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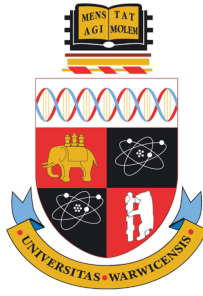
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**Emerging Customer Orientation and Radical Service
Innovation: The Moderating Role of Customer
Involvement and Organizational Reward Practices**

by

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A thesis submitted in partial fulfillment of the requirements for the
Degree of Doctor of Philosophy

Marketing Group
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Declarations

I, Ping-Jen Kao, hereby, declare that:

This thesis is presented in accordance with the regulations for the degree of Doctor of Philosophy.

This thesis has not been previously submitted for any degree at the University of Warwick or any other university.

The work presented in this thesis has been composed by myself.

Abstract

Although previous studies have considered customer orientation to be one of the most important precursors of innovation, the role played by emerging customer orientation in determining the success of radical service innovation remains underexplored. In particular, the extant research has not yet examined how emerging customer orientation influences radical service innovation, nor how innovation-related practices can strengthen or weaken the effect of emerging customer orientation. Moreover, while previous literature has acknowledged the importance of radical service innovation in manufacturing and recognized that scholars should pay close attention to the differences between manufacturing and service firms, there are still few insights into whether the innovation-related practices that support radical service innovation for manufacturing firms are equally as effective for service firms. To address these gaps, this thesis develops five outcome-based characteristics of service innovation that differentiate a radical service innovation from an incremental one. An overarching research model and a set of detailed hypotheses are then proposed. The model investigates the relationship between emerging customer orientation and radical service innovation by examining key moderators in ICT manufacturing firms and information services firms. Analyses of multi-source data, involving two survey respondents per firm and objective firm data, reveal that the effect of emerging customer orientation on radical service innovation depends on both customer involvement practices and organizational reward practices. Specifically, emerging customer orientation is positively related to radical service innovation when customer involvement as an information source is low for both type of firms. However, the moderating effects of customer involvement as co-developers and customer involvement as innovators are only significant in the sample of information services firms. In addition, the relationship between emerging customer orientation and radical service innovation is significantly positive under high outcome-based reward practice in ICT manufacturing firms and under high strategy-based reward practice in information services firms. These findings provide a basis for assessing the value of emerging customer orientation as a facet of the marketing strategies designed to enhance radical service innovations in different industries.

CHAPTER 1: INTRODUCTION

This chapter aims to provide a comprehensive overview of the thesis. It introduces the research motivation, research questions, and the scope of the research. A summary of the research methodology is also presented, in addition to a general description of how the thesis is organized.

1.1 Research Motivation

Radical service innovation is imperative to incumbent firms' sustainable competitive advantage (Arnold et al. 2011; Ostrom et al. 2015). Firms at the leading edge of radical service innovation are more likely to dominate their markets and to be commercially successful (O'Cass and Wetzels 2018; Ordanini and Parasuraman 2011). To successfully create radical service innovation, incumbent firms must mine into emerging customer needs because the identification of under-served needs is considered to be a critical precursor of radical innovation (Atuahene-Gima 2005; Narver et al. 2004; Raja et al. 2013). This reflects the importance of emerging customer orientation, which is defined in this dissertation as the extent to which a firm is inclined to generate, disseminate, and use emerging customer information to satisfy new customer segments and latent needs of existing customer segments (Biemans et al. 2016; Govindarajan et al. 2011; Storey et al. 2016).

For several years, marketing and innovation scholars have dedicated considerable effort to understanding the relationship between customer orientation and radical

innovation in a variety of contexts (e.g, Baker and Sinkula 2007; Cheng and Krumwiede 2012; Govindarajan et al. 2011; Joshi 2016; Slater et al. 2014). Although prior studies have made substantial contributions to this area, there are at least three research gaps that warrant further attention and offer opportunities for further research.

First, there is a sense of stagnation in the field of service innovation. This is due to the inconsistent conceptualization and operationalization of radical service innovation, which may account for the degree of variation seen in the findings (Kuester et al. 2013; Storey et al. 2016). The extant literature on service innovation is fragmented, with research being conducted in many academic fields in parallel; these include marketing (Dotzel et al. 2013; Michel et al. 2008), innovation (Biemans et al. 2016; Perks et al. 2012), service research (Eisingerich et al. 2009; Ordanini and Parasuraman 2011), operations management (Metters and Maruchek 2007; Oke 2007), information systems (Barrett et al. 2015; Rai and Sambamurthy 2006), strategy (Goes and Park 1997; Möller et al. 2008), and economics (Cainelli et al. 2006; Gallouj and Savona 2009), with each field having its own conceptualizations and operationalization. The inconsistent definitions of radical service innovation across these research fields limit the development of service innovation research. Therefore, in order to advance the development of service innovation research, this thesis identifies five outcome-based characteristics of service innovation and systematically differentiates radical service innovation from incremental service innovation.

Second, a critical issue that remains controversial within the marketing and innovation literature is whether customer orientation plays a key role in determining the success of radical service innovation. Some scholars have adopted a unidimensional perspective and have found that the effects of customer orientation on innovation outcomes are dependent on different innovation-related practices (Atuahene-Gima and Murray 2004; Joshi 2016; Ordanini and Parasuraman 2011; Tsai et al. 2008). Others have taken a two-dimensional perspective that differentiates customer orientation according to whether it is mainstream-oriented or emerging-oriented, and have found that different customer orientations have differing influences on innovation outcomes (Govindarajan et al. 2011). Surprisingly, previous research on service innovation has so far focused almost exclusively on mainstream customer orientation (e.g., Grawe, Chen, and Daugherty 2009; Wang, Zhao, and Voss 2016), largely neglecting the contribution of emerging customer orientation. Thus, this thesis provides a more fine-grained conceptualization and operationalization of emerging customer orientation, and investigates its effect on radical service innovation according to different sets of practices related to customer involvement and organizational reward.

Third, while service innovation in manufacturing is generally considered to be a research priority (Baines et al. 2017; Goduscheit and Faullant 2018; Ostrom et al. 2015), it is still underexplored by marketing and innovation scholars. In fact, few studies have investigated the antecedents and consequences of service innovation in manufacturing contexts (e.g., Ettlie and Rosenthal 2012; Kindström et al. 2013;

Parida et al. 2015; Santamaría et al. 2012; Spring and Araujo 2013; Visnjic et al. 2019). Further, only several articles have clearly investigated whether the service innovation practices appropriate in service firms are effective for manufacturing firms (Aas and Pedersen 2011; Chang et al. 2014; Ettlie and Rosenthal 2011; Leiponen 2012; Nijssen et al. 2006). As Ostrom et al. (2010, p. 15) noted, “there are still few insights into how to drive radical innovation in services, both in traditional service industries and for manufacturers that are differentiating themselves in the marketplace through value-added services”. To address this shortcoming in the service innovation literature, this thesis empirically examines how the relative importance of innovation-related practices differs between manufacturing and service firms when pursuing radical service innovation.

1.2 Research Questions

Motivated by these three research gaps, this thesis seeks to address the following main research questions.

Research question 1:

What criteria differentiate a radical service innovation from an incremental service innovation?

Research question 2:

To what extent does emerging customer orientation affect radical service innovation? In particular, which innovation-related practices (i.e., customer involvement practices and organizational reward practices) strengthen or weaken

the relationship between emerging customer orientation and radical service innovation?

Research question 3:

To what extent do innovation-related practices that potentially moderate the relationship between emerging customer orientation and radical service innovation differ between ICT manufacturing firms and information services firms?

1.3 Scope of Research

This thesis focuses on information and communication technology (ICT) manufacturing firms and information services firms in high-tech industries. Although radical product innovation and radical service innovation are both critical to the success of these firms, the latter is the central research focus in this dissertation because many firms have been developing radically new services as the means of enhancing their short-term profits and maintaining their long-term competitiveness under the pressures of market maturity and globalization (Kowalkowski et al. 2015). Such a narrowed focus and research scope not only provides opportunities for an investigation into whether innovation-related practices that support radical service innovation for ICT manufacturing firms are also effective for information services firms, but also supplements the extant literature's research priority of service innovation in manufacturing (Baines et al. 2017; Macdonald et al. 2016; Ostrom et al. 2015).

1.4 Summary of Research Methodology

The research setting of this thesis is the high-tech industry, which is one that involves advanced methods and the most modern equipment. In particular, this thesis focuses on ICT manufacturing firms and information services firms. Previous studies on service innovation collected data samples mainly from North America and Europe with only a few conducting research in Asia. Therefore, the researcher decided to collect empirical data in Taiwan. The Taiwanese high-tech industry is an ideal context for this dissertation, being an integral part of the global supply chain for technology giants such as Apple, Huawei, and Qualcomm (Lusch and Nambisan 2015; Ostrom et al. 2015). Moreover, Taiwan's high-tech firms have been riding a robust exports cycle thanks to strong global demand for new smartphones, laptops, and other gadgets (Chen et al. 2017).

After deciding the research context, the researcher undertook a preliminary exploratory field study, which involved unstructured in-depth interviews with senior marketing and R&D managers so as to better understand radical service innovation activities in the high-tech industry. Based on the findings from the field study, the researcher created a two-phase survey intended to examine the research hypotheses relevant to the main research questions. This survey was then conducted in collaboration with a well-established Taiwanese marketing research firm. A key informant approach was adopted to collect two-phase survey data from two informants per firm.

The sampling frame for this dissertation consists of 776 ICT manufacturing firms and 413 information services firms out of the top 5000 largest Taiwanese

corporations. Ultimately, 176 firms completed the two-phase surveys. The researcher analyzed this data using a comprehensive two-step analytical approach (Anderson and Gerbing 1988). In line with this approach, the researcher conducted confirmatory factor analysis to confirm the measurement model, and then performed multiple regressions to test the proposed hypotheses.

1.5 Organization of the Thesis

The thesis is organized as follows. Following this chapter, a comprehensive literature review is offered in chapter 2. The literature that is relevant to the definitions of service innovation, the antecedents and consequences of radical service innovation, potential moderators, and service innovation in manufacturing and service firms are discussed in terms of their conceptual and empirical perspectives. After reviewing the key literature, chapter 3 develops and discusses the research model. It also proposes a number of hypotheses that address the main research questions. Chapter 4 presents the research methodology, followed by a discussion of the data analysis and results in chapter 5. Finally, the theoretical contributions and managerial implications of this dissertation and possible directions for future research are presented in chapter 6.

CHAPTER 2: LITERATURE REVIEW

This chapter reviews the literature pertinent to the definition of service innovation and the relationships between customer orientation, radical service innovation, and relevant innovation-related practices. It aims to provide a comprehensive overview of the current state of the literature related to the main research questions. The detailed review also points out three research gaps and identifies the research questions that need to be addressed.

2.1 Service Innovation

2.1.1 Approach for literature review on the definition of service innovation

To systematically review the definition of service innovation, this thesis searched peer-reviewed journals for the relevant literature. Several keywords were identified when constructing search strings, including service innovation, new service development, innovation in service, and service innovativeness. Three leading electronic databases, namely ABI/INFORM, Business Source Complete, and Web of Science, have been searched for articles in which the abstract or title contains at least one of the search terms. This search across three databases returned a total of 1191 articles relevant to service innovation.

After the preliminary literature search, this dissertation uses several inclusion and exclusion criteria to narrow the research focus. First, the researcher only included peer-reviewed studies from 1990 to date. Second, the researcher focused on firm-

level studies, excluding research conducted at the individual and team levels. Third, the researcher selected articles that clearly propose the definition of service innovation. After this review process, 37 articles remained. Most articles came primarily from the fields of marketing, innovation, and service research although there are some studies published in operations management, information systems, and strategy fields (see Appendix 1 for a detailed summary of definitions of service innovation across these fields).

In addition, the researcher found that studies in the marketing, innovation, and service research fields tend to adopt a similar theoretical angle (i.e., the marketing perspective) to investigate service innovation, compared to studies conducted in the operations management, information systems, and strategy fields. This dissertation therefore particularly focuses on leading journals in the marketing, innovation, and service research fields, including *Journal of the Academy of Marketing Science*, *Journal of Marketing Research*, *Journal of Product Innovation Management*, and *Journal of Service Research*. Other leading marketing journals, such as *Journal of Marketing*, *Marketing Science*, *Journal of Retailing*, and *International Journal of Research in Marketing*, were also reviewed. However, these marketing journals do not place sufficient attention to service innovation nor do they provide clear definitions of service innovation. Further, articles that regard service innovation as a process for developing new services (i.e., new service development) were excluded (e.g., Biemans et al. 2016; Eisingerich et al. 2009; Storey et al. 2016) because this dissertation sees service innovation as a type of

‘innovation outcomes’. Ultimately, seven relatively well-developed definitions were obtained from the qualifying journals. These definitions serve as the basis of further evaluation.

2.1.2 A critical evaluation on the definition of service innovation

Although various definitions have been proposed, there remains little general agreement between researchers over (i) ‘what’ precisely constitutes a service innovation and (ii) ‘how’ to determine the radicalness of a service innovation (see Table 1). To address this lack of consensus, this dissertation critically evaluates the commonalities and differences of the selected definitions. The researcher found that many definitions of service innovation are based on the theoretical foundation and assumptions of service-dominant logic (Vargo and Lusch 2004, 2008, 2016). Moreover, three studies were conducted in the business-to-consumer context (Arnold et al. 2011; Ordanini and Parasuraman 2011; Perks et al. 2012), two studies were conceptual papers (Michel et al. 2008; Ostrom et al. 2010), and two studies did not clearly specify whether the research was conducted in the business-to-business or business-to-consumer context (Dotzel et al. 2013; Kang and Kang 2014).

Table 1: The Selected Definitions of Service Innovation

Studies	Definitions	Conceptual Foundation	Context
Arnold, Fang, and Palmatier (2011, p. 238)	“Radical [service] innovation performance pertains to financial benefits obtained from an innovation that incorporates substantially different technology and fulfills novel and emerging customer needs, whereas incremental [service] innovation performance refers to financial benefits obtained from an innovation that involves minor technology changes and relatively incremental customer benefits.”	Not specified but can be traced back to Atuahene-Gima’s (2005) and Chandy and Tellis’s (1998) conceptualization of incremental and radical product innovation	B2C
Dotzel, Shankar, and Berry (2013, p. 259)	Service innovation is defined as “a new or enhanced intangible offering that involves the firm’s performance of a task/activity intended to benefit customers.”	Not specified but can be traced back to Berry et al.’s (2006) conceptualization of service innovation	Not specified
Kang and Kang (2014, p. 183)	Service innovation is defined as “the introduction of new services that are created based on new knowledge or technology; are definitely different; or greatly improve the existing services in terms of the technological aspects, customer relations, or other features.”	Not specified	Not specified
Michel, Brown, and Gallan (2008, p. 61)	A service innovation is discontinuous if “it (1) significantly changes how customers co-create value (value-in-use criterion) and (2) significantly affects market size, prices, revenues, or market shares (value-in-exchange criterion).”	Service-dominant logic proposed by Vargo and Lusch (2004)	—
Ordanini and Parasuraman (2011, p. 5)	A service innovation is defined as “an offering not previously available to the firm’s customers—either an addition to the current service mix or a change in the service delivery process—that requires modifications in the sets of competences applied by service providers and/or customers ... The nature and magnitude of change in competences determine the extent of service innovation.”	Service-dominant logic; an extension of Michel, Brown, and Gallan (2008)’s conceptualization	B2C
Ostrom et al. (2010, p. 5)	“Service innovation creates value for customers, employees, business owners, alliance partners, and communities through new and/or improved service offerings, service processes, and service business models.”	Not specified	—
Perks, Gruber, and Edvardsson (2012, p. 937)	“Radical [service] innovations result in departures from previous practices and lead to significant changes in organizational activities and the service system ... it has a significant impact on both customer co-creation of value processes and market conditions.”	Service-dominant logic; an extension of Michel, Brown, and Gallan (2008)’s conceptualization	B2C

A closer review of these definitions shows that a service innovation is generally viewed as a new or improved service offering or process that aims to address customer needs and wants (Ordanini and Parasuraman 2011); these needs and wants are either manifest or emerging (Arnold et al. 2011). It also reveals a need to pay further attention to the key elements of service innovation (i.e., the sets of resources, value co-creation processes, and value) because a service innovation always involves different extent of changes in these elements.

2.1.2.1 Changes in the sets of resources

Prior studies have proposed that a service innovation entails changes in resources of the focal firm. These resources can be tangible or intangible, and include physical resources (e.g., equipment), human resources (e.g., an individual's knowledge and skills), organizational resources (e.g., organizational culture and routines), informational resources (e.g., knowledge about the potential market), and relational resources (e.g., relationship in a network) (Constantin and Lusch 1994; Madhavaram and Hunt 2008). For instance, Arnold, Fang, and Palmatier (2011, p. 238) suggest that a service innovation “incorporates substantially different technology” or “involves minor technology changes”. Perks, Gruber, and Edvardsson (2012, p. 937) also state that radical service innovations “result in departures from previous practices and lead to significant changes in organizational activities and the service system”.

This literature review finds that the extant service innovation research in the business-to-consumer context has tended to assume that changes in the sets of

resources happen only within the focal firm (Arnold et al. 2011; Kang and Kang 2014). In practice, however, such changes have resulted from service innovations that have occurred to the focal firm's customers in both the business-to-business and business-to-consumer contexts (Ordanini and Parasuraman 2011). An example in the business-to-business context is Rolls-Royce's TotalCare, which is a radical service innovation combining an engine and its servicing in a long-term contract. This innovation not only changes Rolls-Royce's sets of resources but also influences its customers' human, organizational, informational, and relational resources in a significant way. A mobile banking application introduced by Barclays is another example from both the business-to-business and business-to-consumer contexts. This application has significantly reconfigured Barclays' various resources, such as organizational routines, frontline employees' knowledge and skills, and information about customers' transactions. At the same time, the mobile banking application has changed customers' sets of resources because they need to acquire new resources (e.g., knowledge and skills) to maximize the effectiveness of the innovation.

Surprisingly, changes to the customers' sets of resources resulting from service innovation are underestimated in prior literature. This underestimation may be explained by the research focus, where the business-to-consumer context dominates. To provide a more comprehensive view, this dissertation suggests that a service innovation involves changes to the sets of resources applied by the focal

firm and its customers, regardless of whether it is in a business-to-business or business-to-consumer context.

2.1.2.2 Changes in the value co-creation processes

Scholars have proposed that a service innovation changes the value co-creation processes between the focal firm and its customers (Michel et al. 2008; Perks et al. 2012). The value co-creation processes can be defined as “the procedures, tasks, mechanisms, activities and interactions which support the co-creation of value” (Payne et al. 2008, p. 85). For the focal firm, the value co-creation processes involve evaluating and updating value co-creation opportunities; planning, testing and prototyping value co-creation opportunities with its customers; and assessing and auditing whether the focal firm makes appropriate value propositions for customers (Macdonald et al. 2016; Payne et al. 2008; Vargo and Lusch 2011). For customers, the value co-creation processes can be considered as activities performed by customers to facilitate achievement of their goals (Payne et al. 2008; Vargo and Lusch 2008, 2016).

In practice, the changes in value co-creation processes between the focal firm and its customers take place in both the business-to-business and business-to-consumer contexts. For example, Volvo Trucks’ innovation of its driver development service has significantly changed the value co-creation processes in the business-to-business context. This service offers a better value proposition for drivers by teaching them how to save fuel, drive safely, and get the most from a truck, which in turn helps drivers to achieve their goals more effectively and

efficiently. In the business-to-customer context, the latest service offering of insurance firms that extrapolates customers' health data from their wearable devices can be an appropriate example for explaining how a service innovation changes the value co-creation processes between the focal firm and its customers. This service innovation enables the focal firms to capture and utilize the precise data provided by customers and design a tailored service offering (i.e., a value proposition). At the same time, customers can get access to updated information about their health conditions and choose the service most likely to help them to achieve their personal goal. Therefore, a service innovation involves changes in the value co-creation processes between the focal firm and its customers; such changes enable the focal firm and its customers to utilize the available resources more efficiently and effectively, which creates higher value for both of them (Michel et al. 2008).

2.1.2.3 Changes in firm value and customer perceived value

Previous studies have suggested that a service innovation involves changes in firm value and customer perceived value (Arnold et al. 2011; Michel et al. 2008; Ostrom et al. 2010). For example, Ostrom et al. (2010) note that a service innovation creates value for many internal and external stakeholders, such as business owners, employees, customers, and alliance partners. Arnold, Fang, and Palmatier (2011) also suggest that a service innovation fulfills customers' needs and brings benefits to them. Although these studies have pointed out that service innovations enhance firm value and customer perceived value, the researcher finds

that they have provided very limited explanation for these two concepts. To address this shortcoming, this dissertation proposes a more deliberate elaboration on firm value and customer perceived value based on recent marketing literature (Katsikeas et al. 2016; Kumar and Reinartz 2016). In this dissertation, firm value can be considered to be the customers' contribution to the focal firm's accounting performance (e.g., sales revenue, cost, and profit) and the investor's contribution to the focal firm's financial-market performance (e.g., stock price, investor returns, and equity risk) that occurs directly through customer purchases or cost reduction, and indirectly through investor responses to service innovations (Katsikeas et al. 2016). Customer perceived value can be defined as "the customer's net valuation of the perceived benefits accrued from an offering that is based on the costs they are willing to give up for the needs they are seeking to satisfy" (Kumar and Reinartz 2016, p. 62). It is important to note that the value can be either positive or negative.

In practice, it is very common to see changes in firm value and customer perceived value resulting from a service innovation in both business-to-business and business-to-customer contexts. In the business-to-business context, Xerox's printer and copier rental services, for example, not only increase its revenue and stock price but also significantly enhance customer perceived value (i.e., value in use) (Macdonald et al. 2016). The rental services enable customers to satisfy their needs and achieve their goals more effectively and efficiently by improving their working processes and lowering the operation costs. In the business-to-customer

context, Amazon uses artificial intelligence technology to improve its service and enhance customers' shopping experience. Such innovation decreases Amazon's human resources costs and provides more effective marketing practices to enhance its firm value. At the same time, customers can gain higher value in use because they face less pressure, stress, and uncertainty when talking with artificial intelligence and enjoy services that are highly customized to satisfy their personal needs. However, some customers might find that the experience with artificial intelligence is uncomfortable and stop using this service. This thesis summarizes the above discussions in Table 2.

