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ABSTRACT

Information Technology (IT) is regarded as a facilitator for both small and large firms to speed up transactions between firms and their suppliers and customers, achieve real-time communication, lower transaction costs, and enhance speed and flexibility. However, understanding whether and how IT can help firms to create business value still remains unresolved. Drawing upon resource-based view theory, source-position-performance framework, we develop and test a theoretical model to explore the interrelationships between IT resources (IT human resources, IT infrastructure), IT capability (back-end integration), IT-enabled inter-firm processes (activity integration, coordination, partnership enhancement), and organizational performance in the fast growth small-to-medium enterprises (SMEs) context. We propose that the value of IT depends on how firms employ technologies to develop IT capability which facilitates inter-firm integration and enhances intermediate business processes along the value chains. Structural equation modeling is employed to test our theoretical conceptualization of 310 Australian fast-growth SMEs across different industrial sectors. The results show that IT resources do contribute to fast growth SME performance through developing IT capability and enhancing inter-firm value chain processes such as integration, coordination and partnership enhancement. This research highlights the role of IT resources and IT capability in business value creation and the ways in which IT is used by fast growth SMEs to enhance core business competencies.

Keywords: IT Resources, IT Capability, Back-end Integration, IT-enabled inter-firm processes, Resource-based View of Firms, Source-Position-Performance Framework, Fast Growth SMEs.

INTRODUCTION

Information technology (IT) innovation provides new ways for firms to conduct business with their suppliers and customers. Companies such as Cisco, General Electric, TESCO, and Dell employ IT effectively to achieve real-time communications, coordinate inter-firm processes, enhance speed and flexibility, and ultimately improve business performance. The use of IT gains significant attention in the information systems (IS) area. Particularly since Carr (2003), IT business value has become a growing thematic line of enquiry. Today, more than ever, IS researchers face mounting pressure to address questions concerning whether and how IT investments lead to the creation of business value. Debate has focused predominantly on large firms, with comparatively little attention paid to small-to-medium enterprises (SMEs). It is widely acknowledged that SMEs are the driving engines of most economies (OECD, 2010). Their survival and growth is imperative. For example, in the US, small business creates two-thirds of new jobs, produce 39% of GNP, and generate more than half of technological innovations (Johnston, Wade, & McClean, 2007). In Europe, 99.8% of firms are SMEs, contributing to two-thirds of turnover and business employment (Carayannis et al., 2006). In Australia, 94% - 96% of businesses can be categorized as SMEs, employing approximately 3.5 million people and contributing to an estimated 30% of national GDP (OECD, 2007). Specifically, rapidly growing firms represent a substantial proportion of power in the small business sector, creating wealth, income, and jobs (Delmar, Davidsson, & Gartner, 2003). For the purpose of this study, we define fast growth SMEs as those enterprises that "are willing to take risks, to be innovative, and to initiate aggressive competitive actions" and grow faster than their industry sector average (Upton, Teal, & Felan, 2001, p. 61).

Rapid growth is often regarded as "an indication of market acceptance and firm success" (Barringer, Jones, & Neubaum, 2005, p. 664). Their ability to grow and establish themselves

within their chosen markets in a relatively short period of time makes fast growth enterprises an interesting target for academic research. For example, a ground swell of interest in the strategic management literature investigates the determinants of fast growth. Pertinent findings are related to a range of internal (i.e., founder characteristics, strategy & competencies), external (i.e., alliances & access to capital) factors, business practices contributing to their rapid rise. Compared with their larger counterparts, SMEs in general lack resources for IT innovation. Nevertheless, Storey (1994, p. 146) suggested that "small businesses with higher level of technological ability, even in conventional sectors, are likely to grow more rapidly than those with lower levels of technical sophistication". Siegel, Siegel, and MacMillan (1993, p. 173) observed that the use of advanced technologies enables young ventures to compete in fast-growing markets by insulating themselves from their competitors, concluding that fast-growers are "more likely to utilize new, advanced technology than slow-growers". However, it appears that in the IS research field, there is a dearth of literature focusing on SMEs and perhaps surprisingly, research on fast growth SMEs is almost nonexistent. Therefore, understanding whether and how IT helps fast growth SMEs to gain business advantage still remains enigmatic.

A primary issue in extant IS research is a need for theoretically rigorous and practically relevant frameworks to guide empirical studies (Wheeler, 2002). Straub et al. (2002) further criticized the IS literature on the grounds of being weak when making linkages between theory and measures, let alone when subjecting proposed measures to empirical validation for reliability and validity. It can be argued that IS research is fragmented, contributing to the difficulties examining the interrelationships between variables. For example, ex ante research has examined the relationships between IT investments and firm performance (Bharadwaj, Bharadwaj, & Konsynski, 1999), IT use and firm performance (Armstrong & Sambamurthy, 1999), and determinants that impact IT use (Zhu & Kraemer, 2005). However, the IT payoff

literature has generally not considered IT usage, whereas the usage literature has largely overlooked firm performance (Mishra, Konana, & Barua, 2007). Accordingly, it is imperative to develop an integrated theoretical model to investigate the nomological relationships between antecedents and consequences of IT use.

The present research attempts to address the above gaps in the literature. Drawing upon the resource-based view of the firm (RBV) theory (Barney, 1991) and the source-position-performance (SPP) framework (Day & Wensley, 1988), we theorize and explore the interrelationships between IT resources, IT capability, IT-enabled inter-firm processes, and fast growth SME performance. Specifically, RBV theory provides a theoretical platform upon which the indirect role of IT resources in value creation can be explored through the effects of intermediated-level processes (Melville, Kraemer, & Gurbaxani, 2004; Wade & Hulland, 2004). The SPP framework provides a simple, sequential, overarching framework, highlighting "the creation and sustenance of a competitive advantage are the outcomes of a long-run feedback or cyclical process" (Day & Wensley, 1988, p. 2). We posit that fast growth companies tend to strategically utilize IT resources in order to develop a specific IT capability, that is, back-end integration which enables these firms to conduct inter-firm processes effectively and efficiently, thereby achieving business growth.

