The role of service innovation in the market orientation—new service performance linkage

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1. Introduction

The contribution of market orientation to new product/service performance has been examined by a number of academics (e.g., Agarwal et al., 2003; Manzano et al., 2005; Zhou et al., 2005). However, empirical support for this contribution is still equivocal in service sectors. For example, some academics have found support for a direct contribution (e.g., Van Egeren and O’Connor, 1998; Kumar et al., 1998; Langerak, 2003), while others have failed to find support (e.g., Han et al., 1998; Sargeant and Mohamad, 1999; Caruana et al., 2003). Still others have found evidence of a mediated contribution: innovation (e.g., Matear et al., 2002). That is, market oriented service firms are inclined to produce service innovation first, which in turn leads to new service performance.

While several studies have generally agreed that the market orientation—innovation—performance relationship exists (e.g., Zhou et al., 2005), the relationship between market orientation and new service performance seems far from fully explained (Zhou et al., 2009). First, researchers have suggested that customer orientation, competitor orientation and inter-functional coordination, components of market orientation, have differential implications on firm performance. For example, some researchers (e.g., Han et al., 1998; Deshpande and Farley, 1998; Chao et al., 2007) indicate that customer orientation is perhaps the most fundamental element of market orientation to business performance, while others (e.g., Dawes, 2000; Noble et al., 2002; Sin et al., 2005) find competitor orientation to be “detrimental to profitability.” Still others (e.g., Gray et al., 1998; Dawes, 2000) find that the impact of inter-functional coordination on business performance has mixed results. Thus, clarifying why customer orientation, competitor orientation, and inter-functional coordination differ in their effects on new service performance would appear to be useful.

Second, products with a higher degree of innovation are approved to have higher sales and financial performance, leading to greater overall business performance (Gatignon and Xuereb, 1997; Zhou et al., 2005). However, the very nature of services, having a number of distinguishing features when compared to goods (e.g., co-creation with customers, Vargo and Lusch, 2008), leads to a greater need to establish credibility with customers. As such, service firms could also achieve greater business performance even through less innovative services (Atuahene-Gima, 1995; Berry et al., 2006). In this way, different types of service innovation should be studied in greater depth to see how they mediate the market orientation—innovation—performance relationship. To our knowledge, there have been few, if any, attempts to examine how different types of service innovations play this mediating role in the service context.

Finally, because one of the most notable service characteristics is direct and intense interaction between service providers and customers (Ramani and Kumar, 2008), it is assumed that research on market orientation in the context of service should be more abundant than that in the products sector. However, with notable exceptions of Han et al. (1998) and Matear et al. (2002), relatively few studies have explicitly examined this relationship in the service sector.
To fill this gap, this study uses a component-wise approach (Li and Calanton, 1998) to examine (1) the degree to which market orientation directly contributes to new service performance and (2) how three components of market orientation contribute to two types of service innovations, and in turn lead to new service performance. By doing so, this study contributes to literature in the following ways. First, this study assesses how market orientation drives service innovation, which is still an unresolved topic (Sin et al., 2005). If the examination of causal effects among the elements of market orientation and their indirect influences on new service performance can contribute to identifying empirical regularities or reconciling inconsistencies in the relationship between market orientation and performance, the level of confidence in market orientation would be advanced theoretically and empirically.

Second, this study provides new insights by dismantling market orientation and service innovation to more deeply understand the effects of underlying market orientation components on two types of service innovations, a focus that has received little empirical assessment (Tsiotsoo, 2010) and that addresses Han et al. (1998). Specifically, Han et al. (1998) use a component-wise approach to examine the effects of three market orientation components on two organizational innovations, which lead to organizational performance. However, the interplay between market orientation and innovation is not yet well-understood (Han et al., 1998; Noble et al., 2002) and this is particularly true in explaining service innovation (Tsiotsoo, 2010). As indicated by Han et al. (1998, p. 41), “formulating an innovation strategy to complement the firm’s market orientation strategy should provide a more coherent and comprehensive road map for organizations to follow.”

Finally, previous studies regarding market orientation and service innovation have focused mainly on a specific sector, such as banking (Han et al., 1998), retailing (Chang and Chen, 1998), hotel (Zhou et al., 2009), or insurance sectors (Lado and Maydeu-Olivares, 2001). This study covers multiple service sectors.

The remainder of this article is structured as follows. This study begins by reviewing two types of service innovations, incremental and radical service innovation, and the market orientation–innovation–performance relationship. Based on this review, research hypotheses are developed. Next, the study’s sample of 235 respondents is described and the relationships among the constructs are assessed. Finally, analyses of field data and the implications of the findings are discussed.

2. Research model and hypotheses

As proposed by Li and Calanton (1998), each component of market orientation has its own locus of interest and each involves different cognitive activities. Thus, like other similar studies (e.g., Gatignon and Xuereb, 1997; Han et al., 1998; Lukas and Ferrell, 2000), this study uses a component-wise approach to examine the links between market orientation, service innovation, and new service performance. Fig. 1 provides an overview of the relationships to be tested.

2.1. Service innovation: incremental and radical service innovations

The degree of service innovation ranges from a totally new or discontinuous innovation to a service involving a minor adaptation or improvement of an incremental nature (Griffin, 1997; Avlonitis et al., 2001; Garcia and Calantone, 2002). Several service innovation types have been proposed (Gadrey et al., 1995; Debackere et al., 1998; Avlonitis et al., 2001; Berry et al., 2006; Paswan et al., 2009), but because this study is concerned with the greatest and least degree of service innovation, we differentiated service innovation into incremental and radical innovation. Such a differentiation has been frequently used in similar innovation research (Olsen and Sallis, 2006; Min et al., 2006; Song and Thieme, 2009).