Table 2: A Critical Evaluation on the Selected Definitions of Service Innovation

Studies	Changes in...				
	The set of resources applied by... the focal firm	the customers	Value co-creation processes	Firm value	Customer perceived value
Arnold, Fang, and Palmatier (2011, p. 238)	<ul style="list-style-type: none"> different technology technology changes 	—	—	<ul style="list-style-type: none"> financial benefits 	<ul style="list-style-type: none"> customer benefits
Dotzel, Shankar, and Berry (2013, p. 259)	—	—	—	—	<ul style="list-style-type: none"> a task/activity intended to benefit customers
Kang and Kang (2014, p. 183)	<ul style="list-style-type: none"> new knowledge or technology technological aspects, customer relations, or other features 	—	—	—	—
Michel, Brown, and Gallan (2008, p. 61)	—	—	<ul style="list-style-type: none"> customers co-create value 	<ul style="list-style-type: none"> market size, prices, revenues, or market shares 	<ul style="list-style-type: none"> value-in-use
Ordanini and Parasuraman (2011, p. 5)	<ul style="list-style-type: none"> modifications in the sets of competences applied by service providers 	<ul style="list-style-type: none"> modifications in the sets of competences applied by customers 	—	—	—
Ostrom et al. (2010, p. 5)	—	—	—	<ul style="list-style-type: none"> creates value for employees, business owners 	<ul style="list-style-type: none"> creates value for customers
Perks, Gruber, and Edvardsson (2012, p. 937)	<ul style="list-style-type: none"> changes in organizational activities and the service system 	—	<ul style="list-style-type: none"> customer co-creation of value processes 	<ul style="list-style-type: none"> market conditions 	—

*Note: These specific texts in Table 2 are retrieved from the definitions in Table 1

2.1.3 Toward a more systematic definition of service innovation

Based on Table 2 and the above discussions, this dissertation proposes a more systematic definition of service innovation: *‘service innovation is a new or improved service offering or process aiming to address either manifest or emerging customer needs and wants. Such innovation involves changes in (1) the sets of resources applied by the focal firm, (2) the sets of resources applied by the customers, (3) the value co-creation processes between the focal firm and its customers, (4) the firm value, and (5) the customer perceived value’*. Although the changes resulting from a service innovation also happen to other actors (e.g., suppliers, distributors, competitors, and other alliance partners) in business networks, this dissertation focuses on the focal firm and its customers to succinctly integrate and extend prior definitions. It is interesting to note that changes resulting from a service innovation are often interrelated with each other. Take Rolls-Royce’s TotalCare as an illustrative example of these interrelationships. TotalCare is a service innovation that combines Rolls-Royce’s engine with a long-term servicing contract. For Rolls-Royce, such an innovation changes the sets of resources it itself applies, the value processes it co-creates with customers, and the firm value. These changes are interdependent with each other. For instance, changes in informational resources (e.g., knowledge about the customers’ usage of the engine) and relational resources (e.g., the relationships with other suppliers, customers, and business partners) may influence the value co-creation processes with the customers (e.g., assessing and updating value propositions) and firm value (e.g., higher sales revenue and stock price), and vice versa. For Rolls-

Royce's customers, changes in these value co-creation processes with Rolls-Royce may affect the sets of resources that are applied by the customers (e.g., new human resources focusing on international market development rather than on engine maintenance) and customer perceived value (e.g., fast problem solving, lower fixed capital, reduced uncertainty), and vice versa. Figure 1 presents the interdependent relationships among these changes.

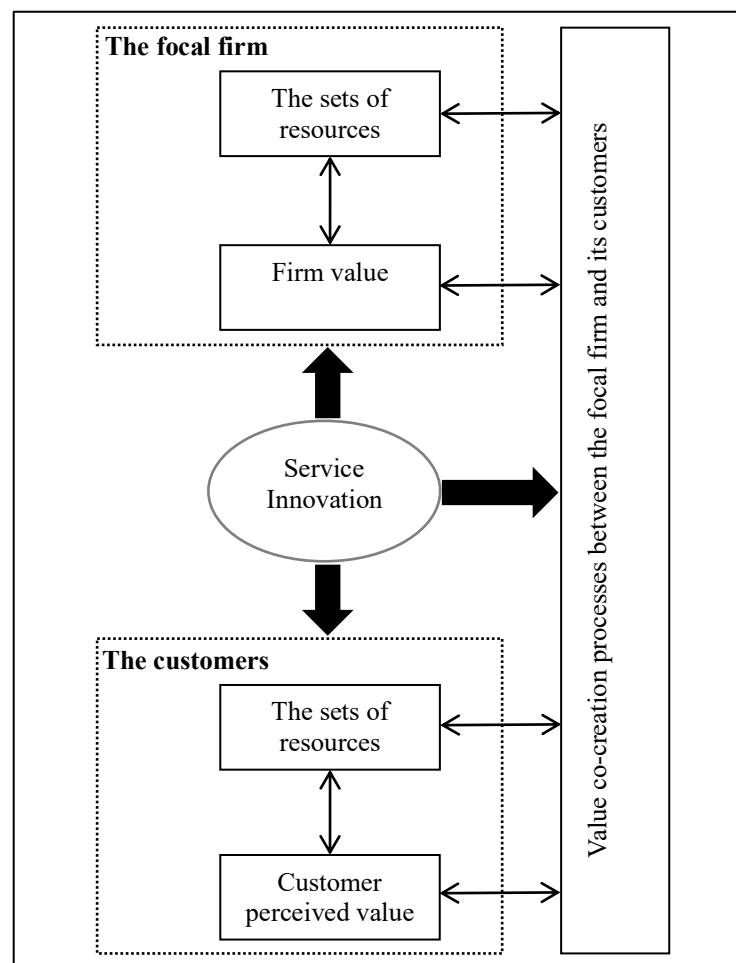


Figure 1: The Illustration of the Integrative Definition of Service Innovation

2.1.4 The radicalness of service innovation

Scholars have increasingly begun to acknowledge the importance of differentiating between incremental and radical service innovations (Arnold et al. 2011; Martínez-Ros and Orfila-Sintes 2009; Ordanini and Parasuraman 2011; Perks et al. 2012). Such differentiation is necessary when investigating the key antecedents and outcomes of service innovation.

Theoretically, newness (i.e., new-to-the-market versus new-to-the-firm) is most frequently used as a measure of the degree of radicalness of a service innovation. However, the understanding of newness is not unanimous in the service innovation literature (Snyder et al. 2016). One stream of service innovation research considers an innovation to be radical only when it is new-to-the-market whereas other scholars view a radical service innovation as a new-to-the-firm innovation (Mansury and Love 2008; Thakur and Hale 2013).

In practice, a service innovation could be either generated or adopted by firms. Generating a service innovation means that a firm internally generates an innovation that is new-to-the-market; adopting a service innovation means that a firm adopts a new-to-the-firm innovation that was developed by other companies across industries (Pérez-Luño and Cambra 2013). This new-to-the-market versus new-to-the-firm distinction is based on the product innovation literature (Garcia and Calantone 2002). Although this traditionally useful distinction helps researchers to clarify the newness concept of a service innovation (Damanpour and Wischnevsky 2006), the assumption that a successful radical service innovation needs to be internally generated (i.e., new-to-the-market) has been

challenged, given that service innovation adoption is a prevailing practice in both the manufacturing and service industries in today's service economy.

Compared to product innovations, service innovations can easily be imitated by followers (Hsieh et al. 2013). This is why many incumbent firms adopt and adapt a service innovation from other industries rather than generating it themselves. In fact, the adoption of a radical service innovation can bring substantial benefits and create competitive advantage for firms (Snyder et al. 2016). This implies that a successful radical service innovation could be either internally generated or adopted by firms. Thus, the new-to-the-market versus new-to-the-firm criterion may not be suitable for evaluating the radicalness of a service innovation.

More recent service innovation literature has considered the 'degree of change' as the basis for assessing the radicalness of service innovation, and categorizes service innovations into incremental versus radical (Dotzel et al. 2013; Janeiro et al. 2013; Perks et al. 2012). Ordanini and Parasuraman (2011, p. 5) view service innovation as "an offering not previously available to the firm's customers...that requires modifications in the sets of competences applied by service providers and/or customers"; the magnitude of change in competences determines the radicalness of a service innovation. In addition, Michel, Brown, and Gallan (2008, p. 54) suggested that a discontinuous or radical innovation is related to the changes in the "customers' roles of users, buyers, and payers" and in the "value creation by embedding operant resources into objects, by changing the integrators of resources, and by reconfiguring value constellations." Perks, Gruber, and

Edvardsson (2012, p. 935) further proposed that radical service innovations “create discontinuities within usual patterns of behavior and can challenge existing way of doing business in the industry.” They explain that incremental and radical service innovations are different due to the latter’s being able to bring about significant benefits and change the focal firm’s underlying business model.

The distinction between incremental and radical service innovations can have important implications when practitioners are setting service innovation objectives and when researchers are investigating the antecedents and consequences of service innovations. However, the literature review highlights that the existing studies show a lack of consistent criteria for objectively differentiating a radical service innovation from an incremental one, and this, in turn, may slow down the accumulation of insights on service innovation.

2.1.5 Schools of thought in service innovation

Scholars have used different perspectives to conceptualize service innovation. These perspectives are generally distinguished by three schools of thought: assimilation, demarcation, and synthesis (Coombs and Miles 2000). Each school of thought represents a different approach to studying service innovation, and each has its own theoretical foundation and distinctive assumptions.

The assimilation approach posits that innovation in service industries is fundamentally the same as innovation in manufacturing industries, assuming that innovation drivers in service contexts are very similar to those in product contexts

(Miles 2007; Sirilli and Evangelista 1998). It suggests that the theories and concepts derived from manufacturing contexts are applicable to understanding innovation in service contexts. In other words, service innovation can be effectively investigated according to the research methods and concepts developed for product innovation. However, the assimilation approach has been criticized for its limited focus on technology-based service innovation without any consideration of the idiosyncrasies of services (Carlborg et al. 2014).

In contrast, *the demarcation approach* assumes that service is a special type of product (i.e., intangible goods) and service innovation is distinctively different from the innovation seen in the manufacturing contexts (Djellal and Gallouj 2001; Gadrey et al. 1995; Hertog 2000). It emphasizes the unique characteristics of services, namely intangibility, heterogeneity, inseparability, and perishability; therefore, new theories and instruments that are largely different from those that examine innovation in manufacturing are necessary (Yen et al. 2012). The demarcation approach has generated many insights, such as the co-creation role of customers in the service innovation processes, the importance of the non-technological characteristics of service innovation, and the difficulties of service innovation protection (de Vries 2006). Nevertheless, it has been criticized as overemphasizing the distinctive features of service innovation, which leads to a limited generalizability of the findings (Ordanini and Parasuraman 2011).

The synthesis approach assumes that the theories and frameworks derived from the assimilation and demarcation approaches can be integrated into a novel and

holistic view on service innovation (Gallouj and Weinstein 1997; Hipp and Grupp 2005). Thus, while the assimilation approach (i.e., product-oriented perspective) suggests that manufacturing and service innovation share many similarities that allow researchers to analyze them together and the demarcation approach (i.e., service-oriented perspective) focuses on the neglected elements of service innovation, the synthesis approach integrates insights from both approaches to promote a more unified framework (Gallouj and Windrum 2009; Santos-Vijande et al. 2016). Since the boundaries between manufacturing and services have become blurred, many researchers now adopt the synthesis approach to investigate service innovation (e.g., Ordanini and Parasuraman 2011; Q. Wang et al. 2016; Yen et al. 2012). Following that research trend, this dissertation uses the synthesis approach to develop an integrated, overarching view on service innovation and a comprehensive research model.

2.1.6 Summary, research gap, and research question

This section presents three schools of thought in service innovation literature: assimilation, demarcation, and synthesis (Coombs and Miles 2000). The researcher summarizes key definitions of service innovation proposed by scholars in different fields, such as marketing, innovation, and service research. Based on a comprehensive review of these definitions, this dissertation defines service innovation as *‘a new or improved service offering or process aiming to address either manifest or emerging customer needs. Such innovation involves the changes in (1) the sets of resources applied by the focal firm, (2) the sets of resources*

applied by the customers, (3) the value co-creation processes between the focal firm and its customers, (4) the firm value, and (5) the customer perceived value’.

A review of the literature finds that there are no consistent criteria to differentiate between incremental and radical service innovations. To address this research gap, this thesis will answer the following research question:

Research question 1: What criteria differentiate a radical service innovation from an incremental service innovation?

2.2 The Set of Antecedents of Radical Service Innovation

This section reviews articles that are relevant to radical service innovation. Table 3 summarizes key insights from these articles in terms of their research methodology, research context, the antecedents of radical service innovation, and the relationships between these antecedents and radical service innovation. This table shows that survey is the most dominant research methodology in the radical service innovation literature. Some scholars have used a case study approach to explore a particular phenomenon of interest (Green and Cluley 2014; Perks et al. 2012) whereas others have proposed several research models or frameworks in their conceptual work (Roy and Sivakumar 2011, 2012). This dissertation also finds that most empirical studies have conducted their research in service contexts; the investigation of radical service innovation in a manufacturing context has been receiving very limited attention (Pérez-Luño et al. 2011). To discuss the

antecedents of radical service innovation in more detail, the researcher further categorized these antecedents into five categories.

Table 3: Existing Findings Relating to Radical Service Innovation

Studies	Research Methodology	Research Context	Antecedents		Relationships
Arnold, Fang, and Palmatier (2011)	Survey	Financial services and general retail services	Customer knowledge development	Depth of customer knowledge	Non-significant
				Diversity of customer knowledge	+
			Resource configuration decisions	Resource exploration	+
				Resource exploitation	-
			Customer orientation	Customer acquisition orientation	+
				Customer retention orientation	Non-significant
Ashok, Narula, and Martinez-Noya (2016)	Survey	IT services	User collaboration	Existing user collaboration	Non-significant
				Prospective user collaboration	+
			Investments in knowledge management practices		+
Carlo, Lyytinen, and Rose (2012)	Survey	Information services	Knowledge base	Knowledge diversity	+
				Knowledge depth	Non-significant
				Knowledge linkage	Non-significant
Cheng and Krumwiede (2012)	Survey	Multiple services	Market orientation	Customer orientation	Non-significant
				Competitor orientation	+
				Inter-functional coordination	+
Green and Cluley (2014)	Case study	Digital design service	Organizational culture		+
Hillebrand, Kemp, and Nijssen (2011)	Survey	B2B services	Willingness to cannibalize	Willingness to cannibalize sales	Non-significant
				Willingness to cannibalize routines	+
				Willingness to cannibalize investments	+

Table 3: Existing Findings Relating to Radical Service Innovation

(Continued)

Studies	Research Methodology	Research Context	Antecedents		Relationships
Koch and Strotmann (2008)	Survey	Knowledge-intensive business services	External linkages	Access to knowledge by partners from universities	+
				Access to knowledge by partners from clients, suppliers, or other firms	Non-significant
				Access to knowledge by partners from other public institutions	+
				Access to knowledge by partners from universities by formal cooperation	Non-significant
				Access to knowledge by partners from clients, suppliers, or other firms by formal cooperation	+
Melton and Hartline (2015)	Survey	Multiple services	Process complexity		+
Ordanini and Parasuraman (2011)	Survey	Luxury hotels	Collaborative competences	Customer collaboration	Non-significant
				Business partner collaboration	+
			Dynamic capability of customer orientation	Customer orientation	+
				Customer orientation*innovative orientation	+
			Knowledge interfaces	Knowledge integration mechanisms	+
				Employee collaboration	+
Pérez-Luño et al. (2011)	Survey	Manufacturing and service firms	Knowledge	Knowledge tacitness	Non-significant
				Knowledge complexity	+
				Knowledge tacitness*social capital	+

Table 3: Existing Findings Relating to Radical Service Innovation**(Continued)**

Studies	Research Methodology	Research Context	Antecedents		Relationships
Perks, Gruber, and Edvardsson (2012)	Case study	Car insurance service	Co-created innovative developments		+
Roy and Sivakumar (2011)	Conceptual paper	Knowledge-based services	Management of intellectual property	Accessing intellectual property	+
				Exploiting intellectual property	-
				Defending intellectual property	+
Roy and Sivakumar (2012)	Conceptual paper	Knowledge-based services	Management of outsourcing transition through control	Rigid, explicit control	-
				Soft, normative control	+
Wang, Zhao, and Voss (2016)	Survey	Manufacturing and service firms	Customer orientation		+
			Supplier collaboration		+

Following prior systematic review and meta-analytic articles on product and service innovation (e.g., Kuester et al. 2013; Slater et al. 2014; Storey et al. 2016), the set of antecedents of radical service innovation is structured under five categories in Table 4: *firm strategy*, *organizational culture*, *knowledge management*, *collaborative competences*, and *radical service innovation process*.

This dissertation discusses the details of each category as follows.

Table 4: Categorization of Results Relating to Radical Service Innovation

Category of Antecedents	Antecedents		Relationships
Firm Strategy	Resource configuration decisions	Resource exploration	+
		Resource exploitation	-
	Management of outsourcing transition through control	Rigid, explicit control	-
		Soft, normative control	+
Organizational Culture	Customer orientation	Customer orientation	Mixed
		Customer acquisition orientation	+
		Customer retention orientation	Non-significant
	Competitor orientation		+
	Willingness to cannibalize	Willingness to cannibalize sales	Non-significant
		Willingness to cannibalize routines	+
		Willingness to cannibalize investments	+
Knowledge Management	The nature of knowledge	Knowledge complexity	+
		Knowledge depth	Non-significant
		Knowledge diversity	+
		Knowledge linkage	Non-significant
		Knowledge tacitness	Non-significant
	Knowledge management practices	Investments in knowledge management practices	+
		Knowledge integration mechanisms	+
		Accessing intellectual property	+
		Exploiting intellectual property	-
		Defending intellectual property	+
Collaborative Competences	Internal collaboration	Employee collaboration	+
		Inter-functional coordination	+
	External collaboration	Customer collaboration	Non-significant
		Existing user collaboration	Non-significant
		Prospective user collaboration	+
		Supplier collaboration	+
		Business partner collaboration	+
		Universities	+
		Universities by formal cooperation	Non-significant
		Clients, suppliers, or other firms	Non-significant
		Clients, suppliers, or other firms by formal cooperation	+
		Other public institutions	+
Radical Service Innovation Process	Process complexity		+

2.2.1 Firm strategy

Firm strategy is critical to radical service innovation because it determines a firm's scope and depth of resource searching and resource reconfiguration. For example, Arnold, Fang, and Palmatier (2011) examine how a firm's *resource decision*

making affects radical service innovation in the context of the financial and retailing services. There are two main types of resource decision making in the literature: resource exploitation and resource exploration. The former refers to the management decision to refine and extend a firm's current innovation knowledge, skills, and processes, whereas the latter refers to the resource reconfiguration decision to acquire a completely new branch of innovation knowledge, skills, and processes (Leonard-Barton 1992). The authors conclude that resource exploitation decreases a firm's radical service innovation performance whereas resource exploration is beneficial to a firm's development of radically new services (Arnold et al. 2011).

In addition, Roy and Sivakumar (2012) propose a conceptual framework to explain the relationship between *global outsourcing strategies* and innovations in knowledge-based service industries. Drawing on management control theory (Lusch and Brown 1996), they suggest that exerting more rigid and explicit behavioral control during the transition stage of outsourcing knowledge-based services (i.e., outsourcing activities are clarified in cause-effect relationships), will make less likely the generation of radical service innovations. In contrast, a soft and normative behavioral control during the transition stage (i.e., outsourcing activities are based on norms of behavior that are mutually expected) leads to more radical service innovations.

2.2.2 Organizational culture

Organizational culture is considered as “the pattern of shared values and beliefs that help members of an organization understand why things happen and thus teach them the behavioral norms in the organization” (Deshpande and Webster 1989, p. 4). It is generally seen as the strongest driver of radical innovation (Tellis et al. 2009). A review of the current literature on service innovation reveals that there are three types of organizational culture that may facilitate the development of radical service innovation: 1) a firm’s customer orientation; 2) a firm’s competitor orientation; and 3) a firm’s willingness to cannibalize.

Customer orientation is defined as the extent to which a firm is inclined to generate, disseminate, and use customer information to understand and satisfy customer needs (Franke and Park 2006; Kohli et al. 1993; Saxe and Weitz 1982). It is one of the most important organizational cultures for incumbent firms wishing to maintain their competitive advantage in dynamically data-rich environments (Green and Cluley 2014; Troilo et al. 2017). However, the importance of customer orientation remains controversial in the literature when it comes to its effect on radical service innovation. Ordanini and Parasuraman (2011) find that a firm’s customer orientation fosters radical service innovation in the luxury hotel industry. Their findings further suggest that the relationship between customer orientation and radical service innovation is strengthened when a firm has a strong innovative orientation. Wang, Zhao, and Voss (2016) also find that customer orientation has a positive effect on product/service innovativeness in both the service and manufacturing industries. In contrast, Cheng and Krumwiede (2012) report that

customer orientation has no impact on radical service innovation. Based on the data in multiple service industries (e.g., financial, tourism, technical, information, and entertainment services), they find that customer orientation is only related to incremental service innovation. Some scholars have further investigated the influences of different types of customer orientations on a firm's service innovation performance. For example, Arnold, Fang, and Palmatier (2011) note that customer acquisition orientation has a positive effect on radical service innovation, whereas customer retention orientation has a non-significant effect on radical innovation. Taken together, these results suggest that the relationship between customer orientation and radical service innovation is complex. A more nuanced investigation is needed to clarify this relationship.

Another organizational culture for radical service innovation is *competitor orientation*, defined as the extent to which a firm is inclined to identify, analyze, and respond to competitors' actions (Kohli and Jaworski 1990). Competitor-oriented firms have a comprehensive understanding of their competitors' strategies, capabilities, and service offerings. This understanding enables them to develop a radically new service that has unique features and avoid direct confrontation with major competitors. Research has shown that competitor orientation has a positive effect on radical service innovation (e.g., Cheng and Krumwiede 2012).

Finally, *willingness to cannibalize* refers to "the extent to which a firm is prepared to reduce the actual or potential value of its investment" by introducing new innovations that challenge existing offerings (Chandy and Tellis 1998, p. 475).