Our research heeds the call from IS researchers that further studies are needed to investigate the imperative role of IT in digitization use and firm performance (Kohli & Grover, 2008; Rai, Patnayakuni, & Seth, 2006). We contribute further to the IT paradox debate by understanding IT value creation in the fast growth SME context and provide a solid theoretical framework to explain the nomological links between variables. We examine the hypothesized linkages empirically based on data drawn from a survey of 310 fast growth SMEs in Australia.

This paper is structured as follows. The theoretical background section introduces the tenets of RBV, which forms the backbone of our conceptual model for hypothesis formulation. The research method section outlines the procedures used for data collection, validation of the measurement properties of the constructs, and the test of the proposed research model. Next we present our findings and finally conclude with a discussion of findings, implications for research and practice, limitations and potential avenues for future research.

THEORETICAL BACKGROUND

The improvements of firm performance depend on availability of, or access to, valuable, rare, inimitable, non-substitutable and relatively immobile resources or resource bundles (Barney, 1991). The RBV advocates that organizations succeed and achieve competitive advantage through treatment of resources and capabilities as central considerations in strategy formulation and as primary sources of competitive advantage. According to the RBV, resources and capabilities represent two distinctive entities. While resources are used to create and produce products, capabilities are developed and emerge from utilization of resources in repeatable patterns (Sanchez, Heene, & Thomas, 1996). Resources are generally regarded as inputs or outputs of organizational processes, and are typically not embedded within those processes. Capabilities, however, are firm-specific and embedded in firm processes and routines, transforming inputs into outputs to generate value (Makadok, 2001). Thus, capabilities are unique organizational processes developed to provide reliable services, create product innovations, generate operational flexibility, shorten product development cycles, and respond to evolving market trends (Amit & Schoemaker, 1993). Makadok (2001, p. 387) posits that firms create value from two complementary, but distinct, mechanisms: “resource-picking” and “capability-building”. Firms possessing bundles of advantage-

generating resources and costly-to-imitate capabilities are regarded as fundamental drivers of superior performance.

IS literature (Bharadwaj, 2000; Wade & Hulland, 2004) employs the RBV theory to explain how firms create value from IT resources and organizational skills to develop a firm-wide IT capability. Although IT resources (e.g., hardware and software) are rarely drawn upon for the purpose of creating and sustaining competitive advantage (Clemons & Row, 1991), IT capability as a firm's ability to acquire, deploy, combine and configure IT resources in order to support and enhance business strategies and processes is hard to imitate and confers firms with superior performance (Bharadwaj, 2000; Mata, Fuerst, & Barney, 1995; Wade & Hulland, 2004). In the present study, we examine the role of two types of IT resources (i.e., IT human resources, IT infrastructure) in developing a specific IT capability: back-end integration. IT human resources are the skills and knowledge of a firm's IT personnel (Wade & Hulland, 2004). IT infrastructure refers to physical IT assets including computers, communication facilities, shareable technical platforms and databases (Zhu, 2004). In the digitally-enabled business environment, back-end integration is regarded as a valuable firm's IT capability which "links Web applications with back-office databases and facilitates information sharing along the value chain" (Zhu & Kraemer, 2005, p. 67). Unlike the commodity technologies, back-end integration "is often tailored to a firm's strategic context and is woven into the organization's fabric, which is not transparent to competitors" (Zhu & Kraemer, 2005, p. 71). Although competitors can easily mimic a firm's IT resources, the way companies effectively integrate IT resources within an organizational strategy so as to develop an specific IT capability is hard to acquire and difficult to imitate, thus providing firms with a source of competitive advantage.

Day and Wensley (1988) propose source-positional advantage-performance (SPP) framework, which provides another theoretical framework for this research. The SPP

framework posits that firms possessing superior skills and resources hold an advantage over their competitors. Positions of advantage based on skills, tangible (e.g. assets), and intangible (e.g. knowledge) resources can be expected to lead to superior performance in terms of customer satisfaction, loyalty, market share, and profitability. Forming a cyclical process, competitive advantage can be sustained through constant monitoring and "reinvesting in the present sources of advantage, as well as investing in other potential sources of advantage" (Bharadwaj, Varadarajan, & Fahy, 1993, p. 87).

A growing consensus among IS researchers (Kohli & Grover, 2008; Melville et al., 2004) emphasizes that research on IT business value should take into account of IT-enabled intermediate processes. This effort enables moving beyond correlational evidence between IT and the business value, and prevents potential cancellation and obfuscation when the impact of IT is aggregated across processes (Mishra et al., 2007). Following this logic, we use SPP framework to integrate IT resources, IT capability, IT-enabled inter-firm processes, and firm performance. We posit that IT resources and IT capability provide fast growth SMEs with sources of advantage to differentiate these companies with competitors. IT-enabled inter-firm processes are drawn upon IT resources and IT capability, integrated with a firm's strategies and involve inter-organizational relationships enable fast growth SMEs to coordinate and improve inter-dependent processes in order to respond to customer preference and market changes, provide high quality products and services to meet customer needs. Thus these inter-organizational processes can be regarded as positional advantage, helping firms to achieve growth.

Based on the above discussion, the RBV theory and the SPP framework offer solid theoretical foundations explaining how and why fast growth SMEs achieve competitive advantage not only from commonly available IT resources but also from the integration of these IT resources to form a valuable IT capability which can be leveraged to develop IT-

enabled inter-mediated business routines residing in organizational skills and processes (Bharadwaj, 2000).

