



A STUDY OF DYNAMIC SERVICE INNOVATIVE CAPABILITIES, CORE COMPETENCIES, AND SUSTAINABLE COMPETITIVE ADVANTAGES OF TAIWAN'S FASTENERS INDUSTRY

Kuo-Ming Chu
Cheng Shiu University, Taiwan
k0574@gcloud.csu.edu.tw

Hui-Chun Chan
Far East University, Taiwan
Oscar85@ms55.hinet.net

Abstract

This study integrates service innovation and the dynamic capability perspective to propose a new structure of “*Dynamic Service Innovative Capabilities*”, which firms use to adjust, integrate, and reconfigure internal resources, and to respond to external environmental alterations, in order to enhance the firm's capability to create new capabilities. This study takes 254 fastener firms in Taiwan as the research object, and the results indicate that the core competencies are the key factors for the success of dynamic service innovation capabilities and sustainable competitive advantage; and regardless of the strength or weakness of the market or technical capabilities, it will be significantly affected by the use of organizational learning and capacity reconfiguration in the dynamic capabilities of the enterprise. Finally, in the conclusion, the conditions for nurturing dynamic innovation capabilities in organizations are discussed.

Key words: Dynamic Service Innovative Capabilities; Dynamic Capabilities; Core Competencies; Sustainable Competitive Advantage; Fasteners Industry.

Introduction

In highly competitive and changing environments, operations must be capable of anticipating alterations and constantly be ready to make changes in their

strategy, in order to benefit and preserve their competitive advantage. Recently, strategy researches have attempted to interpret sustainable competitive advantages, as based on a series of innovative service conceptual frameworks, such as

resources, especially popular dynamic capabilities, and core competencies. The dynamic capabilities approach has grown to become an extension of the resource-based view theory; however, as RBV is fundamentally a static theory, it does not account for the evolution of the resources and capabilities that form competitive advantages. In the era of service economy in recent years, the importance of services has grown significantly in both manufacturing and service industries. Why does innovation depend on services? The high-tech and manufacturing industries, of which Taiwan is very proud of, actually contributes only 25% of the GDP, while the remaining 70% comes from the service industry. This data reaches nearly 80% in the US, and it also provides 80% job opportunities. Therefore, the economy of the next generation is definitely driven by services. The main reason is that services are the most important source of contributions for future economies.

Service innovation is a fundamental source of competitive differentiation throughout markets and firms, and in spite of the growing attention from academics and practitioners, to date; the systematic scholarly questions regarding the various needs of the theoretical basis of service innovation have been restricted. The challenge faced by service organizations is to offer new and improved services to clients; therefore, organizations must meet the demands for service innovation in order to undergo growth, increase their degree of productivity and quality of services, & anticipate and respond to changing customer needs (Janssen et al., 2016). Service in-

novation is not just the innovation of the “service industry”, but the innovation of the “service system”, thus, it can include new service contents, new customer interfaces, or explore new market demands, as the focus is on how much new value is offered to customers. In addition, the relationship between dynamic capabilities and a firm’s sustainable competitive advantage is still questioned, and whether service innovation can create value for firms is an important issue in recent years. Therefore, this study is mainly to integrate the impact of dynamic capabilities on service innovation, propose a new perspective of Dynamic Service Innovative Capabilities, and further examine the impact of this capability on the company's core competency and sustainable competitive advantage. This is the main motivation for this study.

The fastener industry has been developed in Taiwan for more than 60 years, and with Kaohsiung as the core, the relevant industry manufacturers are gathering together, which also creates the reputation of a “screw hole”. Through the integrity of the industrial supply chain, it masters key technologies and forms solid competitiveness; especially in automotive screws, which accounts for 28% of the global fastener production value, and has won the reputation of the “car screw” kingdom. In spite of a growing number of reports on fastener industries in Taiwan, a lot of challenges must be completely addressed, for instance: companies in China have posted strong competition and created some anti-dumping cases for Taiwanese companies to shift their focuses to some

higher value-added parts. Therefore, the most urgent thing in Taiwan's fastener industry is to actively develop core capabilities and innovative services to enhance its competitive advantage and position in the global fastener market.

