interconnected in parallel. And they are the core construction logic that is mutually integrated and interconnected. Finally, the theoretical model of this thesis has been established.

In the end, this thesis also addresses four future research directions, including from Chinese cases to global cases, from intelligent FSC to intelligent global business services, from function-oriented to value-creation-oriented and from technological application to data security.

Keywords: Financial Sharing Center (FSC); Intelligent Upgrade; Driving Factors; Critical Paths

JEL: G30, O32

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Resumo

As empresas chinesas têm continuado a aprender com os países desenvolvidos ocidentais e com as empresas líderes, adotando o modelo de inovação de gestão financeira, incluindo a construção de Centros de Serviços Partilhados Financeiros (doravante designados por FSC), com o objetivo de melhor alocar os recursos empresariais e responder à intensa concorrência do mercado. A questão-chave e ponto crítico abordado nesta tese é como estes centros podem rapidamente evoluir da fase de automação 1.0 e da fase de digitalização 2.0, para a fase 3.0 de FSC inteligentes. Especificamente, quais são os fatores impulsionadores e os caminhos críticos para a construção de um FSC inteligente?

Com base em múltiplos casos de estudo e numa análise comparativa entre casos, esta investigação examina o contexto, a evolução histórica e os fatores influenciadores envolvidos na construção de FSC em várias empresas chinesas representativas. Foram realizadas entrevistas em profundidade com as empresas analisadas, e os dados resultantes foram codificados e analisados segundo a Teoria Fundamentada, permitindo identificar os fatores impulsionadores e os caminhos críticos durante o processo de transformação inteligente dos FSC. Através da integração de todos os resultados da investigação, foi desenvolvido um modelo teórico que conduziu às conclusões finais do estudo.

A pesquisa revelou que a construção dos FSC inteligentes foi impulsionada por três fatores chave, incluindo orientação estratégia, orientação empresarial, e orientação tecnologia. O processo de construção integra-se, principalmente, em quatro caminhos críticos, incluindo reestruturação organizacional, reengenharia de processos, gestão operacional, e atualização de sistemas. Estes quatro caminhos também estão interligados em paralelo e constituem a lógica de construção central, mutuamente integrada e interligada. Por fim, foi possível estabelecer o modelo teórico proposto nesta tese.

No final, esta tese propõe quatro pistas de investigação futura, nomeadamente a passagem, de casos chineses para casos globais, de FSC inteligentes para serviços empresariais globais inteligentes, de um foco na função para o foco na criação de valor, e da aplicação tecnológica para a segurança de dados.

Palavras-chave: Centro de Serviços Partilhados Financeiros (FSC); Atualização Inteligente;

Fatores Impulsionadores; Caminhos Críticos

JEL: G30, O32

摘要

中国企业在经济发展的过程中，不断学习西方发达国家和先进企业，采用了包括构建财务共享中心（Financial Sharing Center，以下简称 FSC）在内的财务管理创新模式，更好的对企业资源进行有效配置，以更好的应对市场竞争。而企业在建立了财务共享中心之后，如何能够快速的从 1.0 的自动化阶段、2.0 的数字化阶段，转型升级到 3.0 的智能化财务共享中心，则是本文提炼的核心问题和关键痛点--构建智能财务共享中心的驱动因素和关键路径是什么？

本文针对多个典型中国企业展开案例研究，研究其财务共享的建设背景、发展历史和转型升级过程中的关键影响因素。本文还进一步采用了交叉案例研究法，跳出单个案例的局限，对案例研究的发现进一步进行了归纳、总结和抽象。最后还对案例企业进行了深度访谈，并基于扎根理论对数据进行了编码与分析，归纳其在建设智能财务共享中心过程中的驱动因素和关键路径。最终将多案例研究、交叉案例研究和基于扎根理论的数据分析相结合，建立了理论模型并形成了本文的研究结论。

通过研究，本文发现建设智能财务共享中心的三个驱动因素，包括了战略驱动、业务驱动和技术驱动。核心的关键路径则包括了并行推动的组织升级、流程重组、运营提升以及系统升级等四个方面，这些建设理念相互作用、有机结合，并最终构筑了本文的理论模型。

最后，本文也描述了未来进一步研究的四个方向，包括从中国案例到更多的全球案例，从智能财务共享中心到智能业务服务中心、从职能赋能导向到价值引领导向，以及从技术应用到数据安全。

关键词：财务共享中心；智能化升级；驱动因素；关键路径

JEL: G30, O32

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Acknowledgements

2025 is destined to be an extraordinary year.

This year, I will turn 50, an age considered in Chinese culture as the time to "know one's destiny"—understanding what one can and cannot do, reducing conflicts and confrontations, and being filled with respect for life and the world. I realize that I am who I am.

This year also marks the 21st anniversary of my master's graduation, a journey that has taken me from campus to campus. I'm still the same me.

I would like to express my gratitude to my supervisors, Professor Luis and Professor Fang Jiaming, to my wife and son, and to my classmates and friends. It is you who have enabled me to see a different side of myself.

The journey with DoM program comes to a close, but I am still me, a unique spark.

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致谢

2025 年注定是不平凡的一年。

这一年，我将 50 岁，对中国人来说是“知天命”的年纪--知道自己的可为、不可为，减少冲突和对抗，充满对生命对世界的尊重。明白我就是我。

这一年，也是我硕士毕业 21 年，从校园又走到校园。我依旧还是我。

感谢我的导师 Luis 教授和方佳明教授，感谢我的妻子和儿子，感谢我的同学与朋友。是你们，让我看到了不一样的我。

DoM 的旅程将告一段落，我还是我，不一样的烟火。

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List of Acronyms

AI	Artificial Intelligence
BI	Business Intelligence
BPR	Business Process Reengineering
FSC	Financial Sharing Center
HCI	Human-Computer Interaction
IoT	Internet of Things
LAN	Local Area Network
MLP	Multi-Layer Perception
NLP	Natural Language Processing
OCR	Optical Character Recognition
PC	Personal Computer
RPA	Robotic Process Automation
SLA	Service Level Agreement
TEAIM	Theory, Methodology, Application, Implementation, Management
VPN	Virtual Private Network
VUCA	Volatility, Uncertainty, Complexity, Ambiguity
XBRL	Extensive Business Reporting Language

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Chapter 1: Introduction

1.1 Research background

The continuous development of science and technology has promoted the industrial revolution persistence. Also, the emergence of the industrial revolution has boosted the profound change of the social economy and enterprise management mode, and the financial management is no exception in the continuous innovation and change.

In the very beginning, the ancient accounting's main purpose was to record the operations, which was mainly done by manual bookkeeping. Double entry bookkeeping appeared in the first industrial revolution. And in the second industrial revolution, accounting was divided into financial accounting and management accounting that reflected the management demands for financial functions. During the third and fourth industrial revolutions, with the rapid progress of science and technology, the management accounting and supervision functions of financial management were constantly improved. Under the development of modern times, the implementation of more cloud computing, big data, artificial intelligence, block chain and other modern technologies into financial management has proved to be an inevitable choice under the current financial management innovation. Promoting the deep integration of new technologies with the real economy and practical enterprise management also makes the development of financial management towards digital, sharing and intelligence.

However, the criticism of financial transformation and construction financial sharing center has never stopped. Lack of timely, effective and adequate financial control makes the financial functions highly criticized. Y. M. Chen and Xu (1992) believes that the traditional accounting statements are in the black and white mode, and the decision-making correlation is weak. In order to support management decision-making and risk control, financial functions must express opinions on business transactions that meet the accounting standards, as well as on which do not fully meet reliability, definition and even measurable standards, and adopt the colorful reporting mode to disclose multi-dimension and multi-layer information.

One reason for the continuous demand of financial innovation and transformation is the "bigger size" of enterprises. With the increasing scale of Chinese enterprises, these are expanding to more business sectors with larger management scope than it was in the past. The

internal data and information flow within the enterprise are not broken through. The lack of standard policy, process, and practice, will lead to many problems of decision-making, including coordination difficulties and less internal control, slow decision-making speed and more man-made complexity.

The second reason is the quality of the enterprise financial personnel. They are likely not able to meet the executive's requirements under a value creation perspective. Traditional finance personnel only pay attention on generating internal financial statements. Also, short of information technology tools, they are difficult to play the key role in financial supervision and risk control in the business, let alone play the supporting role of enterprise decision-making.

In the process of constantly innovation and transformation, financial management provides supporting services, including data operation, and professional and technical capabilities. These supporting service behavior for the front-line business is called 'empowerment'. Y. M. Hu (2019) believes that the sharing concept is the foundation of empowerment. Sharing is also one of the hot topics in China's current economic development. In 2016, 'sharing' was first written into China's 13th Five-Year Plan for National Economic and Social Development, as well as written into the Annual Work Report of China's National Government. 'Sharing' has also quietly occurred in the innovative transformation of financial management. The construction of the financial sharing center has become one of critical models, it is also the specific application of enterprise centralized management mode in the financial management and accounting process. More digital transformation and intelligent implementation are highly considered in the building process of FSC. Under the empowerment of information technology, it has become the top priorities in FSC construction to ensure the rapid improvement of internal collaboration, support the overall strategic goal achievement, and value creation for enterprises. As a result, Q. L. Zhang (2017) proposed that "financial transformation starts from FSC".

Along with the China's economic reform and opening up policy, more western foreign enterprises came to invest in China after the 1990s, simultaneously bringing the new management model of FSC into China. Afterwards, more Chinese local enterprises also learnt this advanced experience. Through building their own financial sharing centers, Chinese enterprises expect FSC to support the release of their scale effect and improve operation alignment. Based on the merge and split up the various non-core business flow, summarize simple and repetitive accounting transactions into a sharing center from different countries, different regions, different entities, FSC accelerate the Chinese enterprises to achieve the

purpose of cost saving, improve operation efficiency, and maximize utilization of their limited resources. FSC can also help to avoid the internal duplicated investment in the financial management function.

The emergence of the financial sharing center provides a tool and a better platform for the improvement of financial control, where enterprises can conduct the standardization and institutionalization of scattered and repeated accounting transactions and processes. FSC also promote the transfer of financial management that focus more on more valuable tasks such as budgeting, financial analysis, risk monitoring and mitigating, instead of basic accounting tasks. Sharing finance has undertaken the original fundamental financial work based on the information platform of financial sharing centers, the efficiency of accounting processes and preparing financial statements has been greatly improved. The saved financial personnel and effort can be allocated to the new positioning of business finance and strategic finance. More finance personnel have the opportunity to participate in the business, management, and even in the decision-making process. This also redefines the financial personnel core skill set that need to acquire more business capability, changes the traditional finance career path accordingly, and creates greater value to the company while empowering their own value and personal development.

The motivation for building the financial sharing center has the following aspects:

1) Economic factors. With the gradual disappearance of the demographic population dividend in developing countries, the labor costs of Chinese enterprises have increased significantly. Building the financial sharing center, it can optimize the business processes to ensure the quality of financial services and business empowerment, as well as to reduce the financial labor costs and also improve the operational efficiency. FSC can ensure the unity of the accounting standard and financial reporting.

2) Strategic factors. H. Chen (2018) pointed out that the standardization of financial and business can help strengthen enterprise risk control and achieve the company's business strategic objectives. Through the establishment of a financial sharing center, the finance function can play a better role of business supervision and risk control, as well extend the financial control scope to each business flow and end-to-end drive the timely, accurate, real time and effective use of business data. The extended financial control framework also drives the standardization, institutionalization and systematization of business processes. These are also the key motivations and value embodiment of building a shared service center.

3) Financial core capability factors. By constantly improving the work effort allocation that provide more knowledge-based services rather than solely undertaking simple

transactional work, the FSC further play the role of information and knowledge center in the enterprise's whole value chain, and improves the overall value of itself and the enterprise total value.

With the construction of financial sharing centers in China, the financial functions of Chinese enterprises gradually transfer from "accounting plant" to "risk control and management". The financial organization, personnel, and work, also converge into three different layers: shared finance, business finance, and strategic finance. Different financial personnel can give full effort in their own layer and provide different value creation. The American Institute of Management Accountants (IMA) also defines financial management functions as three major activities: transaction processing, control and risk management, and decision-making support. Among them, the proportion of "business finance" in control and risk management, and "strategic finance" with decision-making support has increased significantly, while the proportion of "shared finance" which undertakes the accounting function has decreased greatly due to the widespread adoption of automation, informatization, and digital technology.

Therefore, although financial sharing centers originated in western developed countries, Chinese enterprises is nearly 20 years later than the West to adopt this management model. However, just like the development speed of China's economy and Chinese enterprises, financial sharing centers have also been applied and developed in China quite rapidly.

1.2 Research problem and questions

Nowadays, Chinese enterprises are facing more complicated business environments and growing fierce market competition. It is essential in the enterprise development to obtain competitive advantage in a fast and dynamic business environment. Chinese enterprises expect FSC to play an important role in the transformation and innovation of financial management. So, some typical 'China problems' raised under this global context when building financial sharing centers in China are expected.

Through the implementation of Enterprises Resource Planning (ERP) system and different types of accounting systems, most Chinese financial sharing centers have achieved accounting computerization and informatization, which is called FSC version 1.0 (Automatization FSC). FSC became the centralized accounting platform. Accounting operation efficiency is significantly improved in this enterprise accounting center, accounting computerization and informatization is absolutely the core of FSC. FSC played an important

role in promoting the financial control within entire enterprises, in which the established same financial ‘standards, process, and system’ also strongly supports the Chinese enterprises to be bigger, stronger and going abroad.

Since then, driven by cloud computing, big data, the Internet of Things (IoT) and other digital technologies, the financial sharing centers in China have also developed from automation and informatization to enterprise data center and digitalization, which is called FSC version 2.0 (Digital FSC). On the basis of modern technology implementation, digitalization in FSC aims to transform the complex, changeable, unstructured and dynamic information that was input by various business ports, into structured and measurable data. Also, FSC set up an appropriate digital model platform to conduct it with unified processing. In the era of digital economy, the Internet concept of platform, connection, sharing and collaboration has been widely used in the construction of version 2.0 financial sharing center. Taking the digital transformation of the financial sharing center as the key breakthrough point in the digital transformation of enterprises, it further leads to the profound changes in the organizational structure, operation and business model. The financial sharing center, along with digitalization, constantly breaks the linear relationship between the traditional vertical value chain and hierarchical management structure and forms a team organization oriented by goal and innovation. The financial sharing center presents the characteristics of decentralization, dehierarchization, focusing on customer demands and development sharing. On the digitized internet platform, FSC can further reduce the accounting cost, strengthen enterprise management control and promote financial personnel to engage in more valuable financial analysis, investment and financing, capital operation, and other management works.

After 2010, due to the rapid development of intelligent technology, such as artificial intelligence, machine learning, deep learning, human-computer interaction (HCI), natural language processing, and knowledge mapping it became more realistic to build the FSC with more perception, memory and thinking capability, learning and adaptability, and behavioral decision-making ability. Thus, FSC can undertake more risk control and decision support functions. So, building FSC with more intelligence has become the vision in more and more Chinese enterprises. How to build a 3.0 version of "Intelligent financial sharing Center" (Intelligent FSC) has also been put on the senior executives’ agendas. The sudden spread of global epidemic in 2020, not only threat people's lives but also tested the ability of Chinese enterprises to conduct intelligent and digital operations. Executives are generally aware of the importance of entirely online, contactless, whole-process online and collaboration systems in China's financial sharing centers. The epidemic not only made the digital transformation of

enterprises inevitable, but also accelerated the Chinese enterprises to explore the construction of 3.0 version of an intelligent financial sharing center.

Especially when the construction of Data Middle Platform and financial Robotic Processing Automation (RPA) technology are widely applied to financial sharing centers, the efficiency of FSC is further improved by automating processes of low value-added work. By gradually using more intelligent technology, FSC can process data collection, analyze and produce results with more intelligence, and further upgrade from digital to intelligent. Eventually achieving the intelligent FSC with data-driven, greatly release full management value of the financial sharing center. It also let us see the wide prospects of promoting intelligent finance and intelligent financial sharing centers in China. For example, Haier Group formed the global intelligent sharing model with the principles of 'people and order integration' and 'small investment achieves mass innovations'. It has conducted the construction of an agile and intelligent financial sharing center which was driven by the 'platform plus ecology' business model. ZTE Group is another example. ZTE changed the FSC position from a traditional cost center to a profit center by establishing an intelligent financial sharing center. Four key factors were considered in this process, including organizational manpower, process, information system, and operation management. These are all the beneficial exploration and attemptation of Chinese enterprises transform their FSC from 2.0 version of digital towards the 3.0 version of intelligent.

There are two main reasons for the construction of the 3.0 version - intelligent financial sharing center. The first reason is the contradiction between the traditional financial management and financial sharing center models with the growing personalized demand of financial information users. The second reason is the rapid development of new intelligent technologies that make it possible to further innovate and change.

In essence, to build an intelligent financial sharing center is to build a platform where the enterprise and the enterprise financial function can achieve their digital, intelligent transformation. Tang and Hu (2019) pointed out that the use of more intelligent technology, including artificial intelligence, machine learning, natural language processing, and human-computer interaction, are needed to reconstruct the organization of finance and of the financial sharing center, redesign corporate business and financial processes. By doing so, this will improve the data quality and operation efficiency, and better empower business development, support management, and decision-making.

However, there is a lack of a theoretical guiding framework in the process of FSC intelligent transformation. Very few of the effective analyses regards to the driving factors and

path planning in building an intelligent FSC. Thus, and from a practical perspective, there are the following prominent problems in a large number of FSCs in China: data dispersion and fragmentation of financial data; seriously isolated data islands between the financial system and the other business systems; low transmission efficiency, weak timeliness and low quality between the single dimension of financial data with the dynamic, diversified business data; and valuable data mining is limited which leads to hardly provide decision-making support. Moreover, many Chinese enterprises did not realize that it was not only simply to apply intelligent technology when building the intelligent FSC, but also that there was the need to adjust the organizational structure, reengineering business process, and change the company's control mode accordingly. The change of construction concept and of the corporate culture also need to be considered. Therefore, it is obviously still in the initial stage the transformation from the version 2.0 digital FSC towards the version 3.0 intelligent FSC in Chinese enterprises. So, this study analyzes the problems mentioned above during the construction of an intelligent financial sharing center, summarizes practices and proposes constructive suggestions about two key research questions referenced next:

1. What are the driving factors for the efficient implementation of an intelligent FSC?
2. What are the critical paths for building an intelligent FSC based on a digital FSC?

The relationship between the key research questions in this thesis is shown in Figure 1.1. Both questions only existed in the company which are already build up their FSCs. Based on their existed FSC which are already developed from automations phase to digital phase, the question occurs during they are strving to upgrading to intelligent phase.

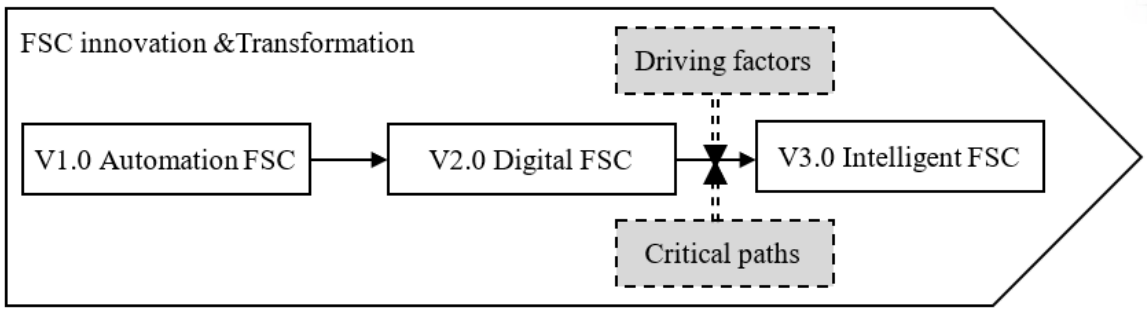

Figure 1.1 The relationship between the research questions

1.3 Research significance

1.3.1 Theoretical significance

Chinese enterprises currently finds themselves in an important period of economic

transformation featuring digital economy, supply-side reform, industrial upgrade, cost efficiency and efficiency improvement. Economic transformation brings important opportunities to the construction and innovation of intelligent financial sharing centers (FSC), which serve as a starting point for the transformation and innovation of financial management. While the original FSCs were targeted at "cost reduction and efficiency improvement" as well as "the processing of accounting", Chinese enterprises are trying to integrate the functions of "management, control and decision-making" into intelligent FSCs with the aim to facilitate business recovery and enterprise development after the pandemic.

Intelligent FSC is an interdisciplinary research theme that combines "management" and "technology". However, it is found that the current research on FSCs of Chinese enterprises has mostly been focused on the system application, whereas high-quality theoretical research on digital and intelligent FSC is very limited. Despite the existing research on digital finance and intelligent finance, a consensus is yet to be reached. Furthermore, there is no systematic theoretical research on the analysis framework and future trends of the FSC transformation and innovation in Chinese enterprises, as well as on the development of intelligent FSC.

Existing research focuses more on the necessities, objectives, contents and tools of FSC innovation, and is usually constrained within a specific system or software in an application area. As the research is not thorough, detailed, comprehensive or systematic, it struggles to provide direct guidance for Chinese enterprises in the development of intelligent FSC. The thesis, on the other hand, gives an in-depth insight into the evolution from the 2.0 digital FSC to the 3.0 intelligent FSC. Driven by practice, its innovative analysis on the driving factors and critical paths of intelligent FSC is of great theoretical significance.

Constrained by time and capabilities, the thesis focuses on the driving factors and critical paths intelligent FSC to provide analysis and solutions. The thesis constructs a theoretical analysis framework to enrich and improve the theoretical system of financial sharing and financial management innovation. By compensating for the gap in the existing literature, the thesis aims to provide theoretical guidance for the practice of Chinese enterprise's financial management innovation.

1.3.2 Managerial significance

Through explorative analysis and validation based on multiple cases, the thesis is dedicated to identifying the drivers and critical implementation paths of the transformation, innovation and construction of intelligent FSCs in China. The thesis reveals the features and the inherent

logic of financial management innovation in Chinese enterprises, and facilitates quick learning and imitation by other Chinese enterprises. As a result, Chinese enterprises are able to identify key considerations in the construction and decision-making of their own intelligent FSCs, select the optimum implementation paths based on their own contexts, and develop their distinctive financial management innovation. The practice of financial management innovation as a whole will therefore be promoted to ultimately ameliorate financial management in Chinese enterprises.

From the managerial perspective of FSC construction, the thesis summarizes common features and the inherent logic based on the leading Chinese enterprises in financial management innovation and FSC development; profoundly analyzes the problems in the transformation from 2.0 digital FSC to 3.0 intelligent FSC; and draws inspirations from the intelligent FSC construction in Chinese enterprises. In face of a digitalized and intelligent era, the thesis profoundly studies how intelligent FSCs lay the important data, organizational, technological and decision-making service theoretical foundations financial transformation, thus further prioritizing the construction of financial FSCs, and guiding the digitalized and intelligent transformation of financial management. The thesis boasts an extended scope of application and is of great managerial significance.

1.4 Technical route

The technical route is shown in Figure 1.2.

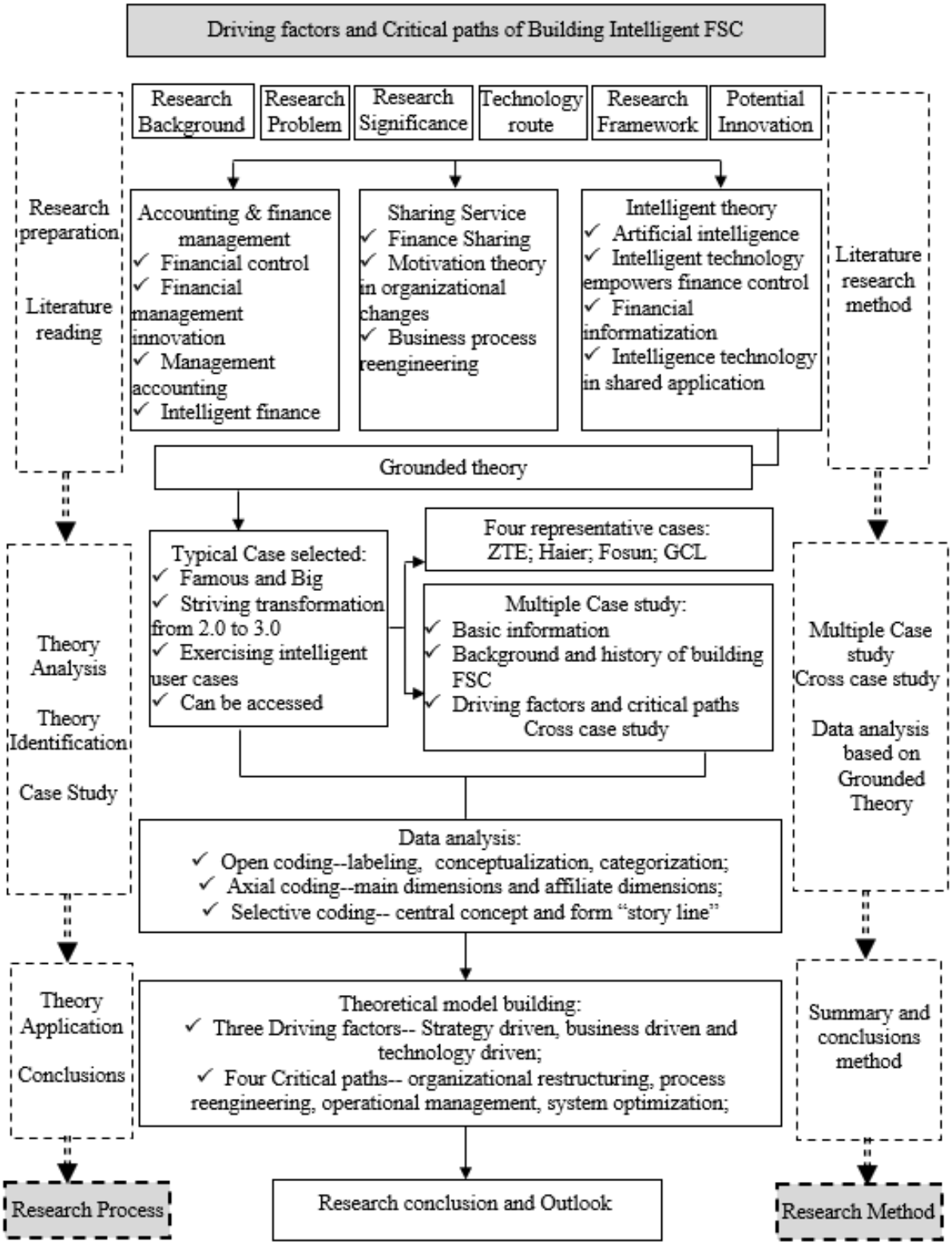

Figure 1.2 The technical route of the thesis

1.5 Research framework and content arrangement

This thesis starts from the background to delineate the research problem. Based on the

literature review, the thesis proposes research assumptions, identifies the roots of the problem and clarifies the status quo of academic research. Then, the thesis selects the cases and research methods, conducts the field investigation and collects data for further processing and analysis. Last, the thesis summarizes the findings and validates them.

Based on the research topic and research questions, the thesis is divided into three parts and five chapters as follows:

1) Part I: problem proposition and research preparation.

Chapter 1, Introduction. It mainly introduces the research background, research problems, research significance and research methods, defines research framework and content arrangement, and identifies potential research innovations.

Chapter 2, Literature Review and Theoretical Foundation. This chapter mainly provides a theoretical basis by investigating into the theories related to financial management, sharing centers intelligent technology, to form the research theoretical basis.

2) Part II: problem analysis.

Chapter 3, Research Method. Based on the Literature review, this chapter introduces the research method and design, selected the case to conduct interview and collect the useful data. It also describes how to make sure the research validity and reliability.

Chapter 4, Multi-Case Study Result and Data Analysis based on Grounded Theory. This chapter conducts explorative and validation analysis, and identifies the key drivers and implementation paths in the transformation from digital to intelligent FSC. Based on the theoretical foundation in Chapter 2 and research method and design in Chapter 3, this chapter explicitly proposes the driving factors and critical paths of intelligent FSC construction. The research findings may provide theoretical reference for enterprises.

3) Part III: problem-solving.

Chapter 5, Conclusion and Outlook. This chapter summarizes the research findings, and outlines its theoretical and practical contributions. The chapter also anticipates the future trends and research orientations of FSC.

The structure of the thesis is shown in Figure 1.3.

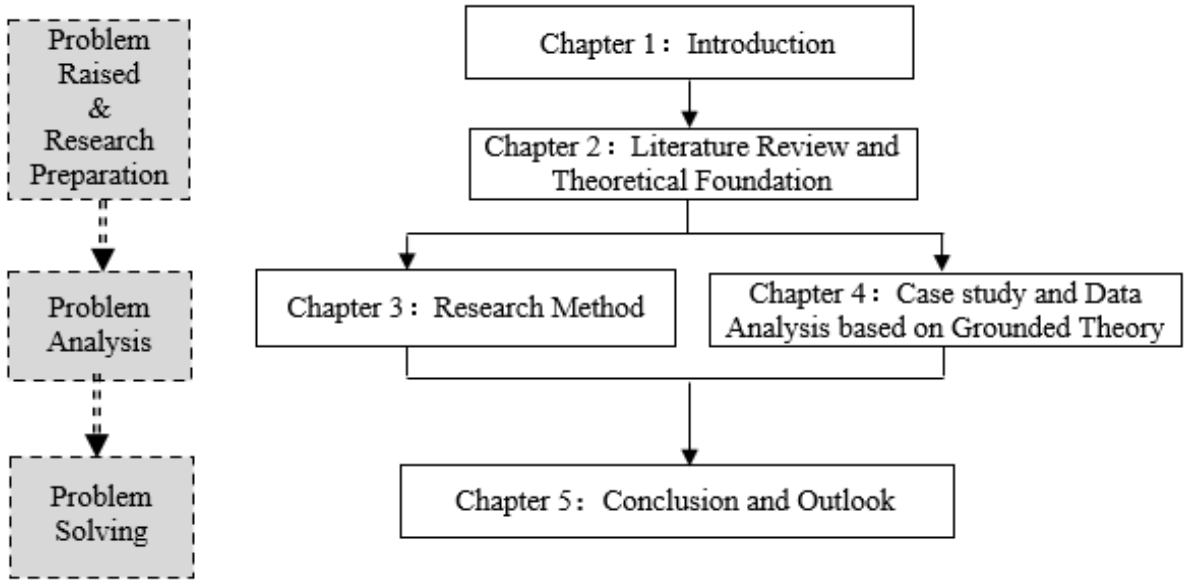

Figure 1.3 The thesis structure

1.6 Major improvement and innovation

Based on the innovation and practice of intelligent FSCs in Chinese enterprises, this thesis discusses the driving factors and critical paths. Major improvements and innovations are embodied in the following aspects.

Firstly, the process perspective. This research clarifies the effects, purposes and significance of intelligent FSCs in enterprise development and financial management transformation and innovation in Chinese enterprises, while identifying the key driving factors in intelligent FSC construction with the multi-case study. On this basis, this research combines literature review with data from multi case study and following cross case study, to conduct preliminary validations on these driving factors and critical paths. Finally, based on the data collected in the in-depth interviews, which will be empirically validated by data from interview outline. Thus, enterprises can more conveniently identify key factors in decision-making and practice.

Secondly, the dynamic perspective. This research discusses the path planning in the construction of intelligent FSCs and states that path planning should rely on different strategies and business demands, different development stages, and different types of FSC positioning. The research further discusses innovative paths to develop an optimal intelligent FSC, providing theoretical guidance for Chinese enterprises in intelligent FSC planning.

Thirdly, case studies. This thesis thoroughly and carefully analyzes the typical and

innovative enterprises in China. By collecting and analyzing data from the cases, the thesis demonstrates the process of FSC construction and financial management innovation, providing guidance for Chinese enterprises in developing intelligent FSCs.

Fourthly, the author. Previous articles were mostly theoretical analysis written by college scholars, and therefore lacked first-hand data and practical experiences in real-life financial management and FSC development. At the same time, frontline financial practitioners have practical experiences and data, but generally lack academic capabilities. Therefore, the practitioners have limited knowledge of relevant theories, and struggle to effectively conclude high-quality research results. However, the author of the thesis has drawn inspirations from previous literature, and enhanced the theoretical knowledge during the pursuit of the doctoral degree. Integrating the first-hand data accumulated over 25 years, the thesis not only systematically consolidates the theoretical foundations, but also provides guidance for large-scale application and practice.

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Chapter 2: Literature Review and Theoretical Foundation

This chapter includes two major parts: literature review and theoretical foundation. Literature review mainly studies the theories on financial management, sharing center and intelligent technology. By comprehensively reviewing the existing research, the thesis aims to lay a solid foundation for the subsequent analysis of key research questions, and help summarize research priorities and contributions. In addition, as the grounded theory is adopted in the research, a systematic introduction of the theory is included.

