Strategic Orientation of Servitization in Manufacturing Firms and its Impacts on Firm Performance

Abstract

Purpose – The purpose of this study is to provide implementation insights and implications regarding the strategic orientations of servitization by testing its impacts on firm performance, including financial performance and customer service performance.

Design/methodology/approach – Empirical research is conducted using an online survey disseminated to manufacturing firms in southeast China. This research develops and verifies a strategic fit framework to understand the relationship between the strategic orientation of servitization and service innovation, and its resulting impacts on firm performance.

Findings – The results show that service orientation has direct positive impacts on firm performance in the manufacturing sector. Customer orientation and learning orientation have no direct impact on firm performance, although they have indirect impacts on it via the mediating role of service innovation capability. Moreover, service orientation has a similar indirect impact on firm performance via service innovation capability.

Research limitation/implications – The survey focuses only on China; future studies should verify whether different cultural backgrounds impact the research results.

Practical implications – The results suggest that firms should build up three strategic orientations (service orientation, customer orientation, and learning orientation) for implementing servitization to facilitate service innovation capability and thus to improve firm performance.

Originality/value – This research contributes to enhancing the theory of servitization by developing a strategic fit model of servitization and revealing the impact mechanism of servitization in the manufacturing sector.

Keywords: servitization, service innovation, strategic orientation, service-dominant logic, firm performance, manufacturing systems, manufacturing strategy

Article classification – Research paper

1. Introduction

An increasing number of manufacturers have realized that competitive advantage may be gained from servitization (Bustinza et al., 2017), which is the innovation of a manufacturer's capabilities and processes to move from selling products to selling integrated product–service offerings that deliver value in use (Baines et al., 2011). Since this strategy has been proven to bring benefits to manufacturing firms, they are increasingly attempting to create greater value and competitive advantage through services rather than physical products (Settanni et al., 2014).

However, implementation of a servitization strategy in manufacturing firms is still under-explored. One research gap within current studies is that there are very limited insights and guidance on how those promised benefits can be achieved. For example, many manufacturing firms are still struggling to earn the promised benefits and performance from innovating their service provision (Stanley and Wojcik, 2005). It has been found that transferring from being a manufacturer to being a service provider is not easy (Parry et al., 2012), and services in manufacturing are actually slowly becoming commoditized to achieve the expected competitive advantage (Opresnik and Taisch, 2015).

Another gap in the extant literature is that the way in which servitization influences firm performance, especially financial performance (FIP), is unclear (Fliess and Lexutt, 2018). Some empirical studies have claimed that additional services will have a positive marginal effect on the firm's overall profits; however, results have also indicated that this will only happen when the sales of services equate to the majority of overall sales in product-centric firms (Suarez et al., 2012). Moreover, research has argued that servitized firms sometimes generate lower net profit as a percentage of revenue, compared to manufacturing firms (Neely, 2008). This lack of clarity and context-limited financial benefits may delay the adoption of servitization in manufacturing firms, or even disengage them from innovating their service business models (Kowalkowski et al., 2015).

In light of the above research gaps, there is a growing need to understand the impacts of servitization strategy on firm performance in the manufacturing sector. This leads to two research questions, which will be addressed in this paper:

RQ1: What strategic orientations should manufacturing firms focus on when implementing a servitization strategy?

RQ2: How does servitization strategy impact firm performance, including financial performance (FIP) and customer service performance (CSP)?

Unlike previous research, this paper adopts a strategic fit model to reflect the relationships between strategic orientation of servitization and strategic capability, and the resulting impacts on firm performance. Meanwhile, this research adopts service-dominant (S-D) logic (Lusch and Vargo, 2014), the strategic innovation paradigm (Sundbo, 1997), and the social capital theory of innovation (Leenders and Gabbay, 2013) to develop dimensions of the strategic orientation of servitization. The research results are expected to contribute to the knowledge of servitization, particularly in the manufacturing sector, by empirically testing its impacts on both FIP and CSP, and by investigating its impact pathways on firm performance. Meanwhile, the results have implications for both researchers and practitioners with respect to effective means of implementing a servitization strategy in manufacturing firms.

The remainder of the paper is structured as follows. The next section outlines the theoretical background against which the conceptual framework for the research is developed. In the third section, hypotheses are developed based on the conceptual framework. The fourth section presents the research methods. The fifth section illustrates the results of the structural equation modeling (SEM) analysis with the collected data. Some concluding remarks are made, and future research directions discussed, in the last section.

2. Theoretical background and research framework

Servitization is usually considered from a strategic perspective (Kastalli and Van Looy, 2013). Therefore, the proposed framework of this research is mainly based on theories pertaining to strategy. The conceptual framework (see Figure 1) is grounded in several theories, including the strategic fit model, the strategic innovation paradigm, and the social capital theory of innovation.

