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The Construction Path of Financial Shared Service Centers in the Digital Transformation of Manufacturing Industry ——A Case Study of Changhong Group

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Abstract:

Against the backdrop of global digital transformation in manufacturing, enterprises face challenges such as inefficient financial processes and a disconnect between business and finance functions.To explore pathways for establishing Financial Shared Service Centres (FSSCs) adapted to digital transformation, this paper adopts Changhong Group as a case study and develops an analytical framework grounded in Business Process Reengineering theory and Data Value Chain theory. The findings indicate that Changhong's FSSC evolved through three stages—standardisation, centralisation, and intelligentisation—culminating in an integrated framework of Process Reengineering—Technology Empowerment—Organisational Synergy.This case underscores the pivotal role of data governance and the cultivation of multi-skilled talent in driving the value transformation of FSSCs. This research not only provides a practical paradigm for manufacturing enterprises establishing FSSCs, but also enriches theoretical applications within the industry, providing valuable reference for enterprises advancing their financial digital transformation.

Keywords: Digital Transformation in the Manufacturing Industry; Financial Shared Service Centres (FSSCs); Business Process Reengineering (BPR); Data Value Chain

1. Introduction

The exponential evolution of digital technologies such as big data, artificial intelligence, and the industrial internet has catalyzed a global restructuring of manufacturing value chains[2][10]. Traditional home appliance manufacturers, in particular, faced unprecedented pressure to transition from production-oriented to service-oriented models[3]. As the pivotal hub for corporate financial digital transformation, the Financial Shared Service Centre (FSSC) substantially enhances corporate value by standardizing financial

processes and leveraging data assets[1]. However, owing to the complexity of manufacturing business scenarios (such as multi-product lines and extended supply chains) and the lagging nature of existing financial systems, the specific implementation pathways for FSSC in manufacturing require further exploration.

Current industry data indicates that manufacturing enterprises commonly face the structural contradiction of 'dual-track operations' between business and finance. According to the 2022 ACCA report, 73% of financial department working hours in manufacturing enterprises were spent on low-value-added transactional tasks (such as manual voucher verification and repetitive data entry), which resulted in severely inadequate strategic support capabilities. The White Paper on Digital Transformation of Chinese Manufacturing Enterprises (2024) further shows that the digital maturity index for manufacturing finance has stood at merely 37.2 (out of 100), with data integration (28.6) and process automation rates (31.4) significantly below industry averages. A 2023 survey by the International Data Corporation (IDC) also found that 63% of manufacturing chief financial officers (CFOs) believed existing financial systems failed to meet real-time decision-making requirements.

As a representative of traditional manufacturing enterprises, Changhong Group successfully transformed its finance function from 'cost control' to 'value creation' through the establishment of a financial shared service centre. Its experience holds significant reference value for the industry. This paper employed a longitudinal case study methodology, tracing the development of Changhong's FSSC from 1999 to 2024. It integrated Business Process Reengineering theory[5] with Data Value Chain theory[6] to construct an analytical framework. The research addressed two core questions: How can manufacturing enterprises achieve value transformation through FSSC? What replicable insights did the Changhong case offer the industry?

The theoretical significance of this research lies in validating the applicability and synergistic potential of the two theories within the context of financial digital transformation in manufacturing, while distilling a universal analytical framework. The practical significance lies in providing a 'three-stage evolution' pathway as a reference for manufacturing enterprises planning to establish financial shared service centres, emphasising the critical importance of data governance and talent development throughout the transformation process.

2. Theoretical Framework

The Financial Shared Service Centre (FSSC) is a management model that leverages information technology to consolidate dispersed financial processes within an enterprise. Its core objective is to achieve economies of scale through business process reengineering, thereby reducing operational costs and ultimately enhancing the strategic value of the finance function[4]. Against the backdrop of digital transformation, the FSSC has evolved beyond a mere efficiency-enhancement tool. It now serves as a central hub for integrating business and financial data, supporting corporate decision-making through comprehensive lifecycle management of data, including collection, cleansing, analysis, and application[1, 8].

