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Performance implications of information-value offering in e-service systems: Examining the resource-based perspective and innovation strategy

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ABSTRACT

This research examines the performance implications of information-value offering in e-service systems. Specifically, this study introduces both a resource-based perspective that combines technology, human, and business resources to develop an e-service capability, and an innovation strategy that emphasizes service innovation orientation to examine information-value offering. This study also examines how firms bundle e-service capability and service innovation orientation to enhance information-value offering that enhances customer relationships and organizational performance. The results from a survey of 115 financial service firms in Taiwan highlight the importance of how e-service capability and service innovation orientation leads to information-value offering and that this value is shown to positively influence organizational performance by customer relationship performance. The results suggest that researchers and practitioners should pay special attention to the complementary resource-strategy that are needed to successfully implement e-service systems initiatives and that an emphasis on the resource or strategy alone may not be sufficient.

Introduction

The natural evolution of business environments has driven industries toward new information technology (NIT) environments (Chuang and Lin, 2015). NITs have led to firms worldwide applying e-service (ESV) systems such as tracking online packages, receiving an email notification regarding the order status, and, more recently, mobile banking (Tan et al., 2011). By using ESV systems, customers can save money and time in commercial activities and avoid awkward personal encounters (Meuter et al., 2000). ESV systems are essential for processing service information for developing customer relationships because they improve customer satisfaction (Loukis et al., 2012) and reduce operational expenses while increasing revenues and profitability (Rust et al., 2002). Moreover, such systems enable task completion, problem solving, and value creation for customers by advancing information processing. Although information processing is crucial, the significance of its effect on customer relationship performance depends considerably on information-value offerings (Messner, 2004), in which value refers to the usefulness and timelessness of service information and the knowledge derived therefrom (Mittal and Sheth, 2001; Ulaga and Eggert, 2006; O'Cass and Ngo, 2012). ESV systems provide informational value by integrating information

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from multiple sources and across different functions, by modifying information for efficient access and analysis, and by eliminating data errors and redundancies. However, the value of service information depends on the data input into ESV systems. If the information obtained from multiple internal and external sources does not improve effectiveness in meeting customer requirements, assist them in solving problems, or shorten their time for achieving service requirements, then businesses cannot benefit from using an ESV system (Chen et al., 2006).

A literature review on information systems (ISs) and business management revealed that certain studies have focused on elucidating informational value by focusing on the effect of ESV quality (Benaroch and Appari, 2011), service orientation (Demirkan and Delen, 2013), and resource-based capability (Ngo and O'Cass, 2009). For example, ESV quality is a crucial determinant differentiating ESV offers (e.g., content availability and functionality), deficiencies in service orientation that can lead to a decrease in gathering and sharing service information, and resource-based capabilities that can enable the system to complete tasks and solve problems.

Previous empirical studies (Rivard et al., 2006; Rapp et al., 2010) have examined the complementary role of technological capability as a firm resource and strategy in information processing. For example, a firm's infrastructure capability tends to emphasize the support of and compatibility with information processing, whereas a firm's strategy is considered a service-oriented innovation approach to rendering information processing more efficient. The approach guides the organization-wide offering of available information and coordinates action on the basis of that information. These studies have reported two crucial findings. First, firms must employ resource-strategy variables to extract a higher information-value offering; and second, modifications in company resources and strategies are crucial for enhancing the information-value offering. Thus, we adopted two main perspectives from the strategic management literature (Spanos and Lioukas, 2001) to examine information-value offerings in ESV systems: a resource-based perspective that combines technology, human resources, and business resources to develop ESV capability; and an innovation strategy that emphasizes service innovation orientation. The findings of this study may provide insights for practitioners to assist them in mitigating problems they encounter when implementing an ESV system. For example, the lack of ESV capability could lead to various integration and operation problems that inhibit the ESV system's capability in offering service information effectively. A lack of service innovation increases the difficulty for ESV systems to gather useful, accurate, and timely information from internal and external sources, which would be detrimental to business performance and inevitably lead to inadequate resource allocation for customer service. ESV capability and service innovation orientation are critical in effectively improving information-value offerings. However, few empirical studies have examined ESV capability and service innovation orientation (and their interactions) in the context of information-value offerings in ESV systems. Therefore, by focusing on how efficiently firms create and enhance informational value, the present study examined information-value offerings in ESV systems in advancing the complementarity between ESV capability and service innovation orientation. Specifically, the antecedents and outcomes related to information-value offerings in ESV systems were investigated; thus, our findings are pertinent to the financial service domain. ESV capability, particularly when coupled with a service-orientated innovation strategy, was found to be positively related to information-value offerings, which enhance customer relationships and overall business performance.

Theoretical background

Resource-based perspective

The resource-based view (RBV) perspective suggests that idiosyncratic, immobile, and strategic resources owned or controlled by a firm are considered valuable firm-specific resources (Melville et al., 2004). The notion of the capability of an RBV application in the context of value offerings is a major perspective for creating value offerings (Ngo and O'Cass, 2009). Although capability is consistent with the success of a value offering program, it can be used in an e-business value creation model (Soto-Acosta and Meroño-Cerdan, 2008). Studies in the IS domain have indicated that firm-specific resources and capabilities can improve firm performance (Peppard and Ward, 2004; Melville et al., 2004; Nevo and Wade, 2011). Several ESV application studies have theoretically and empirically examined the relationship between organizational capability and performance (Oliveira et al., 2002; Ordanini and Rubera, 2010; Wu et al., 2011). On the basis of these studies, we developed a relational model of ESV capability support for an ESV system, and integrated information into this system. Certain studies have investigated the RBV of firms and have extended it to business value creation in e-business systems (Hsu, 2013).

A review of several studies (Barney, 1991; 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 e-service capability, which comprises hardware, software, database systems, and communication systems to support the e-service systems. 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 e-service systems. Business resource is defined as a business plan to integrate e-service 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 (1984) importance of valuable resources, Håkansson and Snehota (1995) assumption that the value of a resource always depends on the type of resource it is combined with, and Chuang and Lin (2015, p. 287) assertion that "technology resources should be developed in combination with complementary resource or capabilities to

create distinctive business capability (e.g., e-service capability)." With the RBV serving as our guide, we combine technology, human, and business resources to develop an e-service capability support for the e-service system. ESV capability, therefore, is viewed as a firm's infrastructure capability for enabling a system that supports customers by offering service information that is more useful and appropriate, by providing information and knowledge, and by developing timely responses that fulfill customer requirements. In this paper, ESV capability is broadly defined as the effective deployment of a firm's resources in support of ESV system implementation.