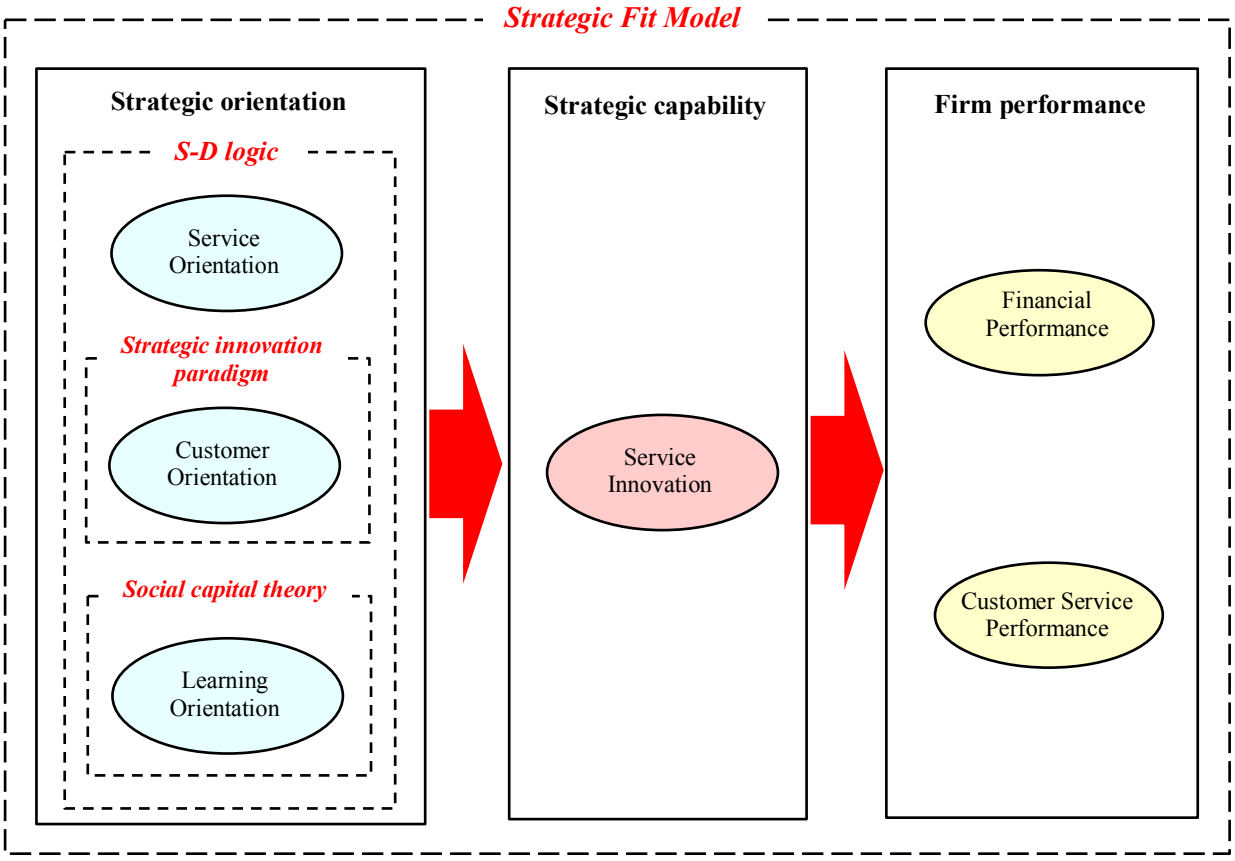

Figure 1 – Conceptual research framework: Strategic fit model of servitization

2.1 Strategic fit model

The strategic fit perspective emphasizes the alignment between manufacturing strategy and strategic capabilities that drive firm performance, which indicates that consistency between the resources and capabilities possessed by companies, and their strategic orientation, influences

their market performance (Camelo-Ordaz et al., 2003). For example, competitor orientation and innovation orientation contribute significantly to marketing capabilities, which in turn have a positive impact on firm performance (Theodosiou et al., 2012). Furthermore, the appropriate alignment of strategic orientation and strategic capability positively impacts new service development performance (Storey and Hughes, 2013). Following this perspective, the current research develops a strategic fit model to advance understanding of the relationship between strategic orientations of servitization and strategic service innovation (SI) capability, and the fit resulting in impacts on firm performance.

Strategic orientation: Servitization represents an increasingly critical competitive strategy for manufacturing firms (Lee et al., 2016), and should thus be understood first at the strategic level. This research adopts the concept of strategic orientation to explore how servitization can be implemented so as to access its anticipated benefits. As discussed broadly in the manufacturing context, a firm's strategic orientation reflects the strategic direction implemented by the firm to create appropriate behaviors for the continuous superior performance of its business (Menguc and Auh, 2005). Aligning the strategic orientation with the innovation strategy is essential for the success of innovation (O'Regan and Ghobadian, 2005).

Service innovation: Following the transition from product to service, innovation is increasingly regarded as one of the strategic capabilities needed to obtain and maintain competitive advantage, beyond the classical capabilities of cost, quality, time, and flexibility (Dörner et al., 2011). Furthermore, servitization can be seen as developing an organization's innovation capabilities by effecting a shift from products to product–service systems (Kastalli and Van Looy, 2013). Nowadays, SI capability is typically discussed in relation not only to service firms, but also, widely, manufacturing firms (McDermott and Prajogo, 2012). The

current research investigates how implementing a servitization strategy can enhance SI capability in manufacturing firms.

2.2 Three dimensions of strategic orientation of servitization

With respect to strategic orientation, this research proposes three dimensions – service orientation (SO), customer orientation (CO), and learning orientation (LO) (see Figure 1) – which are grounded on the insights provided by S-D logic, the strategic innovation paradigm, and social capital theory, respectively.

S-D logic focuses on service provision and value propositions, rather than goods manufacturing as per the traditional "goods-dominant (G-D) logic" (Lusch and Vargo, 2014). S-D logic is captured in 10 foundational premises (FPs), which were intended to establish a framework for the service-centered mindset. The three dimensions of strategic orientation of servitization can be explained with reference to the 10 FPs, as summarized in Figure 2 and explained in detail below.

2.2.1 S-D logic: Service orientation

Above all, in order to achieve success in their service offering manufacturers should be sufficiently service oriented (Davidsson et al., 2009). SO has been defined as "an organization-wide embracement of a basic set of relatively enduring organizational policies, practices and procedures intended to support and reward service-giving behaviours that create and deliver 'service excellence'" (Lytle et al., 1998, p.136). Manufacturers intend to develop their service offerings as they develop their organization, and strive towards increasing SO (Gremyr et al., 2010).

According to the FPs (Lusch and Vargo, 2014), service is the fundamental basis of exchange (FP1), while goods are distribution mechanisms for service provision (FP3), rather than the basic unit and focus of exchange (FP2). These FPs highlight a transition from a product

orientation in G-D logic to a SO in S-D logic (Lusch and Vargo, 2006), which is in line with the industry transition of moving product dominance towards a SO. Furthermore, creating a service-oriented culture is actually regarded as one of the determinants of success in the servitization process (Kinnunen and Turunen, 2012).

