東海大學國際經營與貿易學系碩士班

碩士論文

策略導向對創新的影響

–以共同生產為中介

The Effect of Strategic Orientation on Innovation-the Mediating Role of Co-production

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策略導向對創新的影響-以共同生產為中介

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摘要

本研究目的在於探討策略導向、共同生產與創新之間的關係。研究對象為台中工業區，有效回收問卷為 149 份。研究結果發現(1)策略導向對共同生產的影響。(2)共同生產對創新的影響。(3)共同生產在策略導向與創新之間之中介效果。實證結果顯示策略導向對共同生產具有顯著影響。共同生產對創新具有顯著影響。而共同生產在策略導向與服務創新之間具有中介效果，但在策略導向與科技創新之間不具有中介效果。本研究發現理論以及管理實務上的意涵，同時對未來研究方向提出建議。

【關鍵字】策略導向、共同生產、服務創新、科技創新

Abstract

Market orientation, with its final effect on innovation, appears to be received relatively little attention. This study, we start by delineating the concept of market orientation and proceed to distinguish service innovation and technical innovation. A mediational model that links market orientation to innovation via co-production is proposed. Appropriate measures are identified and we collected the data from Taiwan Industrial Park. The results of our ordinary least squares analysis show that a firm's strategic orientation has a significant and positive effect on its co-production with customers and that co-production, in turn, has a significant and positive effect on service innovation and technical innovation. The results also suggest that co-production mediates the relationship between strategic orientation and service innovation but not that between strategic orientation and technical innovation. Implications are discussed, limitations of the study are noted and possible areas for further research are indicated.

Keywords: Market orientation, Customer orientation, Competitor orientation, Inter-functional orientation, Innovation orientation, Innovation, Co-production

Table Context

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1. Introduction

Strategic orientations are the principles that influence a firm's marketing and strategy-making activities. It reflects the firm's philosophy of how to conduct business through a deeply rooted set of values and beliefs that guides the firm's attempt to achieve superior performance (Gatignon and Xuereb 1997).

However, research in marketing has focused almost exclusively on maintain a market orientation concept. The positive relationship between market orientation and business performance has been empirically confirmed in many studies (Cano, Carrillat, & Jaramillo, 2004; Kirca, Jayachandran, & Bearden, 2005). Market orientation places the chief priority on the profitable creation and maintenance of superior customer value (Narver & Slater 1990). Narver and Slater's (1990) conceptualization of market orientation includes three components: customer orientation, competitor orientation, and interfunctional coordination. Market orientation provides a firm with market-sensing and customer-linking capabilities that could lead to superior performance (Kirca, Jayachandran, & Bearden, 2005) through a better understanding of its environment and customers (Jaworski & Kohli, 1993). Empirical studies have also indicated a positive relationship between market orientation and product performance (Atuahene-Gima, 1995; Slater and Naver, 1994).

However, rather than adopt the narrower conceptualization proposed by Narver and Slater, this study add innovation orientation concept proposed by Siguaw, Simpson, and Enz (2006). The importance of innovation has been emphasized since the seminal works of Peter Drucker and Everett Rogers. A business's survival lies on its ability to innovate in the dynamic environment. Innovation is an essential element of successful business

performance (Avlonitis et al., 2001). In this study, we examined the concept of innovation orientation in addition to customer orientation, competitor orientation, and interfunctional coordination. Innovation orientation may be linked to performance and growth through improvements in efficiency, productivity, quality, competitive positioning, market share, and so forth.

Some studies have indicated that businesses are increasing their co-production with customers in order to innovate (Chen, Tsou, & Ching, 2011). In co-production, customers become involved in new product development while firms gain insights into customers' thoughts and opinions. Through this process, the firms produce customized products (Auh, McLeod & Shih, 2007), which result in high customer satisfaction and better firm performance. Products or services with a higher degree of innovation have been shown to result in higher sales, better financial performance, and better overall business performance (Gatignon & Xuereb, 1997; Zhou et al., 2005).

This study seeks to contribute to the development of a conceptual framework that integrates strategic orientation, innovation and co-production. It reviews the literature on three constructs and outlines the expected relationships in a research model. Appropriate measures are identified and research is carried out among companies of Taichung Industrial Park to test the hypothesized relationships. The demographic characteristics of respondents are also investigated. The implication for theory development and management are discussed.

2. Conceptual Framework and Hypotheses Development

This study examined strategic orientation with the concept of market orientation (Narver and Slater, 1990), which includes customer orientation, competitor orientation, and inter-functional coordination, as well as the more recently developed concept of innovation orientation.

Previous research indicates that strategic orientation provides the firm direction for achieving continuous superior performance (Cano, Carrillat, & Jaramillo, 2004; Kirca, Jayachandran, & Bearden, 2005) and that innovation has a significant influence on business performance. In this study, we examined the relationship between strategic orientation and innovation.

There is increasing evidence that businesses are increasing co-production with customers in order to innovate. Thus, we also considered co-production as a mediating variable in the relationship between strategic orientation and innovation.

This study's conceptual framework is shown in Fig. 1. From our review of the literature, we defined the key constructs of our framework and described the evidence for the relationships involved in this framework.