Incremental service innovation is related to customer-led strategies that focus on manifest needs (Connor, 1999; Slater and Narver, 1999) and is posited to be the most common form of innovation (Bell et al., 2002; Slater and Narver, 1998,1999). In addition, the development of incremental service innovation tends to limit the range of potential service innovation, because it relies on customers’ current view of the service market (Becheikh et al., 2006). On the other hand, radical service innovation is defined as fundamental changes in new services that represent revolutionary changes in service benefits (Berry et al., 2006; Hertog, 2000; Nijssen et al., 2005). To sum up, incremental service innovation describes a new value creation through the incremental addition of existing values, while radical service innovation creates brand new values through innovative concepts.

2.2. Service innovation and new service performance

The innovation literature has indicated that a formidable relationship exists between service innovation and new service performance (e.g., Song et al., 2009; Crawford and Di Benedetto, 2007; Avlonitis et al., 2001). It is argued that service innovation is not an end unto itself. Rather, its value is in the facilitation and generation of outcomes that benefit new service performance regardless of financial rewards or market positions (Wind and Vijay, 1997; Benner and Tushman, 2003). Specifically, the way for service innovation to contribute to new service performance is through new benefits to existing customers, creation of new markets through an incremental addition of existing service values, or radical creation of brand new service values. In other words, service innovation, regardless of whether it is incremental

![Fig. 1. Research framework.](image-url)
or radical, is able to contribute significantly to new service profitability in terms of financial or market perspectives. Thus, the implementation of service innovation will have an impact on new service performance. Therefore, this study hypothesizes:

**H1.** Service innovation has a positive impact on new service performance.

### 2.3. Market orientation and service innovation

Market orientation has been studied primarily as a determinant of firm performance (Dawes, 2000; Matear et al., 2002) and innovation (Agarwal et al., 2003; Manzano et al., 2005). A significant number of studies indicate that a market-oriented firm generates superior service innovation and new service performance (e.g., Augusto and Coelho, 2009; Song et al., 2009; Tsotso, 2010). This is because a market-oriented firm can keep existing customers satisfied and loyal, attract new customers, accomplish the desired level of growth and market share and, as a result, achieve desirable levels of firm performance. On the one hand, empirical support for market orientation making a direct contribution to new service performance is subject to the extent of its influence on service innovation efforts (Agarwal et al., 2003; Manzano et al., 2005; Augusto and Coelho, 2009; Song et al., 2009). On the other hand, studies find evidence of a mediating contribution, service innovation, implying that market orientation cannot make a direct impact on firm performance without service innovation (Tsotso, 2010). Thus, inconsistent findings have been reported regarding the market orientation-new service performance relationship. In an extensive review of related literature, 68 percent of the studies investigating a direct relationship between these two constructs reported positive effects, 30 percent of studies found no effects, while others indicated negative effects (Langerak et al., 2004). On balance, it would seem that consensus on either direct or indirect relationships between market orientation and new service performance has not yet been reached. Therefore the following hypotheses are developed:

**H2a.** Market orientation makes a significant and direct impact on new service performance.

**H2b.** The impact of market orientation on new service performance is mediated by service innovation.

### 2.4. Customer orientation and service innovation

Based on the widely used framework proposed by Narver and Slater (1990), this study uses customer orientation, competitor orientation, and inter-functional coordination as three components of market orientation. Most authors agree that multidimensional market orientation has exhibited a satisfactory fit in a three-factor confirmatory factory analysis (e.g., Kirca et al., 2005; Ward et al., 2006; Zhou et al., 2007).

Customer orientation refers to the collection of intelligence about customers to satisfy their needs and desires (Day, 1994; Deshpande et al., 1993; Hunt and Morgan, 1995). The debate as to the effect of customer orientation on innovation is still unresolved (Christensen et al., 2005; Lukas and Ferrell, 2000). A number of authors argue that an over-reliance on customer feedback impacts negatively on the degree of innovation (Christensen et al., 2005; Christensen, 1997). For example, Christensen (1997) argues that many large organizations fail because “they listen too carefully to their customers and customers place stringent limits on the strategies firms can and cannot pursue”. The notion is that customers do not know how their needs will evolve and how certain technologies may have an impact on the satisfaction of their needs. Thus, based on customer feedback, managers are forced into developing new services that are similar to existing ones. In addition, due to service characteristics (e.g., intensely interact with customers, Ramani and Kumar, 2008), customer oriented service firms may focus mainly on current customers needs and unknowingly ignore potential needs of the current customer. In summary, this study predicts that in the service context customer oriented service firms are more inclined to develop incremental service innovation than radical service innovation. Thus:

**H3.** Customer orientation is (a) significantly and positively associated with incremental service innovation and (b) insignificantly associated with radical service innovation.

### 2.5. Competitor orientation and service innovation

Competitor orientation refers to a firm’s ability to identify, analyze, and respond to competitors’ actions (Khohi and Jaworski, 1990). The debate as to the effect of competitor orientation on innovation is again not resolved as of yet (Lukas and Ferrell, 2000). Generally, to imitate competitors’ new services can be regarded as an attractive source of service innovation, leading to minimizing risks and development costs. This implies that competitor oriented service firms would be intended to develop incremental service innovation and preclude radical service innovation development. Some researchers agree that competitor orientation is a central source of imitation and results in a negative impact on radical innovation (Lukas and Ferrell, 2000). This because focusing too much on competitors will deflect attention from changes in market segment structures and as a result reduces the development of radical innovative abilities (Day and Wensley, 1998; Zhou et al., 2007). Other researchers (e.g., Lukas and Ferrell, 2000) also concur with the argument that a competitor oriented firm is negatively related with the development of radical innovation. Therefore, this study suggests that:

**H4.** Competitor orientation is (a) significantly and positively associated with incremental service innovation and (b) insignificantly associated with radical service innovation.