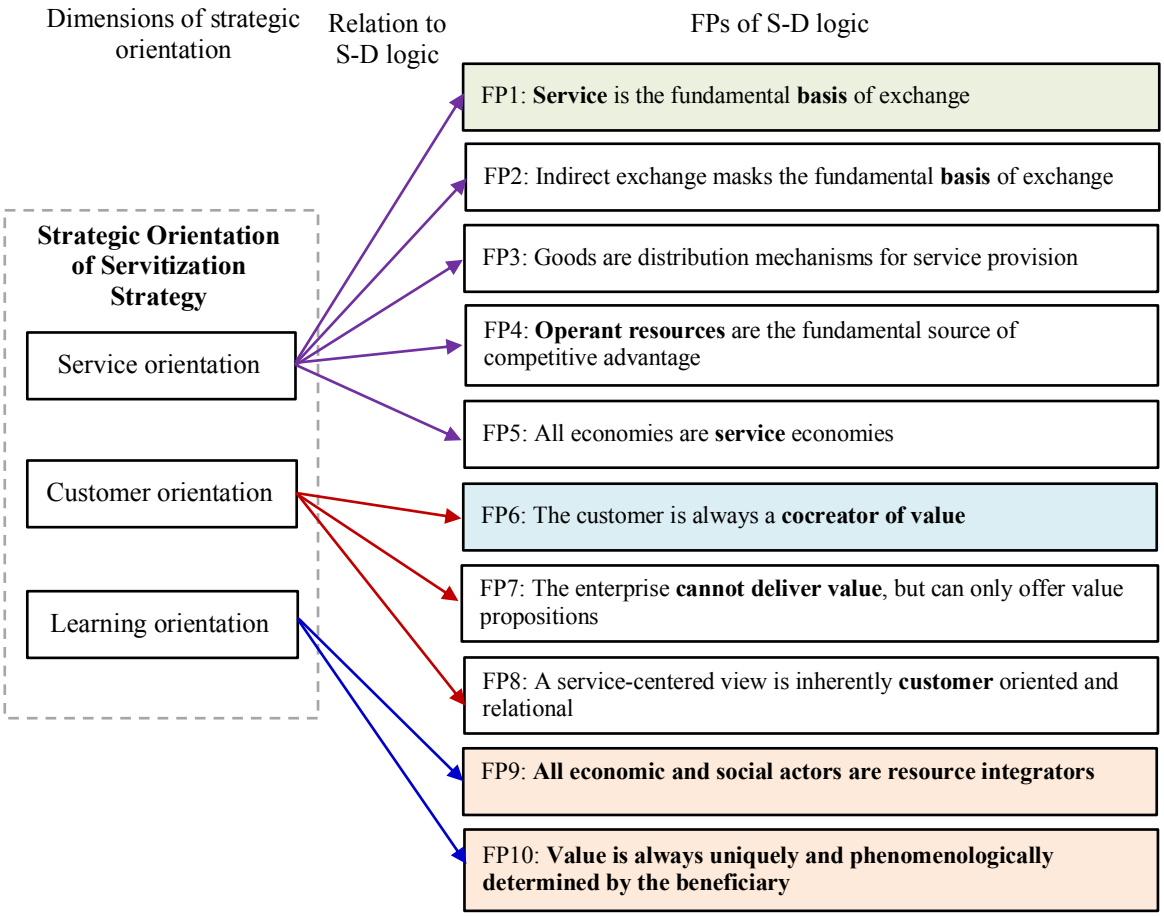

Figure 2 – Framework of strategic orientation of servitization from the perspective of S-D logic

2.2.2 Strategic innovation paradigm: Customer orientation

This paradigm highlights that customer desires and demands communicated to employers act as inspiration for innovation (Sundbo, 1997). For manufacturing firms, a key feature of servitization strategy is strong customer-centricity (Roy et al., 2009). For one thing, customer-focused combinations of products and services require close links between manufacturers and

their customers (Raja et al., 2013). For another, such value is usually defined as value-in-use, which indicates that customers can only evaluate the value of product and service combinations through usage (Vargo and Lusch, 2004).

To explore the operational implications of servitization, a customer-orientation perspective is suggested to investigate the transition from focusing on product to focusing on service (Smith et al., 2014). CO can be defined as "the set of beliefs that puts the customer's interest first, while not excluding those of all other stakeholders such as owners, managers, and employees, in order to develop a long-term profitable enterprise" (Deshpandé et al., 1993, p.27).

CO can be explained with reference to the core of S-D logic, that the customer is the cocreator of value (FP6, FP7). CO is directly indicated in FP8, and represents a disciplinary shift from a product to a CO (Lusch et al., 2007).

2.2.3 Social capital theory of innovation: Learning orientation

The social capital theory of innovation highlights the importance of increasing the speed and efficiency of information transformation and new knowledge development (Leenders and Gabbay, 2013). During implementation, it has been suggested that servitization be considered as a learning process that change corporate's practical, behavioral, and intellectual habits; however, this process is not easy and entails many contradictory situations (Einola et al., 2016). Such learning activities play important roles in developing capabilities to successfully implement a servitization strategy, which relies more on intangible (learning perspective) (Rabetino et al., 2017) and dynamic operant resources than on tangible operand resources for competitive advantage (FP4). However, manufacturers should be able to learn to adapt and change in order to offer competitively compelling value propositions by appropriately integrating operand and operant resources (FP9, FP10), and to improve the customer's experience (FP10) (Lusch et al., 2010).

Based on the social capital theory of innovation, this research proposes a LO as another element of servitization strategy. LO can be defined as the development of new knowledge or insights that have the potential to influence behavior through values and beliefs within the culture of an organization, and has been proven as one of the key factors of successful product innovation (Baker and Sinkula, 2002). Supporting individual learning, promoting knowledge sharing, and creating organizational learning culture have been regarded as effective approaches to help employees prepare for servitization (Lertsakthanakun et al., 2012).

2.3 Relationship between service orientation towards service innovation and firm performance

2.3.1 Service orientation: Service innovation

The complexity of the relationship between service strategy and SI has been highlighted by Lightfoot and Gebauer (2011). Firms with a strong SO often have a competitive edge in mature markets as they can offer superior services to their customers (Lytle and Timmerman, 2006). These manufacturing firms will usually focus on increasing the number and quality of service offerings (Kowalkowski, 2010), which leads to the development of SI capability.

