

Service Innovation in Manufacturing and Service Sectors: An Empirical Comparative Study in China

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Abstract

Service innovation has become a strategic source of competitive advantage to companies in both manufacturing and service sectors. However, despite extensive researches on service innovation, many manufacturing firms are still struggling with service innovation due to lack of insights provided to them. One purpose of the study is to provide insights into the nature of service innovation in both the manufacturing context and service contexts, by testing the impacts of *innovation orientation* and *service orientation* on *service innovation*. A second purpose of the study is to explore service innovation's impacts on firm performance. An empirical comparative research with an online survey was conducted with manufacturing and service companies in China. A statistical analysis of results was conducted through confirmatory factor analysis and structural equation modelling by using Amos. The results indicate that service innovation has a positive influence on firm performance. Both innovation orientation and service orientation has positive impacts on service innovation in service companies. However, in manufacturing companies this study shows that only service orientation positively impacts on service innovation, with no direct link between innovation orientation and service innovation.

Keywords: Service Innovation, Strategic Orientation, Firm Performance, Manufacturing Sector, Service Sector

1. Introduction

Along with the fast growth of the service sector and its major contribution to the gross domestic products (GDP), service innovation attracts more and more attentions from both service sector and also manufacturing sector. Indeed, service innovation has become a strategic source of competitive advantages to not only service companies, but also manufacturing firms. More and more manufacturers realized that developing and providing integrated product-service offers may contribute more to gain competitive advantage, such strategy is referred to as “servitization of manufacturing” (Baines *et al.*, 2009; Vandermerwe and Rada, 1988). This also drives manufacturing firms to change their logics of doing business: shifting from goods-dominant logic (GDL) to service-dominant logic (SDL), which regards the services as the basis of business exchange but not the goods (Vargo and Lusch, 2004; 2008; 2014).

However, despite there are bunch of researches on service innovation (Carlborg *et. al.*, 2014), many manufacturing firms are still struggling with service innovation due to lack of insights provided to them (Chae 2012; Kindström and Kowalkowski, 2014). Thus, the purposes of this study

are to undercover the nature and characteristics of service innovation in the manufacturing sectors and to explore its impact on firm performance, and also to compare it with the service sector. The specific research questions defined for this research are,

RQ1: What are the impacts of service orientation and innovation orientation on service innovation in the manufacturing sector and service sector?

RQ2: What are the impacts of service innovation on firm performance in the manufacturing sector and service sector?

This paper aims to provide an empirical analysis on the relation between strategic orientation and service innovation in the manufacturing sectors. The study contributes to the knowledge on service innovation by providing theoretical insights and empirical findings. To pursue this objective, an online survey was conducted with a sample of 231 Chinese companies. The paper is structured as follows: the next section provides some background on service innovation and strategic orientation including service orientation and innovation orientation. The third section presents the research methods. The fourth section illustrates the findings of the structural equation modelling (SEM) analysis over the collected data. Finally, some concluding remarks and future research directions are discussed in the last section.

2. Theoretical paradigms

In the past decades, there emerges a growing body of service-related academic research. In this research, we focus on service innovation in the manufacturing and service sectors.

2.1 Service innovation and firm performance

The early discussions on service innovation could be traced back to 1990s (Miles, 1993), now this conception has been developed in the past 2 decades, and it has been increasingly andworldly acknowledged (OECD, 2005; IfM and IBM, 2008; European Commission, 2009). There are many definitions of service innovation with different angles, but it mainly focused on service product, service processes, and service firms. Regarding the service firms, now the conception of service innovation is not only discussed in service firms (McDermott and Prajogo, 2012), but also widely applied in manufacturing firms (Gremyr, *et al.*, 2010; Ettlíe and Rosenthal, 2012; Kindström and Kowalkowski, 2014).

However, many firms particular from the manufacturing sector struggle to earn the promised benefits from service provision (Baveja *et al.*, 2004; Stanley and Wojcik, 2005), such that service innovation creates benefits for customers and channel partners, whereas the developer might suffer from sacrifices that exceed its modest benefits. For innovation to be economically sustainable, manufacturers must be able to capture an equitable share of the value created.

In this research, we aim to address the difference of service innovation in manufacturing and service sectors. The first part of this is to investigate the relationship between service innovation and firm performance in both manufacturing and service sectors. In terms of the firm performance, since customer plays a much more important role in service innovation (Gustafsson, *et al.*, 2012; van Riel, *et al.*, 2013), we will measure the firm performance with two dimensions, including not only financial performance but also customer performance. Therefore, the following hypotheses are developed:

H1: Service innovation has a positive impact on firm's financial performance (in manufacturing sector, in service sector).