Innovation strategy

The literature on innovation has theorized "innovation strategy" as a distinct type of strategy (Cheng et al., 2010). Additionally, researchers have proposed various classifications of innovation strategies, such as organizational innovation, market innovation, process innovation, product innovation (Staub et al., 2016), and service innovation (Santamaría et al., 2012; Hidalgo and D'Alvano, 2014). Cheng et al. (2010) proposed that a firm can choose to apply different classifications of innovation strategy to achieve its objective or to enhance its competitive advantage. Such an advantage can arise from the firm's ability to differentiate its offerings, such as from service innovation (Hidalgo and D'Alvano, 2014) and serving customers' needs (Rapp et al., 2010). In the present study, service innovation orientation in innovation strategy represents a service orientation for developing new solutions or improving existing services that meet customers' current and future requirements to improve business performance. Because this orientation emphasizes determining and addressing customer preferences, it generally excludes other concerns. Several researchers used innovation strategy to emphasize the importance of developing service innovations in a firm (Cheng et al., 2010; Hidalgo and D'Alvano, 2014). Although understanding the relationship between service innovation and organizational performance is essential, IS managers are concerned with identifying ESV systems that can be implemented to support service innovation orientation, which, in an ESV system, enables it to support a firm in improving its service quality and flexibility as well as meeting customer requirements more effectively. Therefore, we propose that service innovation orientation stems from the business management literature (O'Cass and Sok, 2013; O'Cass and Ngo, 2012), in which ESV systems use the service-oriented concept by attempting to assist a firm in solving customer problems to an extent that customers feel satisfied. Specifically, the system can manage the requirements of existing customers and easily infer likely alternatives that satisfy their needs; thus, the system can help the firm derive competitive advantages. A previous study showed that managers in Mexican financial and information technology (IT) firms perceived innovation orientation to as indirectly affecting their firm's competitive advantages (Verma and Jayasimha, 2014), although innovation orientation is closely associated with ESV systems and service information management. Other studies have indicated that senior managers emphasize the relationship between service innovation and a value offering in business-to-business service firms (O'Cass and Sok, 2013). Thus, service innovation orientation is likely to be a direct antecedent to value offerings in ESV systems and an indirect antecedent to business performance.

A perspective of complementarity

Complementarity refers to how one resource can influence another, and how the relationship between them affects a firm's competitive position or performance (Teece et al., 1997). In strategy research, Barney and Griffin (1992) have proposed that resource and strategy are complementary rather than opposite. These authors have provided a foundation for researching many related variables and their mutual interdependencies. As argued by Rivard et al. (2006), performance enhancement stems from the fit of a firm's resources to its strategy, and the fit of its strategy to the industrial environment. Although the RBV approach emphasizes that focusing on technology-related capability is crucial in developing and combining resources to enhance firm performance, marketing-related capability is also critical (Song et al., 2005).

Regarding the complementarity between strategy and resource-based perspective, these perspectives complement each other in enhancing business performance (Rivard et al., 2006). The present study draws on the complementarity principle to examine how ESV capability and service innovation orientation work together in practice. We specify that firms with service innovation orientation are associated with effective information-value offerings, and that the orientation could be fitted to various ESV capabilities. Lack of services innovation makes it more difficult for ESV systems to gather useful, accurate, and timely information from internal and external sources, which would make it detrimental and inevitably leads to inadequate resource allocation for customer service. The lack of ESV capability could lead to a variety of integration and operation problems that inhibit the ESV systems to offering service information effectively. We also develop a theoretically grounded framework that clarifies the information-value offering factors and associated resource-strategy related to the successful implementation of ESV systems. Therefore, our study provides evidence that ESV capabilities should be aligned with service innovation orientation to enhance information-value offerings in ESV systems.

Information-value offerings in ESV systems

In the strategic information systems (SIS) literature, efforts aimed at determining the sources of superior performance have been long-standing, and a significant body of research has focused on this objective (Rivard et al., 2006; Bulchand-Gidumal and Melián-González, 2011; Leidner et al., 2011). These researchers have proposed that the strategic role of ISs is critical to sustaining a firm's competitive advantages. Reponen (1993) and Arvidsson et al. (2014) defined strategic role

of ISs as bringing competitive advantages or resulting in a competitive edge. In examining the strategic role of ESV systems, extant studies have suggested that ESV systems enable improving customer service, firm performance, and competitive advantages (Ordanini and Rubera, 2010; Benaroch and Appari, 2011). The successful implementation of the ESV systems is associated with system utilization, which presents a critical challenge. For example, failing to use systems-enabled information may lead to strategic blindness, which can render firms unable to effectively exploit information utilization. Rivard et al. (2006) indicated that the complementarity between strategy and resource-based perspective is essential to long-term success when implementing an IS. The basic logic is that resource-strategies affect ESV system practices, which subsequently leads to the derivation of competitive advantages. For example, when a firm's infrastructure capability is supportive and compatible with their ESV system, it enables the ESV systems to provide information effectively. A firm's service-oriented innovation demonstrates the desire to aid system designers in establishing satisfactory ESV systems through assisting in the assessment of information needs and offering only those services that satisfy those needs. Given this role, measuring the effect that resource-strategy have on information utilization is appropriate for improving firm performance. Therefore, this study proposes that using ESV capabilities and service innovation orientation to enhance information-value offerings in ESV systems is particularly beneficial.

ESV systems use NITs to enable, improve, enhance, transform, or invent a business system that provides a rapid customer response, improves service quality, enhances operational efficiency, and reduces costs (Benaroch and Appari, 2011; Loukis et al., 2012). Such systems have been widely used for collecting, integrating, and analyzing general service information (e.g., information derived from a salesperson's interactions with customers). Although service information processing is crucial, the significance of its effect on customer relationship performance depends on its ability to provide value for customers (DeSarbo et al., 2001). To understand the creation of value offerings, previous studies (Fassnacht and Köse, 2007; Oliveira et al., 2002) have sought to determine the specific informational value derived from ESV systems. Creating informational value through ESV systems depends on the information content that is essential to customers (Chen et al., 2006). Content can include service information, which is useful, timeless, and provides relevant knowledge to firms (Ulaga and Eggert, 2006); such information must be combined, developed, and transformed to create informational value.

ESV systems can manage the integration of service information (e.g., combining customer transaction data with external source data or integrating service information from different contact points) (Boulding et al., 2005); therefore, such systems can provide value-added service information. ESV systems can facilitate the timeliness of service information (e.g., offering quick and enhanced frontline support or executing marketing actions more efficiently), thus accelerating the cycle time of information. ESV systems or NIT-based services can enhance the usefulness of service information (Chen et al., 2006), enabling such systems to provide knowledge or new product and service information from a firm. Therefore, ESV systems are highly efficient for enhancing the value of service information provided by firms. Moreover, certain studies have emphasized the significance of information-value offerings in business intelligence systems (Popovič et al., 2014), supply chain practices (Xue et al., 2011), and IS use (Popovič et al., 2014). Accordingly, the present study proposes that information-value offerings are an immediate manifestation or a first-order effect of ESV system use.

Research model and hypotheses

Research model

Previous studies have proposed that the contribution of IT to business performance is based on both strategy and resource-based perspective (Rivard et al., 2006; Spanos and Lioukas, 2001). Spanos and Lioukas (2001) stated that a resource-based perspective must be aligned with a market-driven strategic perspective for optimal organizational performance. Rivard et al. (2006) contend that the interaction between strategy and resource-based perspective reflects the role of IT in explaining business values. Moreover, Porter (1980) view proposed that resources are not valuable in and of themselves, but instead, they depend on how well they support a particular strategy. The deployment of a firm's resources should be aligned with a firm's strategy to create distinctive systems. Thus, we employed the same logic in this study to examine the complementarity between resource-based perspective and innovation strategy. Complementarity refers to how one resource can influence another, and how the relationship between them affects the competitive position or performance (Teece et al., 1997). Regarding the complementarity between strategy and resource-based perspective, the resource-strategy has been found to complement each other in enhancing business performance. Specifically, in the context of e-service capability should be aligned with service innovation orientation to enhance information-value offering.