However, implementing a SO still entails challenges and paradoxes for servitized manufacturing firms (Roos, 2015). For instance, readiness and unpreparedness have been revealed as significant challenges to increasing SO based on a study of over 300 manufacturing firms in Sweden (Brown et al., 2009). Hence, this research suggests the following hypothesis:

H1a. *SO has a positive impact on SI (capability) in the manufacturing sector.*

2.3.2 Service orientation: Firm performance

From an organizational viewpoint, a high-level orientation towards services will positively contribute to organizational performance (Lytle and Timmerman, 2006). It has been

highlighted that SO will enhance FIP in transitional markets (Lynn et al., 2000), including industries such as retail banking, healthcare/hospitals, and business-to-business e-commerce. It is believed that a SO in terms of the behavior of both manager and employee is positively associated with overall business performance in manufacturing companies (Gebauer et al., 2010).

Meanwhile, a service-oriented company will strive to satisfy customers, create and deliver customer value (e.g., service quality and service value) in the market, and increase company performance and profitability. Furthermore, organizations that pursue a service-oriented business strategy intend to build long-lasting relationships with customers and can thus enhance customer commitment, and SO also has proven positive impacts on customer satisfaction and loyalty (Kim, 2011).

Hence, the following hypotheses are defined:

H1b. *SO has a positive impact on firms' FIP in the manufacturing sector.*

H1c. *SO has a positive impact on firms' CSP in the manufacturing sector.*

2.4 Relationship between customer orientation towards service innovation and firm performance

2.4.1 Customer orientation: Service innovation

According to the extant literature, CO plays an important and positive role in SI. For example, building close communication with the customer is regarded as a determinant of the success of SI, and SI has been proven to be closely linked with customer involvement (Gustafsson et al., 2012). Meanwhile, SI may result from a firm's ability to focus on thinking on behalf of the customer so as to achieve an outcome beyond the customer's expectation (Kandampully, 2002). Survey results have also shown that a CO together with a future market focus increases willingness to cannibalize existing technology, service portfolios, and routines,

which in turn stimulates firm innovativeness (Hillebrand et al., 2011). It has been found that CO stimulates incremental SI, while inter-functional coordination spurs radical SI (Cheng and Krumwiede, 2012).

However, those results have mainly been found in service organizations, such that its impacts in the manufacturing sector remain under-investigated. Hence, the following hypothesis is defined:

H2a. *CO has a positive impact on SI in the manufacturing sector.*

2.4.2 Customer orientation: Firm performance

CO has been proven to have positive impacts on firm performance in terms of profitability, sales growth, and new product success in certain industries. Taking the retail industry as an example, CO is positively related to retailers' performance in understanding and meeting the needs of their customers (Beitelspacher et al., 2012). In the hotel industry, CO has positive impacts on firm performance in terms of service quality, customer satisfaction, employee satisfaction, and objective measures of performance (Agarwal et al., 2003). For small business enterprises, there is also a positive link between CO and firm performance (Appiah-Adu and Singh, 1998).

This research proposes the following hypotheses to test this in the manufacturing sector:

H2b. *CO has a positive impact on firms' FIP in the manufacturing sector.*

H3c. *CO has a positive impact on firms' CSP in the manufacturing sector.*

2.5 Relationships of learning orientation on service innovation and firm performance

2.5.1 Learning orientation: Service innovation

Organizational learning is regarded as one of the dynamic capabilities that create SI (Agarwal and Selen, 2015). Indeed, evidence has suggested that higher levels of innovativeness

are associated with cultures emphasizing learning and development (Pesämaa et al., 2013). A firm that is committed to learning will enhance its innovation capability by having state-of-the-art technology, understanding customer value, and closely monitoring competitors' actions (Calantone et al., 2002). It is also believed that organizational learning and LO will contribute greatly to SI (Melton and Hartline, 2013).

Such a relationship has been widely explored in the service sector, but in the manufacturing sector research on the relationship remains scarce. To further explore this, the following hypothesis is developed:

H3a. *LO has a positive impact on SI in the manufacturing sector.*

2.5.2 Learning orientation: Firm performance

In the public sector higher service quality and higher performance from innovative activity are associated with higher LO (Salge and Vera, 2012). Hence, LO may become one of the primary means of gaining and maintaining competitive advantage in a turbulent competitive environment (Sinkula et al., 1997). Furthermore, with a high willingness to question well-operated organizational systems and update fundamental operating philosophies, a learning-oriented firm is believed to be able to achieve superior long-term performance (Mone et al., 1998).

Based on the above discussion, the following hypotheses are developed:

H3b. *LO has a positive impact on firms' FIP in the manufacturing sector.*

H3c. *LO has a positive impact on firms' CSP in the manufacturing sector.*

2.6 Relationship between service innovation and firm performance

It is widely believed that SI has positive impacts on firm performance (McDermott and Prajogo, 2012). Furthermore, SI has the potential to generate new markets or to reshape existing ones

(Berry et al., 2006). Empirical data has also found that there is no significant difference between manufacturing and service firms in either product or process innovation performance, though the relationship between innovation and business performance is stronger in manufacturing firms than in service firms (Prajogo, 2006).

Most research on the relationship between servitization strategy and firm performance has focused on FIP (Suarez et al., 2012), such as revenue/turnover and profitability. However, the customer plays a much more important role in SI (Gustafsson et al., 2012). Hence, this research measures firm performance according to two dimensions: FIP and CSP. Therefore, the following hypotheses are devised:

H4. *SI has a positive impact on firms' FIP in the manufacturing sector.*

H5. *SI has a positive impact on firms' CSP in the manufacturing sector.*

2.7 Mediating role of service innovation on the strategic orientation–firm performance relationship

The classical strategy–performance paradigm has highlighted the relationship between strategic orientation and firm performance (Voss and Voss, 2000). However, the relationship may not always be direct; for example, the mediating role of dynamic capabilities has been highlighted in the relationship between strategic orientation and firm performance (Sarkar et al., 2016).

In particular, the strategic capability literature has suggested that operational capabilities may mediate the link between service strategy and FIP (Raddats and Burton, 2011). For example, research has highlighted innovation as a mediating link between strategic orientation and organizational performance (Han et al., 1998). SI has been verified as playing a meditating role between CO and firm's market performance (Grawe et al., 2009). Specifically, for new service development (NSD), it has been revealed that NSD capability is important to support the impacts of strategic orientation on NSD performance (Storey and Hughes, 2013).

Hence, this research suggests that SI plays a mediating role in the proposed strategic fit model of servitization. The below hypotheses are developed to test and verify the mediating role of SI.