The theory of business process reengineering, which was proposed by Hammer[5], advocates dismantling traditional functional silos. It calls for rethinking and restructuring business processes from a 'customer value' perspective, eliminating non-value-adding steps to improve operational efficiency. Changhong, by optimising redundant approval procedures, reduced its expense reimbursement cycle from several days to approximately three minutes, thereby demonstrating the practical value of this theory in financial process optimisation.

The data value chain theory, proposed by Loshin[6], emphasizes that data progresses through a closed-loop, value-adding sequence of collection, governance, analysis, and application. In this sequence, fragmented data is transformed into actionable intelligence that ultimately informs decisions. Changhong's "Business–Finance Integrated Data Middle Platform" exemplified the theory in practice: it consolidated multi-source data (procurement, production, sales, and finance) on a unified platform, achieved data cleansing and standardization through governance, and then used analytical models to support scenarios such as intelligent invoice verification and dynamic cash management, thereby unlocking the value of data assets.

3. Current Situation Analysis

3.1 Industry Dilemma

Manufacturing enterprises commonly face the structural contradiction of "dual-track operations for business and finance," which is primarily manifested in a severe disconnect between financial and operational data, as well as inefficient financial processes. According to ACCA (2022) data, finance departments in manufacturing enterprises spent an average of 73% of their working time on low-value-added transactional tasks (such as manual entry of business vouchers and offline invoice verification), while less than 20% was allocated to high-value-added activities like strategic budgeting and risk early warning. This situation resulted in a serious deficiency in the strategic support capabilities of the finance function.

Taking a major home appliance manufacturer as an example, its financial shared service centre revealed three typical pain points during its initial operations. First, data silos – the integration rate between the Enterprise

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Resource Planning (ERP) system (used for financial accounting) and the Customer Relationship Management (CRM) system (used for sales management) was less than 42%, which necessitated manual re-entry of 30% of sales data, with an error rate as high as 8%. Second, efficiency bottlenecks – processing a single expense claim took up to three working days, primarily because seven offline approval stages required repeated verification of physical documentation. Third, delayed decision-making – monthly operational analysis reports took 14 days to generate, and data lag hindered management's ability to promptly adjust production and sales strategies.

The China Manufacturing Enterprises Digital Transformation White Paper (2024) reveals that the financial digital maturity index for manufacturing stands at merely 37.2 (out of 100), with data integration (28.6) and process automation rates (31.4) remaining significantly below industry averages. An IDC (2023) survey further indicates that 63% of manufacturing CFOs believe existing financial systems fail to meet real-time decision-making requirements, while 45% of enterprises still rely on manual Excel for data statistics and analysis.

3.2 Motivation for Changhong's Transformation

Changhong's advancement of its financial shared service centre construction has been driven both by external industry pressures and internal operational requirements.

Externally, profit margins within the home appliance manufacturing sector have persistently contracted in recent years. According to data from the National Bureau of Statistics, China's home appliance industry gross profit margin declined from 23.5% in 2015 to 11.2% in 2024, representing a reduction of more than 50%. Concurrently, the China Electronic Information Industry Development Report indicates that the home appliance sector requires an R&D intensity of 5.2% to sustain innovative competitiveness, thereby imposing heightened demands on corporate cost control. Against this backdrop, optimising financial processes and reducing operational costs through a shared service centre has become a crucial strategy for Changhong to address industry pressures.

Internally, Changhong's existing three-tier financial management model (Group Headquarters → Regional Subsidiaries → Business Divisions) suffered from significant inefficiencies. The monthly closing cycle spanned 28 days, failing to meet flexible production demands (such as rapidly adjusting production plans based on market requirements). According to Changhong's 2015 financial report, finance personnel processed an average of just 8.7 documents per day, significantly below the industry average of 15–20. Furthermore, the multi-tiered accounting system led to fragmented capital allocation: an internal audit in 2016 revealed duplicate account balances totalling ¥120 million within the group. This dispersion of idle funds resulted in an additional ¥8 million in annual capital occupation costs. These internal challenges became the direct impetus for Changhong to advance the construction of its Financial Shared Service Centre.