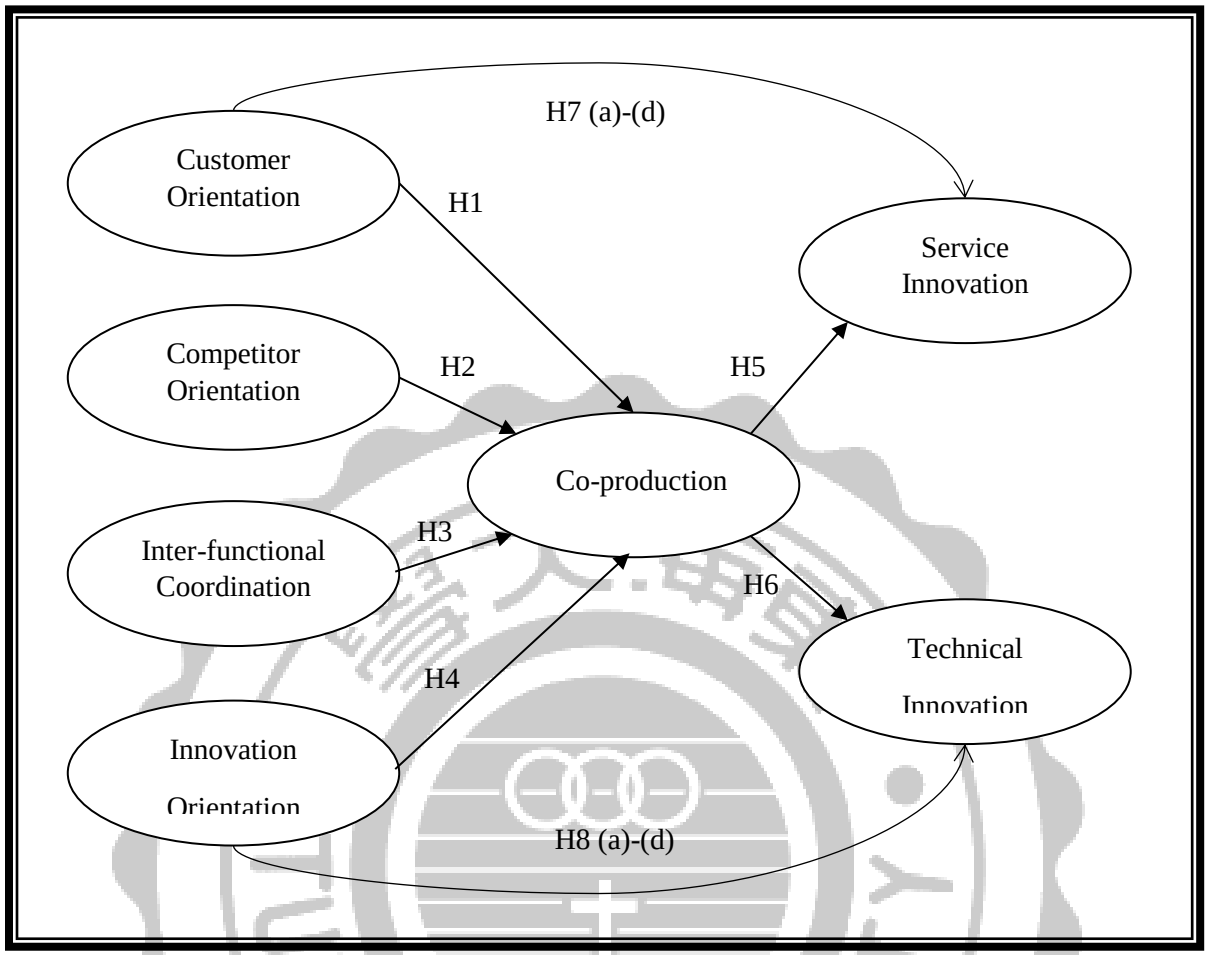

Fig. 1 Conceptual Framework and Hypotheses

2.1 Innovation

In this study, we divided innovation into two categories—technical innovation and non-technical innovation. Innovation has been defined as a technology breakthrough. According to Damanpour (1991), "technical innovations are about product, service, and production process technology; they are related to basic work activities and can concern either product or process." Based on the literature, we defined technical innovation as product or service innovations and non-technical innovation as managerial, administrative, and marketing innovations (Ambruster, Bikfalvi, Kinkel, & Lay, 2008; Han, Kim, & Srivastava, 1998; Kimberly & Evanisko, 1981). The purpose of technical innovation is to

increase a firm's ability to survive in the market by introducing a new product or a new product design into the production process, without sacrificing production costs or product performance. In other words, technical innovation offers a new product with higher levels of emotional and functional values. Service also plays a key role in development economics and has become more popular and more important in the global marketplace. Not only is service the main driver of the economy—it is also the main contributor to productivity growth. However, despite the increased attention to service innovation, it is still among the least understood topics in service management and innovation literature (De Jong & Vermeulen, 2003; Johnson, Menor, Roth, & Chase, 2000). Service innovation is different from technical innovation in that it has incremental and continuous characteristics (Gallouj & Windrum, 2009). Further, the absence of development stages and R&D departments in services firms indicate that service innovation is inherently different from technical innovation (Johne & Storey, 1998). A service that loses its unique characteristics or competitive advantage may no longer be survived in the market. Following Ostrom et al. (2010), we defined service innovation as the practices to create value for customers, employees, business owners, partners, and communities through a new or improved service offering, new service process, or new business model. Service innovation improves business performance and is recognized as an essential element of competitive advantage (e.g., Bharadwaj, Varadarajan, & Fahy, 1993; Gray, Matear, Deans, & Garrett, 2007; Johne & Storey, 1998).

2.2 Co-production

Co-production has been defined as “the degree to which the client is involved in producing and delivering service” (Dabholkar, 1990: 484) and involves both mental and physical participation. A service is distinct from a physical good because it is continuous and dynamic. When a service is delivered to the customer, it always involves a certain degree of co-production (Auh et al., 2007; Bowen, 1986; Lengnick-Hall, 1996). The involvement of the customer in providing a service is especially useful for co-development, that is, in the development of an innovative new service (Neale & Corkindale, 1998; Spohrer & Maglio, 2008). Customer involvement can transform the customer from a passive to an active partner. It involves engaging customers in a dialogue rather than just listening to them and considering them as a productive resource in the co-creation process (Plé and Cáceres, 2010). Co-production can help the firm maximize its profitable relationship with customers (e.g., individual consumers or business clients) by finding ways to satisfy their needs and to strengthen its relationship with them. The underlying objective of the firm is to achieve mutual understanding and boost collaboration with customers in order to co-create effective values.

2.3 Strategic Orientation

Business strategy has been characterized as the manner in which a firm decides to compete (Walker & Rurkert, 1987), which encompasses the pursuit, achievement, and maintenance of competitive advantage in an industry (Varadarajan & Clark, 1994). Organizational decision making has been linked to business performance outcomes. Strategic orientations are the guiding principles that influence a firm’s marketing and

strategy-making activities (Nobel, Sinha, & Kumar, 2002). Marketing research has focused mainly on market orientation (Nobel et al., 2002), which determines the success or failure of new products and which includes the firm's customer orientation and competitor orientation. Inter-functional coordination has also been considered as a part of the market orientation concept (Narver and Slater, 1990). Recently, however, research has been paying more attention to alternative orientations, including innovation orientation, quality orientation, entrepreneurial orientation, and productivity orientation (Gatignon & Xuereb, 1997; Hurley & Hult, 1998; Marinova et al., 2008; Voss & Voss, 2000; Zhou et al., 2005). By combining market orientation with other important strategic orientations, firms can maximize their business performance.