H1d. *SI mediates the relationship between SO and firm's FIP in the manufacturing sector.*

H1e. *SI mediates the relationship between SO and firm's CSP in the manufacturing sector.*

H2d. *SI mediates the relationship between CO and firm's FIP in the manufacturing sector.*

H2e. *SI mediates the relationship between CO and firm's CSP in the manufacturing sector.*

H3d. *SI mediates the relationship between LO and firm's FIP in the manufacturing sector.*

H3e. *SI mediates the relationship between leaning orientation and firm's CSP in the manufacturing sector.*

In order to fully understand the interrelationships within servitization, the conceptual framework and its hypotheses are shown in Figure 3.

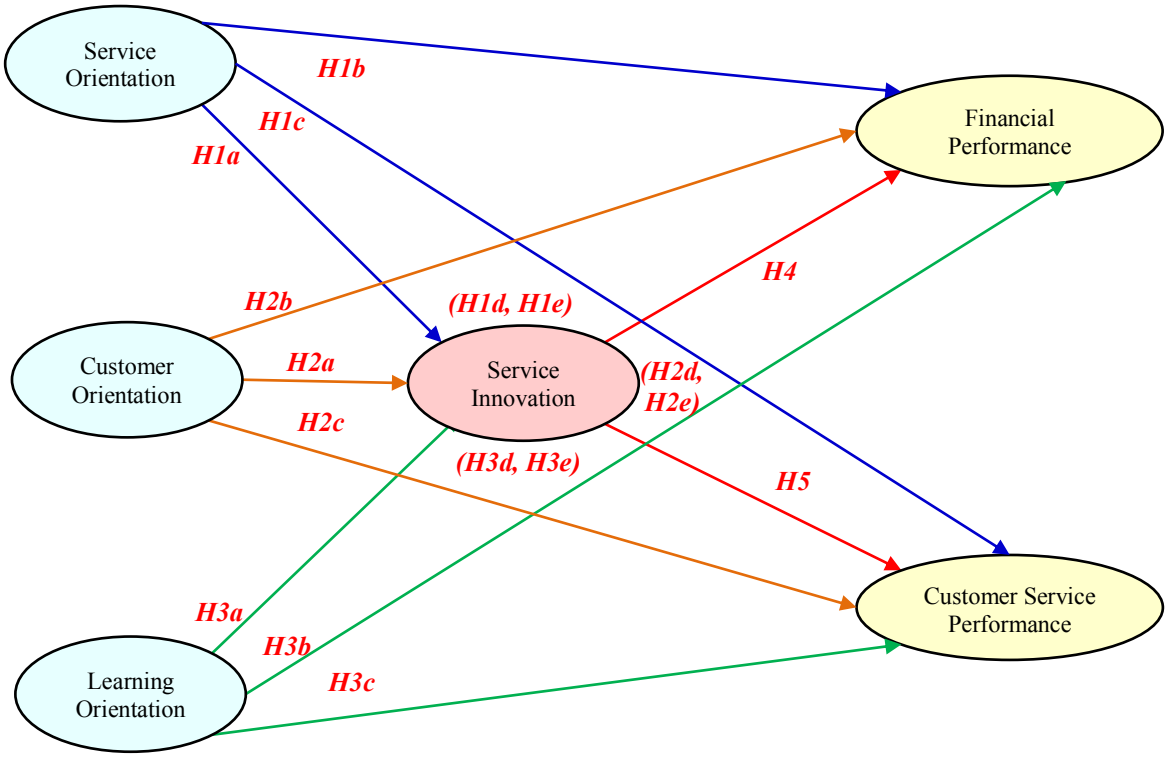

Figure 3 – Structural relationships and hypothesis

3. Research methodology

The above literature review was primarily used to develop the hypotheses and the research framework. A survey was designed for this research (Forza, 2002), and the data were collected via online survey and analyzed using SEM techniques.

3.1 Sample and respondent profile

An online questionnaire was designed and distributed to 600 members of a manufacturing industry association in southeast China. General managers, R&D managers, and engineering managers were invited to take part in the survey. Since the research focused primarily on the strategy level, these managers were considered appropriate to answer the questions from a strategic view, based on their experiences and knowledge of their firms and industries. In total, 364 samples were collected (response rate = 60.7%); 231 respondents completed all questions,

and the rate of valid respondents was 38.5%. Table 1 shows the basic characteristics of the 231 respondents.

Table 1 – Basic characteristic of the respondents (n=231)

Category	Number of firms	Percentage (%)
Firm type		
State owned	33	14.3
Private	120	51.9
Joint venture with foreign investment	42	18.2
Joint venture without foreign investment	26	11.3
Unidentified	10	4.3
Company history (years)		
0–5	27	11.7
6–10	35	15.2
11–15	42	18.2
16–20	32	13.9
>20	95	41.1
Number of employees		
<=50	14	6.1
51–100	19	8.2
101–300	28	12.1
301–500	24	10.4
>500	146	63.2
Capital (million RMB)		
<1	5	2.2
1–5	11	4.8
5–10	15	6.5
10–50	24	10.4
>50	176	76.2
Annual sales (million RMB)		
10–100	6	2.6
101–1,000	30	13.0
1,001–10,000	48	20.8
>=10,001	38	16.5
Unidentified	109	47.2
R&D department for service design and development?		
Yes	116	50.2
No	115	49.8

Among the respondents, 73.2% had over 10 years' experience in the manufacturing industry, which enhanced the likelihood of obtaining appropriate answers from those managers. From the viewpoint of capital, most respondents worked for medium-sized or large companies.

3.2 Measurement scale

The measurement instruments used in this research were derived from an extensive literature review. Appendix 1 provides the survey items for each measurement in this research.

The measurement items for SO in this research are mainly adapted from Lytle and Timmerman (2006), and cover four components: service leadership practices, service

encounter practices, service system practices, and human resource management practices. CO is measured with items mainly adapted from Grawe et al. (2009). LO is also conceptualized as a second-order construct with four subdimensions, including commitment to learning, shared vision, open-mindedness, and intraorganizational knowledge sharing. The first three are measured using items from Sinkula et al. (1997), and the last is measured using items adapted from Calantone et al. (2002).