### 2.6. Inter-functional coordination and service innovation

Inter-functional coordination refers to the degree to which firms’ cooperation between different functions or departments is involved in conducting specific tasks associated with new service development (Narver and Slater, 1990). It can facilitate the generation, collection, and dissemination of market intelligence pertaining to new service development across functional areas (Auh and Menguc, 2005). In addition, it involves sharing of new ideas, resolution of problems, and innovative responsiveness (Gatignon and Xuereb, 1997; Han et al., 1998). Thus, it is often associated with a positive effect on radical innovation because it facilitates dissemination of novel market information and enhances problem solving (Gatignon and Xuereb, 1997). Some studies (e.g., Lukas and Ferrell, 2000) may disagree with this, however, because inter-functional coordination involves the accommodation of disparate views. Very innovative ideas may lose their innovativeness in consequence of the compromises that are undertaken under these coordination efforts. However, in the service context, inter-functional coordination can exist in the share of market information that is crucial for substantially new service development (Henard and Szymanski, 2001; Im and Workman, 2004). Thus, the positive contribution of inter-functional coordination to radical service innovation is expected to exceed its negative contribution. Therefore, this study hypothesizes:

**H5.** Inter-functional coordination is (a) insignificantly associated with incremental service innovation and (b) significantly and positively associated with radical service innovation.
3. Research methods

3.1. Sampling and data collection

Consistent with previous research (e.g., Gatignon and Xuereb, 1997; Zhou et al., 2009), data was drawn from the Top 500 Taiwanese Service Firms in terms of total revenue (CommonWealth Magazine, 2008; China Credit Information Service, 2009). As in similar studies on innovation and new service performance (e.g., Zhou et al., 2005; Avlonitis et al., 2001), respondents were selected at the business unit level. In addition, because it has been determined that senior managers take responsibility for the development of new services and make decisions of market orientation (Narver et al., 2004), they were selected as key respondents. Based on these criteria, each unit was requested to provide the name of a senior manager who was responsible for its units. Accordingly, the names of 5279 senior executive managers of business units were obtained.

To check whether each business unit has performed both incremental and radical new services, a copy of this description of incremental and radical new services (adapted from Baker and Sinkula (2007), Appendix A) was then sent to the business units, asking whether they have introduced at least five new services over the last three years for both radical and incremental new services, respectively. Consequently, 1097 business units introducing both incremental and radical new services were identified. Using Dillman’s (2000) total design method for mail surveys, a total of 1097 questionnaires were mailed along with prepaid postage-paid envelopes and a cover letter explaining the purpose of the study.

It is important to note that before filling in questions regarding service innovation types, respondents were asked to read two innovation types (the same description as in the Appendix A). They were then asked to rate each innovation type. Reminder letters were sent after three weeks. This procedure yielded 235 usable questionnaires and resulted in a response rate of 21.4%. The sample represents six service sectors: information services (18%), financial services (23%), tourism and travel services (21%), technical and scientific services (15%), entertainment and recreation services (17.5%), and others (5.5%). The annual sectors’ sales figures ranged from $40.3 million to $48.4 billion U.S. dollars and the number of business unit employees varied between 221 and 30,500, but 78.2% of units were more than 500 employees.

3.2. Questionnaire development

A questionnaire was developed over several stages. First, scale items were adopted from previously similar research (Narver and Slater, 1990; Avlonitis et al., 2001; Matear et al., 2002; de Brentani and Kleinschmidt, 2004; Han et al., 1998; Citrin et al., 2007; Zhou et al., 2005) and adapted to this study where needed. Second, since all items were originally written in English, a double-translation method was used to translate them into Chinese to ensure conceptual equivalence (Hoskisson et al., 2000; Song and Parry, 1996). Third, to assess the quality of the measured items, a pilot test was performed. The scale was tested using a sample of 42 senior managers with work experience in the service industry. Based on their feedback, a few concerns were raised and adjustments were made in terms of wording and format. As a result, the final questionnaire contained 36 items that were measured on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree). Details of these scales are shown in the Appendix A.

3.3. Measures

Market orientation adopted from Narver and Slater (1990) refers to “the organizational culture that most effectively and efficiently creates the necessary behavior for the creation of superior value for buyers and thus, continuous superior performance for the business” (Narver and Slater, 1990, p. 27). The Narver and Slater (1990) and Paladino (2007) scale was adopted because it is broad in scope and captures an orientation rather than specific processes and procedures. In addition, their scale has been recommended as a more appropriate measurement instrument when studying market orientation across different populations, because it provides consistent across-group results (Mavondo and Farrell, 2000; Zhou et al., 2007). Furthermore, shorter versions of market orientation scale have been widely used (Agarwal et al., 2001; Ward et al., 2006; Paladino, 2007) without diminishing the validity and reliability of the measure. Thus, market orientation was measured with 14 items adopted from Paladino (2007), including three main concepts: competitor orientation, customer orientation, and inter-functional coordination.

Incremental and radical service innovations were measured with three items respectively adapted from Avlonitis et al. (2001). Radical service innovation is defined as revolutionary changes in service offerings. Revolutionary changes in service offerings refer to new service that has the abilities to produce entirely new service features or dramatically change the marketplace. Without these characteristics, the data were classified as incremental service innovation.