Following studies focusing on the three main market orientations and the importance of innovation, we introduce innovation orientation into our framework.

2.3.1 Customer Orientation

Customer orientation refers to the sufficient understanding of one's target buyers, the satisfaction of their needs and desires, and the creation of superior values for them (Day, 1994; Deshpande et al., 1993; Hunt & Morgan, 1995; Narver & Slater, 1990), which contribute the most priority on continuously finding ways to provide superior customer value (Pierce & Delbecq, 1977). A business in a rapidly changing market environment must also address the customers' similarly fast-changing needs and preferences. A firm that is customer oriented can identify, analyze, and understand its target customers and effectively allocate resources to achieve their customers' needs. In other words, customer orientation helps the firm identify some of the market's technical issues and evaluate potential segments and their importance and growth rate.

2.3.2 Competitor Orientation

Competitor orientation refers to a firm's ability to identify, analyze, and respond to competitors' actions (Kohli and Jaworski, 1990), and to the extent to which a firm will go to differentiate itself from competition. In contrast to customer orientation, which focuses on identifying target customers and understanding their needs, competitor orientation focuses on assessing one's competitors (Olson et al., 2005). In a competitive market, a customer can have many alternatives (Augusto & Coelho, 2009; Kohi & Jaworski, 1993), which means that firms have higher probabilities of losing existing customers (Song & Parry, 2009) . Xuereb (1993), pointed out that firms are inventing an increasing number of products to respond to competitor innovation. In a changing environment, facing where firms face the threat of losing customers and profit, firms do not remain passive (Gatignon, Anderson, & Helsen, 1989; Robinson, 1988). In order to respond to a competitor's innovation, a competitor -oriented firm needs to identify its short-term strengths and weakness, and long-term capabilities, and then analyze and respond to the competitor's strategy (Naver & Slater, 1990). Essentially, competitor orientation focuses on the following questions: (1)Who are the firm's competitors? (2) What technologies do they offer to the customer? (3) Do they offer alternatives to the firm's target customers? A competitor -oriented firm needs to assess itself relative to its strongest competitors (Day & Wensley, 1988).

2.3.3 Inter-functional Coordination

Inter-functional coordination is defined as the degree of integration and collaboration within different units in the firm (Narver & Slater, 1990). It describes the ability of different functional areas to accommodate disparate views and work around conflicting perspectives and mental models by putting aside functional interests for the better of the organization as a whole. It can facilitate the generation, collection, and dissemination of market intelligence pertaining to new service development across functional areas (Auh & Menguc, 2005).

2.3.4 Innovation Orientation

Siguaw et al. (2006), who define innovation orientation as "the organizational strategies and actions toward specific innovation-enabling competencies and processes,", propose a conceptualization of innovation orientation along three dimensions: learning philosophy, strategic direction, and transfunctional acclimation. Learning philosophy refers to "organization-wide understandings about learning, thinking, acquiring, transferring, and using knowledge in the firm to innovate" (Siguaw et al., 2006), while strategic direction highlights the future- orientation of the company (Amabile, 1997; Gatignon & Xuereb, 1997). Combining the firm's learning philosophy and strategic direction produces the third dimension of innovation orientation, transfunctional acclimation. Innovation orientation may be linked to performance and growth through improvements in efficiency, productivity, quality, competitive positioning, market share, etc. An innovation -oriented firm focuses on developing key organizational abilities in order to appropriately allocate its resources,

technologies, employees, operations, and markets. Innovation orientation provides a firm with the capability to develop and implement innovations.

2.4 Hypotheses Development

2.4.1 Strategic Orientations and Co-production

Customer orientation and co-production

In co-production, customers are active participants in the service or product creation process, and firms engage in a dialogue with them, to obtain their feedback, and ultimately satisfy their needs and strengthen relationship with them.

According to the literature, a firm that is customer-orientated focuses on analyzing and understanding its target customers, and making profit by satisfying their needs and expectations (Day, 1994; Deshpande et al., 1993; Hunt & Morgan, 1995; Kotler & Armstrong, 1994; Narver & Slater, 1990). In order to offer a product or service that meets customers' expectations, the firm must understand the customers' needs and preferences, which means that it needs to develop a customer-oriented strategy; and seek the customers' cooperation. Therefore, we propose the following hypothesis:

Hypothesis 1: Customer orientation has a significant and positive relationship with co-production.

Competitor orientation and co-production

According to our literature review, in a competitive market, customers can have many substitutes for a product or service (Augusto & Coelho, 2009; Kohi & Jaworski, 1993).

Faced with greater probability of losing customers, a firm needs to cooperate with customers and establish a strong bond with them.

A competitor oriented firm recognizes its abilities, identifies its competitors' advantages, and responds to those advantages. A firm with a keen competitive instinct keeps up to date with its competitor's offerings, consistently monitors its competitor's moves, and is often ready to respond to those moves. A frim that wants to effectively compete must deliver a different product or service to the market. The difference typically centers on product features, customer service, brand images, and so forth (Day & Wensely, 1988; Narver, & Slater, 1990). To understand its differences from competitors, a firm can ask customers why they choose a competitor's service or product. Therefore, we propose the following hypothesis:

Hypothesis 2: Competitor orientation has a significant and positive relationship with co-production.

Interfunctional coordination and co-production

Interfunctional coordination encompasses the coordinated application of organizational resources to synthesize and disseminate market intelligence (Narver & Slater, 1990; Slater & Narver, 1994). It also enhances the communication and exchange between all organizational functions that are concerned with customers and competitors and gives these functions greater proximity to the latest market trend (Gatignon & Xuereb, 1997) . By coordinating the organization's different functions, interfunctional coordination helps firms appropriately and effectively uses resources, which in turn enables the firm to devote more resources for cooperating with customers in order to create synergy and consequently make profit. Therefore, we propose the following hypothesis:

Hypothesis 3: Interfunctional coordination has a significant and positive relationship with co-production.

Innovation orientation and co-production

To survive in a competitive market, an innovation-oriented firm needs a strategy that enhances its ability to innovate and to bring a new product or service to the market. By cooperating and communicating with customers, the firm can get their feedback, understand its weaknesses compared to competitors, and consequently, improve its original offerings or innovate to bring a new product or service to the market. Hence, we predict that an innovation –oriented frim has a high level of willingness to co-produce a new product or service with customers. Therefore, we propose the following hypothesis:

Hypothesis 4: Innovation orientation has a significant and positive relationship with co-production.