The resource-based perspective stated that the necessary condition for a firm's success is its ability to create distinctive resources and capabilities (Teece et al., 1997). From this perspective, a firm's technology, human, and business resources should be compatible with its ESV system to develop its ESV capability. Innovation strategy refers a firm's plans to encourage advancements in technology or services, for example, an innovation strategy might entail the use of new management, processes, or services. The present study adopts an innovation strategy to determine the information-value offerings used in ESV systems, the findings of which may provide insights into service innovation orientation. Consistent with the research of Ordanini and Rubera (2010) and Hinnant and O'Looney (2003), firms should consider service innovation orientation as crucial to the successful use of ESV systems. Service innovation orientation provides new benefits to existing customers by

increasing the number *of* extant services or by creating a new service (Cheng and Krumwiede, 2012), and is considered a source of competitive advantage (Chuang and Lin, 2015; Santamaría et al., 2012).

As Fig. 1 shows, the study explores the antecedents and consequences of information-value offering, focusing on the critical constructs of e-service capability, service innovation orientation, customer relationship performance organizational performance, and market turbulence.

Hypotheses development

The antecedents of information-value offering

ESV systems are designed to assist businesses in implementing the service elements of electronic retailing, customer support, and service delivery (Rowley, 2006). Businesses using ESV systems must have infrastructure capabilities (e.g., hardware and software resources, expertise resources, and business resources) (Coltman, 2007) that are both supportive and compatible with ESV systems. The lack of a supportive and compatible ESV technology can cause various integration and operation problems, thus preventing the ESV systems from improving informational value.

ESV capabilities that are supportive and compatible with ESV systems enable systems to integrate, analyze, and modify relevant information from multiple internal and external sources. Moreover, such capabilities ensure that ESV systems can provide and process information effectively. This perspective accords with the research of Jayachandran et al. (2005), who reported that adequately developed infrastructure capabilities can improve a firm's ability to manage service information derived from external sources. With adequately developed ESV capabilities, ESV systems add value to extant service information, generate new product and service information, and meet customer service requirements. ESV capabilities are therefore critical for providing informational value.

H1. ESV capability is positively related to information-value offering.

Service innovation orientation is a critical factor for successful ESV system implementation. Xu et al. (2005) proposed that Web service innovation is a crucial indicator reflecting business to IS management strategies. Thus, it is a major determinant of successfully implementing an IS; moreover, this view must be considered by businesses when adopting ESV systems. Therefore, a firm's service innovation orientation aids system designers in ensuring that ESV system adoption is satisfactory by assisting in the assessment of customer requirements and by offering services that meet only these requirements. Consistent with this view, O'Cass and Sok (2013) reported that service innovation capability positively affects a firm's value offering. Deficiencies in service innovation decrease customer satisfaction and customer value (Chen et al., 2015), implying that service innovation orientation optimizes information-value offerings.

Firms emphasize service innovation orientation; for businesses, the provision of services can be more valuable than the sale of products, because products tend to become commodities faster (Chen et al., 2015). To achieve this goal, firms strive to integrate information from various sources, eliminate data errors and redundancies, and modify data for efficient access and analysis. With such data or information, firms can maximize the utility of their ESV systems; hence, the information becomes more useful, timeless, and provides knowledge. Accordingly, we posit that innovation service orientation is a necessary condition for enhancing information-value offerings. A lack of service innovation orientation is detrimental to business performance and inevitably leads to inadequate resource allocation for customer service, which would prevent immediate and effective enhancements in informational value. Therefore, service innovation orientation is likely to promote information processing to enhance information-value offerings.

H2. Service innovation orientation is positively related to information-value offerings.

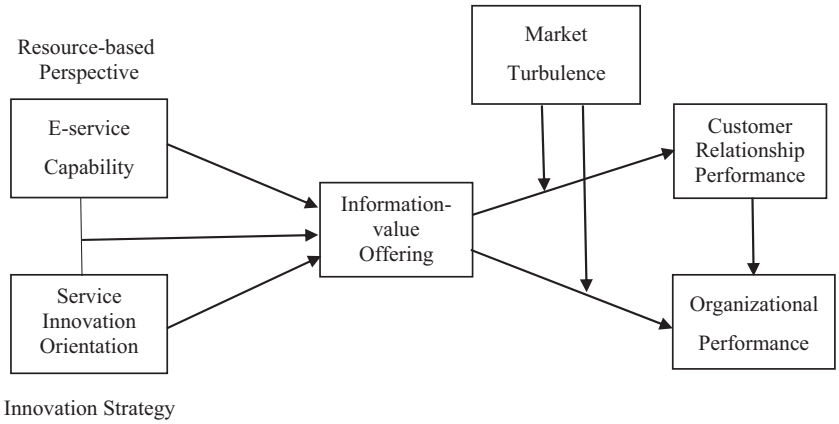

Fig. 1. Research model.

Interactive effects of ESV capability and service innovation orientation

Although ESV capability and service innovation orientation are considered resource-strategy perspectives that directly influence information-value offerings, the interactive effects of these perspectives requires examination. Previous studies have reported that the complementarity between strategy and resource-based perspective is crucial to the success of a firm (Rivard et al., 2006; Spanos and Lioukas, 2001). Furthermore, technology capability combined with marketing capability is crucial to organizational performance (Song et al., 2005). The positive interaction effect of technology capability and customer orientation is empirically supported (Rapp et al., 2010). However, the significance of the complementarity between ESV capability and service innovation orientation requires confirmation, and the effect of this complementarity on information-value offering requires testing.

A firm cannot attain complementarity between two factors easily, because the factors require different managerial focuses; in other words, ESV capability tends to emphasize the support of and compatibility with ESV systems as major firm-specific resources, whereas service innovation orientation is considered a service-focused approach. The approach guides the organization-wide sharing and gathering of customer information and coordinates actions based on this knowledge (Kohli and Jaworski, 1990). Rapp et al. (2010) suggested that the interactive effects of technology and customer orientation are critical for conducting meaningful interactions with customers. ESV capability deployed throughout an organization is highly integrated with service orientation, representing higher levels of service innovation orientation. For example, firms using NIT-based services have more access to service information through resource strategies and interactive processes through the Internet. Therefore, we posit that ESV capability is more highly integrated into service-focused information processes that offer service information that is useful, timeless, and provides knowledge.

H3. The interaction of service innovation orientation with ESV capability positively affects information-value offerings.

The consequences of information-value offering

Previous studies have implied that the use of IS affects lower-level operations, leading to higher levels of aggregation performance (e.g., Barua et al., 1995). Consistent with this approach, our model elucidates aggregate-level performance (e.g., organizational performance), and we suggest that organizations attempt to link information-value offerings with operational-level performance (e.g., customer relationship performance). In research aimed at evaluating both customer relationship performance and organizational performance, customer relationship performance refers to an increase in customer acquisition, satisfaction, and loyalty after an ESV system has been adopted. Customer relationship performance is a crucial prerequisite of market share, profitability, and other performance outcomes.

Studies on ESV have noted that the advantages of providing customers with ESV systems include reduced operating expenses and improved customer satisfaction (Bitner et al., 2002; Rowley, 2006). The IS literature is consistent in its assessment of e-service use as a method for enhancing operational performance (Chuang and Lin, 2015). Although e-service are essential to many firms, their effect on a firm's operational performance depends on the value of the information that such systems provide (Benaroch and Appari, 2011; Ladhari, 2010). Specifically, the value offering of service information by each entity results in more efficient customer services (Gorla et al., 2010), which consequently optimize customer relationship development. For example, timely service information enables employees to understand the marketing environment quickly and offer customer support or execute marketing actions efficiently. This service information capability enables firms to optimize customer relationships by quickly developing mechanisms that are more effective in fulfilling customer requirements. Moreover, information that is useful and provides knowledge results in more favorable responses to changes in the dynamics of an uncertain environment. Therefore, a firm's ability to respond quickly to customer requirements should improve customer relationship performance.