4. Construction Path of Changhong's FSSC

4.1 Standardization Stage (1999-2005)

During this phase, Changhong prioritized resolving issues of inconsistent financial standards and fragmented processes, and became one of China's first manufacturing enterprises to systematically advance financial standardisation. It established a unified chart of accounts and accounting standards, and constructed a financial process framework encompassing 236 control points that covered the entire workflow from procurement requests to payment settlements.

In 1999, Changhong implemented Oracle's ERP system, standardising 186 business processes including 'procurement-to-payment' and 'order-to-cash'. By applying Six Sigma methodologies to optimise procurement and payment workflows, the average cycle time was reduced from 45 days to 27 days—a 40% decrease. In 2003, deployment of the SAP Financial Accounting (FI) module enabled direct bank-to-enterprise connectivity: automatic voucher generation rates rose from 30% to 89%, daily electronic voucher processing surged from 120 to 980 documents, and cross-regional fund transfer efficiency improved by 40%.

During this phase, Changhong achieved substantial cost reductions: 236 redundant positions were eliminated, generating annual labour cost savings of approximately ¥12.7 million.This aligns with findings that financial shared services positively impact firm performance by reducing operational costs[11]. Even during the 2003 'industry winter'—when the home appliance sector experienced a 10% decline in overall cash flow due to the SARS epidemic—Changhong maintained an 18% cash flow growth rate (Changhong internal report, 2005).

Concurrently, most of Changhong's peers maintained fragmented financial processes. In 2002, Midea Group retained 17 regional financial branches, each operated under independent accounting systems with a 35% discrepancy in accounting subjects. Consolidating financial statements required manual adjustment of more than 2,000 journal entries, which consumed over 10 working days (Midea Group 2014 financial report retrospective data). Although Gree Electric initiated the implementation of Baan ERP in 1999, its focus centered on production modules, leaving

financial process standardisation lagging. By 2004, its average procurement-to-payment cycle remained at 45 days—nearly double Changhong's standardised duration (Gree Electric ERP Implementation Report, 1999).

Changhong established 236 control points through the Delphi method, thereby achieving industry-leading precision. By contrast, Haier Group had only 89 financial control points during the same period and lacked cross-departmental coordination mechanisms. This forward-looking approach enabled Changhong to secure significant industry advantages in financial data consistency and process efficiency.

Its alignment with business process reengineering theory was evident in Changhong's fundamental restructuring of financial processes: it dismantled traditional functional silos (e.g., transforming the sequential workflow 'Procurement → Finance → Operations' into a parallel collaborative process) and abandoned the conventional model of 'decentralised regional accounting with inconsistent standards'. This practice fully embodied the core tenet of BPR theory[5]— 'rethinking business processes from the ground up'. By eliminating non-value-added steps and establishing standardised procedures, it achieved breakthroughs in financial processing efficiency, validating the theory's applicability in manufacturing finance transformation.

4.2 Intensification Stage (2006-2015)

Building upon standardisation, Changhong further advanced centralised fund management and the integration of operational and financial data, thereby establishing an intensive financial operations model.

In treasury management, Changhong established a group cash pool system and employed Value at Risk (VAR) modelling to determine optimal cash holdings. By the end of 2015, centralised treasury management had increased from 65% to 94% of total funds, while short-term financing costs in 2010 were 1.2 percentage points below the industry average. In 2012, a mobile expense reimbursement platform was developed using Web 2.0 technology: employee self-service reimbursement coverage rose from 0% to 98%, the number of approval nodes per reimbursement decreased from seven to three, and the processing cycle shortened from an average of 48 hours to six hours. Through full integration of the bank-enterprise direct connection system, the daily average pooling funds reached RMB 1.86 billion in 2015, representing a 370% increase from 2006 and yielding annual financial cost savings exceeding RMB 230 million. This project was awarded the First Prize for Modern Enterprise Management Innovation in Sichuan Province in 2014 .

