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Research Article

Impact Factors of the Maturity of FSSC in the Digital Age: A Study Based on Structural Equation Modeling

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Abstract

Since the mid-1980s, many multinational companies (MNCs) have transformed their finance functions into financial shared service centers (FSSCs), in order to cut costs and optimize internal operations. When it came to the 21st century, breakthroughs in technology have witnessed the rapid growth of the digital economy, promoting the digital transformation of enterprises and the digital transformation of finance. The construction of a FSSC has laid a solid foundation for the digital transformation of finance and has gained popularity in large companies. However, the practices of FSSC in China are deeply associated with the development of IT. Some scholars see it as a kind of IT application in the finance function, as evidenced by the active involvement of IT companies in the establishment of FSSCs. In this paper, the authors launched a questionnaire to measure the maturity of the FSSC in Chinese companies. Data was analyzed by using structural equation modeling (SEM), aiming to study the factors that have impacts on the maturity of FSSC and the influencing path of the factors. Influencing factors were designed based on the TOE (Technology-Organization-Environment) theory, and the maturity model of FSSC was modified from the PwC (PricewaterhouseCoopers) maturity model of FSSC. And then a structural model was constructed. Various tests for SEM were used, and the study showed that the technological and organizational conditions of enterprises have promoted the construction and development of FSSCs, while the external environmental conditions indirectly influenced the maturity of FSSC through affecting the organizational and technological conditions. The paper also showed the influencing path of the factors.

Keywords

Digital Transformation, Finance Function, Financial Shared Service Center (FSSC), Structural Equation Modeling (SEM), TOE Theory, Influencing Factors

1. Introduction

Since the mid-1980s, many multinational companies (MNCs) have transformed their finance functions into financial shared service centers (FSSCs), to cut costs and optimize internal operations. In the 21st century, breakthroughs in technology have witnessed the rapid growth of the digital economy and the digital transformation of enterprises. Digitalization, the process of transforming any kind of activity or information into digital formats that can be collected, stored, retrieved, and analyzed electronically, is gathering pace all over the world [1]. An investigation by IDC (International Data Corporation) shows that of the 2000 top companies worldwide, two thirds of the CEOs think digitalization is the core of their strategy [2]. On the other hand, digital financial transformation is one of the things that the CFO must do to

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accelerate the digital enterprise. With the computerization of accounting systems and the adoption of ERP (enterprise resource planning), the finance function has played an important role in the evolution of enterprise informatization. The finance function provides power for enterprise transformation [3]. Accenture believes that the finance function is the key to pushing the enterprise transformation [4]. The State-owned Assets Supervision and Administration Commission of China encourages the adoption of AI technology and calls for the financial sector to be a leader, pioneer, and promoter in enterprise digitalization [5].

The transformation of digital finance usually starts with the automation of transactional activities and elimination of manual interventions [6], which is a common practice in the construction of FSSC. So FSSC is seen by many companies as the starting point of financial digitalization. Today, it is estimated that 80% of Fortune 500 companies have implemented some type of shared services model [7].

The practice of FSSC was introduced by MNCs in China in the late 1990s. With the rapid growth of digital economy in China, the construction of FSSCs has gained popularity in large companies, especially when it came to 2020. However, the social economic environment and technology today are quite different from those in the 1980s and 1990s. The economy of China has been flushing for decades, and the government has spent a lot on AI related IT investments, which also calls for the adoption of FSSC. Unlike the western MNCs that initiated FSSC practices decades ago, the practice of FSSC in China is deeply associated with the development of IT. Some even see FSSC as a kind of IT application in the finance function, as evidenced by the active involvement of IT companies in the setting of FSSC. And as application of IT is quite widespread today, new technologies are preferred in some FSSCs.

In a recent survey sponsored by IMA (Institute of Management Accountants), the authors investigated the current status of FSSC adoption in China, measuring the maturity of FSSC and the level of technology application [8]. The study found that the maturity level of FSSC in China is around "developing". Strategy and IT application are emphasized, while there is much to be desired in other dimensions.

So in this paper, the authors try to further the research by analyzing the influencing factors of maturity of FSSC. The research question is: what factors have pushed the development of FSSC, and what is the process of these factors in driving the development of FSSC? Based on the questionnaire and the data collected before, the authors use structural equation modeling (SEM) to investigate the factors and the process of the impacting factors on the maturity of FSSC.

The remainder of the paper is organized as follows: Section 2 provides an extensive literature review and a theoretical analysis. Section 3 describes the design of the study and the construction of the model. Section 4 discusses data and the results. Section 5 provides conclusions.

2. Literature Review and Theory Analysis

2.1. Concept and Nature of FSS

Dating back to the 1990's, financial shared service (FSS) derived from shared service. As "a tactical technique by which corporations can organize financial and other transaction-oriented activities to reduce costs," the service helps companies reduce operating costs, provide quality services to internal parties, and add value to business units [9]. Shared service integrates core elements into one or more locations and re-engineers those business processes that are highly repetitive and easily standardized within the enterprise. Shared service is a cooperative strategy that can centralized a part of the existing management functions to a new semi-autonomous business unit, which has a special management structure, to improve efficiency, create value, save costs, and improve the quality of service to internal customers [10]. FSS is the practice of shared service centers (SSC) in the finance function. The finance function in each branch and subsidiary, such as transaction recording and bookkeeping, can be centralized to the FSSC for unified processing [10]. The surge of FSSC has brought great benefits to many companies. FSS helps the accountants get rid of the tedious work of daily transaction records [11]. FSSC is the output of enterprise reform and financial transformation [12]. Most authors hold the view that implementation of FSS is to re-engineer the finance process with the help of an IT system, aiming to reduce costs, increase efficiency, and enhance control [13-16].