H4. Information-value offerings are positively related to customer relationship performance.

When a firm's informational value directly benefits customer relationship performance, that firm is more likely to achieve target performance outcomes. The customer relationship benefits are in the form of customer satisfaction, customer loyalty, and new customer acquisition. Customer satisfaction and loyalty are critical to enhancing performance, and they also provide competitive advantages (Rapp et al., 2010; Reinartz et al., 2004). Customer satisfaction has a substantial effect on repeat purchase behavior and results in fewer customer complaints (Szymanski and Henard, 2001). Moreover, on the basis of the model of IS system use, IS research has implied that a positive relationship exists between operational and organizational performance (Barua et al., 1995). Enhancements in organizational performance benefit customer relationship performance.

H5. Customer relationship performance is positively related to organizational performance.

O'Cass and Ngo (2012) showed that a firm's value offering differentiates its business in the market. Value offerings are crucial for firms to obtain competitive advantages over competitors and survive (Hult and Ketchen, 2001). For example, a firm providing customers with high service value is likely to achieve superior firm performance through higher profits, share value, and sales growth. Furthermore, by providing satisfactory service delivery and service customization, firms can increase their service charges to generate higher profits (Chen and Tsou, 2012). In addition, information sharing affects organizational performance in terms of total cost and service level (Xue et al., 2011); a higher level of information sharing is asso-

ciated with lower costs and a shorter order cycle time (Li and Lin, 2006). Firms implement ESV systems to provide informational value, improve the effectiveness and efficiency of information delivery processes, and realize favorable innovation outcomes and performance. Thus, information-value offerings affect organizational performance.

H6. The information-value offering is positively related to organizational performance.

Moderating influences of market turbulence

Contingency theory states that the fit between a firm's strategy and its environment (rather than the strategy alone) determines organizational performance (Donaldson, 2001). A firm's ability to adapt to its turbulent market environment depends on the IT implemented by that firm. Customer-facing IT systems enable firms to gather market information and adjust their strategies more efficiently when market-related turbulence is high as compared with when markets are stable (Wu et al., 2003). Olson et al. (2005) defined market turbulence as the degree of change in customer preferences for products in an industry. Market turbulence, viewed as the unpredictability of customer requirements (Wang et al., 2015), positively influences information-value offerings. According to Kim and Jae (2007), compared with firms operating in stable markets, those operating in a turbulent market environment tend to adjust and adapt more on the basis of information processing. In highly turbulent markets, firms are more likely to adapt to their competitive environments and derive competitive advantages through information-value offerings. Researchers have argued that firms adapt to rapidly changing competitive/turbulent market environments through employing NITs, which leads to higher performance levels (Chuang and Lin, 2015; Chen et al., 2006). We consider ESV system NITs, which enable firms to react quickly and efficiently to changes in product preferences and customer requirements (Oliveira et al., 2002). ESV systems are crucial for service firms because they create and deliver useful information to customers to achieve customer satisfaction. Therefore, market turbulence might moderate the effect that information-value offerings in ESV systems have on firm performance. According to this logic, the relationship between informational value for managing external relationships and performance is stronger for firms in turbulent markets than for those in stable markets (Oliveira et al., 2002). Because information-value offerings play a critical role that connects a firm to its customers, we argue that durable customer relationships are stronger in turbulent markets than in more stable markets.

H7. Market turbulence has a positive moderating influence on the relationship between information-value offerings and customer relationship performance.

H8. Market turbulence has a positive moderating influence on the relationship between information-value offerings and organizational performance.

Methods

Measurement of the variables

All research constructs were measured by items that have been validated in prior research and reworded to suit the research context (see Table 2). We evaluated e-service capability by measuring the extent to which the organization's resources engage in or support the electronic service. For this study, e-service capability was measured as a second-order construct with three formative first-order dimensions: technology, human, and business resources, adapted from Powell and Dent-Micallef (1997). We assessed service innovation orientation using four items adapted from the Calantone et al. (2002), Hurley and Hult (1998), and O'Cass and Sok (2013) study and modified it for the context of the e-service system. Information-value offering was measure as a second-order construct by using three formative first-order dimensions (Mittal and Sheth, 2001; Ulaga and Eggert, 2006): Useful service (4 items), know-how service (3 items), and timely service (3 items). We assessed customer relationship performance by using a three-item instrument adapted from the Rust et al. (2002) and Rapp et al. (2010) study. We measured organizational performance using a three-item scale adapted from Ramaswami et al. (2009). Finally, the measurements for market turbulence (2 items) from Jaworski and Kohli (1993).

Sample selection and collection

We selected financial service firms as a sample frame according to previous studies (Benaroch and Appari, 2011; Chuang and Lin, 2015) that have argued that ESV is more critical to service firms than to other firms. The sample frame comprised a homogenous sample of financial service firms to reach the optimal degree of internal validity. We used financial service firms listed in CommonWealth Magazine from Taiwan. These firms have similar applications and organizational resources, alleviating the moderating effects of the economic and industrial factors. Moreover, these firms use ESV systems as an IT in their business operations to mediate firm–customer relationships. The managers of financial service firms were selected to provide crucial information because such marketing and service department officials have appropriate in-depth knowledge of ESV use and the resulting performance enhancements (Chuang and Lin, 2015).

The questionnaire was developed in three phases Christmann (2002). First, the survey was conducted in Taiwan, and the original items were translated from English to Chinese. Validity was preserved through a rigorous process. A pretest was performed by two professors and two Ph.D. candidates in Business Management to verify the content validity of the instruments. The four academic experts reviewed the questionnaire design and offered suggestions. The questionnaire was then modified slightly to ensure consistency in semantic meaning between English and Chinese. Second, six marketing managers and three academic experts reviewed the instruments, scales, and questions of the surveys to improve clarity and readability. Third, 12 managers in Taiwan were chosen to pretest the questionnaire. Interviews were then conducted with these managers to ascertain the questionnaire's performance. Based on the managers' feedback, the questionnaire was further modified for clarity and applicability to practices in Taiwan.

The questionnaires were delivered to respondents by e-mail and snail mail, in addition to a cover letter and, when mailed as a package, a self-addressed stamped envelope. The cover letter and questionnaire explained the purpose of the survey and asked the managers whether they had ever used e-service systems. An ESV can be defined as "the use of new information technologies via the Internet to enable, improve, enhance, transform, or invent a business process or system to complete tasks, solve problems, conduct transactions, or create value for current or potential customers" (Benaroch and Appari, 2011, p. 534). The aim of ESV systems emphasizes providing useful and timely information in addition to knowledge. The function of a Web-based ESV system can be simplified into the following main components: Web bank, online application (e.g., request for contacts from service personnel), convenient services (e.g., frequently asked questions for businesses), financial trial (e.g., consumer loans), profile (e.g., financial reports), business introduction, financial indices (e.g., domestic economic and financial signals), news of business opportunities, periodicals (e.g., monthly journals), financial knowledge (e.g., gold investment and value assurance), news, and e-mail. An ESV system can provide service information, that this information must be combined, developed, and transformed to create informational value. Many systems could be categorized as ESVs. However, the ESV system investigated in the present study is a Web-based platform that uses the HTTP application protocol. Other types of system, such as mobile banking apps, were excluded from this study because their characteristic, functions, and operation differ between Web-based and app-based systems; specifically, an app is designed for small handheld displays and touchscreen interfaces. This study has asked the respondents two questions (the function of an ESV system implementing in their company and the experience of applying the system) to confirm that their business used a Web-based ESV system.