2.1 Theories on financial management

2.1.1 Financial control theory

Enterprises are joint organizations formed through property rights to adapt to the fierce market competition and industrial changes. Among the distinctive resources that form enterprise capabilities, financial resources are particularly important. Therefore, the efficiency of financial resource allocation is an important determinant of enterprise growth. Consequently, much focus has been given to the changes of financial functions and financial control.

2.1.1 1 The functions and connotations of financial control

As the organizational model of enterprises is gradually popularized all over the globe, entrepreneurs are paying more attention to the core issues of resource allocation methods and efficiency (Eisfeldt & Rampini, 2008; Ozbas, 2005; Stein et al., 1997). At the same time, due to agent costs and friction costs, more documents are focusing on the "dark side" in the resource allocation.

Q. Liu (2017) pointed out that before the emergence of financial sharing, the basic functions of finance can be clearly divided into financial accounting and management accounting. Financial accounting includes four parts of financial accounting, financial statements, fund management and tax management four parts, while management accounting includes performance management, budget management and cost management. Either function involves the work from three aspects of guidance, control and execution, which

requires the collaboration among the headquarter financial department, financial companies (or settlement centers) and subsidiary financial departments.

After the emergence of financial sharing, financial accounting and management accounting are executed with the coordination among the headquarter financial department, financial companies, the FSCs and subsidiary financial departments: the headquarter financial department is responsible for providing guidance in financial accounting and management accounting; the financial companies are mainly responsible for the control and execution of capital management; FSCs are mainly responsible for the execution of financial accounting; and the subsidiary financial departments are mainly responsible for the control of financial accounting and management accounting. Therefore, after the development of FSCs, this research is able to study the informatization of management accounting based on three aspects of guidance, control and execution (see Table 2.1).

Table 2.1 Basic functions of financial management

	Financial Operation	Financial Reporting	Capital Management	Tax Management	Performance management	Budget Management	Cost Management
Guidance	Accounting policies Accounting process Accounting entry review and approval Financial accounting audit	Management of consolidated statements Legal disclosure requirements External audit requirements Compliance of financial statements	Cash flow planning Cash transfer Cash payment Capital solutions	Tax planning Tax compliance Policy and process Tax knowledge	Management reporting system KPI process/rules/indicator definitions	Budget planning process and policies Strategic planning and targets Budget modeling Organization of budget management	Cost strategy Cost accounting and management standards Cost incentives
Control	Authorization and authority management Financial operation coordination Local financial system	Local financial statements Compliance management Internal check of financial statements Adjustment of local financial statements	Balance of local cash flow Foreign exchange management	International business models Tax compliance management	Business performance forecast Business performance analysis and promotion	Budget planning and requests Budget process control Budget analysis and evaluation	Design cost control Project cost control Production cost control Expense control
Execution	Sales and receivables Purchase and payables Fixed assets Payrolls Expenses and reimbursements Projects Exceptions	Regular accounting closure Financial statement preparation Management of internal transactions Internal check of financial statements Reporting	Offshore bank account reconciliation Issuance of payment instructions	Tax filing Tax reporting files Support of Tax inspection	P&L preparation Cash flow reports Shipping reports Inventory turnover reports	Processing of budget execution data Budget execution reports Expense analysis reports	Cost accounting Cost reports

Under the new financial management model, financial work can be roughly divided into strategic finance, business finance and basic finance (H. Chen & Dong, 2008). Strategic finance provides support for strategic planning and decision-making, which is usually handled by headquarter financial department; business finance is aimed at process control and business facilitation, which is jointly handled by headquarter and local financial departments; basic finance, also referred to as operational or shared finance, is targeted at transaction execution and operational control, which is usually handled by FSCs. Each financial task can be categorized under one of the three finance types and one of the three aspects in the previous paragraph.

Financial control is an important tool of modern enterprise management. Financial control means that the enterprise financial activities are controlled and supervised through specific methods, measures and procedures under standard control process. It can be said that financial control covers all the three types of finance: strategic finance, business finance and basic finance. In addition, financial control is the process where the enterprise headquarter, as the major player in financial control, adopts various control measures to guide, moderate, monitor and control the operation activities of member enterprises, with the intention to realize overall strategic goals and gain benefits. In general, financial control is the contractual arrangements of finance within an enterprise (Miao, 2002) which ensures that the capital flow maximizes the financial value. Financial management involves a hierarchy of financial relationships, which embodies the structure of parent enterprise with a hierarchy of subsidiaries. Financial management and control are mainly handled by different levels of Board of Directors, which conduct key activities and implement internal control on finance and operation on behalf of the enterprises. BoDs is fully responsible for financial decision-making and control, therefore determining the financial status of enterprises (Bin, 2004). Financial management and control cover cross-industry, cross-regional and diversified businesses within an enterprise. The targets of financial management and control include the organizations of the management team, operators and managers, as well as various enterprise resources, such as capital, technology, human resources and information (J. Liu, 2007).

Scholars have also studied the methods of financial management and control. Y. M. Chen (2007) divided the methods into three categories of comprehensive budget management, performance evaluation and management, as well as financial risk control and alert system. According to the research, performance evaluation generally was combined with comprehensive budget management or enterprise planning.

2.1.1.2 Models and means of financial management and control

At present, the studies on the models of financial management and control focus on the centralization and decentralization between the parent company and its subsidiaries. Foreign scholars generally started their research from financial management and control in enterprise activities. The economic crisis between 1929-1933 in the United States led to the bankruptcy of a large number of enterprises. Business operators then realized that market competitiveness and profitability depended on the production costs, and costs control became a theme of financial control. As financial management has gradually developed into a multi-level and multi-dimensional tool handled by specific controllers, its function is to make sure that managers make right decisions in any scenario, learn the variations between planning and reality, take corrective measures and adapt the plans when necessary. Over time, the importance of financial management has been more widely accepted (Menzies, 1987).

With the booming economy in the 1990s, some enterprises in developed countries had developed into a considerable scale, and these multinational enterprises played an important role in both their domestic markets and the global economy. During this period, the focus of controlling subsidiaries is the centralization and decentralization in financial management and control. As multinational enterprises involve in diversified international business activities, the centralized management capabilities are indispensable for headquarters (Mowen & Hansen, 2017). The spread of the Internet and the development of information technology have provided strong technological support for centralized financial management. Meanwhile, as measures such as the delegation of financial responsibilities, external audits and the supervision mechanism (e.g. budget management) are used more frequently in financial management, the theoretical system behind financial control is becoming more mature and improved.

Fan (2004) believed that the factors affecting the choice of financial control model included: the organization size, the ownership concentration of subsidiaries, the style of operators from the parent company, the nature of the subsidiaries. Yin (2004) supplemented other factors including the enterprise's development strategies, the ownership structure, the competition environment and the corporate culture. J. M. Liu (2012) found that due to widely spread administrative management in China, most state-owned enterprises preferred centralized control. A possible path to restructure their centralized financial control models would be rapidly enhancing the financial control capabilities of the parent company through the innovation of financial control over resources and organizational capabilities.

Shared services originated in Western countries in the late 1980s. The term refers to the sharing of resources within an organization, which may generate more competitive advantage compared with decentralized management. As information technology develops, sharing itself has become an effective operation model. Over time, shared services has evolved from cost-driven to control-driven and strategy-driven, with its focus shifted from cost control to value creation. The concept of sharing was later introduced into finance. By consolidating all effective resources within an organization, financial shared services aim to reduce operation costs, ameliorate service quality and improve service efficiency. Financial sharing serves the internal functions of enterprises, and creates value for enterprises. Previous scholars have acknowledged the effects of financial sharing from a process perspective (Ding, 2010; Lu & Wang, 2008).

From emergence to maturity, financial sharing has developed some distinctive characteristics, which can be roughly classified into the following three categories:

First, standardizable and scalable. The definition of a FSC indicates that the businesses integrated into the center must be standardized with identical operation methods and processes. At the same time, the standardization of business models and process can effectively reduce the costs of financial operation and contribute to the scale effects.

Second, technology-driven and professional. The operation of FSCs is highly dependent on professional information integration system and financial control software, and FSCs are executed through information technology. In addition, FSCs involve large quantities of professional knowledge and professional talents. Apart from cost reduction and efficiency improvement, FSCs are committed to value creation and providing support for enterprise decision-making.

Third, service-oriented. FSCs are not only sharing centers but also service centers. Therefore, they must be customer-oriented to improve customer satisfaction while conducting various business activities. An agreement shall be signed to delineate responsibilities of both parties, and specify service contents, quality standards and service durations. Fees should be charged according to the signed agreement.

According to the previous research, the financial management and control models are divided into three categories: "centralized" model, "decentralized" model, and "hybrid" model. As Chinese enterprises were generally started later than their Western counterparts, the research and practice of financial control in China remain at the early stage. There is insufficient theoretical research and application practice in regard to how information tools, notably the intelligent technology that rapidly develops after 2015, can promote management

and control capabilities and optimize decision-making, as well as how the information tools adopted in financial control can have strategic control effects on FSCs. Considering the inadequacy of related research, the thesis studies the driving factors and critical paths in the construction of intelligent FSCs, with the intention to help enterprises strengthen financial control capabilities. The author hopes to realize breakthroughs in the theoretical and practical development of financial management and control in Chinese enterprises.

2.1.2 Theories of financial management innovation

As the construction of intelligent FSCs is a part of financial management innovation, this thesis also reviews the literature on financial management innovation, to further clarify the research problems and lay a foundation for subsequent analysis.

Birkinshaw et al. (2008), systematically reviewed the literature on management innovation, and found that there were four perspectives in literature including the institutional, fashion, cultural and rational perspectives. From the rational perspective, the study found that enterprise or individual innovation and the characteristics of the management had significant effects of management innovation. In addition, more researchers thoroughly studied the factors of management innovation from three aspects of organization, individual and external environment. They found that factors including enterprise size, market scope, the educational background of managers and common employees, the progress of their concepts, enterprise centralization, internal resources, industry competition, leading position in its field had significant effects on management innovation.

Compared with foreign scholars, Chinese scholars further extended the research on the influencing factors of management innovation, mainly from the perspectives of internal and external environments. Following scholars such as Sun and Li (2007) found that external environments could influence organizational behaviors and characteristics, and thereby drive enterprises to continuously innovate. Moreover, the change rates in the external environment also affected innovation models. Chinese enterprises were more inclined to choose among different innovation models to solve target problems in face of complex and volatile environments.

In terms of the internal environments, the existing literature focuses on the effects of organizational characteristics, leader characteristics, organizational capabilities, corporate culture, and technological innovation on management innovation. Some scholars have found that enterprises with higher ages and larger sizes are more prone to progressive innovation

models. The finding indicates that general organizational characteristics also impact management innovation.

Leaders are also important factors behind enterprise management innovation. For example, Xiang and Wang (2004a) found that enterprise leaders and top management teams were cores for sustainable innovation, and could identify innovation projects. In addition, some scholars study the factors behind the success of management innovation, and conclude that the success of management innovation is dependent on leader competence, decision-making capabilities and moral risks (Xiao, 2006). The innovative character of entrepreneurs is the basis of management innovation within an organization (Z. D. Yu & Li, 2006). In addition, they conducted a multi-case study to analyze the factors relevant to management innovation. They concluded that the leadership of the top management, evidence-based decision-making and strict control are key factors behind the success of management innovation.

Organizational capabilities are also factors of innovative organizational management. Xiang and Wang (2004b) found that talent was the core of the implementation of enterprise management innovation; organizational learning was also proven as a tool to cultivate the innovative character of employees (Z. D. Yu & Li, 2006; G. Zhang & Yu, 2005); a more formal and centralized organizational structure was more conducive to organizational breakthrough and innovation (Sun & Li, 2007). The findings of M. J. Wang et al. (2007) were similar to them. They all believed that rigid organizational behaviors were positively correlated with innovation capabilities of an enterprise.

Corporate culture is also a driver of sustainable organizational innovation (Xiang & Wang, 2004a). They found that a good innovation culture was a driver of management innovation, and played an important role in the effective implementation of management innovation. Furthermore, He pointed out that enterprises should encourage employees to challenge past experiences, analyze the current situation with innovative thinking, and tolerate failures in innovation.

Continuous innovation in technology can also drive organizational management innovation (H. M. Xie & Han, 2005), which is a mediator between technological innovation and innovation performance. Organizational innovation (including management innovation) needs technological support (Xin & Shi, 2008). The success of innovation depends on the coordination of all factors within an organization (Zhu et al., 2006).

To summarize, although there are many papers dedicated to financial innovation, most of them are focused on the necessity of financial innovation or the general theoretical description

of finance. As they fail to combine specific cases, they are not sufficiently convincing. On the other hand, there are limited studies on the implementation path and influencing factors of financial management innovation, especially on the construction of intelligent FSCs. Therefore, to address the gap of current literature,Wecan conduct in-depth research from the following aspects: (1) integrate specific practices and innovation cases to understand how intelligent technology is adopted in financial sharing in Chinese enterprises; (2) identify major drivers behind the transformation from automatic and informationized financial sharing to intelligent financial sharing; (3) identify critical implementation paths in the construction of intelligent FSCs under the Chinese system of financial management innovation; systematically propose a theory.

2.1.3 Theories on management accounting

Accounting theory is an integral part of the enterprise theory (Coase, 1990), and an enterprise is comprised of a series of interconnected contracts (Jensen & Meckling, 2019). The signing, execution or termination of contracts cannot be done without information records. Since the management accounting provides information to serve management, it should naturally provide accounting information for different tiers of managers within an enterprise. Although there used to be a heated debate about the nature of accounting, the basic consensus of the accounting community is that accounting is an information system (Ge, 2012), and that accounting itself only provides necessary information to control economic activities. In this sense, these findings apply to both financial accounting and management accounting (Ge & Tang, 1983). The emergence of management accounting does not change the nature of accounting as an economic information system. Up to now, Ge's view still affects the research on accounting theories. Management accounting is essentially a system that provides information to support decision-making. It provides two types of information, namely monetary information and non-monetary information.

As management accounting provides monetary information, it also belongs to accounting (Z. B. Yu, 2018). However, unlike financial accounting, management accounting also provides a wide range of non-monetary information. The delineation of management accounting is a widely discussed topic in both the academic and practical community of accounting in China.

Focusing more on "calculation", financial accounting is more standardized or routine; focusing more on "planning", management accounting is more personalized or situational. In

an Internet environment dominated by computers, when it comes to the accounting profession or practice, future accounting is equivalent to management accounting, and vice versa (Y. M. Hu, 2019).

Drucker (1977) proposed that strategies were not about what we would do in the future, but about we should do today to earn the future. Therefore, strategic positioning is so crucial that it is mentioned throughout enterprise management. Apparently, management accounting must also integrate strategic thinking to help entrepreneurs develop appropriate strategies in any scenario. Based on this argument, Simmonds (2012) put forward the concept of "strategic management accounting". In the practice of financial management, people have also put forward the concept of "business and finance integration". Different from the previous financial management that pays more attention to the past and the present, the new concept pays more attention to the future.

Article 4 of the Basic Rules for Management Accounting issued by the Ministry of Finance of China clearly points out that "when applying management accounting, enterprises should follow the principles of strategic orientation, integration, adaptability and cost-effectiveness. Among them, the "integration principle" refers to that management accounting should be embedded into the relevant fields, levels and links of the entire organizations. Based on business processes, enterprises should use management accounting to organically integrate finance and business. The concept of "business and finance integration" thus has become popular in commercial enterprises (G. L. Tang & Xia, 2018), and quickly drawn attention from theoretical research. The integration of business and finance is the most representative explanation of management accounting in China, which is easy to understand and implement in Chinese scenario (Z. B. Yu, 2018). Y. M. Hu (2019) pointed out that in the Internet environment dominated by computers, the wide application of business and finance integration helps to optimize management accounting.

Although new information technology has not changed the essence of management accounting, but it has inevitably strengthened the utility of accounting information system. Information technology greatly changes the exogenous variables and application conditions for management accounting, and therefore promote the effects of management accounting by catalyzing the deep integration of business and finance (B. Wang, 2020).

Management accounting helps enterprises create values, but it cannot create "value" by itself due to the nature of management accounting and the approaches to value creation. All functions of an enterprise should "speak the same language", and coordinate their actions to continuously create value through candid cooperation.

To sum up, studies have confirmed the close relationship between management accounting and enterprise management. However, there is not enough research on the roles of financial sharing in financial management, strategic management as well as in business and finance integration. Despite the conclusion that accounting is an information system, little theoretical research has focused on how to adopt intelligent and information technology in financial sharing to promote financial transformation.

2.1.4 Theories of intelligent finance

2.1.4.1 The emergence of intelligent finance

Since the first electronic digital computer was invented in 1946, information technology has profoundly changed the ways of life and work. When it comes to enterprise management, information technology, especially artificial intelligence, has brought great opportunities and challenges. Be it the revolution of development strategy and business model, the reengineering of organizational structure and management process, or the restructuring of operation models and organizational culture, transformation has become a “new normal” for enterprises in the context of rapidly evolving information technology. In recent years, people have expected highly of artificial intelligence because of its expanding applications in areas including man-machine game, decision-making support, pattern recognition, risk diagnosis, natural language understanding. As Robotic Process Automation (RPA) is successfully adopted in finance and tax, intelligent finance has made its appearance.

The emergence and maturity of information technology such as “Big data, AI, Mobility, Cloud and IoT” (Q. Q. Liu, 2017) has brought new opportunities and challenges to financial management. More advanced algorithms, models and tools can be adopted in financial prediction and decision-making, financial risk control and financial cost management. Technology development has enabled more comprehensive data collection and processing; business intelligence and expert system combine opinions from different experts; mobile computing enables financial management to be done anytime and anywhere; financial robots facilitate the automation of financial management; modern system integration eliminates the long-existing information and management obstacles between business, finance and tax. It can be said that the new generation of information technology represented by artificial intelligence has brought new opportunities for the development of finance. Informationized finance is thus being transformed to intelligent finance.

There are two reasons behind intelligent finance: first, the tension is more prominent

between the traditional financial model and the growing personalized demands from financial information users; second, the rapid development of new technology such as artificial intelligence and big data can catalyze transformation.

Intelligence means that supported by the new generation of technology, anything can proactively meet different needs. Therefore, intelligent finance means that support by big data, artificial intelligence, cloud computing, Internet of Things, blockchain and other new technology, finance can proactively meet the demands from various functions including production, operation and management. The transformation to intelligent finance is a process that we re-understand dynamics, uncertainty and complexity (Cavalcante et al., 2016), and a process where the organizations form a uniform understanding of internal and external environment (Weick et al., 2005). With data discovery, intelligent decision-making and intelligent actions at its core, intelligent finance is an intelligent management system that facilitates intelligent judgment, strategy development and strategy choice for the decision-making team.

Intelligence is compatible with finance because of the following reasons: first, big data includes business, operation and financial data; second, intelligence is more applicable for descriptive rules based on multiple variables, and accounting standards belong to these rules. Third, intelligent technology can be used in many repetitive financial tasks.

In intelligent finance, information systems can not only collect, process and display data, but directly replace managers to make intelligent decisions. For example, when managers need to adjust the product mix, they no longer need to analyze the data themselves. Instead, the information system will quickly and accurately calculate the profits of different products with existing and simulated outputs and sales, before making a decision based on the calculations.

2.1.4.2 Definition of intelligent finance

Informatized finance focuses more on the integration of financial and business information as well as the rapid processing and real-time sharing of information, whereas intelligent finance pays more attention to the efficiency and intelligence of information processing, For example, Internet of Things, RPA, machine learning and expert systems can be used to automate the entire financial process, thereby reducing costs, increasing efficiency and decreasing errors (Sun & Liu, 2017); neural network, rule engine and data mining can automatically provide more information for real-time financial forecast and decision-making (H. L. Wang, 2017). The reengineering in intelligent finance is not limited to process, organization, management

models and concepts, but extended far beyond. With reference to intelligent manufacturing, intelligent funding and intelligent teaching, some experts coined the term “intelligent finance” in some forums or through some media to describe the new development of financial intelligence.

There is no universally accepted recognized definition of intelligent finance. At present, there are different definitions of intelligent finance, and more terms including financial intelligence, intelligent finance, intelligent accounting and intelligent financial sharing are proposed. We can categorize representative definitions into technological application perspective, systems and models perspective, application scenario perspective, management activity perspective and interdisciplinary perspective.

A. Technological application perspective.

O'Leary (1995) discussed the role of artificial intelligence and expert systems in solving problems of traditional accounting functions. According to M. L. Liu et al. (2020), intelligent finance refers to the integration of new artificial technology such as “Big data, AI, Mobility, Cloud, IoT, Blockchain” into finance. By simulating, extending and expanding the traditional finance, the quality of accounting information is improved; accounting efficiency is increased; accounting costs are reduced; the compliance and value creation of accounting are enhanced. As a result, enterprise finance will play more important roles in manage control and decision-making. Financial digitalization can be a tool to facilitate enterprise digitalization. The digital transformation of financial shared services, the construction data mid-end platform and the application of management accounting tools provide data, organizational and technological foundations for intelligent finance (Q. L. Zhang et al., 2020). Moudud-Ul-Huq (2014) listed ten accounting scenarios that could adopt artificial intelligence. RPA can be important tools in labor-intensive, repetitive, high-capacity, rule-based, digitalized tasks with multiple systems or structured data. Yet obviously, the exhaustive method is not the best way to define intelligent finance.

B. Systems and models perspective.

Hong (2020) defined intelligent finance as a new model of financial management. With the help of financial experts and intelligent information technology, intelligent finance is a process where business activities, financial accounting activities and management accounting activities are analyzed to make strategic decisions and implement complex financial management under the support of human-machine collaboration. Since intelligent finance is not limited to the application of artificial intelligence in various scenarios, will it be a system, a management model, an economic management activity or even developed into a new

discipline? Intelligent finance does not deny the essential nature of traditional financial work, but rather constitutes a transformation where different technological tools are systematically adopted to address current problems in finance.

As early as in the 1990s, the American academic community began to study intelligent finance, covering the use of expert systems, machine learning and other technological tools. Q. Liu and Yang (2018) believed that intelligent finance was developed based on advanced financial management theories, tools and methods. With the support of a hybrid intelligent system of intelligent machines and human experts, human-machine collaboration could be introduced in complex financial management activities. Intelligent finance was then a new financial management model where the extended use of the intelligent system would gradually replace human experts in some financial management activities. Since then, many scholars have defined intelligent finance from different perspectives with distinctive features. However, most definitions are very complicated.

C. Application scenario perspective.

Application scenario perspective believes that intelligent finance is represented by a variety of application scenarios, including strategic, business and accounting or financial sharing scenarios. Heinzelmann and Rafael (2017) noted that by providing more accurate forecast and cost estimates, artificial intelligence could address issues related to management accounting and control, such as procurement decision-making or supplier selection. Similar to Rafael's research, many studies have proposed specific application scenarios based on different technology, but they fail to systematically explain intelligent finance. Qin (2020) argued that the main accounting scenarios for artificial intelligence include accounting voice instructions, accounting verification, machine vision, big data financial analysis, intelligent financial risk control, and the planning of accurate forecast.

D. Management activity perspective.

Management activity perspective believes that intelligent finance is an economic management activity. H. H. Xu et al. (2021) addressed that intelligent accounting was developed in intelligent environments as an economic management activity. By making the best of three elements in intelligent environments, the value movement of different factors can be intelligently and comprehensively managed, so as to enhance the reflecting and monitoring roles of accounting, optimize resource allocation, and coordinate micro-level accounting with macroeconomy. The three elements in intelligent environments include intelligent information resources, intelligent decision-making of human being, as well as intelligent technology, methods and tools. H. L. Gao et al. (2005), R. J. Zhang et al., (2010), and Y. H. Liu et al.,

(2013) have also proposed that intelligent finance is a management model featuring full-function and whole-process intelligence across business activities, financial accounting activities and management accounting activities.

E. Interdisciplinary perspective.

Y. L. Fu (2019) believed that intelligent accounting combined traditional accounting theories with accounting intelligent agents, deep learning and soft computing. It incorporated the design of internal reporting system, controlling system, decision-making support system and financial decision-making system into the knowledge warehouse and rule base of intelligent agents. As a result, a new theoretical system of accounting would be developed that was different from traditional theories but able to address real-life issues in accounting and finance. A. G. Wang (2021) put forward that intelligent accounting is a method science, a computational science, a practical science and an interdisciplinary science. M. Zhang (2020) believed that intelligent finance should include at least three core elements: artificial intelligence (AI); intelligent tools, such as Business Intelligence (BI), and big data analysis which spanned across different disciplines. Later, M. Zhang (2021) said that intelligent finance was a new type of financial management developed upon "Big data, AI, Mobility, Cloud, IoT " and other new technology. Featuring intelligence and automation, intelligent finance could provide precise information related to real-time decision-making, and thereby enhance the value creation capabilities of management.

The thesis clarifies two key points of intelligent finance: first, the essence of intelligent finance is to simulate, extend and expand the scope of traditional finance through intelligent scenario design and the appropriate application of new technology; second, the pillar of intelligent finance is the construction of intelligent finance platform and the development of new financial management models. The two points again validate the interdisciplinary feature of intelligent finance.

Intelligence is not only a historical process, but also a concept that speaks to the present. The purpose of intelligent finance is to empower finance, constantly improve the value of finance value, and promote financial transformation. Intelligent finance requires the coordinated development of both intelligent financial personnel and intelligent tools. Furthermore, the coordinated development of intelligent personnel, intelligent enterprises and intelligent society will enable finance to create more value. M. Zhang (2021) noted that intelligent finance was a new generation of finance that was developed during the process of digital transformation and intelligent application of finance. Han and Yu (2018) stated that a complete intelligent financial system should cover the content of "three horizontal levels and

one vertical penetration": "three horizontal levels" include the basic level, (financial robot based on process automation), the core level (the intelligent financial sharing platform featuring deep integration of business and finance) and the extensive level (intelligent management accounting platform based on business intelligence (BI). "One vertical penetration" refers to the penetration through the three levels by an intelligent financial platform based on artificial intelligence (AI). With the continuous development of artificial intelligence, it gradually penetrates into the basic, core and extensive levels.

2.1.4.3 Intelligent financial sharing

Enterprises can efficiently complete financial accounting through FSCs (R. J. Zhang et al., 2010). When the intelligent transformance of finance achieve some financial goals or financial conditions in a period of time (W. J. Liu, 2012), it could develop into a management model that integrates all the processes including business processes, financial accounting processes and management accounting processes. By integrating the processes in three functions with concepts or tools of intelligent transformation, intelligent finance could avoid inconsistency, fragmentation, and the work in silo.

As enterprise production and operation are realized through the business activities, business and financial intelligence can also be integrated in the process of constructing intelligent financial sharing, to manage the whole supply chain (H. Ding et al., 2018). In this way, the finance functions in different levels can be further integrated through intelligent transformation. Enterprise transactions are collectively processed by FSCs according to the financial accounting process, while value information is evaluated by management accounting. Therefore, financial accounting, as a responsibility of FSCs, should further be intelligently integrated with management accounting (Messner, 2016). Hence, there has been increasing demands of financial sharing.

FSCs, as well as financial automation, digitalization and intelligence based on financial sharing, can not only mitigate the difficulties in accounting data management, but also realize extensive connections and sufficient data collection. Therefore, FCSs provide various application scenarios for the new generation of intelligent technology. As mentioned above, even without a definite explanation of intelligent finance in China or abroad, scholars still study the application of artificial intelligence in accounting, especially the construction of intelligent FSCs. Intelligent finance was developed on the theoretical basis of accounting management activities with the support of intelligent technology. Driven by intelligent technology, the connotations of accounting will inevitably be redefined, which will focus on

the reflecting and monitoring role of accounting. In addition, traditional financial accounting will be integrated with management accounting, enterprise accounting and macroeconomy. Hence, there is an increasing urgency to develop intelligent finance and intelligent finance sharing.

The intelligent transformation of financial management and FSCs will cover processes of business activities, financial accounting and management accounting. All economic and business activities based on resources, events, subjects and values will be intelligently informatized. Intelligent technology such as big data, artificial intelligence, business intelligence and data mining can thus generate a large amount of multi-dimensional information (Rikhardsson & Yigitbasioglu, 2018) to satisfy the needs of management decision-makers inside and outside enterprises. The business community pays more attention to the construction of intelligent FSCs. In 2016, Deloitte and Kira Systems jointly announced the introduction of artificial intelligence into accounting, tax, audit and other tasks, marking that China entered the stage of local accounting intelligence. Subsequently, Chinese financial software manufacturers including Yonyou, Kingdee and YuanNian also launched intelligent financial products. In 2017, Deloitte launched its first financial robot, and other accounting firms and financial software suppliers represented by the "Big Four" also proposed their financial robot solutions. In order to better combine theories and practice, Shanghai National Accounting Institute established the Intelligent Finance Research Center in 2018, and continuously held the events of Top Ten Information Technology Awards. All these initiatives facilitate the development of accounting, and contribute to the construction of intelligent finance and intelligent FSCs.

Further research showed that the construction of intelligent FSCs is not the automation of some links in the financial process, nor the overall optimization and reengineering of the financial process, but the revolution of the entire financial management model and the financial management concept (Q. Liu & Yang, 2018). Supported by man-machine deep integration, an unprecedented function of financial management is generated. Some experts believe that FSCs must be the foundation of intelligent finance. The whole intelligent financial system should involve at least three levels: first, intelligent financial sharing platform based on deep integration of business and finance, which is the foundation of intelligent finance, second, intelligent management accounting platform based on business intelligence, which is the core of intelligent finance; third, intelligent financial platform based on artificial intelligence, which embodies the deep development of intelligent finance (Cavalcante et al., 2016).

At the same time, Greenman (2017) believes that even if AI is applied to FSCs to shift the focus of accountants to business development, consulting services and risk management in the future, it will not completely replace accountants. The total number of financial personnel will remain the same but with a completely different structure. Shu (2018) pointed out that great importance should be attached to the application of blockchain, artificial intelligence and other new technology as one of the one of the three important tasks put forward by the Ministry of Finance to facilitate accounting informatization. D. T. Liu (2018) pointed out that the latest sharing mode was the intelligent service centers, which were aimed at quick accumulation of operational big data in order to realize data empowerment, support decision-making and provide intelligent services. Q. Liu (2021a) divided the intelligent financial platform into three dimensions, namely accounting, management and strategic dimensions. The informatization and digitalization of FSCs can be further divided into three stages as shown in Table 2.2.

Table 2.2 Three different stages of information technologies applied in accounting

Stages	Core technology	Reform depth	Targets	Roles
Automization (Computarization)	Personal computer, operation system, database, WLAN, programming language	The automation of certain links in management process, but not the entire management process and organization	Accounting data	Compliance management (Transaction operator)
Digitalization (Informatization)	Internet, e-commerce, information safety, SaaS service, data warehouse, ERP	Usually the rebuilding of management processes and organizations	Accounting data and accounting information	Control + Service (Business controller)
Intelligence	Knowledge system, neural network, RPA, knowledge mapping, pattern identification	Usually the reengineering of financial management models	Financial management knowledge, accounting information and data	Empowerment + Innovation (Value creator)

To sum up, the current theoretical research has preliminary discussions on the concepts and ideas of intelligent finance, and conducts tentative exploration of a certain point in real-life practice with some outputs. Notably FSCs are considered a platform to facilitate intelligent transformation. However, the discussion of intelligent finance is not thorough and comprehensive. As an emerging discipline, the development trend of intelligent finance remains ambiguous and there is not a systematic thesis on intelligent FSCs in enterprises. There is a desperate need of the research on drivers and critical paths of transforming from automated and digitalized FSCs to intelligent FSCs.

2.2 Theories on shared services

2.2.1 Financial sharing

2.2.1.1 The emergence and development of shared services

Many enterprises suffered from the "big enterprise syndrome" in the 1980s. With low efficiency and slower decision-making, they failed to respond agilely to the rapidly changing external environments, and saw their survival under threat. Since the 1990s, with the development of information technology and economic globalization, enterprises have been expanding rapidly around the globe and the ever-changing business environment has posed great challenges to enterprise management. As the core of enterprise management, financial management has also suffered from low management efficiency, high management costs, and the poor quality of financial information.

American enterprises initiated a huge "enterprise restructuring revolution" in the mid-1980s, and Japanese enterprises began the "second management revolution" in the 1990s. Management scientists Michael and James (1993) and Kobayashi (2018) summarized the theories of process reengineering, pointing out that process reengineering was an important strategy to cure large enterprise syndromes. Some multinational enterprises have reformed their financial management and reengineered their processes, when Financial Sharing Centers (FSC) emerged as a new financial management model (Y. He & Zhou, 2013).