2.2. Factors Driving the Implementation of FSSC

Reijers and Mansar found that partners along the value chain, operational strategy and organizational structure are the key external influencing factors for the establishment of FSSC [17]. Martin put the influencing factors to be site selection, strategic planning, process management, change management, organizational structure, and service level agreement [18]. Rohith found that corporate governance, employees in FSSC, communication, performance management, and agility are the key factors [19]. Based on a case study, Grant and Delvin attributed the success factors of FSSC to the personnel, the internal and external environment, the application method of BPR (Business Process Re-engineering), IT, and the change of enterprise vision [20]. Based on the case of ZTE (Zhongxing Telecom Equipment), Zhang Ruijun, Chen Hu and Zhang Yongji suggested that the reform of financial functions, the integrated network of financial systems, the optimization of core business process and a good performance measurement system are the keys to success [21]. He Ying and Zhou Fang found that strategic

planning, process management, information system, organizational design, humane resource management, and performance management have positive effects on the value of FSSC [22]. Based on the re-engineering theory and the change management theory, Hu Lei put forward 5M factors for successful FSSC, i.e,. strategy management, business process management, information system management, change management, and performance management [23].

Though many are listed, influencing factors can be attributed based on the TOE (Technology-Organization-Environment) model introduced by Tornatzky and Fleischer [24], as the implementation of FSSC is impossible without the use of IT systems. TOE theory provides a framework to examine the influence of technological, organizational, and environmental contexts on the adoption and implementation of technological innovations. The model holds that the effectiveness of IT implementation relies on both internal and external factors. Congruence between the organizational, environmental, and technological factors should be considered in pushing IT implementation.

2.3. Maturity Level of FSSC

There are many maturity models for FSSC. The Hackett Group judges the maturity of Global Business Service (GBS) from technology, service, information management, organizational structure and governance, and business partnership [25]. Based on a survey of Global 500 and Fortune 1000 companies, KPMG (Klynveld Peat Marwick Goerdeler) measures the maturity of FSSC from service type, data analysis, human resource management, process, and technology [26]. CIPFA (Chartered Institute of Public Finance and Accountancy) measures maturity from process, quality assurance, governance arrangement, delivery system, efficiency mechanism and technical support [27]. The PwC maturity model uses eight different evaluation criteria for FSSC, i.e., strategy, organization / governance/ compliance, continuous improvement, business processes, customer relations, performance management, human resources management, systems, and technology [28]. The aggregated score for the eight dimensions determines the position of an FSSC. A summary of the model is shown in Table 1.

Table 1. *PwC's maturity model of FSSC.*

Dimension	Description and Criteria
Strategy	1. Criteria used to select the FSSC location, and their respective ranking 2. Implementation strategy chosen 3. Evaluation of the objectives since FSSC implementation from today's perspective 4. compared to when the FSSC was founded
Organization/governance/compliance	1. Center concept of the FSSC (cost center versus profit center) 2. Cost allocation method for services provided 3. Scope and revision cycle of service level agreements 4. "Process owner"approach to manage processes 5. Governance of the FSSC 6. Monitoring of process compliance and use of automated controls
Continuous improvement	1. Systematic and regular analysis of costs and quality 2. Continuous search for and implementation of optimization measures 3. Deployment of quality improvement tools 4. Approach to measure whether an FSSC is meeting its objectives
Business processes	1. Degree of standardization and automation of processes within the FSSC 2. Degree of standardization and automation of processes in upstream and downstream 3. processes outside the FSSC 4. Level of process documentation
Customer relations	1. Customer structure (share of internal and external customers) 2. Service structure and customer orientation within the FSSC 3. Deployment of tools for customer management
Performance management	1. Sophistication of performance management systems in place 2. Transparency of the performance measurement process 3. Availability of information related to operational and strategic management

Dimension	Description and Criteria
	4. Definition of measurable performance targets and monitoring of target achievement 5. Extent of financial control systems within the FSSC
Human resources management	1. Use of different training tools and training types by staff group 2. Quality of communication between management and staff in the FSSC 3. Approach to linking the performance evaluation of employees with the definition of development measures 4. Use of employee satisfaction surveys
Systems and technology	1. Degree of process automation and standardization of IT systems 2. Continuous optimization of IT systems 3. Extent to which workflow and integrated ERP systems are deployed 4. IT governance supporting financial control processes

3. Research Design

3.1. Data Collection

In order to generate items related to maturity and other latent variables in different dimensions, we designed a structured questionnaire with both quantitative and qualitative measures. A pilot survey was carried out to refine the questionnaire.

The questionnaire was published online from January 5, 2020, to April 16, 2020. Facilitated by the IMA member platform and other individual channels, a total of 323 questionnaires were distributed and received, of which 134 were completed. Of these 134 questionnaires, 91 were from companies that have established FSSC, while 43 were from companies that have not yet established FSSC. For the measurement of maturity of FSSC, 91 samples were used for further analysis.