New service performance was assessed by both market and financial performance, adapted from Matear et al. (2002) and de Brentani and Kleinschmidt (2004). As innovation researchers recommend (e.g., Henard and Szymanski, 2001; Zhou et al., 2005), this study used multiple measures to assess different perspectives of new service performance, including market measures and financial measures. Specifically, market performance was considered because Zhou et al. (2007) recommend that when assessing market orientation, market performance should be emphasized. As for the financial performance, all items were self-reported by asking respondents to rate their business unit’s performance compared with that of their direct competitors. The use of subjective performance measures was intended to overcome difficulties with asking respondents to reveal sensitive information (Atuahene-Gima and Ko, 2001; Im and Workman, 2004). In addition, the relative method was used to overcome difficulties in comparing different sectors and sizes of business units (Van Egeren and O’Connor, 1998). Both approaches have been widely used in similar research (e.g., Matear et al., 2002; Han et al., 1998).

Finally, to account for the effects of extraneous variables, business unit size was viewed as a control variable. Following previous similar research (e.g., Menguc et al., 2007), the log transformation of the number of full-time employees was used to measure firm size, as there is a widespread belief that a positive relationship exists between company size and innovation (Wagner and Hansen, 2005; Shefer and Frenkel, 2005). In addition, market turbulence, technological turbulence, and competitive intensity (adapted from Han et al., 1998; Citrin et al., 2007; Zhou et al., 2005) were viewed as control variables because the effects of these variables on innovation related performance have been documented (Chandy and Tellis, 1998; Zhou et al., 2005).

3.4. Non-response bias and common method bias

Because non-respondents have been found to resemble late respondents (Armstrong and Overton, 1977), non-response bias was assessed by comparing early and late respondents (responses received after a reminder mailing, 37.2%) in terms of the means of all items. Using t-test methodology, the results show that there is no significant difference between these two groups, indicating no systematic differences were found between early and late respondents.

In addition, because the data of dependent and independent constructs were measured by the same method, there is a potential for common method bias (Podsakoff et al., 2003). If common
method bias exists, a CFA containing all constructs should produce a single method factor (Podsakoff and Organ, 1986). The goodness-of-fit indices ($\chi^2$/d.f. = 23.5, RMSEA = .35, CFI = .54, NFI = .41, PNFI = .32) indicate a poor fit for the single factor model, which suggests that biasing from common method variance is unlikely. In addition, as in previous similar studies (e.g., Atuahene-Gima et al., 2005), this study also examined this potential problem by running Harman’s one-factor test, where all the variables in this study were simultaneously entered into an exploratory (principal components) factor analysis with no rotation (Burnett et al., 2005). The results show that 10 factors were extracted with eigenvalues greater than 1, accounting for 74.38%. Not a single factor emerged that could account for the majority of the covariance in the measures, suggesting no common method variance occurred.

4. Analyses and results

4.1. Validation of measures

A combination of SPSS 15 and AMOS 7 software packages was used to carry out all the data analyses. This study first examined the univariate skewness and kurtosis of the variables and found that the figures are within acceptable levels. Next, this study performed the Kaiser–Meyer–Olkin (KMO) and Bartlett’s test because both methods have been widely used in previous studies to ensure that the data have inherent sufficient correlations to perform exploratory factor analysis (EFA) (Chu and Murrmann, 2006). The results show that the KMO index is .907, and Bartlett’s test of sphericity is significant ($p < .001$), both of which justify the use of EFA.

To understand the factor structure and the measurement quality, a principal component analysis was conducted with varimax rotation, and an evaluation of the eigenvalues was used to identify the number of factors to retain. Following the suggestions of Hair et al. (2006), an item was removed if (1) the factor loading is lower than 5, (2) an item loads in two different factors at the same time, and (3) the item does not load in a group that it belongs to so this study dropped these items. Throughout this process, a seven-factor with separate solutions is loaded as expected. Thus, these results indicate the unidimensionality of the various constructs.

The reliability was then measured and the results indicate that the Cronbach’s alpha values for three dimensions of market orientation, incremental and radical service innovations, and market and financial performances are well above the threshold value of .7 that Nunnally (1978) recommended (from .83 to .92, see Appendix A).

4.2. Measurement models

This study further evaluated measurement properties by running confirmatory factor analysis (CFA). Following similar studies (Baker and Sinkula, 1999; Hult et al., 2004), this study divided the variables into three related groups: the three components of market orientation, the two service innovation types, and the two new service performance measures. Each item was set to load only on its respective latent construct, and the latent constructs were allowed to be correlated.

The results indicate that the measurement model fit the data satisfactorily ($\chi^2$/d.f. = 1.32, RMSEA = .05, CFI = .92, NFI = .95, PNFI = .76). Following the same procedure, the two service innovation types fit the data satisfactorily ($\chi^2$/d.f. = 1.94, RMSEA = .07, CFI = .91, NFI = .92, PNFI = .81) and the two new service performance measures were also represented satisfactorily ($\chi^2$/d.f. = 1.46, RMSEA = .05, CFI = .94, NFI = .97, PNFI = .87). However, one item in the construct of customer orientation was dropped due to low and insignificant factor loading (.27), as compared to the suggested .45 threshold (Joreskog and Sorbom, 1993). The remaining indicators are significant ($p < .01$) and well above the recommended level (from .62 to .91). These results suggest this study’s constructs possess unidimensionality (Joreskog and Sorbom, 1993).