H2: Service innovation has a positive impact on firm's customer performance (in manufacturing sector, in service sector).

2.2 Strategic orientation

Strategic orientation is defined as the “strategic directions implemented by a firm to create the proper behaviors for the continuous superior performance of the business” (Gatignon and Xuereb, 1997; Menguc and Auh, 2006; Narver and Slater, 1990). Align strategic orientation with innovation strategy is essential to the success of innovation (O'Regan and Ghobadian, 2005). Customer orientation and competitor orientation have positive relationship with service innovation, but cost orientation does not (Grawe, *et al.*, 2009). In this research, we mainly investigate the other two strategic orientations, including service orientation and innovation orientation.

2.2.1 Service orientation

In order to understand firms' strategic orientation to service innovation, this research adopted the service-dominant (S-D) logic to observe strategic orientation of firms who pursuing service innovation. The development of the S-D logic is based on the understandings of the changing focus of marketing theory, from tangibles to intangibles, from producers of physical goods to consumers as co-producer (Vargo and Lusch, 2004; more details about the S-D logic, please refer to Vargo and Lusch, 2014). The S-D logic has been regarded as an especially suitable way for examining service innovation (Ordanini and Parasuraman, 2011; Edvardsson and Tronvoll, 2013).

According to the S-D logic (Vargo and Lusch, 2014), service is regarded as the fundamental basis of exchange (FP₁), while goods are defined as a distribution mechanism for service provision (FP₃), not the basic unit and focus of exchange as found in the G-D logic. From an organization view, high-level orientation towards service will positively contribute to the organizational performance according to the results from a research conducted in the retail banking industry context (Lytle and Timmerman, 2006), and also a research in business-to-business (B2B) e-commerce environment (Oliveria and Roth, 2012).

The complexity of the relationship between service strategy and service innovation has been highlighted by Lightfoot and Gebauer (2011). In this research we aim to investigate the differences of the service orientation' impacts on service innovation between manufacturing and service sectors. Hence, the following hypothesis is defined.

H3: Service orientation has a positive impact on service innovation (in manufacturing sector, in service sector).

2.2.2 Innovation orientation

Comparing with the customer orientation that always put customer first, the innovation orientation is different that it put technology first (Berthon *et al.*, 2004). Chen *et al.* (2013) defined innovation orientation as an organization's openness to new ideas and propensity to change through adopting new technologies, resources, skills, and administrative systems. Openness to innovation is the critical part of the innovation process and is determined by the degree of willingness of members in an organization to consider the adoption of new ideas (Hurley and Hult, 1998; Berthon, *et al.*, 1999;

2004). Capacity to innovate refers to the ability of introducing new process, product, or idea in the organization (Hult, *et al.*, 2004).

Hurley and Hult (1998) indicated that innovation orientation is a determinant of organizational innovation. We propose that a firm's service innovation depends on the firm's innovation orientation, to both manufacturing and service firms. We formulate the following hypothesis:

H4: Innovation orientation has a positive impact on service innovation (in manufacturing sector, in service sector).

2.3 Research framework and hypotheses

Figure 1 summarizes our research framework and the research hypotheses proposed above.