RESEARCH MODEL AND HYPOTHESIS DEVELOPMENT

Figure 1 depicts a hypothesized model of IT resources, IT capability, IT-enabled inter-firm processes, and organizational performance, and is followed by a discussion and formulation of testable hypotheses.

Insert Figure 1 about here

IT human resources can be regarded as IT personnel who have specialized intellectual technical skills to develop IT applications that support business processes (Lin & Lin, 2008). IT technical skills contain employees' knowledge of programming, system analysis and design, and competencies in emerging technologies (Bharadwaj, 2000). Compared with physical IT assets (e.g., IT infrastructure), the technical skills of IT employees are regarded as intangible and valuable firm resources which are more difficult to imitate by competitors (Powell & Dent-Micallef, 1997), and are likely to generate competitive advantage for firms (Helfat, 1997; Mata et al., 1995). IS literature (Bharadwaj, 2000; Bhatt & Grover, 2005; Fink & Neumann, 2007) highlights the prominent role of IT human resources in successfully designing IT applications in line with business strategy in order to sustain business advantage. For example, Sambamurthy and Zmud (1997) posit that IT employees with extensive business experience and skills in IS development enable firms to integrate IT strategy and business strategy, to develop reliable and cost-effective systems for businesses, and to anticipate business needs sooner than competitors. Bharadwaj (2000) notes that firms with high level of IT expertise are able to establish efficient communication between IT and operation staff, to develop reliable and relevant business applications, and to align IT and business processes effectively. Zhu and Kraemer (2005) highlight that in digital business

environments, IT employees with superior knowledge about business strategy, competition, and opportunities is imperative to develop business applications that fit a firm's operational and business needs.

Compared with their larger counterparts, SMEs in general lack the resources for IT innovation. However, there is a growing evidence suggesting that more and more SMEs are able to develop a high level of IT expertise through gaining IT project experience over the years and by employing internal IT expertise (Cragg, Caldeira, & Ward, 2011). IT expertise is important for IS success in SMEs (Caldeira & Ward, 2003). More recently, Bi, Kam, and Smyrnios (2011) find that IT human resources is essential in enabling fast growth SMEs to develop an appropriate IT infrastructure platform on which to develop a technically superior back-end functionality for integrating multiple internal as well as external (i.e., business partners, suppliers) databases. Thus, we hypothesize that:

H1: IT human resources are related positively to IT infrastructure.

H2: IT human resources are related positively to back-end integration.

IT infrastructure refers to a set of shared, tangible IT resources, including computers, network and telecommunication facilities, shareable technical platforms, and databases (Ross, Beath, & Goodlue, 1996). Bharadwaj (2000) contends that IT infrastructure provides not only a solid platform upon which firms can leverage IT to conduct business activities but also an agile and flexible technology structure (e.g., integrated database) to respond to customer demands and market changes for future business development. Zhu and Kraemer (2005) argue that digital business is unlikely to become an integral part of the value chain when firms lack appropriate IT infrastructure to readily and efficiently distribute necessary information for e-business operations. A reliable and flexible IT infrastructure fosters strong

links between firms and their business partners and suppliers, leading to the development of robust back-end integration (Bi et al., 2011). Thus, we hypothesize that:

H3: IT infrastructure is related positively to back-end integration.

Activity integration is the extent to which firms collaborate on strategic planning and forecasting activities with their business partners and suppliers in value chains (Kim, Cavusgil, & Calantone, 2006). Coordination refers to firms' ability to coordinate transactional related activities with their partners (Wu et al., 2006). Zhu and Kraemer (2005) argue that a technically sound back-end integration can increase transactional efficiencies, lower operation costs, and create business value for the focal firms. Dong, Xu, and Zhu (2009) contend that back-end integration can improve inter-firm business processes by establishing integrative, collaborative and coordinative connections among value chain members. As an enabler for information processing, integration and coordination to facilitate cross-functional and multi-layer querying, back-end integration is expected to facilitate information flow (Vickery et al., 2003), enhance integrative activities such as collaborative planning, forecasting, and replenishment (Wu et al., 2006), helping firms to create value by improving coordination efficiency and reducing cost (Dong et al., 2009). Thus, we hypothesize that:

H4: Back-end integration is related positively to activity integration.

H5: Back-end integration is related positively to coordination.

A high level of activity integration among value chain members facilitates joint inter-firm processes such as joint production planning and sales forecasting, joint resource planning and work scheduling (Johnson et al., 2007). In the context of digital business operations, a firm's ability to effectively integrate strategic business activities with business partners and suppliers is a prerequisite to achieving high level of coordination efficiency (Cao & Zhang,

2011). Firms employing strategic integration with their value chain partners are likely to increase coordination efficiency of production or exchange through close integration of decisions and operations (Dong et al., 2009). Thus we hypothesize that:

H6: Activity integration is related positively to coordination.

Extending the RBV theory, the relational view of competitive advantage (Dyer & Hatch, 2006; Dyer & Singh, 1998) suggests that critical resources often span firm boundaries and are embedded in inter-firm routines and processes. This type of resources has great potential to generate a relational rent. Following this logic, we argue that IT-enabled inter-firm processes facilitate rent generation by means of inter-firm relation-specific assets and inter-firm knowledge-sharing routines (Rosenzweig, 2009). IS literature (Grover & Malhotra, 1999; Rai & Tang, 2010) highlights that IT can help firms to gain sustainable competitive advantage by facilitating communication, collaboration, and fostering relational capabilities. Firms can achieve sustainable business advantage when they understand how to strategically employ IT resources/capability to enhance collaboration and coordination activities, leading to the development of inter-firm complementary capabilities (Powell & Dent-Micallef, 1997). Companies such as Dell and Wal-Mart develop strategic relationships with their partners and derive substantial benefits from such partnerships.