For the sake of scale economy and easy system installation, General Electric (GE) established financial services operation (FSO) in 1984, serving three strategic objectives: customer satisfaction, employee participation, and corporate responsibility. The establishment of the FSO achieved significant results, including 30% fewer employees and 80% fewer financial systems, and the ratio of shared management increased from 7:1 to 15:1.

Other companies, including Digital Equipment Company and Johnson & Johnson, similarly structured their financial functions and significantly improved the efficiency of services such as accounts receivable, fixed assets, and payroll accounting. Ford Motor, General Electric and Kearney all started to implement shared services in 1997 (Moller, 1997). Hammer (1990) noted that the concept of shared services had first come from accounting and finance in enterprises.

Based on the practice of these companies, Gunn et al. (1993) first put forward the concept of shared service, believing that shared service was a new management model. They argued that the core of shared service was that enterprises should make full use of shared resources.

They also pointed out that shared service is a new management concept, where the company obtained advantage by streamlining the management hierarchy to share employees, technology and resources when providing services. The abovementioned practices go beyond the traditional concepts of financial leadership and line managers.

As an important way to integrate resources and tap internal potential, shared services are widely used in multinational enterprises in Europe and the U.S. At the same time, as multinational enterprises expand their businesses in China, the concept of shared service management is also introduced to China. Representative examples include the data service center set up by HSBC, the human resource shared service center established by TECO International, and the financial shared service center set up by MOTOROLA, Philips. Influenced by multinational enterprises, some Chinese enterprises have also tried shared services to effectively integrate internal resources. The enterprises include financial enterprises (Ping An Insurance Group, Pacific Insurance Group), manufacturing enterprises (Haier Group), communication enterprises (ZTE). Financial shared service contributes to not only service quality and work efficiency, but cost reduction.

2.2.1.2 The transformation and promotion of shared service centers

Economic globalization has reduced China's domestic demand and led to overcapacity. Therefore, enterprises are facing difficulties such as rising costs, low efficiency and intensifying competition. At the same time, the booming development of new technology such as big data, artificial intelligence, cloud computing, the Internet of Things and blockchain is forcing the transformation of corporate finance and FSCs. More and more Chinese companies have begun to transform their finance through the transformation of their financial shared service model as an important component of the organizational transformation (Y. He & Zhou, 2013; Zhang et al., 2010). Y. Yang and Liu (2019) believed that the functions of strategic finance, business finance and sharing finance based on financial shared service had positive effects on cost reduction, service quality, efficiency and risk management and control. With the rapid development of intelligent technology, P. Xu and Xu (2020) believed that new application scenarios and development orientations had emerged. Intelligent technology had brought more opportunities in functions of strategic finance, business finance, and shared finance. Therefore, there are obviously two trends in sharing: the trend of "extensive sharing" and “big sharing”, and the trend of deeper integration with modern intelligent technology.

Compared with FSCs in the early years that focused on costs and efficiency, modern FSCs are expected to play a better role in supporting the strategic development and financial

transformation of enterprises. As Professor John Cotter from Harvard pointed out in (John, 1997) and Leadership for Change (John, 2007): management reform has become an important research topic of management theories, and many scholars have studied financial shared service as a financial management reform. As shared service develops, its application scope has expanded from finance to human resources, public relations and information systems (Cecil, 2000; Triplett & Scheumann, 2000). Kris and Fahy (2003) proposed that financial shared services enabled enterprises to recognize the importance of next-generation technology in financial transformation. With the surge of new technology including "Big data, AI, Mobility, Cloud, IoT and Blockchain" (W. J. Liu, 2012), enterprises have entered a new round of financial transformation as more enterprises have shifted their focus to the intelligent transformation of financial shared services (Q. Liu & Yang, 2019).

2.2.1.3 Literature review on financial sharing

Since sharing originated in the West, the research of western scholars started earlier and generated more outputs to support the practice of financial sharing. After Gunn et al. (1993) first proposed the concept of shared service, they also proposed that the shared service center should be an independent part of an organization, and that its main responsibility was organizing the decentralized activities and data for centralized processing, and charging the corresponding fees from service receivers. Based on the concept of shared service, financial shared service is a new model of financial management that is realized through the construction of a new semi-independent business unit-FCS. This business unit is designed to provide basic transaction services including accounting, capital settlement, and expense reimbursement. By integrating personnel, technology and processes in one or more sites, financial shared service consolidates financial businesses with the nature of scope economy or scale economy in a single center for processing. Financial sharing thus embodies cost reduction, the accumulation of knowledge capabilities, the improved service quality for internal and external customers and the application of new technology (Shah, 1998). Financial shared service is not only a new institutional arrangement that integrates financial operations and reengineers financial processes, but also an innovative means to standardize and streamline processes within the enterprise (Gould & Fahy, 2005). The implementation of financial shared services must be subject to the process reengineering theory, because the essence of financial shared services is the sharing of processes (Schulman et al., 1999).

Based on the practice in Chinese enterprises, R. J. Zhang et al. (2010) pointed out that financial shared service was the consolidation of decentralized financial tasks from member

organizations to a new financial organization. Called Financial sharing center (FSC), the new financial organization provided standardized, normalized, efficient, low- cost shared services, and created value for enterprises in different countries and regions through network in the form of business partners (BPs).

The value and influencing factors of sharing are also the key issues of research. In recent years, the accelerated development of shared services has generated huge economic benefits and created additional value. Gould and Fahy (2005) pointed out that shared services could avoid cyclical inefficiency in decentralized enterprises, so that enterprises could save costs through sharing, and further improve profits. SSCs are responsible for the centralized handling of internal customers' financial services to manage the costs, quality and timeliness. SCC has definite resources, and usually establishes formal or informal contracts with its service clients, known as the Service Level Agreement (SLA).

Grant (1999) summarized the factors behind the success of financial shared services from five perspectives: environment, people, BPR approach, information technology, and a vision for transformation. Janssen and Joha (2008) identified key factors in implementing shared services, including thorough execution strategies, the redesign of business activities, standardization of processes, sound information systems, and change management involving all shareholders. Based on case studies, R. J. Zhang and Zhang (2008) proposed the key factors behind the successful implementation of financial shared services, including financial organization reform, network integration of financial system, the optimization of core business processes, and the improvement of evaluation system. From the perspective of risk control, Derven (2011) put forward the key considerations in the implementing financial shared services, including aligning the enterprise mission with customer goals, creating a corporate culture of responsibility, improving the knowledge management, strengthening process standardization, and regularly implementing performance evaluation. Based on questionnaire survey, H. Chen and Sun (2011) summarized that the key factors for the successful implementation of financial shared services included process management, business standardization, information system and, personnel management. Martin (2011) designed questionnaire and distributed it through an online platform. After categorizing and sorting the collected data, he used linear regression model to test the significance of different factors. Six factors of the final siting decision, service level agreement, process management, change management, organizational structure and strategic planning passed the significance test and became the key factors for the successful implementation of financial shared service. Melchior et al. (2011) discussed the construction concept, function positioning, construction

process, site selection, organizational structure, process guidance and other issues of shared services.

Financial shared service model creates value for enterprises, under the effects of various positive and negative factors. Prerequisite factors including targets, strategy and process, information technology, and operational factors including organizational structure, personnel management, service quality, operation management can both constrain transformation and constitute positive or negative factors (Bresnahan et al., 2002; Grant, 1999).

After the introduction of shared service centers in China, it has developed rapidly despite the late start of domestic research. R. J. Zhang and Zhang (2008) believed that multinational enterprises should apply financial shared services as a new financial management model. H. Chen and Dong (2008) proposed that financial shared service was an innovative means to integrate personnel, technology and process in one or more sites to standardize and streamline internal processes. Based on the financial shared service center of DD Group, J. Y. Liu et al. (2015) proposed that the construction of the financial shared service center should fully consider the characteristics of the enterprise, and that the support from the management was indispensable. The financial shared service center should focus on service rather than control. X. Y. Chen and Li (2017) integrated the characteristics of the big data era, and proposed that FSCs should be the data center of enterprises. M. L. Liu (2017) proposed five development trends for Chinese financial shared service center, including flexibility and automation of processes; virtualization and fragmentation of positions; outsourcing and crowdsourcing of operations; integration and clouding of platforms; integration of services. And concluded that the positioning of FCSs in Chinese central enterprises should be different without practical cases for reference. Tian et al. (2019) proposed that in the context of "Big data, AI, Mobility, Cloud, IoT", FSCs should be the starting point for financial transformation, and the embodiment of the reengineering and optimization of financial processes. W. Y. Li et al. (2020) summarized the development of Chinese financial shared service centers, and put forward the development trends from the aspects of information technology, work scenarios, process design and process value chain.

In conclusion, the early literature focused on the concept, significance, role and value of financial shared service, and theoretically clarified the essence of this financial management reform. Some scholars have applied the theory and methods of business process reengineering (BPR) to deeply study the reform of enterprise management, and have validated key factors with case studies. From the perspective of process reengineering, there are key factors in four aspects of strategic planning, process management, information system and organizational

management (organizational structure, personnel management and performance management), but no consensus has been reached when it comes to the development of FSC.

With the application of more information and intelligent technology, some studies have paid attention to the intelligent transformation of FSC in enterprises. However, there is a lack of research on the drivers and implementation paths of the transformation from automated and informatized FSCs to intelligent ones through intelligent technology. Therefore, it is necessary for us to conduct systematic research on the reengineering of core business processes based on the construction of intelligent FSCs.

2.2.2 Motivation theory in organizational changes

FSCs constitute the change in financial management organization, and the development of FSCs also manifests the continuous transformation of financial management organization.

Moore (1993) believed that an organization was an ecosystem. The environment around an organization restricted the development of an organization. Therefore, all organizations should evolve with the environment to shape an open and resilient ecosystem (Qu, 2011). The era of digital economy is a VUCA (Volatility, Uncertainty, Complexity, Ambiguity) era. Cavalcante et al. (2016) pointed out that the intelligent transformation of finance was dynamic, uncertain and complex, and it was a process of re-understanding financial management. In addition to technological changes induced by informatization, political, economic, social and ecological environments are constantly changing. Anti-globalization, quality economic development, normalized social crisis and the sustainable development of environment force enterprises to constantly adjust strategies and thus are important drivers for FSC transformation. The research on the drivers behind intelligent FCSs constitutes a profound discussion on the logic of FSC, which aims to learn the essence of FSC through the identification of its drivers.

The motivation (drive) theory involves the emergence and mechanism of drivers, as well as the relationships between motivations and needs, and between behaviors and goals. As a psychological concept, motivation refers to the internal arousal of human behaviors by some means. People are self-aware to pursue the intended purposes. The theory is generally used to explain the motivation behind the behaviors of an organization or an individual and the continuity of the behaviors. Motivations include external ones (environmental changes) and internal drivers (management needs) (Leonard et al., 1999). Motivations from environmental changes include scientific and technological development, the changes in financial

management concepts, complex business environments and globalization; motivations from management needs include internal informatization, the complexity of organizational risks, higher stakeholder expectations (Bi, 2021; X. P. Zhang et al., 2021). The abovementioned research also provides insights for this thesis.

2.2.2.1 Organizational change and the development of FSC

The organizational changes under environmental influences can be divided into first-order changes and second-order changes (Meyer et al., 1993). First-order changes refer to the adjustment of the organizational system, process or structure, without fundamental changes in organizational strategies and core values. First-order changes last longer and generally occur in a stable environment. Second-order changes often occur in a dynamic, complex and uncertain environments, and the core elements of an organization go through radical and fundamental changes. Second-order changes demonstrate a spiral-up trend. Therefore, second-order changes are referred to as organizational reforms.

The environment determines the strategy, and the strategy determines the organization (Chandler, 1969). Therefore, environmental factors are prerequisites for organizational transformation. The number and change extent of environmental factors facilitate organizational transformation through their effects on the core elements of the organization. At the same time, organizations will make strategic choices to adapt to the environmental changes. Organizations will in turn influence environmental changes by going through the cycle of self-adaptation, self-learning and self-organization. Therefore, environmental factors and strategic choices are important variables for organizational transformation (Daft, 2001). Based on the theory of motivation, the intelligent transformation of FSCs is a dynamic process where FSC organizations adjust FSC strategies in response to external environmental changes.

This process conforms to the basic logic of "environment-strategy-organization". Although the construction of intelligent FSCs has many motivations (drivers) and the inherent logic is complicated, the author concludes that the core drivers remain to be environmental factors and strategic choice. Therefore, the discussion on the logic and drivers of intelligent FSCs should be based on the two dimensions of organizational environment and organizational strategies.

2.2.2.2 Environmental uncertainty and the construction of intelligent FSCs

China is currently facing an ever-changing circumstance, where changes in political,

economic, social, technological and ecological environments have intensified the complexity of the global economic landscape. The most important manifestations include the increasing constraints, more advanced technology and more complicated scenarios. In regard to the political environment, China-US trade frictions and Brexit have facilitated the trend of anti-globalization, and enterprises are facing more uncertainties including market expansion, trade barriers and the lack of core technology. From the perspective of the economic environment, China's economy has shifted its focus from high-rate growth to high-quality growth. Therefore, enterprises should make structural adaptations from the supply side and make customer-oriented improvements on the quality of products and services. From the perspective of the social environment, black swan incidents represented by the COVID-19 pandemic have significant impacts on the whole society, posing significant challenges to the survival and development of enterprises. From the perspective of the technological environment, the promotion of high-quality enterprise development with the help of the new generation of information technology has become a hot topic at present. From the perspective of the ecological environment, "carbon peak" and "carbon neutrality" have been listed as priorities in the first year of China's 14th Five-Year Plan. Consequently, enterprises are forced to adopt green energy for energy savings, improve product mix, and facilitate technological innovation. In general, the environmental changes generate new uncertainties in the business environment, and constitute key factors that affect the realization of enterprise value.

The construction of intelligent FSCs is bound to affected by external environments, which affect the generation, existence and development of FSCs. External environments have three characteristics: complexity, dynamics, and richness (Dess & Beard, 1984). The uncertainties of external environments can be divided into those from subjective environments (uncertainties caused by changes in internal factors of an enterprise), those from objective environments (uncertainties caused by changes inside the FSC environment), those from the environments around FSCs (uncertainties caused by changes in the environment around FSCs). The first two types of uncertainties can be collectively referred to as the uncertainties of the internal environment of FSCs, while the third type of uncertainties are from the external environment of FSCs. The abovementioned division is defined by organizational boundaries. However, the mainstream resource dependency theory pays more attention to the construction of objective environments (Shi et al., 2020). That is to say, the uncertainties from external environments should be included as an objective factor into the analysis on organizational transformation. The view corresponds to the externality of environmental factors stated in the theory of organizational structure. The thesis adopts the view and defines the changes in FSCs

due to the changes in external objective environments as uncertainties of FSC environments. By doing so, the thesis wishes to discuss the relationship between uncertainties of FSC environments and the intelligent transformation of FSCs.

The transformation of FSCs is essentially the evolution process where FSC organizations adjust their objectives, functions, structures and behaviors in response to the environmental uncertainties (Jia, 2004; H. Y. Li et al., 2006). As an important means to promote organizational value, FSCs should adapt to constant changes in uncertain environments to bring more value to organizations. By enhancing the resilience, expanding the depth and breadth of services, and improving the efficiency and effectiveness of services, FSCs can realize rapid, stable and high-quality development. The process reflects precisely the environmental uncertainties that FSC behaviors change due to changes in the objective environments. Financial organizations and FSCs must realize that with the emergence of various new risks, the external environments will become increasingly complex and volatile.

It should be recognized that the current development of the FSCs is driven by policies that require a full coverage of services, the technology in the context of information technology reform, the data from the upgrades of business models and the needs of crisis management in the context of COVID-19 pandemic. The key to intelligent FSCs is to identify and address the uncertainties from the environments around FSC. Furthermore, the intelligent transformation of FSCs should take into consideration the uncertainties from external environments, to eliminate negative effects and leverage opportunities to facilitate changes through intelligent methods. For example, the COVID-19 pandemic accelerated the intelligent transformation of enterprises, and also induced the intelligent technology application in FSCs. The construction of a shared cloud, the development of a data mid-end platform in intelligent FSCs and the realization of intelligent sharing have become hot topics in FSC community and relevant institutions. All these changes are driven by uncertainties in the external environments.

2.2.2.3 Strategic orientation and the construction of intelligent FSCs

The theory of strategic management first proposed that the internal behavior choice of an organization embodied the organization's subjective initiative in the process of "choice-adaptation" between the environment and strategy. That is to say, organizations do not always passively adapt to the environment, but also leverage their opportunities and capabilities to reshape the environment and achieve their goals (Child, 1972; Z. He et al., 2006). Organizational transformation is an important proactive behavior choice oriented at organizational strategies. Strategies focus on how to "do the right thing", rather than how to

"do things right". The implementation of strategy-oriented goal management in FSC management embodies the application and extension of organizational strategies in FSC management practice, determines the depth and coverage of FSC, and constitutes an important way to create value for organizations.

In the era of digital economy, the survival and development of enterprises are prioritized problems in face of environmental uncertainties. More and more enterprises are conducting digital transformation strategies to facilitate steady operation and long-term development. The digital transformation represented by business model transformation and management model transformation is accelerating. More enterprises are looking for transformation solutions suitable for their maturity and development strategy based on their needs and pain points. The digital transformation of enterprises thus is further improved. From the perspective of business model transformation, the quality development of enterprises relies on customer stickiness. With the advent of the Consumption 4.0 Era, customer demands are more personalized. Therefore, enterprises should transform their business models from the ones featuring "standardization, long cycle and mass production" to ones featuring "personalization, short cycle and small-batch production". By doing so, enterprises can rapidly identify customer demands, efficiently organize production and operation, and accurately make pricing decisions (Miura & Ma, 2014). Management model transformation is indispensable for business model transformation. The interdependence of various factors within the environment lowers the predictability of the whole environment and raises the costs of macro management. Only through management model innovation can enterprises improve organizational agility and adaptability. Through the decentralization of decision-making authority, the agile "small teams" can form a "big team" with unified goals. "Small teams" are leveraged to empower the "big team", to tackle uncertainties caused by complex changes. . To bring value to the "big team" and facilitate the governance of the “big team”, the “small team” of FSCs must increase agility through intelligent methods, align the goals with organization strategies. By doing so, the “small team” of FSCs can empower the "big team" in digital transformation, and promote the development of enterprises. It can be said that the intelligent transformation of FSCs is an inevitable proactive choice for the digital transformation of enterprises. The intelligent transformation of FSCs is a strategic choice to create value and realize the quality development of FSC, thereby empowering the “big team”.

To sum up, the construction of intelligent FSCs is an inevitable choice of FSC organizations in the era of digital economy following the logic of "environment-strategy-organization". In face of the two motivations of environmental

uncertainties and organizational transformation, the way for financial management and FSC to create value has transformed from decision-making based on stable or known variables to the perception of dynamic risks and forecast capabilities based on innovation-driven improvement of financial capabilities. Therefore,we divide the effects of intelligent FSCs into three dimensions: efficiency, effectiveness and innovation. The internal logic relationship is shown in Figure 2.1.

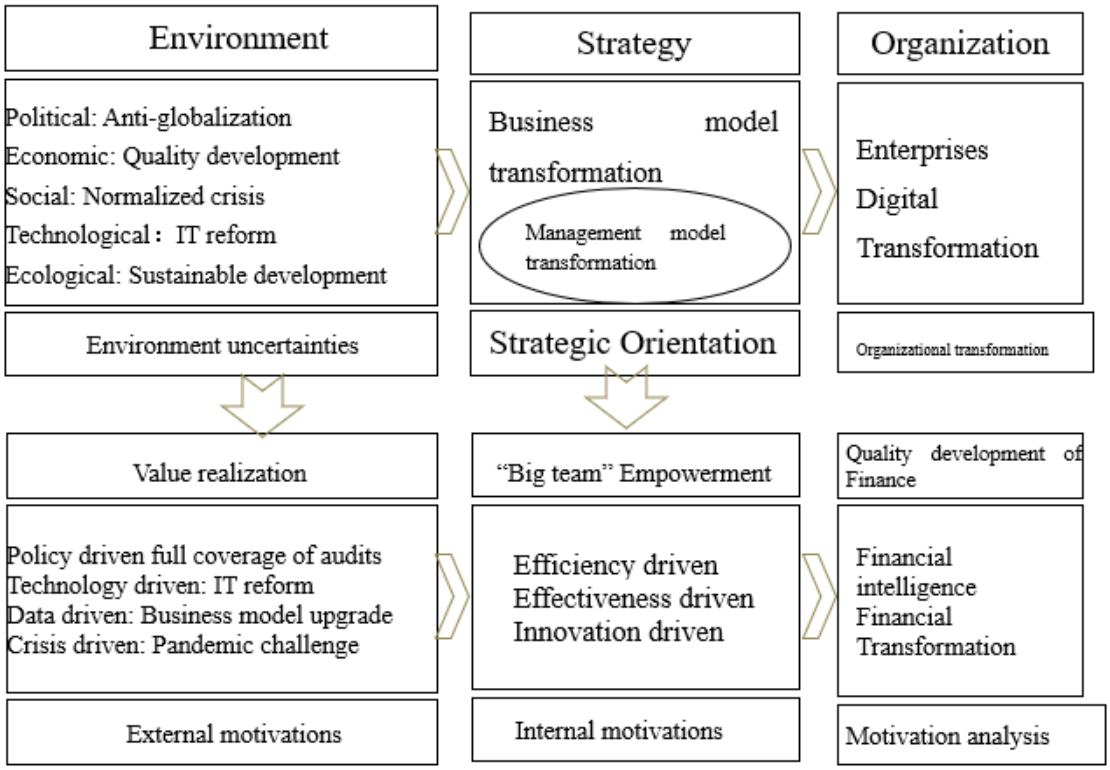

Figure 2.1 Theoretical mapping of intelligent financial transformation

The intelligent transformation of financial management and FSC enables enterprises and individuals to interpret various scenarios, understand financial intelligence, adapt their behaviors in the transformation and thereby influence the results of transformation. Therefore, the thesis intends to study the drivers and implementation paths of intelligent FSCs, and provide theoretical and practical evidence for the intelligent transformation of FSCs in enterprises.

2.2.3 Business process reengineering

FSC requires the reengineering of financial and business resources. Meanwhile, the internal process of FSCs should be reengineered to facilitate their intelligent transformation. Process is a continuous and regular series of activities, which are manifested as working procedures in practice (Huang, 2010). The essence of processes is labor division, and thus the essence of

process reengineering is the "re-division of labor". The development of FSC is essentially the process of financial process reengineering. Based on China's FSC practice, R. J. Zhang and Zhang (2008) conducted research based on the theory of process reengineering.

The enterprise processes generally include business processes and management processes. Business processes refer to relevant procedures of enterprise business and operation. Business processes involve three basic functions: production, supply and sales. The common business processes of enterprises include market and customer analysis, target and strategic design, new product development management, marketing and sales management, product and service provision, collection and after-sales service process. Through the operation of business processes, the enterprise can directly create value for customers and ensure the realization of its own business goals. Management process refers to the relevant procedures of various management activities of the enterprise. The common management process of enterprises includes strategic management process, human resource management process, information technology management process, quality management process, financial management process, administrative management process and other six categories. Through management activities to supervise, control, coordinate and serve the business development of the enterprise, indirectly create value for the enterprise.

In the process of building an intelligent finance and building an intelligent financial sharing center, enterprises can, on the one hand, give priority to the financial management process, trace it back to the business process, and extend it back to the human resource management process, which is the integration process of the business and financial management. On the other hand, comprehensive budget management can be used as a framework to distinguish between major business process design stages such as planning and planning, budgeting, budget implementation control, internal control analysis and performance assessment. Third, in order to make the designed business process can run smoothly and normally, it also needs the relevant supporting design, including planning, department, post, system, performance, report, information technology, that is, the process reengineering scheme needs to be organically combined with these seven aspects, to be successfully implemented.

Business Process Reegineering (BPR), a management idea that originated in the 1990s, was initially praised, then questioned, and finally regarded by managers (Bilodeau & Rigby, 2013). Especially with the promotion and application of financial shared services in enterprises, some scholars began to realize that the significance of studying financial process reengineering is also very important. One of the important reasons is that these processes that

were ignored by managers in the early stage have more possibilities to improve, and people also try to reveal the process reengineering mechanism of shared services with the process reengineering theory. The reorganization and integration of repetitive auxiliary functions into the shared service center provides theoretical support for optimizing the internal resource allocation and giving full play to the advantages of economies of scale. By rearranging those repetitive auxiliary functions and integrating them into the shared service centers, enterprises can also help to optimize the allocation of internal resources and leverage the economies of scale advantages.

From the perspective of the process reorganization and the process reengineering research, the process reengineering of the financial shared service is a creative breakthrough for the enterprises to realize the auxiliary business process reengineering. After analyzing a large number of financial shared service cases, if the value chain model is used to express financial shared services, financial sharing center forms a value chain with the business between various departments and units of the enterprise, and BPR is the process of building this value chain (Bergeron, 2003).

Although the above scholars have promoted the research on the management change of financial shared services from a new perspective based on the theory of process reengineering, it does not reveal the drivers of process restructuring and the key paths of practice. Considering the high failure rate of BPR in reality, the theoretical community also pays special attention to the research of the factors affecting the success or failure of process reengineering, which is also an important branch of BPR-related research. This area of research assumes that, with the confirmation of the most important influencing factors, subsequent practitioners will have higher opportunities to successfully implement BPR. In addition, some scholars apply case study methods to deeply discuss the key factors of process reengineering, which play an important role in enriching the theories and methods of process reengineering. Reijers and Limanmansar (2005) through the review of BPR implementation literature, summarizes the best practice of several enterprise core business process reengineering, and obtained after a two years online survey, proposed a set of BPR implementation framework, namely seven key factors (customer, operation, behavior, external environment, organization, information, technology) and their characteristics. In the construction of financial sharing center, there have been two value improvements based on human efficiency improvement and internal work redivision of labor, and the third value improvement has been achieved through process restructuring and reengineering (Wu & Zhou, 2015). This value improvement is obviously different from the previous two times. It requires

not only the in-depth business insights, but also the deep integration of finance and business, to transform and upgrade the end-to-end business process, so as to improve the efficiency of the whole business process.

Through the literature review, from the theoretical research level, although the researchers on the concept of enterprise financial shared service research, significance, function, value, after some scholars based on process reengineering theory, will build the process of financial shared service as process reengineering, reveals the dynamics of financial sharing center development, theoretically illustrates the nature of the financial management change. However, under the background of intelligence, how to carry out the process reengineering of the financial sharing center, especially the construction of the financial sharing center under the transformation of automation and information to intelligence, which driving factors should be paid attention to, and the key path of the construction, is not deep enough.

From the perspective of research methods, although some scholars have conducted in-depth research on the core business process reengineering of enterprises, and proved the correctness of the key factors by case study method, the research on the key factors of financial sharing center to intelligent financial sharing center is seriously insufficient. The construction of intelligent financial sharing center has its own uniqueness. Therefore, it is necessary to choose the construction of intelligent financial sharing center as the research object, deeply research, and refine and confirm its key driving elements and implementation paths.

2.3 Theory on intelligence

2.3.1 Artificial intelligence

2.3.1.1 The emergence and development of AI

Artificial Intelligence (AI) is a branch of computer science. It is a late but rapidly developed science, and gradually becomes the three cutting-edge technologies of the 21st century, in the name of genetic engineering and nanotechnology. In 1956, McCarthy first proposed the concept of "artificial intelligence" when discussing how to "simulate human intelligence with machines", and also officially announced the birth of the artificial intelligence discipline. Professor McCarthy is also regarded as the "father of artificial intelligence". Artificial intelligence is an interdisciplinary subject, and a close combination of natural science and social science (Qin, 2020).

The combination of "artificial" and "intelligence" is called artificial intelligence. Artificial generally refers to artificial and artificial made. Intelligence refers to the process of extending from feeling to memory and then deepening to thinking, and generating behavior and language by thinking. The process of optimizing and improving behavior and language is called "intelligence". Different scholars have different interpretations of the meaning of AI. AI is the science of how to represent, acquire, and apply knowledge. AI is studying how to use computers to replace intelligent work that can only be done by people. It can be said that artificial intelligence is a science to study the law of human intelligence activities, and the study of artificial systems with intelligent functions to complete the work that can only be done by talents before.

Since the 20th century, scientists have been looking for ways to give human wisdom to machines. The development of artificial intelligence has three important bases: algorithm, data and computing power. Algorithms are the core, while data and computing power are the important support. The development of AI is also divided into two stages: theoretical development and commercial application.

In the field of artificial intelligence in the early 1950s, there were already some cable-controlled robots that were able to walk and speak out simple phrases. The expert system, which began to appear in the 1960s, is usually integrated by six parts, including human-computer interaction interface, knowledge base, reasoning machine, interpreter, comprehensive database, and knowledge acquisition. Thirty-eight of the first 52 theorems in the Principles of Mathematics are also proved on the logical machines of Newell (Newell & Simon, 1956). Simon asserted that they had solved the question of how physical systems acquired spiritual properties, a view known in later AI theory, called "strong AI", arguing that machines had the ability to think as logically as humans. After the early exploration stage, artificial intelligence developed in a more systematic direction until it became an independent discipline.

Subsequently, AI has made great development and improvement in knowledge engineering theory, technology and application, including multi-expert system, large expert system, micro-expert system, distribution expert system and so on. Intelligent management information system, intelligent decision support system, intelligent control system have also emerged, especially the breakthroughs in deep learning. Deep learning is a technique of using a neural network with nonlinear transform input or representation learning to realize progressive abstract nonlinear information processing in the way of hierarchical connection. Deep learning is particularly good at solving complex nonlinear transformations from raw

data to desired output, with which implements representation learning or nonlinear modeling. Deep learning is essentially an artificial neural network with multiple hidden layers, which particularly emphasizes the "end-to-end" learning from the original data, unlike the past process of learning from artificially designed features.

As Rosenblatt proposed the perceptron (perceptron) model, the first wave of research on artificial neural networks began. Rumelhart et al. (1986) published the famous backpropagation (BP) algorithm in Nature to train multi-hidden layer neural networks, thus making it possible to solve multi-layer perceptron (MLP) with nonlinear learning ability, starting the second research boom of artificial neural networks. In fact, as a standard algorithm for training multilayer neural networks, the BP algorithm is still widely used until today. Hornik et al. (1989) theoretically proved that the multi-layer perceptron can approximate arbitrary complex continuous functions, further motivating the development of the nonlinear perceptron. In particular, Hinton and Salakhutdinov (2006) published articles in Science and Neural Computation, emphasizing that multi-hidden layer deep neural networks have better feature learning ability than shallow networks, and can effectively solve the problem of deep neural network training difficulties through hierarchical and unsupervised pre-training. At the same time, Bengio et al. (2006) published a thesis at the international conference NIPS2006, which also emphasized the hierarchical (layerwise) deep training of network models, making an important contribution to improving the intelligent capabilities of robots.

2.3.1.2 Application of AI in the financial field

Artificial intelligence has developed rapidly in the past 20 years. It has been widely used in many disciplines, including financial management, and has achieved remarkable results. It has gradually become an independent discipline, both in theory and in practice. The practical application field of artificial intelligence is very wide, including language image recognition, expert system, intelligent control, machine vision, face recognition, fingerprint recognition, iris recognition, intelligent search, automatic planning, genetic programming, and began to integrate into people's daily life, become a new infrastructure. In the field of accounting, there have been many applications and alternatives of AI technology in the logical, repetitive and tedious mechanical work, mainly including accounting voice instructions, account verification and verification machine vision, big data financial analysis, intelligent financial risk control, and providing accurate prediction schemes (Qin, 2020). These not only reduce the cost of accounting work, but also improve the accuracy of accounting work, but in the whole

accounting process of the lack of cases.

Artificial intelligence is between weak and strong artificial intelligence. Weak artificial intelligence refers to intelligent machines that do not really have intelligence and have no sense of autonomy. These smart machines do not have the reasoning (Reasoning) and problem-solving (Problem solving) capabilities. Artificial intelligence, in its essence, is simulating the human thinking process. Artificial intelligence is not human intelligence, but it can think like people. There are two ways to simulate human thinking: one is the functional simulation, not the internal structure of the human brain, but from the process of its thinking function; the second, the human brain internal structure, according to the human brain structure mechanism, to construct the "human brain" artificial intelligence machine.

Qin (2017) pointed out that from the perspective of AI application in accounting, a successful application of artificial intelligence in accounting field needs five conditions: first, practical algorithm; second, quality data; third, strong computing power; fourth, clear user; fifth, clear application purpose. These conditions are now basically available. Gartner also releases the next year's top 10 strategic technology trends. There are two criteria: first, they must be disruptive technologies that profoundly affect all industries, all businesses and human life; and second, these technologies may not be fully mature now (M. L. Liu & Liu et al., 2020). The top 10 strategic technologies in 2019 involve three themes: intelligence, digitalization and grid networking, while the top ten strategic technologies in 2020 will involve two themes: people-centered and intelligent space.