For the study in this paper, 19 items were used. The data were collected on a five-point Likert scale (5<----1>), where 5 denotes strongly agree and 1 denotes strongly disagree.

3.2. Hypothesis Formulation

Hypotheses are derived based on the framework of TOE, literature review, and theory analysis.

3.2.1. Technological Factor

TOE theory extends the factors that affect the implementation of technological innovation in a company from the impact of its own technical aspects to three levels of the current system, namely, technology, organization, and environment. That is, the adoption of innovation by an organization is not only affected by technical factors but also by organizational factors and the factors of the environment it faces. [24].

In the establishment of FSSC, new technologies are adopted, while current IT systems are integrated and centralized. Various information systems have been widely used in FSSC; the data from different systems should be integrated. Whether the system architecture matches, whether the connection between each system is successful, and whether the information infrastructure of the enterprise supports the access of the new system will greatly affect the construction effect of FSSC. Without technology, there will be no FSSC. Introduction of new technology requires a multifunctional IT platform, mature data management ability, and stable running IT infrastructure. Maturity of IT helps FSSC improve efficiency and further develop. According to Accenture, digitalization leads to the integration of processes, technical data, and talents, and digital data centers and platforms increase the efficiency of finance [6]. Advances in technology push the evolution of FSSC.

So we have a hypothesis as:

H1: A higher level of technology has a positive effect on the maturity of FSSC.

3.2.2. Organizational Factor

Adoption of new technology is affected not only by technology itself but also by organizational factors, such as the design of the organization, support from the top management, human resource management, and performance management.

Establishment of FSSC causes a redesign of the finance function and may lead to a redesign of the organizational structure [29]. The relationship of FSSC and other units in the organization should be redefined to ensure the smooth operation of FSSC. Good organizational design is a prerequisite for effective operation of an organization, providing power and support for FSSC. Support from the top is also necessary, as the design of FSSC is a strategic decision. Good planning ensures further development of FSSC.

Dong identified three types of top management, namely, resource allocation right, involvement in change management,

willingness to share the system, and influence that top management exercise on the system implementation [30]. Support from the top indicates that there are available resources to push the development of FSSC and ensure its success.

Other than the two factors, talent is an important factor too. A FSSC applies a new operating model in a new operating mode. Do employees accept the new model? Are they capable of the new position? Proper training helps the employees build the capabilities needed for the new model [31]. Roles and positions of FSSC will change, sometimes leading to layoffs or repositions of employees. Unable to deal with such change may hinder the development of FSSC.

Performance management, allowing each part of FSSC to operate in a balanced and coordinated manner, is the guarantee for efficient operation of the center [32]. Performance management is an important means to achieve consistency between FSSC and the overall strategic goals and value pursuit of the enterprise, and to assist the continuous optimization and improvement of enterprise processes [33]. A good performance measurement system help to judge the soundness of FSSC operation. So we have a hypothesis as:

H2: Good organizational conditions have positive effects on the maturity of FSSC.

3.2.3. Environmental Factor

Organizational innovation is produced in a certain environment. Environmental factors are the macroenvironment in which an organization conducts its business and activities. In this article, environmental factors refer to the industry environment and policies and regulations.

FSSC is a form of digitalization. In the digital age, the development of new business models and technologies pose challenges to many firms, forcing them to undergo digital transformation. Pressure from competitors forced firms to make a change too.

The Chinese government has been vigorously developing the digital economy. There are several governmental policies encouraging and requiring the establishment of FSSC for large companies [34, 35]. So we have a hypothesis as:

H3: A good environmental condition has a positive impact on the maturity of FSSC.

3.2.4. Interrelationship among Environmental, Organizational and Technological Factors

The above three factors are interrelated. Environmental factors affect enterprises through internal factors of the organization. For example, external institutional norms or policy support can affect the cognitive and behavioral preferences of corporate executives, thereby affecting their support of FSSC. Pressure from the industry may have impacts on the organization's design and resource allocation.

On the other hand, support from the top affects the application of technology. Good organization or process design can ensure the application of technology. Proper training of organizational personnel is also a driving force for the development of sustainable technology. So we have hypotheses as:

H4: Environmental conditions have impacts on organizational conditions of FSSC.

H5: Organizational conditions have impacts on technology implementation of FSSC.

3.3. Design of the Variables

There are four latent variables in the study, i.e., technology, organization, environment, and maturity of FSSC. For each variable, several items are designed. See Table 2 for details. Items of maturity are based on the framework of the PwC maturity model, with some revisions based on a literature review and survey. Strategy, as a long term plan, normally includes other items such as process and organization. As stated in the report of the PwC maturity model,"result from the strategy dimension has positive effects on continuous improvement, customer relationship, and performance management". To avoid multicollinearity, the strategy item is excluded.