4.3. Convergent and discriminant validity

After establishing the construct unidimensionality, this study proceeded to examine construct convergent and discriminant validity. Composite reliability is an indicator of shared variance among the set of observed variables used as indicators of a latent construct (Fornell and Larcker, 1981; Kandemir et al., 2006). As shown in the Appendix, the composite reliabilities of all constructs exceed the usual .60 benchmark, ranging from .80 to .91 (Bagus and Yi, 1988). The results show the necessary evidence that all the constructs exhibit convergent validity.

This study then examined discriminant validity using a procedure suggested by Fornell and Larcker (1981), which has been widely used by other studies (e.g., Kandemir et al., 2006). This study computed the average variance extracted by the indicators corresponding to each of the 10 factors and compared it with the variance that each factor shared with the other factors in the model. The results in Table 1 indicate that all the diagonal elements representing the square root of the average variance extracted are greater than the highest shared variance (the off-diagonal correlations).

Apart from Fornell and Larcker’s procedure, this study also examined discriminant validity using an alternative approach that Anderson and Gerbing (1988) recommended. The chi-square values for the unconstrained models, which allowed each pair of constructs to co-vary freely, were always significantly lower than those of the constrained models, which constrained the estimated correlation for each pair of estimated constructs to one. In this study, the value of the unconstrained model is significantly lower than that of the constrained model in all cases (For example, for the pair of constructs, market orientation and service innovation, the unconstrained model had a chi-square of 35.2 and the constrained model had a chi-square of 122.5. The chi-square difference is significant at $p < .001$). As both approaches’ criteria are satisfied, an inference error of multicollinearity is unlikely (Grewal et al., 2004). Accordingly, the measurement model fits the data satisfactorily and exhibits unidimensionality, convergent and discriminant validity.

4.4. Hypotheses testing

After the preliminary analyses, structural equation modeling with maximum likelihood estimation was used to test the structural model. Market orientation is the exogenous construct, with service innovation as intermediate endogenous constructs, and new service performance as endogenous outcomes. The model links control variables to new service performance.

This study examined the second-order factor structure by performing a one-factor CFA on the average scores of each first-order construct, respectively (Jayachandran et al., 2005; Ramani and Kumar, 2008). The result reveals that the hypothesized (partial mediating) model fits well with the observed data ($\chi^2$/d.f. = 1.91, RMSEA = .08, CFI = .91, NFI = .92, PNFI = .74) and the indices are above the desired level recommended by Bentler (1990).

In the specification of the structural model, the residuals of the mediator may covary (Preacher and Hayes, 2008). Bootstrapping enables the computation of the unstandardized estimates of the direct effects, 95% bias-corrected confidence intervals, and p-values. As Table 2 shows, service innovation is positively associated with new service performance ($\beta = .43, p < .001$), in support of Hypothesis 1. Market orientation is significantly
related to new service performance ($\beta=.21, p < .01$), in support of Hypothesis 2a.

4.5. The second-order mediating effects

The investigation of the mediated effects associated with service innovation relies on Preacher and Hayes’s approach (Preacher and Hayes, 2008,2004; Preacher et al., 2007). The mediated effect of a variable represents the ability of that variable to mediate the effect of an independent variable on a dependent variable when the model includes further mediators. Therefore, employing a series of mediation analysis across the causal steps proposed by Baron and Kenny (1986) is critical. Summing separately calculated, specific mediated effects cannot reveal the accurate total mediated effect, because the separate effects may be due to several (correlated) mediators. Thus, this study uses Preacher and Hayes’s (2008) application of the Sobel test to investigate the specific mediated effects of multiple mediators.

Preacher and Hayes’s (2008) propositions for investigating mediation are based on bootstrapping procedures with the observed variables. Thus, this approach cannot account for measurement error, as SEM does. Their application instead can quantify specific indirect effects associated with each mediator, which currently is not possible in AMOS. Therefore, we used regression-based factor scores as the data pertaining to market orientation, service innovation, and new service performance. The results in Table 2 show that the proposed model accounted for 47% of the variance in new service performance. The total effect of market orientation and service innovation on new service performance is $\beta=.36$ and $\beta=.43$, respectively. All direct and indirect effects are statistically significant ($p < .01$). Particularly, the indirect effect of market orientation on new service performance through service innovation (.15) offers support for Hypotheses 2b. Thus, service innovation mediates the relationship between market orientation and new service performance.

4.6. The first-order structural model

This study then examined the first-order structural model to test the remaining hypotheses. The hypothesized model exhibited a good fit with the data ($\chi^2$/d.f. = 1.49, RMSEA = .05, CFI = .92, NNFI = .93, PNFI = .70). According to the results, customer orientation is positively and significantly related to incremental innovation ($\beta=.32, p < .01$) and insignificantly related to radical

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Table 1
Basic descriptive statistics, correlation matrix, and the square root of the AVE.

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<td>.08</td>
<td>.08</td>
</tr>
<tr>
<td>8 market turbulence</td>
<td>4.52</td>
<td>.65</td>
<td>.65</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
<td>.08</td>
<td>.08</td>
<td>.08</td>
<td>.08</td>
<td>.08</td>
<td>.08</td>
</tr>
<tr>
<td>9 technological turbulence</td>
<td>4.49</td>
<td>1.02</td>
<td>1.02</td>
<td>.23</td>
<td>.23</td>
<td>.23</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
</tr>
<tr>
<td>10 competitive intensity</td>
<td>4.65</td>
<td>.71</td>
<td>.71</td>
<td>.09</td>
<td>.09</td>
<td>.09</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
</tr>
<tr>
<td>11 business unit size</td>
<td>4.62</td>
<td>1.17</td>
<td>1.17</td>
<td>.16</td>
<td>.16</td>
<td>.16</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
</tr>
</tbody>
</table>

S.D.: standard deviation, N = 235.