The Shanghai National Accounting Institute "Top ten Information Technology Selection" has been held for seven consecutive years. In 2022 the results include financial cloud, accounting big data analysis and processing technology, process automation (RPA and IPA), middle technology (data, business, finance,), electronic accounting files, electronic invoices, online audit and remote audit, a new generation of ERP, online and telecommuting, business intelligence BI (report released by Shanghai national accounting institute, 2022). Thus, smart technology will have a profound impact on all industries and all enterprises, and the financial field is certainly no exception.

To sum up, the current research on artificial intelligence and its related technology is very popular, but the current research pays more attention to the technology itself and the application scenario, mode and function of intelligent technology, and is more inclined to the application of technology and landing. And ignoring the research on the real needs of finance, ignoring the research on the construction of intelligent financial sharing center. This thesis is precisely hoping to combine the two perfectly, focusing on the driving factors and

implementation path in the transformation process from automation and information stage to intelligent financial sharing center.

2.3.2 Intelligent technology empowers financial control

Intelligent technology is an integral part of information technology. With the development of information technology, it also provides better financial control tools for enterprises. Obviously, the improvement of financial management ability is also inseparable from the empowerment and support of information technology.

In management, empowerment refers to the process of improving self-efficacy by combining these factors through formal or informal organizational activities to improve their ineffectiveness (Conger & Kanungo, 1988).

Enabling is multidimensional (Hur, 2006). Therefore, the focus of empowerment research also includes structural empowerment, psychological empowerment, organizational empowerment and other dimensions. Structural empowerment (Structural empowerment) suggests that power can be given to weaker individuals from a power perspective (Spreitzer et al., 2005). Structural empowerment holds that the supporting environment inevitably leads to empowerment, or the structure itself can be empowerment. Psychological empowerment refers to improving the subjective emotional interpretation of each individual (ie, self-confidence, self-awareness, drive) of meaning, ability, belief, autonomy (self-determination) and influence, so that each individual can feel in control of their own destiny (Christens, 2012). In the daily operation and production activities of enterprises, organizational empowerment becomes increasingly important, which not only helps to improve the efficiency of internal control, but also contributes to the realization of strategic goals. In addition, authorization and empowerment has also become a new perspective to study organizational performance on the basis of combining financial indicators.

Information empowerment (including intelligent technology) is an emerging word emerging in recent years. Researchers usually put information empowerment in a specific phenomenon or event, discussing the specific impact of information empowerment on that phenomenon or event. Y. J. Yang (2015) used information technology empowerment to study the substantive impact on the improvement of professional in-service teachers' learning quality, thus putting forward the action learning mode of teachers under information empowerment. G. C. Xie and Feng (2015) through the study of the reform path of financial regulations from the perspective of information, he proposed that information empowerment

is helpful to cultivate the information subjects of financial legal system, and extended the functional scope to social functions such as regulating and controlling the financial market, regulating and promoting the role of financial development in promoting social progress. Ran (2014) analyzed the impact of information and studied the marketing activities with the Internet as a technical tool through analyzing the impact of information on e-commerce, market and market exchange. Through information empowerment, the behavior and relationship between supply and demand in marketing are changed, and network marketing, an emerging form of marketing, is shaped.

In the unique resources that form the enterprise ability, the financial resources occupy an important position. Correspondingly, the efficiency of financial resource allocation has become an important factor in determining the boundary of enterprise capabilities. In practice, people also gradually begin to pay attention to the way and efficiency of enterprise internal resource allocation (Eisfeldt & Rampini, 2008). Based on the framework of information construction, how to improve the efficiency of internal financial resource allocation of enterprises has become the core factor to expand the boundary of enterprise capabilities. The establishment of a sound financial information system can not only ensure the continuous contact between enterprises and the outside world, but also is the best means to implement financial control (W. J. Liu, 2012). Thus, intelligent technology is not only an important guarantee to expand the boundary of enterprise scale, but also an important prerequisite to improve the boundary of enterprise capacity. Only by strengthening the information and intelligent construction of the enterprise, and establishing a perfect financial control system on this basis, and reasonably solving the problems of internal organizational relations, encroachment and encroachment of the group, cooperation and coordination in the value chain, can we ensure the overall efficient operation of the enterprise (Mu & Cui, 2011).

Frances and Garnsey (1996) noted that IT-supported management and control mechanisms can strengthen cross-organizational connections, and that they can effectively reduce the operating costs of the entire system. J. M. Liu (2012) research found that the current state-owned enterprises adopt centralized management mode, is formed under the Chinese traditional administrative management color, the reconstruction path should be through the innovation of financial control resources and organization ability, quickly improve the parent company's financial control ability, so as to directly form a new centralized financial control mode.

Therefore, the development of information technology and intelligent technology is closely related to the development and strategic structure of enterprises. Based on the

perspective of intelligent financial sharing center construction, the intelligent innovation of enterprise financial control mode is conducted, and the key factors and implementation path affecting the construction of intelligent financial construction are studied, which has research value and practicability.

2.3.3 Financial informatization

2.3.3.1 The practical development of financial informatization

From the perspective of practical development, since China adopted the foreign reform and opening-up policy in 1989, China's financial informatization has experienced a development process of more than 40 years. With the tide of China's reform and opening up, financial informatization has also made great development and progress.

In 1979, Changchun No.1 Automobile Factory received a subsidy of 5 million yuan from the Ministry of Finance of China, and started the pilot work of accounting computerization (Y. T. Liu, 2009). Since then, financial management from computerization to information, and then to the current rising intelligence, is not only the epitome of China's financial field informatization development, but also the continuous transformation of thinking, innovative management, organization, training, exploration of new technology applications to serve China's economic development (Q. Liu & Yang, 2018).

Accounting computerization phase from 1980 to 2000

Around the 1980s, due to the expensive computer hardware and software, backward processing technology, China's computer application is still in its infancy, accounting computerization has not yet caused the great attention of enterprises. With the development of information technology, China began to use a large number of microcomputers, which solved the problem of inconvenient and expensive traditional computers, and set off the upsurge of computer application in the field of accounting. Due to the different requirements of accounting work, accounting software is mainly developed at fixed points. In 1981, the concept of accounting computerization was first put forward at the "Seminar on Finance, Accounting and Cost Application of Electronic Computer Problems", and China entered the exploration stage of accounting computerization. The small database and simple computer software have replaced part of the manual accounting work, and initially realized the transformation from a single accounting (such as wage accounting, fixed assets accounting, cost accounting) to the computer-aided processing of accounting treatment (J. W. Yang, 1985).

In the following years, enterprises in Beijing, Shanghai, Guangzhou and other places began to develop accounting software products at fixed points, until 1988, the "first academic seminar" on the commercialization of accounting software was discussed. In 1989, the Ministry of Finance of China promulgated the Several Provisions on the Management of Accounting Software (Trial), which clarified the basic requirements of commercial accounting software, and China's accounting software entered the commercialization stage. With the deepening of China's economic system reform, enterprises must deal with accounting work by means of information under the fierce market competition environment. With the in-depth development of accounting computerization in China, the normative requirements of accounting computerization in enterprises are constantly improved. In 1977, China Software Industry Association held the "March to ERP" press conference, which also opened the prelude to the transformation of Chinese accounting software to management software, and enterprises also paid more attention to management software (W. L. Chen & Wei, 1997). With the entry of the Internet into China, the remote processing and real-time presentation of accounting statements provide a new opportunity for the development of network finance (D. H. Wu, 1998). The work of financial software and financial personnel in the computerization stage is basically separate. In essence, information technology does not change the process of financial processing and the basic financial organization structure, but only uses the software to realize the automation of some processing links.

Financial informatization stage from 2000 to 2015

In the 21st century, China actively expands domestic demand, drives the rapid economic growth, and continuously expands the operation scale of enterprises. After joining the WTO, in the process of vigorously expanding the international business, the financial management has also encountered problems such as low efficiency, rising cost and increasing difficulty in control. It was the first time that the concept of accounting informatization also appeared in the "Expert Forum on accounting Informatization Theory" jointly held by Shenzhen Municipal Finance Bureau and Kingdee Company. The birth of ERP and the popularization of computer network make financial management into the information stage (J. H. Zhou, 2003), enterprises began to use strong data processing ability and network transmission ability, initial integration of business management and financial management, and began to realize the rapid processing of business information and financial information, real-time sharing, across space-time processing and utilization, promote the financial management from accounting to management (Z. N. Yang, 2003). As the Internet technology became more and more mature, Yonyou and Kingdee also launched their own network accounting software services

respectively in 2000, and China also began to enter the network finance stage (R. S. Li & Xu, 2004).

Economic integration makes the global economic rules and technical rules more and more consistent, and accounting information standards have become the key technology for enterprises to solve financial management problems (Ying et al., 2013). In 2005, Shanghai National Accounting Institute held the seminar on XBRL (eXtensible Business Reporting Language) application and development in China, which opened the prelude to the construction of accounting information standards in China.In 2008, XBRL China regional organization was established, and China's accounting informatization entered the standardization stage. During the Annual Meeting of China Accounting Society, XBRL technology was proposed annually from 2005 to 2015 (Mao & Liu, 2015; Y. F. Sun & Liu, 2017).

Economic globalization also makes enterprises face problems such as rising costs, insufficient innovation and risk control difficulties, and financial informatization puts more emphasis on the coordination of man-machine work, which has become a tool to optimize and reengineering financial management process and even business management process. With the gradual popularization of financial shared service mode in China, the process of financial informatization has been greatly promoted by Optical Character Recognition (OCR), mobile communication, cloud computing and big data technologies. Nevertheless, in the stage of financial informatization and financial shared services, with the help of accounting standardization and process, provide data, management for financial transformation and organizational foundation, it is mainly for financial accounting process information processing (R. J. Zhang et al., 2010), has not yet realized business activity process, financial accounting process and management accounting process three aspects of the comprehensive intelligent.

Financial intelligence stage from 2015 to the present

In the digital economy era of surging new technologies such as "Dazhi Moving Cloud and Things Area", data has become a new factor of production due to the breakthrough progress of artificial intelligence technology".Shanghai" has become a new driving force leading economic development. In such a context, the construction of financial information has also fully stepped into the intelligent stage. The sharing of intelligent finance and intelligent finance has also become a new thing jointly faced by the academic circle and the practical circles. Its theoretical discussion and practical exploration have become a hot spot in the past two years, which has aroused wide attention from the society. Combined with

high-performance computing power and big data analysis technologies, machine learning, expert systems, pattern recognition, robotics and other technologies have given financial management and financial sharing centers many new application scenarios, and more deeply studied machine learning based on neural networks and genetic algorithms (Du et al., 2018).

The advent of the era of big data requires enterprises to have the agility of operation and management and the real-time nature of information decision-making. Modern enterprises need to obtain decision-making information from the big data environment to drive business development with data. With the help of artificial intelligence technology, enterprises can intelligently deal with accounting work, dig out the hidden secrets behind the data, so that the data can be transformed into information and knowledge through insight, and then assist the management decisions. In 2016, Deloitte and Kira Systems jointly announced the introduction of artificial intelligence into China's accounting, tax, audit and other work, marking that China has entered the financial intelligence stage, and the construction of the financial sharing center has also entered the intelligent stage.

Compared with financial informatization, Intelligent finance has significant advantages in information processing: it can use RPA, pattern recognition, expert systems, neural networks and other technologies, Automatically, quickly, accurately and continuously, Help financial personnel to release their energy from regular work, To work that requires more social insight, negotiation skills, and creative thinking; Intelligent financial and financial sharing center, Also automatically and intelligently conduct risk assessment and compliance review of financial activities, By automatic processing logic, finding wrong clues, and accountability according to regulations, To maximize the financial security of enterprises (Cavalcante et al., 2016).

To sum up, after the financial sharing center was introduced into China around 2005, the development of financial sharing center soon started in computerization, automation, and accelerated in financial informatization, and finally gradually developed rapidly in the direction of financial sharing intelligence as shown in Table2.3. Q. Liu and Yang (2019) also made a clear summary of the development of China's financial informatization.

Table 2.3 Development of accounting informatization in 40 years by timing phases and contents

Phases	Content and Timing
Accounting computarization	Exploration and experimental phase 1979-1981 Customized software phase 1982-1987 Commiditized software phase 1988-1997
Accounting informatization	Beginning phase (ERP) 1998-1999 Originally implementation phase (Network finance) 1999-2004 Expansion and development phase (Standard and Finance Share service) 2005-2015
Accounting intelligence	Beginning phase (Partial intelligence) 2016-Now

2.3.3.2 Theoretical development of financial informatization

The basic theory of financial informatization refers to the system of accounting informatization, namely Theory (theoretical system), Methodology (methodology system), Application (application system), Implementation (implementation system), and Management (industry and social management system), short for TMAIM. The traditional financial information theory system includes system theory, information theory and cybernetics, while the new financial information theory system includes coordination theory, dissipation structure theory and mutation theory (M. L. Liu, 2017). But both traditional and new theoretical systems recognize that any theme in nature and human society is an open system of constant material, energy, and information exchange with the outside world.

Review the theoretical development course of financial informatization in China for recent 40 years, this research clearly identified its evolution from three different perspective.

First, from the dimension of technology. In the accounting computing stage, Personal Computer (PC) machine and database technologies are mainly used. In the information stage, Internet, data warehouse, Enterprises Resources Planning (ERP) and other technologies are mainly used. In the intelligence stage, technologies related to artificial intelligence such as Robotic Process Automation (RPA), neural network, natural language processing (NLP) are mainly applied. Information technology varies very much from stage to stage.

Secondly, from the perspective of organizational change, in the stage of accounting computerization, information technology only replaces part of the open business links with computers. In the stage of financial informatization and intelligence, the application of information technology will lead to the transformation of financial management mode, accompanied by the reform of accounting process and accounting organization. A very typical example, is the emergence of the FSC financial sharing center. The construction process of the financial sharing center is actually the process of process reengineering, organization

reengineering, system reengineering and management concept reengineering. The application of these new technologies encapsulates the traditional financial management process in the information system integrating software and hardware, which is automatically executed by the computer, thus breaking the original basic principles and concepts of financial operation, and also changing the original financial management mode.

Third, we should look at it from the role of finance. The task of the accounting computerization stage is mainly compliance management, while the key task of the financial informatization stage is control and service. In the intelligent stage, it pays more attention to empowerment and innovation, and constantly adds more functions in the development, which also has an impact on the functional positioning of the financial sharing center and the future development direction.

Therefore, intelligence is also bound to become the direction of the financial shared service center transformation (X. Y. Chen & Li, 2017). Q. Liu (2021b) also put forward the theoretical research direction of the future financial informatization from the perspective of development: first, the deep integration of business and finance. Under the influence of information technology, the future financial work and business work will gradually move towards deep integration, that is, the business system and financial system in the information input, processing, storage, output and control level, as well as the mutual integration of system, organization, personnel, process, system and financial work. Second, the deep development of management accounting. Financial work will shift from the current accounting and financial reporting to management accounting, management control and strategic finance, and thus bring about the profound enterprise strategic change, information system change, organizational form change and personnel knowledge structure change. Three is highly Shared financial organization, enterprise finance will increasingly adopt the new sharing management mode, and on the basis of highly sharing the accounting management process flexibility, automation, financial virtualization, fragmentation, Shared operation mode of outsourcing, crowdsourcing, sharing platform integration, cloud trend. Fourth, the highly intelligent information system, the financial information system will continue to increase the application of neural network, natural language understanding, pattern recognition, deep machine learning and other standard intelligent technologies, on the basis of the frequent use of RPA and other quasi-intelligent technologies, the intelligence degree of the accounting information system is significantly improved.

All these more confirm that no matter from the practical or theoretical development, the research on the key factors and the implementation path of building intelligent financial

sharing center has a very high theoretical value and practical significance.

2.3.4 Intelligent technology in shared application

In 2017, China's State Council issued the Plan for the Development of the New Generation of Artificial Intelligence, marking a new stage in the development of artificial intelligence in China. Q. L. Zhang et al. (2020) pointed out that the core force of the new round of global productivity revolution is intelligence. The digital economy is becoming the core element of global industrial transformation and economic growth. Major developed countries in the world all regard intelligent upgrading as their strategic direction and seek new advantages in international competition. The new technology of "big intelligent moving cloud and object area" represented by artificial intelligence mainly includes big data, artificial intelligence, mobile Internet, cloud computing, Internet of Things, blockchain and so on.

In order to keep up with the development of intelligent technology, all walks of life are promoting the application of new technologies and new methods. In the financial field and financial sharing center construction, some typical intelligent application scenarios have been explored, including intelligent accounting, intelligent accounting and intelligent operation services (Y. Tang, 2018), as well as automatic collection and payment (D. T. Liu, 2018), automatic tax declaration, which have been introduced into the daily work of financial management. Other possible directions for intelligent financial applications have also been proposed, such as financial prediction, operation deduction, risk quantification, value optimization, decision automation, and information recommendation (Han & Yu, 2018); Some initial intelligent financial systems begin to emerge, For example, artificial intelligence accounting system (Tarmidi et al., 2018) to solve intelligent document identification problems for small and medium-sized enterprises, the intelligent reimbursement platform generally provided by domestic manufacturers; Some possible intelligent financial implications are widely watched, If part of the accounting work will be replaced by a computer (Frey & Osborne, 2017), AI will liberate accountants (Joshi, 2021), reshaping the accounting profession (Stancheva-Todorova, 2018). But it can be seen that on the whole discussion about intelligent financial construction, build intelligent financial sharing center is still in a point state, systematic construction of intelligent technology and financial sharing center, standing in the height of strategy and system of financial sharing center intelligent transformation, build the key driving factors and implementation path of high value, high level of theoretical research, is very rare.

Shanghai National Accounting Institute (SNAI) has organized the selection of the "Top Ten Information Technologies affecting Chinese Accounting Employees" since 2017, aiming to sort out the list of new technologies and find the key technology applications of enterprises in the process of building intelligent finance and intelligent finance sharing and sharing. Through combing based on 2017-2022 seven years of selection results (supplement 2021, 2022) (M. L. Liu & Liu et al., 2020), can be found from the artificial intelligence, mobile Internet, cloud computing, Internet of things, electronic accounting files, electronic accounting vouchers, identity authentication, digital signature, visualization technology, business intelligence and other new technologies, have entered the enterprise in the financial management practice and financial intelligent construction of sharing. Whether it is enterprise practice or theoretical research, we should closely track the development trend of new technologies, deeply understand the application of new technologies, carefully design intelligent application scenarios, and accurately match and apply the application of new technologies, so as to accurately select and properly use new technologies in the process of intelligent financial construction. However, the existing research often only focuses on the "technology" itself, which is inevitably fragmented and not systematic.

In addition to those mentioned above, Besides the continuous introduction of intelligent technology in financial management and financial sharing center, Financial sharing center, as the core department of enterprise value management, Will promote the transformation of financial functions and financial business integration, With the role of "middle platform" to open up the business and finance linkage, Integration of financial core resources, core capability precipitation, core system integration, To form a professional competence center in finance, To coordinate and support the different business units, Provide more agile financial professional solutions, Help companies to maintain a sensitive insight into the market, Maintaining the ability to innovate quickly, Adapt to the business environment under the digital wave (H. Chen & Guo, 2020). Build a new type of financial sharing center based on intelligent technology, make it have the opportunity to become the enterprise financial management function "middle" ability center, better help enterprises to realize under the intelligent drive "strategic finance, business finance, Shared financial" organic function division, further promote the financial sharing center by "accounting financial" to "data center", and eventually promote the financial function from value guardian to value creation transformation and upgrading. This is also an inevitable direction for the development of financial management function in the new era.

In financial informatization, the sharing center is regarded as a capability center and a

data center. Although the name of the financial sharing center does not contain the word "middle platform", it is fully in line with the concept of Middle platform in terms of functional integration and IT architecture construction, so financial sharing center is a real pioneer in the concept of Middle platform (H. Chen & Guo, 2020). In order to make the data sharing center work effectively, we should not just regard the financial sharing center as a system and a technical tool, but more as a value framework of "continuous data use". Data Center is a set of systems between the underlying basic technology support and the upper data application. Its core value system includes technical system, data system, service system, operation and security system (Fu & Jiang, 2020). Therefore, financial digitalization and intelligence are essentially a deep change of business and management driven by information technology, and the data center is also the only way to build financial intelligence sharing. Business scenario is the core, and its core competitiveness is the ability to integrate, purify processing, service visualization and value realization (Feng et al., 2021). Financial sharing center is financial Center (Guo et al., 2019). With the support of shared services, the financial functions and financial structure began to differentiate, forming a financial management mode where strategic finance, business finance and shared services support each other. Strategic finance focuses on global, systematic and strategic matters, and business finance focuses on the agile response to the front desk business and the audit, control and supervision of major financial matters involved in customized services. Shared finance takes the whole process, end-to-end, and deep automation and intelligence as the core, and takes service pricing, data management, and efficiency improvement as the guidance. The focus of financial function is no longer just reporting and measurement, but provides support for enterprise value chain management and its strategic decisions. The core capacity of building middle platform is to build an intelligent financial sharing center based on intelligent technology. Of course, it is obvious that building a financial center is not easy. Its core is the establishment and connection of the business center platform and the data center platform. Enterprises can give priority to upgrading and reengineering the existing financial information system, further establish a business center in the financial field, realize comprehensive financial business integration, and provide support for the future finance with a powerful information system.

So to sum up, the use of intelligent technology in financial management and financial sharing center, should be systematic, systematic reference to the idea of "middle" construction, form a rigorous, thorough, comprehensive architecture, to build intelligent financial sharing center driving factors and implementation path for targeted research, has a high theoretical and practical significance.

2.4 Grounded theory

Grounded Theory is a process of targeting a phenomenon and then search and collective useful data, study it and find and, develop a theory in the end (Charmaz, 2015). There are different views on whether Grounded Theory should be regarded as an academic theory or as a research method only. Considering of its connotation, hierarchy and dynamism, this research uses Grouded theory as a theoretical foundation, not only following its data processing guidance but also to direct the research work on a dynamic way to make sure the research conclusions better adapt to the constantly changing social reality, maintaining its theoretical vitality and effectiveness. The final research result is a theoretical illustration based on the practical practices. It is a theoretical solution and paths based on the systematical collection of data and procedure analyze. This theory is very suitable for the author’s research topic since the research topic does not have a mature and complete literature framework (Cutcliffe, 2000; Thornberg & Dunne, 2019).

This thesis uses the Grounded theory, to identify, analyze, refine, and summarize the building process of Company's intelligent FSC. Ultimately, the driving factors and critical paths are identified and modeled. Grounded theory is a process of systematically collecting and analyzing data on phenomena, and discovering, developing, and testing theories from the data. The research conclusion is a theoretical presentation of reality, which is a method and path to create theory through systematic data collection and analysis procedures.

Eventhough there are several different data processing procedures based on grounded theory, we are using mainstream three-step decoding process in this research, including open coding, axial coding, and selective coding, to achieve analysis of qualitative data. Among them, open coding is the process of conceptualizing and categorizing original research data. By decomposing the collected data word by word and sentence by sentence, labeling and decoding them, and continuously comparing the similarities and differences of the initial concepts extracted from the research data, merging the initial concepts with similar or overlapping meanings to discover the initial conceptual categories (Dey, 2004).

Axial coding is a typical model that connects the various categories obtained from open decoding by using "conditions—action--conclusion", and then extracts the main dimensions and affiliate dimensions as well (Oktay, 2012).

Selective coding is the development of main dimensions by elucidating the "story line", systematically connecting main dimensions with affiliate dimensions. Using collected research data to develop a theoretical insights and form theoretical model, to explain all

phenomena and evaluating the relationships between the main dimensions and affiliate dimensions (Tarozzi, 2020).

Chapter 3: Research Method

Based on literature review and theoretical foundation in Chapter 2, this chapter includes three major parts: research method, case selection, data collection and analysis. In addition, this chapter also describes how to improve the assurance of validity and reliability of the research conclusion.

3.1 Research approach

Compared with quantitative research, qualitative research often requires researchers themselves to participate in the context and then collect and analyze data. This thesis employs various qualitative approaches including observation, interview, coding, and data analysis. This thesis conducts both theoretical research and empirical research, the research approaches which are used in this thesis include the following:

3.1.1 Literature review

Firstly, the thesis studies the theories on finance management, including those on financial control, financial management innovation, management accounting and intelligent finance. The thesis aims to figure out how financial management serves strategic and business goals, and investigate into related theories on the transformation from financial management to intelligent finance.

Secondly, the thesis studies the theories on the sharing centers, including the theory of financial sharing, the theory of driving factors in organizational reform, and the theory of process reengineering. The thesis aims to study the approaches to FSC development, analyze the transformation and re-positioning of FSCs, and identify the trends of intelligent FSCs.

Thirdly, the thesis studies intelligence-related theories, including research on artificial intelligence, the effects of intelligent technology on financial management and control, informationized finance, and the application of intelligent technology in FSCs. The thesis summarizes how to integrate information, digital and intelligent technology into FSCs to strengthen financial control and develop a scientific model for FSC construction.

Finally, the thesis introduces the Grounded theory, to better identify the driving factors

behind the construction of intelligent FSCs by case study. Thus, the thesis helps enterprises to better plan the path for intelligent FSC construction based on the variations in internal and external resources and environments.

3.1.2 Case study

This thesis conducts a multi-case study method based on grounded theory. Compared with the one-case studies, conclusions of multiple-case studies may or may not provide support to one another, which makes the results of case studies more convincing. By comparing different cases, some common rules or different results could be noted and based on which, a general rule may be concluded from the similar results, while the root cause also could be found for those different results. All of these efforts would lead this study to discover and refine theories. And besides, there are more reasons for using multiple-case studies in this thesis, which are the following:

Firstly, the research question of the thesis is ‘what’ are the driving factors behind the intelligent FSC construction in Chinese enterprises and ‘what’ are the critical path in constructing intelligent FSCs. Therefore, case studies based on grounded theory are important sources to answer both “What” questions.

Secondly, intelligent FSCs in Chinese enterprises remain in the starting phase, the theoretical development still lags behind the practice. So, this research topic is innovative with no existing mature references that can be found directly. Case study based on grounded theory are suitable for concluding on the mechanism and effects of intelligent FSCs in Chinese enterprises.

Thirdly, even though building intelligent FSC in China is still in the starting phase, there are several pioneer commercial companies which are already successful cases during the transformation from 2.0 digital FSC to 3.0 intelligent FSC. So, it brings the author a very good advantage to conduct the corresponding case studies.

Furthermore, this research also conducts the cross case study after analyze each of four selected case companies, combine and compare the case analysis result. The cross case study improves the reliability of research conclusions, and avoid the potential influence from each single case.

3.1.3 Interview and data analysis method

The research topic is an innovative topic but not a quantitative topic. So, it is difficult to

directly obtain large samples from academic databases regarding the research question. Thus, on-site in-depth interviews are used to obtain research data for the analysis. Thereafter, open coding, initial categories, axial coding, and selective coding are used, which will be the basis for identifying key drivers and critical paths of intelligent FSCs.

3.1.4 Interdisciplinary research

As an interdisciplinary topic, the research on intelligent FSCs goes beyond discipline boundaries to integrate different disciplines. The interdisciplinary research on intelligent FSCs is a new paradigm in contemporary scientific research. As the research is no longer limited to a single area of management innovation or the application of intelligent technology, the thesis manages to keep up with the current trend.

3.1.5 Summary and develop conclusion

The research question of the thesis is what are the driving factors and what are the critical paths of building a successful intelligent FSC. Through profound study on this topic, the thesis develops conclusions of practical significance that can be extended to a wide range of scenarios. By discussing, analyzing and validating the driving factors and critical paths summarized through a systematic and scientific approach, the thesis guarantees the applicability and integrity of the logic, contents and conclusions.

3.2 Case selection

The aim of the research is to explore the driving factors and critical paths in building intelligent financial sharing centers. In terms of selecting cases, the chosen enterprises should be representative, and the data and material of these cases should be accessible and accurate. Representative, typicality and importance are the three standards of cases selection in this thesis. Based on this and associate with previous literature review within this research field, the selected enterprises should have the following criteria:

1) Be famous and very big companies in China which have already established their financial sharing centers;

2) Striving for the transformation of their financial sharing centers from 2.0 digital phase to 3.0 intelligent phase;

3) Exercising many intelligent user cases in their financial sharing centers;

4) Can be accessed by the author before conducting the case study.

Criterion 1) is to make sure the selected enterprises are all very famous and leading companies among their industries and that they have all experienced a relatively long development period to build up their financial sharing centers and have the independent ability in running their FSC. Criterion 2) is to ensure the selected enterprises' FSC are all at the turning point and trying to improve their FSC to intelligent FSC based on their existing automatized and digitalized FSCs. Criterion 3) is to comply with the research topic and make sure the selected cases have already implemented lots of intelligent tools through their FSC, otherwise they will not have a rich experience during the transition period. Criterion 4) is to collect and obtain diversified research material while also making sure that the target case is accessible to conduct the interviews, otherwise the case is meaningless to this study.

With these four criteria, this research locates the objects among those famous enterprises which have successfully established their FSCs in China.

This research also considers to ensure the quantity of the cases. As the aim of the research is to explore the driving factors and critical paths during the process of building intelligent FSC, it is then more convincing and inclusive in applying the multiple case studies. There is no specific requirement in the quantity of the chosen cases, but the chosen cases are strictly required to be special and typical enough in this thesis's research topic area, therefore four distinguish enterprises are realized and meet the requirement of specialty and typicality.

Then this study settles down the cases. After collecting the research data from the public resources, the author intends to hold interviews with finance staff (high level, medium level, and basic level) and take the accessibility of data and the representativeness of enterprises into consideration. The chosen companies are the Zhongxing Telecommunications Equipment Corporation (hereinafter refered to ZTE), Haier Group (hereinafter refered to Haier), Fosun Group (hereinafter refered to Fosun), and Golden Concord Limited Group (hereinafter refered to GCL). A brief introduction to these 4 companies is presented next:

1) Zhongxing Telecommunications Equipment Corporation (ZTE)

ZTE, established in 1985, is a global leading provider of integrated information and communication technology solutions. It is a listed company publicly traded in Shenzhen China and Hong Kong as well. Its business covers more than 160 different countries globally which serve one fourth of the total population worldwide. Especially, the core competency in 5G, IoT, Cloud computing technologies, allows ZTE to remain in a very strong and leading position in the telecommunication industry worldwide while having a very high market share. ZTE ranked the 218th in the Top 500 enterprises of China which was released by China

Enterprise Confederation (CEC) and China Enterprise Directors Association (CEDA), it had 73,709 employees and 101.4 billion RMB total revenue in 2022.

Being a high technology company, ZTE is one of the earliest company to establish a financial sharing center beginning in 2005, and its FSC is becoming more famous and representative since they are moving to the next phase of intelligent FSC.

2) Haier Group

Founded in 1984, Haier Group is a leading household equipment and digital transformation solutions provider, the brand name of Haier is also a top famous brand name all across the world. Now Haier group have built 10 R&D centers, 71 research institutes, 35 industrial parks and 143 manufacturing centers around the world. Haier group have six listed companies, and its subsidiary Haier Smart Home is named among the Fortune's Global 500 (No. 405) which was publicly released by Fortune magazine. In 2022, total employees beyond 99,299 globally and total assets reaches 203.4 Billion RMB, it has revenue 209.7 billion RMB.

Haier Group built its financial sharing center starting from 2005, it is one of the earliest enterprises in China to do so, and now they are trying transfer their FSC to be more intelligent.

3) Fosun Group

Fosun group is a global innovation-driven consumer group, and it was founded in 1992. After more than 30 years of development, Fosun group already covers four key business areas, including health, happiness, wealth and intelligent manufacturing. Adhering to the mission of creating happier lives for families worldwide, Fosun is committed to creating a global happiness ecosystem fulfilling the needs of one billion families, and it is listed on the main board of the Hong Kong Stock Exchange. In 2023, Fosun group’s total assets amounted to 808.4 billion RMB, the annual revenue was close to 136.6 billion RMB, and total the number of employees was above 108,000.

With its business development, Fosun group established its financial sharing center in 2015, and now its FSC can support its global business while using a lot of intelligent technologies.

4) Golden Concord Limited Group (GCL)

GCL Group was founded in 1990 and focuses on new energy industry, including solar, wind and eco power plants. The group has adhered to the leadership of science and technology and digital empowerment for 34 years, focusing on silicon materials, lithium materials, carbon materials and core materials of integrated circuits. The whole group has four

different listed subsidiary companies in both mainland China and Hong Kong Special Administration Region of P.R.C as well. In 2023, the entire group had 40,783 employees, total assets in excess of 200 billion RMB and the annual operating income reached 200 billion RMB. GCL has been ranked in the top 500 enterprises in China which was released by China Enterprise Confederation (CEC) and China Enterprise Directors Association (CEDA) in 2023.