The first round of mailing yielded 56 responses. This response rate was inadequate; therefore, phone calls were subsequently made to solicit replies to the questionnaire. The second mailing yielded an additional 66 responses, raising the total response to 122 and producing a final response rate of 24.4%. However, 7 of 122 respondents were excluded from the final sample because their questionnaires were incomplete, yielding 115 valid questionnaires. Table 1 summarizes the respondent characteristics in terms of financial service type, total sales revenue, number of employees, and position of respondents. The analysis results regarding the composition of investments in the financial industry show that for 16.52% of companies, more

Table 1
Respondent characteristics.

Range	Number of firms (n = 115)	Percent
(a) Financial service types		
Banking/Finance	45	39.13
Insurance	30	26.09
Securities Corporation	29	25.22
Other	11	9.57
(b) Firm capital (1 US dollar = 30 NT dollars)		
Less than USD 0.3 million	5	4.35
USD 0.3–1.7 million	13	11.30
USD 1.7–3.3 million	8	6.96
USD 3.3–16.6 million	35	30.43
USD 16.6–33.3 million	23	20.00
Over USD 33.3 million	31	26.96
(c) Number of employees (people)		
50 and fewer	0	0
51–100	9	7.83
101–500	52	45.22
501–1000	16	13.91
Over 1000	38	33.04
(d) Composition of investments		
Foreign investors	19	16.52
Local enterprises with foreign offices	74	64.35
Other local enterprises	22	19.13
(e) Position of respondents		
Marketing/service managers	85	97.39
Other title	30	2.61

than 50% of their investments are from overseas Chinese or foreign investors, which makes them the subsidiaries of multinational banks. The proportion of financial companies established by local enterprises with foreign offices is 64.35%, whereas the proportion of other company types with non-foreign offices is19.13%.

Analysis of non-respondent bias

To verify that these responses were representative of the population, nonresponse bias was assessed by comparing the early respondents with the late respondents for two crucial organizational characteristics (i.e., the number of employees and sales revenues) of the sample. The rationale for this test was that late respondents are likely to have characteristics similar to those of nonrespondents. A chi-square test revealed nonsignificant differences between the two groups of respondents for a number of employees ($\chi^2 = 3.833$, $p = 0.685$) and sales revenues ($\chi^2 = 4.532$, $p = 0.563$) at the 5% significance level, indicating that nonresponse bias was not a problem.

Common method variance

The respondents who answered the independent-variable questions also answered the dependent-variable questions in a cross-sectional manner, which may raise concerns regarding common method bias. We reduced this bias by separating the predictor and criterion variable items through a lengthy survey and by assuring anonymity. To test for common method bias, we employed Harman's one-factor test (Podsakoff et al., 2003). Unrotated principal component factor analysis of all the variables used in this study revealed five factors with eigenvalues greater than 1, which together accounted for 71% of the variance. The first (largest) factor accounted for 19% of the variance. Because more than one factor was extracted and no single factor accounted for more than 50% of the variance, common method bias was not considered a major problem in this study.

Analysis and results

Data analysis was performed using partial least squares (PLS), a structural equation modeling (SEM) technique that has become widely accepted for its accuracy and utility. The PLS uses a least squares estimation procedure, allowing the flexibility to represent both formative and reflective latent constructs, while placing minimal demands on measurement scales, sample size, and distributional assumptions. Data analysis proceeded in two stages: (a) we tested the measurement model by subjecting our measures to a series of confirmatory factor analyses (CFA); and (b) we developed a structural model to test our hypotheses.

Measurement model

In order to determine the relative fit of a structural model, researchers must examine reliabilities and validities along with specific path significance and R-square measures. We examine and present the results of a series of statistical analysis to ensure that we have achieved measurement validity. Table 2 presents standardized loading and other metrics for the item measures, as well as reliability and validity measures. All items in the measurement model exhibited factor loadings ranging from 0.682 to 0.908; they were thus considered acceptable for the remainder of the analysis. The composite reliability metrics for all the first-order constructs, ranging from 0.837 to 0.937, also exceeded the recommended threshold of 0.70 (Segars, 1997) and were thus acceptable. Average variance extracted (AVE) showed that all AVE values exceeded the recommended threshold of 0.50 (Segars, 1997). In addition, Cronbach's alpha was used to examine the reliability of the instruments. A cutoff value of higher than 0.7 is acceptable since these instruments have been adopted from previous studies (Nunnally, 1978). All constructs have higher than 0.7 cutoff alpha values, ranging from 0.706 to 0.899. Table 3 displays the discriminant validity of the measurements. For good discriminant validity, the square root of the AVE of a construct must be larger than that of the construct's correlations with the other constructs (Fornell and Larcker, 1981). The data indicated that our constructs satisfied this criterion, thus confirming discriminant validity. An examination of cross-loadings also indicated acceptable discriminant validity (see Appendix A).

Structural model

We used PLS with the bootstrap resampling procedure to test the proposed model. An examination of the structural model included the path coefficients of the causal relationships between constructs; these path coefficients were obtained using SmartPLS software. The results of structural model analysis are shown in Table 4. Because the hypothesized interaction effects are significant, we focused on the description of Model 2. Fig. 2 shows the paths and their significance for the Model 2. Information-value offering was significantly influenced by e-service capability ($\beta = 0.137$, $p < 0.05$), service innovation orientation ($\beta = 0.254$, $p < 0.05$), and the complementarity between e-service capability and service innovation orientation ($\beta = 0.348$, $p < 0.05$). Accordingly, H1, H2, and H3 were supported. A firm's information-value offering had a significant effect on customer relationship performance ($\beta = 0.498$, $p < 0.001$), which supported H4; however, it did not have a direct effect on organizational performance, thus, H6 was rejected. The effect of customer relationship performance on organizational per-

Table 2
Factor loading, AVE, and reliabilities.