2.4.2 Co-production and service/technical innovation

A service has special characteristics, including intangibility, heterogeneity, inseparability, and perishability (Paswan, D'Souza, & Zolfagharian, 2009). In the process of service delivery, customers are always considered as participants. Service innovation has become a customer-oriented term that captures both the development of new service offerings and the processes or methods employed to develop and market new services to customers (Eisingerich et al., 2009). Most importantly, service innovation can only occur as a result of partnering and cannot be delivered on individual organizational merits (Agarwal & Selen, 2009) . Past findings have suggested that collaborations help businesses improve and

enhance their innovative capabilities (Faems et al., 2005). Several studies have revealed that collaboration has positive effects on innovation practices (e.g., Deeds & Rothaermel, 2003; Dodgson, 1993; Faems, Van Looy, & Debackere, 2005; Schilling & Phelps, 2007), but empirical evidence supporting the extent and effects of collaborative relationships on service innovation remain scarce . Therefore, we propose the following hypothesis:

Hypothesis 5: Co-production has a significant and positive relationship with service innovation.

According to Damanpour(1991), technical innovations are defined as innovations "about product, service, and production process technology," and they "are related to basic work activities and can concern either product or process." A firm that performs technical innovation is aims to offer a new product with higher levels of emotional and functional values. Although there are some studies that have indicated that co-production has positive effects on service innovation, because it transforms customers into active participants in the service creation process, few have examined co-production's effect on technical co-production's effect on technical innovation. However, some studies argue that the participation of diverse actors in innovation can enhance the effectiveness of the process in terms of innovations meeting users' requirements and enabling new technologies, practices, or products to become better embedded in society and more broadly adopted Enkel et al., 2005; Neef & Neubert, 2011; von Hippel, 2005). Therefore, we propose the following hypothesis:

Hypothesis 6: Co-production has a significant and positive relationship with technical innovation.

2.4.3 Mediating role of co-production

There is increasing evidence that businesses work with customers to innovate (Chen, Tsou, & Ching, 2011). Customers actively engage in the product or service creation and delivery process, which can result in higher customer satisfaction and higher firm product. In addition to examining the relationship between strategic orientation and innovation, we examined the mediating effect of co-production. Therefore, we proposed the following hypotheses:

Hypothesis 7-(a): Co-production at least partially mediates the relationship between customer orientation and service innovation.

Hypothesis 7-(b): Co-production at least partially mediates the relationship between competitor orientation and service innovation.

Hypothesis 7-(c): Co-production at least partially mediates the relationship between interfunctional coordination and service innovation.

Hypothesis 7-(d): Co-production at least partially mediates the relationship between innovation orientation and service innovation.

Hypothesis 8-(a): Co-production at least partially mediates the relationship between customer orientation and technical innovation.

Hypothesis 8-(b): Co-production at least partially mediates the relationship between competitor orientation and technical innovation..

Hypothesis 8-(c): Co-production at least partially mediates the relationship between interfunctional coordination and technical innovation.

Hypothesis 8-(d): Co-production at least partially mediates the relationship between innovation orientation and technical innovation.

3. METHODOLOGY

3.1 Research Setting and Data Collection Procedure

This study examined the relationship between strategic orientations, co-production, and innovation using a sample of firms established in the Taichung Industrial Park. The descriptive statistics of the survey respondents are reported in TABLE 3-1-1. A total of 200 questionnaires were sent, 149 of which were returned. Some 50.3% of the respondents were male, and 49.7% were female, with a mean number of years since entering the firm of 5 to 10 years and a mean firm size of 200-300 employees. As this study focuses on co-production's mediating effect on the relationship between strategic orientations and innovation, we required the respondents to choose their main customers as empirical study targets from the survey response; we obtained a mean number of years of cooperating with customers of 6 to 10 years.

TABLE 3-1-1 Descriptive Statistics of Survey Respondents

Items	Number	Percentage
Gender		
Female	74	50.3
Male	75	49.7
Number of years since entering the firm		
Less than 5 years	3	2
5 to 10 years	14	9.4
10 to 20 years	36	24.2

More than 20 years	96	64.4
Firm size		
Less than 50 employees	19	12.8
50 to 100 employees	13	8.7
100 to 200 employees	49	32.9
200 to 300 employees	42	28.2
300 to 500 employees	8	5.4
More than 500 employees	18	12.1
Number of years firm has been cooperating with its main customers		
Less than 3 years	5	3.4
3 to 6 years	15	10.1
6 to 10 years	36	24.2
10 to 15 years	40	26.8
More than 15 years	53	35.6
Total	149	100

3.2 Measures

This study adopted the scale development and testing procedure suggested by Hinkin (1995) . The literature on service innovation, product innovation, customer orientation, competitor orientation, internal orientation, and innovation orientation was used as guidance for developing the scales.

We adopted measures from the literature whenever possible and followed the appropriate measurement development procedure (e.g., Anderson & Gerbing, 1988; Churchill, 1979). First, the domain of each construct was clearly defined in terms of what should be included and excluded. Second, the literature was received to set any suitable scales. If none were available or appropriate, new measures were developed. Multiple

items were used for each construct to increase reliability. All items were measured on seven-point Likert scales, anchored by “Strongly disagree” (1) to “Strongly agree” (7).

Based on previous research, 26 measures were used to capture the model. Items for strategic orientations were drawn from related studies. However, because these articles discussed issues in terms of different these, some items and wording were adapted for this study. The other measures were adapted from a variety of sources because appropriate and similar measurements were not available.

Three items were adapted to capture the construct of co-production. Based on previous research (Auh et al., 2007; Bovaird, 2007; Gruen et al., 2000; Lovelock & Young, 1979), a total of three items were developed. To assess strategic orientation, we adapted customer orientation measures developed by (Atuahene-Gima, (1996), Gauzente, (1999), Han et al. (1998), and Nwankwo, (1995); competitor orientation measures developed by Narver & Slater, (1990); interfunctional coordination measures developed by (Paladino, (2007); and innovation orientation measures developed by (Hurley & Hult, (1998).