The GCL financial sharing center was founded in 2010 and now it is on its transformation to be more intelligent.

These four case companies are all very typical since they all built up their own financial sharing centers many years ago, and are pushing their FSCs to transfer from digitalized FSCs to be more intelligent ones. Haier Group and ZTE Group are among the first Chinese enterprises to set up FSCs; Fosun Group and GCL Group are committed to investing in informatized, digitalized and intelligent FSCs, to witness benefits in operation efficiency and enterprise management. All these five selected cases, have earned their places either as China Top 500 or Global Fortune 500 enterprise. They are rooted in China and boast great outcomes in the context of China's boosting economy. So, their experience, information, and data are all relatively impeccable and very critical to this thesis.

3.3 Data collection and analysis

3.3.1 Data source

This research contains the concept of triangulation, since the different sources of research data should not only support each other but also verify each other.. Diversity of research data will also ensure the validity and reliability of the conclusions. The data obtained in this research includes the following types:

1) Primary interviews.

This research has designed the interview outline and conducted the series of interviews based on the interview schedule. During the interview process, a narrative oriented questioning approach is used to guide the interviewee to describe his own experiences. Beyond the interview, the on-site visiting is conducted as well, which help us understand its actual internal business process. This research intentionally select the middle to senior management team as the interviewee in each company. A research assistant supports the author during the interview and cross checks the transcripts afterwards. This also improves the research validity.

With the permission of interviewees, all interviews are recorded and afterwards specific software (Nvivo) is used to convert recording into transcripts automatically. These technical tools not only improve the research efficiency but also avoid any subjective influences over the research data.

Trying to avoid interviewees of being too tired with a lengthy interview, every interview will be controlled to take about 60 minutes. This will also maintain our research validity in case participants mislead our research conclusions based on their tired physical condition.

2) Secondary data.

This mainly includes relevant reports on the four case study companies on the internet, as well as public information on the companies' website, including basic information, mission and vision description, main products, business performance, among others. Also, archive files including internal materials and printed materials in paper form, such as introductions to the company's main products, internal management process documents, are also used. All of this collected secondary data help us to understand the case study companies' business areas and their overall business development trends.

Also, especially after the interview and on-site visiting, the authormaintain in contact with interviewees via Wechat and email, to conduct the supplement and follow-up interviews if necessary.

Based on the above different types, more than 200,000 words of original research data were obtained after 25 in-depth interviews were conducted. Adding together the data collected before and after each interview and second hand materials, this research obtained totally more than 300,000 words of research data relevant to this thesis. All of these became a solid base to this research which facilitates the data analysis supported on the grounded theory.

The interview conducted in this research lasted for four months (from October 2023 to January 2024). Four to nine interviews were conducted in each of the four case companies, totally 25 interviews complete for the research and meet the theoretical saturation based on previous literatre review regarding to this research topic. Face to face interviews were given priority while telephone interviews were only acceptable if the interviewee had emergencies. This is because on-site observation and body language during interviews are also very important to the research.

3.3.2 Interview outline design

The outline of the interview mainly guides the interview with high efficiency and make sure

the interview will focus on the research topic. So, the interview outline contains around 15 major questions which was separate into three sections as follows:

1) Basic information section

This part includes two questions with tick mark answers to save the interview time. The questions here refer to lengths of years and position level (high/medium/basic) of the interviewees in their FSCs.

2) Main section: including three sub-sections with a total of 13 questions

Sub-Section 1—Focus on Finance management and includes two parts with a total of 3 questions:

A. With two questions

a) What is the financial organization structure of your company?

b) What is the financial sharing center's position in it and the relationship between FSC with your business?

B. How does the company evaluate the FSC's performance?

Sub-Section 2—Focus on FSC management and includes 4 parts with a total of 6 questions.

A. With two questions

a) When was your company's corporate FSC built?

b) What were the key reasons to build it at that moment?

B. What were the key considerations during the construction process?

C. What are the main difficulties or major problems in the FSC at the present moment?

D. With two questions

a) How to solve these problems properly?

b) What is the future development direction of upgrading FSC?

Sub-Section 3—Focus on Intelligent FSC, and includes 3 parts with a total of 4 questions.

A. With two questions

a) What is the impact of intelligent technology (Big data, AI, Internet, Cloud, Internet of Things, Block chain) on the construction of a corporate FSC?

b) What are the application scenarios of these intelligent technologies in the FSC?

B. What are the key points of intelligent technology application in the FSC?

C. How to evaluate the construction performance of intelligent FSCs? And how to evaluate the operation efficiency and effectiveness of intelligent FSCs?

3) Open question Section: Close the interview with an open question:

Are there any other comments in regard to but not limited to the driving factors and the

critical paths while building an intelligent FSC?

The interviews were anonymous which means that the interviewees did not need to sign their names once the interviews were completed. However, the interviewees had the option to sign their name on the printed form of the interview for archiving purposes, if they so whished.

3.3.3 Data analysis

This thesis processes and analyzes the research data based on the Grounded Theory. Before that, this research converts the interview recording into transcripts by software and cross check with the research assistant to double confirm the data validity. This research labels every interviewee a unique and sequential number in the very beginning, then use the coding software NVIVO to improve research efficiency and lower subjective influence on the research conclusion. From time to time, this research aligns and compare the research results to the existing related literature. Regarding to the research data which was gained from the interviews, this study processes it by three steps, namely "open coding, axial coding, and selective coding " respectively.

1) Open coding

This thesis conducts the open coding by three steps based on the original research data.

Step one, labeling: By extracting words and phrases related to the construction process and characteristics of the intelligent FSC from the original data. Step two, Conceptualization: Based on the causal, similarity, overlap and other relationships between labels, labels belonging to the same phenomenon were categorized into one concept. Step three, Categorization: Reclassify concepts belonging to the same phenomenon into one category, create new concept nodes.

2) Axial coding

The main purpose of axial coding is to find the intrinsic relationships between initial categories and further extract the essence of the research data. The author studies the initial categories, generate main theoretical dimensions and affiliates dimensions.

3) Selective coding

This study set up a systematical linkage between the main theoretical dimensions with the affiliates dimensions, develop the core categories as well. This study then develops theoretical insights and form theoretical model and evaluate the relationship between the main dimensions with the affiliate dimensions.

Based on above coding process, this study can build up theoretical model and come to conclusions. It is found that when the enterprises building the intelligent FSC, it will follow some basic principles: Firstly, the enterprise should meet certain starting conditions or key driving factors, that are the transformation period of the new strategy, the new business model and new technology to push them to do so. Secondly, during the construction process, four "rigid" transformation critical paths should be followed, namely organizational restructuring, process reengineering, operational management and system optimization. In the end, this thesis accumulates an interactive model in regard to building the intelligent FSC.

3.4 Assurance of validity and reliability

This research was conducted based on multiple case studies, with the analysis of the corresponding qualitative research data being conducted according to the grounded theory. To ensure the validity and reliability of the research conclusions, the author intentionally design the following actions:

1) Before the Interview

Beyond the data generated from the interviews, secondary data and on-site observation is also used during the research. Although this secondary data is mainly from the Internet, it is still feasible to use them in our research. In addition, these publicly released information have already undergone supervision, questioning, and review by stakeholders such as the media, public and employees as well. This is already reducing the possibility of fraud or misinformation and improving the credibility of the research data.

And when this research prepares the interview outline, no objective question was designed at all in the purpose of not to influence the research conclusions.

2) During the Interview

To ensure the reliability of the research, one research assistant helps the author during the interview to eliminate any subjective influence. The research assistant was asked to record the interview, and double check the transcripts which were generated by the recording software. Also, the interviewer tried not to ask the interviewee suggestive questions with biased results.

3) After the Interview

Technically use the software to process the research data, to avoid judgmental influence. During the coding process by software, preliminary coding is carried out by the author and the research assistant simultaneously. After coding, the author conducted a one-to-one comparison, while relating to the existing literature and comparing them from time to time. A

cross reference is performed with the research results based on the literature review. The research conclusions were re-reviewed, including selective coding and theoretical conclusions and communicated to the interviewees.

4) Author's personal expertise

Different from scholar researchers that study in campus, the author of this thesis has more than 25 years working experience in finance management field, successfully leading several companies' financial management transformation and building intelligent FSC for which received many top awards in China.

These expertise and experience empower the author to collect the research data more easily, including initial contacts with the selected case study companies, making appointments with their senior management teams and conducting intensive interviews. These expertise and experience increases the research validity and reliability as well.

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Chapter 4: Multi-Case Study Result and Data Analysis based on Grounded Theory

According to the research method in Chapter 3, this chapter includes case studies and data analysis which mainly includes four parts, multiple case study, cross case study, data analysis based on grounded theory, and the building of the theoretical model afterwards. This chapter is the core part in this research.

4.1 Multi-case study and result

Based on the case selection standards presented in Chapter 3, this research selects four representative case companies, including ZTE, Haier, Fosun and GCL, to study their financial sharing centers. The order of the four cases is based on the timeline of the research, with no other special purpose. In the detailed analysis of the four representative cases, this study examines the basic corporate profiles, the background for establishing 3.0 intelligent FSCs, the development processes, and the driving factors and critical paths involved in building these centers. Each case is independently analyzed to understand the unique characteristics and complexities associated with the construction of intelligent FSCs within the respective organizations.

In general, all the informationa and data showed below in case study, are all collect based on the data source which was mentioned in Chapter 3, including the company website, publications, company annual and quarterly report. During the following in-depth interview, interviewees contribute us some of the company archived documentations as well. All of them combined provide this research very solid foundation to the below case study.

4.1.1 ZTE Corporation

1) Basic Information

ZTE was established in 1985. Its primary business operations encompass 2G/3G/4G/5G wireless base stations and core networks, optical networks, chipsets, data centers, as well as aviation and transportation equipment. ZTE has become a globally leading provider of comprehensive communication and information solutions and a major supplier of

communication equipment. As an industry leader, the group delivers innovative, differentiated, and high-quality services and products to customers in over 180 countries, serving more than 25% of the global population. According to ZTE's annual report, the group's operating revenue exceeded RMB 124.3 billion in 2023, with a net profit attributable to shareholders surpassing RMB 9.3 billion.

ZTE has established six major business units, including the Network Division and the Mobile Division, which specialize in distinct product lines and functions. Each division operates independently with specialized responsibilities. A management center, headquartered in Shenzhen, China, houses administrative departments such as the Finance Center, Human Resources Center, and Operations Center to oversee functional management.

2) Background and History of Building FSC

A. Background

As a leading communications corporation and an industry frontrunner in China, ZTE has embraced globalization by establishing branches across multiple domestic and international locations. However, the corporation's traditional management model began to show limitations as business operations expanded.

First, before 2005, ZTE's business operations were relatively simple. Each branch maintained independent financial departments, performed their own accounting, and reported results to the headquarters. This decentralized model suited the dispersed nature of operations at the time. However, as the industrial chain extended and the scope of operations expanded, numerous subsidiaries and branches developed their own financial systems, each responsible only for their respective financial activities. Variations in accounting methods and standards among these entities resulted in inconsistencies in financial reports submitted to the headquarters. These discrepancies significantly increased the difficulty of financial consolidation at the corporation level, prolonged the closing cycle, and reduced accuracy, hindering the ability to accurately reflect the corporation's operational status.

Second, the rapid increase in subsidiaries introduced inefficiencies commonly observed in large enterprises, such as high costs and low operational efficiency. Every region, branch, and subsidiary within the corporation was required to establish dedicated financial departments, deploying a substantial number of financial personnel. The financial staff, primarily engaged in basic accounting tasks, were largely non-transferable between departments, leading to redundant staffing and inefficiencies that severely hampered productivity.

Third, delays and inconsistencies in information exchange resulted in the creation of information silos and poor data quality. Financial models varied across entities, and

accounting methods were inconsistent, leading to inaccurate consolidated information. As a result, the corporation could not ensure reliable data to support forecasting and decision-making. The corporation's growth was constrained by the limitations of its traditional financial settlement methods during its rapid expansion phase.

To address these challenges, ZTE recognized the urgent need to establish a new financial management model to support its rapid development. A transformation of the decentralized financial management model was initiated to achieve unified management and align with global strategic objectives. This marked the beginning of ZTE's journey in establishing the FSC.

B. Development Timeline

The construction of ZTE's FSC began around 2005 and can be divided into three distinct phases: the 1.0 Information Phase (2005–2010), the 2.0 Digital Transformation Phase (2010–2015), and the 3.0 Intelligent Financial Sharing Phase (2015–present).

a) 1.0 Information Phase – The Foundational Stage of the FSC

From 2005 to 2007, ZTE initiated the foundational stage of the FSC model. This phase focused on standardizing four key financial elements: accounting codes, accounting data, financial systems, and financial processes. The unification of these elements facilitated data aggregation and processing. Simultaneously, homogenous processes were clearly delineated to streamline interface relationships, laying a robust foundation for the establishment of the FSC.

ZTE developed a "four-tier" financial management system during this period, encompassing "Strategic Finance", "Operational Finance", "Financial Sharing", and an "Expert Team". By 2005, the corporation centralized data and product division management, establishing an accounting team in Shenzhen. In 2006, the FSC was formally established in Shenzhen to centralize domestic financial accounting. After a six-month pilot phase, the centralized model was successfully rolled out across all branches, marking the transition from a decentralized financial management system to the FSC model.

b) 2.0 Digital Phase – Developmental Stage of the FSC

Between 2010 and 2015, ZTE experienced rapid growth, integrating advanced technologies and systems to enhance financial management. During this phase, the group implemented a centralized financial information system, including b)2.0 Digital Phase (ERP), to support comprehensive financial workflows such as planning, processing, approval, verification, supervision, and handling. This integration of financial systems with information networks ensured effective data feedback and provided actionable insights for

decision-makers.

The system enabled centralized financial control across geographically and operationally diverse subsidiaries. To further promote FSC development, ZTE relocated the FSC to Xi'an and established a new operational framework. This framework encompassed process management, organizational management, and information systems, providing the group with a broader scope for expansion.

Innovations included an electronic imaging reimbursement system and a travel management system, significantly reducing the workload of document entry staff. Digital scanning of invoices allowed for paperless archiving, expediting document review and reimbursement processes, thereby saving time and improving efficiency.

c) 3.0 Intelligent Phase – Transformation Stage of the FSC

Since 2015, ZTE has entered the mature stage of FSC development. Leveraging domestic FSC experience, the group extended its shared service model to overseas subsidiaries, establishing unified management policies and business processes to enhance alignment with international operations.

By utilizing technologies such as Big Data, Artificial Intelligence, Cloud Computing, and Internet of things (IoT), ZTE transitioned its FSC to a "Financial Cloud", further optimizing service quality to ensure an enhanced customer experience. The rapid development of network technology enabled deeper digital transformation of the FSC platform. In 2017, a "Cloud Computing" center was established, and the FSC was renamed "Financial Cloud", offering management consulting and educational training services to other enterprises.

3) Driving factors and critical paths of the FSC's intelligent development

Based on the above case analysis, the transformation of ZTE's FSC from the digital phase to the intelligent phase has been driven by several factors and follows critical development paths. These include the integration of advanced technologies, the alignment of global operations, and continuous optimization of financial processes to support strategic business goals.

A. Driving Factors

During the transformation process of building the intelligent FSC in ZTE, the following major factors played key roles and accelerated its speed.

a) Organizational restructuring within ZTE's financial system, prompted by strategic adjustments at the corporate level, has been a critical driver in the transformation and upgrade of its FSC into an intelligent financial sharing model.

The initial step in this transformation involved streamlining the financial organization and

workforce. ZTE dismantled the traditional model where financial departments were independently established within each member unit. Instead, accounting functions were consolidated within the shared service center, centralizing daily financial operations. This structural change significantly reduced the number of financial departments and personnel, resulting in lower labor costs and simplified management complexities.

Furthermore, this organizational restructuring led to innovations in ZTE's financial model. Building on the foundation of shared accounting, ZTE introduced a triangular financial structure comprising the FSC, the Business Finance Department, and the Strategic Finance Department. This model ensured a balanced integration of strategic and operational financial management. The Strategic Finance Department focused on corporate strategy research and planning, while the Business Finance Department oversaw the execution of operational financial tasks. A continuous feedback mechanism was established to link strategic planning with implementation, enabling adjustments based on real-time information.

b) The development of a centralized financial network system has been a pivotal factor driving ZTE's transition from a digital to an intelligent financial shared service model.

Over years of FSC development, ZTE constructed a comprehensive financial integration system embedded with standardized financial policies and processes. This centralized system addressed challenges such as overstaffing and overlapping functions, substantially enhancing efficiency. By facilitating the rapid dissemination of directives and tasks to subsidiaries, the system improved overall management and operational efficiency while reducing enterprise costs to a significant extent.

Additionally, ZTE implemented vertical and horizontal integration within its information systems, ensuring the seamless transfer of data across different systems. Recognizing that financial data originates from business operations, ZTE reinforced the management of data interfaces to enable real-time connectivity between business and financial systems. To further enhance system integration capabilities, the group established a unified database for storing and managing financial business data.

c) The optimization of core business processes has been a critical factor in advancing the development and upgrade of ZTE's intelligent FSC.

Alongside strategic and technological drivers, the FSC's internal process improvements have played a pivotal role in driving its transformation into an intelligent financial management model.

In adherence to the principle of synchronization, ZTE redesigned its business workflows and undertook a comprehensive process reengineering. This initiative significantly enhanced

the efficiency of document review processes within the FSC. By optimizing workflows, the FSC enabled quicker access to financial documents, minimizing the impact of physical document loss or damage on financial operations. These advancements not only lowered operational costs but also improved overall management efficiency.

To further strengthen its system, ZTE incorporated barcode and multimedia functionalities into the financial shared system. Financial personnel at various subsidiaries and branches utilized scanning technology to convert physical documents into electronic formats, with each document assigned a unique barcode. These electronic documents were then transmitted in real-time through the network to the FSC for review. Upon verification, financial transactions were settled and archived promptly. This method ensured the authenticity of the documents and the timeliness of their transmission, thereby enhancing the reliability of financial operations.

B. Critical Paths

The development of ZTE's intelligent FSC has followed several critical paths that have ensured its successful transformation and ongoing optimization.

a) Continuous improvement of operational processes

One of the foundational paths in the development of ZTE's intelligent FSC has been the continuous refinement of its operational processes. As the organization expanded in scale, diversified its business models, and adopted varying organizational forms, the FSC adapted by evolving its service workflows. Instead of adhering to static processes, ZTE continually refined its operations to align with changing business needs and advancements in technology.

This adaptability proved essential in preventing the organization from falling behind in a rapidly evolving technological landscape. By reengineering and reconstructing service processes, the FSC maintained alignment with the group's growth strategy and operational plans. This approach also adhered to principles of cost optimization and efficiency maximization, ultimately achieving the goal of enhancing overall corporate performance.

b) Enhancing performance evaluation and expanding professional talent reserves

For the intelligent FSC, ZTE not only refined its evaluation system but also introduced differentiated performance appraisal criteria for employees. By integrating methodologies such as the balanced scorecard, ZTE established a performance assessment and reward framework based on five key standards: management and service quality, quality management levels, operational efficiency, on-site management standardization, and a combination of piece-rate pay and evaluation metrics. This comprehensive system effectively enhanced the motivation of financial personnel, driving the intelligent transformation of the FSC.

c) Intelligent upgrades to the information system and data protection

ZTE places significant emphasis on the intelligent upgrades of its information systems and the protection of data, recognizing that data security represents one of the greatest threats to the intelligent FSC. To address this, ZTE has established an access-rights-centered information protection system to safeguard sensitive data. Leveraging its expertise in communication technologies, the group has enhanced external network defenses to mitigate the risks of data breaches originating from the internet.

As part of the FSC's intelligent system upgrades, ZTE developed a comprehensive "big database" to ensure the integrity of critical financial data, including management records, performance evaluations, and financial reports. Standardized information coding and unified data standards were implemented across the FSC to ensure data accuracy, uniqueness, completeness, and validity from the source. These measures not only bolster the security and reliability of financial data but also enhance the overall integration and synergy of the financial management system.

d) Leadership support and continuous expansion and innovation

The transformation and upgrades of ZTE's FSC inherently involve adjustments that may impact the interests of stakeholders, often resulting in resistance to change. Leadership support plays a critical role in mitigating such resistance by alleviating pressures from lower organizational levels, effectively allocating resources, and accelerating the construction of the intelligent FSC. This support ensures the alignment of the FSC's development with the overall interests of the group.

The value of an intelligent FSC extends beyond the efficient handling of basic financial tasks. It also provides high-level support for advanced business functions, including services in the financial asset domain and the design of cost models. By leveraging the comprehensive data capabilities of the FSC, the group can utilize its insights for strategic planning and decision-making, further enhancing its operational effectiveness.

To maximize its potential, ZTE emphasizes strengthening the role and positioning of the intelligent FSC. This involves improving customer satisfaction with its services, thereby expanding its service scope. Additionally, scaling up its operations not only broadens the FSC’s service capacity but also effectively reduces costs through economies of scale.

The analysis of ZTE is shown in Table 4.1.

Table 4.1 Analysis of ZTE

Case company	Driving factors	Critical paths
ZTE	Organizational restructuring within ZTE's financial system, prompted by strategic adjustments at the corporate level. A centralized financial network system The optimization of core business processes	Continuous improvement of operational processes Enhancing performance evaluation and expanding professional talent reserves Intelligent upgrades to the information system and data protection Leadership support and continuous expansion and innovation

4.1.2 Haier Group

1) Basic Information

Founded in 1984, Haier has grown into a globally renowned home appliance giant and a leading provider of smart living and digital transformation solutions. Over the years, Haier has established a vast global presence with 10 major R&D centers, 71 research institutes, 35 industrial parks, 138 manufacturing centers, and 230,000 sales networks worldwide. For five consecutive years, Haier has been the only IoT ecosystem brand ranked among the "BrandZ Top 100 Most Valuable Global Brands", and it has maintained the top position in "Euromonitor International's Global Large Appliance Brand Retail Volume" rankings for 14 consecutive years.

Haier's core business includes the sales of traditional appliances such as air conditioners, refrigerators, kitchen appliances, water appliances, and washing machines, securing approximately 40% of the market share in China's home appliance market. Beyond these offerings, Haier has expanded its product base to provide smart home solutions that cater to various lifestyle scenarios. In 2023, Haier achieved an annual revenue of RMB 261.4 billion, representing a 7.33% increase from 2022, and a net profit attributable to shareholders of RMB 16.5 billion, a year-on-year growth of 12.81%.

2) Background and History of Building FSC

A. Background of Building FSC

As Haier experienced rapid development, its financial system revealed several issues that were increasingly misaligned with the group's growth trajectory. To better support its internationalization strategy, Haier continuously upgraded and transformed its financial system. The decision to establish a FSC was driven by the following key factors:

First, lack of uniform accounting standards. In Haier's earlier stages of international expansion, its business units were divided into regional operational segments. Each region adopted its own independent accounting methods, which facilitated the rapid execution of

localized business activities but led to inconsistencies in accounting standards across the enterprise. Additionally, Haier's focus on market expansion during its internationalization process lacked a strategic approach to standardizing financial data or realizing the benefits of centralized accounting.

This issue became particularly evident in overseas subsidiaries, where accounting records were maintained according to local standards that were often incompatible with domestic requirements. These subsidiaries operated independently, with financial data not integrated into the headquarters' system. This disconnection between financial and business data hindered decision-making, as headquarters lacked comprehensive and standardized financial information to support strategic management.

Second, inefficient allocation of accounting resources. At the time, Haier's accounting practices were primarily focused on manual voucher entry and report preparation. This reactive approach resulted in a significant allocation of internal accounting resources to post-transaction activities, leading to inefficiencies and unnecessary costs. Manual operations were prone to human error, and accounting information often lagged behind, lacked foresight, and was unreliable.

To remain competitive globally and strengthen its market position, Haier required precise market positioning and accurate market forecasting. However, the existing accounting framework was unable to provide the financial insights necessary to support these objectives, thereby limiting the group's ability to execute its internationalization strategy effectively.

Third, high costs of decentralized accounting. While a decentralized accounting approach provided operational flexibility for individual branches, it also introduced significant inefficiencies as the number of subsidiaries increased. Issues such as redundant processes, overlapping software and hardware systems, and an overly complex accounting workforce became increasingly problematic. These inefficiencies contributed to escalating overall accounting costs for the group.

Additionally, the reporting of accounting data required a bottom-up process. As Haier's international operations expanded, this transmission chain became progressively longer, further increasing the time and cost associated with obtaining accounting information. Ultimately, time constraints in report preparation may prevent the group's accounting personnel from conducting more insightful analyses of annual business performance.

B. Development Timeline

To address the challenges outlined above, Haier initiated the construction of its FSC in 2005. This process unfolded across three distinct phases:

a) The Financial Shared Service Construction Phase (2005–2011)

Guided by IBM's research theories, this phase involved a multi-step process that included forming an implementation team, defining the center's objectives and scope, and organizing responsibilities.

The implementation team was officially established in February 2007 and consisted of IBM consultants, specialists from Haier's internal control center, and IT personnel. After the team was formed, Haier refined the FSC's objectives and outlined its operational scope. Drawing on industry best practices, the group reorganized its internal financial staff into three key teams: Business Finance, Specialized Finance, and Shared Finance. Financial activities related to transactions were centralized and integrated into the FSC, creating a unified financial management structure.

During this phase, Haier utilized various information systems to support the FSC's operations. These included funds management software, a data management system, an enterprise information portal, internal digital implementation software, and ERP financial management software. The integration and seamless communication among these systems enabled Haier to digitize its financial management processes. This digital transformation not only resolved immediate operational inefficiencies but also established a robust foundation for the FSC's future development.

b) The Financial Shared Service 2.0 Digitalization Phase (2011–2017)

In contrast to the transformative "tear down and rebuild" approach of the first phase, the second phase of Haier's financial management evolution was characterized by a "building on the past to shape the future" approach. During this period, the group shifted from traditional financial accounting to a management accounting model, establishing a proprietary digital financial system. This phase marked a significant step forward in leveraging the foundation of its existing information systems to enhance financial management practices.

As the group grew, and its financial systems and FSC technologies matured, the scope of the financial shared platform expanded. Haier integrated an increasingly diverse range of business functions into the FSC. Key innovations during this phase included embedding budget warning functions into processes such as tax filing, report preparation, and risk control. These advancements enriched the platform's capabilities, making it more versatile and responsive to the group's financial and operational needs.

The digitalized FSC not only improved the professional skills of Haier's financial staff but also strengthened the group's ability to identify and manage potential risks. Through a management approach that emphasized setting clear standards beforehand, self-checks and

corrections during operations, and robust post-event safeguards, Haier effectively mitigated financial, operational, and strategic risks faced by the group. This approach laid a solid foundation for the subsequent transformation and construction of an intelligent FSC.

c) The 3.0 Intelligent Financial Shared Service Upgrade Phase (Post-2018)

Since 2018, Haier's FSC has entered a strategic era of intelligent and networked development, establishing itself as one of the most competitive FSCs in China. Haier's financial management has evolved toward a model of intelligence and smart operations, fully transforming the FSC into a platform-based enterprise and implementing a "Financial Cloud Platform".

This transformation introduced highly automated and intelligent processes for travel reimbursement, office supply procurement, and bulk purchasing, integrating "Internetization + Cloudization" into financial operations. These innovations enabled real-time reimbursements and supplier payment settlements, significantly enhancing operational efficiency. By utilizing electronic invoice data, the FSC system extracts and aggregates incoming and outgoing data from various legal entities in real-time, supporting tax planning, providing critical business data, and offering decision-making support. This approach also helps mitigate tax and operational risks through proactive risk management.

Intelligent and automated service modules facilitate seamless integration across platforms. For instance, the internet-based "Funds Through" platform incorporates risk assessment, sensitivity analysis, user profiling, and KPI tracking to generate large-scale financial data. This data is used to create tailored financial solutions, reducing financial risks and optimizing financing efficiency. These advancements enable the FSC to deliver value-added services, further enhancing financial management capabilities and increasing Haier's overall corporate value.

3) Driving factors and critical paths of FSC's intelligent development

Based on the case analysis, Haier FSC exhibited several defining characteristics as it transitioned from the 2.0 digitalization phase to the 3.0 intelligent phase.

A. Driving Factors

The continuous advancement toward intelligence was driven by five main factors: market environment, compensation incentives, construction goals, corporate culture, and corporate strategy. These drivers can be further classified into two levels: external drivers and internal drivers.

a) External drivers

The external factors influencing the development of Haier's intelligent FSC include the

market environment, policy changes, and technological advancements.

First, the industry transformation faced by Haier in both domestic and international contexts is a significant external driver. These transformations impact not only the group's industry position but can also catalyze changes in industry structures and business environments. To support such revolutionary changes, a corresponding financial management system is essential; otherwise, the group risks appearing strong externally while being weak internally.

Second, domestic policy changes have reshaped the market environment. Policies promoting high-quality development, expanding domestic demand, independent innovation, and industrial restructuring have shifted market competition away from traditional metrics like cost, quality, and delivery time. Instead, competition now focuses on meeting customer needs. This shift has accelerated the need for intelligent FSC construction and guided Haier to design its intelligent FSC around customer-centric principles.

Lastly, technological advancements have played a critical role in driving the intelligent transformation of Haier's FSC. The widespread adoption of advanced technologies such as cloud computing, big data, IoT, AI, and blockchain has ushered in a new era of financial information development, creating opportunities for companies like Haier to further enhance their financial systems.

b) Internal drivers

Internal drivers, primarily represented by corporate strategy, originate from within the organization and play a crucial role in shaping Haier's intelligent FSC. As a core department within the group, the evolution and development of the FSC are deeply intertwined with Haier's strategic objectives.

Unlike traditional financial management, Haier's FSC construction prioritizes not only profit growth and risk reduction but also the sharing of financial data and the unification of data standards. This strategic focus ensures that the FSC serves as a critical enabler for Haier's broader business goals, aligning financial operations with the group's long-term vision.

Corporate culture also plays a pivotal role in driving the transformation of the FSC. Haier's corporate culture reflects the group's ethos and serves as a source of inspiration for its employees. Over the years, Haier's cultural philosophy has undergone four iterations, evolving from "selfless dedication and pursuit of excellence" to "integrity, ecosystem-driven, and co-evolution". Each cultural transformation has shaped employee attitudes and work ethics, fostering enthusiasm and commitment across the organization. This strong cultural

foundation has created an environment that supports innovation and collaboration, essential for the successful development of the intelligent FSC.

Driven by both internal and external factors, the development of an intelligent FSC has become an inevitable choice for Haier. This transformation not only strengthens the integration of financial and business operations but also significantly enhances operational efficiency. By fully leveraging the benefits of financial transformation, the intelligent FSC serves as a vital initiative to boost Haier's competitiveness and expand its market share.

B. Critical Paths

Haier focused on four critical paths to construct its intelligent FSC: organization and personnel arrangement, process design, technology application, and platform development. These paths collectively laid the foundation for the center's successful implementation and operation.

a) Organization and personnel optimization

In the process of building the intelligent FSC, Haier redefined and integrated resources across business, financial, and management teams. This involved restructuring roles and responsibilities and providing innovative training for interface personnel to enhance their capabilities in intelligent financial management. Haier also adjusted its financial organizational structure to align with the decentralized characteristics of intelligent financial management.

b) Process design and visualization

Haier meticulously mapped out its operational processes, using visualization tools to present the sequencing and connection of specific process nodes. This approach established a solid foundation for subsequent technological integration. Process reengineering was treated as a cornerstone of Haier's intelligent FSC development. By reconstructing business workflows, the group facilitated the organic integration of financial shared services with business activities.

c) Integration of intelligent technologies

The integration and application of suitable intelligent technologies were central to Haier's approach. The construction of the intelligent FSC relied on integrating different business modules and implementing group-level digital transformation. Leveraging the convenience of network-based data collection, Haier utilized a financial big database to empower staff with self-service capabilities. This integration transitioned the FSC from functionally segmented modules to interconnected systems, enhancing communication and data sharing across platforms.

d) Defining strategic goals for the intelligent FSC

To ensure the intelligent construction of its FSC on a digital foundation, Haier undertook a top-down transformation of management perspectives during implementation. Managers at all levels were required to gradually adjust their thinking, deeply understand the significance of building an intelligent FSC, and emphasize its strategic value. This approach served to guide all employees in accurately understanding and appreciating the concept of intelligent financial sharing. Throughout this process, Haier systematically led employees from both business and financial departments to discard outdated thought frameworks and actively embrace the new opportunities arising from transformation.

The analysis of Haier is shown in Table 4.2.