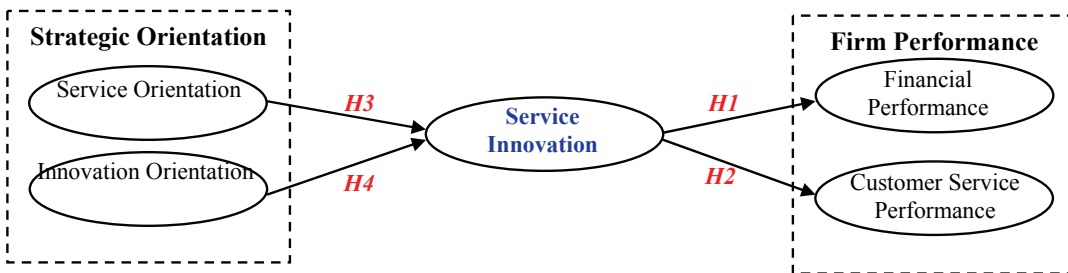


Figure 1 Conceptual Research Framework and Hypotheses

3. Methodology

3.1 Measurement scale

The instruments used to measure strategic orientation and service innovation were generated from an extensive literature review. Items to measure Innovation Orientation (IO) are adopted from Chen *et al.*(2013); Zhou *et al.*(2005), and Ordanini and Parasuraman(2011, originally devised by Hurley and Hult(1998)). Service Orientation (SO) is measured with service leadership (items from Zhou *et al.*(2005); Lytle and Timmerman(2006), originally devised in Lytle *et al.*(1998)), service encounter (items from Lytle and Timmerman (2006), originally devised in Lytle *et al.*(1998)), service system (items from Lytle and Timmerman (2006), originally devised in Lytle *et al.* (1998)), and human resource management (items from Lytle and Timmerman (2006), originally devised in Lytle *et al.* (1998)). Service Innovation (IO) is measured with items adopted from Daugherty *et al.*(2011); Grawe *et al.* (2009);Yen *et al.* (2012); Thakur and Hale(2013).Firm performance is measured through financial performance (Ngo and O’Cass, 2012) and customer service performance (Yang *et al.*, 2009).

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

3.2 Data collection

An online questionnaire was designed and distributed to 600 members of an industry association in South-Eastern China. In total, 364 samples are collected (respond rate is 60.7%), 231 of them completed all questions, hence the valid rate of the respondents is 63.5%. Table I shows the basic characteristics of the 231 respondents.

Table 1 Basic Characteristic of the Respondents

Category	Number of firms	Percentage	Measurement source
Firm type			(Grawe <i>et al.</i> , 2009)
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%	
Industry sector			
Manufacturing	92	39.8%	
Service	116	50.2%	
Other	23	10.0%	
Company history (Years)			(Lin, 2007)
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			(Lin, 2007)
<=50	14	6.1%	
51-100	19	8.2%	
101-3000	28	12.1%	
300-500	24	10.4%	
>500	146	63.2%	
Capital (in million RMB yuan)			(Lin, 2007)
<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 (in million RMB yuan)			(Grawe <i>et al.</i> , 2009)
10-100	6	2.6%	
101-1,000	30	13.0%	
1,001-10,000	48	20.8%	
>=10,0001	38	16.5%	
Unidentified	109	47.2%	
R&D department			(Lin, 2007)
Yes	116	50.2%	
No	115	49.8%	

3.3 Reliability and validity

After data collection, a series of analyses were performed to test the reliability and validity of the constructs based on the sample of 231 respondents. Reliability of the measurement scale is measured by Cronbach's α (Nunnally, 1978). Cronbach's α value for all four measurement scales are above 0.75 (see Table 2), which shows good reliability of the measurement scales, and also it demonstrates that the measurement scales have high reliability (Garver and Mentzer, 1999).

Table 2 Data Reliability

	IO	SO				SI	FP	CSP
		<i>Service Leadership</i>	<i>Service Encounter</i>	<i>Service System</i>	<i>HRM</i>			
Cronbach's α	0.890	0.947	0.896	0.971	0.936	0.973	0.903	0.947

4. Empirical analysis and findings

4.1. Structural equation modelling results

In this research, structural equation modelling (Anderson and Gerbing, 1988) with AMOS 20.0 is used to estimate the conceptual model as described in Figure 1. For the comparative study purpose, we divided the sample into two categories: manufacturing firms (92) and service firms (116). For both groups' SEM models, all the relevant indices are within the recommended range which shows that the measurement models fit well.

For the manufacturing firms, all hypotheses are accepted except H4 is rejected (see Figure 2). While for the service firms, all hypotheses are accepted (see Figure 3)



Figure 2 SEM in the Manufacturing Sector



Figure 3 SEM in the Service Sector

4.2. Research findings

The results indicate that service innovation has a positive influence on firm performance. This is in line with previous researches on service innovation's impact on firm performance.

To service firms, both innovation orientation and service orientation has positive impacts on service innovation. However, to manufacturing firms this study shows that only service orientation positively impacts on service innovation, with no direct link between innovation orientation and service innovation.

One explanation to this, is that the manufacturing firms are more focused on product innovation and adopting and developing new technologies, not focused too much on developing services. Or even when they start to consider service innovation, they still follow the old logic of product innovation. Hence the link between innovation orientation and service innovation is not clear in the manufacturing firms.

To those manufacturing firms, the management implication based on this results is that the managers should figure out how to actually build a service orientation or service logic internally to facilitate the service innovation if they really want to make benefits from service offerings.

To service firms, they should focus on both service orientation and innovation orientation to achieve high level of service innovation, and to achieve higher finance performance and customer service performance.