Finally, seven demographic variables — genders, company age, respondent’s position in the company, company’s area, number of year the respondent has been working for the company, company size, and number of years the company has been cooperating with its main customers—were adopted.

TABLE 3-2-1 Measures and Items for Co-production and Innovation

Measures and Items	Sources
Co-production	Auh et al. (2007),
The customer contributes greatly to the new	Bovaird (2007),

product/service development process. Our company recognizes customers as co-producers and customer participation as very important.	Gruen et al. (2000), and Lovelock and Young (1979)
Service innovation	
Through co-production, we create a new service for customers. Through co-production, we create a new service that offers new benefits and new functions to our main customers. Through co-production, we create a new service that allows the company to enter a new market. Through co-production, we create a new service that offers newer features than those of competitors' services.	Booz et al. (1982), Cooper and Kleinschmidt (1993), Gounaris et al. (2003),
Technical innovation	
Through co-production, we create a new product that has a higher level of innovativeness than an old product. Through co-production, we create a new product that integrates new technology and new knowledge. Through co-production, we create a newer product than competitors' products.	Ha˚kansson and Laage-Hellman (1984), Ford and Saren (1996), and Ford et al. (1998)

TABLE 3-2-2 Measures and Items for Strategic Orientation

Measures and Items	Sources
Customer orientation	
We constantly monitor our level of commitment and orientation toward customers.	Atuahene-Gima (1996), Gauzente (1999), Han et al. (1998), and Nwankwo (1995)
Our market strategies are driven by our understanding of possibilities for creating value for our customers.	
Our strategy for competitive advantage is based on our understanding of our customers' needs.	
We pay close attention to after-sales service.	
Competitor orientation	
Our salespersons regularly collect information concerning competitors' activities.	Narver and Slater (1990)
We attempt to identify our competitors' strategies.	
Top management regularly discusses competitors' strengths and weaknesses.	
We rapidly respond to competitive actions that threaten us.	
We track the performance of key competitors.	
Interfunctional coordination	
We share programs and resources with other business units in the corporation.	Paladino (2007)
All of our functions, not just marketing and sales, are responsive to and integrated in serving markets.	

Information on customers is communicated across functions in a business.		
Innovation orientation		
Management actively seeks innovative ideas.		
Employees feel free to express their innovative ideas.		Hurley and
Higher management has innovative ideas.		Hult (1998)
Our company pays attention to the required resources for innovation.		

3.3 Measure Reliability and Validity

This study performed correlation analyses and reliability tests for each construct. To examine the reliability of the scales of service innovation, product innovation, co-production, and the four types of strategic orientation, we calculated the Cronbach's alphas for the scales. We obtained Cronbach's alphas of 0.74 and 0.69 for service innovation and production, respectively; 0.87 for co-production; and 0.78, 0.93, 0.81, and 0.90 for customer orientation, competitor orientation, internal orientation, and innovation orientation, respectively. Nunnally (1978) suggested acceptable alphas value of larger than 0.5. Measures are considered reliable if their Cronbach's alphas are at least 0.70, and thus, the reliability values we obtained were more than acceptable (Foreman et al., 1998), indicating a moderate to high interrelatedness among the items and consistency with their related constructs.

Moreover, the composite (construct) reliability was calculated by using the formula proposed by Hair et al. (1998). The estimates ranged from 0.70 to 0.92. As illustrated in

TABLE 3-3-1 and TABLE 3-3-2, all of the constructs had values higher than the suggested level of 0.70, indicating composited reliability.

To test the construct validity of each scale, a confirmatory factor analysis (CFA) was conducted. The fit statistics of the co-production and innovation model were $X^2 = 41.19$, $X^2/df = 1.903$, goodness-of-fit index (GFI) = 0.949, comparative fit index (CFI) = 0.972, and root mean square error of approximation (RMSEA)=0.077. The fit statistics of the four -orientations model were $X^2 = 124560, \mathrm{X}^2/df = 1.730$, GFI=0.913, CFI=0.972, and RMSEA=0.070. These statistics indicate that the two models fulfilled the requirements suggested by the literature.

Next, we examined construct validity by determining convergent and discriminant validity (Churchill, 1979) and conducting a CFA using AMOS 18. Convergent validity refers to the extent to which the measures for a variable act as if they are measuring the underlying theoretical construct because they share variance (Schwab, 1980). Convergent validity was assessed using two criteria. The first is significance level of 0.5 for each loading; and is suggested to be greater than 0.45 with accurate direction (Bentler & Wu, 1995; Joreskog & Sorbom, 1989). According to the results in TABLE 3-3-1 and TABLE 3-2-3, each loading was between 0.50 and 0.96 and at a significance level. The second is an average variance extracted (AVE) of greater than 0.5 for each latent variable (Fornell & Larcker, 1981). According to TABLE 3-3-1 and TABLE 3-3-2, each latent variable had an AVE between 0.42 and 0.71. Although the AVEs of service innovation and technical innovation were lower than 0.5, their composite reliabilities were greater than 0.6, and thus, their convergent validities were still acceptable (Fornell and& Larcker, 1981).

Discriminant validity refers to the degree to which measures of two constructs are empirically distinct (Bagozzi et al., 1991). It was assessed using a procedure suggested by Gaski and Nevin (1985) , whereby a correlation between two scales that is lower than the reliability of each of those scales is taken as proof of good discriminant validity. According to the results in TABLE 3-3-3, all of the study variables were all significantly correlated with each other, but not so highly as to suggest that they were not distinct.

TABLE 3-3-1 CFA Results for Co-production, Service Innovation, and Technical Innovation

Measures and Items	Loadings	Composite Reliability	AVE
Co-production		0.89	0.74
The customer contributes greatly to the new product/service development process.	0.95		
Our company recognizes customers as co-producers and customer participation as very important.	0.94		
Service innovation		0.734	0.42
Through co-production, we create a new service for the customer.	0.80***		
Through co-production, we create a new service that offers new benefits and new functions to our main customers.	0.62***		

Through co-production, we create a new service that allows the company to enter a new market.	0.50***		
Through co-production, we create a new service that offers newer features than those of competitors' services.	0.62***		
Technical innovation		0.699	0.44
Through co-production, we create a new product that has a higher level of innovativeness than an old product.	0.56***		
Through co-production, we create a new product that integrates new technology and new knowledge.	0.76***		
Through co-production, we create a newer product than competitors' products.	0.65***		