In the context of relationship development, the sustainability of strategic advantage depends on how IT is employed to foster inter-firm processes and to facilitate the development and use of complementary capabilities (Dyer & Singh, 1998). Recent research (Autry & Golicic, 2010; Oh, Teo, & Sambamurthy, 2012; Rai & Tang, 2010) demonstrates that the inter-firm collaboration and coordination can help the focal company to increase the intensity of, and enrich the quality of, its interactions with partners and suppliers, thus enhancing business relationship development. Firms sharing important product planning and

inventory information with value chain members on a regular and real-time basis are more likely to develop productive relationships (Paulraj, Lado, & Chen, 2008). In addition, an imperative precursor to effective and efficient inter-firm processes is the commitment of resources among members in the value chain to ensure that their business processes and systems are mutually compatible (Carr & Pearson, 1999). When the focal company's systems and online information repositories are integrated with those of its partners and suppliers, these parties are able to exhibit a greater commitment to their mutual relationships (Du et al., 2012). Such commitment can, in turn, foster trusting, long-lasting relationships and can credibly signal the parties' intentions to ensure the long-term success of their business relationships (Wu, Mahajan, & Balasubramanian, 2003). Thus, we hypothesize that:

H7: Activity integration is related positively to partnership enhancement.

H8: Coordination is related positively to partnership enhancement.

Inter-firm collaboration and coordination is necessary to ensure performance (Stank, Keller, & Daugherty, 2001). Effective coordination not only reinforces a firm's ability to maintain, advance, and strengthen its relationships with value chain partners (Rai & Tang, 2010), but also enables partner organizations in the value chain to share information in a timely manner, schedule procurement, production, and distribution operations synchronously, and respond to market changes swiftly (Devaraj, Krajewski, & Wei, 2007). Given that coordination is facilitated by the efficacy of a robust back-end integration and a repetitive collaboration process, firms endowed with superior coordination competency can outperform competitors through efficient order handling procedures and short delivery lead time, therefore achieving improved performance (Kim et al., 2006).

Strategic alliance research (Dyer & Hatch, 2006; Dyer & Singh, 1998) emphasizes that it is imperative for companies to build strategic relationships in order to achieve sustainable

value in the face of the increasing pace of change and complexity of business environments. Building strategic relationships with business partners and suppliers not only enables firms to access to new technologies, markets, and complementary resources, but also to increase their responsiveness to market changes, fosters great knowledge seeking, and achieve synergetic rents (Gulati, Nohria, & Zaheer, 2000). Studies show that the higher level of collaboration in a relationship, the better business performance companies can achieve (Rosenzweig, 2009). In relation to fast growth SME context, research (Barringer et al., 2005; Beekman & Robinson, 2004) suggests owing to a lack of resources, rapid growth SMEs tend to engage proactively in inter-organizational partnerships to build resources which provide another avenue to high growth. Thus, we hypothesize that:

H9: Coordination is related positively to sales performance.

H10: Partnership enhancement is related positively to sales performance.

RESEARCH METHODOLOGY

Target Population and Survey Sample

The data used for testing our hypothesized model was collected through an online survey of 1,335 Australian fast-growth SMEs compiled by Business Review Weekly (BRW). The BRW Fast Growth enterprises are similar to Fortune's FSB 100 annual list of North America's fastest growing small companies. Key inclusion criteria for SMEs to enter the BRW fast-growth project are that their previous year's turnover must exceed AUD$500,000; they must have fewer than 200 full-time employees; they cannot be a subsidiary of an Australian or overseas corporation; and they must not receive more than 50% of their revenue from a single client. Except for the turnover criterion, which is subject to indexing, the other criteria have remained constant. Fast-growth companies from this sample fall within Ghobadian and O'Regan's (2000) definition of SMEs.

We have chosen to test our proposed model using fast-growth SMEs because SMEs are a dominant part of and significant contributor of employment of the Australian economy (OECD 2007). IS research on SMEs is still thin on the ground and the benefits SMEs derive from IT investments is far from conclusive (Eikebrokk & Olsen, 2007). Fast-growth SMEs are more entrepreneurial and risk taking in their business orientation. Focusing on fast growth SMEs provides insightful understanding how this cohort of firms leverages IT to develop IT capability in order to achieve outstanding business performance.

Data Collection Procedures

A personalized email highlighting the academic nature of the study was sent to either the founder or CEO of all 1,335 fast-growth SMEs on the BRW database. In our emails, we emphasized the importance of having respondents with a good understanding and overview of their firm's e-business activities to participate in our survey, urging the founder or CEO to personally complete the online questionnaire, where possible. A follow-up email was sent three weeks after the initial one, and a second reminder email another two weeks later. Respondents were assured of confidentiality. A total of 310 responses were obtained, which gave a gross response rate of 28.1%, after discounting 195 incorrect email addresses and 32 SMEs which declined to participate. All responses were filled by either the company founder or its CEO.

We first tested the sample for non-response bias, using the approach suggested by Armstrong and Overton (Armstrong & Overton, 1977). Differences in responses to all the constructs between early respondents (i.e., those that completed the survey upon the first invitation) and late respondents (i.e., those who replied to follow-up emails) were compared. Independent sample *t*-tests on each construct failed to reveal significant differences between early and late respondents (all *p*-values>.05), suggesting that non-response bias was not an issue.

The profile of the responding firms in our study (Table 1) shows that our sample contains companies in all major industry sectors. There is also equal distribution of companies in terms of their age (or years of establishment). All responding firms had achieved a growth rate in excess of 20%.