Table 4.2 Analysis of Haier

Case company	Driving factors	Critical paths
Haier	External drivers: Industry transformation Domestic policy changes Technological advancements Internal drivers Corporate strategy Corporate culture	Organization and personnel optimization Process design and visualization Integration of intelligent technologies Defining strategic goals

4.1.3 Fosun Group

1) Basic Information

Founded in 1992, Fosun is a large, diversified multinational corporation that has evolved over 30 years into an innovation-driven global family consumer industry group. Its businesses span healthcare, steel, mining, real estate, cultural services, and retail. Fosun adheres to its long-term strategy of driving growth through "innovation" and "globalization", making it one of the few Chinese enterprises with both deep technological and innovation capabilities and robust global operations and investment expertise.

Fosun's operations are structured into four major business segments: a). Healthcare Segment. This segment focuses on pharmaceuticals, medical devices and diagnostics, health services, and consumer healthcare products. b). Consumer Segment. Fosun has extensively invested in brand consumption and tourism culture, creating a global and comprehensive ecosystem. c). Wealth Segment. Concentrating on insurance and asset management, this segment benefits from a strong foundation in financial assets and global investment capabilities. d). Intelligent Manufacturing Segment. This segment involves a global deployment of digital and intelligent technologies to empower industrial manufacturing. It emphasizes mineral and oil & gas resources and smart manufacturing while actively exploring

high-tech peripheral industries. Notably, Fosun's global investments and operations, exemplified by Fidelidade, its Portuguese insurance subsidiary, highlight its significant presence as one of the largest Chinese private investors in Portugal.

In 2023, Fosun achieved annual revenue of RMB 198.2 billion, an 8.6% increase compared to 2022, with a net profit attributable to shareholders of RMB 1.8 billion.

2) Background and History of Building FSC

A. Background of Building FSC

Fosun established its FSC in 2017 amidst various challenges and pain points. The primary reasons for initiating the FSC included addressing issues in financial governance, streamlining processes, and supporting the group's digital transformation.

a) Inadequacy of financial systems and management processes.

Fosun's rapid business expansion across multiple industries, spanning domestic and international operations, created a chaotic financial management environment. Establishing the FSC was seen as an opportunity to experiment with improving digital transformation by developing a comprehensive financial management framework. This included creating a robust business-finance management process to replace traditional accounting systems, strengthening internal oversight, and fostering greater cost-control awareness.

Another critical driver behind the establishment of the FSC was the need to enhance internal management processes and governance through technology. Fosun aimed to achieve process formalization and digitalization by leveraging technological tools to institutionalize workflows and procedures. By transforming financial management practices through the FSC, the group sought to prepare its organizational structure for future digital transformation needs. The FSC was envisioned as a platform to improve the overall competencies of financial personnel. By automating routine tasks, the center enabled employees to focus on value-added activities that better supported business development, mitigated risks, and aligned with Fosun's strategic objectives.

b) Lack of ecosystem awareness in financial digitalization

Before establishing its FSC, Fosun lacked a cohesive awareness of the ecosystem necessary for financial digitalization. The FSC aimed to transcend the traditional transition from manual bookkeeping to computerized accounting, focusing not only on reducing financial management costs but also on enhancing the competencies of financial personnel. By leveraging information technology and digital tools, the FSC sought to fully realize its management functions and foster an ecosystem and atmosphere conducive to financial digital transformation. This included promoting an understanding within the organization of the

value that digital transformation could bring to the group.

c) Emphasizing the value of financial management

Prior to the FSC's establishment, Fosun's leadership viewed financial management primarily in terms of accounting, taxation, and fund management roles. Expectations regarding its potential to create greater corporate value were modest, and there was little emphasis on the benefits that financial digital transformation could deliver.

Against this backdrop, the initiation of Fosun's FSC marked a strategic shift in recognizing the broader role of financial management. The project aimed to elevate the perception of financial functions from basic compliance and record-keeping to a value-creating asset capable of driving operational efficiency, supporting strategic goals, and contributing to the group's long-term growth.

This context underscores the significance of the FSC in Fosun's journey toward modernizing financial management and embedding digital transformation into its operational and strategic framework.

B. Development Timeline

Compared to other large enterprises, Fosun's FSC began relatively late. However, leveraging the experiences of other Chinese companies, Fosun designed its FSC with a high degree of informatization and digitalization from the outset. The development process can be divided into two key phases:

a) The Financial Shared Service Construction and Rapid Digitalization Phase (2017–2020)

In early 2017, Fosun established its FSC to address the unique characteristics of its operations: diversified business formats, international business scope, multi-location regulatory oversight, and the non-standardized processes of acquired enterprises. The FSC was built around four core objectives: to serve as a high-value financial operations provider, a safeguard for financial risk, a producer of foundational financial big data, and a crucial hub for cultivating financial talent within the group. Its business scope included global financial reviews, accounting, fund settlements, expense control and reimbursement, data maintenance, tax management, financial control, and consolidated financial reporting.

At its inception, the FSC incorporated 48 companies within the group, optimizing and innovating their existing financial platforms. Leveraging the trends in big data and informatization, Fosun developed an intelligent platform tailored to its needs and market conditions. The financial informatization systems integrated into the FSC included New Century Accounting Software and Office Automation System.

The FSC quickly grew from a small team of 12 employees into an operation with over 100 staff members, supporting more than 800 companies, equally split between domestic and international entities. This rapid development resulted in a cost savings and efficiency improvement of over 30% for Fosun, achieving significant cost-sharing and reduction.

Over 35% of the FSC's personnel have overseas education backgrounds and are proficient in at least two foreign languages, ensuring robust support for Fosun's international financial operations. The FSC also collaborated with Fosun University to provide courses for FSC employees while offering internships and placement opportunities for students. This approach seamlessly integrated theoretical knowledge with practical application, enhancing service quality and efficiency while contributing highly skilled, agile-thinking professionals to society.

b) The 3.0 Intelligent Financial Sharing Center Upgrade Phase (Post-2020)

After 2020, Fosun's FSC embraced the application of advanced intelligent technologies, integrating cutting-edge tools such as intelligent tax robots, smart document cabinets, and optical character recognition (OCR) systems. These technological innovations allowed the FSC to address operational challenges more effectively, achieving refined operational management and transitioning from its initial focus on "simple informatization and professional reimbursement" to "intelligent and precise operations". This evolution marked a leap from the FSC's 1.0 stage of informatization to its 3.0 stage of intelligent operations.

The FSC independently designed a third-generation intelligent financial operations platform, continuously upgrading its professional intelligent modules and functionalities. Given the diverse and extensive nature of Fosun's investment portfolio, the center developed an automated investment accounting module. This module embedded accounting rules and retrieved front-end data to automatically generate accounting vouchers. The introduction of a smart voucher cabinet enabled features such as scan-based location tracking, rapid document retrieval, and one-click cabinet access.

An intelligent operational dashboard was also implemented, providing real-time visibility into the operational status of over 800 companies served by the FSC. Additionally, the center introduced financial robots, including a tax declaration robot and a bank receipt download robot, significantly reducing labor and resource expenditures. On its 3.0 platform, the FSC achieved comprehensive integration across multiple domains, including business-finance integration, finance-tax integration, finance-treasury integration, and management-accounting integration. These advancements propelled Fosun's digital financial management into a new era.

3) Driving factors and critical paths of FSC's intelligent development

Fosun's FSC began relatively late compared to its peers, but its rapid development has significantly supported and propelled the growth of the group's business operations. The intelligent transformation of the FSC has exhibited several notable characteristics.

A. Driving Factors

Since the establishment of its FSC in 2017, Fosun has embraced the trends of the digital era, profoundly transforming its financial management practices. The rapid advancements in information technology, including big data analytics, cloud computing, BI (business intelligence) data collection, and blockchain technology, have significantly accelerated Fosun's drive to build an intelligent FSC. These driving forces are prominently reflected in three key aspects:

a) Elevated positioning of financial organization and personnel functions

With the dual transformation of corporate and financial digitalization, Fosun placed considerable emphasis on restructuring its financial organization and redefining the roles of its financial personnel. Traditional methods of dividing financial responsibilities based on accounting modules no longer suffice, and financial personnel are no longer limited to routine accounting tasks. The era of traditional bookkeepers is gradually being replaced by a more dynamic and strategic financial workforce.

Fosun recognized that a financial organization must become a fully empowered entity, capable of driving business growth, supporting corporate strategy, and reshaping the group's ecosystem. The group restructured its financial organization in alignment with its business structure, integrating financial functions deeply into business operations. By establishing financial BP teams, Fosun enabled closer collaboration between financial and operational teams. Leveraging the FSC's data platform and intelligent tools, the group automated data extraction and analysis, providing comprehensive services and controls to support the full spectrum of business activities.

Additionally, Fosun emphasized the cultivation of financial personnel into multi-dimensional, versatile professionals. Financial staff are expected to possess expertise not only in traditional areas such as accounting, taxation, funding, and financing but also in financial analysis and business intelligence. This holistic skill set enables them to identify current and future challenges within the group's industry and provide strategic insights to guide corporate decision-making. This approach not only supports the group's growth but also continuously supplies the group with senior-level financial talent equipped to navigate a rapidly changing business environment.

b) Higher positioning for financial and shared management concepts

A key factor in determining whether a FSC can be scaled and strengthened lies in its ability to evolve with advancements in digital and intelligent technologies. Fosun has redefined the traditional concept of financial sharing, pushing its FSC to move beyond basic tasks such as bookkeeping, accounting, reporting, and analysis. Instead, the center has expanded into areas such as risk control, data analytics, market insights, and decision support.

Under this elevated positioning, Fosun established dedicated personnel within its data center and created specialized departments such as the Data Management Division and Data Center. These changes were designed to better support the intelligent transformation of the FSC, ensuring that its operations align with the group's broader strategic objectives.

c) Accelerated adoption of financial intelligence technologies

Fosun's FSC, rapidly developed on the foundation of ERP-based financial accounting, has integrated its business and finance systems to enable mobile office capabilities and create a cross-departmental collaborative ecosystem. With improved data integration, the FSC has significantly enhanced its support for business functions such as customer evaluation, risk forecasting, and financial analysis.

Focusing on achieving characteristics like mobility, efficiency, connectivity, and intelligence in its financial management systems, Fosun has aggressively expanded into technologies such as big data analytics, cloud computing, BI data collection, and blockchain. The FSC has also adopted tools like intelligent image recognition, voice recognition, automated auditing, and intelligent payment systems to maximize human-machine interaction and data sharing. These innovations have reduced the routine workload of financial personnel, allowing them to dedicate more time and energy to high-value financial management activities.

Organizational innovation, management innovation, and technological innovation have emerged as core driving forces behind Fosun's construction of an intelligent FSC, aligning seamlessly with the demands of the intelligent era. This comprehensive approach has not only strengthened the FSC's capabilities but also ensured its alignment with Fosun's long-term strategic goals.

B. Critical Paths

In constructing its intelligent FSC, Fosun pursued a dual strategy. First, it fully leveraged advanced technologies such as big data, IoT, and blockchain to enable efficient integration, analysis, and operation of business and financial data, creating a resource ecosystem centered on financial data. Second, it implemented internal organizational reforms to enhance the

competencies of financial personnel, empowering them to support business development more deeply and broadly. This approach ultimately achieved the integration of business and finance within the intelligent FSC.

a) Designing an integrated platform framework for intelligent financial sharing

Fosun's FSC is built on a multi-layered platform framework that consists of four hierarchical levels: the technology layer, the data layer, the engine layer, and the application layer. As for the technology layer, the foundation of the framework is the technology layer, which employs tools such as cloud computing, business intelligence (BI) technologies, and voice recognition. These technologies provide the backbone for implementing intelligent financial functionalities. Above the technology layer lies the data layer, centered around a data middle platform. This layer focuses on the efficient and timely identification, collection, and storage of data. It serves as the fuel for the engine layer, ensuring that processed data is accurate and readily available. The engine layer acts as a data processing factory. Integrated data from the data layer undergoes advanced processing, transforming raw information into actionable insights. Financial data is converted into accounting vouchers and linked with business data. This integration bridges financial and operational processes, enabling comprehensive analysis to support the application layer. At the top is the application layer, where processed data is utilized through various intelligent applications. These include smart reimbursement, smart procurement, smart taxation, smart sharing, and smart reporting. The application layer enables the creation of a real-time operational dashboard, visualizing the group's business performance. It also facilitates the development of detailed profiles for products, customers, and suppliers, providing strategic insights that drive stable and sustainable business growth.

b) Restructuring the financial value system in intelligent financial sharing

Fosun has integrated the positioning of its FSC into its overarching corporate strategy. The group's strategy, characterized by "current industry operations + future industry investments", follows a dual-track, complementary approach. By implementing financial sharing within existing industries, Fosun drives acquisitions and investments in new industries. Subsequently, these newly acquired industries are incorporated into the FSC, creating an optimized strategic financial sharing loop.

Following the establishment of the FSC, Fosun has continually analyzed both external and internal environments, making timely adjustments to its strategies and positioning. These proactive efforts have led to the formulation of higher standards for building an intelligent FSC, significantly enhancing the platform's adaptability and its alignment with the group's

evolving strategic objectives.

In the process of financial digital transformation and the construction of an intelligent FSC, Fosun's transformation of financial functions and the restructuring of its financial value system have become particularly critical. By utilizing a unified data center and automated data acquisition, the collection of daily financial data has become increasingly standardized and refined. As a result, basic accounting tasks now account for less than 10% of the FSC's functional allocation.

Through digitalized controls and approvals, the FSC mitigates business risks, with an increasing emphasis on providing proactive insights and oversight. This aspect accounts for 20% of the FSC's functional allocation, reflecting the growing need for financial personnel to deliver actionable recommendations.

As the data middle platform generates a larger volume of information, financial staff are tasked with maintaining data quality and producing analytical reports. By integrating these reports with the group's operational data, the FSC can issue timely warnings and track follow-ups, a function that comprises 30% of its operational focus.

The largest share of the FSC's role, accounting for 40% of its functional allocation, involves embedding financial expertise deeply into the business. Financial personnel serve as business partners (BPs), focusing on preemptive controls and offering specialized financial advice. This proactive engagement ensures more stable business development and empowers the group to achieve its strategic objectives, highlighting the FSC's critical role in driving business innovation and sustainable growth.

c) Continuously advancing innovation in intelligent FSC

Despite achieving notable successes in developing its intelligent FSC, Fosun remains committed to continuous innovation guided by the "one-two-three-four-five" framework:

One Core Principle: The FSC is centered on serving business operations. The goal is not to create a superficial or performance-driven project but to prioritize supporting stable business development. Every initiative focuses on enhancing operational efficiency and sustainability.

Two Fundamental Principles: The FSC adheres to strict regulatory compliance while maintaining a value-oriented approach. These principles ensure that financial operations align with both external standards and the group's strategic goals.

Three Key Focus Areas: Data, funds, and taxation form the primary pillars of the FSC's operations. These elements drive the center's ability to integrate financial and business activities effectively.

Four Value Directions: The FSC emphasizes value reflection, value addition, value protection, and value design. These dimensions define how the FSC contributes to the group's overall strategic vision and operational excellence.

Five Core Competencies: The FSC fosters digital analysis capabilities, business insight, communication and negotiation skills, reverse engineering, and systems thinking. These competencies equip the center to adapt to evolving demands and provide comprehensive support for business development.

Under the framework of Fosun's intelligent FSC development, the group has systematically designed an integrated platform, restructured the financial value system, and continuously driven innovation. These strategic paths have positioned Fosun at the forefront of financial sharing technology, solidifying its foundation for future growth. The intelligent FSC has demonstrated significant value in reducing costs, improving service quality, and addressing challenges such as information silos.

The analysis of Fosun is shown in Table 4.3.

Table 4.3 Analysis of Fosun

Case company	Driving factors	Critical paths
Fosun	Elevated positioning of financial organization and personnel functions	Designing an integrated platform framework for intelligent financial sharing
	Higher positioning for financial and shared management concepts	Restructuring the financial value system in intelligent financial sharing
	Accelerated adoption of financial intelligence technologies	Continuously advancing innovation in intelligent FSC

4.1.4 GCL Group

1) Basic Information

Founded in 1990, GCL is a conglomerate focused on new energy and clean energy as its core industries. It has also expanded into related sectors, including silicon materials, lithium materials, and carbon materials, leveraging green energy technology to drive its development. Under the framework of China's "dual carbon" national strategy, GCL has embraced a new development model characterized by "green", "technology-driven", and "digitalized" approaches.

Guided by the philosophy of "bringing green energy into life", GCL is committed to sustainable development and improving living environments. The group actively supports the construction of a low-carbon, clean, efficient, and safe energy system. In response to the ongoing energy reform, GCL is accelerating its strategic transformation from a producer of green and clean energy to a service provider in the sector. By doing so, GCL has demonstrated

its commitment to fulfilling its social responsibilities as a major energy enterprise.

To support its strategic goals, GCL has established a comprehensive corporate governance framework. At the top of the structure is the Board of Directors, serving as the highest decision-making authority. The board is supported by eight management committees that systematically oversee the group's overall development. This governance model strengthens the foundation for business growth and enhances the group's decision-making capabilities.

Operating under a three-tier management framework comprising the group level, industry segments, and grassroots enterprises, GCL reported an annual revenue of RMB 179.2 billion in 2023, reflecting its robust performance and strategic direction.

2) Background and History of Building FSC

A. Background of Building FSC

The rapid expansion of GCL's business operations has resulted in challenges such as repetitive foundational tasks, inconsistent policies and execution standards, and an overly complex organizational structure. These issues have imposed constraints on the group's development, with significant impacts in the following areas:

a) Complex organizational structure leading to high costs and low efficiency

GCL's emphasis on industrial diversification has led to a sprawling and intricate business landscape. The group has actively supported the "Belt and Road Initiative", exemplified by its "Ethiopia-Djibouti Oil and Gas" project. In addition, it has established power and manufacturing projects in over ten countries, with branches located in the United States, Canada, Ethiopia, and Djibouti.

However, the complexity of its subsidiary network has resulted in overly lengthy communication and business processes. In turn, this has weakened the oversight capacity of the group's headquarters, making it more challenging to manage strategic, financial, and human resource functions effectively. The fragmented structure has led to inefficient allocation of financial resources and increased operational costs, further burdening the group and hindering its overall management efficiency.

b) Increased strategic execution and financial risks

The growth of GCL's operations has brought heightened demands for management and financial oversight, particularly following the public listing of its key business segments. In November 2007, GCL's polysilicon business went public in Hong Kong. Subsequently, in 2014, the group restructured its operations, resulting in GCL New Energy and GCL Integration being listed in Hong Kong and Shenzhen, respectively.

The increasing number of listed companies has imposed stricter requirements on the

group's management and financial practices. Frequent business reorganizations and expansions have further escalated management complexities and financial risks. The group's sprawling network of subsidiaries has exacerbated these challenges, as the multi-tiered transmission of information has led to misinterpretations of policies and inconsistencies in handling similar documents. These issues pose significant risks for subsequent data analysis, hinder the effective execution of policies at the frontline, and increase the potential for fraud. Collectively, these factors have impeded the group's ability to sustain its rapid growth.

c) Significant industry differences hindering standardization and globalization

The diverse characteristics of the power, photovoltaic, and natural gas industries within GCL have created challenges in standardizing financial practices. Financial norms have lagged behind operational needs, with no unified foundational data to support cross-industry comparisons. Varied requirements from management further complicate financial data comparability, exacerbated by differences in personnel expertise and inconsistent ERP system versions across the group. This lack of standardization has made it difficult to establish a unified financial framework.

During GCL's global expansion, the absence of a comprehensive global risk warning system and poor financial information transparency have hindered strategic global management by the group's senior leadership. Traditional financial management practices have proven inadequate for meeting the demands of GCL's global operations, underscoring the urgent need for a cohesive global financial management model.

Given these challenges, the establishment of a FSC has become an inevitable choice for GCL. Recognizing this, the group began taking foundational steps as early as 2007, introducing online banking payment systems, creating cash pools, and leveraging its strong ERP infrastructure.

B. Development Timeline

The development process in GCL's FSC can be divided into three key phases:

a) Preparation Phase (2010–2016): Laying the Foundation for Standardization and Informatization

During this phase, GCL focused on defining the scope and structure of its FSC, establishing processes, and setting the stage for rapid expansion and internationalization.

In 2010, GCL initiated research and formulated plans for launching its shared services. The first Shared Service Center (SSC) was established in Xuzhou to standardize invoice templates across seven power companies.

In 2011, a dedicated Power FSC was set up in Nanjing to handle accounts receivable,

accounts payable, and general ledger operations for 28 power enterprises. An innovative "pending document bidding" model was introduced to streamline document processing.

In 2012, the FSC was relocated to Suzhou, marking a period of rapid expansion. By May, the Suzhou SSC began servicing 14 photovoltaic enterprises, and by July, preparations started for shared services in North America's photovoltaic operations. This included back-entering a substantial number of historical vouchers, initiating the internationalization of GCL's accounting shared services. Concurrently, real estate operations were incorporated, with the workforce growing to 45 personnel, supporting major business segments across GCL.

In 2014, the FSC expanded to serve over 230 enterprises, with personnel increasing to 150. Financial systems underwent standardization, moving beyond traditional financial reporting to include the preparation of financial analysis reports. Advanced technologies like bank-enterprise direct connection, imaging systems, and business intelligence (BI) systems were integrated. By this point, the FSC had achieved stable operations and full informatization.

b) Emphasis on Business-Finance Integration and the SAP "Corner-stone"(Panshi) Project (2016 Onward)

In 2016, GCL initiated its partnership with SAP to integrate its business and financial systems, marking a significant step in its digital transformation journey. This initiative, known as the "Panshi Plan", focused on unifying the group's ERP system and peripheral systems, with a clearly defined objective of completing implementation within three years and optimizing the system over the following two years. Leveraging this opportunity, GCL's FSC embarked on a self-driven transformation to achieve business-finance integration. The goal was to align closely with business operations by implementing a shared services model combined with unified management across various segments.

By 2018, the FSC began transitioning from a purely financial management role to an operational finance model. This marked a pivotal shift in the platform's evolution, characterized by its adoption of a business-centric approach and leveraging digital intelligence as a cornerstone for comprehensive reform and innovation. The FSC deepened its engagement with business segments, alleviating operational pressures on these units while simultaneously optimizing its organizational structure.

A robust talent development mechanism was also established, aimed at enhancing the quality and scope of shared services. As a result, the status of the FSC was further consolidated and elevated, transforming it into a "decentralized FSC".

c) Accelerated Development Phase (2019–Present): Strategic Finance and 3.0 Intelligent

Financial Sharing

In 2019, GCL launched its "Two Transitions and One Reform" initiative, marking a new phase of rapid development aimed at establishing an intelligent FSC. This phase emphasized positioning the FSC as a strategic finance platform to align more closely with the group's long-term goals.

The initiative introduced the financial "Golden Triangle" system to monitor and enhance financial management capabilities, ensuring that business variables were accurately reflected in financial outcomes. Comprehensive budget management became the cornerstone of business-finance integration, enabling the optimization of organizational structures. This approach matched the right processes with the appropriate organizational units, transforming each department into either a profit center or a management service backend supporting the profit centers.

To further strengthen the FSC's capabilities, GCL established a centralized data platform, facilitating the integration of business, finance, and taxation. The group also introduced a business travel platform and expanded the application of intelligent technologies to enhance the FSC's operational agility. These measures created a more interconnected information chain between business and finance, enabling faster and smarter responses to business needs.

The intelligent FSC now plays a critical role in refining business processes, making them more intelligent and efficient. By leveraging these advancements, the FSC provides secure and stable support for management decision-making, ensuring the group's operations are both strategic and robust. Ultimately, GCL's intelligent FSC drives decision-making through advanced analytics and automation, elevating the group's overall management value.

3) Driving factors and critical paths of FSC's intelligent development

GCL's FSC was not among the earliest to be established within Chinese enterprises, with its initial development primarily driven by the rapid pace of the group's business expansion. However, it has demonstrated significant "late-stage acceleration". Since 2015, with the iterative upgrades of its information systems, GCL quickly adjusted its development direction, setting intelligent financial sharing as the primary construction goal.

A. Driving Factors

The development of GCL's intelligent FSC was driven by several key factors:

a) Changes in Industry and Market Dynamics Prompting Value Reorganization and Resource Optimization

The energy industry, as a primary sector for achieving the "dual carbon" goals, plays a crucial role in advancing sustainable development. Promoting the research, development, and

application of clean energy, alongside measures for energy conservation and emission reduction, is essential for achieving harmony between humans and nature. In a rapidly evolving market, precise data capture is vital for efficient decision-making. This necessity underscores the importance of upgrading financial management systems and establishing an intelligent FSC. By extracting market data and integrating information flows from front-end operations into back-end financial processes, the FSC facilitates data sharing and enhances collaboration in corporate development and management.

As a large-scale integrated energy enterprise, GCL has taken on the responsibility of actively pursuing a low-carbon and green transformation under the guidance of the "dual carbon" goals. This transition is inherently long and complex, requiring collaboration across all corporate departments. While expanding its business operations, GCL must also establish efficient financial shared service processes to create greater corporate value. These processes are crucial for identifying new profit growth points, maximizing the group’s contribution to energy structure adjustments, and optimizing internal resource allocation.

Additionally, the intelligent FSC enhances management efficiency, drives higher profitability, and provides GCL with a sustainable competitive edge. These efforts not only accelerate the realization of the "dual carbon" goals but also strengthen the group’s ability to adapt to evolving market demands and support long-term growth.

b) Global mergers and acquisitions and integrated operations necessitating business model optimization

Despite the fragmented nature of the mergers and acquisitions (M&A) market and significant differences across industries and regions, transactions in the energy, utilities, and resources sectors have remained active. Factors such as the ongoing COVID-19 pandemic and uneven economic performance have continued to influence the landscape. The pandemic has accelerated the global shift toward carbon neutrality and green energy, with an increasing number of cross-regional energy companies committing to reducing carbon emissions.

In this context, building an intelligent FSC becomes essential. It not only enhances internal management efficiency and reduces costs but also serves as a strategic tool for achieving the "dual carbon" goals, driving the enterprise forward on its sustainability journey.

As a large integrated energy enterprise, GCL must continuously adjust its business development model to adapt to changing climate conditions and ensure internal sustainable growth. Optimizing the business model requires accelerating the construction of an intelligent FSC to secure a competitive development advantage. For instance, GCL New Energy maintained a high debt-to-asset ratio until 2018. Recognizing the need for transformation, the

group embarked on a "light-asset" strategy and successfully achieved this goal by 2021. Simultaneously, it seized opportunities in zero-carbon energy, evolving its business model into a dual-focus strategy of "photovoltaics + hydrogen energy", with a long-term vision of developing "green hydrogen" to create enduring value. This shift positioned the group for greater growth while contributing to China's "dual carbon" objectives.

The optimization of GCL's business model has expanded the group's scope of operations and increased the complexity of its business systems. These developments underscore the necessity of standardizing and enhancing the efficiency of business and financial processes. By integrating finance into the operational front end and advancing the construction of an intelligent FSC, GCL can achieve true business-finance integration on the basis of building FSC.

c) Rapid advancement of intelligent technologies driving financial shared service model upgrades

The rapid development of intelligent technologies presents both opportunities and challenges for GCL. To adapt, the transformation of financial management models and the FSC must rely on intelligent technologies. Integrating the group's growth with advanced information technologies is essential to fully leverage the benefits of this technological progress.

The FSC serves as a critical hub for data collection, management, and analysis within the enterprise. Transforming it into an intelligent FSC enables the sharing of information and data, which is key to achieving business-finance integration and meeting the group's development needs in an era of rapid technological advancement. Traditional informatized and digitized FSCs are no longer sufficient to sustain modern business development. Instead, intelligent FSCs are needed to provide financial data that supports business decision-making effectively.

Through an intelligent FSC, business planning can be translated into financial data, offering clear and quantitative results to illustrate the financial impacts of potential decisions. This data-driven approach assists management and operational teams in making informed judgments and resolving business challenges. Additionally, the intelligent FSC fosters trust between financial and business units by providing valuable insights and support, enabling greater collaboration and empowering the financial department to take on more strategic roles.

B. Critical Paths

The development of GCL's intelligent FSC follows several strategic paths.

a) Formulating financial strategy and defining goals and principles for intelligent FSC construction

GCL strives to ensure that its financial function supports corporate strategy, facilitates decision-making, serves business operations, creates value, and mitigates risks. To achieve this, the group emphasizes four core financial management capabilities: value recording, value reflecting, value safeguarding, and value creation.

GCL has proposed starting from an informatized and digitized financial shared service model and advancing towards intelligent financial management. This involves establishing robust system, organizational, and data foundations to transition from traditional financial operations to comprehensive business-finance integration. By breaking through boundaries in functions, technology, and data, GCL has worked to establish a centralized data platform, leveraging internal and external resources for targeted diagnostics and benchmarking analysis.

To enhance operational efficiency and improve customer experience, GCL integrates cutting-edge technologies such as big data, artificial intelligence, and the internet into its processes. Using the FSC as a foundation, the group has implemented a lean financial management strategy structured around "Strategic Finance, Business Finance, and Shared Finance". This approach not only provides a clear path for building an intelligent financial sharing system but also demonstrates the strong commitment of the leadership to driving innovation and transformation within the financial domain.

GCL's establishment of its intelligent FSC marked a pivotal step in the group's financial transformation. Throughout its development, GCL clarified key optimization principles to ensure the success and sustainability of the initiative:

First. Practicality: The construction plan must align with GCL's development strategy and current environmental conditions. The goal is to create actionable and sustainable solutions that can be effectively implemented and integrated into the organization.

Second. Balance Between Unity and Individuality: Standards are established at the group level to maintain consistency across the organization. However, individual business units are encouraged to propose tailored solutions within this unified framework, addressing their unique operational needs.

Third. Combination of Benchmarking and Innovation: GCL incorporates best practices from other successful enterprises while adapting these approaches to its specific conditions and future objectives. This ensures that the transformation is both grounded in proven strategies and tailored to GCL's unique context.

b) Leveraging intelligent technologies to optimize and standardize financial shared service processes

Adopting a global development strategy, GCL recognizes that standardized and

streamlined business processes are essential for ensuring the reliability and consistency of financial data. Without unified standards, discrepancies in how subsidiaries and branches handle business processes can lead to difficulties in data extraction, increased workloads, reduced efficiency, and potential accounting errors. To address these challenges, GCL retained foundational accounting practices while incorporating high-value-added processes to achieve greater standardization and consistency across its operations.

Beyond establishing unified standards and processes through institutional measures, GCL also considered the varying operational workflows across its business segments. By utilizing intelligent technologies, the group conducted comprehensive studies of subsidiary operations to identify and extract core business processes. These processes were restructured and integrated into a comprehensive system applicable to the entire organization.

This approach allows critical business processes across various segments to align with the group's unified framework, improving the efficiency of the FSC. Moreover, it enhances employee and internal customer satisfaction by streamlining workflows and reducing redundancies. These improvements contribute to a positive feedback loop, facilitating the successful and sustainable development of the intelligent FSC.

c) Organizational development and platform construction: Building a data center

At the outset of constructing its intelligent FSC, GCL prioritized the standardization of organizational development and platform architecture. The goal was to achieve internal structural consistency and seamless connectivity while also establishing integration with external stakeholders.

GCL's FSC underwent a series of informatization initiatives, including the implementation of ERP systems. By leveraging ERP and Hyperion for multi-system data collaboration, the group achieved comprehensive budget control, automated report generation, and advanced business intelligence (BI) analysis. These digital applications played a pivotal role in connecting internal operations with external systems, ensuring efficient data flow and enhancing the center's overall functionality.

When constructing the intelligent Financial Shared Service Platform, the group also considered achieving order and logistics coordination with suppliers and customers, fund coordination with banks, and invoice coordination with tax authorities. Additionally, it proposed the establishment of a more advanced intelligent data middle platform to support the intelligent transformation of the FSC and ensure seamless connectivity with external systems.

The intelligent financial shared platform leverages internal data generated by the organization and external data provided by data service providers. Through the data middle

platform, this information is stored, processed, and analyzed to deliver data services that meet the enterprise group's needs for management accounting and operational analysis.

In constructing its intelligent financial shared platform, GCL restructured its organizational framework to establish a data center, laying the foundation for the long-term development and advanced capabilities of its financial shared services. The data center, as a key component of big data analytics, plays a critical role in GCL's operations by enabling comprehensive data analysis.

The group employs data mining techniques to build data warehouses, followed by data cleansing and analysis. Using data visualization technologies, the processed insights are presented in an intuitive manner to decision-making teams, providing robust data support for corporate decision-making, future forecasting, and strategic planning.

The data sources extend beyond internal production and operational data to include external information, which is crucial for formulating responses to industry competition. In addition to upgrading hardware and information systems, GCL has invested in training its technical personnel in database management, machine learning, and other specialized skills, ensuring the effective utilization of business intelligence technologies.

d) Intelligent information systems and data security

In 2008, GCL successfully implemented the Yonyou NC system, paving the way for the establishment of its FSC. This system enabled the remote processing of business and financial operations, laying a foundational step toward integrated financial management.