Bold figures on the diagonal are the square root of the AVE (average variance extracted).

* $p < .05$.

** $p < .01$.

Table 2
Direct, indirect, and total effect of of the first- and second-order constructs of market orientation, service innovation, and new service performance.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Service innovation</td>
<td>New service performance</td>
<td>Service innovation</td>
</tr>
<tr>
<td></td>
<td>Incremental</td>
<td>Radical</td>
<td>Market</td>
</tr>
<tr>
<td>1 order Market orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd order Customer orientation</td>
<td>.32**</td>
<td>.09</td>
<td>.28</td>
</tr>
<tr>
<td>2nd order Competitor orientation</td>
<td>.03</td>
<td>.25</td>
<td>.36</td>
</tr>
<tr>
<td>2nd order Inter-functional coordination</td>
<td>.08</td>
<td>.34</td>
<td>.32</td>
</tr>
<tr>
<td>1 order Service innovation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd order Incremental service innovation</td>
<td>N/A</td>
<td>N/A</td>
<td>.41**</td>
</tr>
<tr>
<td>2nd order Radical service innovation</td>
<td>N/A</td>
<td>N/A</td>
<td>.47**</td>
</tr>
</tbody>
</table>
innovation ($\beta=.09$). However, competitor orientation fails to be significantly related to incremental innovation ($\beta=.03$) but significantly and positively related to radical innovation ($\beta=.25$, $p < .05$). Meanwhile, inter-functional coordination is positively and significantly related to radical innovation ($\beta=.34$, $p < .01$) and insignificantly associated with incremental innovation ($\beta=.08$). Finally, this study assessed the model with the four control variables. The control variables do not influence the two dimensions of new service performance.

4.7 The first-order mediating effects

Following the same procedures as shown in the second-order mediating effects, this study examined the mediating effects of the first-order structural model. Table 3 suggests that both customer orientation (both $p < .05$) and inter-functional coordination (both $p < .01$) significantly affects market and financial of new service performance, while competitor orientation fails to affect both dimensions of new service performance. Overall, Hypotheses 3a, 4b, and 5b are supported. Thus, incremental service innovation is a partial mediator between customer orientation and new service performance. Radical service innovation is a full mediator between competitor orientation and new service performance, while it acts as a partial mediator between inter-functional coordination and new service performance.

5. Discussion and conclusion

5.1. Discussion

The results show that there is a significantly positive relationship between customer orientation and incremental service innovation, which, in turn, leads to new service innovation. Specifically, this study found that customer orientation is the only direct impact on incremental service innovation exhibiting a strong effect ($\beta=.32$). The finding concurs with previous studies that customer orientation leads to incremental innovation (Christensen, 1997; Gatignon and Xuereb, 1997). This finding also signifies the importance of customer orientation as a distinct element of market orientation in developing incremental innovation.

In contrast, both competitor orientation and inter-functional coordination are significantly associated with radical service innovation. The evidence is somewhat different from the innovation literature. Specifically, this study finds an unexpected result of no significant relationship between competitor orientation and incremental service innovation. On the contrary, the impact of competitor orientation on new service performance is fully mediated by radical service innovation. While we can only speculate at this point, it is possible that since new services have been easily imitated by competitors (Berry et al., 2006), service firms are forced to develop new services that are radically different from existing service offerings in order to outperform these competitors. Further research may provide a fuller understanding of this result.

Meanwhile, the indirect effect of inter-functional coordination through radical service innovation on new service performance is larger ($\beta=.34$) than that of competitor orientation ($\beta=.25$). In addition, competitor orientation and inter-functional coordination explained a large portion of the variance on radical service innovation. Thus, in order to enhance radical innovation, a service firm needs to increase its competitor orientation and inter-functional coordination.

Finally, the findings also indicate that the proposed model is superior to previous models explaining the linkage between market orientation and innovation performance. As this study reveals, when tested against rival models, the partial mediating models almost outperform other competing models (except competitor orientation) by exhibiting much better $R^2$. Thus, the findings suggest that a component-wise approach is more appropriate for a better explanation of how market orientation contributes to innovation performance.

5.2. Conclusion

This study uses a component-wise approach to examine a mechanism where three components of market orientation contribute to new service performance by a mediating effect of two

<table>
<thead>
<tr>
<th>Direct effect</th>
<th>Service innovation</th>
<th>Effect CI high</th>
<th>CI low</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st order</td>
<td>Market orientation</td>
<td>Incremental service innovation</td>
<td>.38***</td>
<td>.03</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>Customer orientation</td>
<td>Incremental service innovation</td>
<td>.32***</td>
<td>.05</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>Customer orientation</td>
<td>Radical service innovation</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Competitor orientation</td>
<td>Competitor orientation</td>
<td>Incremental service innovation</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Inter-functional coordination</td>
<td>Inter-functional coordination</td>
<td>Incremental service innovation</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Inter-functional coordination</td>
<td>Inter-functional coordination</td>
<td>Radical service innovation</td>
<td>.34**</td>
<td>.04</td>
</tr>
<tr>
<td>2nd order</td>
<td>Market orientation</td>
<td>New service performance</td>
<td>.21*</td>
<td>.09</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>Customer orientation</td>
<td>Market performance</td>
<td>.28*</td>
<td>.08</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>Customer orientation</td>
<td>Financial performance</td>
<td>.22*</td>
<td>.09</td>
</tr>
<tr>
<td>Competitor orientation</td>
<td>Competitor orientation</td>
<td>Market performance</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Inter-functional coordination</td>
<td>Inter-functional coordination</td>
<td>Market performance</td>
<td>.32**</td>
<td>.07</td>
</tr>
<tr>
<td>Inter-functional coordination</td>
<td>Inter-functional coordination</td>
<td>Financial performance</td>
<td>.35**</td>
<td>.05</td>
</tr>
<tr>
<td>1st order</td>
<td>Service innovation</td>
<td>New service performance</td>
<td>.43***</td>
<td>.03</td>
</tr>
<tr>
<td>Incremental service innovation</td>
<td>Incremental service innovation</td>
<td>Market performance</td>
<td>.41***</td>
<td>.04</td>
</tr>
<tr>
<td>Incremental service innovation</td>
<td>Incremental service innovation</td>
<td>Financial performance</td>
<td>.49***</td>
<td>.03</td>
</tr>
<tr>
<td>2nd order</td>
<td>Radical service innovation</td>
<td>Market performance</td>
<td>.47***</td>
<td>.03</td>
</tr>
<tr>
<td>Radical service innovation</td>
<td>Radical service innovation</td>
<td>Financial performance</td>
<td>.39***</td>
<td>.05</td>
</tr>
</tbody>
</table>