Factor loading		AVE and reliabilities	
Item and construct reliability for technology resource			
Our company has sufficient technology to support e-service implementation	0.869	AVE	0.638
Our company has sufficient hardware resources to support e-service implementation	0.816	Composite reliability	0.913
Our company has sufficient software resources to support e-service implementation	0.804	Cronbach's alpha	0.793
Our company has communication and network technologies that are compatible with e-service implementation	0.832		
Our company has database technology that is compatible with e-service implementation	0.725		
Our company has an IS that is compatible with e-service implementation	0.720		
Item and construct reliability for human resource			
We have a well-developed e-service culture in our organization	0.804	AVE	0.634
Our top management fully supports our e-service activities	0.887	Composite reliability	0.837
We have encountered several problems to fit e-service into the culture of our company	0.685	Cronbach's alpha	0.706
Item and construct reliability for business resource			
There are clearly stipulated priorities for our e-service projects	0.682	AVE	0.604
We regularly measure the effectiveness and the success of our e-service projects	0.754	Composite reliability	0.859
We have a formal strategic plan for e-service initiatives	0.824	Cronbach's alpha	0.793
Our e-service plans are integrated into our overall business plan	0.839		
Item and construct reliability for service innovation orientation			
Our e-service is to develop new services for our customers' need	0.821	AVE	0.699
Our e-service is to extend the firm's services range	0.847	Composite reliability	0.903
Our e-service is to improve existing service quality	0.832	Cronbach's alpha	0.885
Our e-service is to improve services flexibility	0.844		
Item and construct reliability for useful service			
Our e-service systems provide our customers with better services	0.817	AVE	0.707
Our e-service systems provide our customers with more appropriate information	0.791	Composite reliability	0.906
Our e-service systems are more available when we want to use information	0.868	Cronbach's alpha	0.861
Our e-service systems responds more rapidly when we want to use information	0.885		
Item and construct reliability for know-how service			
Our e-service systems provide our customers a better access to firms' know-how	0.803	AVE	0.700
Our e-service systems are better at assisting our customers when they face any difficulties/problems	0.831	Composite reliability	0.875
Our e-service systems perform better at introducing new product/service to our customers	0.875	Cronbach's alpha	0.785
Item and construct reliability for timely service			
Our e-service systems are better at helping our customers improve their time to achieve their service requirements	0.839	AVE	0.651
Our e-service systems help our customers more by reducing the time they takes to access our service	0.824	Composite reliability	0.848
Our e-service systems are better at helping our customers speed up their business activities	0.755	Cronbach's alpha	0.732
Item and construct reliability for customer relationship performance			
Our company has experienced increased customer satisfaction after adopting the e-service systems	0.908	AVE	0.832
Our company has experienced increased customer loyalty after adopting the e-service systems	0.916	Composite reliability	0.937
Our company has gained more customers after adopting the e-service systems	0.912	Cronbach's alpha	0.899
Item and construct reliability for organizational performance			
Our company has experienced increased market share after adopting e-service systems	0.848	AVE	0.707
Our company has experienced rapid growth after adopting e-service systems	0.774	Composite reliability	0.878
Our company has generated more profits after adopting e-service systems	0.896	Cronbach's alpha	0.791
Item and construct reliability for market turbulence			
Our market surroundings are liable to many changes	0.895	AVE	0.843
In our industry the customer preference changes frequently	0.941	Composite reliability	0.915
		Cronbach's alpha	0.817

formance also proved to be positive and significant ($\beta = 0.376$, $p < 0.001$); thus, H5 was received. On the structural model level, we assessed the coefficient of determination R2, to determine overall model adequacy. With a value of 42.8% for information-value offering, 53.6% for customer relationship performance, and 34.8% for organizational performance. We tested the direct and interactive effects of market turbulence. We did not find significant effects of market turbulence on customer relationship performance ($\beta = -0.055$) and organizational performance ($\beta = -0.164$). Moreover, we examined the moderating influence of market turbulence on the relationships of information-value offerings with customer relationship performance ($\beta = 0.327$, $p < 0.01$) and organizational performance ($\beta = 0.326$, $p < 0.05$), both of which were significantly positive; therefore, H7 and H8 are supported.

Table 3
Discriminant validity.

	M	SD	TR	HR	BR	SIO	US	KS	TS	CP	ORP	MT
TR	5.210	0.808	**0.807**									
HR	5.125	0.922	0.326	**0.796**								
BR	5.015	0.893	0.263	0.526	**0.777**							
SIO	4.640	1.170	0.119	0.157	0.113	**0.836**						
US	4.890	1.195	0.348	0.285	0.223	0.540	**0.841**					
KS	4.578	1.153	0.209	0.241	0.189	0.533	0.728	**0.837**				
TS	4.843	1.045	0.191	0.208	0.375	0.431	0.566	0.430	**0.807**			
CRP	4.934	1.297	0.262	0.320	0.293	0.455	0.644	0.636	0.539	**0.912**		
OP	4.700	1.031	0.251	0.301	0.293	0.413	0.491	0.415	0.396	0.564	**0.841**	
MT	4.490	1.475	0.060	0.070	0.004	0.309	0.356	0.300	0.475	0.456	0.346	**0.918**

Notes: Diagonals represent the square root of average variance extracted, while the other matrix entries represent the correlations; TR: Technology resource; HR: Human resource; BR: Business resource; SIO: Service innovation orientation; US: Useful service; KS: Know-how service; TS: Timely service; CRP: Customer relationship performance; OP: Organizational performance; MT: Market turbulence; M: Mean; SD: Standard deviation.

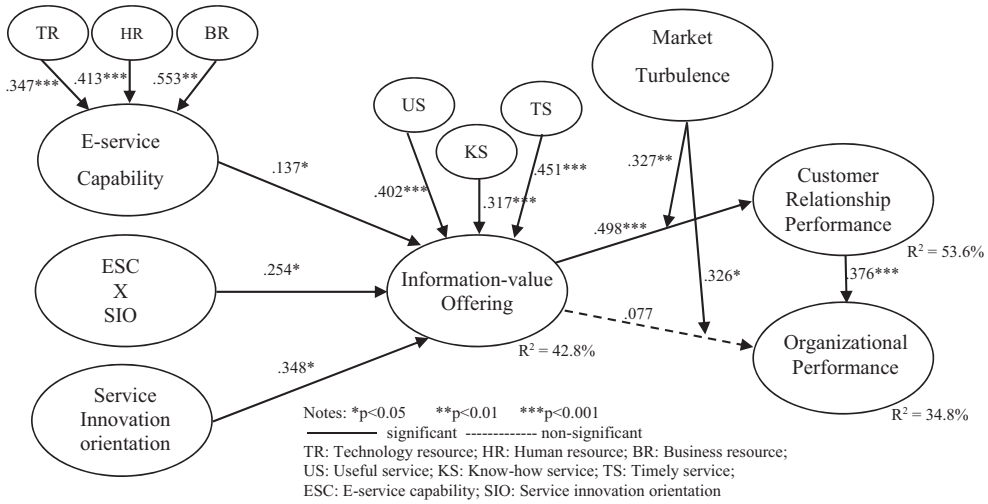

Fig. 2. Results of the model.

Table 4
Parameter estimates for all model runs.

Model 1 (direct effects)			Model 2 (interactive effects)
H1	ESC → IVO	0.276**	0.137*
H2	SIO → IVO	0.547**	0.348*
H3	ESC x SIO → IVO		0.254*
H4	IVO → CRP	0.629**	0.498***
H5	IVO → OP	0.205	0.077
H6	CRP → OP	0.381***	0.376***
	MT → CRP	0.190*	−0.055
	MT → OP	0.079	−0.164
H7	MT × IVO → CRP		0.327**
H8	MT × IVO → OP		0.326*
R^2	Information-offering value	0.426	0.428
	Customer relationship performance	0.533	0.536
	Organizational performance	0.346	0.348

Notes: ESC: E-service capability; IVO: Information-value offering; SIO: Service innovation orientation; CRP: Customer relationship performance; OP: Organizational performance; MT: Market turbulence.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Discussion

This study analyzed the factors affecting information-value offerings in ESV systems and the consequent outcomes in customer relationship performance and organizational performance. Our results reveal that ESV capability and service innovation orientation directly influence information-value offerings. An ESV capability that supports and is compatible with an ESV system must considerably mitigate the inherent operational challenges of integrating a firm's internal resources with the ESV system. This finding supports our view that a supportive and compatible ESV capability, as a firm's infrastructure capability, leads to higher informational value. In addition, service innovation orientation is critical to information-value offerings because it positively affects information processing. The collection and sharing of service information to ascertain customer requirements can facilitate realizing innovative solutions to customer problems. Our results support the hypothesis that service innovation orientation positively affects information-value offerings by facilitating information processing. The results imply that a firm must first focus its strategy toward service innovation orientation to enhance the usefulness and timelessness of and the knowledge derived from the service information.