SI was measured with items adapted from Daugherty et al. (2011), Grawe et al. (2009), Thakur and Hale (2013), and Yen et al. (2012). Firm performance was measured through FIP (Ngo and O'Cass, 2013) and CSP (Yang et al., 2009).

All construct items were measured on a seven-point Likert scale, ranging from 1 (= strongly disagree) to 7 (= strongly agree).

4. Data analysis and results

SEM was used to analyze the data and its relationships (Hair et al., 2006). A two-step approach was followed to test the hypotheses (Anderson and Gerbing, 1988) via AMOS 22.0. In step 1 the measurement model was tested to establish the reliability and validity of the scales used in this research, and the remaining structural relationships were tested in step 2.

4.1 Measurement model, validity, and reliability

4.1.1 Reliability

The reliability of the measurement scale was assessed using Cronbach's α. The Cronbach's α values (see Table 2) for all measurement scales were higher than 0.80, which is greater than the recommended minimum value of 0.70 (Garver and Mentzer, 1999), thus showing good reliability of the measurement scales.

Table 2 – Confirmatory factor analysis (construct)

Measurement items	**Cronbach's α**	Factor loading[a]	*t*-value[b]	Mean	Std. Deviation
Service Orientation (SO)					
Service leadership (SOSL)	**0.947**				
SO1		0.693	12.030	5.6407	1.30080
SO2		0.759	13.716	4.8788	1.52744
SO3		0.806	14.956	5.3723	1.37680
SO4		0.890	17.553	5.0563	1.48948
SO5		0.830	17.689	4.9957	1.57838
SO6		0.894	15.465	5.0087	1.48614
SO7		0.948	17.798	5.2468	1.40331
SO8		0.751	13.341	4.9394	1.45834
SO9		0.813	–	5.3030	1.45481
Service encounter (SOSE)	**0.893**				
SO10		0.858	11.296	5.0693	1.34954
SO11		0.791	10.578	4.9870	1.38777
SO12		0.822	10.876	5.0779	1.37461
SO13		0.842	11.067	5.1602	1.36266
SO14		0.527	9.986	4.2078	1.62056
SO15		0.644	–	4.5455	1.51410
Service system (SOSS)	**0.971**				
SO16		0.778	11.322	5.2165	1.30080
SO17		0.829	11.961	5.2294	1.34623
SO18		0.802	11.622	5.4329	1.29667
SO19		0.818	11.865	5.1082	1.53551
SO20		0.821	11.914	5.1732	1.45225
SO21		0.812	11.954	5.1732	1.41586
SO22		0.864	12.462	5.1645	1.38273
SO23		0.852	12.379	5.0130	1.38149
SO24		0.829	12.097	4.8874	1.49938
SO25		0.840	12.151	4.9740	1.50628
SO26		0.843	12.208	4.9394	1.49368
SO27		0.861	12.390	5.0043	1.44312
SO28		0.870	12.633	4.9567	1.42275
SO29		0.789	11.636	4.7316	1.44667
SO30		0.845	12.371	5.1948	1.32572
SO31		0.688	–	4.5584	1.64312
Human resource management (SOHR)	**0.936**				
SO32		0.872	14.171	5.0649	1.46855
SO33		0.925	16.069	5.0606	1.49659
SO34		0.913	15.808	5.0563	1.46594
SO35		0.894	15.418	4.7879	1.46348
SO36		0.757	–	4.7835	1.48496
Customer Orientation (CO)	**0.893**				
CO1		0.672	–	5.2857	1.23560
CO2		0.809	15.294	5.3074	1.24966
CO3		0.917	12.237	5.5801	1.21632
CO4		0.763	10.741	5.3463	1.26198
CO5		0.694	9.808	5.0087	1.40802
CO6		0.856	9.401	5.4061	1.25362
Learning Orientation (LO)					
Commitment to learning (LOCL)	**0.926**				
LO1		0.787	–	5.1775	1.35088
LO2		0.862	20.259	5.2554	1.31865
LO3		0.871	15.568	5.0476	1.45135
LO4		0.952	17.361	5.1472	1.40959
Shared vision (LOSV)	**0.901**				
LO5		0.828	–	5.1645	1.39213
LO6		0.851	22.174	5.1429	1.41158
LO7		0.918	18.458	4.9610	1.35879
LO8		0.895	14.988	4.2814	1.72035
Open-mindedness (LOOM)	**0.918**				
LO9		0.843	–	4.4848	1.58484
LO10		0.913	19.449	4.6104	1.49918
LO11		0.839	16.775	4.7446	1.33177

LO12		0.837	16.326	5.0390	1.36198
Inter-organizational knowledge sharing (LOIO)	**0.812**				
LO13		0.874	–	4.8615	1.42275
LO14		0.901	26.038	4.7835	1.45240
LO15		0.877	19.379	4.8528	1.46406
LO16		0.854	19.094	4.9870	1.44307
LO17[c]		0.032	18.563	4.1255	1.66467
Service Innovation (SI)	**0.973**				
SI1		0.864	18.530	4.8052	1.29922
SI2		0.818	16.569	4.7965	1.27422
SI3		0.879	18.924	4.6883	1.37613
SI4		0.909	20.529	4.7013	1.40865
SI5		0.922	21.037	4.7056	1.38310
SI6		0.862	18.485	4.6840	1.40485
SI7		0.787	19.311	4.9654	1.30505
SI8		0.862	–	4.8918	1.36142
Financial Performance (FIP)	**0.903**				
FIP1		0.627	–	5.0303	1.26626
FIP2		0.964	10.906	4.8485	1.49157
FIP3		0.960	12.329	4.5844	1.44177
FIP4		0.905	12.239	4.6061	1.49368
FIP5		0.694	9.154	4.6667	1.30106
Customer Service Performance (CSP)	**0.947**				
CSP1		0.927	–	5.1342	1.26635
CSP2		0.836	19.610	5.1169	1.28511
CSP3		0.863	17.077	4.7186	1.34925
CSP4		0.884	17.797	4.9091	1.35308
CSP5		0.792	14.795	4.9827	1.27165

Note: [a] Standardized coefficients; all loadings are significant at $p < 0.001$.
[b] Some *t*-value items are not shown since their loading was fixed at 1.
[c] This is a reverse-scored item.