Nijssen, Hillebrand and Vermeulen (2005) further expand this concept and identify three dimensions of willingness to cannibalize (i.e., sales, routines, and investments). Willingness to cannibalize on sales refers to the “disposition to introduce new products/services that will diminish the sales of its current products/services”; willingness to cannibalize on routines refers to the “disposition to introduce new products/services that will make current organizational skills and routines obsolete”; and willingness to cannibalize on investments refers to the “disposition to introduce new products/services that will make previous investments obsolete” (Nijssen et al. 2006, p. 243). Hillebrand, Kemp, and Nijssen (2011) find that willingness to cannibalize on routines and investments have positive influences on firm innovativeness in the business-to-business service industry.

2.2.3 Knowledge management

How knowledge management affects radical service innovation has attracted increasing research attention. Research in this field suggests that the success of knowledge management is determined by the nature of knowledge and knowledge management practices (De Luca and Atuahene-Gima 2007; Grant 1996; Nonaka 1994).

The nature of knowledge influences the effectiveness of a firm’s knowledge utilization when developing radically new services. Carlo, Lyytinen, and Rose (2012) propose three knowledge-based factors that may facilitate radical service innovation in small software firms: knowledge diversity; knowledge depth; and

knowledge linkages. Their results show that knowledge diversity influences the level of radical service innovation; by contrast, knowledge depth and knowledge linkages have non-significant impacts on radical service innovation. Arnold, Fang, and Palmatier (2011) find similar results. They conclude that the diversity of customer knowledge is critical to the development of radical service innovation whereas the depth of customer knowledge has no impact on such innovation in financial and retailing service industries. In addition, Pérez-Luño et al. (2011) examine the effects of knowledge tacitness and knowledge complexity on the development of radical service innovation in both manufacturing and service contexts. Results show that while knowledge complexity has a positive influence on radical service innovation, the effect of knowledge tacitness appears only when combined with a firm's social capital.

A firm's *knowledge management practices* reflect its approaches to managing knowledge and this is critical to radical service innovation (Kim and Atuahene-Gima 2010). One recent study reports that increasing a firm's investments in knowledge management practices significantly increases radical process innovation in IT service industries (Ashok et al. 2016). Another study finds that the knowledge integration mechanism, defined as the formal structures and processes that facilitate the integration of various types of knowledge and the dissemination of that knowledge among functional units, plays an important role in the development of radically new services (Ordanini and Parasuraman 2011). Roy and Sivakumar (2011) also investigate how intellectual property management

practices in the global outsourcing context affect the generation of radical innovation in knowledge-based service industries. They propose that accessing and defending intellectual property would facilitate the generation of radical service innovation whereas exploiting intellectual property is detrimental to such innovation.

2.2.4 Collaborative competences

Collaboration or co-creation with other actors can bring diverse resources to the focal firms, contributing to the development of radical service innovation (Helkkula et al. 2018). In a longitudinal case study, Perks, Gruber, and Edvardsson (2012) observe that a radical telematics-based motor insurance service is co-created with many stakeholders, such as suppliers, customers, competitors, research institutions, and other business partners. To successfully create a radical innovation, firms need to put effort into acquiring the necessary resources via internal and external collaborations in a business ecosystem (Chandler et al. 2019; Randhawa et al. 2018).

A few studies examine the impact of internal collaboration on radical service innovation. For example, Ordanini and Parasuraman (2011) suggest that service employees are an operant resource that serve as an important source of innovation knowledge. They find that contact-employee participation in the service innovation process contributes to the radicalness of service innovation in the hospitality industry. Cheng and Krumwiede (2012) also note that inter-functional

coordination has a positive effect on radical service innovation performance in the service industries.

Some studies find that external collaboration with others is highly beneficial to radical service innovation. In their case study, Nicolajsen and Scupola (2011) reveal that customers can be not just mere resources but also co-creators of radical service innovation. However, other studies find that customer collaboration is unlikely to foster radical service innovation (Ordanini and Parasuraman 2011). Ashok, Narula, and Martinez-Noya (2016) take a deeper look into existing user collaboration and prospective user collaboration. Whereas existing users are those customers who currently have a working relationship with the focal firm, prospective users are new customers that the focal firm intends to acquire in a new or existing market. Ashok, Narula, and Martinez-Noya (2016) conclude that prospective user collaboration is important when developing radically new IT services. Finally, collaboration with research institutions or other business partners also boosts radical service innovation. For example, Koch and Strotmann (2008) find that accessing knowledge from universities or other public institutions is particularly important for the development of radical service offerings in the knowledge-intensive business services industry; however, collaboration with other business partners has a positive effect on radical service innovation only when such collaboration is based on joint projects or formal cooperation contracts.

2.2.5 Radical service innovation process

The relationship between innovation process and radical innovation has been largely discussed in the product innovation literature (Cooper 2008; Reinders et al. 2010). Studies show that more than 70% of radical innovation projects are completed through complex and formal innovation processes (Barczak et al. 2009). However, there is little research that empirically examines the effect of the innovation process on the development of radical service innovation. Drawing on complexity theory, Melton and Hartline (2015) investigate how customer and employee involvements in different innovation stages (i.e., design, analysis, development, and launch stages) influence radical service innovation through the mediator of process complexity in multiple service industries, such as financial, health care, legal, and transportation services. Process complexity is defined as the extent to which the service innovation process has many and various activities that allow different actors to interact creatively (Melton and Hartline 2015). Melton and Hartline (2015) find that process complexity has a positive effect on radical service innovation because it helps a firm to develop new competencies, explore opportunities for radically new service concepts, and overcome obstacles to the development and implementation of radical service innovation.

2.2.6 Summary

A number of studies investigating the antecedents of radical service innovation have been summarized in this section. The above review suggested the following possible avenues for the present research.

First, although there are studies investigating the relationship between firm strategy and radical service innovation, it would be beneficial to pay more attention to senior leadership practices to understand how a senior leader or top management team shapes the development of radical service innovation.

Second, organizational culture is essential for radical service innovation because it determines a firm's scope and depth of information search and utilization. In particular, customer orientation needs greater research attention because its effect on radical service innovation is inconclusive (Cheng and Krumwiede 2012; Ordanini and Parasuraman 2011). A more nuanced investigation into the relationship between customer orientation and radical service innovation would improve the development of the service innovation field, given that addressing customer needs is usually a starting point for developing new service offerings.

Third, many studies have examined how the nature of knowledge and knowledge management practices influence radical service innovation. What the review of literature seems to be missing here, however, is an investigation of their interactive effects on radical service innovation. Further exploration of the interaction between the nature of knowledge and knowledge management practices would deepen the understanding of managing knowledge in the development of radical service innovation.

Fourth, researchers have identified only a limited set of collaborative competences for radical service innovation. Future research is needed to identify the full range of collaboration modes for service innovation.

Finally, research on the radical service innovation process is surprisingly sparse. In-depth future research is needed to uncover the main and interactive effects of innovation processes on radical service innovation.

The objective of undertaking this review is to present the main antecedents of radical service innovation. As the literature review progressed, the researcher found that organizational culture plays a critical role in stimulating radical innovation in both the service and product innovation literature. However, scholars have been debating for decades on the importance of customer orientation in developing radical innovation. As a marketing researcher, a complete understanding of whether customer orientation is beneficial to radical service innovation is interesting. Therefore, the researcher decided to look deeper at customer orientation and its effect on radical service innovation.

2.3 Customer Orientation as the Key to Radical Service Innovation

2.3.1 The concept of customer orientation

Marketing stipulates that “an organization’s purpose is to discover needs and wants in its target markets and to satisfy those needs more effectively and efficiently than competitors” (Slater and Narver 1998, p. 1001). This customer-

oriented thought has become “a cornerstone of modern marketing” (Kirca et al. 2005, p. 24).

Customer orientation is considered to be one of the most important organizational cultures in the marketing and innovation literature (Kohli and Jaworski 1990; Narver et al. 2004; Saxe and Weitz 1982; Slater et al. 2014; Slater and Narver 1994). Firms with strong customer orientation have “sufficient understanding of one’s target buyers” (Narver and Slater 1990, p. 21); they are able to generate and disseminate information about current and future customers and can create superior value for them continuously (Atuahene-Gima 2005; Franke and Park 2006; Grawe et al. 2009; Saeed et al. 2015). However, very little is accomplished if the firm cannot respond to customer needs and wants by offering new services or products (Kohli and Jaworski 1990).

Customer needs vary across customer groups. According to the extant marketing and innovation literature, there are two forms of customer needs: expressed and latent needs (Day 1994). Expressed needs are defined as the needs that customers are aware of and able to clearly express. In contrast, latent needs refer to the needs that customers are unaware of and unable to express but which can be understood and interpreted by firms (Menguc and Auh 2006; Slater and Narver 1998). Based on two types of customer needs, Narver, Slater, and MacLachlan (2004) further proposed responsive and proactive customer orientations.¹ Whereas responsive

¹ It is worth noting that Narver et al. (2004) specify responsive and proactive market orientations as two forms of market orientation. Nevertheless, “the constructs they measure deal only with identifying and satisfying customers’ needs and do not encompass the other traditional dimensions

customer orientation refers to “the generation, dissemination, and use of market information pertaining to the current customers and product domain and focuses on expressed customer needs”, proactive customer orientation refers to “discovering and satisfying the latent, unarticulated needs of customers through observation of customers’ behavior in context to uncover new market opportunities, with working closely with lead users, with undertaking market experiments to discover future needs, and with cannibalizing sales of existing products” (Atuahene-Gima et al. 2005, p. 466).

Despite the progress of research on customer orientation, differentiating only between expressed and latent needs is considered to be an oversimplified way of categorizing customer needs (Narver et al. 2004). In practice, expressed customer needs are suggested either by firms’ mainstream (i.e., at the center of a firm’s business) or emerging (i.e., at the periphery of a firm’s business) customer segments. In this dissertation, *mainstream customer needs* are ‘well-defined needs that most customers are aware of and able to clearly express’. *Emerging customer needs* are ‘ill-defined needs that are starting to exist, grow, and become perceptible in small group of customer segments’. Based on the concept of mainstream and emerging customer needs, this dissertation further discusses mainstream and emerging customer orientations as follow.

2.3.2 Mainstream and emerging customer orientations

of a market orientation”, such as competitor orientation and inter-functional coordination (Blocker et al. 2011, p. 217). To be more precise, this dissertation utilizes the terms responsive and proactive customer orientation rather than market orientation.

Govindarajan, Kopalle, and Danneels (2011) proposed two forms of customer orientation: mainstream and emerging customer orientations. They defined mainstream customer orientation as “the focus of the firm on serving its most important current customers, by gathering information about them and developing products to suit their current and anticipated needs” and emerging customer orientation as a firm’s interest in small but emerging customer segments, which involves “developing knowledge about customers that are ill-identified and whose needs are not well-known, and assessing the size of that market ... allocating financial and human resources to distant search, deliberately seeking input from new types of customers ... identifying potential customers, constructing relationships and communication channels with these customers, and developing knowledge about them” (Govindarajan et al. 2011, pp. 123–124).

Govindarajan, Kopalle, and Danneels (2011)’s definitions and measurement scales of mainstream and emerging customer orientations reflect the elements of expressed and latent needs proposed by Narver et al. (2004). However, such conceptualization and operationalization are too broad to identify the unique nature of different forms of customer orientation. For example, some firms may put efforts only into satisfying expressed mainstream customer needs rather than discovering latent mainstream customer needs. Therefore, this dissertation specifically focuses on expressed customer needs. Drawing upon different streams of the academic literature, the researcher revises the existing conceptualization and subsequently uses strategic orientation, market segmentation, market

characteristics, and the actions of the firm to clearly differentiate between mainstream and emerging customer orientations (see Table 5).

Table 5: Distinguishing Mainstream and Emerging Customer Orientations

Criteria	Mainstream customer orientation	Emerging customer orientation	Supporting references
Strategic orientation	<ul style="list-style-type: none"> • More responsive • Present focus 	<ul style="list-style-type: none"> • More proactive • Future focus 	– Narver et al. (2004)
Market segmentation	<ul style="list-style-type: none"> • Well-defined expressed customer needs in current customer segments 	<ul style="list-style-type: none"> • Ill-defined expressed customer needs in current and new customer segments 	– Day (1994) – Menguc and Auh (2006)
Market characteristics	<ul style="list-style-type: none"> • Low risk and uncertainty • Well-developed market potential • From a long-term perspective, the financial projection of revenue and cost is predictable 	<ul style="list-style-type: none"> • High risk and uncertainty • Under-developed market potential • From a short-term perspective, the financial projection of revenue and cost is predictable 	– Arnold et al. (2011) – Danneels (2003) – Govindarajan et al. (2011) – Kirca et al. (2005)
Actions of the firm	<ul style="list-style-type: none"> • Few changes in human, financial, and technological resources input to satisfy well-defined customer needs • Searching for proximate (local) customer information • Aiming for improving existing products and services for mainstream customers 	<ul style="list-style-type: none"> • Big changes in human, financial, and technological resources input to satisfy ill-defined customer needs • Searching for distant customer information • Aiming for introducing new products and services after developing knowledge of emerging customer needs 	– Chandy and Tellis (1998) – Govindarajan et al. (2011) – Ordanini and Papasuraman (2011)

Based on this table, this dissertation defines *mainstream customer orientation* as ‘the extent to which a firm is inclined to generate, disseminate, and use mainstream customer information to satisfy expressed mainstream customer needs in current customer segments’. Firms with mainstream customer orientation are led by their mainstream customers (Atuahene-Gima et al. 2005; Tsai et al. 2008). They systematically and frequently analyze mainstream customer information and

develop new offerings that mainstream customers value (Blocker et al. 2011; Yannopoulos et al. 2012). *Emerging customer orientation is defined as ‘the extent to which a firm is inclined to generate, disseminate, and use emerging customer information to satisfy new customer segments and latent needs of existing customer segments’.* Firms with an emerging customer orientation focus on obtaining and developing knowledge about emerging needs and wants of customers. They assess the potential future market size and invest adequate resources to carve out a strong position in emerging customer segments by developing new offerings that customers value (Govindarajan et al. 2011).

These two forms of customer orientation are neither contradictory to each other nor are they mutually exclusive customer orientations. Rather, they can co-exist within a firm to a varying degree. Mainstream customer orientation is always prevailing in incumbent firms because they tend to keep eyes on the current markets that they have continuously strived to keep well developed (Nijssen et al. 2006). It is the incumbent’s curse for radical innovations (Chandy and Tellis 2000). In other words, overly focusing on mainstream customer segments may be inevitable for incumbent firms. To surmount this challenge, firms must simultaneously seek the potential innovation opportunities that lie in other customer segments. Since prior literature has focused on mainstream customer orientation (e.g., Cheng and Krumwiede 2012; Grawe et al. 2009; Hillebrand et al. 2011; Joshi 2016; Ordanini and Parasuraman 2011), this paper focuses on

examining how emerging customer orientation influences radical service innovation.

2.3.3 The relationship between customer orientation and radical innovation

Although customer orientation is seen as a critical precursor of innovation, its effect on radical innovation is still controversial in the marketing and innovation literature. Some scholars argue that customer orientation is beneficial to radical innovation because the information from the marketplace shapes innovative ideas and science into commercial services or products (Slater et al. 2014). Customer-oriented firms focus on a group of customers and develop a deep understanding of the needs and wants of that group (Arnold et al. 2011; De Luca et al. 2010), which in turn encourages firms to search for new technologies to satisfy customer preferences. Customer orientation also enables firms to learn generatively (Baker and Sinkula 2007). Such generative learning enables firms to think beyond the extant frame of understanding of customer needs, encouraging employees to search for new technologies that address underlying customer needs (Jansen et al. 2006).

However, others argue that customer orientation is detrimental to radical innovation for several reasons. First, a customer-oriented information search is a source of incremental innovation because customers can neither articulate their latent needs beyond current consumption experience nor clearly define a solution (Verganti 2008). Second, firms with high customer orientation develop a tight coupling with their existing customers (Danneels 2003). This makes firms

unwilling to displease their powerful customers, meaning that the core competences that satisfy the existing customers become a core rigidity (Slater and Narver 1998), thereby narrowing their attention to the technologies that are favored by existing customer groups and causing them to miss potential market opportunities for radical innovation. Third, customer orientation tends to breed organizational inertia because managers avoid innovation decisions that act against existing customers' interest (Hillebrand et al. 2011); thus, customer-oriented firms may neglect competence-destroying innovations, such as radical innovations.

To deal with the above controversies, prior literature has empirically employed different approaches to explain the relationship between customer orientation and radical innovation. Some scholars have adopted a mediator-based approach. For example, Atuahene-Gima (2005) finds that the effect of customer orientation on radical product innovation is fully mediated by competence exploration. Wang, Zhao, and Voss (2016) note that customer orientation increases supplier collaboration and technological capability, which improves a firm's radical service innovation. Others have adopted a moderator-based approach. For example, Ordanini and Parasuraman (2011) find that a firm's customer orientation, both directly and by interacting with innovative orientation, enhances radical service innovation. Joshi (2016) finds that the effect of customer orientation on radical product innovation is largely dependent on organizational reward practices.

However, most extant studies do not distinguish between mainstream and emerging customer orientation. This dissertation finds that, as a result of their definitions and measurement scales of customer orientation, these studies focus exclusively on mainstream customer orientation, neglecting the potential contribution of emerging customer orientation on radical service innovation.

2.3.4 Summary, research gap, and research question

This comprehensive review shows that many studies underestimate, misunderstand, or overlook the differences between customer needs (Cheng and Krumwiede 2012; Govindarajan et al. 2011; Joshi 2016; Ordanini and Parasuraman 2011), resulting in inconclusive findings. This dissertation, on the other hand, clearly differentiates between mainstream and emerging expressed customer needs. In addition, the attention of prior research has mainly been on the mainstream needs rather than emerging needs of customers (e.g., Cheng and Krumwiede 2012; Grawe et al. 2009; Ordanini and Parasuraman 2011). This dissertation, therefore, specifically investigates how emerging customer orientation influences radical service innovation and explores the boundary conditions for this relationship. To do this, this thesis intends to answer the following research questions:

Research question 2: To what extent does emerging customer orientation affect radical service innovation? In particular, which innovation-related practices (i.e., customer involvement practices and organizational reward practices) strengthen

or weaken the relationship between emerging customer orientation and radical service innovation?

2.4 Key Factors Influencing the Relationship between Emerging Customer Orientation and Radical Service Innovation

According to the culture-centric theory of radical innovation, organizational culture is the primary driver of radical innovation in today's converging economies (Tellis et al. 2009). Prior marketing and innovation literature has also pointed out that organizational culture (e.g., emerging customer orientation) is only a starting point for radical innovation, and needs to be complemented by innovation-related practices to achieve maximum effectiveness of organizational culture (Joshi 2016; Slater et al. 2014; Slater and Narver 1995). Hence, it is critical to understand whether the specific customer involvement practices and organizational reward practices that are highly relevant to radical innovations are synergists of or impediments to the effect of emerging customer orientation on radical service innovation (Cui and Wu 2016, 2017; Joshi 2016; Storey and Larbig 2018).

Building on the above insights, interviews with practitioners, and prior marketing and innovation literature, the researcher identifies three customer involvement practices and two organizational reward practices as key contextual factors that shape the direction and magnitude of the influence of emerging customer orientation on radical service innovation. The customer involvement practices are customer involvement as an information source, customer involvement as co-

developers, and customer involvement as innovators; the organizational reward practices are outcome-based reward and strategy-based reward.

2.4.1 Customer involvement practices

Customer involvement practices have been considered to be a critical element for successful new service development (NSD) (Alam 2006; Carbonell et al. 2009; Storey and Larbig 2018), being approaches whereby firms can utilize customer information (Fang et al. 2008; Trischler et al. 2018). By appropriately involving customers in the service innovation process, firms are more likely to transform their knowledge of customer needs and wants into real radical service innovations (Mahr et al. 2014). Prior research has generally categorized customer involvements into three forms, based on the roles that customers play in new service/product development. These are: (1) customer involvement as an information source; (2) customer involvement as co-developers; and (3) customer involvement as innovators (Blazevic and Lievens 2008; Cui and Wu 2016; Fang et al. 2008).

In *customer involvement as an information source*, the members of the NSD team gather information on customer needs and wants by listening to customers (Cui and Wu 2017). They conduct marketing research methods (e.g., interviews, focus group, and market surveys) to collect information, and combine this information with technological knowledge to develop radical service innovations that meet customer needs and wants (Jeppesen 2005; Nambisan 2002). Customer involvement as an information sources requires firms to transfer customer

information to the NSD team before applying such information to develop radical service innovations. In this practice, customers are not directly involved in the process of developing radically new services; they serve only as information providers.

In *customer involvement as co-developers*, customers participate in the service innovation process and develop new services by acting together with the internal experts (Cui and Wu 2017). They act as members of the NSD team by closely interacting with internal employees, and engaging in joint problem solving (Bogers and Horst 2014). Customers become partners with the NSD team and share the responsibility for developing radically new services. In such a practice, the focal firm is closely coupled with its customers, and customers contribute to a significant portion of the NSD efforts (Jeppesen 2005; Lilien et al. 2002).

In *customer involvement as innovators*, customers are empowered to develop their own services, which are then adopted and offered by the firm (Cui and Wu 2016). They are the locus of innovation and serve as the primary contributors of NSD (von Hippel and Katz 2002). The firm is responsible for sharing certain technological knowledge with customers, offering innovation platforms and technical support in the process of developing new services (Nambisan 2002; von Hippel and Katz 2002).

Although these three conduits for customer involvement can represent different degrees of involvement, this dissertation follows the extant marketing and

innovation literature in viewing them as three forms of involvement with different characteristics (Blazevic and Lievens 2008; Cui and Wu 2016). Table 6 summarizes the main characteristics of each form of customer involvement practice.