Previous studies have adopted the resource-based perspective in assessing the contribution of IT to firm value (Melville et al., 2004; Wade and Hulland, 2004). Moreover, several researchers have adopted a strategic positioning to examine the potential and actual effects of IT on firm value (Kim et al., 2008). The current study is the first to provide evidence that resource-based perspective and innovation strategy are applicable in an ESV system context. This study used a framework for examining the antecedents of information-value offerings in an ESV by using resource-based perspective and innovation strategy. This framework highlights the importance of a firm's resources and service innovation orientation strategy, which should be considered by firms seeking to enhance their information-value offerings. To create an outcome based on informational value, firms must identify their valuable resources and capabilities and deploy them effectively to enhance the value of information, including its usefulness, timelessness, and knowledge provided. The results show that ESV systems support the strategies and methods employed by firms to address their strengths and weaknesses. Service-oriented strategies can improve the value of service information, which enables ESV systems to manage customer requirements more effectively.

The complementarity between resource-based perspective and innovation strategy may exhibit synergistic value of service information, but this is rarely empirically tested. Thus, we modeled the interactive effect on information-value offering in addition to the main effects. The findings of this study are consistent with complementary theory (Spanos and Lioukas, 2001), which posits that a firm should align resources and capabilities with the firm's strategy. According to this theoretical approach, the finding supports our hypothesis that information-value offering, if it is to be optimized, must be a service innovation orientation strategy winner, and not only a firm-specific resource taker. To be a successful strategy winner, it must gather useful service information quickly and offer front-line support.

We tested the correlation between information-value offering and organizational performance by adding an additional path between these two constructs. Based on our empirical data, information-value offering has no significant direct impact on organizational performance, whereas it has a strong positive effect on customer relationship performance. This result suggests that information-value offering on organizational performance is insubstantial in a direct path, whereas it is substantial in an indirect path through customer relationship performance. This also implies that financial service industries can derive IS benefits by increasing their operational benefits, which is a result that is also consistent with the study on competitive advantages by Barua et al. (1995).

Conclusions

The study demonstrated that the resource-based perspective and the innovation strategy can complement each other to model the relationships between e-service capability, service innovation orientation, and information-value offering. In order to effectively improve information-value offering in an e-service system, firms should develop their e-service capability and service innovation orientation to support the implementation of the e-service system. Additionally, it is evident that customer relationship performance plays a mediating role in the relationship between information-value offering and organizational performance.

Theoretical implications

This study determined several critical implications for IS and information management research. Our model and findings bridge the gap between the value offering and IT perspectives on service. Although ESV has garnered considerable attention in recent years, the actual definition of an ESV system remains debatable. Chen et al. (2006) indicated that the definitions of ESV depend on a continuum ranging from the processing of specific information to a complete organizational culture embracing a holistic approach and strategy for delivering customer value. This study determined the different facets of value offerings and identified the available value and service information required for successfully implementing an ESV initiative.

Although previous studies have examined the interactive effects of firm resources and strategy in the context of IS systems, the current study is the first to explain the importance of providing informational value by creating complementarity between resource-based perspective and innovation strategy. The findings confirm that ESV capability interacts with service

innovation orientation to positively influence information-value offerings. Because the interaction has a strong influences information-value offerings, these two views must be considered complementary to—rather than competing with—each other. Finally, to successfully introduce an ESV system to improve how business' manage customer relationships, firms must strengthen their service-oriented innovation strategies and develop their ESV capability to be compatible with ESV systems to ensure that ESV can support service-orientated innovation strategies. This enables firms to obtain considerable amounts of useful real-time service information from internal and external sources. ESV systems with high-value service information are more effective and can facilitate one-on-one personalized in-depth service innovation interactions, thereby improving the management of customer relationships.

This study contributes to the growing body of literature that implies that a service-oriented innovation philosophy is a necessary component of organizational success, although such a philosophy by itself may be insufficient. Despite the wide acceptance that innovation orientation can enhance firm performance, the method for achieving target performance outcomes remains debatable. Using a model adapted from past empirical studies, Chen and Tsou (2012) indicated the service innovation-performance chain is mediated by customer service, service delivery, and customization. Our findings are consistent with this revised model in that information-value offerings in ESV systems are considered a form of service support that leads to customer satisfaction and loyalty.

Our analysis revealed the moderating effect of market turbulence. The results accord with contingency theory. The positive effects of information-value offerings on both customer relationship performance and organizational performance are evident in highly turbulent markets, in which firms using ESV systems can leverage their new capabilities to promote meaningful interactions with customers. Firms offering valuable information through ESV systems can provide some type of intraindustry competitive advantage. This study determined the moderating role of market turbulence as a crucial contingency factor in the relationship between information-value offerings and customer relationship performance. The findings provide additional insights into the crucial role of ESV systems that provide appropriate value to customers through the information-value proposition. Furthermore, the findings are crucial for the literature, which neither theorizes nor tests the role of market turbulence in enhancing the relationship between information-value offerings and organizational performance.

Traditionally, researchers view this resource or strategy factor as a one-sided factor, but this view might not capture a holistic picture of how these factors influence information processing in SIS. This study simultaneously considered the resource and strategy factors to provide a complete picture of how these factors influence the information-value offerings of ESV systems. Parallel to a recent call by theorists in SIS research (Rivard et al., 2006), our findings suggest that in addition to a simultaneous examination of the direct effect of resource and strategy factors on information-value offerings, examining interaction effects between them might also be necessary. The interaction role in the current study suggests that the complementarity between resource-based perspective and innovation strategy might lead to effective ESV systems implementation processes that have critical information-value offering implications. Thus, in reality, both resource-based and strategic perspectives can coexist and shape actual firm behaviors in explaining SIS and complement each other in enhancing ESV systems effectively.

Managerial implications

This study provides several implications for practitioners. Managers should reinforce the strategic importance of ESV systems when explaining information-value offerings. The results of this study imply that an ESV system plays two critical roles in providing informational value. An ESV system contributes to informational value when used to leverage ESV capability and support service innovation orientation. In practical terms, this suggests that an essential criterion for developing or implementing an ESV system must be integrated with a firm's resources and strategy. The results may provide a conceptual foundation for business managers. Providing the value of service information on the basis of complementary resource-based perspective and innovation strategy elucidates the advantages and disadvantages in the competencies derived from firm resources supporting ESVs according to the requirements for achieving customer satisfaction and those that emerge from ESV systems supporting a service innovation orientation.