During the same period, peers exhibited significant gaps in centralisation efforts. Whilst Haier Group advanced financial centralisation through its Ren Dan He Yi model, its focus remained predominantly on physical organisational integration. By 2012, fund centralisation reached 98%; however, the absence of a scientific cash-holding calculation model resulted in idle funds amounting to RMB 830 million (Haier Finance Company Bond Prospectus, 2013). TCL Group's 2010 expense reimbursement system covered only 30% of staff, with each claim requiring five approval stages (department manager → regional finance specialist → group finance director → internal audit → payment), which took 2.5 days—four times Changhong's processing duration.

Changhong's differentiated advantage lay in the deep integration of capital management with operational scenarios. Addressing the issue of RMB 120 million in duplicate account balances (primarily due to mismatched fund allocations between regional subsidiaries and the group), it designed a 'fund pool + budget control' linkage mechanism: subsidiary fund usage was required to be tied to operational budgets, with the system automatically matching fund disbursements to business progress. This model was approximately three years ahead of the simple fund pooling approach commonly adopted in the industry. Furthermore, Changhong's mobile expense platform incorporated a business approval rules engine that automatically verified expense-to-business alignment (e.g., whether travel expenses matched approved itineraries). By contrast, Midea Group's equivalent 2015 platform only supported basic document uploads, with manual review resulting in a 12% error rate—40 times that of Changhong (0.3%).

The alignment with data value chain theory is evident in this phase: centralised management and the analytical application of fund data constitute the initial closed loop of the data value chain. Changhong not only achieved the centralised collection of financial data (through treasury pool construction) but also enhanced capital utilisation efficiency by using analytical tools such as VAR models. Furthermore, its mobile expense platform enabled the process-driven application of expense data. This practice aligns with the value-added logic of data value chain theory[6]— "data collection, governance, analysis, and application"—transforming dispersed data into value-creating assets. It validates the foundational role of centralised data management in value creation.

4.3 Intelligence Stage (2016-Present)

Since 2016, Changhong has pioneered the deployment of Robotic Process Automation (RPA) and Artificial Intelligence (AI) technologies within the industry, and it has established an intelligent financial system that has become a benchmark for financial digitalisation in manufacturing[13].

For intelligent auditing, Changhong used a Convolutional Neural Network (CNN) model to develop an automated invoice verification system. This increased accuracy from

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85% in manual auditing to 99.8%, enabling the processing of an average of 2,300 special VAT invoices per day—eight times the efficiency of manual handling. In 2019, a payment prioritisation model based on the XGBoost algorithm was introduced. By comprehensively evaluating multi-dimensional data including supplier credit terms, collaboration history, and production stability, the average supplier payment cycle was shortened from 5.8 days to 2.1 days, while supplier satisfaction rose by 27%. The machine learning-based procurement forecasting model achieved an error rate below 3%, significantly outperforming the industry average of 5–8%. Data from 2024 show that the intelligent document review system now processes 23,450 documents daily, equivalent to the workload of 50 full-time finance staff, generating annual labour cost savings exceeding RMB 8 million. This initiative was recognised by the Ministry of Industry and Information Technology as a 2023 Industrial Internet Pilot Demonstration Project (Changhong Digital Transformation White Paper, 2024).

At this stage, the industry's intelligent transformation exhibits a gradient disparity. Gree Electric Appliances piloted RPA invoice verification in 2018, achieving an initial accuracy rate of only 89% with a daily processing capacity below 500 documents. The system lacked integration with business operations and therefore required manual intervention for non-standard invoices (Manufacturing Financial Digital Transformation Report, 2024). Hisense Group introduced machine learning for procurement demand forecasting in 2020. However, due to insufficient data samples and inadequate algorithm optimisation, its prediction error rate reached 5.8%—nearly double that of Changhong (Hisense Group Supplier Quality Report, 2023).

Changhong distinguishes itself by establishing a complete closed-loop system encompassing "data–algorithms–scenarios." Its CNN model, trained on a decade of expense reimbursement data, is able to identify non-standard invoices specific to manufacturing (such as customised component procurement documents), whereas most competitors' intelligent systems only support standard VAT invoices. Its payment prioritisation model considers not only credit terms but also supplier capacity stability data (such as equipment utilisation rates and on-time delivery rates). This integrated "finance + supply chain" algorithm achieved a 98% on-time delivery rate for emergency supplies in 2023, significantly exceeding the industry average of 76%. Furthermore, Changhong initiated RPA–ERP system interface development in 2016, whereas TCL completed similar integration only in 2021, resulting in a five-year lag in intelligent process implementation.