Table 2. *Variables and items.*

Variables	Dimension	Code	Item	Reference
Maturity	Organization/governance/compliance	MA1	Clear structure and governance of FSSC monitoring of process compliance and use of automated controls existed	Pwc (2012) [28].
	Continuous improvement	MA2	Continuous search for and implementation of optimization measures in FSSC	
	Business processes	MA3	Degree of standardization and automation of processes within and outside the FSSC is high	
	Customer relations	MA4	Operation of FSSC is customer orientated	
	Performance management	MA5	Transparency of the performance measurement process existed in FSSC	
	Human resources management	MA6	Use of different training tools and training types by staff	

Variables	Dimension	Code	Item	Reference
			group	
	Systems and technology	MA7	IT system deployed is process automated and standardized	
	Technology adoption	TE1	Mature ERP in place before FSSC was established	
	Functions	TE2	There are Reliable and multifunctional platform for IT application	
	Stability	TE3	The company have continuous maintenance of IT equipment	He Ying and Zhou Fang (2013) [22];
	Compatibility	TE4	IT system is fit for FSSC	The Hackett Group (2018) [36];
Technology	Data management	TE5	Data management is mature when establishing FSSC	
	Process automation	TE6	Automation and standardization have been achieved when establishing FSSC	Thomas and Hiensch (2016) [37].
	SMAC*	TE7	SMAC technology is in use for decision making before FSSC implementation	
	Business intelligence	TE8	Business intelligence and expert system are in use for decision making before FSSC implementation	
	Organizational design	OR1	Organization structure is fit for implementation of FSSC	
Organization	Support from the top management	OR2	Top managers deem it necessary to implement FSS to optimize the finance process	He Ying and Zhou Fang (2013) [22].
	Human resources management	OR3	There are periodic training for employees of the company	
	Performance management	OR4	There exists refine and opaque performance evaluation	
	Compliance pressure	EN1	FSSC establishment is required by the governmental agency or industry associations	
Environment	Supportive policy	EN2	FSSC establishment is recommended by the governmental agency	Xu Feng (2012) [38].
	Competitive advantage	EN3	FSSC helps the company to gain competitive advantages among competitors	
	Competitors	EN4	Competitors have implemented FSSC	

*Social, Mobile, Analytics and Cloud.

3.4. Model Construction

The summary of the hypothesis is shown in Table 3, and the estimated SEM is given in Figure 1.

Table 3. *Summary of hypothesis.*

Code	Hypothesis
H1	Higher level of technology has positive effect on maturity of FSSC
H2	Good organizational conditions have positive effects on maturity of FSSC
H3	A good environmental condition has a positive impact on the maturity of FSSC
H4	Environmental conditions have impacts on organizational conditions of FSSC
H5	Organizational conditions have impacts on technology implementation of FSSC