4.1.2 Validity

As all the scales were directly adapted from prior research (see Appendix 1), content validity was assumed. Convergent validity was assessed by checking the significance of the loading for an item on its posited underlying construct (Anderson and Gerbing, 1988). As demonstrated in Table 2, the loadings and *t*-values for the measurement model indicate that all items load significantly on their posited constructs, which indicates convergent validity.

Furthermore, in order to check the adequacy of the measurement model, discriminant validity was evaluated to ensure that the individual items intended to measure one latent construct did not at the same time measure a different latent construct. As presented in Table 3, the average variance extracted (AVE) by the items of the construct is greater than the average shared variance (square of the correlations in the off-diagonals) between two constructs. This indicates an adequate level of discriminant validity (Garver and Mentzer, 1999).

Table 3 – Correlation, reliability, and validity (n=231)

	AVE	**Composite reliability (ρc)**	SO	CO	LO	SI	FIP	CSP
SO	0.848401	0.975873	1.000					
CO	0.623916	0.977235	0.557	1.000				
LO	0.849906	0.977833	0.908	0.580	1.000			
SI	0.746260	0.992378	0.815	0.561	0.862	1.000		
FIP	0.708937	0.967910	0.593	0.306	0.581	0.641	1.000	
CSP	0.742343	0.987989	0.835	0.557	0.803	0.822	0.756	1.000

4.2 Structural model results

Figure 4 presents the SEM results of the path diagram and loadings specified in the AMOS 22.0 output. The results relating to the fit of the structural model generally support a claim of good fit. Table 4 provides a summary of the goodness-of-fit statistics.

As shown in Table 4, the relative chi-square (chi-square/degrees of freedom) value of 1.796 is less than the recommended maximum value of 3.00 (Kline, 2010), which represents a good fit of the model. The RMSEA value of 0.059 is below the recommended maximum of 0.08 suggested by Browne and Cudeck (1992), which also indicates that the measurement model fits well.

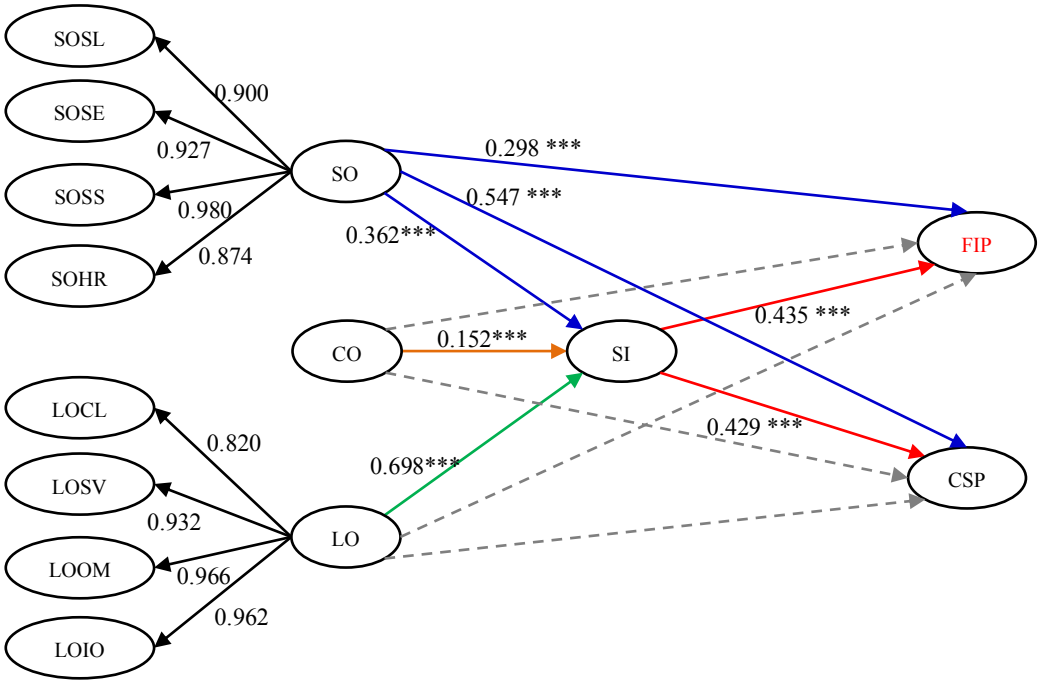

Figure 4 – Path diagram of the structural model

Table 4 – Fit statistics of the structural model (n=231)

Fit statistics	**Overall fit measure**	
	Notation	**Model value**
Chi-square to degrees of freedom	x^2/df	1.796
Root mean square error of approximation	RMSEA	0.059
Goodness-of-fit index	GFI	0.677
Adjusted goodness-of-fit index	AGFI	0.637
Normed fit index	NFI	0.808
Comparative fit index	CFI	0.904
Incremental fit index	IFI	0.905

While the GFI value of 0.677 and the AGFI value of 0.637 are both below the 0.90 level recommended by Byrne (2014), these were affected by the "small" sample size. However, according to Kline (2010), 200 is a typical sample size in SEM studies. As a result, this research also used IFI and CFI to measure the goodness of fit of the model, as IFI and CFI are more appropriate to measure goodness of fit when the sample size is small. The IFI (0.905) and CFI (0.904) index values for the measurement model both exceed the recommended level of 0.90

(Byrne, 2014), which indicates adequate fit of the model. Furthermore, the NFI value of 0.808 indicates reasonable fit.

From the values outlined above, it is inferred that the structural model represents acceptable fit.

4.3 Hypothesis testing and results

The results of the hypothesis tests using the SEM technique are shown in Table 5.