Table 6: Characteristics of Three Forms of Customer Involvement in Radical Service Innovation (Adapted from Cui and Wu (2016))

	Customer involvement as an information source	Customer involvement as co-developers	Customer involvement as innovators
Role of customers	<ul style="list-style-type: none"> Customers play a passive role as information providers 	<ul style="list-style-type: none"> Customers are co-developers of new services 	<ul style="list-style-type: none"> Customers are innovators on their own
Role of the firm	<ul style="list-style-type: none"> The firm is responsible for developing new services 	<ul style="list-style-type: none"> The firm manages collaboration with customers in new service development 	<ul style="list-style-type: none"> The firm provides customers with technical knowledge and support, and utilizes customer-generated service designs
Customer contribution to innovation	<ul style="list-style-type: none"> Customers provide information on their needs 	<ul style="list-style-type: none"> Customers provide both information on their needs and inputs on new services 	<ul style="list-style-type: none"> Customers contribute new services, not directly sharing information on their needs
Customer interaction	<ul style="list-style-type: none"> Customers do not closely interact with new service development employees 	<ul style="list-style-type: none"> Customers closely interact and engage in joint problem solving with new service development employees 	<ul style="list-style-type: none"> Customers develop new services without interacting with new service development employees
Service development responsibility	<ul style="list-style-type: none"> New service development employees 	<ul style="list-style-type: none"> Shared between new service development employees and customers 	<ul style="list-style-type: none"> Customers
Locus of service development	<ul style="list-style-type: none"> Within the firm 	<ul style="list-style-type: none"> Within the firm 	<ul style="list-style-type: none"> Outside of the firm, with the customers
Means of utilizing customer knowledge	<ul style="list-style-type: none"> Transfer customer knowledge to the firm 	<ul style="list-style-type: none"> Bring customers closer into the new service development process 	<ul style="list-style-type: none"> Customers apply their knowledge directly to service design, without direct transfer of customer knowledge to the firm

The different forms of customer involvement employ different mechanisms for utilizing information on customer needs and wants. Thus, they have own advantages/disadvantages when it comes to transforming emerging customer needs and wants into radical service innovations, and may be suitable for different types of firms. Since customer involvement practices are critical to the success of radical service innovation process, this dissertation selects customer involvement as an information source, customer involvement as co-developers, and customer involvement as innovators as three moderators and investigates how they influence the relationship between emerging customer orientation and radical service innovation.

2.4.2 Organizational reward practices

Conventional wisdom suggests that organizational reward practices are effective ways to communicate a firm's future directions and priorities (Melnik et al. 2010). They can motivate employees to take potential risks related to innovation activities (Atuahene-Gima and Li 2002). A well-designed reward system also enables the top management team to collect updated information about how well the firm is doing, facilitates communication about what is wanted to employees who engage in NSD or NPD, and offers a concrete yardstick by which incentives can be implemented. Hence, firms often use rewards as a means of controlling, managing, and enhancing innovation performance (Sarin and Mahajan 2001).

Organizational reward practices are especially critical to radical service innovation because they lead to greater tolerance for ambiguity and frame-breaking thinking,

thereby generating more novel and useful ideas (Im et al. 2013). There are two prevailing reward practices in the marketing literature: process-based and output-based rewards (Atuahene-Gima and Murray 2004). A process-based reward is the degree to which rewards are tied to specified procedures, activities, and behaviors of achieving desired innovation outcomes, such as the completion of specific phases in the NSD. An output-based reward is the degree to which rewards are tied to certain performance outcomes, such as completion date, budgets, sales, volume, and market share for an innovation (Atuahene-Gima and Murray 2004; Chen 2015; Sarin and Mahajan 2001). Since both reward practices are oriented toward the achievement of short-term outcomes, this dissertation treats them as *outcome-based rewards*.

In addition, prior innovation literature suggests that it is important to consider the time horizon of different reward practices (Cabrales et al. 2007). Whereas outcome-based rewards are short-term oriented, *strategy-based rewards*, defined as the degree to which rewards are tied to the strategically relevant criteria, are long-term oriented. Strategy-based rewards are designed to “incentivize those activities in the present that contribute to the organization’s ability to meet future customer needs, differentiate against future competitors, and adapt to the business models of the future” (Joshi 2016, p. 440).

As Slater and Narver (1995, p. 67) note, “values are difficult to sustain if the appropriate incentives ... do not exist”. It is important to understand which organizational reward practice is most complementary to emerging customer

orientation in order to maximize radical service innovation performance. Thus, this dissertation selects outcome-based rewards and strategy-based rewards as two moderators and investigates how they influence the relationship between emerging customer orientation and radical service innovation.

2.5 Radical service innovations in ICT manufacturing firms and information services firms

2.5.1 The trend of radical service innovation in manufacturing

Manufacturing firms have been increasingly developing service innovations to accompany their products (Kastalli and Van Looy 2013; Kroh et al. 2018). These service innovations can be in various forms, ranging from incrementally new services (e.g., goods and spare parts, helpdesks, training, maintenance, repairs, and overhauls) to more radical ones (e.g., customer support agreements and outcome contracts, precision manufacturing in design service, and intelligent factories) (Baines et al. 2017; Davies 2004; Spring and Araujo 2009; Vandermerwe and Rada 1988). In particular, radical service innovations have been receiving significant attention from practitioners because they can increase revenue and profit (Eggert et al. 2014), improve responses to customer needs (Ostrom et al. 2010), develop new revenue streams (Kastalli and Van Looy 2013), enhance customer loyalty (Saccani et al. 2014), and set higher barriers to competition (Oliva and Kallenberg 2003).

The extant literature has proposed concepts to investigate service innovation in manufacturing, such as service infusion and servitization (Burton et al. 2016; Kroh et al. 2018; Ostrom et al. 2015; Vandermerwe and Rada 1988). Service infusion is defined as “the process whereby the relative importance of service offerings to a company or business unit increases, so augmenting its service business orientation” whereas servitization refers to “the transformational process of shifting from a product-centric business model and logic to a service-centric approach” (Kowalkowski et al. 2017, p. 7). These concepts point out the importance of developing service innovations in manufacturing because firms with such innovations distinguish themselves from their competitors.

However, few articles have conducted empirical research on service innovation in manufacturing contexts. For example, Santamaría et al. (2012) investigated how service-related factors (i.e., human capital and training, advanced technology, and interaction with customers) and manufacturing-related factors (i.e., R&D activities, collaboration with other partners, and market prospecting activities) influence service and product innovation outcomes of manufacturing firms. Results showed the critical differences between service and product innovations, with service innovations being particularly related to human resources development and closer links with customers. Moreover, Ettlie and Rosenthal (2012) used a case study approach to explore the relationship between the corporate culture of manufacturing firms and the development of service innovations. They found that both the engineering and entrepreneurial cultures work well when the

development culture and available resources are taking into account. Sjödin et al. (2016) used fuzzy set qualitative comparative analysis to identify four capability configurations that enable the development of new services in manufacturing firms: service development capabilities; mass service customization capabilities; digitalization capabilities; and network management capabilities.

2.5.2 A comparison between manufacturing firms and service firms

In addition, prior literature has examined the differences in innovation practices followed in manufacturing firms and service firms (Visnjic et al. 2019). For example, Nijssen et al. (2006) found that R&D strength is more critical to new product development (NPD) than to NSD, while a firm's willingness to cannibalize prior investments and organizational routines is more critical to NSD than to NPD. Leiponen (2012) found that although manufacturing firms and service firms can benefit from breadth in external knowledge sourcing strategies, breadth in terms of pursuing parallel innovation objectives has a detrimental effect on innovation in service industries. Ettlie and Rosenthal (2012) also investigated service versus manufacturing innovation. Their findings indicated that manufacturing and service firms use different ways to develop innovation and place different emphasis on internally and externally sourced ideas. All the above examples show the similarities in and differences between the innovation practices for manufacturing and service firms. More importantly, they demonstrate the importance of separating out manufacturing from service firms because the innovation-related practices that are effective for manufacturing firms may be not

effective for service firms. As Ostrom et al. (2010, p. 15) noted, “there are still few insights into how to drive radical innovation in services, both in traditional service industries and for manufacturers that are differentiating themselves in the marketplace through value-added services”. Therefore, this dissertation simultaneously investigates radical service innovations in manufacturing and service firms.

2.5.3 Summary, research gap, and research question

This section presents the emerging research trend of service innovation in manufacturing. It also indicates that the extant literature has very little understanding of the different innovation-related practices that drive radical service innovations in manufacturing and service firms (Goduscheit and Faullant 2018). Thus, this thesis aims to investigate whether customer involvement practices and organizational reward practices that are potentially beneficial/detrimental to the relationship between emerging customer orientation and radical service innovation in the context of ICT manufacturing firms operate to produce different effects in information services firms. To do this, this thesis tries to answer the following research question:

Research question 3: To what extent do innovation-related practices that potentially moderate the relationship between emerging customer orientation and radical service innovation differ between ICT manufacturing firms and information services firms?

2.6 Summary

This chapter summarizes the relevant literature that examined 1) the definitions of service innovation, 2) the antecedents of radical service innovation, 3) the relationship between emerging customer orientation and radical service innovation, 4) potential key moderators (i.e., customer involvement practices and organizational reward practices), and 5) the differing impacts of innovation practices for manufacturing firms and service firms. Based on this review of the current literature, this thesis proposes three main research questions. In the next chapter, the conceptual development and research hypotheses will be discussed.

CHAPTER 3: CONCEPTUAL DEVELOPMENT AND RESEARCH

HYPOTHESES

After reviewing the literature pertinent to the phenomenon of interest, this chapter aims to address the following three main research questions:

Research question 1:

What criteria differentiate a radical service innovation from an incremental service innovation?

Research question 2:

To what extent does emerging customer orientation affect radical service innovation? In particular, which innovation-related practices (i.e., customer involvement practices and organizational reward practices) strengthen or weaken the relationship between emerging customer orientation and radical service innovation?

Research question 3:

To what extent do innovation-related practices that potentially moderate the relationship between emerging customer orientation and radical service innovation differ between ICT manufacturing firms and information services firms?

Based on the findings in the literature review, this chapter develops five outcome-based characteristics of service innovation that differentiate a radical service innovation from an incremental service innovation. An overarching research

model and detailed hypotheses are also proposed to answer the main research questions. In particular, the model investigates the relationship between emerging customer orientation and radical service innovation. The moderators (i.e., customer involvement practices and organizational reward practices) that potentially influence the relationship between emerging customer orientation and radical service innovation are also examined.

3.1 A Systematic Conceptualization of Radical Service Innovation Versus Incremental Service Innovation

Service innovation is an integral part of many firms' success. Research to date, however, has not reached a consensus on the conceptualization and operationalization for this well-known phenomenon. Moreover, systematic differentiation between radical and incremental service innovations is absent from the extant literature. This can lead to the inconsistent findings seen in previous studies on service innovation. To build up a conceptual foundation in service innovation research, the researcher identified five outcome-based unique characteristics of service innovations, as outlined in the previous chapter.

Based on the literature review in chapter 2, this dissertation finds that a service innovation always involves five outcome-based characteristics: the changes in (1) the sets of resources applied by the focal firm, (2) the sets of resources applied by the customers, (3) the value co-creation processes between the focal firm and its customers, (4) the firm value, and (5) the customer perceived value. These

characteristics can serve as criteria to distinguish a radical service innovation from an incremental one (see Table 7).

Table 7: Characteristics of Incremental and Radical Service Innovation

Outcome-based Criteria	Radical service innovation	Incremental service innovation	Supporting references
(1) Degree of changes in the sets of resources applied by the focal firm	Large recombination of existing sets of resources with new resources	Modifications in the existing sets of resources applied by the focal firm	– Kang and Kang (2014) – Ordanini and Papasuraman (2011)
(2) Degree of changes in the sets of resources applied by the customers	Large recombination of existing sets of resources with new resources	Modifications in the existing sets of resources applied by the customers	– Ordanini and Papasuraman (2011)
(3) Degree of changes in the value co-creation process between the focal firm and its customers	Value co-creation processes between the focal firm and its customers are changed in a substantial way	Value co-creation processes between the focal firm and its customers are changed in a minor way	– Michel, Brown, and Gallan (2008) – Perks, Gruber, and Edvardsson (2012)
(4) Degree of changes in the firm value	Substantial benefits for firm's accounting and financial performance	Relatively incremental benefits for firm's accounting and financial performance	– Arnold, Fang, and Palmatier (2011) – Ostrom et al. (2010)
(5) Degree of changes in the customer perceived value	Significantly greater customer benefits	Relatively incremental customer benefits	– Arnold, Fang, and Palmatier (2011) – Dotzel, Shankar, and Berry (2013)

This dissertation follows these five criteria and conceptualizes a *radical service innovation* as a completely new service offering or process that involves substantial changes in the sets of resources applied by the focal firm and its customers, the value co-creation process, and the firm and customer value. Radical service innovations would satisfy relatively ill-defined customer needs and create significantly higher benefits, compared with incremental service innovations. In contrast, an *incremental service innovation* can be conceptualized as the

modification of a firm's existing service offering or process that involves minor changes in the sets of resources applied by the focal firm and its customers, the value co-creation process, and the firm and customer value. Such innovations would satisfy well-defined customer needs and create incremental benefits. On the basis of the above discussions, research question 1 has now been addressed.

3.2 An Overarching Research Model Linking Emerging Customer Orientation with Radical Service Innovation

To address research question 2 and 3, this thesis proposes an overarching research model. This model investigates the relationship between emerging customer orientation and radical service innovation by examining five potential moderators in both ICT manufacturing and information services firms. These moderators are: customer involvement as an information source; customer involvement as co-developers; customer involvement as innovators; outcome-based reward; and strategy-based reward. These are selected because of their relevance in the marketing and innovation literature. Figure 2 exhibits the overarching research model.

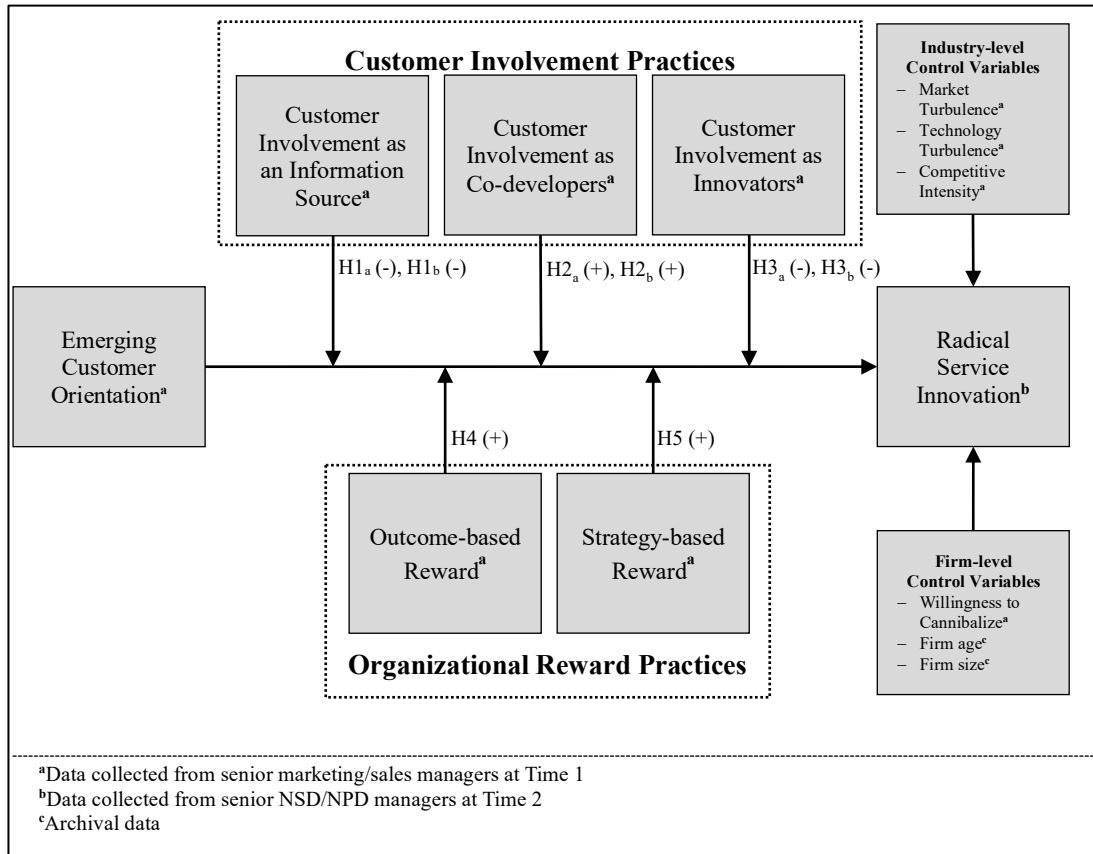


Figure 2: A Research Model Linking Emerging Customer Orientation with Radical Service Innovation for ICT Manufacturing and Information Services Firms

3.2.1 The Relationship between emerging customer orientation and radical service innovation

In this dissertation, emerging customer orientation refers to the extent to which a firm is inclined to generate, disseminate, and use emerging customer information to satisfy new customer segments and latent needs of existing customer segments. Firms with high emerging customer orientation tend to search for ill-defined emerging customer needs and wants, focus on highly potential but risky markets, and invest substantially in human, financial, and technological resources to

develop new offerings that emerging customer segments value (Govindarajan et al. 2011).

The extant literature has three theoretical explanations to account for the positive relationship between emerging customer orientation and radical service innovation. First, from an organizational focus perspective, emerging customer orientation encourages a firm to search for distant customer information and develop an in-depth understanding of emerging customer needs and wants (Slater et al. 2014). This in-depth knowledge of emerging needs of customers is an essential prerequisite for the development of radical service innovation (Arnold et al. 2011; Troilo et al. 2014). Second, from an organizational learning perspective, a firm with high emerging customer orientation has the ability to learn generatively (Baker and Sinkula 2007). Such generative learning is conducive to radical service innovation because it helps a firm to identify the frames that shape existing thought patterns/behaviors and facilitates firms to understand customer preferences and new technologies beyond existing frames (Jansen et al. 2006; Slater and Narver 1995). Third, from an organizational investments perspective, an emerging customer-oriented firm is more willing to invest substantially in human, financial, and technological resources (Govindarajan et al. 2011). Given that a radical service innovation always involves a significant recombination of the existing sets of resources with new resources, these substantial investments are essential to the development of radically new services (Kang and Kang 2014; Ordanini and Parasuraman 2011). On the basis of these arguments, the researcher develops a

baseline hypothesis (H0) for the relationship between emerging customer orientation and radical service innovation.

H0: Emerging customer orientation is positively related to radical service innovation.

However, prior marketing and innovation literature has suggested that the effectiveness of emerging customer orientation on radical service innovation is likely to vary depending on the characteristics of the innovation-related practices involved (Slater et al. 2014; Slater and Narver 1995). As such, emerging customer orientation may be more (or less) appropriate for radical service innovation based on different customer involvement and organizational reward practices. In addition, recent studies have demonstrated that the innovation-related practices that are effective for manufacturing firms may be not effective for service firms (Chang et al. 2014; Leiponen 2012; Ostrom et al. 2010). Therefore, this dissertation discusses customer involvement and organizational reward practices, and their influences on the relationship between emerging customer orientation and radical service innovation in both ICT manufacturing and information services firms.

3.2.2 Moderating effects of customer involvement practices on the relationship between emerging customer orientation and radical service innovation

The previous discussion seems to imply that fostering emerging customer orientation is an effective way of developing radical service innovation. However,

this thesis suggests that the story is even more complex. Although this dissertation expects that emerging customer orientation will lead to the development of higher radical service innovation performance, the researcher also believes that the relationship may be positively or negatively moderated by customer involvement practices.

3.2.2.1 Moderation by customer involvement as an information source

In the practice of customer involvement as an information source, firms will focus more on mainstream customer information and develop an in-depth knowledge of the customer's well-defined needs and wants (Carbonell et al. 2009). Customer involvement as an information source involves regular market surveys, interviews, and focus groups with mainstream customers, all of which tend to curtail distant information search efforts and hamper precise and comprehensive analysis of emerging customer needs and wants (Cui and Wu 2017). The practice tends to result in a conflict between mainstream and emerging customer information and an unorganized analysis of emerging customer needs and wants (De Dreu 2006). For this reason, firms with high customer involvement as an information source will value the knowledge of the emerging customer needs to a lesser extent than will those firms that rely less on customer involvement as an information source. This suggests that emerging customer orientation will lead to increased radical service innovation under low customer involvement as an information source but might decrease radical service innovation performance when such involvement practice is high.

In addition, when customer involvement as an information source is high, the core competence of firms become a core rigidity of resource reconfiguration because firms are unwilling to ‘put off’ their mainstream customers (Slater and Narver 1998). As such, those firms would give less importance to investing in human, financial, and technological resources, thus weakening the effect of emerging customer orientation on radical service innovation. In, contrast, when customer involvement as an information source is low, firms are more likely to invest new resources and flexibly transform the emerging customer information into radically new service offerings. In light of these arguments, this thesis posits the following hypotheses:

H1_a: For ICT manufacturing firms, emerging customer orientation will have a stronger positive relationship with radical service innovation when customer involvement as an information source is lower in volume.

H1_b: For information services firms, emerging customer orientation will have a stronger positive relationship with radical service innovation when customer involvement as an information source is lower in volume.

3.2.2.2 Moderation by customer involvement as co-developers

In the practice of customer involvement as co-developers, customers directly participate in the process of combining information about their needs with new technologies and interact with internal experts in NSD team to co-develop radical service innovations (Cui and Wu 2016). They closely interact with service

innovation employees in a collaborative process (Bogers and Horst 2014). Emerging customer orientation is positively related radical service innovation when customer involvement as co-developers is high for the following three reasons.

First, firms with high customer involvement as co-developers will have a deeper understanding of the changes in customer needs and wants owing to their long-term and close interactions with their customers (Dong and Sivakumar 2017). Such understanding would stimulate the NSD team to recognize more on the information of emerging customer needs (Chang and Taylor 2016), which in turn strengthens the positive relationship between emerging customer orientation and radical service innovation. In contrast, firms with low customer involvement as co-developers value emerging customer information to a lesser extent because they are less likely to realize the importance and potential of an emerging trend in the customers' needs and want, thus attenuating the effect of emerging customer orientation on radical service innovation.

Second, firms with high customer involvement as co-developers engage in the process of joint problem solving (Jeppesen 2005). In this process, firms will give more importance to generative learning because the co-development of radical service innovation often needs to change existing thought patterns in a flexible way (Verona and Ravasi 2003), thus strengthening the effect of emerging customer orientation on radical service innovation.