Literature Review and Hypotheses

The Impact of Firm's Service Innovation on Core Competencies in Dynamic Service Innovative Capabilities

Wang & Ahmed (2007) pointed out the capabilities that organizations must emphasize when developing service innovation, meaning they must recombine and create new resources and capabilities, and focus on the benefits of the internal and external knowledge of the organization to develop service innovation to achieve its construction, in order to achieve the ability to build its core competencies to respond to environmental changes. Innovation capability research is principally interested in industry- or firm-specific factors. Strönen et al. (2017) specified that innovation capability, meaning higher-order capability, could cast and handle multiple capabilities. The development of service innovation must be based on the core competence of the organization, in order to continuously inject new kinetic energy into the services provided during the development process, and to consistently accumulate competitive advantages. Therefore, service innovation is closely related to the core competence of the organization. The following hypotheses are presented:

H₁: Firm's service innovative capabilities have positive impact on the firm's core competencies.

Carter & Calamtone (2002) argued that service innovation can be based on changes in the scope of existing service systems, which enables companies to demonstrate different performance than in the past. Chesbrough & Spohrer (2006) pointed out that understanding customer needs is the cornerstone of successful service innovation to attend to customer needs, improve customer interfaces, and enhance customers' more refined services to enhance the core competence of the company. In addition, Tsou et al. (2015) pointed out that innovation will improve the quality of products or services through consistent delivery services, while the indirect profit will improve corporate image, raise customer loyalty, and appeal to potential customers. Finally, Chen et al. (2009) pointed out that a company's technology choices can be combined with the content of innovative services to achieve the appropriate utility, in order that innovative services can proceed smoothly. Based on the review of former studies, the following hypotheses are made:

H_{1a-d}: The (a) new service concept, (b) new client interface, (c) new service delivery system, and (d) of technological options of the firm has positive impact on the firm's core competence (market and technical capabilities).

The Impact of Firm's Dynamic Capabilities on Core Competencies in Dynamic Service Innovative Capabilities

Core competencies are produced by consolidating firm resources, and stem from valuable capabilities, rare capabilities, costly to imitate capabilities, and non-substitutable capabilities, and such capabilities can gain sustainable competitive advantage sources. This study adopts Teece (2007) and Pavlou & Sawy (2010) to consider the dynamic capabilities of firms, which refer to the ability of enterprises to integrate, establish, and reorganize internal and external resources, and constantly create new core capabilities to respond to the external ability of rapid change in the environment. Firm resources show the current business situation, while dynamic capabilities will develop new competitive situations for the future, thus, helping enterprises to move to the next stage of competition. Pisano (2016) further point out that such dynamic capabilities refer to the ability of organizations to purposefully reconfigure their internal and external capabilities to meet rapidly changing environments. Therefore, this study infers the following hypothesis:

H₂: Firm's dynamic capabilities have positive impact on its core competencies.

In addition, firms with dynamic capabilities as the main body will correct the existing problems of the organization through repeated experience accumulation and environmental detection, in order that they can continuously improve their own capabilities, adapt the organization to cope with environmental changes, and believe that dynamic resistance comes from learning. Therefore, competitive advantage depends on the

acquisition and distribution of organizational expertise, as well as on the ability to absorb new knowledge. Learning ability refers to the ability to integrate new concepts or ideas into organizational knowledge. The continuous development of a firm in a rapidly changing environment depends on the organizational mechanism for its transformation and renewal, meaning the organization must constantly reconfigure its resource structure to achieve valuable and necessary internal and external resource transfers, as rapid reconfiguration and transfer for competition is the essence of dynamic capabilities. Therefore, this research develops the following hypotheses:

H_{2a-c}: The higher the degree of (a) coordination, (b) learning, and (c) reconfiguration of firm's resources, the higher the positive impact on the firm's core competence (market and technical capabilities).

According to Teece et al. (2007) and de Wit-de Vries et al. (2018), in order to combine, establish, and reconfigure internal and external capabilities, and to encounter rapidly changing environments, firms must look for potential and emerging integration methods to comprehend its sources of competitive advantages. Therefore, this study develops the following assumptions:

H₃: The higher the degree of firm's dynamic service innovative capabilities, the higher the positive impact on the firm's core competence (market and technical capabilities).