5. Conclusion

This research has tested the impacts of strategic orientation (including service orientation and innovation orientation) on service innovation and firm performance in terms of finance performance and customer service performance. The results bring insights to both academia and practitioners on service innovation.

One of the future research directions is to collect data in different culture background to investigate whether cultural background will impact the research results here presented. Also firm size as a control variable should be tested in future research.

References

- Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: areview and recommended two-step approach", *Psychological Bulletin*, Vol. 103 No. 3,pp. 411-423.
- Baines, T., Lightfoot, H., Peppard, J., Johnson, M., Tiwari, A., Shehab, E., Swink, M. (2009), "Towards an operations strategy for product-centric servitization", *International Journal of Operations & Production Management*, Vol. 29 No.5, pp. 494-519.
- Baveja, S. S., Gilbert, J., and Ledingham, D. (2004), "From products to services: Why It's not so simple", *Harvard Management Update*, Vol. 9 No. 4, pp. 3-5.
- Berthon, P., Hulbert, J.M. and Pitt, L. (1999), "To Serve or Create? Strategic Orientations toward Customers and Innovation", *California Management Review*, Vol. 42 No. 1, pp. 37-59.
- Berthon, P., Hulbert, J.M. and Pitt, L. (2004), "Innovation or customer orientation? An empirical investigation", *European Journal of Marketing*, Vol. 38 No. 9/10, pp. 1065-1090.
- Carlborg, P., Kindström, D. and Kowalkowski, C. (2014), "The evolution of service innovation research: a critical review and synthesis", *The Service Industries Journal*, Vol. 34 No. 5, pp. 373-398.

Chae, B.K. (2012), "An evolutionary framework for service innovation: Insights of complexity theory for service science", *International Journal of Production Economics*, Vol. 135 No. 2, pp. 813-822.

Chen, J.-S., Tsou, H.T., Huang, A.Y.-H. (2013), "Service delivery innovation: Antecedents and impact on firm performance", *Journal of Service Research*, Vol. 12 No. 1, pp. 36-55.

Daugherty, P.J., Chen, H.Z. and Ferrin, B.G. (2011), "Organizational structure and logistics service innovation", *International Journal of Logistics Management, The*, Vol. 22 No. 1, pp. 26- 51.

Edvardsson, B. and Tronvoll, B. (2013), "A new conceptualization of service innovation grounded in S-D logic and service systems", *International Journal of Quality and Service Sciences*, Vol. 5 No. 1, pp. 19-31.

Ettlie, J.E. and Rosenthal, S.R. (2012), "Service innovation in manufacturing", *Journal of Service Management*, Vol. 23 No. 3, pp. 440-454.

European Commission (2009), "*Challenges for EU Support to Innovation in Services -Fostering New Markets and Jobs through Innovation*", European Commission, Brussels.

Garver, M.S. and Mentzer, J.T. (1999), "Logistics research methods: employing structural equation modeling to test for construct validity", *Journal of Business Logistics*, Vol. 20 No.1, pp. 33-57.

Gatignon, H. and Xuereb, J.M. (1997), "Strategic orientation of the firm and new product performance", *Journal of Marketing Research*, Vol. 34 No. 1, pp. 77-90.

Grawe, S.J., Chen, H.Z., Daugherty, P.J. (2009), "The relationship between strategic orientation, service innovation, and performance", *International Journal of Physical Distribution & Logistics Management*, Vol. 39 No. 4, pp. 282-300.

Gremyr, I., Löfberg, N. and Witell, L. (2010), "Service innovations in manufacturing firms", *Managing Service Quality: An International Journal*, Vol. 20 No. 2, pp. 161-175.

Gustafsson, A., Kristensson, P. and Witell, L. (2012), "Customer co-creation in service innovation: a matter of communication?", *Journal of Service Management*, Vol. 23 No.3, pp. 311-327.

Hurley, R.F. and Hult, G.T.M. (1998), "Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination", *Journal of Marketing*, Vol. 62 No. 3, pp. 42-54.

Hult, G.T.M., Hurley, R.F. and Knight, G.A. (2004), "Innovativeness: Its Antecedents and Impact on Business Performance," *Industrial Marketing Management*, Vol. 33 No. 5, pp. 429-438.

IfM and IBM (2008), "*Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government*", Institute for Manufacturing, Cambridge, MA.

Kindström, D. and Kowalkowski, C. (2014), "Service innovation in product-centric firms: a multidimensional business model perspective", *Journal of Business & Industrial Marketing*, Vol. 29 No. 2, pp. 96-111.