Third, in the practice of customer involvement as co-developers, firms share the responsibility of radical service development with customers (Cui and Wu 2017). Thus, they are more comfortable making a substantial investment in human, financial, and technological resources because of lower perceived risk in the innovation process (Forlani and Mullins 2000). In other words, firms with high customer involvement as co-developers are more likely to be attentive to organizational investment, which strengthens the relationship between emerging customer orientation and radical service innovation. The above three arguments suggest the following:

H2_a: For ICT manufacturing firms, emerging customer orientation will have a stronger positive relationship with radical service innovation when customer involvement as co-developers is higher in volume.

H2_b: For information services firms, emerging customer orientation will have a stronger positive relationship with radical service innovation when customer involvement as co-developers is higher in volume.

3.2.2.3 Moderation by customer involvement as innovators

In the practice of customer involvement as innovators, firms empower customers to design and develop new services, which are then adopted and offered by the focal firms (Cui and Wu 2016). However, customers can rarely articulate their emerging needs beyond their current consumption experience nor can they clearly define a service solution so their ideas of service innovation are usually

mainstream-oriented (Verganti 2008). This may lead firms to be less sensitive to emerging customer needs, weakening the effect of emerging customer orientation on radical service innovation.

Furthermore, firms with high customer involvement as innovators tend to share existing technological knowledge and innovation resources with their customers by offering them innovation platforms and technical supports in the service innovation process (Oliveira and von Hippel 2011; von Hippel and Katz 2002). Therefore, they are less likely to invest in new human, financial, and technological resources, which in turn, weakens the relationship between emerging customer orientation and radical service innovation. In contrast, when customer involvement as innovators is low, firms will be more sensitive to emerging customer needs and attentive to the adoption of new technologies in the process of radical service innovation. These arguments suggest the following hypotheses:

H3_a: For ICT manufacturing firms, emerging customer orientation will have a stronger positive relationship with radical service innovation when customer involvement as innovators is lower in volume.

H3_b: For information services firms, emerging customer orientation will have a stronger positive relationship with radical service innovation when customer involvement as innovators is lower in volume.

3.2.3 Moderating effects of organizational reward practices on the relationship between emerging customer orientation and radical service innovation

Extant literature argues that a customer-oriented strategy is more likely to result in better service innovation performance when it is implemented in conjunction with appropriate organizational reward practices (Slater and Narver 1995). Moreover, recent studies have demonstrated the importance of comparing manufacturing firms and service firms because the innovation-related practices that are effective for manufacturing firms may be not effective for service firms (Ettlie and Rosenthal 2012; Leiponen 2012; Nijssen et al. 2006), especially for incentive practices that are highly dependent on the type of industry. Therefore, this thesis examines how a firm's organizational reward practices influences its ability to benefit from emerging customer orientation for both ICT manufacturing firms and information services firms.

3.2.3.1 Moderation by outcome-based reward

Outcome-based reward refers to the degree to which rewards are tied to the generation of particular outcomes, such as the attainment of sales-related targets, completion dates, and market share for an innovation (Atuahene-Gima and Murray 2004; Sarin and Mahajan 2001). Outcome-based reward is a relatively short-term orientated practice, with concrete criteria for evaluating a radical service innovation. Such a reward system is particularly relevant to the innovations of ICT manufacturing firms.

In the presence of high outcome-based reward, ICT manufacturing firms are able to tap quickly into the radical service innovation opportunities uncovered by the

process of identifying emerging customer needs and wants (Melnyk et al. 2010). An explanation for this argument is developed as follows. When an outcome-based reward is in place, the innovation team of ICT manufacturing firms is more likely to be sensitive to emerging customer information because they realize that such information is potentially profitable and time-sensitive, and hence they will quickly respond to emerging customer needs and wants (Wang et al. 2015). In contrast, ICT manufacturing firms with low outcome-based reward may discourage the innovation team from leveraging their knowledge of emerging customer needs and wants, thereby diminishing the impact of emerging customer orientation on radical service innovation.

H4_a: For ICT manufacturing firms, emerging customer orientation will have a stronger positive relationship with radical service innovation when outcome-based reward is higher in volume.

Although outcome-based reward is particularly beneficial to the relationship between emerging customer orientation and radical service innovation for ICT manufacturing firms, it is less relevant to information services firms. In contrast to ICT manufacturing firms, information services firms are people-oriented and face more uncertainties in the marketplace (Moeller 2010). Therefore, they tend to use a relatively long-term perspective for evaluating an innovation rather than relying on short-term and concrete criteria. On the basis of above arguments, this thesis suggests the following hypothesis.

H4_b: For information services firms, outcome-based reward does not significantly moderate the relationship between emerging customer orientation and radical service innovation.

3.2.3.2 Moderation by strategy-based reward

Strategy-based reward refers to the degree to which rewards are tied to the long-term and strategically relevant criteria (Joshi 2016). This practice incentivizes innovation activities conducted in the present that contribute to the firm's capability in the future for meeting customer needs and wants, differentiating the firm from their potential competitors, and adapting the existing business model.

This dissertation expects that high strategy-based reward will strengthen the positive relationship between emerging customer orientation and radical service innovation. Firms with high strategy-based reward specify that future-oriented criteria serve as the basis of rewards for innovation activities. These criteria encourage the service innovation team to value future-oriented knowledge to a greater extent (Lindgren and O'Connor 2011; Tellis et al. 2009). As a result, firms with high strategy-based reward become more sensitive to emerging customer needs. In contrast, firms with low strategy-based reward attach less importance to the knowledge of emerging customer needs. Thus, the effect of emerging customer orientation on radical service innovation may diminish.

In addition, when firms are high in strategy-based reward, they are motivated to take more risks to successfully develop innovations (Melnyk et al. 2010). In turn,

they are more likely to make a substantial investment in human, financial, and technological resources. Such investment accelerates the radical service innovation activities, taking new services based on emerging customer needs from conceptualization to implementation. The above arguments suggest the following hypothesis.

H5_a: For ICT manufacturing firms, emerging customer orientation will have a stronger positive relationship with radical service innovation when strategy-based reward is higher in volume.

H5_b: For information services firms, emerging customer orientation will have a stronger positive relationship with radical service innovation when strategy-based reward is higher in volume.

3.3 Summary

This chapter addresses research question 1 by systematically conceptualizing radical service innovation versus incremental service innovation. Specifically, this dissertation defines a radical service innovation as a completely new service offering or process that involves substantial changes in the sets of resources applied by the focal firm and its customers, the value co-creation process, and the firm value and customer perceived value. In addition, this chapter develops an overarching research model to investigate the relationship between emerging customer orientation and radical service innovation by examining relevant moderators in both ICT manufacturing firms and information services firms.

Research question 2 and 3 are fully addressed by empirically testing the proposed research model and hypotheses. In the next chapter, the research methodology will be discussed.

CHAPTER 4: RESEARCH METHODOLOGY

This chapter presents the research methodology used to examine the research model and hypotheses developed in the previous chapter. In the following sections, this thesis first describes the uniqueness of the research context in order to determine the representability of the research sample. It then outlines the research methods, which include exploratory field research, survey data collection and development of measures. Statistical analysis techniques are also summarized in this chapter.

4.1 Research Context

4.1.1 Research setting

The research setting is the high-tech industry, an industry involving advanced methods and the most modern equipment. In particular, ICT manufacturing firms and information services firms were chosen as the central focus. Previous studies on service innovation mainly collected data in North America and Europe. This thesis differs by collecting samples in Taiwan. Taiwan is an ideal context for this research because it is an integral part of the global supply chain for the technology giants (Chen et al. 2017). Further, it is increasingly important to Taiwanese high-tech industry for it to engage in service innovation activities. ICT manufacturing firms as well as information service firms devote substantial effort to marketing research to capture customers' rapidly changing needs (Chandler et al. 2019).

Therefore, Taiwanese high-tech industry offers an appropriate research setting to empirically test the research model and hypotheses of this thesis.

4.1.2 Research sampling frame

The sampling frame for this thesis consists of all high-tech firms from the registry of “Top 5000 largest Enterprises in Taiwan” published by China Credit Information Service. Since this thesis focuses on incumbent firms, this data list is the most appropriate information source for this study. Out of these 5000 corporations, 776 are ICT manufacturing firms and 413 are information service firms. Overall, 1189 firms were selected as the sample population.

4.1.3 Sample selection

This thesis adopted a key informant approach in collecting multiphase surveys from two informants per firm. In the first survey phase, the key informants of each firm were the senior marketing or sales managers. The first survey collected the antecedent variable (i.e., emerging customer orientation) and moderating variables (i.e., organizational reward practices and customer involvement practices). If the firm had no marketing or sales department, the manager who undertakes the marketing function was identified as the key informant. In the second survey, the key informants were the NSD or NPD managers who were responsible for service innovation activities. The second survey asked the informants to evaluate their firm’s radical service innovation performance.

4.2 Research Procedure

4.2.1 Preliminary exploratory field research

Before the formal data collection, the researcher conducted unstructured interviews with high-tech practitioners so as to gain a better understanding of the contemporary views of service innovation. Through professional contacts, the researcher conducted 6 interviews with senior managers in the high-tech industry. All interviews were conducted face-to-face and lasted approximately 1 hour. These interviews show that 1) there is a trend of servitization in the manufacturing corporations and 2) both information service firms and ICT manufacturing firms have similar service innovation practices, but the relative importance of these practices may differ. Information gleaned from these interviews also enabled the researcher to identify the potential knowledgeable informants, such as senior managers in the marketing, sales, and NSD/NPD departments. Key criteria for appropriate informants were that they should have at least three years of management experience in their current firms and have been involved in service innovation activities during the previous two years.

In-depth interviews helped the researcher to understand how senior managers conceptualize service innovation in the high-tech industry. The majority of senior managers interviewed considered service innovation to be a new or improved service offering or process that involved changes in several key elements, such as a firm's competences, value co-creation processes with customers, and the benefits of service providers and receivers. A common theme throughout the interviews

was that customer involvement practices and organizational reward practices play an increasing role in transforming the identified emerging needs into radical service innovations. Based on the findings from the interviews and the literature review, the researcher formulated a survey to formally test the hypothesized relationships.

4.2.2 Survey data

4.2.2.1 Survey development, purification, and validation

The thesis used the following research procedure to develop and refine survey items. First, a review of the construct definitions and measures suggested that there were opportunities for a more fine-grained conceptualization and operationalization of key constructs. Accordingly, the researcher developed and refined constructs based on the systematic conceptualization of radical service innovation and emerging customer orientation, as well as a comprehensive review of the marketing and innovation literature. Second, the researcher provided clear definitions and concrete examples of the key constructs used in the questionnaire, such as emerging customer orientation and radical service innovation. Regarding the items in the questionnaire, the researcher followed Baumgartner and Steenkamp (2001)'s suggestion to use positively and negatively valenced multiple items to minimize yea-saying bias. Third, the questionnaire used in this study was translated from English into Chinese by the researcher (See Appendix 2A and Appendix 3A for English version). Other two professors specializing in the marketing and innovation fields then independently back-translated the

questionnaire into English. Finally, five bilingual English-Chinese marketing doctoral students compared the original and back-translated versions for semantic equivalence and refined the survey items (See Appendix 2B and Appendix 3B for Chinese version).

4.2.2.2 Pilot study

This dissertation conducted a pilot study with 6 marketing scholars, 10 full-time doctoral students, and 16 practitioners in the high-tech industry. This pilot test was to ensure the face validity and appropriateness of the measures in Taiwan context. Based on their feedback, a few adjustments were made in terms of wording and format.

4.2.2.3 Formal data collection: multiphase surveys

The researcher collaborated with a well-established marketing research firm in Taiwan to collect multiphase surveys. The marketing research firm first contacted each firm in the sampling frame via telephone to validate the initial information held on the putative key informants and to solicit their interest in participating in our survey. After receiving their agreement to participate, the marketing research firm sent the first-phase survey to the key informants via their email address. In the email, we explained the purpose of the study and provided them with a hyperlink, which enabled them to get access to the online survey. Reminder letters were sent to each key informant 10 to 14 days after the initial email. 253 informants responded to the online survey at this stage (21.2% response rate). One

month later, the marketing research firm sent the second-phase survey to senior managers in the respondent firms' NSD/NPD departments. This survey evaluated firms' radical service innovation performance. The second stage survey was completed by 176 informants (69.5% response rate). All respondents were assured that their responses would be treated confidentially. Sample characteristics are presented in Table 8.

Table 8: Sample Characteristics

	ICT Manufacturing Firms (123 firms)	Information Service Firms (53 firms)		
Firm age (Years)				
≦ 5	1	1		
6-10	9	4		
11-15	14	12		
16-20	24	14		
21-25	26	11		
26-30	13	6		
>30	36	5		
Number of employees				
≦ 50	4	11		
51-100	11	15		
101-200	26	15		
201-300	20	3		
301-400	6	1		
401-500	7	3		
>500	49	5		
Annual revenue (New Taiwan dollar)				
<100 million	1	6		
10-500 million	29	19		
600 million-1billion	17	10		
1.1billion-1.5 billion	18	3		
1.6 billion-2 billion	12	3		
2.1 billion-2.5 billion	6	3		
>2.5 billion	40	9		
Respondents information	1st phase survey	2nd phase survey	1st phase survey	2nd phase survey
Years of experience with the firm (average)	10.3	12.1	11.2	12.2
Years of experience with the industry (average)	14.2	15.9	15.5	16.7
Male	85	109	42	47
Female	38	14	11	6

4.2.3 Archival data

Secondary data, such as firm age and firm size, was retrieved from the companies' annual reports. Data collection from multiple sources minimizes concerns about common method bias (Podsakoff et al. 2003).

4.3 Measures

This section presents an overview of the constructs with their specific item measures and respective survey questions (illustrated in Table 9). All the constructs were measured with seven-point Likert-type scales (i.e., 1 = strongly disagree, and 7 = strongly agree). These variables and their measures are described in more detail in the remainder of this section.

Table 9: Study Variables and Measures

Conceptual Variables	Measures	Data Sources
Dependent variables		
Radical service innovation	To what extent do the following statements represent the radical service innovation outcomes achieved by your firm in the last two years? (1) Our firm now leads the way in introducing radically new services that require brand new competences. (2) We constantly introduced new service offerings that are radically different from our existing services. (3) We persistently considered introducing radically new services that provide better ways of creating value with customers. (4) Compared to major competitors, our firm introduced more radically new services in the last two years.	Second survey from key informant

Table 9: Study Variables and Measures (Continued)

Conceptual Variables	Measures	Data Sources
Independent variables		
Emerging customer orientation	To what extent do you agree with the following statements about your firm's emphasis on identifying and satisfying emerging customer needs (i.e. the needs that are starting to exist, grow, and become aware in small and emerging customer segments)? (1) We pursue ideas that small, emerging customer segments value. (2) We always disseminate and discuss market information on emerging customer needs. (3) We believe that it is important to develop new services to satisfy emerging customer needs. (4) We always invest adequate resources to carve out a strong position in small, emerging customer segments.	First survey from key informant
Moderating variables		
Customer involvement as an information source	During most of our new service development projects: (1) The transfer of information about customers' needs and preferences takes place frequently. (2) We actively transfer information gathered from our customers to our service development team. (3) We use information about our customers' needs in the new service development.	First survey from key informant
Customer involvement as co-developers	During most of our new service development projects: (1) Our customers are actively involved in a variety of service designs and development activities. (2) Our customers frequently interact with the new service team during the development process. (3) Our customers provide frequent feedback and inputs on new service designs.	First survey from key informant
Customer involvement as innovators	During most of our new service development projects: (1) We allowed our customers to design services customized to their own needs. (2) We utilized service designs that were created by our customers. (3) We allowed our customers to provide design prototypes that we later developed.	First survey from key informant
Outcome-based reward	In evaluating and rewarding a potential new service development, our firm emphasizes the following objectives: (1) Profitability. (2) Market share. (3) Repeat business.	First survey from key informant
Strategy-based reward	In evaluating and rewarding a potential new service development, it is important that the new service development should: (1) Address future customer needs. (2) Address future competitor actions. (3) Change the rules of the game in the industry.	First survey from key informant

Table 9: Study Variables and Measures (Continued)

Conceptual Variables	Measures	Data Sources
Control variables		
Industry-level		
Market turbulence	Please indicate your degree of agreement about how well these statements describe the market environment in your industry: (1) It is difficult to predict how customers' needs and requirements will evolve in our markets. (2) Generally, it is easy to understand how our market will change. (reverse)	First survey from key informant
Technology turbulence	Please indicate your degree of agreement about how well these statements describe the technological environment in your industry: (1) The technology in our market environment is changing rapidly. (2) Many new service ideas have been made possible through technological breakthroughs in our industry.	First survey from key informant
Competitive intensity	Please indicate your degree of agreement about how well these statements describe the competitive intensity in your industry. (1) Competition in our industry is cutthroat. (2) Price competition is a hallmark of our industry.	First survey from key informant
Firm-level		
Willingness to cannibalize (Chandy and Tellis 1998)	To what extent do you agree with the following statements about your firm? (1) We are very willing to sacrifice sales of existing services in order to increase sales of new services. (2) We tend to find it difficult to change our established procedures to cater to the needs of a new service. (reverse)	First survey from key informant
Firm age	Natural log of Number of years firm existed	Firm annual report
Firm size	Natural log of number of employees	Firm annual report

4.3.1 Dependent variable

This thesis used previous literature and the systematic conceptualization of radical service innovation to develop a four-item scale to measure *radical service innovation* (Arnold et al. 2011; Cheng and Krumwiede 2012; Michel et al. 2008; Ordanini and Parasuraman 2011; Perks et al. 2012). A two-year time window was employed in the survey questions because the effects of service innovation outcomes increase over time.

4.3.2 Independent variable

This study developed items for the measure of *emerging customer orientation* from existing research (e.g., Kohli, Jaworski, and Kumar 1993; Narver, Slater, and MacLachlan 2004; Menguc and Auh 2006; Govindarajan, Kopalle, and Danneels 2011; Ordanini and Parasuraman 2011). The researcher combined these items with the conceptualization of emerging customer orientations to develop additive scales for these constructs.

4.3.3 Moderating variable

To measure *outcome-based reward* and *strategy-based reward*, this dissertation drew upon the measures used in Joshi (2016). For the measures of *customer involvement as an information source*, *customer involvement as co-developers*, and *customer involvement as innovators*, items were adapted from Cui and Wu (2016, 2017). The adaptations were based on the in-depth interviews with senior managers in high-tech industries. This adaptation approach is consistent with the

suggestion by Farh, Cannella, and Lee (2006) on developing valid instruments for research in the Chinese setting.

4.3.4 Control variables

To control the influences on radical service innovation, this study included industry-level control variables (i.e., market turbulence, technology turbulence, and competitive intensity) and firm-level control variables (i.e., willingness to cannibalize, firm age, and firm size) in the research model.

4.4 Data Screening Prior to Formal Analysis

4.4.1 Knowledge and involvement check

This dissertation conducted knowledge and involvement checks to assess the respondents' self-reported knowledge of the firm's marketing and service innovation activities. Seven-point answer scales were used in both surveys to verify the appropriateness of the key informants (Nardi 2018). The average score for self-reported knowledge is 6.4 and the average score for involvement in service innovation activities is 6.2. All respondents have a score equal to or higher than 5.

4.4.2 Outliers and normality

This thesis checked outliers through the graphical representation of histograms and box plots. The assessment established that there is no outlier in the collected sample. In addition, this paper also examined the normality of distribution since this is the most important assumption in multiple regression analysis. The

researcher ran a graphical analysis (i.e., histogram plots and normal probability plots) to assess the normal distribution of variables (Tabachnick and Fidell 2007). Statistical tests of normal distribution were also conducted to examine skewness and kurtosis. All the values were in the acceptable range, with ± 1 for skewness and ± 2 kurtosis (George 2011).

4.5 Selection of Statistical Analysis Techniques

After data screening, this study adopted a comprehensive two-step analytical approach to test the hypothesized model (Anderson and Gerbing 1988). In line with this approach, the study first used confirmatory factor analysis (CFA) to confirm the measurement model, and then performed multiple regressions to test the proposed hypotheses. All the analyses were conducted by SPSS and AMOS. To assess the goodness of fit, this study employed chi-square tests, goodness-of-fit index (GFI), comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean square error of approximation (RMSEA) (Hu and Bentler 1999).

4.6 A Summary of Research Methodology

This chapter presents the research methodology that examines and tests the research model and hypotheses. The specific research context, data collection methods, and development of measures are also summarized, in addition to the statistical analysis techniques adopted.

CHAPTER 5: DATA ANALYSES AND RESULTS

This chapter presents the data analysis and research results. First, the measurement model evaluation is discussed. This includes explanations about item reliability, correlation matrix, internal consistency, and discriminant validity. The results in terms of the proposed hypotheses are then reported and discussed with reference to whether each hypothesis is supported or not supported. Overall, most of the hypotheses are supported by the data. The findings also show that the relative importance to a firm of innovation-related practices that influence the effect of emerging customer orientation on radical service innovation differ by ICT manufacturing firms and information services firms. Several figures are provided to illustrate those moderating effects.

5.1 Measurement Model Evaluation

CFA on the whole set of constructs in the regression model was conducted to assess the measurement properties of the reflective latent constructs. The CFA model includes radical service innovation, emerging customer orientation, customer involvement as an information source, customer involvement as co-developers, customer involvement as innovators, outcome-based reward, strategy-based reward, market turbulence, technology turbulence, competitive intensity, willingness to cannibalize, firm size, and firm age. The model produces a satisfactory fit to the data ($\chi^2(379) = 620.27$, $p \approx .00$; GFI = .912; CFI = .920; TLI

= .901; RMSEA = .060) (Bagozzi and Yi 2012; Baumgartner and Homburg 1996; Hu and Bentler 1999).

5.1.1 Item reliability

To examine item reliability, this dissertation followed Bagozzi and Yi's (1988, 2012) standard to evaluate the factor loadings for each observed item of every latent construct. The factor loadings should exceed .50 in order to be reliable. Table 10 provides a detailed summary of multi-item measurement scales and their factor loadings. All items in this dissertation are significantly higher than this criterion ($p < .001$).