The Impact of Firm's Core Competencies on Sustainability Competitive Advantage

Kabue & Kilika (2016) pointed out that the establishment of core competency can bring and maintain the current competitive advantage; however, to establish the firm's long-term competitive advantage (Sustainable Competitive Advantage), it must be leveraged by core competencies to continuously update and develop, and thus, continue to lead the competition. Therefore, the core can grow within the organization through systematic and complex learning mechanisms; however, firms over-emphasis on internal resources and capabilities at a certain point to establish their core capabilities and develop development strategies will render them unable to explain that, when the external environment changes, some of the firm's core capabilities will be eliminated. Therefore, the above arguments are inferred:

H₄: The firm's core competencies have positive impact on the firm's sustainability competitive advantage (Market-based, Customer-based and Financial-based sustainability competitive advantage).

Methodology

The Conceptual Framework

This paper suggests an integrated theoretic model for linking firm innovation service with sustainable competitive advantage and core competencies, while providing for the role of the external dy-

namic environment of the firm. Therefore, based on the research questions and the aforementioned literature, the overall conceptual framework of this study is organized, and the research structure is shown in Figure 1.

Data Collection

This study uses the database provided by China Credit Information Service Ltd., and takes Taiwan's fastener industry as the main research sample. A total of 400 electronic questionnaires were sent out between February and May 2018, a total of 254 valid questionnaires were collected, and the effective questionnaires accounted for 67.0% of the total questionnaires. The capital of the collected sample companies in this study is mainly under 3 million, accounting for 49.1%. In terms of turnover, it is more than 10 million, accounting for 29.8%; in terms of the number of employees, most of the companies with samples below 100 are about 85%. In terms of the education level of the respondents, the highest is university, accounting for 82.5% of the total sample; the respondents are the most in the period of 6 to 10 years. In terms of job positions, managers account for the most (30.5%). The role played by the project is the largest number of project managers, accounting for 26.0%.

Empirical Study

The impact of dynamic service innovation Capabilities on the Firm's core competence

This section offers verification regarding service innovation, new service concepts, new customer interfaces, new service delivery systems, and new technology options, and determines whether there is a positive relationship between the results of the multiple regression analysis of the market and technical competencies of the core competence, as well as the analysis results.

Among the four predicted variables, the three facets of the new service concept, the new customer interface, and the new service delivery system have reached a significant level, with regression coefficients of 0.454, 0.328, and 0.208, respectively. The impact of service innovation on technical capabilities is reflected in the four prediction vari-

ables, including the new service delivery system and technology selection. The regression coefficients are 0.395 and 0.493, respectively, showing that a new service delivery system and technology options play a very important role in the impact of technical capabilities. The influence of a firm's dynamic capabilities on its core competence show that the two facets of learning and reconfiguration have reached a significant level, and the regression coefficients are 0.427 and 0.383, respectively. The dynamic capabilities show that the two aspects of coordination/integration and learning reach a significant level for technical capabilities, and the regression coefficients are 0.294 and 0.357, respectively.

The above table shows that, the overall regression model is quite significant ($F = 8024^{***}$), and the adjusted R^2 of 0.259 indicates that the model has certain explanatory power. The research results show that the cross-multiplying

Table 1: Regression Results of Dynamic Service Innovative Capabilities and Core Competencies

Independent Variables	Dependent Variables	Beta (β)	T Statistics	P-value	F-value	R ²	Adj. R ²	D-W value	Max VIF
New Service Concept	Customer Competencies	0.454***	4.235	0.000	12.254***	0.492	0.403	2.472	1.684
New Client Interface		0.328***	3.125	0.000					
New Service Delivery System		0.208*	2.001	0.092					
Technological Options		0.184	1.634	0.110					
New Service Concept	Technology Competencies	0.107	0.923	0.563	11.519***	0.364	0.319	2.005	1.597
New Client Interface		0.278	1.471	0.102					
New Service Delivery System		0.395***	3.427	0.0001					
Technological Options		0.493***	4.563	0.000					
Coordination	Customer Competencies	0.150	1.023	0.235	12.254***	0.428	0.395	2.567	1.854
Learning		0.427***	3.125	0.000					
Reconfiguration		0.383**	2.721	0.001					
Coordination	Technology Competencies	0.294*	2.351	0.041	7.254***	0.276	0.251	1.958	1.831
Learning		0.357**	3.859	0.001					
Reconfiguration		0.102	0.953	0.428					
Service Innovation	Dynamic Service Innovative Capabilities	0.244*	2.351	0.041	8.024***	0.299	0.257	1.985	1.765
Dynamic Capabilities		0.418**	3.859	0.001					
Service Innovation x Dynamic Capabilities		0.294*	2.994	0.027					