Insert Table 1 about here

Common Method Bias

As our study used a self-administered questionnaire and respondents were in a senior management position qualified to assess firm performance, measurement was subject to cognitive biases due to participants "seeking to present themselves in a favorable manner" (Thompson & Phua, 2005, p. 541). Anticipating such a possibility, we incorporated Marlowe and Crowne's (1961) Social Desirability Scale in our online questionnaire, inviting participants to complete this section as part of the survey. The incorporation of Marlowe and Crowne's (1961) Social Desirability Scale in our questionnaire enabled us to assess all study items for social desirability response bias in order to address internal validity and psychometric aspects of instruments. Marlowe and Crowne's (1961) Social Desirability Scale has been used widely for checking cognitive biases (Ballard, 1992).

In this study, we tested common method bias using SEM procedures recommended by Podsakoff et al. (2003). First, we conducted a Harman one-factor test to estimate the extent of the bias. Principal components analysis resulted in six components, accounting for 70.1% of the total variance. The first component explained only 37.1% of the variance, implying the absence of a dominant general factor that accounts for more than 50% of the variation. Second, this study controlled for the effects of a directly measured social desirability factor (i.e., the social desirability factor was linked to all endogenous variables). Results culminated in a poor fitting model entailing associations between social desirability and model parameters, with all path coefficients being close to zero and nonsignificant (all *ps*>.05).

Accordingly, social desirability does not contribute significantly to the model, suggesting that there is no common method bias.

Constructs

Measurement items were developed based on a comprehensive review of the literature (Table 2). Development of respective measurement models incorporate successive stages of theoretical modeling, statistical testing, and refinement (Straub, 1989).

Insert Table 2 about here

Instrument Validation

Data were analyzed with AMOS 19.0, using confirmatory factor analysis (CFA) procedures with the maximum likelihood (ML) estimation method. Prior to conducting the CFA, we ran an exploratory factor analysis (EFA) on all indicators. Principal axis factoring with direct oblimin rotation yielded consistent groupings with our hypothesized measurement models. All constructs were tested for reliability, validity, and fit. Based on an assessment of CFA fit statistics, measurement models were further refined to obtain sound fit. Respectively, Tables 3 and 4 show correlations and descriptive statistics and measurement properties of constructs. As reported below, instrument validation proceeded through four steps: calculation of construct reliability; variance extracted estimates; and evaluation of convergent and discriminant validity.

Insert Tables 3&4 about here

Construct Reliability

Construct reliability, a measure of consistency, assesses the degree to which items are free from random error. Indictor and composite reliability are two measures of construct reliability (Fornell & Larcker, 1981). While indicator reliability represents the proportion of variation that is explained by a construct it purports to measures, composite reliability reflects

the internal consistency of indicators (Werts, Linn, & Jöreskog, 1974). In the present study, indicator reliability values range between .50 and .88, and composite reliability values exceed the recommended value of .70 (Nunnally & Bernstein, 1994).

Variance Extracted Estimate

Variance extracted estimate reflects the overall amount of variance in indicators accounted for by a latent construct (Fornell & Larcker, 1981). In this study, all estimates exceed the recommended value of .50 (Hair et al., 2006).

Construct Validity

Construct validity was established by measuring convergent and discriminant validity of measurement items (Phillips & Bagozzi, 1986). Convergent validity assesses the consistency across multiple operationalizations. Values for *t*-statistics for all factor loadings were found to be significant (all *p*-values<.001), indicating that measures satisfy convergent validity criteria (Gefen, Straub, & Bourdreau, 2000). According to Fornell and Larcker (1981), average variance extracted for each construct should be greater than the squared correlation between constructs when assessing discriminant validity, the extent to which different constructs diverge from one another. In this case, results suggest that items share more common variance with related than non-related constructs, with all constructs meeting this criterion.

Data Analysis

Confirmatory and full structural model fit were assessed using multiple indices (Hair et al. 2006), including the normed chi-square (χ^2/df), comparative fit index (CFI), Tucker-Lewis Index (TLI), root mean-square error of approximation (RMSEA), and standardized root mean-square residual (SRMR). All seven measurement models tested were found to meet the

criteria set for these indices (i.e., χ^2/df ratio < 3; CFI and TLI > .90; RMSEA < .08; and SRMR < .08). All seven measurement models tested were found to meet these criteria.

RESULTS

Given the acceptable measurement models, we estimated a full latent variable structural model (Anderson & Gerbing, 1988) using same goodness of fit criteria to test our structural model and respective hypotheses. Table 5 summarizes the results of hypotheses testing, revealing reliable and robust fit between our theoretical model and sample covariances: $\chi^2(179)=346.348$, $\chi^2/df=1.935$, CFI=.960, TLI=.953, SRMR=.062, RMSEA=.055. These indices suggest a good model fit. The squared multiple correlation (SMC) values, which are similar to R^2 in regression analysis, show that this model accounts for 32% of the variance in IT infrastructure, 45% of the variance in back-end integration, 17% of the variance in activity integration, 31% of the variance in coordination, 24% of the variance in partnership enhancement, and 44% of the variance in sales performance. Table 5 shows that all hypothesized relationships are supported.

Insert Table 5 about here

DISCUSSION

Aiming to address understudied issues about IT and fast growth SME performance, this research develops and empirically tests a hypothesized theoretical model integrating IT resources, IT capability, IT-enabled inter-firm processes, and organizational performance. The RBV theory and SPP framework underpin the present research. Results show that all ten hypothesized relationships are supported, suggesting that IT can help fast growth SMEs to achieve business growth through the development of back-end integration capability and IT-enabled inter-firm processes. This study provides six insights significantly contributing to theory, IS research, and business practices.