5.1.2 Internal consistency

This dissertation used two measures to assess the internal consistency of the constructs in the proposed model: composite reliability (CR) and average variance extracted (AVE). When the CR coefficients exceed .60 and the AVE estimate exceed .50, it indicates that there is an adequate level of internal consistency (Bagozzi and Yi 1988, 2012). Table 10 shows that the CRs range from .67 to .90 and the AVEs range from .51 to .75. As a result, all constructs in the research model exhibit a good level of internal consistency.

5.1.3 Correlations and discriminant validity

This thesis uses two approaches to evaluate the discriminant validity of the constructs in the research model. First, Table 11 shows that none of the 95%

confidence intervals for each correlation coefficient include the value of ± 1 , offering evidence of discriminant validity. Second, as shown in Table 11, the diagonal elements (square roots of the AVE for each construct in the proposed model) are greater than the off-diagonal elements. This indicates that each construct shares more variance with its measures than with other constructs (Fornell and Larcker 1981). Therefore, all constructs in the model exhibit strong discriminant validity.

Table 10: Summary of Measures

Constructs	Measures^a	Factor Loadings^b
Radical service innovation (CR = .90, AVE = .70)	To what extent do the following statements represent the radical service innovation outcomes achieved by your firm in the last two years?	
	1. Our firm now leads the way in introducing radically new services that require brand new competences.	.83
	2. We constantly introduced new service offerings that are radically different from our existing services.	.81
	3. We persistently considered introducing radically new services that provide better ways of creating value with customers.	.86
	4. Compared to major competitors, our firm introduced more radically new services in the last two years.	.85
Emerging customer orientation (CR = .86, AVE = .61)	To what extent do you agree with the following statements about your firm's emphasis on identifying and satisfying emerging customer needs (i.e. the needs that are starting to exist, grow, and become aware in small and emerging customer segments)?	
	1. We pursue ideas that small, emerging customer segments value.	.71
	2. We always disseminate and discuss market information on emerging customer needs.	.81
	3. We believe that it is important to develop new services to satisfy emerging customer needs.	.80
	4. We always invest adequate resources to carve out a strong position in small, emerging customer segments.	.79
Customer involvement as an information source (CR = .85, AVE = .65)	During most of our new service development projects:	
	1. The transfer of information about customers' needs and preferences takes place frequently.	.79
	2. We actively transfer information gathered from our customers to our service development team.	.88
	3. We use information about our customers' needs in the new service development.	.75

Table 10: Summary of Measures (Continued)

Constructs	Measures^a	Factor Loadings^b
Customer involvement as co-developers (CR = .85, AVE = .66)	During most of our new service development projects:	
	1. Our customers are actively involved in a variety of service designs and development activities.	.81
	2. Our customers frequently interact with the new service team during the development process.	.88
	3. Our customers provide frequent feedback and inputs on new service designs.	.74
Customer involvement as innovators (CR = .89, AVE = .73)	During most of our new service development projects:	
	1. We allowed our customers to design services customized to their own needs.	.76
	2. We utilized service designs that were created by our customers.	.92
	3. We allowed our customers to provide design prototypes that we later developed.	.88
Outcome-based reward (CR = .76, AVE = .51)	In evaluating and rewarding a potential new service development, our firm emphasizes the following objectives:	
	1. Profitability.	.67
	2. Market share.	.73
	3. Repeat business.	.75
Strategy-based reward (CR = .75, AVE = .51)	In evaluating and rewarding a potential new service development, it is important that the new service development should:	
	1. Address future customer needs.	.76
	2. Address future competitor actions.	.82
	3. Change the rules of the game in the industry.	.52
Market turbulence (CR = .86, AVE = .75)	Please indicate your degree of agreement about how well these statements describe the market environment in your industry.	
	1. It is difficult to predict how customers' needs and requirements will evolve in our markets.	.83
	2. Generally, it is easy to understand how our market will change. (reverse)	.90

Table 10: Summary of Measures (Continued)

Constructs	Measures^a	Factor Loadings^b
Technology turbulence (CR = .80, AVE = .67)	Please indicate your degree of agreement about how well these statements describe the technological environment in your industry. 1. The technology in our market environment is changing rapidly. 2. Many new service ideas have been made possible through technological breakthroughs in our industry.	 .89 .74
Competitive intensity (CR = .67, AVE = .52)	Please indicate your degree of agreement about how well these statements describe the competitive intensity in your industry. 1. Competition in our industry is cutthroat. 2. Price competition is a hallmark of our industry.	 .88 .52
Willingness to cannibalize (CR = .83, AVE = .71)	To what extent do you agree with the following statements about your firm? 1. We are very willing to sacrifice sales of existing services in order to increase sales of new services. 2. We tend to find it difficult to change our established procedures to cater to the needs of a new service. (reverse)	 .95 .73

^aAll items were assessed on seven-point scales, anchored by 1 = Strongly disagree and 7 = Strongly agree.

^bAll factor loadings are significant at $p < 0.01$.

Notes: CR = Composite reliability; AVE = Average variance extracted.

Table 11: Correlation Matrix and Summary Statistics

Variable	Correlation ^a												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Radical service innovation	.84^b												
2. Emerging customer orientation	.10	.78											
3. Outcome-based reward	.05	.43	.72										
4. Strategy-based reward	.09	.44	.53	.71									
5. Customer involvement as an information source	.11	.43	.54	.50	.81								
6. Customer involvement as co-developers	.06	.35	.28	.44	.59	.81							
7. Customer involvement as innovators	-.05	.24	.26	.37	.46	.66	.86						
8. Market turbulence	-.25	.32	.18	.17	.15	.17	.23	.87					
9. Technology turbulence	.09	.41	.32	.35	.31	.23	.20	.44	.82				
10. Competitive intensity	-.12	.19	.04	.14	.11	.12	.20	.32	.26	.72			
11. Willingness to cannibalize	.02	.39	.50	.42	.50	.38	.36	.29	.32	.11	.85		
12. Firm size (log)	.15	-.05	-.22	-.01	-.04	.07	.02	-.07	-.09	-.06	-.09	--	
13. Firm age (log)	.07	.03	-.12	-.04	.03	.06	.09	-.03	.03	.03	.00	.13	--
Mean	5.08	5.65	5.78	5.67	5.93	5.52	5.36	4.99	5.83	5.63	4.86	5.24	3.04
Standard Deviation	1.27	.97	.99	.93	.91	1.03	1.27	1.30	1.06	.96	1.14	1.27	.47

Notes:

^aAll correlations are significantly less than 1.00.

^bThe figures on the diagonal are the square roots of the average variance extracted score for each construct.

5.2 Analyses and Results for Hypotheses Tests

Table 12 presents the results of the empirical analyses, which were performed in two steps. First, the researcher divided the data into two groups: (i) ICT manufacturing firms and (ii) information services firms. This two-group analysis enabled the researcher to better understand whether the moderating factors that influence the relationship between emerging customer orientation and radical service innovation for ICT manufacturing firms have dissimilar effects for information services firms. For the second step, this thesis ran four regression models for each group. Model 0_a and Model 0_b include only the control variables. Model 1_a and Model 1_b investigated the main effect of emerging customer orientation on radical service innovation, with control variables of market turbulence, technology turbulence, competitive intensity, willingness to cannibalize, firm age, and firm size. The result shows that the positive relationship between emerging customer orientation and radical service innovation is significant in ICT manufacturing firms ($\beta=.256, p < .05$) whereas this relationship is not significant in the sample of information services firms ($\beta=.382, p > .05$), which partially support the baseline hypothesis. This result also points out the importance of investigating different moderators. Model 2_a and Model 2_b added all the independent variables to the research model. Model 3_a and Model 3_b examined the moderating effects of customer involvement as an information source, customer involvement as co-developers, customer involvement as innovators, outcome-based reward, and strategy-based reward. The results show that these moderators have different moderation effects for ICT manufacturing

firms and for information services firms. The next section will relate these findings to the main hypotheses.

5.2.1 Moderating effect of customer involvement as an information source (H1_a, H1_b)

In Table 12, Model 3_a shows that customer involvement as an information source influences the effect of emerging customer orientation on radical service innovation in the context of ICT manufacturing firms ($\beta = -.540$, $p < .01$). Consistent with Model 3_a, Model 3_b indicates a similar result for information services firms ($\beta = -1.184$, $p < .01$). The nature of the interaction effect was examined by conducting a simple slope analysis and plotting the graph at high (one standard deviation above the mean) and low (one standard deviation below the mean) levels of the moderator variable (i.e., customer involvement as an information source) (Aiken and West 1991). Simple slope analysis reveals the following results. For ICT firms, when the level of customer involvement as an information source is low, the relationship between emerging customer orientation and radical service innovation is positive and statistically significant ($\beta = .770$, $t = 3.18$, $p < .01$), whereas when the level of customer involvement as an information source is high, the relationship between emerging customer orientation and radical service innovation is not significant ($\beta = -.365$, $t = -1.75$, $p > .05$). For information services firms, when the level of customer involvement as an information source is low, the relationship between emerging customer orientation and radical service innovation is positive and statistically significant ($\beta = 1.465$, $t = 3.69$, $p < .01$),

whereas when the level of customer involvement as an information source is high, the relationship between emerging customer orientation and radical service innovation becomes negative and insignificant ($\beta = -.595$, $t = -1.58$, $p > .05$). These results provide support for H1_a and H1_b. Figure 3 and 4 illustrate the interaction effects for ICT manufacturing firms and information services firms.

Table 12: Multiple Regressions (ICT Manufacturing Firms vs. Information Services Firms)

		123 ICT Manufacturing firms								53 Information Services firms							
		Model 0 _a		Model 1 _a		Model 2 _a		Model 3 _a		Model 0 _b		Model 1 _b		Model 2 _b		Model 3 _b	
Variables	Hypotheses	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE
Intercept		5.084	.103***	5.093	.102***	5.096	.105***	5.110	.112***	5.120	.229***	5.068	.230***	5.013	.272***	4.879	.250***
Two-Way Interactions																	
Emerging customer orientation × Customer involvement as an information source	H _{1a} , H _{1b}							-.540	.185***							-1.184	.380***
Emerging customer orientation × Customer involvement as co-developers	H _{2a} , H _{2b}							.036	.181							1.023	.376***
Emerging customer orientation × Customer involvement as innovators	H _{3a} , H _{3b}							.262	.168							-.778	.334**
Emerging customer orientation × Outcome-based reward	H ₄							.492	.170***							.373	.328
Emerging customer orientation × Strategy-based reward	H ₅							-.048	.142							.807	.355**
Main Effects																	
Emerging customer orientation				.256	.118**	.222	.136	.209	.138			.382	.270	.482	.305	.379	.306
Outcome-based reward						.078	.148	.096	.148					-.108	.296	.193	.288
Strategy-based reward						.006	.130	.128	.138					-.112	.307	-.322	.329
Customer involvement as an information source						.018	.155	-.010	.171					.228	.293	.474	.273*
Customer involvement as co-developers						.010	.172	-.137	.177					-.229	.309	-.380	.289
Customer involvement as innovators						.030	.167	-.034	.173					-.018	.255	.191	.244
Control Variables																	
Market turbulence		-.242	.129*	-.253	.127**	-.232	.133*	-.158	.135	-.600	.181***	-.659	.183***	-.637	.202***	-.838	.191***
Technology turbulence		.047	.127	-.030	.130	-.051	.136	.010	.136	.621	.206***	.544	.211***	.578	.251**	.780	.243***
Competitive intensity		-.254	.104***	-.294	.104***	-.291	.109***	-.303	.109***	.214	.217	.297	.223	.311	.237	.341	.215
Willingness to cannibalize		.159	.107	.101	.109	.044	.134	-.009	.132	.076	.221	-.013	.227	.049	.272	-.350	.264
Firm age (log)		.044	.095	.046	.093	.047	.098	.086	.097	-.059	.254	-.155	.260	-.189	.287	.193	.314
Firm size (log)		.150	.104	.139	.102	.134	.107	.156	.105	.322	.230	.345	.228	.292	.283	.363	.266
Adjusted R ²		.043		.058		.076		.132		.141		.153		.195		.375	

Dependent variable: Radical service innovation; *p < .10; **p < .05; ***p < .01;

The coefficients are unstandardized coefficients; Bootstrapping regressions were run for Model 3_a and Model 3_b, and the substantive results remain largely unchanged.

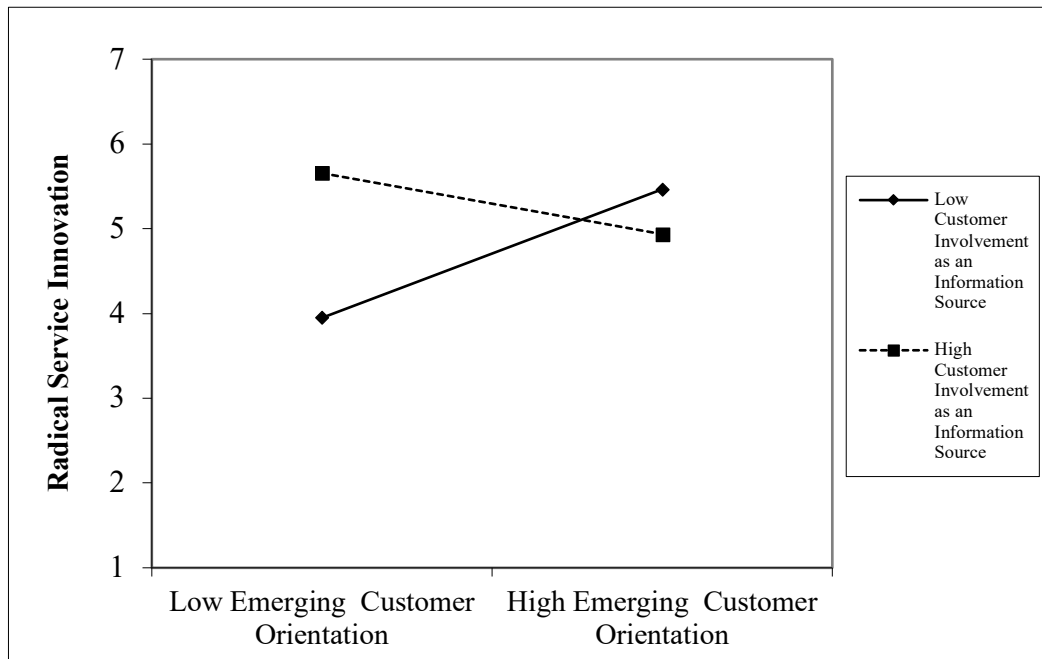


Figure 3: Moderation Effect of Emerging Customer Orientation and Customer Involvement as an Information Source on Radical Service Innovation for ICT Manufacturing Firms

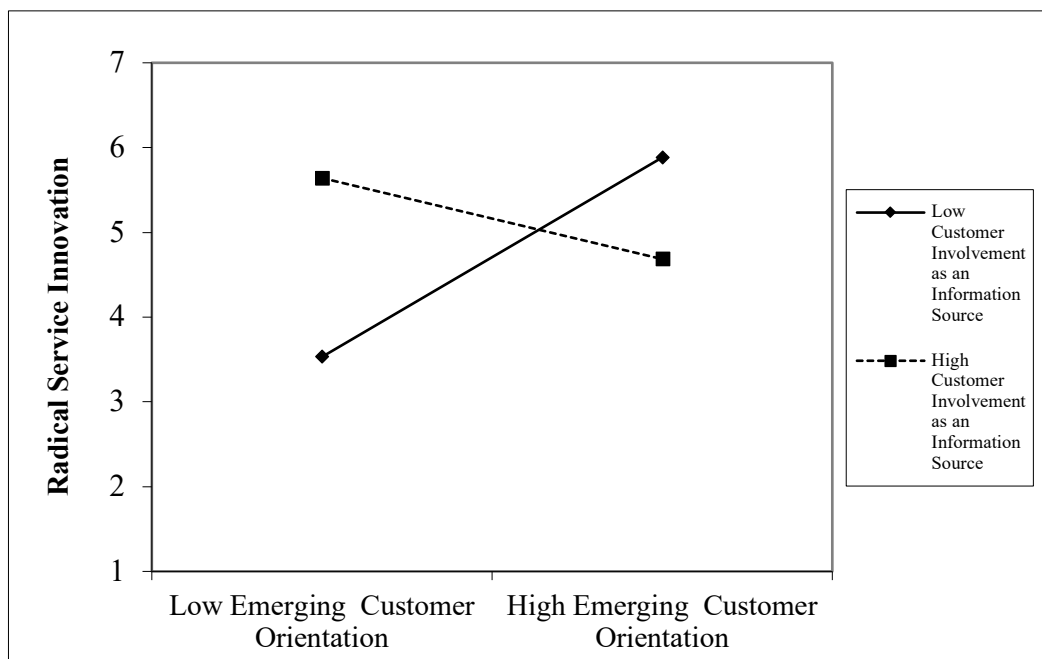


Figure 4: Moderation Effect of Emerging Customer Orientation and Customer Involvement as an Information Source on Radical Service Innovation for Information Services Firms

5.2.2 Moderating effect of customer involvement as co-developers (H2_a, H2_b)

Model 3_a and Model 3_b also reveal that the customer involvement practices that are potentially beneficial to the relationship between emerging customer orientation and radical service innovation in the context of ICT manufacturing firms differ from those of information services firms. Specifically, customer involvement as co-developers plays an important role in moderating the emerging customer orientation–radical service innovation link for information services firms ($\beta = 1.023$, $p < .01$). Simple slope analysis reveals the following results. For information services firms, when the level of customer involvement as co-developers is high, the relationship between emerging customer orientation and radical service innovation is positive and statistically significant ($\beta = 1.256$, $t = 3.56$, $p < .01$), whereas when the level of customer involvement as co-developers is low, the relationship between emerging customer orientation and radical service innovation is not significant ($\beta = -.708$, $t = -1.49$, $p > .05$), in support of H2_b (see Figure 5). However, no significant interaction effect emerged in the sample of ICT manufacturing firms ($\beta = .036$, not significant), lending no support to H2_a.

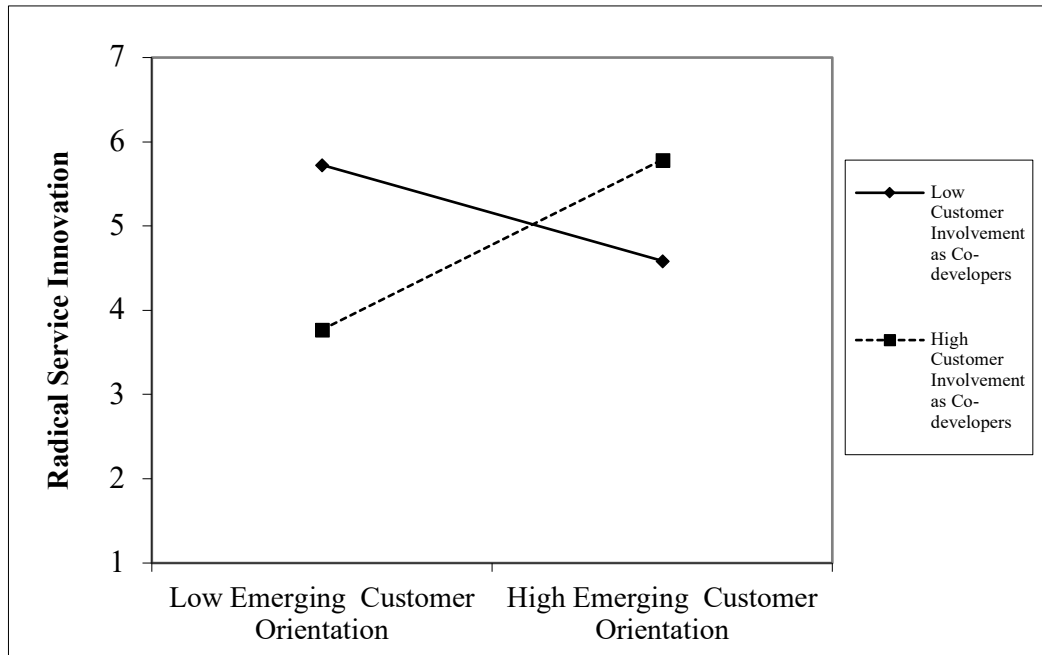


Figure 5: Moderation Effect of Emerging Customer Orientation and Customer Involvement as Co-developers on Radical Service Innovation for Information Services Firms

5.2.3 Moderating influences of customer involvement as innovators (H3_a, H3_b)

In terms of the moderating effect of customer involvement as innovators, Model 3_a shows that no significant interaction effect emerged in the sample of ICT manufacturing firms ($\beta = .262$, not significant), lending no support to H3_a. In contrast, Model 3_b indicates that customer involvement as innovators significantly influences the relationship between emerging customer orientation and radical service innovation in the context of information services firms ($\beta = -.778$, $p < .05$). Simple slope analysis reveals the following results. For information services firms, when the level of customer involvement as innovators is low, the relationship between emerging customer orientation and radical service innovation is positive and statistically significant ($\beta = 1.400$, $t = 3.13$, $p < .01$), whereas when the level

of customer involvement as innovators is high, the relationship between emerging customer orientation and radical service innovation is not significant ($\beta = -.349$, $t = -.930$, $p > .05$), in support of H3_b (see Figure 6).