n.s. = not significant.

* $p < .05$.
** $p < .01$.
*** $p < .001$. 

Table 3

Direct effects of the first- and second-order constructs of market orientation, service innovation, and new service performance (Bootstrap results).
different service innovations. Survey results of 235 service business units indicate support for most of the hypothesized relationship. Specifically, customer orientation is an indirect determinant of new service performance through a mediator of incremental service innovation, while inter-functional coordination and competitor orientation are indirectly related to new service innovation through the other mediator of radical service innovation. Thus, service innovation acts as a mediator in the relationship between three market orientation components and new service performance. These mediating effects are more complex than the direct relationships of the market orientation components on innovation performance previously assumed.

5.3. Theoretical implications

Several implications to academic research are noteworthy. First, the findings add to the market orientation literature by uncovering the underlying process through which service innovation affects new service performance. For example, previous studies suggest that customer and competitor orientations are two distinct aspects of market orientation (e.g., Lukas and Ferrell, 2000) and some have posited that a competitor orientation can even be antithetical to customer orientation (e.g., Deshpande et al., 1993). Examination of the market orientation-service innovation link reveals why this situation may occur. The results suggest that customer orientation seems to be the main factor for achieving incremental innovations in the service industry. On the other hand, competitor orientation and inter-functional coordination have a positive impact on radical innovation and no significant influence on incremental innovation. Therefore, these results explain why customer and competitor orientations can be antithetical to each other, and enrich the market orientation literature by revealing how market orientation affects performance (Hult et al., 2004).

Second, the findings suggest that each component of market orientation has a significantly indirect effect on new service performance. In other words, their effectiveness seems to operate via the medium of service innovation. This result confirms the claim that the impact of market orientation on new service performance is mediated by service innovation (Matear et al., 2002). This result also provides a possible explanation as to why previous studies have indicated that there is no direct effect of competitor orientation and inter-functional coordination on innovation performance (Sin et al., 2005; Tsiotsou, 2010).

Finally, from a methodological perspective, although the use of the component-wise approach is not completely novel in the literature (Gatignon and Xuereb, 1997), the causal models among the market orientation components and their indirect effects on new service performance suggest that all components should be performed in a distinct role when service firms implement the marketing concept.

5.4. Managerial implications

First, this study highlights the importance of managerial emphasis on the creation of a market-oriented business environment and encouragement of innovative activities. Given that market orientation helps managers to be more connected to the business environment (e.g., focuses of customers and competitors), such dimensions of market orientation appear to play an important role in allowing service industry firms to devise innovative solutions to business problems. Second, management should plan and implement radical innovation within the framework of competitor orientation and inter-functional coordination. Third, having innovative activities in market orientation may be very important when customers’ preferences and industrial compositions are changing rapidly. This is because such conditions can force service firms to innovate their services more often than when they operate in a stable market.

Fourth, the process for implementing the marketing concept is clarified when managers are required to engage in behaviors following a specific sequence. For example, customer orientation should be regarded as the starting point in introducing incremental service innovation to a firm. Gathering market intelligence on competitors’ actions is the first step for creating radical service innovation. As well, inter-functional coordination is an initial point of radical service innovation. Finally, market-oriented firms must fully understand the benefits and limitations of each component of market orientation to achieve new service performance.

To sum up, the causal model proposed in this study provides new directions for strategic managers and assists marketing managers in gaining a better understanding of the marketing concept and its implementation for accomplishing innovation performance.

5.5. Limitations and future research

As with most research, the design of this study is subject to limitations that open up opportunities for future research. First, single informant bias could be a concern as only senior executive managers completed the survey instrument. Future research could attempt to avoid such concerns by recruiting multiple informants such as new service development managers, marketing managers, operations managers or sales managers. Second, this study is primarily based on the subjective assessment of the key informant, so the evaluation of the firm’s new service performance is inclined toward subjective biases. Future research that collects a diversity of viewpoints (e.g., objective data) can potentially overcome such biases. Third, although the sample for this study is drawn from a wide range of service sectors, the applicability of these findings to other industries should be considered with caution. Generalizations to other service firms (e.g., small or medium size) should also be made with caution. Fourth, this study focuses on the mediating process of market orientation–innovation–performance relationships. Further research could examine the boundary conditions of market orientation. For example, the role of customer orientation may be particularly salient in interaction-based service sectors (e.g., life insurance), while competitor orientation may be significant in self-service technology areas (e.g., online sales). Finally, this study was conducted in Taiwan where there may be a higher inclination toward the service industry than many other countries. Replication of this research in other countries should help to verify the applicability of the results of this study for other parts of the world.