Fit statistics

$X^2(22) = 41.19$, $X^2/df = 1.903$, GFI = 0.949, CFI = 0.972, IFI = 0.973, TLI = 0.943, RMSEA = 0.077

TABLE 3-3-2 CFA Results for Strategic Orientations

Measures and Items	Loadings	Composite Reliability	AVE
Customer orientation		0.81	0.52
We constantly monitor our level of commitment and orientation toward customers.	0.82***		
Our market strategies are driven by our understanding of possibilities for creating value for our customers.	0.73***		
Our strategy for competitive advantage is based on our understanding of our customers' needs.	0.62***		
We pay close attention to after-sales service.	0.69***		
Competitor orientation		0.92	0.71
Our salespersons regularly collect information concerning competitors' activities.	0.92***		
We attempt to identify our competitors' strategies.	0.96***		
Top management regularly discusses competitors' strengths and weaknesses.	0.87***		
We rapidly respond to competitive actions that threaten us.	0.72***		
We track the performance of key competitors.	0.72***		
Interfunctional coordination		0.81	0.59

We share programs and resources with other business units in the corporation.	0.66***		
All of our functions, not just marketing and sales, are responsive to and integrated in serving markets.	0.82***		
Information on customers is communicated across functions in a business.	0.81***		
Innovation orientation		0.90	0.68
Management actively seeks innovative ideas.	0.88***		
Employees feel free to express their innovative ideas.	0.80***		
Higher management has innovative ideas.	0.84***		
Our company pays attention to the required resources for innovation.	0.78***		

Fit statistics

X^2 (72) = 124.560, X^2/df = 1.73, GFI = 0.913, CFI = 0.972, IFI = 0.973, TLI = 0.954, RMSEA = 0.070

TABLE 3-3-3 Correlation Matrix

	Mean	S.D.	1	2	3	4	5	6	7
1. Co- production	5.46	1.29	.86						
2. Service innovation	5.38	0.79	0.37**	0.64					
3. Technical innovation	5.37	0.85	0.24**	0.64**	0.66				
4. Customer orientation	5.96	0.67	0.27**	0.25**	0.21**	0.72			
5. Competitor orientation	5.27	1.08	0.44**	0.37**	0.35**	0.41**	0.84		
6. Interfunctional coordination	5.32	1.04	0.52**	0.27**	0.24**	0.53**	0.65**	0.77	
7. Innovation orientation	5.40	1.12	0.41**	0.33**	0.27**	0.57**	0.58**	0.65**	0.83

4. Results

4.1 Hypothesis Results

To test our hypotheses, we performed ordinary least-squares regression analysis. TABLE 4-1-1 and TABLE 4-1-2 report the standardized coefficients and associated t-statistics for all independent variables.

4.1.1 Relationship between Strategic Orientation and Co-production

The results from Model 1 to Model 4 are reported in TABLE 4-1-1. Model 1 tested the effect of customer orientation on co-production, and the results provide strong support for Hypothesis 1. Customer orientation has a positive effect on co-production (β = .255, t-statistic = 3.255, $p < .001$). The results from Model 2 (β = .429, t-statistic = 5.864, $p < .001$) also provide support for Hypothesis 2, indicating that competitor orientation is positively related to co-production. Similarly, the results from Model 3 provide support for Hypothesis 3, suggesting that interfunctional coordination has a positive effect on co-production (β = .491, t-statistic = 6.923, $p < .001$). The results from Model 4 also provide support for Hypothesis 4 (β = .393, t-statistic = 5.344, $p < .001$), showing that innovation orientation positively affects co-production.

TABLE 4-1-1 Regression Analysis Strategic Orientations and Co-production

	Co-production	Co-production	Co-production	Co-production
	Model 1	Model 2	Model 3	Model 4
Control variable				
Year	.297 (3.588)***	.291 (3.775)***	.215 (2.852)**	.279 (3.557)**
Size	-.095 (-.187)	-.097 (-1.301)	-.088 (-1.226)	-.095 (-1.254)
Length of relationship	-.107 (-1.289)	-.071 (-.917)	-.066 (-.893)	-.110 (-1.416)
Independent variable				
Customer orientation	.255 (3.235)**			
Competitor orientation		.429 (5.864)***		
Inter-functional coordination			.491 (6.923)***	
Innovation orientation				.393 (5.344)***
Analysis				
R^2	.149	.263	.315	.238
Adjusted- R^2	.125	.243	.296	.217
F-statistic	6.304***	12.854***	16.563***	11.261***

Standardized regression coefficients are reposted; t-value is in parenthesis.

$^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$

4.1.2 Relationship between Co-production and Service/Technical Innovation

The results for Hypothesis 5 and Hypothesis 6 are reported in TABLE 4-1-2. The results from Model 13 provide support for Hypothesis 13, indicating that co-production is positively related to service innovation (β = .327, t-statistic = 4.219, $p < .001$). The results from Model 14 also provide support for Hypothesis 14, suggesting that the co-production is positively related to technical innovation.

TABLE 4-1-2 Regression Analysis Results for Relationship between Co-production and Innovation

	Service innovation	Technical Innovation
	Model 5	Model 6
Control variable		
Age (Years)	.228 (2.739)**	0.252 (2.854)**
Size	-0.164 (-2.130)*	-0.052 (-.634)
Length of relationship with customers (Years)	-0.080 (-1.009)	-0.069 (-.815)
Independent variable		
Co-production	0.327 (4.219)***	0.175 (2.128)*
Analysis		
R^2	0.208	0.109
Adjusted R^2	0.186	0.084
F-statistic	9.452***	4.406**

Standardized regression coefficients are reposted; t-value is in parentheses.

$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

TABLE 4-1-3 Summary of Results for Hypothesis 1 to Hypothesis 6

Hypothesis		Result
1.	Customer orientation has a positive effect on co-production.	Supported
2.	Competitor orientation has a positive effect on co-production.	Supported
3.	Interfunctional coordination has a positive effect on co-production.	Supported
4.	Innovation orientation has a positive effect on co-production.	Supported
5.	Co-production has a significant and positive relationship with service innovation.	Supported
6.	Co-production has a significant and positive relationship with technical innovation.	Supported

4.2 Mediating Effect of Co-production on Relationship between Strategic Orientation and Service/Technical Innovation

After examining the relationships between strategic orientation, co-production, service innovation, and technical innovation, we also examined the mediating effect of co-production on those relationships. The study followed the procedures suggest by Baron and Kenny (1986). First, direct paths between strategic orientation and service innovation and technical innovation were established. Second, the mediating variable, co-production, was added to the model. According to Baron and Kenny, full mediation would occur only if (a) the direct path from strategic orientation to service innovation/technical innovation is insignificant and (b) the indirect paths through co-production are significant. Partial mediation would occur if (a) the direct path between strategic orientations and service innovation/technical innovation is significant and (b) the indirect paths through are significant.