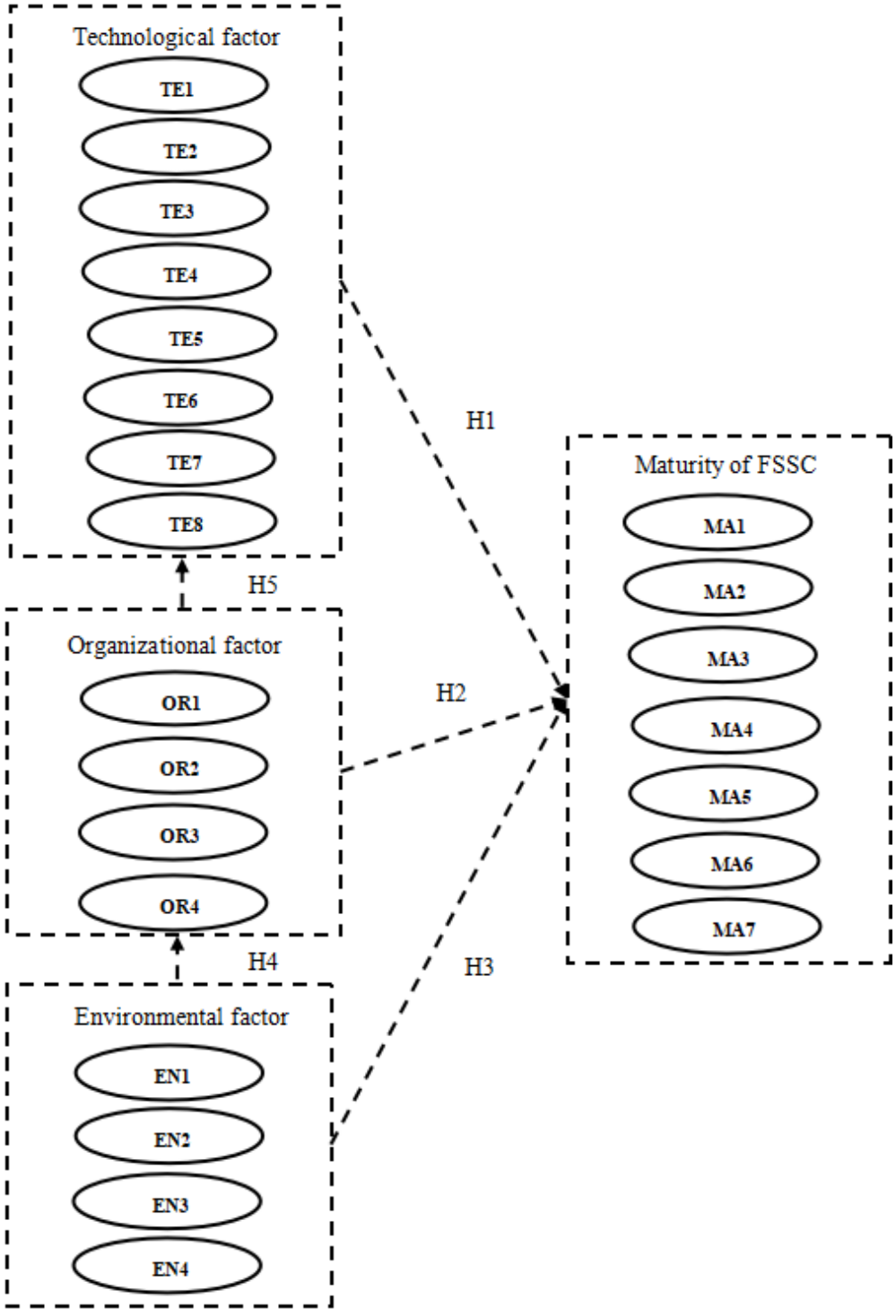

Figure 1. *Estimated structural model.*

4. Data Analysis and Results

Construct validity was established in the study by establishing factor loading, Cronbach α, convergent validity and discriminant validity. The data collected through the questionnaire was analyzed using SPSS 25, for estimation of the Cronbach α, factor analysis. SEM (AMOS Software Package, which is available on SPSS platform) was used to carry out confirmatory factor analysis, interrelationships, structural relationships between different factors, and for testing the hypotheses of the conceptual model.

4.1. Facts of the Sample Enterprises

Of the 91 companies that have established FSSC, 67 have undergone the establishment of FSSC, while 24 have just

started the practice. Respondents come from a variety industries, with the majority coming from the manufacturing industry (24%). As for ownership, 42% are SOEs (State Owned Enterprises); the rest are private enterprises, foreign firms, joint ventures, etc. The size of the companies varies, and most are in the range of 100Million to 10Billion turnovers. See Table 4 for details.

The IT application rate is higher in companies with FSSCs than in companies without FSSCs. Technologies that have greater application include electronic invoices (70%), visualization (62%), and big data (53%). New technologies, such as RPA (Robotic Process Automation), and cloud computing enjoy a higher adoption rate in FSSCs.

Table 4. *Facts of the samples.*

Item	Category	Samples (no)		%	
		Established	Starter	Established	Starter
Industry	Manufacture	22	14	24%	33%
	Wholesaler and retailer	12	4	13%	9%
	IT	9	4	10%	9%
	Finance	7	5	8%	12%
	Transportation	4	3	4%	7%
	Real estate	7	0	8%	0%
	Scientific research and technology services	3	3	3%	7%
	Utilities	5	1	5%	2%
	Others	22	9	24%	21%
Ownership	State owned	38	16	42%	37%
	Private	31	19	34%	44%
	Foreign	20	3	22%	7%
	Joint venture	1	5	1%	12%
	Collectively owned	1	0	1%	0%
Revenues	Less than 50 million	2	7	2%	16%
	50M-100M	4	5	4%	12%
	100M-1000M	20	19	22%	44%
	100M-10 billion	31	10	34%	23%
	10 billion -50billion	11	2	12%	5%
	50 billion -100 billion	11	0	12%	0%
	100 billion -500 billion	7	0	8%	0%
	More than 500 billion	5	0	5%	0%

4.2. Descriptive Analysis of Lantern Variables

As can be seen from Table 5, the standard error of variables is between 0 and 1.3, and the absolute values of skewness and kurtosis value are mostly below 1, indicating that values are reasonable. The overall sample data approximately conforms to the normal hypothesis, indicating that SEM is proper for further analysis.

Table 5. Descriptive statistics for latent variables.

Item	Min	Max	Average	Std Err	Skewness	Kurtosis
MA1	1	5	3.82	0.94	-0.71	0.13
MA2	1	5	3.88	0.81	-0.66	0.91
MA3	1	5	3.46	0.89	-0.37	-0.30
MA4	1	5	3.07	1.25	-0.26	-0.95
MA5	1	5	3.25	1.14	-0.38	-0.44
MA6	1	5	3.43	1.10	-0.41	-0.64
MA7	1	5	3.64	0.97	-0.84	0.43
TE1	1	5	4.08	0.96	-0.83	0.06
TE2	1	5	3.92	1.04	-0.68	-0.46
TE3	1	5	4.29	0.82	-1.32	2.32
TE4	1	5	3.97	0.94	-1.05	1.45
TE5	1	5	3.90	0.96	-0.85	0.56
TE6	1	5	3.70	0.99	-0.76	0.34
TE7	1	5	3.07	1.19	-0.13	-0.78
TE8	1	5	2.86	1.24	0.10	-0.95
OR1	1	5	3.75	0.99	-0.85	0.50
OR2	1	5	4.13	0.77	-1.11	2.43
OR3	1	5	3.79	0.97	-0.68	0.21
OR4	1	5	3.53	0.99	-0.25	-0.40
EN1	1	5	2.79	1.01	-0.15	-0.43
EN2	1	5	3.38	1.00	-0.51	0.30
EN3	1	5	3.76	1.04	-0.90	0.54
EN4	1	5	3.66	0.95	-0.47	0.08

4.3. Appropriateness of Factor Analysis

Using KMO (Kaiser-Meyer-Olkin) and Bartlett's test of sphericity, we test the sampling adequacy. Results are shown in Table 6. the KMO values range from 0 to 1. The higher the value of KMO, the better. As a rule of thumb, the KMO value should be higher than the acceptable threshold of 0.6 for factor analysis to be satisfactory. In the study, KMO values of four variables are all higher than 0.6. Bartlett's test has been passed, indicating appropriateness for further analysis.

Table 6. KMO and Bartlett's test of sphericity.