Notes: * $P < 0.10$; ** $P < 0.05$; *** $P < 0.01$

terms of service innovation and dynamic capabilities have significant effect on core competence, and the regression coefficient is 0.294, which shows that the stronger the firm's dynamic capability, the more service innovation can produce the core competence of the enterprise, thus, H₃ is established. This means that the firm's dynamic service innovation capability plays a very important role in the impact of core competence.

The Impact of Core Competence on The Firm's Sustainable Competitive Advantage

The results of the multiple regression analysis of the customer-based sustainable competitive advantage for the market capability and technical capability of the core competence are shown in Table 2.

Table 2: Regression Results of Core Competencies and Sustainability Competitive Advantage

Independent Variables	Dependent Variables	Beta (β)	T Statistics	P-value	F-value	R ²	Adj. R ²	D-W value	Max VIF
Market Competencies	Market-based SCA	0.373**	2.784	0.011	11.039***	0.394	0.320	2.109	1.428
Technology Competencies		0.107	1.194	0.247					
Market Competencies	Customer-based SCA	0.458***	4.628	0.000	17.351***	0.503	0.489	2.109	1.462
Technology Competencies		0.506***	5.359	0.000					
Market Competencies	Financial-based SCA	0.095	0.472	0.633	0.758	0.097	-0.013	-	1.021
Technology Competencies		0.166	0.567	0.491					

Notes: * $P < 0.10$; ** $P < 0.05$; *** $P < 0.01$

Table 2 shows that the market and technology competencies reflect the results of the multiple regression analysis of the customer-based sustainable competitive advantage facet, and the overall regression model reaches a significant level. Among the two facet prediction variables, only one facet of market competencies reached a significant level, and the regression coefficient is 0.373, which shows that the firm's ability to own markets plays an important role in the impact of customer-based sustainable competitive advantage. The two regressions of market and technology competencies yielded a significant level of regression analysis for the market-based sustainable competitive advantage. In the two facet prediction variables, market and technology competencies have reached a significant level, and the regression coefficients are 0.458 and 0.506, respectively, which shows that the firm's market and technology competencies play a very important role in the impact of market-based sustainable competitive advantage. The impact of core compe

tency on financially based sustainable competitive advantage show that the core competence and technical ability of the firm's core competence are not significant in the results of the multiple regression analysis of the financially based sustainable competitive advantage.

Discussion and Implications

Summary of Results

Based on the above results, this study finds that: First, this study integrates the dynamic capabilities and service innovation architecture to develop a dynamic service innovative capabilities theoretical framework, and through the three stages of the dynamic capabilities (coordination, learning, and reconfiguration), determines the impact of the firm's core competence on firm performance. This study believes that, if the fastener industry in Taiwan can effectively promote or innovate their original core capability, it will enhance the impact of dynamic capability on all aspects of the

firm's performance. Secondly, the core competencies can be the basic factor for the success of dynamic service innovation capability and sustainable competitive advantage. The fastener industry should actively cultivate and accumulate its intrinsically core competence, especially the market technology competencies closely related to new products. These technology competencies include R&D, engineering, and manufacturing skills, as well as the external relationships between suppliers, distributors, and customers. Firms can grasp the opportunities of the market and narrow the distance between the company and the customers, which will enable firms to generate benefits for correct and fast market control.

In addition, the study found that the number of employees in a fastener industry company has a threshold for the control of the number of employees in the new service concept and technology options. Therefore, the implementation of service innovation in planning management practice must consider the difference in the number of employees. Furthermore, this study also found that, the strength and weakness of the firm's core competence, regardless of market or technology capabilities, will be affected by the learning and reconfiguration of the firm's dynamic capabilities. This means that the company can effectively and correctly integrate and coordinate its actions and technologies inside and outside the organization, as well as the learning mechanism for cultivating the ability of employees to solve problems, further adjust the organization's needs before competitors can take action, and

complete the ability to reorganize its resources and the transformation of internal and external needs. This will enable enterprises to grasp market opportunities and bring the firm closer to the customer, so that the firm can correctly and quickly generate its benefits.