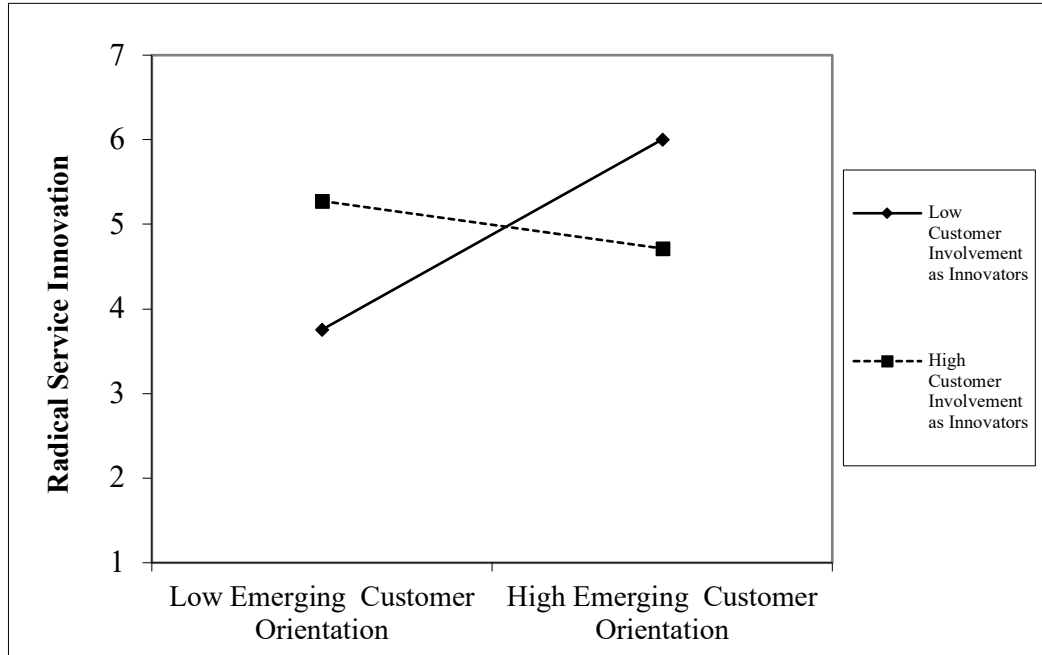


Figure 6: Moderation Effect of Emerging Customer Orientation and Customer Involvement as Innovators on Radical Service Innovation for Information Services Firms

5.2.4 Moderating effect of outcome-based reward (H4_a, H4_b)

For the moderating effect of outcome-based reward in the context of ICT manufacturing firms, Model 3_a shows that outcome-based reward is a critical moderator in influencing the relationship between emerging customer orientation and radical service innovation ($\beta = .492$, $p < .01$). Figure 7 demonstrates this moderating effect. Simple slope analysis also reveals that, when the level of outcome-based reward is high, the relationship between emerging customer

orientation and radical service innovation is positive and statistically significant ($\beta = .653$, $t = 3.67$, $p < .01$), whereas when the level of outcome-based reward is low, the relationship between emerging customer orientation and radical service innovation is not significant ($\beta = -.368$, $t = -1.552$, $p > .05$), in support of H4_a. No significant interaction effect emerged in the sample of information services firms ($\beta = 0.373$, $p > .05$), supporting to H4_b.

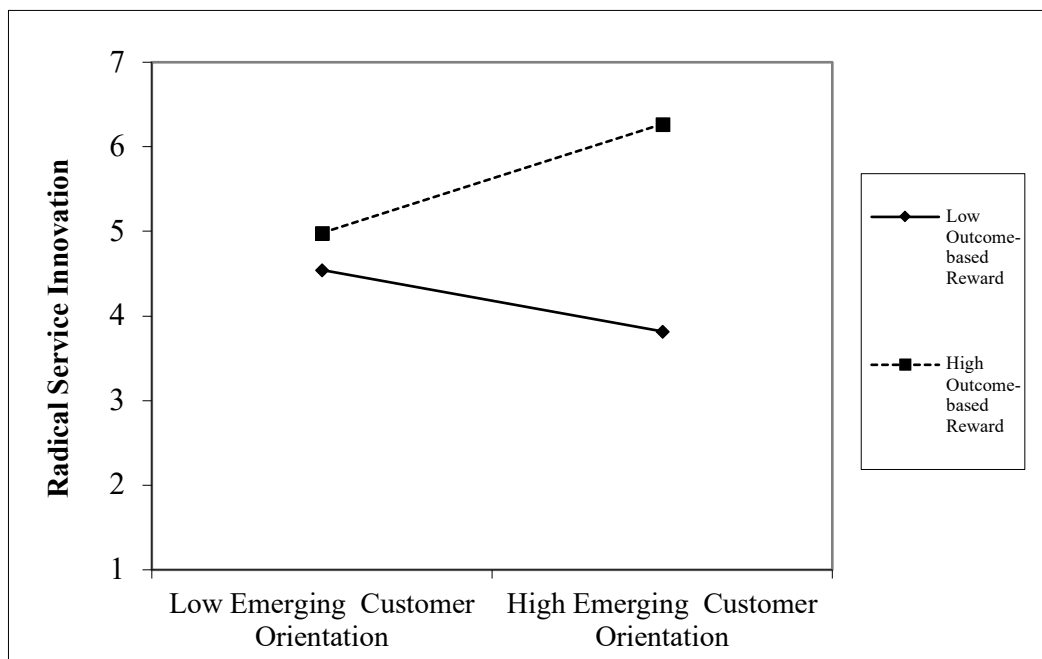


Figure 7: Moderation Effect of Emerging Customer Orientation and Outcome-based Reward on Radical Service Innovation for ICT Manufacturing Firms

5.2.5 Moderating effect of strategy-based reward (H5_a, H5_b)

In terms of the moderating effect of strategy-based reward, Model 3_a shows that no significant interaction effect emerged in the sample of ICT manufacturing firms ($\beta = -.048$, $p > .05$), lending no support to H5_a. Model 3_b finds that the relationship

between emerging customer orientation and radical service innovation is highly dependent on strategy-based reward in information services firms ($\beta = .807$, $p < .05$). Figure 8 depicts this result. Simple slope analysis also reveals that, when the level of strategy-based reward is high, the relationship between emerging customer orientation and radical service innovation is positive and statistically significant ($\beta = 1.117$, $t = 2.57$, $p < .01$), whereas when the level of strategy-based reward is low, the relationship between emerging customer orientation and radical service innovation is not significant ($\beta = -.366$, $t = -.864$, $p > .05$), in support of H5_b.

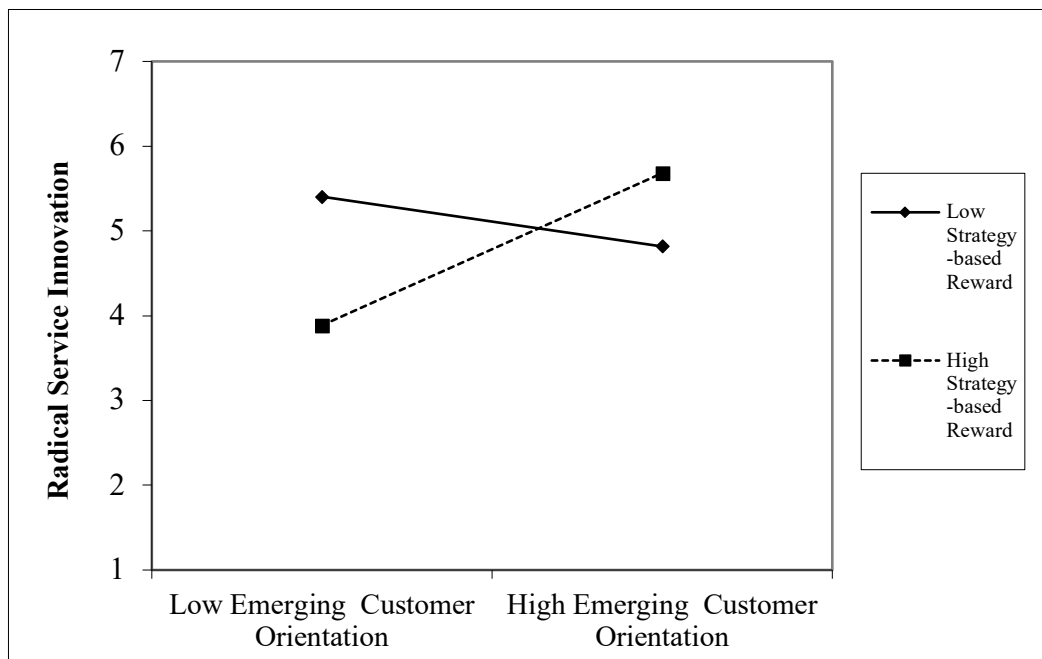


Figure 8: Moderation Effect of Emerging Customer Orientation and Strategy-based Reward on Radical Service Innovation for Information Services Firms

5.3 Robustness Check

5.3.1 Checks on common method bias

To deal with common method bias, this thesis collected multiple sources of information, involving two respondents per firm and multiple data. It also measured the independent and dependent variables separately (Hulland et al. 2017). In addition, the researcher used two approaches to check the potential issue of common method variance. First, the researcher conducted a Harman's single factor test, in which all measurement items were selected into a single factor analysis. The results show that no single, dominant factor emerged and the first unrotated factor accounts for only 27.38%, which is below the 50% threshold set by Podsakoff and Organ (1986). Second, the common latent factor approach was applied to account for common method bias (Podsakoff et al. 2003). The results show that the pattern of path coefficients in the model remains stable in both direction and significance; the square value of unstandardized path coefficient (.176) is below .50, suggesting a lack of evidence for common method bias.

5.3.2 Checks on non-response bias

Two approaches were adopted to evaluate non-response bias.² First, the researcher compared the mean responses of all the manifest variables of the survey instrument for the firms that completed both waves of survey versus the firms that

² This thesis did not use Armstrong and Overton's (1977) approach because the assumption that late respondents have more in common with non-respondents does not always hold (Hulland et al. 2017).

only completed the first wave. These variables included emerging customer orientation, customer involvement as an information source, customer involvement as co-developers, customer involvement as innovators, outcome-based reward, strategy-based reward, market turbulence, technology turbulence, competitive intensity, and willingness to cannibalize. The t-test shows no significant differences, indicating that non-response bias does not appear to be a major concern in this dissertation. Second, this thesis compared participating and non-participating firms based on firm age, number of employees, and annual sales (Hulland et al. 2017). 150 non-participating firms in the sampling frame were randomly selected to conduct this test. There were no significant differences ($p > 0.10$) between participating and non-participating firms.

5.3.3 Checks on multicollinearity

To minimize the potential concern of multicollinearity, the constituent variables were mean-centered prior to creating the interaction terms (Aiken and West 1991). This thesis also conducted an analysis to check multicollinearity. Results show that the variance inflation factors range from 1.04 to 2.34, which is substantially below the recommended cutoff value of 10 (Belsley et al. 2004) and suggests there are no serious problems with multicollinearity.

5.4 A Summary of Data Analyses and Results

This chapter analyzes the measurement model evaluation, and examines the main hypotheses. Most of the hypotheses are supported by the empirical data. In

addition, the researcher also conducted analyses on common method bias, non-response bias, and multicollinearity. The results have not identified any concerns for these issues. In next chapter, the theoretical contribution and managerial implications of these findings will be discussed, followed by discussions about research limitations and directions for future research.

CHAPTER 6: DISCUSSION AND CONCLUSION

This chapter discusses the theoretical contributions and managerial implications. The discussions are related back to the previous chapters of the thesis. This dissertation specifically contributes to the extant marketing and innovation literature in three ways, and develops three managerial implications for practitioners. The research limitations of this thesis and the possible directions for future research are discussed at the end of this chapter.

6.1 Theoretical Contributions

6.1.1 Toward a systematic conceptualization of radical service innovation versus incremental service innovation

This thesis contributes to the extant marketing and innovation literature by developing a more fine-grained conceptualization of radical service innovation and incremental service innovation. Although prior studies have investigated service innovation in various ways (Kuester et al. 2013; Ostrom et al. 2015; Storey et al. 2016), there is a sense of stagnation in the field of service innovation due to

the inconsistent conceptualization of a radical service innovation versus an incremental one. Therefore, the researcher critically reviews the previous literature and provides a stronger conceptualization of service innovation, using five criteria to differentiate two types of innovation. As Shown in chapter 3.1, this thesis finds that a service innovation always involves five outcome-based characteristics: namely, the changes in (1) the sets of resources applied by the focal firm (Kang and Kang 2014), (2) the sets of resources applied by the customers (Ordanini and Parasuraman 2011), (3) the value co-creation processes between the focal firm and its customers (Perks et al. 2012), (4) the firm value (Arnold et al. 2011), and (5) the customer perceived value (Dotzel et al. 2013). The magnitude of changes in these criteria determines the radicalness of a service innovation.

Based on the five criteria identified in this thesis, radical service innovation is conceptualized as ‘a completely new service offering or process that involves substantial changes in the sets of resources applied by the focal firm and its customers, the value co-creation process, and the firm and customer value’. It would satisfy relatively ill-defined customer needs and wants and create significantly higher benefits, compared with incremental service innovations. In contrast, an incremental service innovation is conceptualized as ‘the modification of a firm’s existing service offering or process that involves minor changes in the sets of resources applied by the focal firm and its customers, the value co-creation process, and the firm and customer value’. Such innovations would satisfy well-defined customer needs and create incremental benefits. This more systematic

conceptualization of service innovation establishes a foundation for further research to accumulate knowledge on this topic, thus contributing to the marketing and innovation literature (Biemans et al. 2016; O’Cass and Wetzels 2018; Storey et al. 2016).

6.1.2 The relationship between emerging customer orientation and radical service innovation: the contingent perspective

This thesis also contributes to marketing and innovation literature by demonstrating that the effect of emerging customer orientation on radical service innovation is contingent on different innovation-related practices (i.e., customer involvement practices and organizational reward practices).³ In support of Slater et al.’s (2014) and Slater and Narver’s (1995) theoretical arguments, this thesis shows that the effectiveness of emerging customer orientation on radical service innovation will vary according to the types of customer involvement practices and organizational reward practices. As illustrated in Figure 3-8, the findings confirm that overlooking the moderating effects of innovation-related practices would lead to misleading conclusions about the contribution of emerging customer orientation to radical service innovation. Emerging customer orientation needs to be aligned with a firm’s innovation-related practices and misalignment can render emerging customer orientation ineffective.

³ It is worth noting that this dissertation has a conflicting result with Govindarajan et al.’s (2011) study. In their paper, they found that emerging customer orientation is unrelated to radical product innovation. This difference may be explained by the use of different dependent variables, research contexts, and the investigation of potential moderators.

In addition, this thesis advances the current understanding of the moderating roles of customer involvement practices and organizational reward practices in service innovation contexts. Although previous studies noted that customer involvement practices are critical antecedents of product and service innovations (e.g., Carbonell et al. 2009; Cui and Wu 2017; Nicolajsen and Scupola 2011; Storey and Larbig 2018; Trischler et al. 2018), their potential role of being as moderators has received very little attention. This thesis therefore extends these studies by demonstrating that customer involvement as an information source, customer involvement as co-developers, and customer involvement as innovators each carry different moderating effects on the relationship between emerging customer orientation and radical service innovation, shown in H1-H3. Moreover, the results show that outcome-based reward and strategy-based reward are important moderators. Compared with Joshi's (2016) finding, H4 and H5 demonstrate that organizational reward practices have different effects depending on the type of firm.

6.1.3 A comparison between ICT manufacturing firms and information services firms

This thesis contributes to the literature on service innovation and servitization by investigating radical service innovation in the contexts of ICT manufacturing firms and information services firms (Baines et al. 2017; Ostrom et al. 2010). Although radical service innovation in manufacturing is considered to be a research priority (Goduscheit and Faullant 2018; Ostrom et al. 2015), there is still little insight into

how to drive radical service innovation for manufacturing firms. Moreover, prior literature has called for further examination into whether the innovation practices for service firms are effective for manufacturing firms (e.g., Aas and Pedersen 2011; Chang et al. 2014; Ettlie and Rosenthal 2011; Leiponen 2012; Nijssen et al. 2006). By comparing the samples of manufacturing firms and service firms, this dissertation finds that customer involvement practices and organizational reward practices have different moderating influences on the relationship between emerging customer orientation and radical service innovation.

Specifically, this thesis finds that customer involvement practices that moderate the relationship between emerging customer orientation and radical service innovation have effects on ICT manufacturing firms that differ from the effects on information services firms. As indicated in H1_a and H1_b, Customer involvement as an information source negatively moderates the relationship between emerging customer orientation and radical service innovation for both types of firm. However, H2_{a-b} and H3_{a-b} show that the moderating effects of customer involvement as co-developers and customer involvement as innovators are significant only in the sample of information services firms. One possible explanation for such differences may be that, from a high-tech industry perspective, ICT manufacturing firms are less people-oriented (Moeller 2010); hence, the moderators of customer involvement as co-developers and customer involvement as innovators are less relevant and meaningful for ICT manufacturing firms. Another explanation might refer to the mindset of the top management team. From

an upper-echelons perspective (Hambrick 2007; Hambrick and Mason 1984), the top management teams in ICT manufacturing firms are generally more R&D-oriented. With respect to this, ICT manufacturing firms might focus more on developing service innovation internally rather than engaging in the practices of customer involvement as co-developers or customer involvement as innovators (Visnjic et al. 2019).

The results also show that outcome-based reward positively moderates the relationship between emerging customer orientation and radical service innovation in ICT manufacturing firms whereas strategy-based reward positively moderates this relationship in information services firms, as indicated in H4_{a-b} and H5_b. Surprisingly, strategy-based reward has no moderating effect in the sample of ICT manufacturing firms, which might be attributed to their conventional manufacturing mindset. When developing radical service innovation, they are likely to adopt same innovation criteria that are used in the context of radical product innovation. These findings complements prior innovation research on organizational rewards and deepens the understanding of how different reward practices moderate the relationship between emerging customer orientation and radical service innovation in different contexts (Atuahene-Gima and Murray 2004; Joshi 2016).

Taken together, these findings provide a more comprehensive understanding of customer involvement practices and organizational reward practices as critical moderating mechanisms for the relationship of emerging customer orientation and

radical service innovation. They also demonstrate the importance of comparing manufacturing firms and service firms when investigating the topic of radical service innovation.

6.2 Managerial Implications

Radical service innovation is an imperative driver of the growth and success of firms and industries. Consequently, improving the development of such innovation is of considerable interest to marketing and innovation practitioners. The findings of this thesis suggest three practical insights for managers and policy makers.

First, this thesis provides fresh guidelines to managers who have responsibility for service innovation projects. The findings indicate that a service innovation involves a degree of change in (1) the sets of resources applied by the focal firm, (2) the sets of resources applied by the customers, (3) the value co-creation processes between the focal firm and its customers, (4) the firm value, and (5) the customer perceived value. These five criteria provide a diagnostic tool that can guide firms to tailor their innovation projects. For example, before the NSD team undertakes a service innovation project, it is crucial that it obtains clarification on the resources to be introduced or reconfigured and a decision as to how the value co-creation process might be changed, thereby enabling it to frame the picture of radical service innovation. Moreover, managers can use the relevant criteria to benchmark their service innovations against competitors within and cross industries. In this respect, the five criteria could serve as guidance for managers

who intend to strategically set service innovation objectives and objectively evaluate the outcomes.

Second, marketing and innovation practitioners are fervent advocates of the customer orientation tenet with respect to the value of acquiring comprehensive knowledge about their customers. This notion is partially justified by the findings of this thesis. To generate radical service innovation opportunities, incumbent firms obviously have to focus their efforts on customer needs and wants. However, results suggest that it is structured knowledge about emerging customer needs and wants that leads to better radical service innovation performance. This means that managers who encourage customer orientation as an end while neglecting to further their understanding of the potential emerging needs of customers may not achieve their intended objectives in radical service innovation. Managers should resist the temptation to overemphasize attention on their mainstream customers because this may lead to ossification in the development of radically new service.

Third, managers of manufacturing firms and service firms cannot assume that emerging customer orientation has a positive influence on radical service innovation in every circumstance. Although anecdotal reports suggest that firms focusing on emerging customer needs and wants tend to have higher radical service innovation performance, these reports rarely identify the specific boundary conditions for this relationship. The results of this thesis indicate that manufacturing firms and service firms should be aware of the innovation-related practices that influence the effectiveness of emerging customer orientation on

radical service innovation. For instance, manufacturing firms should carefully use customer involvement practices because customer involvement as an information source negatively influences the relationship between emerging customer orientation and radical service innovation, while customer involvement as co-developers and customer involvement as innovators have no effect on the relationship. Service firms should be wary of the practices of customer involvement as an information source and customer involvement as innovators when pursuing radical service innovation through the use of an emerging customer-oriented strategy; instead, the adoption of customer involvement as co-developers may be a good practice for service firms. Moreover, results suggest that finding an appropriate organizational reward practice conducive to the influence of emerging customer orientation is key for managers wishing to pursue radical service innovation. In sum, managers should be aware that if they focus their efforts exclusively on emerging customer needs and wants, their attempts to exploit the potential of radical service innovation opportunities will remain suboptimal. Such potential is more likely to be fully realized through the combination of appropriate innovation-related practices.

6.3 Research Limitations and Directions for Future Research

This thesis is subject to a number of limitations that suggest the directions for future research. First, this dissertation focuses on radical service innovation in the ICT and information services sectors. This specific context enabled the researcher to empirically test the proposed conceptual arguments, and it is an ideal research

setting due to the popularity of radical service innovation as a competitive advantage for ICT manufacturing firms and information services firms. Nevertheless, future research in different contexts would afford greater confidence in the generalizability of the findings. The researcher thus invites future research to replicate this study in different contexts, such as hotel, banking, healthcare, retailing, machinery equipment, and transport equipment.

Second, the research design of this thesis does not fully address the specific claim that is implied in the research model, namely, that emerging customer orientation is causally related to radical service innovation. Although the researcher collected multiphase surveys from two key informants per firm, future research can strengthen the causal inference by implementing a longitudinal design (Hulland et al. 2017; Rindfleisch et al. 2008). For example, researchers might measure emerging customer orientation and radical service innovation separately with a longer timeframe (e.g., measuring radical service innovation 2 years after the first survey to capture the long-term effect of emerging customer orientation).

Third, this dissertation adopts a survey-based approach to measure radical service innovation from senior managers in NSD/NPD departments. Although previous studies have shown that, where objective archival measures are unavailable, innovation performance measures reported by knowledgeable informants are reliable alternatives (Atuahene-Gima et al. 2005; Storey et al. 2016; Tellis et al. 2009), it would still be worthwhile to measure radical service innovation from different data sources. For example, researchers can evaluate a firm's radical

service innovation performance by counting the announcements of radically new service introductions. Another alternative would be to invite industry experts to assess the radical service innovation performance of firms based on their knowledge of and familiarity with these firms.

Fourth, this dissertation did not include mainstream customer orientation in the control variables because the emphasis of the study is on emerging customer orientation. However, future research is encouraged to include mainstream customer orientation in the model because it might be relevant to radical service innovation under different boundary conditions.

Fifth, there is a potential survivor bias since the sample contains only incumbent firms that have survived into maturity (Chandy and Tellis 2000). It is possible that this study may have uncovered different relationships if new ventures were included in the sample. Additional research that explicitly investigates different types of firms (e.g., new ventures versus incumbent firms) could provide further insights into the development of radical service innovation.