Variable	KMO Value	Bartlett 's Test of Sphericity		
		Chi-Square	df	P Value
Technology	0.874	569.138	28	0.000
Organization	0.786	154.955	6	0.000

Variable	KMO Value	Bartlett 's Test of Sphericity		
		Chi-Square	df	P Value
Environment	0.666	62.711	6	0.000
Maturity	0.830	363.236	21	0.000

The result of the factor analysis is given in Table 7. Factor loadings are coherent (initial eigenvalues are all greater than 1), resulting in three factors with 67.271% of the total variance explained.

Table 7. Total variance explained.

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotated Sums of Squared Loadings		
	Total	% of Variance	Cumula-tive %	Total	% of Variance	Cumula-tive %	Total	% of Variance	Cumula-tive %
1	7.536	47.102	47.102	7.536	47.102	47.102	4.759	29.746	29.746
2	2.005	12.529	59.631	2.005	12.529	59.631	3.423	21.395	51.140
3	1.222	7.640	67.271	1.222	7.640	67.271	2.581	16.131	67.271

According to the result of the factor load coefficient after rotation, the factor attribution of each measurement item can be further judged. Generally, the factor load coefficient is greater than 0.5. As can be seen from Table 8, except for TE7 and TE8, the load coefficients of the remaining items of technology are all greater than 0.5 and can be attributed to factor 1. The load coefficients of the four measurement items of organization are all greater than 0.5, hence, they can all be attributed to factor 2. For the measurement items of environment, only EN1 and EN2 have load coefficients greater than 0.5 under factor 3, and can be attributed to factor 3. From the above analysis, it can be seen that the load coefficients of the items TE7, TE8, EN3, and EN4 under the corresponding factors do not meet the standards, so these items are eliminated from the model.

Table 8. Factor load coefficient after rotation.

Item	Factor Load Coefficient after Rotation		
	Factor 1	Factor 2	Factor 3
TE3	0.881		
TE5	0.852		
TE2	0.828		
TE4	0.777		
TE6	0.759		0.351
TE1	0.741		
OR3		0.771	
OR4		0.769	0.326
OR2	0.442	0.735	
EN3		0.721	0.361
OR1		0.659	0.331
EN4		0.526	
TE8	0.392		0.745
TE7	0.464		0.706
EN1			0.689
EN2			0.656

4.4. Assessing Validity and Reliability of the Constructs of the Measurement Model

Cronbach α was used to indicate the internal validity of the constructs. Cronbach α indicates the internal validity of the constructs. As a rule of thumb, a value above 0.8 infers good reliability.

As shown in Table 9, Cronbach α for technology, organization, and maturity are 0.923, 0.849, and 0.893 respectively, all higher than 0.8, indicating a good level of validity. Cronbach α for environment is 0.678, greater than 0.6, which is still acceptable. The values of CITC (corrected item-total correlation) are all greater than 0.4, indicating a good relationship among items. So the test of validity is passed.

Table 9. Test of internal validity of the construct.

Variable	Item	CITC	Cronbach α with deleted items	Cronbach α
Technology	TE1	0.669	0.923	0.923
	TE2	0.853	0.898	
	TE3	0.828	0.904	
	TE4	0.752	0.912	
	TE5	0.815	0.904	
	TE6	0.772	0.910	
Organization	OR1	0.686	0.811	0.849
	OR2	0.725	0.803	
	OR3	0.665	0.819	
	OR4	0.703	0.803	
Environment	EN1	0.513	-	0.678
	EN2	0.513	-	
Maturity	MA1	0.665	0.881	0.893
	MA2	0.722	0.877	
	MA3	0.711	0.877	
	MA4	0.705	0.879	
	MA5	0.748	0.871	
	MA6	0.657	0.883	
	MA7	0.700	0.877	

4.5. Test of Convergent and Discriminant Validity

Table 10 shows the results of factor loading. From Table 10, it can be seen that except for EN1, the factor loadings of all other items are greater than 0.7, and all are significant, indicating a good fit of items and factors.

Table 10. Factor loading.

Latent Variable	Item	Std Err	Std Factor Loading	P Value
Technology	TE1	-	0.702	-
	TE2	0.17	0.884	0.000
	TE3	0.134	0.875	0.000
	TE4	0.154	0.804	0.000
	TE5	0.157	0.85	0.000
	TE6	0.161	0.805	0.000

Latent Variable	Item	Std Err	Std Factor Loading	P Value
Organization	OR1	-	0.773	-
	OR2	0.107	0.828	0.000
	OR3	0.134	0.735	0.000
	OR4	0.136	0.745	0.000
Environment	EN1	-	0.535	-
	EN2	0.584	0.958	0.000

Further, AVE (average variance extracted) and CR (composite reliability) measurements are used to test the reliability of the constructs. To achieve convergent validity, the factor loadings and CR should be greater than 0.7, and the AVE of the constructs should be greater than 0.5. Table 11 shows the results.

Table 11. *AVE and CR for the construct.*

Variable	AVE	CR
Technology	0.675	0.925
Organization	0.585	0.849
Environment	0.600	0.735

The discriminant validity is tested by comparing the square root of AVE with the correlation coefficient of factors. If the square root of AVE is greater than the correlation coefficient, then good discriminant validity exists. Table 12 shows the results. The highlighted values are square root values of AVE. It can be seen that all square root values are greater than the correlation coefficients.