First, this study develops, theorizes, and empirically validates an integrated theoretical model to investigate nomological relationships among IT resources, IT capability, IT-enabled inter-firm processes, and organizational performance. Our results highlight IT resources and IT capability are sources of advantage, helping firms to achieve business value through facilitating inter-firm business processes. Because transaction-specific know how and inter-firm knowledge-sharing routines are socially complex advantages subject to considerable causal ambiguity and time-compression diseconomies, these inter-firm processes are difficult to replicate, providing positional advantage for firms to outperform their competitors (Barney, 1991; Day & Wensley, 1998; Dyer & Hatch, 2006). Through exploring the entire nomological net containing IT resources, IT capability, and implications of IT resources/capability, this research empirically tests the application of RBV theory and SPP framework, thus offering a sharp theoretical lens to view the phenomena in IT business value creation.

Second, this study contributes to IS literature by synthesizing resource-picking and capability-building mechanism to investigate how IT resources help firms to build IT capability which in turn leads to business value. Although the RBV theory emphasizes the possession of rare, valuable, and inimitable resources as drivers of competitive advantage (Barney, 1991), recent theorizing argues that capability-building processes are more significant than resource-picking processes (Oh et al., 2012). It is noteworthy, however, that ex ante studies of impact of IT resources on IT capability and firm performance largely overlook resource-picking and capability-building processes (Ravinchandran & Lertwongsatien, 2005). To bridge this apparent gap in the literature, we disaggregate IT resources into IT human resources and IT infrastructure and explore the synergistic effects of these two IT-based resources on the development of IT capability. Our results suggest that IT human resources with superior knowledge about business strategy, competition, and

opportunities are the origin of source of advantage, helping firms to renew and redevelop existing resources/capability and create strategic value (Bhatt & Grover, 2005; Fink, 2011). Examinations of direct relationship between IT resources/capability and firm performance are unlikely to generate such insights.

Third, our results indicate that backend integration, as a valuable IT capability, has a substantial effect on inter-firm process-level performance along the value chain. This finding highlights that IT business value depends on how firms effectively employ technology to improve value chain operations (Dong et al., 2009; Zhu & Kraemer, 2005). According to RBV theory, in competitive environments, it is imperative for firms to develop ability to integrate resources into bundles of organizational capabilities which are difficult to imitate and confer firms with superior performance (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997). Consistent with this logic, IS researchers (Bharadwaj, 2000; Wade & Hulland, 2004; Zhu & Kraemer, 2005) suggest that although commonly available IT resources cannot by themselves create sustained performance gains for firms, IT capability can provide firms with sustainable business advantage because it involves a long-term development process and requires firms to make a series of linked strategic decisions and moves related to IT resources so as to blend them with organizational processes and knowledge resources.

Our results indicate that inter-firm integration and coordination processes are achieved through the deep embedding of integrated IT capability as process enablers. The development of such IT-enabled inter-firm process capability that leverages IT infrastructure integration requires significant time, substantial expertise spanning the business process domain, partnership context, and IT, the perspective of which makes competitors hard to imitate. IS research (Rai et al., 2006; Rai & Tang, 2010) highlights the fundamental role of IT in value chain management is not only to provide speed and flexibility, but also to facilitate a close linkage in key processes among value chain members so as to improve procurement,

forecasting, and new product development. Lee and Whang (2001) emphasize that building an integrated value chain glued by information flows is imperative for firms to survive and achieve long-term competitive advantage in fast-changing business environments. Our study provides empirical evidence about how firms gain business advantage through inter-firm process competencies which are enabled by back-end integration. Our results provide an implication for IT business value research, suggesting the usefulness to gauge intermediate firm performance and probe into the specific ways that IT is used to improve business processes (Kohli & Grover, 2008).

Fourth, our results suggest that IT-enabled integration and coordination processes are positively related to partnership enhancement and sales performance. These findings confirm the relational view of competitive advantage which provides a valuable theoretical lens to investigate the ways in which inter-firm processes influences business-related performance. Rayport and Jaworski (2004, p. 58) assert that ‘‘as the focus of competition shifts from what companies do to how they do it, the new frontier of competitive advantage lies in the quality of interactions and relationships companies can establish with their customers and markets.” Along these lines, recent research (Patnayakuni, Rai, & Seth, 2006; Rai & Tang, 2010) underscores that in the digitally enabled business environments, the emergence of a new model of competitive strategy stems from how firms effectively manage value chains through integration of inter-firm processes across partner organizations. Our findings highlight that sustainability of strategic advantage depends on how IT is used to foster collaborative communication between value chain partners, and facilitate the development and use of complementary capabilities.

Fifth, this study contributes to IS research by investigating the business value of IT in the fast growth SME context. It is noteworthy that compared with larger counterparts, SMEs gain little attention and research targeting fast growth enterprises is almost non-existent in the IS

field. Fast growth SMEs are entrepreneurially-oriented, willing to seek competitive opportunities to add profitable value to their products or services, and share relevant customer- or market-focused information with key stakeholders (Barringer et al., 2005). Our findings highlight that this cohort adopts a proactive IT stance, employs high level of IT expertise to experiment and explore new and available technologies in order to exploit existing competencies, address and create new business opportunities.

Last, this study contributes to practice by providing a useful integrative framework for managers to understand the ways in which IT investments help firms to create strategic advantage and achieve financial performance. Just as a map is not the actual territory it is supposed to represent, sources of competitive advantage, be they technological, organizational, or environmental do not guarantee competitive advantage. It is the ways in which firms combine these qualities to develop unique organizational capabilities to achieve superior business advantage. Managers are advised to examine external industry contexts, firm-specific resources, and core processes that foster the development of capabilities that form part of corporate strategies and growth.

This study offers three important implications for managers. First, our model identifies technologies are critical for the success of the digitally enabled business environments. It is essential that managers take these resources into account when transforming their physical supply chains into those based on digital connections and information flow. Particularly, firms need to understand the important role of backend integration in achieving seamless information flow among various information systems and databases both internally and externally across the production, supply, and distribution networks. This will become even more important as competition intensifies.

