



# The roles of infrastructure capability and customer orientation in enhancing customer-information quality in CRM systems: Empirical evidence from Taiwan

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## ABSTRACT

This study adopts both a resource-based perspective that combines technology, human, and business resources to develop an infrastructure capability, and a strategic-positioning perspective that emphasizes customer orientation to examine customer information quality in customer relationship management (CRM) systems. Specifically, this study examines how firms bundle infrastructure capability and customer orientation to enhance the quality of customer information that enhances customer relationships and firm performance. The results of data gathered from 116 financial service firms in Taiwan suggest that the impact of quality on firm performance begins with infrastructure capability and customer orientation, and that the complementarity between these factors positively influences customer information quality. The results indicate that customer information quality positively affects customer relationship performance, which consequently leads to improvements in overall firm performance.

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## 1. Introduction

In today's business environment, top managers invest in customer relationship management (CRM) systems as a strategic tool for processing end-to-end customer information to develop customer relationships. Previous studies have demonstrated that CRM systems significantly improved customer relationship performance (Keramati, Mehrabi, & Mojir, 2010; Kim & Choi, 2010). However, CRM systems have become the backbone of customer relationship development by advancing customer information processing capabilities. Although information processing is important, the significance of its impact on customer relationship performance depends largely on the quality of customer information (Jayachandran, Sharma, Kaufman, & Raman, 2005; Messner, 2004; Missi, Alshawi, & Fitzgerald, 2005), where quality refers to the integration, timeliness, and usefulness of customer information (Hill, 2009; Mueller & Nyfeler, 2011). The function of a CRM system facilitates information processing by integrating information from multiple sources and across different functions, tailoring data for efficient access and analysis, and eliminating data errors and redundancies. However, the effectiveness of CRM systems depends on the data fed into it. If the provided data or information from

multiple internal and external sources is not timely, up-to-date, correct, accurate, complete, and relevant, businesses cannot benefit from using a CRM system (Roh, Ahn, & Han, 2005; Messner, 2004).

A review of the literature on information systems (IS) and strategic management shows that some prior studies focus on increasing understanding of information quality. They focus on the conceptual basis of successful CRM implementation (Garrido-Moreno & Padilla-Meléndez, 2011), the impact of customer orientation (Poddar, Donthu, & Wei, 2009), and the effect of IT capability (Li & Lin, 2006). However, few empirical studies examine the antecedent factors and their interactions underlying customer information quality in CRM systems. Moreover, the only empirical study (Rapp, Trainor, & Agnihotri, 2010) that examines the complementary role of technological capability as a firm's resource and customer orientation as a firm's strategy relates to information processing. For example, information gathering and sharing can be leveraged for an enhanced understanding of customer needs and how to respond to these needs quickly. These studies highlighted two findings. First, firms must be in harmony with resource-strategy variables to extract higher-quality customer information, and second, modifications in company resources and strategies play a pivotal role in enhancing the quality of customer information.

To address this issue, we adapted two main perspectives from the strategic management literature (Spanos & Lioukas, 2001): (a) a resource-based perspective that combines technology, human, and business resources to develop an infrastructure capability; and (b) a strategic-positioning perspective that emphasizes customer orientation. Therefore, the present study examines customer

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information quality in advancing the complementarity between the two perspectives, focusing on how well a firm creates and enhances customer information quality. Specifically, the study describes antecedents and outcomes relating to the quality of customer information in CRM systems, situating our findings in the financial service domain. The infrastructure capability, especially when coupled with a customer-orientated business strategy, relates positively to the quality of customer information, which enhances customer relationships and the overall firm performance.

## 2. Theoretical background and hypotheses

Complementarity refers to how one resource can influence another, and how the relationship between them affects the competitive position or performance (Teece, 1986). Regarding the complementarity between resource-based and strategic-positioning perspectives, resource-based and strategic-positioning perspectives have been found to complement each other in enhancing a firm's performance. For example, Spanos and Lioukas (2001) state that a resource-based perspective must be aligned with a market-driven perspective of strategy for optimal firm performance. Rivard, Raymond, and Verreault (2006) contend that the interaction between resource-based and competitive strategy perspectives reflect the role of information technology (IT) in explaining business values. We employed the same logic in this study to examine the complementarity between resource-based and strategic-positioning perspectives.

The resource-based perspective emphasizes the importance of firm-specific resources and capabilities (Melville, Kraemer, & Gurbaxani, 2004; Wade & Hulland, 2004). The view posits that the necessary condition for a firm's success is its ability to create distinctive resources and capabilities (Teece, Pisano, & Shuen, 1997). From a resource-based view of the firm, the firms' technology, human, and business resources should be compatible with CRM systems to develop infrastructure capabilities. Strategic positioning refers to strategic action conducted to identify the optimal combination of strategies to compete with industry competition.