Alignment with data value chain theory is evident in this phase through the comprehensive implementation of a closed-loop value-creation logic, achieving end-to-end value generation from data collection and governance to analysis and application. Changhong utilised RPA for automated data collection (e.g., extracting procurement orders and sales-contract data), employed an integrated business–finance data middle platform for governance (e.g., eliminating duplicate entries and standardising data formats), and leveraged machine-learning algorithms for analysis (e.g., forecasting procurement demand and assessing payment risks). These initiatives enabled value application in scenarios such as invoice verification and payment management. This practice of "data-driven decision-making" represents a quintessential application of data value chain theory within[6] manufacturing finance and thereby validated the theory's guiding value for digital transformation[12].

5. Challenges and Countermeasures

According to Changhong's security report, three core challenges emerged during the construction of its financial shared service centre.

Technologically, the standardisation rate of data interfaces between heterogeneous systems (such as ERP, CRM, and Supply Chain Management (SCM) systems) stood at only 67%, hindering data exchange across systems. For instance, data format inconsistencies between procurement and financial systems required manual conversion for 15% of procurement data.

At the organisational level, fewer than 41% of finance personnel met digital competency standards. While most senior finance staff excelled in traditional accounting operations, they lacked proficiency in tools such as Python for data analysis and RPA process design, which hindered their adaptation to the requirements of intelligent transformation.

Regarding security, three unauthorised data access incidents occurred in 2024. The absence of real-time monitoring of data access activities allowed internal staff to access sensitive financial data (e.g., supplier pricing) beyond their authorised permissions, thereby posing a threat to data security.

To address these challenges, Changhong implemented systematic optimisation strategies. Technologically, it established an Enterprise Service Bus (ESB) to unify data interface standards across heterogeneous systems. By the end of 2024, the success rate of Application Programming Interface (API) calls between systems had risen to 98.3%, effectively resolving the issue of data silos.

At the organisational level, a Financial Digital Competency Certification Programme was implemented, establishing a training framework that covered Python programming, SQL data querying, and Business Intelligence (BI) reporting. By 2023, 67% of finance personnel had obtained certifications, and data analysis efficiency had

improved by 35%[15].

On the security front, a zero-trust security architecture was deployed, incorporating dynamic identity authentication (such as multi-factor authentication for sensitive operations) and end-to-end data encryption. As a result, data breach risks decreased by 76% in 2024 compared with the previous year.

Furthermore, Changhong enhanced its supporting systems. In data governance, it constructed a dual-driven model combining "metadata + master data" and established an evaluation system covering 238 data governance metrics (such as data accuracy and completeness). For talent development, it implemented a Financial Business Partner (BP) + Data Scientist training programme, which encouraged finance personnel to participate in business department projects and thereby enhanced cross-functional collaboration capabilities—delivering a 42% increase in cross-functional team project efficiency in 2023[7][14]. For security protection, it established a dynamic risk assessment model, which reduced the security vulnerability remediation cycle from 24 hours to 4.2 hours.

6. Conclusions

6.1 Theoretical Contributions

This study makes three major theoretical contributions.

First, it validates the applicability and synergy of Business Process Reengineering (BPR) theory[5] and Data Value Chain theory[6] in the digital transformation of manufacturing finance. The Changhong case demonstrated that BPR theory provided methodological guidance for standardising Shared Service Centres (SSCs) in finance (e.g., breaking down functional silos, optimising processes), while Data Value Chain theory charted the path for SSCs to evolve from efficiency gains towards value creation (e.g., data assetisation, intelligent decision-making).

Their integration forms a complete logical chain— "process standardisation—data assetisation—intelligent decision-making"—enriching the theoretical framework of financial shared services.