Second, this study highlights that resources/capabilities become sources of advantage only when they are exploited through business processes. Managers should assign a high priority

to the identification of resource competencies that have strong potential for developing specific IT capability and focus on appropriate business processes where IT capability is deployed.

Third, managers should bear in mind that establishing information-linked strategic alliances with business partners and suppliers is critical. In the current digitally enabled business environments, firms are no longer working alone; they have to learn to build strategic partnerships with their value chain partners so as to leverage the external resource provided by business partners and thus gain relational rents.

LIMITATIONS AND FUTURE RESEARCH

This study has four notable limitations. First, a cross-sectional research design was adopted with data collected at a single point in time. IT-enabled business processes and competencies are dynamic. Firms require time to reconfigure their resources to adapt to changes in the technological and business environments. Future research might consider using longitudinal designs to address issues relating to the evolution of IT-enabled processes and the development of core business competency.

Second, utilizing single-informant (CEO and/or founder) in each responding company presents issues of data credibility. Single informant studies are well-known for their susceptibility to reporting bias. Future research might consider obtaining data from managers across the IT, marketing, and operational functions.

A third limitation relates to sample characteristics upon which the present hypotheses are tested. The current investigation is drawn from a relatively small proportion of self-selected fast-growth SMEs in a specific geographic region. While the present hypothesized model might be applicable to larger firms as well as firms in other geographic locales, further research is needed to expand the generalizability of the findings.

Finally, the present study only explores the impact of IT resources/capability in enhancing organizational performance. Future research should extend the current investigation and explore other elements such as how culture, structure and leadership interact with IT in enabling firm performance. Including these variables could offer significant improvements over the current model, providing a more comprehensive understanding of the value of IT complementary resources and IT capability.

CONCLUSION

Understanding whether and how IT helps firms to create business value is an ongoing debate among both researchers and business practitioners. However, most of research targets larger companies with little attention paid to SMEs. We sought to better understand this commonly understudied IT-business performance issue in the SME context. We examine the role of two specific IT resources: IT human resources and IT infrastructure in business value creation. We argue that IT resources and IT capability, as sources of advantage, help fast growth SMEs to develop positional advantage over competitors by improving inter-firm business processes along value chains which in turn create business value. The current findings demonstrate that fast growth SMEs foster, nurture and develop firm-wide IT capability by successfully managing and leveraging their IT resources in such a way as to achieve high growth. In the light of the ongoing debate about the business value of IT, we hope this study motivates further discussion and encourages the advancement of theory that helps us to improve our understanding of the dynamics of IT and its relationship to organizational performance in the SME context.