After 2015, the group adopted the SAP system as its core platform. This system achieved comprehensive coverage across all segments and processes, extending to full functional control. Moreover, the SAP system seamlessly integrated with other key platforms, including imaging systems, tax control systems, budget management, report analysis, bank-enterprise direct connection, and customer portals. These integrations not only enhanced operational efficiency but also created a solid foundation for implementing advanced intelligent technologies on the digital platform.

With the increasing application of intelligent technologies, a substantial amount of critical information is now stored in the cloud by GCL. This includes not only financial data but also other key corporate information, making information security a critical issue and a top priority in the process of building an intelligent FSC. Ensuring the security of this information requires the establishment of a robust information protection system.

First, reinforcing the network channels between the FSC and its branches is essential to prevent data loss caused by network congestion or interruptions. Second, to safeguard the

group's organizational network, GCL utilizes Virtual Private Network (VPN) technology to construct a private, encrypted Local Area Network (LAN) on public internet infrastructure. Access to this network is restricted and can only be granted by the group's IT department, ensuring a basic level of information security. Third, employees with access to cloud storage are managed through a real-name system, with dynamic identity verification methods such as facial and fingerprint recognition. Responsibilities and access permissions are clearly defined, with segregation of incompatible duties to minimize risks. For sensitive information stored in the cloud, GCL employs segmented storage and management techniques. Multi-layer firewalls are used to protect the data, reducing the likelihood of cyberattacks such as hacking.

Last, GCL has established stringent information confidentiality regulations and has implemented severe penalties for violations of corporate information security policies. This not only acts as a deterrent but also reinforces a culture of accountability among employees.

e) Upgrading operational management and comprehensive talent development

GCL's FSC adheres to a people-centered approach, establishing a comprehensive operational and personnel management system to create a positive ecosystem that attracts high-level talent. Through initiatives such as partner programs, professional sequence evaluations, internal rotation systems, leadership pipeline development, and the creation of a talent reservoir, GCL has built a robust talent development framework to support the intelligent transformation of the FSC.

The partner system, which includes "Business Partners", "Elite Talent Partners", "Technology Partners", and "Team Partners", fully mobilizes employee enthusiasm and potential. This approach ensures that employees contribute actively to the group's growth while maximizing their personal value in tandem with organizational development.

In the operational management of intelligent financial sharing, GCL places a strong emphasis on employee training. The group advocates for a sharing-oriented, enhancement-oriented, and collaboration-oriented talent development model, establishing a comprehensive and scientific employee training system to help employees improve themselves through their work.

The FSC leverages GCL University to build a talent training framework focused on cultivating both "expert" and "specialized" professionals. In collaboration with industry-specific human resources teams, GCL has established industry branches such as GCL Photovoltaics, GCL Energy Technology, GCL New Energy, and GCL Integration. These branches provide multifaceted and comprehensive training programs to strengthen the development of professional and artisan talent.

From a training perspective, entry-level financial staff account for the largest proportion of trainees. New employees participate in foundational business training, shared business operations, and standardized business-finance workflows, with mentorship provided by experienced colleagues. Hands-on learning is further enhanced through immersion in business segments, allowing employees to integrate financial operations with real-world scenarios and improve their overall business capabilities.

Through a dual-focused approach combining talent empowerment and knowledge management, GCL promotes a three-dimensional talent cultivation mechanism encompassing "business segments, industries, and headquarters". This holistic training strategy ensures a steady pipeline of skilled professionals.

To build a team of "multi-skilled" professionals for the intelligent FSC and strengthen the development of capabilities in intelligent finance, GCL has implemented several initiatives. A job rotation system is in place to reduce complacency among FSC employees, complemented by regular performance evaluations. The results of these evaluations are used to comprehensively assess employee compensation and promotion opportunities, ensuring a dynamic and merit-based work environment.

In the context of advancing intelligent systems, the FSC places a strong emphasis on employees' data analysis capabilities. Recognizing the importance of this skill set, GCL actively nurtures these abilities among its FSC staff. The group also recruits data analysts directly, bringing specialized talent to enhance the FSC's data-driven decision-making processes.

The upgraded performance management system plays a pivotal role in human resource management. It not only motivates existing employees, fostering enthusiasm for their work, but also reduces internal turnover rates. Furthermore, the system helps attract external talent, offering opportunities for skilled professionals to thrive and contribute to the group's intelligent transformation goals.

In conclusion, under the strategic framework of building an intelligent FSC, GCL has leveraged strategic transformation and goal-setting principles, iterative upgrades in business processes, organizational development and platform construction, system upgrades and information security, and operational management and talent cultivation as its critical paths. These initiatives have positioned GCL at the forefront of intelligent financial sharing development, establishing it as a leader in the construction of intelligent FSCs among Chinese enterprises.

The analysis of GCL is shown in Table 4.4.

Table 4.4 Analysis of GCL

Case company	Driving factors	Critical paths
GCL	Changes in industry and market dynamics, prompting value reorganization and resource optimization Global mergers and acquisitions and integrated operations necessitating business model optimization Rapid advancement of intelligent technologies	Formulating financial strategy and defining goals and principles for intelligent FSC construction Leveraging intelligent technologies to optimize and standardize financial shared service processes Organizational development and platform construction, building a data center Intelligent information systems and data security Upgrading operational management and comprehensive talent development

4.2 Cross case study

After the individual analysis of each case done in the previous section, the research extends to the cross-case analysis, moving beyond the limitations of within-case thinking. By adopting a systemic and holistic perspective, this study compares the concepts that emerge across the cases, enhancing the theoretical abstraction and robustness of the findings. This iterative process enables the development of a comprehensive theoretical framework.

Through cross-case study, the four cases are unified and abstracted to identify commonalities and patterns in their driving factors and critical paths for building intelligent FSCs. This approach provides more insightful descriptions and stronger explanations, offering a robust theoretical foundation for understanding the processes and principles underpinning the development of intelligent FSCs.

4.2.1 Driving factors of build intelligent FSC

Through cross-case analysis, this study identifies three primary driving factors for constructing intelligent FSCs in enterprises. These are the following:

1) Strategic drive under changing industry and market conditions

A detailed analysis of the driving factors across the four cases reveals the significant influence of strategic considerations in the construction of intelligent FSCs. ZTE emphasized the need for organizational restructuring under strategic management. Haier highlighted changes in external market and policy environments, which brought strategic realignment and transformation to the forefront of its agenda. Fosun Group directly pointed out the necessity of elevating the roles and responsibilities of financial organizations and personnel, alongside

adopting a higher-level management philosophy. Meanwhile, GCL, faced with intensified industry and market changes, focused on value reorganization and optimizing limited resources.

Abstracting and synthesizing these insights, this study finds that with the evolving global economic landscape, enterprises—particularly large corporate groups—are no longer content with establishing FSCs solely for the purposes of standardization and cost savings. Instead, their focus has shifted toward leveraging standardized and procedural operational models to implement centralized control by headquarters over business units. This approach allows for greater flexibility in responding to business expansion and market fluctuations, facilitates organizational transformation, and accelerates strategic upgrades. Moreover, by building intelligent FSCs, enterprises aim to deliver more timely and higher-quality services, thereby achieving strategic synergies within the organization. Thus, strategic drive emerges as a fundamental motivator for many enterprises to construct intelligent FSCs. Additionally, intelligent FSCs are increasingly leveraged to provide more timely and higher-quality services, thereby achieving strategic synergies within the organization.

Thus, strategic drive emerges as one of the fundamental motivations for enterprises to construct intelligent FSCs.

2) Business drive under the transformation and upgrade of business models

An analysis of the four cases reveals that the transformation and optimization of business models are critical driving factors behind the construction of intelligent FSCs. In the ZTE case, emphasis was placed on optimizing business processes to streamline operations. GCL, faced with the challenges of global mergers and integrated operations, focused on refining its business model to adapt to increasingly complex market demands. Similarly, Fosun Group elevated the organizational positioning and management philosophy of its financial sharing under its strategic adjustments. Haier, responding to significant changes in market, policy, and technological environments, proactively initiated internal strategic adjustments and transformation management.

By abstracting and synthesizing these factors, it becomes clear that these business adjustments stem from enterprises reconfiguring their business models to respond to increasingly complex and competitive environments. These adjustments necessitate changes in operational frameworks and processes, with the establishment of intelligent FSCs emerging as a core component of these transformations.

The transformation of financial management begins with the establishment of a FSC. This initiative not only addresses challenges related to data management and business processing

but also lays a robust foundation for an enterprise's data, organization, technology, and service structures. By leveraging intelligent technologies such as big data and cloud computing, the transformed FSC reconstructs financial organizations, re-engineers business processes, and enhances both the quality of financial data and the efficiency of financial operations. These advancements enable the FSC to better support the group's business and facilitate the transformation of its business model. The construction of an intelligent FSC goes beyond improving process efficiency. It builds on the foundation of enterprise-wide data management to extract data value, supporting business expansion, aiding operations, and informing decision-making.

Thus, business drive is a significant factor compelling many enterprises to upgrade and construct intelligent FSCs, ensuring their capacity to adapt to evolving business demands and sustain competitive advantages.

3) Technology drive under rapid development and iteration of intelligent technologies

In all four cases examined in this study, the rapid advancement of technology emerges as a fundamental factor driving enterprises to construct intelligent FSCs. GCL leveraged intelligent technologies to upgrade its financial shared management model. Both Fosun Group and Haier actively promoted the adoption and iteration of new intelligent technologies within their FSCs. Similarly, ZTE utilized centralized network systems to not only support its informatization and digitization phases but also to lay the groundwork for transitioning to an intelligent FSC.

In the era of intelligent technologies, the features of connectivity, sharing, platforms, and collaboration have significantly highlighted the principles of shared service centers and their alignment with enterprises' pursuit of value creation. The rapid application of intelligent technologies to FSCs has become a key aspect and driving force for enterprises' digital transformation and upgrading.

The construction of intelligent FSCs facilitates the maximization of resource utilization and data value, enhancing the efficiency of resource allocation. It enables enterprises to proactively identify and address needs for management innovation, thereby driving significant improvements in overall organizational management. Moreover, the development of intelligent FSCs provides new objectives for secondary transformation and upgrading for those already advanced in informatization and digitization. It expands their functions, emphasizing their roles as organizational platforms and data-sharing hubs, making them the optimal choice for financial shared services in the intelligent era.

Thus, technology-driven initiatives emerge as a pivotal factor compelling enterprises to

construct intelligent FSCs.

In summary, based on multi-case studies and cross-case analysis, this research identifies strategic drive, business drive, and technology drive as the primary factors influencing enterprises in the construction of intelligent FSCs.

4.2.2 Critical paths of build intelligent FSC

Similarly, by summarizing, comparing, and analyzing the critical paths of the four case enterprises in constructing intelligent FSCs, this study identifies four aspects that can serve as universally applicable critical paths for building intelligent FSCs, forming a theoretical foundation.

1) Operational Management

In the cases analyzed, ZTE emphasizes strengthening performance evaluation mechanisms and talent reserves. Furthermore, it highlights the importance of sustained innovation and leadership support during the process of building intelligent FSCs. Haier, during its efforts to establish an intelligent shared center, places significant focus on enhancing employee competencies. Fosun Group mentions the need to reconstruct the financial value system of the intelligent FSC and to develop an internal operational system that supports intelligent financial processes. GCL not only stresses the importance of formulating a transformational financial strategy but also emphasizes setting clear goals and principles for operating an intelligent financial shared platform.

By abstracting these findings from their specific case contexts, it becomes evident that operational management in the construction of intelligent FSCs extends beyond merely integrating financial processes with business and management functions. It involves the seamless integration of intelligent technologies into full-process operational management, showcasing the convenience, efficiency, and applicability of intelligent systems within operational workflows. Thus, the construction of an operational ecosystem encompassing end-to-end processes, combined with highly refined performance evaluation dimensions, covers various aspects such as goal management, performance management, talent management, knowledge management, quality management, process regulations, service management, standardization, and information systems.

Thus, operational management is evidently a critical path in the construction of intelligent FSCs and must be given significant attention.

2) Organizational restructuring

Haier places significant emphasis on reshaping its organizational structure and adjusting its workforce composition while enhancing employee competencies during the construction of its intelligent FSC. GCL similarly prioritizes organizational development and shared platform construction. A notable innovation is its establishment of a "Data Center" within the FSC, designed to support the transition and upgrade from digital to intelligent financial sharing. This demonstrates an understanding that the evolution to intelligent systems requires a reimagining of traditional organizational frameworks. ZTE, during its journey toward intelligent transformation, underscores the importance of talent reserves and the development of corresponding performance evaluation and incentive mechanisms. These measures are tailored to meet the specific demands of intelligent FSCs, ensuring that the organization is equipped with the right capabilities to support the transition.

In the cross-case analysis and synthesis of these examples, it becomes evident that in the era of Big Data, Artificial Intelligence, Cloud Computing, Internet of Things, and Blockchai, the construction of intelligent FSCs is undoubtedly an innovative and exploratory endeavor. The analysis reveals that building intelligent FSCs is not merely a technological enhancement of traditional financial sharing but also an exploration and development of new financial management models. Therefore, organizational planning is clearly one of the focal points in constructing intelligent FSCs.

Organizational planning represents one of the most complex paths in this process. It involves multiple aspects, including the establishment of overarching management principles, the adjustment of the organizational structure of the FSC, the delineation of responsibilities among different levels of financial organizations, and the intelligent positioning, role allocation, and staffing within various financial units. These tasks require a forward-looking approach, demanding that enterprises carefully plan and proactively address the organizational challenges inherent in such transformations. In particular, when planning and constructing intelligent FSCs, enterprises must anticipate and adapt to potential organizational restructuring challenges. By leveraging organizational restructuring, enterprises can clarify the functional roles of departments, define job responsibilities, and make appropriate staffing adjustments. These measures provide critical support for building intelligent FSCs.

3) Process Reengineering

The cross-case analysis of the four examples highlights that optimizing internal business processes is a critical path in constructing intelligent FSCs. Each case underscores the importance of refining workflows to support the transition to intelligent financial systems.

ZTE places significant emphasis on the management and upgrading of operational

processes throughout its journey of building an FSC, making this a primary focus of its efforts. Haier, with its unique insights, demonstrates a distinct approach to reorganizing its operational workflows, aligning them with the needs of an intelligent FSC. Fosun Group, in reconstructing its financial value system centered around intelligent financial sharing, adjusts both its business and management processes to accommodate the new framework. Similarly, GCL leverages intelligent technologies to standardize the workflows of its financial sharing operations. This not only creates the conditions for management upgrades but also serves as a reinforcing mechanism that drives the construction of the intelligent FSC.

Financial sharing is a subset of financial management and, more broadly, a part of enterprise management. The construction, reorganization, and reshaping of business processes contribute significantly to improving enterprise management and operations. Process reengineering should encompass two key dimensions: business processes and management processes.

From the individual case analyses and the cross-case synthesis, it is evident that in the construction of intelligent FSCs, enterprises can extend process management in two directions: backward to encompass business processes and forward to integrate broader management processes. Through this approach, intelligent FSCs not only oversee and control business operations but also coordinate and serve them, directly and indirectly creating value for the enterprise while supporting the construction of intelligent FSCs.

In the process of streamlining workflows, it is essential to utilize professional tools and adhere to the principles of elimination, consolidation, reordering, and simplification. These principles help clarify the goals of process reengineering and ensure that the design of the FSC aligns with intelligent operations. The integration of these processes with planning, departmental coordination, role allocation, institutional frameworks, performance management, reporting, and information technology ensures that process reengineering initiatives are effectively implemented.

4) System optimization

In all four cases of constructing intelligent FSCs, the importance of upgrading and utilizing intelligent technologies is consistently emphasized. Enterprises such as ZTE, Haier, and GCL have leveraged these technologies to enhance their data analysis capabilities. Furthermore, the adoption of intelligent systems has brought the issues of data security and protection to the forefront. Notably, ZTE and GCL have implemented specific, actionable measures to ensure data security, offering valuable insights for similar endeavors.

Cross-referencing and abstracting the four cases reveals that, based on the existing

informatization and digitization technology platforms established during the construction of financial sharing, the rapid introduction of intelligent new technologies to further enhance the operational efficiency and management capabilities of FSCs is undoubtedly a critical path in constructing intelligent FSCs.

System optimization encompasses two aspects: the platform design of the intelligent FSC and the design of the application of intelligent technologies. When building an intelligent FSC, the enterprise's financial information system, based on informatization and digitization, requires reconstruction while adhering to four fundamental principles: systemic, forward-looking, innovative, and feasible.

On one hand, it is essential to continuously introduce new, dedicated intelligent financial shared information systems, such as the operational management platform for the shared center, impact management platforms, and electronic accounting archive management systems. On the other hand, it is necessary to upgrade and improve the business systems, financial systems, and management systems related to the intelligent FSC to address issues of system integration and overall system optimization during the construction of the intelligent FSC.

The design of intelligent technology applications includes two aspects: the design of intelligent application scenarios and the matching application of new technologies. In the process of building an intelligent FSC, opportunities for intelligent application should continuously be identified across five areas: accounting, financial reporting, funds, taxation, and accounting archive management. It is also important to go beyond the financial system itself and focus on the integration of the intelligent FSC platform with surrounding systems, such as production management systems, business management systems, procurement management systems, sales management systems, project management systems, and human resources management systems. Opportunities for the use of intelligent technologies can be found through these interfaces.

In the specific application design of intelligent technologies, the focus should be on aligning with technologies such as artificial intelligence, mobile internet, cloud computing, and the Internet of Things. For instance, in the case of artificial intelligence, it can be designed and applied from three aspects: perceptual intelligence, computational intelligence, and cognitive intelligence. In addition to focusing on existing intelligent technologies, it is also essential to closely follow the trends in the development of new technologies, understand the mechanisms behind their application, and carefully design intelligent application scenarios to precisely match new technologies.

In conclusion, based on the analysis and synthesis of the four cases and cross-case comparisons (see Table 4.5), this research identifies operational management, organizational restructuring, process reengineering, and system optimization as the four critical paths in constructing intelligent FSCs.

Table 4.5 Synthesis of the four cases and cross-case comparisons

Case company	Driving factors	Critical paths
Cross case study	Strategic drive under changing industry and market conditions Business drive under the transformation and upgrade of business models Technology drive under rapid development and iteration of intelligent technologies	Operational Management Organizational restructuring Process Reengineering System optimization

4.3 Data analysis based on grounded theory

Based on the targeted case analysis and cross-case research conducted in the preceding sections, this study has preliminarily identified the driving factors and critical paths for constructing intelligent FSCs.

As described in Chapter 3, this study also conducted 25 in-depth interviews with financial management personnel and management staff of the FSCs within the selected case companies. The interviews yielded primary data, which are summarized in Table 4.6, detailing the basic characteristics of the interviewees. All the interview transcripts will be marked as "Interviewee A, B…" and to be the data bases to the following data analysis, before come to the final conclusions.

Table 4.6 Summary of basic information of interviewees

Case	ZTE			Haier			Fosun			GCL		
Interviewees	H	M	B	H	M	B	H	M	B	H	M	B
	1	3	1	1	1	2	2	3	2	3	4	2
Business	Communications			Home appliance			Industrial Group			New energy		
Time of FSC	2005			2005			2017			2010		
Size	China Top 500			Fortune 500			China Top 500			China Top 500		
FSC development stage	Intelligent transformation in progress Market-oriented business has been launched			Intelligent transformation in progress			Intelligent transformation in progress Market-oriented business has been launched			Intelligent transformation in progress		

Note: H: High, M: Middle, B: Basic

This study utilizes Nvivo software to import the data and perform coding in a systematic manner. The analysis of the interviews follows three stages: open coding, axial coding, and selective coding. This qualitative data analysis process is enhanced by using Nvivo's word

frequency query function and automatic coding features, which improve the granularity and efficiency of the coding work.

4.3.1 Open coding

The first step in grounded theory research is open coding. Open coding refers to interpreting the underlying meaning of the content shared by the interviewees, using labeling, conceptualization, and categorization to distill and express the essence of the corresponding statements, thereby gradually narrowing the data.

The first step of open coding is "labeling". In this process, to avoid personal bias, pre-existing ideologies, and theoretical influences, the interviewees' original words are used as labels as much as possible. By extracting key phrases related to the driving factors, key paths, and other processes and characteristics in the construction of the FSC, 173 labels are identified. The different interviewees will be defined by "Interviewee A, Interviewee B, and C…" as the unique index. For each of their interview transcripts will be separately analysis.

The second step is "conceptualization". In the process of conceptualization, it is essential to ensure that the codes closely align with the data, remain open to new insights, are simple and precise, and facilitate comparison between different data pieces. Based on causal relationships, similarities, and overlaps between labels, those that correspond to the same phenomenon are grouped together into a concept.

The third step is "categorization". In this step, concepts belonging to the same phenomenon are further grouped into a category.

Examples of an open coding excerpt is shown in Table 4.7.

Table 4.7 Example of open coding list

Transcribed text	Open coding		
	Labeling	Conceptualization	Categorization
"I worked at Haier for 13 years, and during that time, my role changed several times. These changes allowed me to experience different aspects of the company's management and business operations, giving me a broad understanding of the organization" (Interviewee A).	Tenure experience attribute	Knowledge accumulation Comprehensive learning	Work experience
"Especially the expense reimbursement process, which is highly automated. Currently, we have 80,000 employees and over 100 branches globally, but 90% of our financial accounting work is done in Xi'an, particularly for AP, where nearly 100% of the work is completed" (Interviewee A).	Development of an intelligent management platform based on data mining and analysis output Improving full-process efficiency from business to finance	Unified processing of financial data	Data collection Data integration
"When we moved to Xi'an in 2007, the employee turnover rate was less than 5%. This was because we had already done the necessary training and communication, and made appropriate commitments. As a result, the growing pains we experienced back then were very minimal" (Interviewee F).	Achieving unified data management through data collection, updating, and integration Implementing data-driven budget management through data mining analysis and output	Employee training Employee commitment or rewards Understanding employee thoughts	Data mining and analysis Data output Business and financial data integration
"We have a job rotation system... so we have a saying: 'Job rotation is the best way to get promoted.' Because our roles are very specialized, and we strongly encourage everyone to learn and familiarize themselves with different areas" (Interviewee C).	Establishing an integrated consolidated reporting platform Enhancing the integration of business and financial data Developing intelligent robotic products to promote process reengineering Empowering management and decision-making through data Achieving end-to-end deep integration of business and financial data through data integration.	Rotation mechanism	Process reengineering Intelligent decision support

"We started driving financial organizational transformation within the group, breaking through traditional financial organizational boundaries and management levels, while promoting specialized operations and full-range collaboration across all directions. The shift from a cost center to a profit center involved transforming from 'strategic finance - shared finance - business finance' into an independent, decentralized, and tiered financial organization, becoming an integrated and flattened financial structure, which accelerated the efficiency of information flow". (Interviewee A)	Breaking through organizational boundaries and management hierarchies Establishing an integrated and flattened financial organization	Organizational restructuring Financial organization upgrade	Restructuring
"In 2017, the financial shared service center began launching an intelligent management platform based on data mining, analysis, and output, which could improve the efficiency of the entire process from business to finance. It also introduced the first-generation data platform, which unified the management of enterprise data through data collection, data updates, and data integration. (Interviewee C) In 2019, we collaborated with iFlytek to co-develop an intelligent robot to promote process reengineering. By 2023, we released a new-generation ERP solution that empowers management and decision-making with data. This solution integrates the front-end business systems with the enterprise financial shared services, achieving a deep fusion of business and finance". (Interviewee C)	Utilizing data mining analysis and output. Developing intelligent robotic products to promote process reengineering. Empowering management and decision-making through data Achieving end-to-end integration of business and financial data through data integration	Intelligent management platform Process integration Improved business and financial data integration capabilities	Based on the middle platform for financial intelligence transformation

The 76 categories formed by open coding are shown in Table 4.8.

Table 4.8 List of open coding categories

Type	Number	Description
External	6	Environment changes, economic crisis, globalization, customer needs, innovative development
Internal	14	Financial transformation, management needs, low level of financial management, separation of business and finance, post-management of traditional financial management, bureaucracy, high management costs, financial core capabilities, organizational operation, stakeholders, operational issues, personnel issues, capabilities, efficiency
External and internal	6	Information technology, data value, digital technology, intelligent technology (big data, cloud computing, AI, blockchain), technology, process-driven to data-driven
Organization related	12	Concept and process of construction, functional positioning, mission culture, financial organizational change, change management, execution strategy, clear goal vision, organizational planning and design after status quo assessment, strategic planning, restructuring, strategic matching (positioning), organizational change based on the middle platform
Process related	10	Enterprise process reengineering (process, organization, system, culture), process standardization, process reengineering, system architecture (business standardization, process automation), business to finance, process management, management attention, concept reengineering, site reengineering, operation reengineering
Operation related	8	Knowledge management, performance management and performance evaluation, SLA service level agreement, platform architecture planning and design, system planning, work experience, personnel management, operation and management structure (SLA, team, performance), compound talents
Technology related	20	Improve financial system, integrated network financial system, algorithm, computing power, data application purpose, new technology integration and application, data integration and institutionalization, system integration, model visualization, data + sharing dual center, data collection, technical architecture, overall framework (business, application, data output, business and financial data integration, network security architecture), shared center data processing capabilities, automated intelligent application scenarios, data collection and connection, big data center, cloud platform, data mining and analysis, financial intelligent transformation based on the middle platform

4.3.2 Axial coding

The second step in grounded theory research is axial coding. After the first step of open coding, the data is broken down into conceptual fragments and integrated into categories. Axial coding builds upon open coding and focuses on analyzing the inherent relationships between major and minor categories. In this step, connections are established between these conceptual categories, typically following the "condition → action → outcome" logic to identify relationships between several initial categories, which are then logically sequenced to eventually form the main categories and their corresponding affiliate categories (Table 4.9).

Table 4.9 Results of axial coding

Main categories	Affiliate categories		
	Condition	Action	Outcome
New strategic management concepts	Environmental changes, economic crisis	Globalization, Economic Development	Meeting customer needs, Enterprise innovation and development
New business development models	Management requirements, separation of business and finance, low level of financial management, post-event management, bureaucratic style, high management costs.	Financial core capabilities, operational efficiency improvement, personnel quality and capabilities	The organization runs smoothly and stakeholders are satisfied
New intelligent technological methods	Information technology, digital technology	Intelligent technology, technological development	From process-driven to digital-driven, data generates value
Higher organizational positioning	Organizational structure design, strategic matching positioning, functional positioning, and mission culture after current situation assessment	Construction concept and process, change management, strategic planning, organization transformation based on a centralized platform.	Achieve financial organizational change, clarify development goals and vision, and reshape the structure with the implementation strategy in place
Improved process system	Financial activity design, business to finance, site change, operational change	Management attention, business process reorganization (process, organization, system, culture), concept reengineering, process planning and design	Core process reengineering, process standardization, system architecture
Improved operational efficiency	System planning and implementation, personnel management, knowledge management, performance management	Platform architecture design, service level agreement, planning and sharing evaluation system, work experience, rotation system	Build compound talents and improve operation and management structure
Innovative technological methods	Improve the financial system, data application purpose, overall framework, technical framework, data mining and analysis of the shared center, and the integration and application of new technologies	System integration, model visualization, algorithms, computing power, data integration and structuring, automated intelligent application scenarios, data collection and connection, data update and integration, data output, big data center, cloud platform, financial intelligent transformation based on the middle platform	Business and financial data integration, data + sharing dual centers, data-based intelligent decision support, integrated network financial system

The main purpose of axial coding is to find the internal relationship between categories

and further extract the essence of the data. Through repeated comparison of categories and data, 18 affiliate categories and 7 main categories were finally obtained (see Table 4.10).

Table 4.10 List of main categories and affiliate categories

7 main categories	18 affiliate categories
New strategic management concepts, new business development models, new intelligent technology means, higher organizational positioning, improved process system, improved operational efficiency, innovative technology means	Satisfy customer needs, innovate and develop enterprises, run organizations smoothly, satisfy stakeholders, transform from process-driven to digital-driven, generate value from data, realize financial organizational transformation, clarify development goals and visions, reshape the architecture under the implementation strategy, optimize core processes, standardize processes, build system architecture, create compound talents, improve operation and management architecture, integrate business and financial data, data + sharing dual centers, support data-based intelligent decision-making, and integrate network financial systems

This thesis also made further analysis on the coding results of the main category.

1) Main Category: "New Strategic Management Concepts"

The main category of "new strategic management concepts" includes two sub-categories: "meeting customer demands" and "enterprise innovation development". New and innovative strategic management concepts impose higher requirements on the construction of enterprise FSCs. These include optimizing financial processes and standardization, driving financial transformation to provide higher-value added services, supporting enterprises in making correct strategic decisions quickly, adjusting strategies during execution, and ensuring the smooth realization of strategic goals. Under the condition of meeting market and customer needs, enterprises should continuously innovate their business models and value creation channels, creating new value for the company and the entire industry.

In summary, the impact of new strategic management concepts, based on meeting customer needs and enterprise innovation development, on the construction of intelligent FSCs is comprehensive. It not only improves the efficiency and quality of financial management but also promotes strategic decision-making and business innovation, providing strong support for the enterprise's sustainable development.

2) Main Category: "New Business Development Models"

The main category of "new business development models" includes sub-categories related to "smooth organizational operation" and "meeting the demands of all stakeholders". The new business development model aims to create a full-process ecosystem for the enterprise to increase the space and opportunities for business value creation. As new strategic management concepts drive enterprises to build intelligent financial shared centers, the new business development model will inevitably encourage enterprises to apply more intelligent

technologies, optimize internal performance management, institutional management, and system management, and strengthen risk control and compliance in business development. This not only ensures smooth organizational operation but also maximizes the benefits for all stakeholders.

In summary, the new business development model is also one of the main drivers for enterprises in constructing intelligent FSCs, providing strong support for the enterprise's sustainable development and competitiveness enhancement.

3) Main Category: "New Intelligent Technological Methods"

The main category of "new intelligent technological methods" includes two sub-categories: "transitioning from process-driven to digital-driven approaches" and "generating continuous digital value through the mining, integration, and analysis of data". The emergence and application of intelligent technologies have not only improved the efficiency and quality of FSCs but have also advanced the process of business-finance integration. Furthermore, they have significantly contributed to the enterprise's digital transformation, providing opportunities for FSCs to optimize and expand their functions. This also allows FSCs to become the data hub for the organization.

As artificial intelligence technologies continue to evolve, they have undoubtedly become the primary driver for the transformation of FSCs from digitalization to intelligence. This evolution provides financial shared centers with the chance to move from the background to the forefront, enabling enterprises to enhance their business operations through data-driven empowerment.

In summary, the role of new intelligent technological methods in promoting the construction of intelligent FSCs is profound. It is one of the key driving factors for enterprises in building such centers, playing a critical role in their development.

4) Main Category: "Higher Organizational Positioning"

The main category of "higher organizational positioning" includes three sub-categories: "financial organizational transformation", "clarification of development goals and vision", and "structural reorganization".

To drive the construction of an intelligent FSC, the first step is to transform the financial organization, steering it toward a "flattened" structure. This transformation helps achieve "synchronous resonance" with the business front, improving the organization's agility and its ability to respond to market changes. Over time, the FSC shifts from its initial role of controlling and standardizing business processes to integrating financial resources and unlocking financial value. Clearly, financial organizational transformation is the starting point

for building an intelligent FSC.

Second, it is essential to clarify the vision and development goals for the construction of an intelligent FSC. This vision should include the promotion of financial standardization based on intelligent technologies, the integration of business and finance through intelligence to support management analysis and decision-making. The development goals for the intelligent FSC should further break through functional, technological, and data boundaries, driving the center's evolution into the organization's data and algorithm hub.

Third, the focus on structural reorganization should improve the organizational support system. This includes aspects such as organizational design, operational models, internal divisions, and staff structures. The roles should be clearly defined, with job responsibilities summarized and the qualifications and standards for each position outlined. This helps realize the intelligent transformation of financial processes, enhancing the efficiency and effectiveness of building an intelligent FSC.

In summary, "higher organizational positioning" provides a strong organizational foundation for the construction of an intelligent FSC through financial organizational transformation, clear development goals and vision, and structural reorganization. It is undeniably one of the key paths and plays a pivotal role in driving the enterprise's digital transformation.

5) Main Category: "Improved Process System"

The main category of "improved process system" is one of the key foundations for constructing an intelligent FSC. It includes three sub-categories: "core process reengineering", "process standardization", and "system architecture".

Although foundational work on process standardization has already been carried out in the construction of the FSC, under the premise of intelligent transformation and upgrading, it is necessary to further optimize and standardize core processes. This involves leveraging the advantages of intelligent technologies to address bottlenecks and streamline processes. Specifically, it includes redesigning business processes, clarifying responsibilities and linkages at each stage, introducing intelligent technologies to reduce manual intervention, and establishing unified business operation standards based on intelligent technology to ensure process execution is accurate and consistent.