Sixth, while this dissertation concentrates on customer involvement practices and organizational reward practices as moderators, other types of contingency factors that are relevant to high-tech industry might also be viable moderators. For example, future research can investigate the application of big data and artificial intelligence in transforming emerging customer knowledge into radical service innovation (Troilo et al. 2017).

Seventh, this study focuses on the customer side of involvement in the innovation process (Cui and Wu 2016, 2017). However, the supplier side of involvement also prevails in the high-tech industry (Luzzini et al. 2015). It would be worthwhile to test a research model that integrates both sides. Therefore, this dissertation suggests that an investigation into how customer involvement and supplier involvement directly and jointly influence the relationship between emerging customer orientation and radical service innovation would be a fruitful research avenue.

Last, this thesis does not examine the financial consequences of a firm's radical service innovation performance. Additional studies that explicitly explore the impact of radical service innovation on different financial outcomes would provide a more detailed picture of the importance of radical service innovation (Katsikeas et al. 2016). For example, researchers can adopt backward-looking financial measures (e.g., customers' responses to radical service innovation) and forward-looking financial measures (e.g., investors' responses to radical service innovation) to evaluate the influence of radical service innovation on financial performance from the perspectives of different stakeholders.

6.4 Conclusion

In conclusion, this thesis has identified five outcome-based characteristics of service innovation and systematically differentiated a radical service innovation from an incremental one. Moreover, it has proposed and empirically tested a

research model that links emerging customer orientation with radical service innovation. Findings show that customer involvement practices and organizational reward practices serve as key moderators for the relationship between emerging customer orientation and radical service innovation. It also demonstrates that these moderators have different effects for manufacturing firms versus service firms. The research limitations and directions for future research at the end of thesis provide fruitful research avenues for marketing and service innovation research.

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Appendix 1: Definitions of Service Innovation across Six Fields

Fields	Studies	Definitions
Marketing	Arnold, Fang, and Palmatier (2011, p. 238)	“Radical [service] innovation performance pertains to financial benefits obtained from an innovation that incorporates substantially different technology and fulfills novel and emerging customer needs, whereas incremental [service] innovation performance refers to financial benefits obtained from an innovation that involves minor technology changes and relatively incremental customer benefits.”
	Chen, Tsou, and Ching (2011, p. 1332)	Service innovation is defined as “a new or significantly improved service concept or process ... It can be further characterized as a new service application that was created with the intention of deriving benefits from it.”
	Dotzel, Shankar, and Berry (2013, p. 259)	Service innovation is defined as “a new or enhanced intangible offering that involves the firm’s performance of a task/activity intended to benefit customers.”
	Gremyr et al. (2014, p. 125)	Service innovation is defined as changes in service characteristics. “The service characteristics are the provider’s direct competencies, clients’ competencies, material and immaterial technical characteristics, and final users’ value or service characteristics.”
	Kindström and Kowalkowski (2014, p. 97)	Service innovation is defined as “any recombination of resources that creates new benefits for any actor – customer, developer, or others – in the business network.”

Appendix 1: Definitions of Service Innovation across Six Fields (Continued)

Fields	Studies	Definitions
Marketing	Michel, Brown, and Gallan (2008, p. 61)	A service innovation is discontinuous if “it (1) significantly changes how customers co-create value (value-in-use criterion) and (2) significantly affects market size, prices, revenues, or market shares (value-in-exchange criterion).”
	Olsen and Sallis (2006, p. 467)	“Incremental [service] innovations are based on improvements to existing technology, whereas discontinuous [service] innovations incorporate substantially different technology into services that satisfy customer needs better than existing services”
	Ottenbacher and Harrington (2010, p. 5)	“Incremental [service] innovations are mainly associated with the short-term viability of the firm; because of only minor changes and improvements to existing service offers, it directly addresses short-term performance ... discontinuous [service] innovation relates to long-term viability by providing a broader view of trends and offering pioneering advantages such as being the first-mover in the market.”
	Salunke, Weerawardena, and McColl-Kennedy (2011, p. 1253)	Service innovation is defined as “the extent to which new knowledge is integrated by the firm into service offerings, which directly or indirectly results in value for the firm and its customers/clients.”

Appendix 1: Definitions of Service Innovation across Six Fields (Continued)

Fields	Studies	Definitions
Innovation	Biemans, Griffin, and Moenaert (2016, p. 383)	Service innovation is defined as “the process of devising a new or improved service, from idea or concept generation to market launch.”
	Cheng and Krumwiede (2012, p. 488)	“Incremental service innovation is related to customer-led strategies that focus on manifest needs and is posited to be the most common form of innovation ... On the other hand, radical service innovation is defined as fundamental changes in new services that represent revolutionary changes in service benefits.”
	Kang and Kang (2014, p. 183)	Service innovation is defined as “the introduction of new services that are created based on new knowledge or technology; are definitely different; or greatly improve the existing services in terms of the technological aspects, customer relations, or other features.”
	Martínez-Ros and Orfila-Sintes (2009, p. 633)	Service innovation can be differentiated between radical and incremental innovation, “using a dimension that denotes whether they were introduced for the first time (learned or explored) or consisted of modifications, improvements, or extensions to previously introduced innovations (additional or exploitative) ... the first time a firm includes or adopts an innovation, is a radical innovation; whereas modification to a previous innovation represents an incremental innovation.”

Appendix 1: Definitions of Service Innovation across Six Fields (Continued)

Fields	Studies	Definitions
Innovation	Perks, Gruber, and Edvardsson (2012, p. 937)	“Radical [service] innovations result in departures from previous practices and lead to significant changes in organizational activities and the service system ... it has a significant impact on both customer co-creation of value processes and market conditions”
	Storey et al. (2016, p. 527)	Service innovation is defined as “the development of new or enhanced intangible offerings that involves the firm’s performance of a task/activity intended to benefit customers.”
Service Research	Aas and Pedersen (2011, p. 2073)	Service innovation is defined as “a new or considerably changed service concept, client interaction channel, service delivery system or technological concept that individually, but most likely in combination, leads to one or more (re)new(ed) service functions that are new to the firm and do change the service/good offered on the market and do require structurally new technological, human or organisational capabilities of the service organisation.”
	Den Hertog, Van der Aa and De Jong (2010, p. 494)	“A service innovation is a new service experience or service solution that consists of one or several of the following dimensions: new service concept, new customer interaction, new value system/business partners, new revenue model, new organizational or technological service delivery system.”
	Eisingerich, Rubera, and Seifert (2009, p. 349)	Service innovation is defined as “both the development of new service offerings as well as the processes or methods employed to develop and market new services to customers.”

Appendix 1: Definitions of Service Innovation across Six Fields (Continued)

Fields	Studies	Definitions
Service Research	Hsueh, Lin, and Li (2010, p. 1726)	“Service innovation can provide two types of new solutions to customers: one involves combining new issues or concepts to form new solutions, and is broken down into improvement innovation and radical innovation; the other involves solving the same problem with greater efficiency, and can include the enhancement of productivity, suitability, or quality.”
	Ordanini and Parasuraman (2011, p. 5)	“A service innovation can be considered as an offering not previously available to the firm’s customers—either an addition to the current service mix or a change in the service delivery process—that requires modifications in the sets of competences applied by service providers and/or customers ... The nature and magnitude of change in competences determine the extent of service innovation.”
	Ostrom et al. (2010, p. 5)	“Service innovation creates value for customers, employees, business owners, alliance partners, and communities through new and/or improved service offerings, service processes, and service business models.”
	Rubalcaba et al. (2012, p. 708)	“A service innovation provides new resources, available to customers in value constellations.”
	Toivonen and Tuominen (2009, p. 893)	“A service innovation is a new service or such a renewal of an existing service which is put into practice and which provides benefit to the organisation that has developed it; the benefit usually derives from the added value that the renewal provides the customers.”

Appendix 1: Definitions of Service Innovation across Six Fields (Continued)

Fields	Studies	Definitions
Operations Management	Agarwal and Selen (2011, p. 1172)	Service innovation is defined as “a new or enhanced service offering which can only be eventuated as a result of a collaborative arrangement, one that could not otherwise be delivered on individual organisational merits, and comprises of a new or modified service offering; new client interface/customer encounter; new service delivery system; new organisational architecture or marketing proposition; and/or improvements in productivity and performance through human resource management capabilities management.”
	Chong and Zhou (2014, p. 52)	“Service process innovation is the introduction of new or improved ways of designing and producing services. This can include novel ways to handle services commercially and is applied to the entire value chain process, such as gathering customer requirements, manufacturing, data processing and distribution. Service product innovation, on the other hand, involves introducing a new or improved service and entails the development, production and dissemination of new services to new consumers.”
	Dominguez-Péry, Ageron, and Gilles Neubert (2013, p. 441)	“Innovation in services can be related to changes in various dimensions like innovation in the service concept, client interface, the delivery system or technological options.”

Appendix 1: Definitions of Service Innovation across Six Fields (Continued)

Fields	Studies	Definitions
Operations Management	Menor, Tatikonda, and Sampson (2002, p. 138)	Service innovation is defined as “an offering not previously available to a firm’s customers resulting from the addition of a service offering or changes in the service concept that allow for the service offering to be made available”
Information Systems	Carlo, Lyytinen, and Rose (2012, p. 869)	“Service innovation involves the adoption and use of knowledge to create new software functionality for a client’s tasks...Service innovations are radical when they involve significant departures from existing software in terms of domains, functionality and structure, types of users or use goals, use processes, or the underlying business model.”
	Chae (2014, p. 3)	“From complexity theory, service innovation can best be explained as a co-evolutionary process, which includes dynamic stages, nonlinear interaction, openness, and emergent properties in complex environments.”
	Kankanhalli, Ye, and Teo (2015, p. 671)	“User service innovation has been defined as the new services or changes in services, production, or delivery created by users.”
	Lusch and Nambisan (2015, p. 161)	Service innovation is defined as “the rebundling of diverse resources that create novel resources that are beneficial (i.e., value experiencing) to some actors in a given context; this almost always involves a network of actors, including the beneficiary (e.g., the customer).”

Appendix 1: Definitions of Service Innovation across Six Fields (Continued)

Fields	Studies	Definitions
Information Systems	Ryu, Lee, and Choi (2015, p. 101)	“Service innovation can be related to changes in the various characteristics of the service product itself. Service innovation dimension refers to the area where service innovation occurs. Therefore, this study defines service innovation as a change either in the service innovation dimensions (characteristics) or in the combinations of the service innovation dimensions.”
	Tsou and Chen (2012, p. 178)	E-service innovation is defined as “a service process innovation that responds to the needs of customers and is created by a service provider using technical capabilities involving interaction with partners through electronic technologies to reduce service production risk.”
Strategy	Goes and Park (1997, p. 674)	Service innovation is defined as the activities that “incorporate changes in the technology, design, or delivery of a particular service or bundle of services.”
	Möller, Rajala, and Westerlund (2008, p. 34)	“Incremental service innovation describes a value-creation strategy in which services are employed for the incremental addition of value ... radical service innovation describes an approach that pursues value creation through novel service concepts.”
	Thakur and Hale (2013, p. 1110)	Service innovation is defined as “those service offerings and processes that are new-to-the company and/or new-to-the market (customer), where the intention is meant to create value for any of the service stakeholders.”

Appendix 2A: Time 1 Survey (English Version)

Survey on Service Innovation

We are a team of service innovation researchers at Warwick Business School in the UK and are now conducting a survey on service innovation best practices. This survey asks about the marketing and service innovation activities within your firm. Participation in this survey will take around 8 minutes. All information is completely anonymous and confidential. Thank you very much for your interest and participation!

Kind regards,

Ping-Jen Kao | PhD candidate in Marketing |

Warwick Business School | University of Warwick

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☉Mobile: 0989185091

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◆ There are no right or wrong answers here, only your views.

<p><u>Emerging customer needs</u> are the needs that are starting to exist, grow, and become aware in small and emerging customer segments.</p> <p>To what extent do you agree with the following statements about your firm's emphasis on “identifying and satisfying emerging customer needs”?</p>	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. We pursue ideas that small, emerging customer segments value.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. We always disseminate and discuss market information on emerging customer needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. We believe that it is important to develop new services to satisfy emerging customer needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. We always invest adequate resources to carve out a strong position in small, emerging customer segments.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Please indicate your degree of agreement about how well these statements describe the market environment in your industry:</p>	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. It is difficult to predict how customers' needs and requirements will evolve in our markets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Generally, it is easy to understand how our market will change.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Please indicate your degree of agreement about how well these statements describe the technological environment in your industry:</p>	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. The technology in our market environment is changing rapidly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Many new service ideas have been made possible through technological breakthroughs in our industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please indicate your degree of agreement about how well these statements describe the competitive intensity in your industry:	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
1. Competition in our industry is cutthroat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Price competition is a hallmark of our industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40% Complete !							
In evaluating and rewarding a potential new service development, our firm emphasizes the following objectives:	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
1. Profitability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Market share	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Repeat business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In evaluating and rewarding a potential new service development, it is important that the new service development should:	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
1. Address future customer needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Address future competitor actions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Change the rules of the game in the industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During most of our new service development projects:	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
1. The transfer of information about customers' needs and preferences takes place frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. We actively transfer information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

gathered from our customers to our service development team.							
3. We use information about our customers' needs in the new service development.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During most of our new service development projects:	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. Our customers are actively involved in a variety of service designs and development activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Our customers frequently interact with the new service team during the development process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Our customers provide frequent feedback and inputs on new service designs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During most of our new service development projects:	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. We allowed our customers to design services customized to their own needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. We utilized service designs that were created by our customers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. We allowed our customers to provide design prototypes that we later developed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80% Complete !							
To what extent do you agree with the following statements about your firm?	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. We are very willing to sacrifice sales of existing services in order to increase sales of new services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. We tend to find it difficult to change our established procedures to cater to the needs of a new service.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To what extent do you agree with the following statements?	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. I am knowledgeable about the issues noted in this survey.							
2. The issues noted in this survey are highly relevant to my current job.							
<p align="center">Demographic Information</p> <p>◆ About how many years have you worked in your current industry: _____ years (e.g., 10.5 years)</p> <p>◆ About how many years have you worked for your current firm: _____ years</p> <p>◆ Gender : <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Other</p> <p>◆ Age : _____ years</p>							

Thanks for your participation!

Appendix 2B: Time 1 Survey (Chinese Version)

學術問卷調查

親愛的朋友您好：

這是一份由「英國華威大學商學院」主持的學術研究問卷。感謝您撥冗填寫本問卷【填答時間約 8 分鐘】，這份問卷主要在探討「企業的服務創新」議題；以下問題，期望獲得您的協助，您的填答對本研究將有莫大的助益。您所提供的意見絕對保密，請您放心賜答。於此致上最誠摯的感謝與敬意，並祝福您 身體健康 工作順利！

英國華威大學商學院 (Warwick Business School)

研究聯絡人：高炳仁 (Ping-Jen Kao) 華威大學商學院 博士候選人

◎聯絡方式： Ping-Jen.Kao.15@mail.wbs.ac.uk

◎聯絡電話： 0989185091

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◆以下題目沒有所謂的正確答案，請依「您的個人感受或直覺」填答。

<p>新興客戶需求是指貴公司少數客戶們關注但逐漸成長的小眾需求。</p> <p>以下題目是想瞭解貴公司對於「新興客戶需求」的重視程度，請依您的認知作答：</p>	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 我們追求 新興客戶群重視的需求 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 我們公司內部常彼此 交換新興客戶需求的市場資訊 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. 對我們公司而言， 發展創新服務來滿足新興客戶需求 是一件很重要的事。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. 為了能 在新興的小眾市場中取得領先地位 ，我們會持續投入足夠資源。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
以下題目是想瞭解貴公司所在產業的 市場動盪 程度	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 在這個產業中， 預測客戶的需求與偏好 是一件困難的事。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 我們能夠 輕易地預測未來市場變化 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
以下題目是想瞭解貴公司所在產業的 科技變動 程度	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 在這個產業中， 科技變動是非常快速的 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 在這個產業中， 許多服務創新的想法 都能經由科技上的突破來實現。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
以下題目是想瞭解貴公司所在產業的 競爭程度	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 我們的 產業競爭相當激烈 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. <u>價格競爭</u> 是我們的產業特性。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
已完成 40%，感謝您！							
當貴公司在 <u>獎勵與評估</u> 一個創新服務的價值時， <u>會考量這個創新能不能達成下列的績效目標：</u>	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 獲利能力	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 市佔率	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. 客戶回購率	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
當貴公司在 <u>獎勵與評估</u> 一個創新服務的價值時， <u>會考量這個創新能不能有效地.....</u>	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 滿足 <u>客戶未來的需求</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 回應 <u>競爭對手未來的行動</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. <u>改變本產業現有的遊戲規則</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
在新服務的開發案中， <u>我們公司經常會.....</u>	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 彼此頻繁地交換 <u>客戶需求與偏好的</u> 相關資訊。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. <u>主動地將從客戶那端蒐集而來的資訊</u> 轉交給創新研發團隊。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. <u>將客戶需求與偏好的資訊實際用於新服務的開發中</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
在新服務的開發案中， <u>我們的客戶經常會.....</u>	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 在新服務設計與開發的活動中 <u>扮演積極的角色</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. 與創新研發團隊 <u>頻繁地互動</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. 為新服務設計 <u>提供回饋及建議</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
在新服務的開發案中， <u>我們公司經常會.....</u>	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 讓客戶 <u>依照自己的需求設計服務</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 仔細採用 <u>客戶所設計的服務原型</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. 以 <u>客戶設計的服務原型為基礎</u> 來做創新。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p style="text-align: center;">已完成 80%，感謝您！</p>							
以下題目是想瞭解貴公司的 <u>營運文化</u>	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 在新舊服務有所衝突的情況下，我們 <u>願意犧牲現有服務的銷售額來增加新服務的銷售業績</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 我們認為 <u>改變公司現有體制來適應新服務是一件困難的事</u> 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
請問您對下列問題的 <u>同意程度</u>	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 我 <u>非常了解這份問卷的調研內容</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 這份 <u>問卷的調研內容與我的工作息息相關</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

基本資料

◆請問您在這一個產業服務約多久了：_____年 (比如：10.5 年)

◆請問您在目前任職的公司服務約多久了：_____年

◆性別： ☐ 男 ☐ 女 ☐ 其他

◆年齡：_____歲

本問卷到此結束，再次感謝您的協助！謝謝！

Appendix 3A: Time 2 Survey (English Version)

Survey on Service Innovation

We are a team of service innovation researchers at Warwick Business School in the UK and are now conducting a survey on service innovation best practices. This survey asks about the service innovation activities within your firm. Participation in this survey will take around 3 minutes. All information is completely anonymous and confidential. Thank you very much for your interest and participation!

Kind regards,

Ping-Jen Kao | PhD candidate in Marketing |

Warwick Business School | University of Warwick

☉Email: Ping-Jen.Kao.15@mail.wbs.ac.uk

☉Mobile: 0989185091

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◆ There are no right or wrong answers here, only your views.

<p>Service innovation can be divided into radical service innovation and incremental service innovation. Radical service innovation is defined as a completely new service offering or process that satisfies relatively ill-defined customer needs and creates significantly higher benefits to firms and customers whereas incremental service innovation is considered as the modification of a firm's existing service offering or process that satisfies well-defined customer needs and creates incremental benefits to firms and customers.</p>							
<p>To what extent do the following statements represent the radical service innovation outcomes achieved by your firm in the last two years?</p>	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. Our firm now leads the way in introducing radically new services that require brand new competences.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. We constantly introduced new service offerings that are radically different from our existing services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. We persistently considered introducing radically new services that provide better ways of creating value with customers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Compared to major competitors, our firm introduced more radically new services in the last two years.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>To what extent do you agree with the following statements?</p>	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. I am knowledgeable about the issues noted in this survey.							
2. The issues noted in this survey are highly relevant to my current job.							

Demographic Information

◆ About how many years have you worked in your current industry: _____ years
(e.g., 10.5 years)

◆ About how many years have you worked for your current firm: _____ years

◆ Gender : ☐ Male ☐ Female ☐ Other

◆ Age : _____ years

Thanks for your participation!

Appendix 3B: Time 2 Survey (Chinese Version)

學術問卷調查

親愛的朋友您好：

這是一份由「英國華威大學商學院」主持的學術研究問卷。感謝您撥冗填寫本問卷【填答時間約 3 分鐘】，這份問卷主要在探討「企業的服務創新」議題；以下問題，期望獲得您的協助，您的填答對本研究將有莫大的助益。您所提供的意見絕對保密，請您放心賜答。於此致上最誠摯的感謝與敬意，並祝福您 身體健康 工作順利！

英國華威大學商學院 (Warwick Business School)

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◆以下題目沒有所謂的正確答案，請依「您的個人感受或直覺」填答。

服務創新可區分為突破性創新與漸進式創新。**突破性服務創新**是指貴公司「**創造出全新的服務或流程**」，此種創新能滿足相對不明確的客戶需求，並創造較高的價值給公司與客戶；**漸進式創新**則是指貴公司「**針對現有服務或流程進行改良**」，此種創新能滿足相對明確的客戶需求，並創造漸進式的價值給公司與客戶。請依您的認知作答下列問題：

以下題目是想瞭解貴公司在 <u>過去兩年</u> 的「 突破性服務創新 」表現	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
1. 我們目前是這個產業的 創新先驅 ，持續 推出需要結合新資源的突破性服務創新 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 我們公司持續地 推出不同於現有服務的突破性創新 給客戶們。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. 為了 替客戶創造更多的價值 ，我們持續 發展突破性服務創新 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. 與產業內的主要競爭者相比， 我們公司在過去兩年創造出更多的突破性服務創新 。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
請問您對下列問題的 <u>同意程度</u>	非常不同意	不同意	有點不同意	普通	有點同意	同意	非常同意
我 非常了解這份問卷的調研內容	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
這份 問卷的調研內容與我的工作息息相關	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

基本資料

◆請問您在這一個產業服務約多久了：_____年 (比如：10.5 年)

◆請問您在目前任職的公司服務約多久了：_____年

◆性別： ☐ 男 ☐ 女 ☐ 其他

◆年齡：_____歲

本問卷到此結束，再次感謝您的協助！謝謝！