Appendix A

See Table A1.
Table A1

Overall model: \( \chi^2/d.f. = 1.49, \) RMSEA = .05, CFI = .92, NNFI = .93, PNFI = .70

<table>
<thead>
<tr>
<th>Competitor orientation (adopted from Narver and Slater, 1990; Paladino, 2007)</th>
<th>Factor loading</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our salespeople regularly share information within our business concerning competitors' strategies</td>
<td>.65</td>
<td>8.53</td>
</tr>
<tr>
<td>We respond rapidly to competitive actions that threaten us</td>
<td>.74</td>
<td>9.62</td>
</tr>
<tr>
<td>We target customers and customer groups in which we have or can develop a competitive advantage</td>
<td>.76</td>
<td>10.22</td>
</tr>
<tr>
<td>Top management regularly discusses competitors' strengths and strategies</td>
<td>.86</td>
<td>12.20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer orientation (( \alpha = .87; ) CR = .88; AVE = .61)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Our objectives are driven primarily by customer satisfaction</td>
<td>.81</td>
<td>11.13</td>
</tr>
<tr>
<td>We constantly monitor our level of commitment and orientation toward customers</td>
<td>.91</td>
<td>13.58</td>
</tr>
<tr>
<td>Our strategy for competitive advantage is based on our understanding of our customers' needs</td>
<td>.70</td>
<td>8.97</td>
</tr>
<tr>
<td>Our market strategies are driven by our understanding of possibilities for creating value for our customers</td>
<td>.76</td>
<td>10.22</td>
</tr>
<tr>
<td>We measure customer satisfaction systematically and frequently</td>
<td></td>
<td></td>
</tr>
<tr>
<td>We give close attention to after-sales service</td>
<td>.70</td>
<td>8.97</td>
</tr>
</tbody>
</table>

Information on customers, marketing successes, and marketing failures are communicated across functions in the business | .62 | 8.26 |
All of our functions—not just marketing and sales—are responsive to and integrated in serving markets | .69 | 8.72 |
All of our managers understand how the entire business can contribute to creating customer value | .77 | 10.61 |
We share programs and resources with other business units in the corporation | .73 | 9.52 |

Service innovation (adapted from Avlonitis et al., 2001), please indicate your agreement when you worked in Type 1

Incremental innovation (\( \alpha = .89; \) CR = .83; AVE = .63)

The services were modification of an existing company service | .82 | 11.22 |
The services were revision of an existing company service | .75 | 9.67 |
The services were repositioning of an existing company service | .80 | 10.88 |

Please indicate your agreement when you worked in Type 2

Radical innovation (\( \alpha = .84; \) CR = .84; AVE = .64)

The services were totally new to the market | .72 | 9.27 |
The services offered new features versus competitive services | .84 | 12.01 |
The services required changes in the customer's buying behavior (e.g., way of buying or using it) | .83 | 11.64 |

New service performance (adapted from Matear et al., 2002; de Brentani and Kleinschmidt, 2004)

Market performance (\( \alpha = .86; \) CR = .84; AVE = .63)

Over the last three years, compared to your direct competitors, how well did you do in the following measures?

Customer satisfaction | .72 | 9.27 |
Customer loyalty | .78 | 10.78 |
Brand equity | .88 | 12.54 |

Financial performance (\( \alpha = .88; \) CR = .83; AVE = .62)

Over the last three years, compared to your direct competitors, how well did you do in the following measures?

Business unit's profit | .82 | 11.22 |
Market share | .79 | 10.78 |
Return on investment | .76 | 10.22 |

Control variables

Market turbulence (Han et al., 1998; \( \alpha = .90, \) CR = .89, AVE = .68)

Extent of market turbulence in the market | .72 | 9.27 |
Frequent changes in customer preferences | .81 | 11.13 |
Ability to reduce market uncertainty | .89 | 13.08 |
Ability to respond to market opportunities | .86 | 12.29 |

Technological turbulence (Citrin et al., 2007; \( \alpha = .81, \) CR = .78, AVE = .55)

Technological changes provide big opportunities in your industry | .72 | 9.27 |
A large number of new service ideas have been made possible through technological breakthroughs | .70 | 8.97 |

Competitive intensity (Zhou et al., 2005; \( \alpha = .81, \) CR = .82, AVE = .61)

There are too many similar services in the market | .72 | 9.27 |
It is very difficult to differentiate your service | .79 | 10.78 |
This market is too competitive | .82 | 11.22 |

Cronbach's alpha (\( \alpha \)), composite reliability (CR), average variance extracted (AVE).

- **Innovation** type 1: Your firm does not prefer to simply follow the lead of your competitors; however, you do prefer to innovate within well-established paradigms, such as (1) a bank is constantly searching for unique ways to improve its service process, but does not want to stray far from the prototypical service process utilized by most banks, or (2) a travel agency is willing to use spokespersons that have not been used by other advertisers but does not want to depart from well-accepted methods to evaluate spokesperson potential.

- **Innovation** type 2: Your firm does not prefer to follow the lead of its competitors. Your firm strives to innovate by developing new paradigms to satisfy customer needs, such as (1) an insurance firm is not only willing to introduce a radically new insurance policy, but it also searches for ways to create a totally unique policy that has the potential to replace current ones, or (2) a travel agency is willing to risk spokespersons that do not conform to the accepted norms for judging spokesperson potential to or completely scrap the plan to use a spokesperson to build brand credibility.

References