Table 12. *Pearson correlation coefficient and AVE square root value.*

Variable	Technology	Organization	Environment
Technology	0.822	-	-
Organization	0.554	0.765	-
Environment	0.333	0.449	0.775

4.6. SEM Analysis

4.6.1. Assessing Model Fitness

Table 13 shows the indices of the goodness of fit for the first round.

Chi square per degree of freedom (χ^2/df) was used to test the fitness of the model. For the model to be acceptable, the value should be in the range of 1-3. Root Mean Square Error of Approximation (RMSEA) should be close to 0. A value less than 0.1 is still acceptable. Goodness of Fit Index (GFI), Comparison Fit Index (CFI), Normed Fit Index (NFI), Tucker-Lewis Index (TLI), Incremental Fit Index (IFI) can also be used for the test. A value close to 1 infers goodness of fit. Normally, a value above 0.9 infers acceptaance of the construct.

For the model to be acceptable, all goodness-of-fit indices should be greater than 0.9 and RMSEA should be less than 0.1. For the proposed model, χ^2/df is less than the observed data of 3, while values of other indices do not meet the acceptable criteria. Further revision of the model is necessary.

Table 13. *Goodness of fit indices for estimated model.*

Index	Norm	Value
χ^2	-	286.465
χ^2/df	1~3	1.949
RMSEA	<0.10	0.103
GFI	>0.90	0.736
CFI	>0.90	0.881
NFI	>0.90	0.786
TLI	>0.90	0.861
IFI	>0.90	0.883

Modification Index (MI) was used. For the first trial, we chose path one (m4<---->m5), which has a larger MI. The results show some improvements, yet the construct is still not acceptable. So we have a further trial, constructing a second path of t3<---->o2, Results of the goodness of fit indices are shown in Table 14. Values of χ^2/df, RMSEA, CFI, and IFI meet the acceptable norm, while values of GFI, NFI, TLI are a little higher than the norm. As the size of the study is not large,

the model is still acceptable.

Table 14. Goodness of fit indices for modified model (two paths added).

Index	Norm	Value
χ^2	-	259.191
χ^2/df	1~3	1.788
RMSEA	<0.10	0.094
GFI	>0.90	0.771
CFI	>0.90	0.902
NFI	>0.90	0.807
TLI	>0.90	0.885
IFI	>0.90	0.905

Further analysis of the two added paths is given to test the reasonability of the modified model.

m4 and m5 are the residual errors of MA4 and MA5, two items of the maturity of FSSC. m4 tests the customer orientation of FSSC. A customer-oriented FSSC normally emphasizes the customer relationship, hoping to increase the satisfaction and royalty of customers. These two are the performance measures usually embedded in the performance management system. The more customer-oriented, the better performance management, and vice versa.

t3 is the residual error of the item of technological factor T3, i.e., the company has continuous maintenance of the IT equipment. o2 is the residual error of the item of technological factor O2, i.e., the top managers deem it necessary to implement FSSC to optimize the financial process. When the managers pay more attention to the implementation of the company's FSSC, they will support the IT adoption. As a result, continuous maintenance of the IT system will be necessary, and vice versa.

It is economically reasonable for the two paths to exist.

The modified SEM is shown in Figure 2.