Although previous studies have highlighted the advantages of value offerings, insufficient guidance is available for practitioners to identify and develop customer-perceived value from which a competitive advantage can be derived. Because managers face turbulent markets and changes in their environment, it becomes increasingly critical for them to detect changes in customer preferences and take necessary action to capitalize on the changes rather than merely adapting to the original needs of customers. This study offers insights into ISs as well as the useful, knowledge-providing, and timeless information that is necessary to identify and cultivate new processes that link a firm to its environment. Our findings suggest that managers must focus on ESV system implementation when undertaking initiatives aimed at connecting customer relationships to firm performance. In addition to ensuring that ESV systems are dedicated to such efforts, managers must emphasize information processing (e.g., information collection, integration, and analysis) that enables systems to offer informational value. Firm managers must clearly articulate a strategic purpose for the ESV environment and its organization-wide application.

Most of Taiwan's financial-service firms use customized or selectively packaged ESV systems. Such systems commonly comprise various enterprise-software modules that can be purchased separately according to what best meets a firm's specific requirements and technical capabilities. Each ESV feature focuses on one aspect of an organizational process (e.g., online

package tracking, email notification of order status, and mobile banking). Certain ESV systems can support the introduction of new products and services, forecast customer preferences, develop marketing plans, help customers solve problems, and meet customer requirements. Because ESV systems have become more crucial, newly developed software features and techniques must enable managers to use these features to support other aspects of organizational processes.

Our findings imply that information-value offerings can increase the efficiency of executing customer relationship management activities. The effects are particularly visible when collecting and storing service information, understanding and satisfying customer needs, and improving services. This enables firms to further develop and enhance their relationships with customers. Firms must use service information effectively to provide appropriate products and services to customers, thereby reducing the number of customer complaints. The successful implementation of an ESV system can assist firms in obtaining information about their customers and in promptly responding to customer needs, which can also contribute to reducing the number of customer complaints.

Limitations and future research directions

In this study, the following limitations were encountered. First, we obtained theoretical support for an alternative model that considers the service innovation orientation antecedent. Because the testing procedure outlined in this study yielded research results, we agree with the predominant view in the literature that suggests that these orientations (e.g., product, technology, customer, and marketing orientations) are antecedents to the performance implications of information-value offerings. Future research examining these variables by using longitudinal data could provide a deeper understanding of the relationship between them. Second, although for certain reasons this study used only subjective measures for organizational performance, both objective and subjective measures have advantages and disadvantages. Therefore, whenever possible, future research must use both measures to evaluate organizational performance. Third, the response to this study were voluntary and thus inevitably subject to self-selection variance. We checked for this potential problem with the Harman one-factor test. The test resulted that each principal construct explains roughly equal variance, indicating that our data do not suffer from high common method variance. Finally, this study presented information value is critical to successful e-service systems implementation and resource-strategy complementarity plays a key role in enhancing information-value offerings. In addition to the resource based view of the firm, this study takes the innovation strategy perspective and explores the effects of resource-strategy complementarity on information-value offerings. Taking customer-oriented innovation as a construct representing innovation strategy, future studies may take other strategic perspectives, such as strategic positioning (Kim et al., 2008), strategic innovation (Oshri et al., 2015), and business strategic orientation (Wang and Ahmed, 2009), to find other important strategic factors influencing the successful implementation of e-service systems. Researchers may also explore the role of the complementarity between these factors and RBV in successful e-service systems implementation. The present study will certainly aid in the development of related theories.

Appendix A

Cross-loadings of measurement items on latent constructs.

	BR	CRP	OP	HR	KS	MT	SIO	TR	TS	US
BR1	0.682	0.148	0.175	0.484	0.054	−0.109	0.009	0.148	0.166	0.016
BR2	0.754	0.208	0.257	0.456	0.082	−0.044	0.093	0.187	0.220	0.193
BR3	0.824	0.244	0.287	0.430	0.113	−0.008	0.086	0.260	0.276	0.244
BR4	0.839	0.271	0.205	0.360	0.251	0.081	0.123	0.209	0.408	0.188
CRP1	0.339	0.908	0.532	0.349	0.601	0.334	0.432	0.305	0.518	0.675
CRP2	0.263	0.916	0.512	0.262	0.573	0.484	0.459	0.205	0.491	0.572
CRP3	0.182	0.912	0.494	0.254	0.562	0.441	0.344	0.196	0.459	0.496
OP1	0.209	0.469	0.848	0.244	0.324	0.419	0.347	0.115	0.352	0.385
OP2	0.278	0.436	0.774	0.229	0.305	0.185	0.361	0.281	0.284	0.395
OP3	0.258	0.514	0.896	0.285	0.411	0.258	0.340	0.247	0.357	0.458
HR1	0.455	0.232	0.200	0.804	0.170	−0.004	0.032	0.282	0.131	0.168
HR2	0.458	0.322	0.324	0.887	0.230	0.109	0.122	0.326	0.240	0.252
HR3	0.339	0.192	0.171	0.685	0.167	0.044	0.228	0.154	0.103	0.258
KS1	0.169	0.517	0.364	0.164	0.803	0.239	0.461	0.196	0.338	0.596
KS2	0.152	0.535	0.335	0.204	0.831	0.225	0.350	0.129	0.311	0.574
KS3	0.155	0.543	0.341	0.236	0.875	0.288	0.524	0.199	0.427	0.655
MT1	0.104	0.422	0.271	0.091	0.326	0.895	0.323	0.146	0.458	0.398
MT2	−0.073	0.419	0.356	0.045	0.239	0.941	0.256	−0.014	0.422	0.274
SIO1	0.060	0.323	0.316	0.020	0.464	0.258	0.821	0.137	0.376	0.454

(*continued on next page*)

Appendix A (*continued*)

	BR	CRP	OP	HR	KS	MT	SIO	TR	TS	US
SIO2	0.133	0.422	0.348	0.153	0.460	0.285	0.847	0.113	0.335	0.503
SIO3	0.108	0.363	0.393	0.185	0.378	0.309	0.832	0.075	0.351	0.393
SIO4	0.082	0.414	0.328	0.174	0.478	0.188	0.844	0.073	0.376	0.456
TR1	0.302	0.175	0.211	0.304	0.233	0.041	0.144	0.869	0.195	0.397
TR2	0.187	0.194	0.205	0.262	0.118	−0.015	0.081	0.816	0.088	0.249
TR3	0.216	0.145	0.204	0.300	0.118	0.011	0.148	0.804	0.092	0.233
TR4	0.207	0.233	0.183	0.294	0.141	0.038	0.080	0.832	0.164	0.271
TR5	0.224	0.303	0.174	0.280	0.205	0.033	0.093	0.725	0.180	0.204
TR6	0.073	0.248	0.225	0.108	0.159	0.186	0.003	0.720	0.181	0.239
TS1	0.329	0.411	0.272	0.202	0.293	0.245	0.276	0.152	0.839	0.457
TS2	0.278	0.483	0.417	0.183	0.358	0.484	0.370	0.216	0.824	0.419
TS3	0.307	0.400	0.251	0.119	0.384	0.396	0.388	0.086	0.755	0.499
US1	0.183	0.555	0.381	0.257	0.627	0.318	0.476	0.254	0.581	0.817
US2	0.166	0.470	0.465	0.189	0.565	0.355	0.398	0.296	0.432	0.791
US3	0.186	0.590	0.376	0.288	0.628	0.213	0.412	0.312	0.375	0.868
US4	0.214	0.543	0.441	0.218	0.627	0.326	0.530	0.309	0.525	0.885

Notes: TR: Technology resource; HR: Human resource; BR: Business resource; SIO: Service innovation orientation; US: Useful service; KS: Know-how service; TS: Timely service; CRP: Customer relationship performance; OP: Organizational performance; MT: Market turbulence.

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