Finally, the strength and weakness of the firm's customer-based sustainable competitive advantage will be affected by the market power of the firm's core competence. This means that companies can close the distance between the company and the customers by leveraging the opportunities of the market, meaning that the company can generate benefits because it can correctly grasp the market, which can lead to the creation of basic value, the ability to cause customer loyalty, and bring sustainable competitive advantage to the company.

Implications For Research And Practice

First, when companies pursue sustainable competitive advantage, they must plan a complete set of management practices, including: regularly open communication and coordination meetings to allow departments to exchange information with each other; flexibly adjust their innovation processes, as well as the management and practice of internal organization planning and adjustment, employee education and training, and new skills and new ability learning opportunities, in order to enhance the firm's development of a stronger core competence, and further achieve sustainable competitive advantage opportunities. Second, firms must develop a complete strategy for resources, capabilities, and

competencies to respond to future competition. However, the emergence of corporate advantages requires cultivation and continuous learning, investment, and commitment of the company. The corresponding concept of the level of the core competence of a corporate strategy allows the linkage between the core competence and the corporate strategy architecture to be clearly seen. This concept can help firms clearly understand each other's relationships when building core competencies.

Finally, knowledge integration and reconfiguration capabilities enable organizations to generate stronger service innovations in highly competitive environments. Firms must develop their own competitive advantage to maintain their position in the market, thus, “*service innovation*” is an indispensable key factor. Knowledge integration ability has a very important impact on the cultivation of organizational core competitiveness; even the procedures and characteristics of its operations will affect the cultivation of organizational competitiveness. When organizations collect knowledge and information through various channels, and integrate old and new knowledge, the market environment continues to change. Therefore, if companies can simultaneously adapt to changes in market demands to adjust their operational policies, they will be able to develop timely innovation strategies. That is to say, the stronger the reconfiguration ability of the organization, the more favorable it is to the development of its innovation strategy.

References

- Chen, J. S., Tsou, H. T., & Huang, Y. H. (2009). Service Delivery Innovation: Antecedents and Impact on Firm Performance. *Journal of Service Research*, 12 (1) , pp. 36-55.
- Chesbrough, H., Spohrer, J. C. (2006): A research manifesto for service science. In: *Communications of the ACM*, 49(7). 35-40.
- de Wit-de Vries, E., Dolfsma, W. A., van der Windt, H. J., & Gerkema, M. P. (2018). Knowledge Transfer in University--Industry Research Partnerships: A Review. *Journal of Technology Transfer*. doi: 10.1007/s10961-018-9660-x
- Janssen, M. J., Castaldi, C., & Alexiev, A. S. (2016). Dynamic capabilities for service innovation: conceptualization and measurement. *R&D Management*, 46(4), pp. 797-811.
- Kabue, L. W. & Kilika, J. M. (2016). Firm Resources, Core Competencies and Sustainable Competitive Advantage: An Integrative Theoretical Framework. *Journal of Management and Strategy*, 7(1), pp. 98-108.
- Pavlou, P. A., & El Sawy, O. A. (2010). The “Third Hand”: IT-Enabled Competitive Advantage in Turbulence Through Improvisational Capabilities. *Information Systems Research*, 21(3), 443-471.

- Payne, A. F., Storbacka, K., & Frow, P. (2008). Managing the Co-creation of Value. *Journal of the Academic Marketing Science*, 36, pp. 83-96.
- Strønen, F., Hoholm, T., Kværner, K. J., & Støme, L. N. (2017). Dynamic Capabilities and Innovation Capabilities: The Case of the 'Innovation Clinic'. *Journal of Entrepreneurship, Management and Innovation*, 13(1), pp. 89-116.
- Teece, D. J. (2007). Explicating Dynamic Capabilities: The Nature and Micro-foundations of Sustainable Enterprise Performance. *Strategic Management Journal*, 28, pp. 1319-1350.
- Tsou, H. T., Cheng, C. C., & Hsu, H. Y. (2015). Selecting business partner for service delivery co-innovation and competitive advantage. *Management Decision*, 53 (9), pp. 2107-2134.
- Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: a review and research agenda. *International Journal of Management Reviews*, 9(1), pp. 31-51.