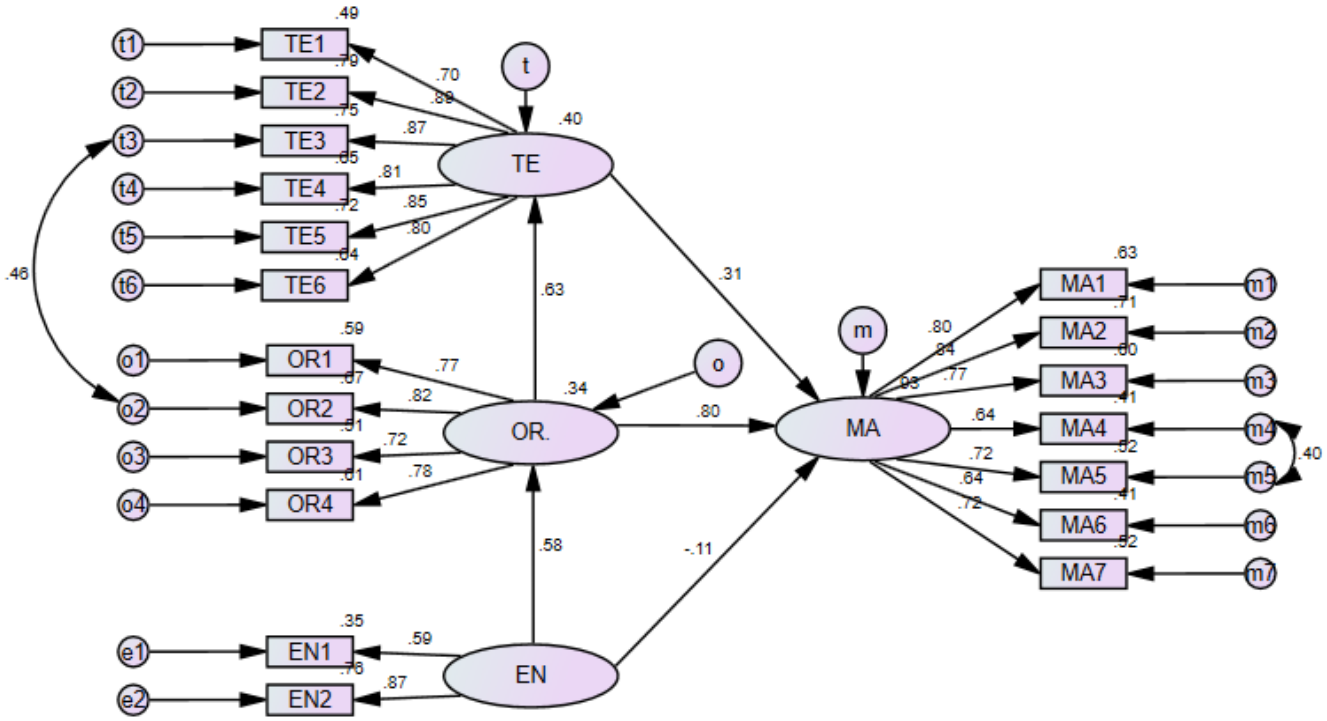

Figure 2. Modified SEM.

4.6.2. Hypothesis Testing

SEM is used to test the relationship among hypotheses. Results are shown in Table 15. All except for H3 have been tested. Both technological or organizational factors have positive effects on the maturity of FSSC.

Environmental factors have no significant impact on the maturity of FSSC (r = -0.111, p=0.313). A negative CR value shows that the policies or industry pressures do not have substantive effects on maturity of FSSC. H3 is not supported. A possible reason may be the ownership structure of the sample companies. Of the 91 samples, 53 (58%) have no state capital. Compared to SOEs, these companies are less sensitive to governmental policies. Supporting policies are most often targeted at SOEs, and the practices of FSSC are required to be

adopted by large SOEs first. As for non-SOEs, the effect is not significant.

Interrelationships between variables are tested too. H4 and H5 are supported. It is also implied that environmental factors have impacts on organizational and technological factors, so it has indirect effect on FSSC.

Table 15. Results of hypothesis testing based on modified SEM model.

Hypothesized Path /Structural relationship	Standardized Estimates	C. R. Value	P Value	Is hypothesis Supported?
Technology→ Maturity	0.305	3.358	0.000	supported
Organization→ Maturity	0.799	5.724	0.000	supported
Environment→ Maturity	-0.111	-1.009	0.313	Not supported
Environment→ Organization	0.582	3.192	0.001	supported
Organization→ Technology	0.635	5.211	0.000	supported

Effects of latent variables on maturity of FSSC are summarized in Table 16. The total effect of organizational factors on the maturity of FSSC is the greatest (0.993), with a direct effect of 0.799 and an indirect effect of 0.194 (by impacting the technological factor). Although environmental factors do not have direct effects, they have indirect effects (0.578) through the impact on organization and technology conditions.

Table 16. Direct effects, indirect effects and total effects of the constructs.

Constructs	Direct effects	Indirect effects	Total effects
Technology→ Maturity	0.305	0.000	0.305
Organization→ Maturity	0.799	0.194	0.993
Environment→ Maturity	0.000	0.578	0.578

5. Conclusion and Recommendation

It is recognized that the establishment of FSSC leads to an increase of efficiency and the cutting of costs in the finance function. In the age of digital economy, FSSC has gained great popularity. However, the maturity level varies, and on average, many companies are still in the beginning phase of implementing FSSC. To succeed in the future, companies should not focus on the technology nature of the service. Influencing factors and the interrelationships among them should be emphasized.

In the paper, based on the TOE model and the maturity model of FSSC, the authors analyzed the data collected from a questionnaire, using SEM. The results suggest that both technological and organizational conditions have positive effects on the maturity level of FSSC. The external environmental factors do not have direct impacts on the implementation of FSSC; however, they have indirect effects through the impact on the technological and organizational conditions of the firms. In addition to that, the organizational conditions have the greatest effects on FSSC establishment.

It is recommended that companies should focus the organizational conditions and have a proper strategic plan for the business transformation, rather than taking the FSSC implementation as a practice by the finance function alone. Keeping a keen eye on the environmental factors, especially the policies and trends of best practice in FSSC, may help the companies to reevaluate their digital strategy and push their digitalization of finance functions to a deeper level.

Due to the time limit, the size of the sample in the study is not large, yet with the validity, the conclusions are reasonable.

Abbreviations

MNC	Multinational Company
FSSC	Financial Shared Service Center

FSS	Financial Shared Service
SEM	Structural Equation Modeling
TOE	Technology-Organization-Environment
PwC	PricewaterhouseCoopers
IDC	International Data Corporation
ERP	Enterprise Resource Planning
IMA	Institute of Management Accountants
SSC	Shared Service Center
BPR	Business Process Re-engineering
ZTE	Zhongxing Telecom Equipment
GBS	Global Business Service
KPMG	Klynveld Peat Marwick Goerdeler
SMAC	Social Mobile Analytics and Cloud
SOE	State Owned Enterprise
RPA	Robotic Process Automation
KMO	Kaiser-Meyer-Olkin
CITC	Corrected Item-Total Correlation
AVE	Average Variance Extracted
CR	Composite Reliability
RMSEA	Root Mean Square Error of Approximation
GFI	Goodness of Fit Index
CFI	Comparison Fit Index
NFI	Normed Fit Index
TLI	Tucker-Lewis Index
IFI	Incremental Fit Index
MI	Modification Index
CIPFA	Chartered Institute of Public Finance and Accountancy

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Data Availability Statement

The data is available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

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