- Lightfoot, H.W. and Gebauer, H. (2011), "Exploring the alignment between service strategy and service innovation", *Journal of Service Management*, Vol. 22 No. 5, pp. 664-683.
- Lin, C.-Y (2007), "Factors affecting innovation in logistics technologies for logistics service providers in China", *Journal of Technology Management in China*, Vol. 2 No. 1, pp. 22-37.
- Lytle, R.S. and Timmerman, J.E. (2006), "Service orientation and performance: an organizational perspective", *Journal of Services Marketing*, Vol. 20 No. 2, pp. 136-147.
- McDermott, C.M. and Prajogo, D.I. (2012), "Service innovation and performance in SMEs", *International Journal of Operations & Production Management*, Vol. 32 No. 2, pp. 216-237.
- Menguc, B. and Auh, S. (2006), "Creating a firm-level dynamic capability through capitalizing on market orientation and innovativeness", *Journal of the Academy of Marketing Science*, Vol. 34 No. 1, pp. 63-73.
- Miles, I. (1993), "Services in the New Industrial Economy", *Futures*, Vol. 25 No. 6, pp. 653-672,
- Narver, J.C. and Slater, S.F. (1990), "The effect of a market orientation on business profitability", *Journal of Marketing*, Vol. 54 No. 4, pp. 20-35.
- Ngo, L.V., O'Cass, A. (2012), "Innovation and business success: The mediating role of customer participation", *Journal of Business Research*, Vol. 66 No. 8, pp. 1134-1142.
- Nunnally, J.C. (1978), "*Psychometric Methods*", McGraw-Hill, NY.
- O'Regan, N. and Ghobadian, A. (2005), "Innovation in SMEs: the impact of strategic orientation and environmental perceptions", *International Journal of Productivity and Performance Management*, Vol. 54 No. 2, pp. 81-97.
- OECD (2005), "*Enhancing the Performance of the Services Sector*", OECD, Paris.
- Oliveira, P. and Roth, A.V. (2012), "Service orientation: the derivation of underlying constructs and measures", *International Journal of Operations & Production Management*, Vol. 32 No. 2, pp. 156-190.
- Ordanini, A., Parasuraman, A. (2011), "Service innovation viewed through a service-dominant logic lens: A conceptual framework and empirical analysis", *Journal of Service Research*, Vol. 14 No. 1, pp. 3-23.
- Stanley, J. and Wojcik, P. (2005), "Better B2B selling", *McKinsey Quarterly*, Vol. 38 No. 3, pp. 15.
- Thakur, R. and Dena Hale, D. (2013), "Service innovation: A comparative study of U.S. and Indian service firms", *Journal of Business Research*, Vol. 66 No. 8, pp. 1108-1123.
- van Riel, A.C., Calabretta, G., Driessen, P.H., Hillebrand, B., Humphreys, A., Krafft, M. and Beckers, S.F.M. (2013), "Consumer perceptions of service constellations: implications for service innovation", *Journal of Service Management*, Vol. 24 No. 3, pp. 314-329.
- Vandermerwe, S., Rada, J. (1988), "Servitization of business: adding value by adding services", *European Management Journal*, Vol. 6 No. 4, pp. 314-324.

Vargo, S.L., Lusch, R.F. (2004), "Evolving to a new dominant logic for marketing", *Journal of Marketing*, Vol. 68 No. 1, pp. 1-17.

Vargo, S.L., Lusch, R.F. (2008), "From goods to service(s): divergences and convergences of logics", *Industrial Marketing Management*, Vol. 37 No. 3, pp. 254-259.

Vargo, S.L., Lusch, R.F. (2014), *Service-Dominant Logic: Premises, Perspectives, Possibilities*, Cambridge University Press, Cambridge.

Yang,C.C., Marlow.PB. and Lu.C.S (2009),"Assessing resources, logistics service capabilities,innovation capabilities and the performance of container shipping service inTaiwan", *International Journal of Production Economics*,Vol. 122 No. 1, pp. 4-20.

Yen, H.R, Wang, W.K., Wei, C.-P., Hsu,S.H.-Y. and Chiu, H.-C. (2012), "Service innovation readiness: Dimensions and performance outcome", *Decision Support Systems*, Vol. 53 No. 4, pp. 813-824.

Zhou, K.Z, Gao, G.Y., Yang, Z.L., Zhou, N. (2005), "Developing strategic orientation in China: antecedents and consequences of market and innovation orientations", *Journal of Business Research*, Vol. 58 No. 8, pp. 1049-1058.