Table 5 – Results of hypothesis tests for the structural model

Hypothesis	Path	Estimate	SE	CR	*p*
H1a	**SO → SI**	**.362**	.052	7.403	***
H1b	**SO → FIP**	**.298**	.048	4.632	***
H1c	**SO → CSP**	**.547**	.059	9.377	***
H2a	**CO → SI**	**.152**	.055	3.371	***
H2b	**CO → FIP**	**-.051**	.048	-0.985	***Reject***
H2c	**CO → CSP**	**.098**	.056	2.166	***Reject***
H3a	**LO → SI**	**.698**	.058	11.835	***
H3b	**LO → FIP**	**-.109**	.058	-1.402	***Reject***
H3c	**LO → CSP**	**-.054**	.069	-0.780	***Reject***
H4	**SI → FIP**	**.435**	.071	4.676	***
H5	**SI → CSP**	**.429**	.079	5.532	***

(*** $p<0.001$)

As expected, *H1a*, *H1b* and *H1c* are all accepted, with estimated coefficients of 0.362 (CR=7.403, p<0.001), 0.298 (CR=4.632, p<0.001), and 0.547 (CR=9.377, p<0.001), respectively. This supports that SO positively impacts SI, which complies with the results in the current literature (Lytle and Timmerman, 2006). Furthermore, it represents new evidence that implementing servitization leads to positive performance in the manufacturing sector, which is complementary to current mixed evidence regarding the impact of SO on firm performance (Kastalli and Van Looy, 2013). This is also in line with the argument that firms who integrate SO into their corporate strategy will be more successful in their servitization (Fliess and Lexutt, 2018).

The results indicate that CO enhances SI. This is supported by the acceptance of *H2a* with an estimated coefficient of 0.152 (CR=3.371, $p<0.001$). However, *H2b* and *H2c* are both rejected. Nevertheless, this is in line with the argument that CO has a negative and nonsignificant effect on firm performance (Ngatno et al., 2014).

The results also highlight that LO facilitates SI (*H3a*). The estimated coefficient for the relationship between LO and SI is 0.698 (CR=11.835, $p<0.001$), which significantly supports *H3a*. This finding is in line with earlier research (Calantone et al., 2002). Unfortunately, *H3b* and *H3c* are both rejected; however, this supports the argument that LO does not provide extensive opportunities for a service organization to attain higher market performance (Lam et al., 2011).

Unsurprisingly, the proposed impacts of SI on FIP (*H4*) and CSP (*H5*) are both strongly supported by the estimates of 0.435 (CR=4.676, $p<0.001$) and 0.429 (CR=5.532, $p<0.001$). More interestingly, SO has two pathways to contribute to firm performance: either directly (*H1b*: SO→FIP, *H1c*: SO→CSP) or indirectly via SI capability as a mediator (*H1d*: SO→SI→FIP, *H1e*: SO→ SI→CSP).

In contrast, neither CO nor LO have a direct impact on firm performance (leading to the rejection of *H2b*, *H2c*; *H3b*, *H3c*). However, SI capability plays a mediating role here which has not found in current literature, ensuring that both CO and LO indirectly impact firm performance (*H2d*: CO→SI→FIP, *H2e*: CO→ SI→CSP; *H3d*: LO→SI→FIP, *H3e*: LO→ SI→CSP).

5. Discussion and implications

5.1 Theoretical contributions

This research contributes to enhancing the theory of servitization by developing a strategic fit model of servitization and revealing the impact mechanism of servitization in the manufacturing sector.

First, in order to address the research gap regarding how servitization actually benefits manufacturing firms (Parry et al., 2012), this research developed a strategic fit model of servitization. The tested model clearly reveals the relationship between strategic orientation towards servitization and strategic SI capability, and its resulting impacts on firm performance in the manufacturing sector. Furthermore, the model enhances understanding of the manufacturing firm's strategic logic, which is required for effective implementation of servitization (Rabetino et al., 2017).

Second, this research proposed and verified three dimensions – SO, CO, and LO – of the strategic orientation within the context of implementing servitization strategy. These three dimensions differ from the framework used in previous research on strategic orientation, which are CO, competitor orientation, and cost orientation (Grawe et al., 2009). The reason for the difference is that previous frameworks were developed mainly based on traditional marketing and strategy theories, but the framework in this research is based on contemporary strategy, innovation, and service theories, including strategic innovation theory, social capital theory, and S-D logic.

Third, strategic orientation has not been explored in depth in the field of SI to date (Storey and Hughes, 2013); hence, the three proposed and verified dimensions of strategic orientation in this research could contribute to linking strategic thinking with SI. The results reflect the emphasis in several studies on the importance of the three orientations in the process of servitization and SI (Rubalcaba et al., 2012).

Fourth, the results confirm that implementing servitization has a positive impact on firm performance in the manufacturing sector, including both FIP and CSP. This result contributes to knowledge of servitization by providing insights necessary to overcome the challenges (in particular regarding financial concerns) of implementing servitization mentioned in the previous literature (Neely, 2008).

Fifth, the results address the research gap to reveal the impact mechanism and transition paths of servitization strategy in the manufacturing sector. They highlight that the positive impacts mentioned above can be achieved via the mediating role of SI capabilities on the relationship between strategic orientation and firm performance. This enriches understanding of the servitization success factors in terms of service-related resources and capabilities (Fliess and Lexutt, 2018).

5.2 Managerial implications

The results suggest that firms should build three strategic orientations (SO, CO, and LO) to implement servitization and thereby facilitate SI capability and improve firm performance. This differs from the traditional marketing and strategy view, which has focused on costs and competitors to achieve competitive advantage in the market (Grawe et al., 2009). However, the finding only highlights the importance of these three orientations within the context of implementing a servitization strategy in the manufacturing sector.

The results reveal that manufacturers could put more focus on building SO when implementing a servitization strategy, because it has both a direct and an indirect impact on firm performance via SI capability. However, even with no direct impacts on firm performance, manufacturers should also focus on CO and LO and their indirect impacts on firm performance.

The results could also further convince manufacturers that implementing servitization and developing SI capabilities will help them to improve both FIP and CSP. The research shows

that manufacturers could adopt S-D logic to understand how to implement a servitization strategy. This means that they should not simply treat services as "add-ons" to products (Foster and Whittle, 1993), but actually extend their views to comprehensively understand and manage the implementation of servitization. For example, they should extend the focus from cost and competitor to service, customer, and learning.

6. Conclusion

This research develops a strategic fit framework of implementing servitization to demonstrate the relationships between strategic orientation and SI capability, and the resulting impacts on firm performance. As with every study, this research is not without its limitations. One of these is that the research was only conducted in the context of manufacturers in southeast China. Hence, future research could try to collect data from different cultural backgrounds to investigate whether cultural background affects the results presented here. Such evidence would enrich the understanding and knowledge obtained. Second, empirical case studies would help to support and verify the results derived from this research.

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