Following the procedures by Baron and Kenny, first, we regress the dependent variables (meaning strategic orientations) on the independent variables (meaning service innovations and technical innovations). According to the results in TABLE 4-2-1 and TABLE 4-2-2, the direct path between strategic orientations and service innovation/technical innovation is significant, satisfying the first requirement of mediation. Second, we regress the mediators (meaning co-production) on the independent variables (meaning strategic orientations). According to TABLE 4-2-3, the second requirement of mediation is satisfied. To test the third step of mediation, we regressed the dependent variables on the mediating variables, with the independent variables included in the equations, according to TABLE 4-2-4 and TABLE 4-2-5, the beta weight for all strategic

orientations are significant. Next, we examined all cases in which the first three conditions of mediation had been met to ascertain whether complete or partial mediation was present. According to TABLE 4-2-4, all beta weight of strategic orientations are significant but dropped compared to the beta weight shown in TABEL 4-2-1, meaning co-production partially mediates between strategic orientations and service innovation. The result in TABLE 4-2-5 show that all beta weight of strategic orientations are significant, but compared to TABLE 4-2-2, the beta weight of Model, Model, and Model don't show significantly drop and the beta weight of Model isn't significant; therefore, the results do not fulfill the requirements suggested by the literature, indicating that co-production doesn't mediate between strategic orientations and technical innovation.

TABLE 4-2-1 Regression Analysis Strategic Orientations and Service Innovation

	Service Innovation	Service Innovation	Service Innovation	Service Innovation
	Model 7	Model 8	Model 9	Model 10
Control variable				
Year	.311(3.782)***	.307(3.912)***	.278(3.308)**	.298(3.711)***
Size	-.202(-2.529)**	-.200(-2.639)**	-.181(-2.271)*	-.196(-2.534)*
Length of relationship	-.064(-.776)	-.037(-.477)	-.073(-.882)	-.075(-.946)
Independent variable				
Customer orientation	.253(3.237)*			
Competitor orientation		.380(5.120)***		
Interfunctional coordination			.229(2.898)**	
Innovation orientation				.326(4.337)***
Analysis				
R^2	.162	.239	.151	.205
Adjusted-R^2	.139	.218	.127	.183
F-statistic	6.959***	11.334***	6.381***	9.275***

Standardized regression coefficients are reposted; t-value is in parenthesis.

$^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$

TABLE 4-2-2 Regression Analysis Strategic Orientations and Technical Innovation

	Technical Innovation	Technical Innovation	Technical Innovation	Technical Innovation
	Model 11	Model 12	Model 13	Model 14
Control variable				
Year	.298(3.542)***	.293(3.641)***	.269(3.144)**	.288(3.462)**
Size	-.089(-1.095)	-.090(-1.164)	-.073(-.895)	-.084(-1.043)
Length of relationship	-.053(-.630)	-.024(-.297)	-.059(-.702)	-.064(-.778)
Independent variable				
Customer orientation	.167(2.047)**			
Competitor orientation		.338(3.580)***		
Interfunctional coordination			.197(1.792)*	
Innovation orientation				.220(2.595)**
Analysis				
R^2	.123	.198	.188	.145
Adjusted-R^2	.098	.176	.093	.122
F-statistic	5.038***	8.881***	4.802**	6.128***

Standardized regression coefficients are reposted; t-value is in parenthesis.

$^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$

TABLE 4-2-3 Regression Analysis Strategic Orientations and Co-production

	Co-production	Co-production	Co-production	Co-production
	Model 15	Model 16	Model 17	Model 18
Control variable				
Year	.297 (3.588)***	.291 (3.775)***	.215 (2.852)**	.279 (3.557)**
Size	-.095 (-.187)	-.097 (-1.301)	-.088 (-1.226)	-.095 (-1.254)
Length of relationship	-.107 (-1.289)	-.071 (-.917)	-.066 (-.893)	-.110 (-1.416)
Independent variable				
Customer orientation	.255 (3.235)**			
Competitor orientation		.429 (5.864)***		
Interfunctional coordination			.491 (6.923)***	
Innovation orientation				.393 (5.344)***
Analysis				
R^2	.149	.263	.315	.238
Adjusted-R^2	.125	.243	.296	.217
F-statistic	6.304***	12.854***	16.563***	11.261***

Standardized regression coefficients are reposted; t-value is in parenthesis.

$^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$

TABLE 4-2-4 Mediating Effect Analysis Co-production on Strategic Orientations to Service Innovation

	Service Innovation	Service Innovation	Service Innovation	Service Innovation
	Model 19	Model 20	Model 21	Model 22
Control variable				
Year	.329 (3.900)***	.329 (3.900)***	.329 (3.900)***	.329 (3.900)***
Size	-.185 (-2.275)*	-.185 (-2.275)*	-.185 (-2.275)*	-.185 (-2.275)*
Length of relationship	-.132 (-1.600)	-.132 (-1.600)	-.132 (-1.600)	-.132 (-1.600)
Independent variable				
Customer orientation	.224 (2.921)**			
Competitor orientation		.225 (2.725)**		
Interfunctional coordination			.076 (.868)	
Innovation orientation				.251 (3.151)**
Co-production	.268 (3.419) **	.226 (2.678)**	.289 (3.218)**	.222(2.690)**
Analysis				
R^2	.253	.247	.212	.259
Adjusted-R^2	.226	.221	.185	.233
F-statistic	9.663***	9.384***	7.699***	10.017***

Standardized regression coefficients are reposted; t-value is in parenthesis.