Second, it distils a "three-stage evolution model" for establishing financial shared service centres in manufacturing enterprises. This model reveals the transformation patterns of manufacturing enterprises from decentralised accounting to centralised sharing and ultimately to intelligent decision-making. It clarifies the core tasks for each stage (e.g., the standardisation phase focuses on process unification; the centralisation phase focuses on fund pooling), the key technologies (e.g., ERP in standardisation; RPA/AI in intelligence), and the value outputs (e.g., cost reduction in standardisation; value creation in intelligence), thereby providing industry-specific practical annotations to relevant theories.

Third, this study establishes an integrated framework of "Process Reengineering – Technology Empowerment – Organisational Synergy." Unlike existing research that focuses on single dimensions (such as examining only technology application or process optimisation), this framework emphasises the dynamic alignment of three elements: process reengineering as the foundation, technology empowerment as the driving force, and organisational synergy as the safeguard[9]. Only through the coordinated application of these three elements can the value of the financial shared service centre be maximised, thereby transcending the limitations of single-dimensional research.

6.2 Practical Implications for Manufacturing Enterprises

This study offers practical insights for manufacturing enterprises in three main aspects.

Firstly, the establishment of financial shared service centres should adhere to the principle of "incremental evolution," advancing in phases according to the enterprise's digital foundation. During the standardisation phase, enterprises should prioritise addressing process unification and data standardisation issues, drawing upon Changhong's "control point framework + ERP system" model (e.g., establishing process control points covering the entire business chain and utilising ERP to solidify processes). In the consolidation phase, emphasis must be placed on strengthening centralised fund management and integrating business and financial data, referencing Changhong's "cash pool + mobile expense reporting" collaborative solution (e.g., achieving fund centralisation through cash pools and enhancing efficiency via mobile tools). During the intelligent phase, enterprises should focus on deeply integrating AI technology with business scenarios, learning from Changhong's experience in building a "data – algorithm – scenario"closed loop (e.g., training industry-specific AI models based on historical data and applying them to core financial scenarios).

Secondly, data governance capabilities are the cornerstone for unlocking the value of financial shared service centres. Enterprises must establish a data governance framework spanning the entire lifecycle (from collection to application), strengthening metadata management (e.g., defining data sources and attributes) and master data management (e.g., standardising customer and supplier data). Data security safeguards must be prioritised. Changhong's zero-trust architecture and dynamic risk assessment mechanisms can be adopted to ensure the security and availability of data assets.

Polished Version:

Thirdly, cultivating multi-skilled talent is essential for the sustainable development of financial shared service centres. Enterprises must establish systematic digital skills

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training programmes to enhance finance personnel's capabilities in data analysis and intelligent tool application. This should be complemented by promoting cross-functional talent mobility (e.g., rotating finance staff through business departments). Adopting a "Finance Business Partner + Data Scientist" model can foster professionals who understand both finance and operations while mastering digital skills, thereby addressing talent bottlenecks during transformation.

6.3 Implications for Industry Ecosystem Construction

Regarding the development of a digital finance ecosystem for the manufacturing sector, this study offers the following insights.

Government departments should issue guidance on digital finance transformation for manufacturing, establish unified industry data governance standards (such as standardised data interface specifications for integrated business and financial systems), support collaboration between enterprises and universities (e.g., establishing specialised programmes in intelligent finance), and create dedicated funds for technological innovation in intelligent finance to reduce transformation costs for small and medium-sized manufacturing enterprises.

Industry associations may facilitate the formation of financial shared service alliances, organise cross-enterprise best practice exchanges (such as case study sharing sessions), and establish public service platforms for financial digital transformation (e.g., providing RPA template sharing and AI model training services) to accelerate the sector's overall digital transformation.

From a broader perspective, Changhong's experience demonstrates that financial digital transformation in manufacturing enterprises is not merely a matter of technology application but involves systemic change encompassing processes, technology, and organisation. This necessitates sustained commitment from senior management and cross-departmental collaboration (such as coordination between finance, IT, and business units). Only through comprehensive advancement of transformation can enterprises achieve the leap from "traditional finance" to "intelligent finance."

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