This study adopts a strategic-positioning perspective to determine the quality of customer information used in a CRM system, and can provide an insight into customer orientation strategies. Consistent with that reported by Garrido-Moreno and Padilla-Meléndez (2011) and Singh and Koshy (2011), firms should consider customer orientation strategies as crucial to the successful use of CRM systems. Customer orientation strategies emphasize customer-centered planning and objectives (Jakelski & Lebrasseur, 1997; Hartline, Maxham, & Mckee, 2000), and are considered a source of competitive advantage (Luo, Hsu, & Liu, 2008; Matsuo, 2006).

According to Porter's (1980) view, resources are not valuable in and of themselves, but instead, they depend on how well they support a particular strategy. Therefore, the deployment of a firm's resources should be aligned with a firm's strategy to create distinctive systems. Specifically, infrastructure capability should be aligned with customer orientation to enhance the quality of customer information. The rich body of literature on IS and strategic management provides the foundation for our customer information quality and performance constructs. Thus, this study examines the complementarity between infrastructure capability and customer orientation in financial service firms.

As Fig. 1 shows, the study explores the antecedents and consequences of customer information quality, focusing on the critical constructs of infrastructure capability, customer orientation, customer relationship performance, and overall firm performance. More specifically, the model includes two perspectives and one complementarity. From a resource-based perspective that

combines technology, human, and business resources to develop infrastructure capabilities, the path ( $\eta^1$ ) refers to the effect that infrastructure capabilities have on the quality of customer information. From a strategic-positioning perspective that emphasizes customer orientation, the path ( $\eta^2$ ) refers to the effect that customer orientation has on the quality of customer information. The model indicates that the complementarity between infrastructure capability and customer orientation is related to customer information quality ( $\eta^1 \times \eta^2$ ). According to Spanos and Lioukas, "a firm's ability to develop and/or modify its strategy posture is determined by the available resources." The quality of customer information is believed to influence customer relationships ( $\eta^3$ ). Thus, customer relationships directly affect the overall firm performance ( $\eta^4$ ).

### 2.1. Infrastructure capability

From a resource-based view (RBV), resources that are valuable, inimitable, and non-substitutable lead to achieving a sustainable competitive advantage (Wernerfelt, 1984). The RBV suggests that idiosyncratic, immobile, and strategic resources owned or controlled by a firm are considered valuable firm-specific resources (Melville et al., 2004). Literature in the information system domain indicates that firm-specific resources and capabilities can improve a firm's performance (Melville et al., 2004; Mithas, Ramasubbu, & Sambamurthy, 2011; Mithas, Tafti, Bardhan, & Goh, 2012; Wade & Hulland, 2004). The notion of capability of RBV's application to the context of CRM has been presented as an important perspective on CRM implementation, and whereas capability is consistent with CRM program success, it could also be used in the CRM value creation model (Keramati et al., 2010).

Several CRM studies have theoretically and empirically examined the relationship between a firm's capability and performance (Coltman, 2007; Keramati et al., 2010; Rapp et al., 2010). Based on these studies, we developed a relational model of infrastructure capability support for the CRM system and export quality of customer information in the CRM system. We thus observed that certain studies investigated the RBV of a firm and extended it to the quality of information in interorganizational systems (Craighead, Patterson, Roth, & Segars, 2006; Premkumar, Ramamurthy, & Nilakanta, 1994).

A review of several studies (Barney, 1991; Coltman, 2007; Keramati et al., 2010; Melville et al., 2004; Rapp et al., 2010) shows that firm-specific heterogeneous resources can be classified into three categories: technology, human, and business resources. Technology resource refers to the IT infrastructure, which comprises hardware, software, database systems, and communication systems to support the CRM system. The RBV contribute significantly to the field of strategic human resource management and emphasized that human resource represents the firm's know-how and skills related to CRM systems. Business resource is defined as a business plan to integrate CRM systems projects into the overall business process. Powell and Dent-Micallef (1997) found that business resources contribute to value creation only when combined with complementary human and technology resources; thus, business resources alone do not create value.

This study also follows Wernerfelt's (1984) importance of valuable resources, Håkansson and Snehota's assumption that (1995) the value of a resource always depends on the type of resource it is combined with, and Coltman's (2007, p. 105) assertion that "CRM programs require the orchestration of a variety of resources and capabilities, none of which is superior in isolation, but when combined with others, make for a better and more effective program." With the RBV serving as our guide, we combine technology, human, and business resources to develop an infrastructure capability support for the CRM system. Infrastructure capability, therefore, is viewed as a firm's internal capability, enabling a system to access

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