$^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$

TABLE 4-2-5 Mediating Effect Analysis Co-production on Strategic Orientations to Technical Innovation

	Technical Innovation	Technical Innovation	Technical Innovation	Technical Innovation
	Model 23	Model 24	Model 25	Model 26
Control variable				
Year	.306 (3.527)***	.306 (3.527)***	.306 (3.527)***	.306 (3.527)***
Size	-.063 (-.762)	-.063 (-.762)	-.063 (-.762)	-.063 (-.762)
Length of relationship	-.097 (-1.148)	-.097 (-1.148)	-.097 (-1.148)	-.097 (-1.148)
Independent variable				
Customer orientation	.177 (2.142)*			
Competitor orientation		.340 (3.989)***		
Interfunctional coordination			.148 (1.591)	
Innovation orientation				.225 (2.638)**
Co-production	.128 (1.523)	.022 (.257)	.100 (1.058)	.080 (.911)
Analysis				
R^2	.137	.198	1.125	.150
Adjusted- R^2	.107	.170	.094	.121
F-statistic	4.530	7.072***	4.068	5.062***

Standardized regression coefficients are reposted; t-value is in parenthesis.

$^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$

TABLE 4-1-6 Summary of Results for Hypothesis 7 and Hypothesis 8

Hypothesis	Result
7(a) Co-production at least partially mediates the relationship between customer orientation and service innovation.	Supported
7(b) Co-production at least partially mediates the relationship between competitor orientation and service innovation.	Supported
7(c) Co-production at least partially mediates the relationship between interfunctional coordination and service innovation.	Supported
7(d) Co-production at least partially mediates the relationship between innovation orientation and service innovation.	Supported
8(a) Co-production at least partially mediates the relationship between customer orientation and technical innovation.	Not supported
8(b) Co-production at least partially mediates the relationship between competitor orientation and technical innovation.	Not supported
8(c) Co-production at least partially mediates the relationship between interfunctional coordination and technical innovation.	Not supported

8(d) Co-production at least partially mediates the relationship between innovation coordination and technical innovation.	Not supported

5. Discussion and Suggestions for Future Research

5.1 Conclusion

In this study, we identified the relationships between strategic orientation, co-production, and innovation. As we expected, the results revealed that strategic orientation has a significant and positive effect on co-production, indicating that an appropriate firm strategy can positively affect co-production.

The results provide support for Hypothesis 1, which coincides with findings in the literature. The literature indicates that customer orientation strategies aim to fulfill customer expectations, create customer satisfaction, strengthen the firm's bond with customers, and consequently, make profit for the firm (Day, 1994; Deshpande et al., 1993; Hunt & Morgan, 1995; Kotler & Armstrong, 1994; Narver & Slater, 1990). Such strategies can positively affect a firm's co-production with customers during the product or service creation process. Hypothesis 2 is also supported, which also coincides with findings in the literature. The literature shows that a competitor-oriented firm uses a strategy that recognizes its weaknesses, compares its abilities to those of competitors, and enables it to respond to competitors' actions, by co-producing with customers; during co-production, the customers offer their feedback, which can help the firm further understand its competitors. In other words, as we predicted, a competitor orientation positively affects co-production. Similarly, the results provide support for Hypothesis 3, showing that interfunctional coordination also has a significant influence on co-production. Because the various functions of the firm share customer and market information with each other, the firm effectively uses such information in co-producing with customers. The results also provide support for

Hypothesis 4 regarding the relationship between innovation orientation and co-production. Innovation can help a firm survive in a competitive market; by improving an old product or service or by introducing a new product or service to the market, the firm can prompt customers to choose its product or service over alternatives (Augusto & Coelho, 2009; Kohi & Jaworski, 1993). Through co-production with customers, a firm recognizes its weaknesses and its competitors' strengths; thus, we can say an innovation-oriented firm has a high willingness to cooperate with customers.

As we expected, Hypothesis 5 and Hypothesis 6 are supported by the results, indicating that co-production has a significant effect on service innovation and technical innovation, respectively. The finding for Hypothesis 5 coincides with those in previous research (Chen, Tsou, & Ching, 2011). Likewise, the finding for Hypothesis 6 coincides with those in the literature that the participation of diverse actors in innovation can enhance the process of technical innovation.

Meanwhile, the results establish the mediating role of co-production only in the relationship between strategic orientation and service innovation, perhaps because a special characteristic of service—it cannot be created without customers' active participation. Because of the importance of customer participation in the service delivery process, co-producing with customers can increase their interaction with the firm, provide the firm information about their needs, and consequently, enable the firm to provide them customized service.

The mediating role of co-production is not established in Hypothesis8 (a)-(d), which suggests that co-production does not mediate the relationship between strategic orientation and technical innovation. This may be because, as stated in the literature, technical innovations are innovations are "about product, service, and production process technology"

and “are related to basic work activities and can concern either product or process” (Damanpour, 1991). Because a technical orientation focuses on professional and fundamental technologies, the chances of customers giving the firm suggestions are low, regardless of whether the customers co-produce with the firm or not.

5.2 Managerial Implications

The results of this study provide several managerial implications. First, co-production plays a key role in the service creation process. Because services are intangible and service production and delivery happen at the same time, these processes cannot occur without customer participation. Co-production is defined as the degree to which the client is involved in producing and delivering service (Dabholkar, 1990: 484). The results suggest that managers should first help customers truly understand the service offered by the firm and then reinforce the feedback or communication mechanism between the firm and its customers. Service innovation can occur only if customers play an active role in the service creation and delivery process, because then, the customers can freely express their opinions and suggestions to the firm before, during, and after the service delivery.

Second, as stated by Naver and Slaster (1990), a firm’s strategic orientation provide the firm direction in developing appropriate actions for ensuring continuous superior performance. Using the appropriate strategic orientation can help co-production with customers create more effective value. The results of this study

show that customer orientation, competitor orientation, interfunctional coordination, and innovation orientation can help increase the chances of success of co-production.

5.3 Limitations and Suggestions for Further Research

We would like to acknowledge the limitations of this study. First, this study employed perceptual measures, which may lead to biases. Therefore, future research may develop alternative measures to the variables used in this study and use more objective data. Second, the sample consisted of firms from Taichung Industrial Park, and thus, is not representative of the total population. Although it is not the best way to go, but Taiwan Industrial Park have different from different sectors, raising the possibility of getting more objective data. Finally, recent studies have been paying more attention to alternative strategic orientations, including quality orientation, entrepreneurial orientation, and productivity orientation (Gatignon & Xuereb, 1997; Hurley & Hult, 1998; Marinova et al., 2008; Voss & Voss, 2000; Zhou et al., 2005). Thus, future research can examine such alternative orientations' relationships with innovation.

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