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Figure 1. Research Model

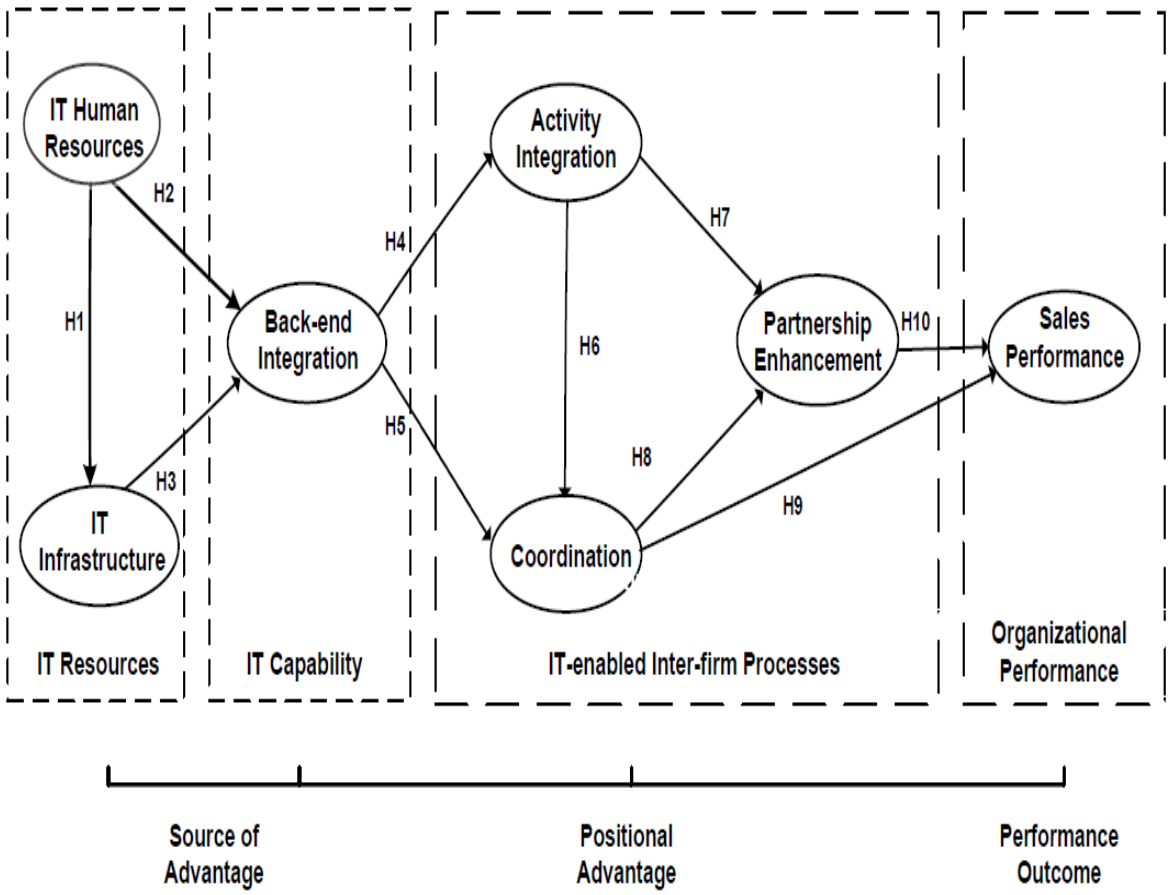

Table 1. Profile of Responding Firms

	% (*n*=310)
Industry	
Information Technology	18.8
Property & Business Services	18.1
Personal & Other Services	9.6
Finance & Insurance	8.9
Communications	6.6
Others [a]	38
Company Age	
Less than 5 years	49
More than 5 years	51
Previous Year Growth Rate	21.9-759.5
CEO/Founder's Education Level	
Tertiary	53.9
MBA	16.6
Year 12	13.7
PhD or Doctorate	1.8
Other	14.0

Note. [a] Other industry sectors include Construction, Retail Trade, Manufacturing, Health & Community services, Wholesale Trade, Education, Transport & Storage, Accommodation, café, restaurants, Mining, Cultural & recreational services.

Table 2. Constructs and Indicators

Constructs	Indicators
1.IT Human Resources (ITHR) *Adapted from Lin and Lin (2008)*	Our company hires highly specialized or knowledgeable people for e-business. IT people working for our company are well aware of the multi-faceted functions of e-business. IT people working for our company are adequately trained in e-business.
2. IT Infrastructure (ITIF) *Adapted from Zhu (2004)*	Our company has a good telecommunication infrastructure. Our company's IT systems infrastructure is very flexible in relation to company's future needs. Our company's IT systems enable us to effectively cooperate electronically with suppliers/partners and customers.
3. Back-end Integration (BI) *Adapted from Zhu and Kraemer (2005)*	There are well-integrated multiple web applications encompassing different areas in our company. Our company shares common databases for various applications, rather than having a separate database for each application. Our company's databases are electronically integrated with our business partners and suppliers.
3. Activity Integration (AI) *Adapted from Kim et al. (2006)*	Our company collaborates actively in forecasting and planning with our business partners. Our company projects and plans future demand collaboratively with our business partners. Collaboration in demand forecasting and planning with our business partners is something we always do.
4. Coordination (COOD) *Adapted from Wu et al. (2006) and Kim et al. (2006)*	Our company conducts transaction follow-up activities more efficiently with our business partners and suppliers than do our competitors with theirs. Our company spends less time on supply chain coordination transactions with our business partners and suppliers than our competitors with theirs. Our company conducts supply chain coordination transactions at less cost than do our competitors with theirs.
5. Partnership Enhancement (PE) *Adapted from Wu et al. (2003)*	Our company is able to strengthen the existing business relationships with business partners and suppliers. Compared with our competitors, the relationships between our

Constructs	Indicators
	company and business partners and suppliers are likely to last longer.
	Our company is able to build up new business relationships with business partners and suppliers.
6. Sales Performance (SALP) *Adapted from Wu et al. (2003)*	Compared with our competitors, our sales area has widened significantly.
	Compared with our competitors, our company performs much better in market development.
	Compared with our competitors, our company performs much better in product development.

Table 3. Correlation Matrix, Mean Scores and Standardized Deviations

	Mean	SD	1	2	3	4	5	6	7
1. ITHR	4.95	1.69	**.83**						
2. ITIF	5.53	1.08	.48**	**.82**					
3. BI	4.12	1.63	.52**	.39**	**.70**				
4. AI	4.30	1.64	.28**	.26**	.34**	**.95**			
5. COOD	4.40	1.24	.31**	.38**	.34**	.45**	**.85**		
6. PE	5.42	1.11	.21**	.24**	.20**	.37**	.38**	**.87**	
7. SALP	5.32	1.21	.27**	.23**	.23**	.36**	.51**	.42**	**.86**

Note. (1) *p<.05. **p<.01.
(2) The diagonal elements are the square root of the AVE.

Table 4. Confirmatory Factor Analysis: Standardized Loadings and Reliability

Constructs	Cronbach's α	Construct Reliability	Variance Extraction	Range of Standardized Loadings	Range of Indicator Reliability
1. ITEP	.86	.87	.69	.75-.94	.57-.90
2. ITIF	.83	.89	.66	.74-.89	.54-.76
3. BI	.75	.74	.50	.65-.77	.43-.60
4. AI	.75	.74	.50	.65-.81	.42-.66
5. COOD	.87	.89	.73	.83-.93	.58-.82
6. PE	.95	.89	.72	.71-.93	.58-.82
7. SALP	.86	.87	.69	.67-.80	.57-.84

Note. All factor loadings are significant at p<.001 level

Table 5. Proposed Hypotheses and Test Results

Hypothesis	Standardized Paths Estimates	Conclusion
H1: IT Human Resources → IT Infrastructure	.56***	Supported
H2: IT Human Resources → Back-end Integration	.51***	Supported
H3: IT Infrastructure → Back-end Integration	.24**	Supported
H4: Back-end Integration → Activity Integration	.41***	Supported
H5: Back-end Integration → Coordination	.26***	Supported
H6: Activity Integration → Coordination	.35***	Supported
H7: Activity Integration → Partnership Enhancement	.28***	Supported
H8: Coordination → Partnership Enhancement	.25***	Supported
H9: Coordination → Sales Performance	.23***	Supported
H10: Partnership Enhancement → Sales Performance	.53***	Supported
Model Fit Indices		
$\chi^2(179)=346.348$,		
$\chi^2/df=1.935$,		
CFI=.960, TLI=.953,		
SRMR=.062,		
RMSEA=.055		

Note. *p<.05. **p<.01. ***p<.001.