Following the logic of systems to processes, processes to organizations, and organizations to positions, the extensive use of intelligent technology also necessitates improvements and optimizations in the organizational and staffing structures of the FSC. Leveraging the development direction of intelligence, the goal is to create, merge, or eliminate organizational

structures and positions to establish a robust organizational support system for the construction of the intelligent FSC. The staffing structure is a further subdivision based on the organizational structure. It involves summarizing the responsibilities for each position in the context of intelligent development and describing the standards and specifications for personnel.

6) Main Category: "Improved Operational Efficiency"

The main category of "improved operational efficiency" is one of the critical paths for constructing an intelligent FSC. It includes two sub-categories: "cross-functional talent" and "operational and management architecture".

On one hand, the construction of an intelligent FSC requires a large number of cross-functional talents. These talents include not only business process experts and problem diagnosis and repair specialists (soft skills), but also technical development experts for intelligent applications (hard skills), as well as management experts who possess a mindset for digital transformation and innovative business thinking (cross-disciplinary skills). As intelligent technologies are applied in FSCs, it is essential for these centers to address the challenge of training financial personnel who are equipped to meet the needs of the intelligent economy era.

On the other hand, based on the strategies, organization, vision, processes, and personnel discussed earlier, further planning, upgrading, and designing of new system architecture is required. The goal is to ensure that the financial shared platform has strong scalability and flexibility while integrating AI technologies such as OCR, RPA, and machine learning, thus enabling real-time collaboration between financial and industrial processes. Both modular design and data integration are emphasized to ensure that financial data effectively reflects the dynamic changes in production, sales, and supply chain activities, providing a data foundation for business value creation.

Moreover, the architecture should not be static; it must undergo continuous evaluation and improvement. Especially in the rapidly changing landscape of intelligent technologies, a comprehensive operational evaluation system must be established to monitor the performance of shared services regularly, analyze the efficiency of financial and industrial process collaboration, and enhance the use of AI tools. The algorithms and functions of these intelligent tools should be continuously optimized.

Through the implementation of these strategies, the intelligent FSC will improve its operational efficiency, achieve the transformation of the FSC into an intelligent entity, and create greater value for the organization.

7) Main Category: "Innovative Technological Methods"

The main category of "innovative technological methods" encompasses several key areas, including business-finance data integration, the data + shared dual center, data-driven intelligent decision support, and integrated network financial systems. These innovative technological methods play a crucial role in the construction of the intelligent FSC and are one of its critical paths.

Firstly, business-finance data integration and the data + shared dual center refer to the integration of business data and financial data within an enterprise to achieve interconnectedness and deep integration of the data. Through intelligent accounting and data integration techniques, the financial shared center is upgraded from a unit data center to one that provides high-quality data sources, meeting various business and control needs. Ultimately, in the intelligent FSC, both the enterprise data center and financial relationship center functions are realized and carried out.

Secondly, the digital platform involves leveraging intelligent technologies such as big data, artificial intelligence, and cloud computing to drive the transformation of the financial shared center from information-based to digital and intelligent. This enhances the capability of management accounting to support decision-making. The intelligent decision support system in the intelligent FSC helps enterprises in budget preparation, cost control, and investment analysis, as well as in real-time data analysis to identify financial risks and provide corresponding countermeasures.

Thirdly, there is a need to build an intelligent integrated network financial system to achieve business-finance integration. This ensures that business activities are immediately reflected in the financial accounts, effectively controlling operational risks and providing enterprise-level analytical decision-making information.

In summary, innovative technological methods, including business-finance data integration, the data + shared dual center, building a management accounting system on a digital platform, data-driven intelligent decision support, and integrated network financial systems, provide strong technical support and innovation momentum for the construction of the intelligent FSC. These methods are one of the critical paths for its successful development.

4.3.3 Selective coding

The third step in grounded theory research is selective coding. Selective coding requires

building on axial coding to identify a dominant core category, and naturally establish connections between the core category and other categories. This process aims to reveal the underlying patterns and models in the original data.

The first step in selective coding is to further explore the relationships between main categories and affiliate categories based on the original data. The categories "new strategic management concepts", "new business development models", and "new intelligent technological methods" reflect the driving forces behind the establishment of an intelligent FSC by enterprise groups. These categories exhibit theoretical consistency and are unified under the core category "driving factors". On the other hand, "higher organizational positioning", "improved process systems", "enhanced operational efficiency", and "innovative technological methods" reflect the critical paths that enterprises need to focus on when building an intelligent financial relationship center. These categories also show theoretical consistency and are grouped under the core category "critical paths".

Second step is identifying the "storyline". In this step, guided by the main categories and their logical connections, a review of the literature is conducted, and continuous interaction with interview data deepens the exploration of the essential meanings of the main categories. The core categories are extracted from the main categories, and all categories are systematically integrated to prepare for constructing the theoretical model. In this research, the relationships between the main categories were identified, leading to the creation of a theoretical model specific to the issue of building an intelligent FSC in the context of a digital financial shared center.

The "storyline" connects all seven main categories and revolves around the construction of the intelligent FSC, maintaining logical coherence throughout.

Through selective coding, the connotations and logical relationships of the seven main categories were analyzed, resulting in the identification of two core categories: "driving factors" and "critical paths" (see Table 4.11).

Table 4.11 Results of selective coding

Research Topic	Core category	Main category
Build intelligent FSC	driving factors	New strategic management concepts
		New business development models
		New intelligent technology means
	critical paths	Higher organizational positioning
		Improved process system
		Increased operational efficiency
		Innovative technological means

The third step is to develop the main categories and core categories, validate the logical relationship of the "storyline", and provide the final explanation of the "storyline", reflecting

the underlying patterns in the original data and forming a grounded theory model. Specifically, the construction of an intelligent FSC is driven by three main factors: strategic, business, and technological drivers. To successfully establish an intelligent FSC, four critical paths must be followed and well-managed: organizational restructuring, process reengineering, operational management, and system optimization. Throughout the process of constructing the intelligent FSC, the drivers and critical paths interact, leading to different construction models across various corporate groups, which in turn may result in distinct outcomes when constructing the FSC.

Based on this, this study clarifies the "storyline" surrounding the establishment of an intelligent FSC as the core category:

Why do corporate groups push for the transformation and upgrade of their FSCs, accelerating the transition from the 1.0 information phase and 2.0 digital phase to the 3.0 intelligent FSC? This transformation is primarily driven by three factors.

First, strategic drivers: Corporate strategies must be reexamined and redefined to meet the demands of the intelligent era. New strategic management concepts must emphasize customer-centricity, innovation, flexibility, and the ability to respond quickly to market changes. Consequently, corporate groups are required to elevate the expectations for their FSCs, which must not only support traditional accounting and reporting functions but also provide strategic decision-making support. This could involve using data analytics to optimize business processes and enhance efficiency.

Second, business drivers: To remain competitive and achieve growth in a fiercely competitive market, corporate groups must continually innovate and expand their business models, typically involving cross-departmental collaboration, value chain integration, and digital services. These innovative business models require the FSC to offer more flexible and efficient financial services to support rapid business changes and expansion. For example, by integrating finance with business operations (business-finance integration), the FSC can better understand and respond to business needs, thereby supporting business development.

Third, technological drivers: New intelligent technologies, including big data, artificial intelligence, cloud computing, and the Internet of Things (IoT), are driving companies to adapt or risk being left behind in the digital age. These technologies offer automation and intelligent tools that enhance data processing capabilities, optimize decision-making processes, and improve risk management. The application of these intelligent technologies allows corporate groups to realize the potential of intelligent FSCs, thus accelerating their transformation and upgrading, ultimately becoming a key factor in improving the core

competitiveness of the enterprise.

This study identifies four critical paths for organizations in building an intelligent FSC:

First, organizational restructuring. When attempting to upgrade the FSC and transition from an information-based and digitalized platform to an intelligent FSC, the first priority is to elevate its strategic position within the organization. The FSC must be positioned as a core support unit for enterprise decision-making and business operations. This requires the center to not only handle routine financial tasks but also to engage in strategic planning and business development, offering in-depth financial analysis and recommendations.

Second, process reengineering. To improve efficiency and accuracy while reducing errors and delays, the FSC must optimize and standardize financial processes, as well as the associated business processes. Process improvement also involves the introduction of automation tools and systems to reduce manual interventions and increase the speed and quality of data processing. Building an intelligent FSC requires a strong focus on refining the process framework to create the necessary conditions for intelligent upgrades.

Third, operational management. In the process of upgrading the intelligent FSC, operational management and efficiency enhancement are key priorities. By introducing multidisciplinary talent and optimizing the operational and management structure, the FSC can improve its operational efficiency. This includes enhancing employee skills and knowledge, as well as adopting advanced management methods and tools to streamline operations.

Fourth, system optimization. The implementation of innovative intelligent technologies is essential for realizing the intelligent FSC. This involves adopting the latest intelligent information technologies to automate and optimize financial processes, as well as leveraging data analytics and artificial intelligence to improve the quality and speed of decision-making.

By implementing these driving factors and critical paths, companies can establish an efficient, flexible, and business-supportive intelligent FSC, which will help them maintain a competitive edge in the highly competitive market.

4.4 Model building

In Chapter 4, the study first conducts a multi-case analysis and synthesis based on case studies. Subsequently, utilizing primary data obtained through interviews, the study applies grounded theory to perform open coding, axial coding, and selective coding on qualitative data. The analysis leads to the research conclusions.

The findings demonstrate that the conclusions drawn from both the case study method and data analysis based on grounded theory mutually corroborate each other, thus laying a solid foundation for constructing the theoretical model in this thesis.

The study identifies a pattern in the construction of intelligent FSCs within corporate groups. First, the building of a FSC requires meeting certain baseline conditions. This includes having already established a FSC and achieved the initial stages of informatization (1.0) and digitalization (2.0), thus ensuring the necessary capability foundation. Second, with an existing FSC, substantial strategic, business, and technological driving forces must be present to prompt the company to aim for the higher-level construction of a 3.0 intelligent FSC. Third, during the construction process, corporate groups should adopt four key strategic paths—organizational restructuring, process reengineering, operational management, and system optimization—to ensure the successful upgrading of the intelligent FSC, leading to enhanced financial efficiency and strengthened centralized control.

In this context, driving factors serve as the prerequisite conditions for the critical paths in the implementation and construction process. Only with sufficient driving forces can a company recognize the need to innovate and upgrade its financial management model, thereby setting the stage for the construction of an intelligent FSC. The critical paths permeate through the driving factors and various stages of building the intelligent FSC, helping to leverage these driving forces, eliminate obstacles during the upgrading process, and ensure the practical implementation of the driving factors. They are also essential conditions for the successful construction of the intelligent FSC.

Further analysis of the driving factors and critical paths reveals that among the three driving factors, strategic and technological drivers are external drivers, while the business driver is internal. External drivers compel organizations to take measures in response, while internal drivers reflect the company's endogenous motivation for sustained business development and value creation, under the influence of external drivers.

In the four critical paths, organizational restructuring serves as the foundational condition for building the intelligent FSC. Process reengineering and operational management are the primary focus during the construction of the shared center, while system optimization acts as the method and means for achieving the construction of the intelligent FSC.

Based on these insights, this study constructs the theoretical model of "Driving Factors and Critical paths in the Construction of Intelligent Financial Shared Service Centers”, as illustrated in Figure 4.1.

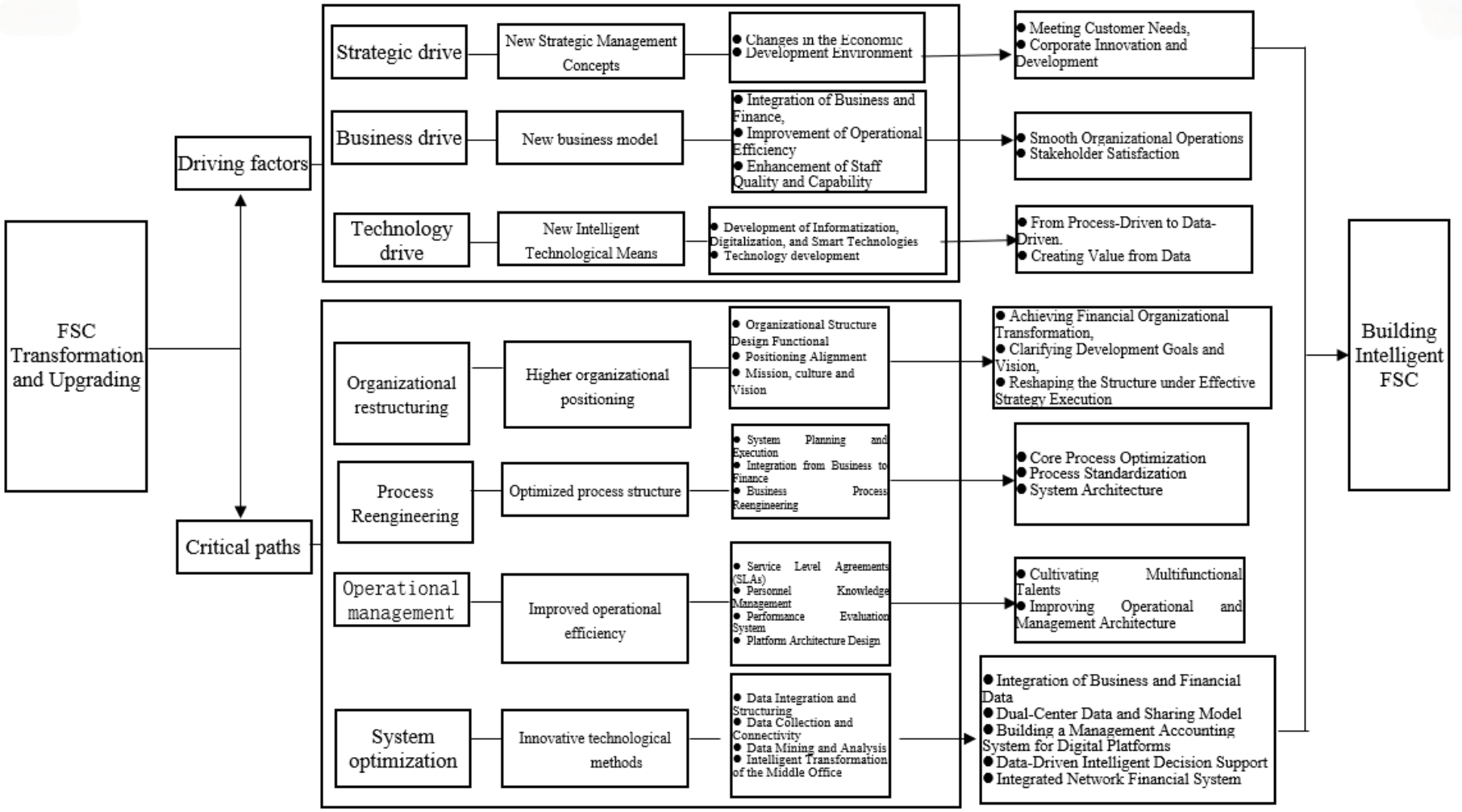

Figure 4.1 Theoretical model of the driving factors and critical paths for building intelligent FSC

Chapter 5: Conclusions and Prospects

Based on the case study, data analysis and theoretical model formed in Chapter 4, this chapter mainly introduces the research conclusions, theoretical and practical significance of this study, as well as the research limitations and future research directions.

5.1 Research conclusions

With the development of emerging technologies such as big data and artificial intelligence, the intelligent transformation of finance not only facilitates financial reforms but also drives digital transformation within enterprises and enhances organizational management capabilities. Building a 3.0 intelligent FSC has become an expected choice for corporate financial transformation, gaining recognition from both academia and industry. It is seen as an essential path for the high-quality development of modern enterprises.

Starting from the case study and data analysis based on grounded theory, this study systematically reviews relevant literatures on financial management, shared services, intelligence, and grounded theory, both domestically and internationally. Using coding processing procedures based on grounded theory, in-depth exploration and systematic generalization were conducted on four case enterprises selected through theoretical sampling. The reliability, validity, and theoretical saturation of the study were effectively ensured. Ultimately, this study developed a theoretical model for the driving factors and critical paths in the construction of intelligent FSCs, providing an in-depth analysis and explanation for each driving factor and key path, thereby bridging the gap between theory and practice.

The main conclusion of this study also directly addresses the two research questions previously stated. Regarding to the first question,

1. What are the driving factors for the efficient implementation of an intelligent FSC?

Three major driving factors of strategic drive, business drive and technology drive are identified in this research. While for the second question,

2. What are the critical paths for building an intelligent FSC based on a digital FSC?

Four critical paths, including organizational restructuring, process reengineering, operational management and system optimization, were developed after this research.

The details and further explanation of the research conclusion are as follows:

When an enterprise has already established a FSC, based on the foundation of 1.0 informatization and 2.0 digitization, the construction and implementation of an intelligent FSC can be advanced through the driving forces of three factors—strategic, business, and technological drivers—along with four critical paths: organizational restructuring, process reengineering, operational management, and system optimization. The ultimate goal is to improve the overall efficiency of the enterprise, empower business processes, and provide decision-making support.

1) In-depth analysis of the three driving factors for building intelligent FSCs

Strategic Drive: Changes in strategic concepts are the driving force for fostering collaboration and internal unity across various functions. Strategic drive can be divided into external and internal drivers. The external driver primarily refers to the market environment in which the enterprise operates, while the internal driver is represented by the enterprise's strategic goals and direction, which originate internally. Faced with an intelligent economic environment, most enterprises elevate their intelligent strategy to a corporate-level strategy, clearly defining their vision and goals for digital transformation.

This study argues that an intelligent FSC integrates new technologies such as artificial intelligence and other elements of the "big data, smart, cloud, and IoT" ecosystems into the operations of FSCs. It involves building an intelligent financial shared platform and new financial management models, simulating, extending, and expanding traditional financial shared services. This transformation is a necessary step for corporate upgrade and achieving strategic objectives.

Business Drive: Intelligent transformation must be aligned with the actual business context of the enterprise. The company must understand its own situation and conduct strategic transformation based on the current environment. Therefore, when constructing an intelligent FSC, enterprises should first assess their business status, operational management capabilities, and industry environment. By thoroughly analyzing the issues the enterprise needs to address, they can find the most suitable path for transforming the FSC to align with the company's development needs. Traditional enterprises, with their fixed management concepts, operating models, and production methods, face considerable challenges in digital transformation. Hence, it is crucial for the company to fully understand its current situation before transformation, grasp the market development direction, define its positioning, and formulate a digital transformation strategy that suits its development.

During the process of implementing the intelligent FSC, enterprises must make targeted changes based on their industry characteristics and market needs. Timely adjustments are

essential to keep the market, products, and business strategies precise. This ensures smooth operation of the transformed organization and satisfies the demands of all stakeholders, thus enabling a successful transformation.

Technology Drive: Intelligent technologies, led by artificial intelligence, are revolutionizing many traditional industries, and the business characteristics of FSCs naturally provide the conditions to apply these intelligent technologies. The key to driving the intelligent transformation of FSCs lies in collecting, processing, and utilizing financial and business data gathered at the center, thereby shifting the focus from process-driven to data-driven operations.

The use of big data technology can broaden the financial perspective and generate value from data. Through cloud computing, enterprises can build a cloud platform for financial services, breaking down physical "walls" and achieving full connectivity between various modules. This creates a platform for business connections and data integration, promoting the integration of finance, taxation, and resources. The use of machine learning technology harnesses the power of artificial intelligence. By further combining AI with cloud computing and big data, the capabilities of models and algorithms in data processing can be leveraged to extract valuable insights. Blockchain technology, with its distributed ledger system, enhances data security and automates smart contracts. Its decentralized and immutable features break down organizational boundaries, enabling secure sharing and effective transaction of data, which ultimately supports the functional transformation of financial organizations and the creation of an open financial ecosystem.

2) Provide a detailed discussion of the four critical paths for constructing an intelligent FSC and offers an explanation of each.

This study argues that although the construction of an intelligent FSC is centered around financial management, it encompasses a variety of business and management functions. The process of building such a center is not instantaneous but must be advanced progressively, in alignment with the enterprise's specific development. The construction of the intelligent FSC can proceed along four critical paths: organizational restructuring, process reengineering, operational management, and system optimization. These paths emphasize four core construction concepts: "Big Sharing, Big Integration, Big Data, and Big Management”.

Organizational Restructuring: The establishment of an intelligent FSC requires the creation of an appropriate organizational structure and the refinement of top-level design. A well-defined organizational structure provides the necessary support for the concrete construction of the intelligent FSC. Changes must be made to the overall financial

organization, and even the relevant business departments, to lay the groundwork for achieving comprehensive intelligent management across the enterprise. By enhancing the top-level design, clarifying the vision and goals of transformation, and introducing corresponding management systems, the standardization of the intelligent financial management system can be ensured.

Financial organization planning is crucial to the construction and subsequent operation of the intelligent FSC and must be given significant attention by management. This includes defining the operational management principles for the intelligent FSC, adjusting the organizational structure of the financial team, clarifying the division of responsibilities between different levels of the financial organization, and defining the functions, role assignments, and personnel placement within the organization. Organizational restructuring is one of the most complex aspects of constructing an intelligent FSC. Therefore, early consideration of the organization's planning issues is necessary, and flexible strategies must be devised to address the challenges posed by organizational change.

Process reengineering: The construction of an intelligent FSC is, in essence, a process of business process reengineering, which requires the enterprise to focus on and actively promote. Enterprises should consider the execution of institutional planning and process reengineering design for the intelligent FSC at an early stage. It is recommended that enterprises prioritize and systematically arrange the drafting and release of institutional policies based on their urgency. The Plan-Do-Check-Act quality management cycle should be adhered to, ensuring continuous optimization of each institutional policy.

During the process of streamlining business workflows, two stages can be distinguished: process design and process reengineering. Enterprises can utilize integrated business-financial management flowcharts and flexible, information-rich process matrices to present a top-down, hierarchical, and integrated enterprise business process panorama and system architecture.

Additionally, this process may also involve specific business functions. In such cases, the FSC must collaborate with the relevant business management departments. From an enterprise-wide perspective, supporting policies and institutional frameworks should be introduced to ensure the smooth implementation and normal operation of the business process design outcomes, thereby achieving the integration of business and finance processes.

Throughout the construction of the intelligent FSC, the design of intelligent financial work scenarios and the application of advanced technologies such as "Big Data, Artificial Intelligence, Cloud, IoT, Blockchain" should be considered primarily by the internal team. This approach not only helps retain control over the intelligent finance construction process

but also facilitates the cultivation of a skilled team for intelligent financial services and supports the ongoing optimization of business processes in the future.

Operational Management: With the deep integration of intelligent technologies in the intelligent FSC, both its operations and management structures undergo significant changes. These changes are primarily reflected in four aspects: the end-to-end ecosystem, value creation through business, technological transformation, and comprehensive, refined performance metrics.

The end-to-end ecosystem considers the expanded scope of work handled by the intelligent FSC, which integrates business, finance, and management into a complete, seamless process. The value creation through business aspect focuses on the application of intelligent technologies in the operational management of the intelligent FSC, enabling the center to provide automated, visualized, and intelligent analysis and reporting of various performance metrics, thereby supporting decision-making for business operations.

The technological transformation aspect explores how the intelligent FSC and its operational management can better leverage intelligent technologies. This includes adopting innovations in data processing, machine learning, cloud computing, and AI to enhance the center’s capabilities. Lastly, the comprehensive, refined performance metrics aspect emphasizes the need to conduct precise analyses, decisions, and presentations of performance indicators under the application of intelligent technologies, ensuring enhanced precision in operational management.

In addition, it is crucial to place human resources at the forefront. Building a strong human capital foundation is essential. Attention must be given to cultivating intelligent and multi-skilled talent within the shared services sector. Enterprises should develop a comprehensive talent training program that fully motivates employees, encouraging them to enhance their interest in and practical skills for intelligent technologies. This ensures that employees can transform acquired knowledge into actionable practices, improving both operational efficiency and the center's overall performance.

System Optimization: The construction of an intelligent financial shared services platform is the most crucial component of the critical paths, serving as both the starting point for the financial shared services organization restructuring and the endpoint for the business process reengineering. This aspect requires significant attention and focused efforts from enterprises. Leadership must pay particular attention to critical technological factors related to system selection and implementation, focusing on developing an integrated network for the financial system. This includes building the overall technical architecture of the platform, selecting the

platform network and database, standardizing various types of data, achieving integration between the platform and both internal and external systems, and addressing risks associated with platform unification and data centralization.

During the construction of the intelligent FSC, it is inevitable that the enterprise will need to optimize its existing business management models and operational methods, adjusting the financial management responsibilities and authority at all levels of the organization. This requires top leadership to take this matter seriously and closely monitor the project's progress. Enterprises can take the intelligent transformation through the creation of a data middle platform as an entry point. The financial, information, and business departments should closely cooperate to drive the integration of financial and business data, supported by consulting firms, software providers, and on-site working groups, all collaborating to advance the project and establish a data-driven intelligent decision-making system.

In this way, the four critical paths are interlinked, achieving collaborative operations across the entire FSC and facilitating the transformation and upgrade to the 3.0 intelligent FSC.

5.2 Theoretical contribution and managerial insights

5.2.1 Theoretical contribution

As an innovative proposition that drives theoretical development through practice, this research enriches the existing literature on the construction of intelligent FSC, filling the theoretical research gap from the 2.0 digitalization stage to 3.0 intelligent stage. The theoretical model constructed in this research abstracts the characteristics and patterns of leading enterprises at the forefront of construction and systematically provides a basis for analyzing the dynamic process of building intelligent FSCs in other contexts. This study helps to fully reveal the characteristics and intrinsic laws of financial management innovation in Chinese enterprises and also helps other Chinese enterprises to determine the key factors that need to be focused on when making decisions about the construction of their own intelligent FSCs through learning and imitation, possessing strong theoretical value.

5.2.2 Managerial insights

The rigorous research process of this study is also beneficial in managerial for guiding enterprises to quickly identify key resources in their internal and external environments and

make timely strategic adjustments when building intelligent FSCs.

The intelligent transformation of enterprise finance is a systematic project, and the discussions on driving factors and critical paths in this research also provide practical value for the intelligent transformation of enterprise finance. Based on comprehensive sharing under organizational restructuring, process re-engineering under broad integration, optimize data platforms for operational management, and value creation under system upgrading, all these aspects point the way for promoting the digital and intelligent transformation of enterprises. Under the influence of new technologies such as "big data, artificial intelligence, cloud computing, IoT, and blockchain", enterprises have reason to expect to achieve multi-aspect values such as management analysis, business analysis, decision support, and management control on the basis of intelligent FSCs.

5.3 Research limitation and prospects

5.3.1 Research limitation

This study is an exploratory and inductive investigation of a new phenomenon. As practices rapidly evolve and grounded research continues to accumulate, our understanding of the construction of intelligent FSCs is bound to become increasingly comprehensive and profound.

However, this study has several limitations. First, case limitations. The operational models of FSCs vary across industries and companies, each with its own unique characteristics. Therefore, the FSCs in this study possess certain idiosyncrasies, meaning that the research findings may not be directly applicable to other enterprises. Second, uncertainty regarding the development of intelligent technologies. The potential effects of future intelligent technologies are largely based on assumptions and forecasts. Their impact on FSCs and their application effectiveness still depend on further empirical testing. Third, data limitations. This case study relies on secondary publicly available data. When analyzing the interview data qualitatively, the study predominantly employed qualitative methods, which, to some extent, resulted in a less intuitive and concrete presentation of the outcomes.

But limitations represent opportunities for future research. No theory in management research could be expected to explain all of the variance observed. It is expected that more and more scholars can put their efforts on this topic.

5.3.2 Prospects

Future research can proceed along the following lines:

1) From Chinese cases to global cases

With an increasing number of Chinese enterprises expanding abroad and entering international markets, the scope of FSCs has extended from national to regional and, eventually, to global levels. As enterprises grow in size and the number of their branches expands under the guidance of corporate development strategies, this trend presents both opportunities and challenges for the management and operation of FSCs. It also adds complexity to research on intelligent finance and FSCs. These developments will provide a broader range of global enterprise cases for future research.

2) From intelligent FSC to intelligent Global Business Services

The expansion of shared boundaries from finance to full business functions signifies an extension of the scope of financial shared services. This extension indicates that as the application of financial shared services becomes more in-depth, the range of services provided by FSCs will further broaden. As the shared boundary extends beyond finance to encompass all business functions, the study of a single intelligent financial shared center will evolve to include the concept of intelligent Global Business Services centers.

3) From function-oriented to value-creation-oriented

The next development step for intelligent financial sharing centers is to not only serve their own enterprise but also provide corporate services externally. In the future, it is expected that more services will be provided to external clients through market mechanisms. This shift will give intelligent financial shared centers the opportunity to gradually transform from cost centers to profit centers.

4) From technological application to data security

The construction of intelligent financial sharing centers involves the integration and application of various information technologies. The data circulating within these systems is mostly confidential and proprietary to the enterprise. While ensuring data connectivity is crucial, data security must also be prioritized. In the future, as intelligent financial shared centers continue to develop, building accompanying information security technology centers to safeguard data protection will become a key area of focus.

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Annex A: Interview Outline

本次访谈目的是为了撰写《智能财务共享中心建设的驱动因素及其关键路径研究》论文，鉴于贵公司在智能财务共享领域有着卓越的成就，特访谈了解贵公司建设智能财务共享中心的背景、动因、未来发展方向等相关内容。访谈时间约 60 分钟；为保证信息的准确与全面性，访谈全程录音，我将对您的个人信息进行保密，您的个人信息不会出现在学术研究中，感谢您百忙之中接受此次访谈！

The purpose of this interview is to write the paper " Driving Factors and Critical Paths of Building Intelligent Financial Sharing Centers". Since your company has made outstanding achievements in the field of intelligent financial sharing center, this interview is to learn about the background, motivation and future development direction of your company's construction of intelligent financial sharing center. The interview lasted about 60 minutes. In order to ensure the accuracy and comprehensiveness of the information, the interview will be recorded. I will keep your personal information confidential, and your personal information will not appear in the academic research. Thank you for taking time to accept this interview!

Basic Information（基础信息）--Only tick mark needed

1. 您的职位属于 What is your position in the company

☐高层 Senior level

☐中层 Middle level

☐初级 Fundamental level

您在当前公司从事财务共享业务的年限

How long have you been working in current company’s FSC

☐1 年以内 ＜1 year

☐1-3 年 1 - 3 years

☐3-5 年 3 - 5 years

☐＞5 年 ＞5 years

2. 您所在公司财务共享人数规模 How many people are in your company's financial sharing center

□50 人以内 ＜50 people

□50-100 人 50-100 people

□101-200 人 101-200 people

□200 人以上 ＞200 people

Section 1 (Finance Management) 模块 1（财务管理）

3. With two questions below 公司财务组织架构如何？财务共享与财务、业务二者的定位关系？

3.1 What is the financial organization structure of your company?

3.2 What is the financial sharing center's position in it and the relationship between FSC with your business?

4. 公司（财务管理）如何评价财务共享？How does the company (financial management) evaluate the financial sharing center's performance？

Section 2 (Financial Sharing Center or FSC Management) 模块 2（财务共享中心管理）

5. With two questions below 公司财务共享建设的时间？当时建设财务共享的动因有哪些？

5.1 When was your company's corporate FSC built?

5.2 What are the key reasons to build it at that moment？

6. 公司在财务共享建设过程中的关键注意事项有哪些？What are the key considerations during the construction process？

7. 目前财务共享存在的主要困难或问题有哪些？What are the main difficulties or major problems in the FSC at the present moment?

8. With two questions below 如何妥善解决这些问题以及财务共享未来升级发展的方向？

8.1 How to solve these problems properly?

8.2 What is the future development direction of r upgrading FSC？

Section 3 (Intelligent FSC management) 模块 3（智能财务共享管理）

9. With two questions below 智能技术（大智移云物区）对公司财务共享建设的影响以

及具体落地的应用场景有哪些？

9.1 What is the impact of intelligent technology (Big data, AI, Internet,Cloud, Internet of Things, Block chain) on the construction of a corporate FSC?

9.2 What are the application scenarios of these intelligent technologies in the FSC？

10. 智能技术在财务共享实施的关键点是什么？What are the key points of intelligent technology application in the FSC？

11. 如何评价智能财务共享建设和其运作的效率和效果？How to evaluate the construction performance of intelligent FSCs? And how to evaluate the operation efficiency and effectiveness of intelligent FSCs?

Open Question 开放问题

12. 有关智能财务共享，包括但不限于其驱动因素、关键路径，您还有什么补充点 Are there any other comments in regard to but not limited to the driving factors and the critical paths while building an intelligent FSC？

公司名称 Company name：

姓名 Your name：

（可匿名 Anonymous is acceptable）

时间 Date：