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### Effect of IT Complementary Resources on Fast Growth Small-to-Medium Enterprise Performance

#### A Resource-based View

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# THE EFFECT OF IT COMPLEMENTARY RESOURCES ON FAST GROWTH SMALL-TO-MEDIUM ENTERPRISE PERFORMANCE: A RESOURCE-BASED VIEW

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## Abstract

*Owing to limited resources available to small-to-medium enterprises (SMEs) to take advantage of technologies, IT is regarded as less important to SMEs compared with larger firms. Understanding whether and how IT helps SMEs to achieve business advantage still remains unclear. Drawing upon the resource-based view theory, the information systems (IS) and fast growth company literature, we develop and test a theoretical model that integrates IT complementary resources, business process performance and firm performance. We propose that fast growth SMEs are highly entrepreneurial and innovative, know how to strategically utilize IT to improve business processes and thus achieve rapid growth. 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 complementary resources do lead to firm growth through enhancing activity integration and information sharing processes along the value chains. This research contributes to the ongoing debate of IT business value in the SME context and highlights the ways in which IT helps fast growth SMEs to achieve business success.*

*Keywords: IT Complementary Resources, IT Infrastructure, Strategic IT Alignment, Market Orientation, Activity Integration, Information Sharing, Firm Performance, Resource-based View of Firms.*

# 1 INTRODUCTION

Since Carr (2003), research focusing on information technology (IT) business value has become an increasing thematic line of enquiry for investigators and business practitioners. However, debate has been focused on large companies, with little attention paid to small-to-medium enterprises (SMEs). It is well acknowledged that SMEs are the driving engines of most economies (OECD 2010). Specifically, rapidly growing firms represent a substantial proportion of power in the small business sector, creating wealth, income, and jobs (Delmar et al. 2003). According to Upton et al. (2001, p. 61), fast growth SMEs are 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. Barringer et al. (2005, p. 682) posit that “firm growth is not a random or chance event” but associated with entrepreneurial firm attributes, behaviors, strategies, and relative environmental munificence. Although an extensive research has been done in fast growth SME area, understanding the determinants and behaviors of this cohort still remains limited and fragmented.

IT is regarded by managers as a competitive tool for implementation of strategic plans and support for firm core competencies (Aral and Weill 2007). Compared with larger companies, SMEs in general lack resources for IT innovation. However, Steiner and Solem (1988) observe that the adoption of new technologies and the availability of resources to adopt new technologies are strongly related to SME success, highlighting that small firm access to resources is a key to growth. Todd and Taylor (1993, p. 75) state that access to new technologies is “frequently the basis of the fast growth firms’ competitive advantage”. Tiessen et al. (2001) accentuate three main reasons why SMEs are driven to use new technologies: they are able to, they want to, and environmental changes and industry norms tell them to. More recently, Khazanchi (2005) concludes that the flexible structure and sound managerial capabilities of SMEs not only guarantee success of IT adoption and use, but also have positive effects on financial performance. Notwithstanding, we notice that there is not a substantial body of theory-driven empirical studies that demonstrate how IT enhances fast growth SME performance, constituting an apparent gap in both the fast growth company and information systems (IS) literatures.

Examining IT usage in the digitally enabled inter-firm processes has also gained intensive attention in the IS area. As IT provides new opportunities for firms to manage inter-firm relationships, it is imperative that we understand the impact of IT resources complementary with other organizational resources on business performance through inter-firm business processes (Dong et al. 2009). Although research has examined the performance benefits of IT resources, there is still limited understanding of the links between IT and SME performance. Moreover, understanding IT value creation in the SME context will have significant implications for the way firms approach IT investment and management. Thus, further rigorous empirical examination is needed to understand how and why IT enhances firm performance through intermediate processes.

Drawing upon the resource-based view of the firm (RBV) theory (Barney 1991) and the IS and fast growth company literature, we explore the relationship between IT complementary resources and fast growth SME performance. We argue that IT resources (i.e., IT infrastructure) complementary with other organizational resources (i.e., strategic IT alignment, market orientation) can help fast growth firms to achieve business value by improving inter-firm business process performance such as activity integration and information sharing. 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 the 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.

## **2 THEORETICAL BACKGROUND AND HYPOTHESES**

The RBV posits that 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). Wernerfelt (1984, p. 172) posits that resources are “anything that might be thought of as a strength or weakness of a given firm”, comprising tangible and intangible assets. While tangible resources include financial capital (e.g. equity capital, debt capital, retained earnings) and physical capital (e.g. machinery & buildings), intangible resources such as organization culture, learning, networks, and reputation tend to be tacit, idiosyncratic, and deeply embedded in an organization’s social fabric and are more likely to produce a competitive advantage (Winter 1987).

Owing to resource constraints, small or new firms are usually unable to achieve significant economies of scale or scope, or serve a broad target market, limiting their choices of strategy (Porter 1985). Notwithstanding, Brush et al. (2001) advise that the resources of innovative and growth-oriented firms are different from those of slow-growth niche enterprises. Recently, Moreno and Casillas (2007) advocate a new approach by using the resource constraints (Baker and Nelson 2005) and the slack resources argument (George 2005) as a way of explaining SME growth. While the resource constraints literature (Baker and Nelson 2005) states that firms with fewer resources are likely to leverage them more efficiently, the slack resources argument (George 2005) proposes that slackness provides a cushion of actual or potential resources, enabling firms not only to adapt successfully to internal pressures of transformation but also to initiate changes in strategy, thus influencing business performance.

Both the resource constraints and slack resources arguments are consistent with the combination of entrepreneurial firm and the RBV theory (Barney 1991; Penrose 1959), the perspective of which suggest that organizations can be regarded as a set of resources and firm growth can be explained through the availability of idle resources. According to Penrose (1959), when a firm is entrepreneurial, the existence of slack resources promotes firm growth. It is argued that slack resources are potentially utilizable, and can be diverted or redeployed for the achievement of organizational goals (Moreno and Casillas 2007). The availability of idle resources can enhance experimentation and risk-taking, insulate firms from exogenous shocks, and provide flexibility for managers to develop strategic options. Compared with their larger counterparts, entrepreneurial SMEs are viewed as having greater availability of slack resources and are impelled to grow in order to reach their optimal size (Moreno and Casillas 2007).

IS research (e.g., Clemons and Row 1991; Ravinchandran and Lertwongsatien 2005) has employed the RBV theory to explain how firms create business value by leveraging IT complementary resources. Studies highlight that IT resources are likely to affect firm performance only when they are deployed to create unique complementarities with other firm resources in order to provide strategic benefits. For example, Clemons and Row (1991, p. 275) initially proposed the notion of “strategic necessity”, arguing that while IT resources are essential to firms, they are neither unique nor difficult to imitate. Similarly, Benjamin and Levinson (1993) contend that business performance depends on how IT is integrated with organizational, technical, and business resources. In order to better understand how IT complements with other resources to create strategic value, IS researchers (e.g., Clemons and Row 1991; Ravinchandran and Lertwongsatien 2005) have conceptualized resource complementarity in two broad ways. First, firm resources are considered complementary when the presences of resources enhance the value or effect of other resources. Another perspective conceptualizes resource complementarity based on how resources are channelled and utilized. It is not only the co-presence of

resources that results in complementarities but also the decisions firms take about how resources are to be deployed and channelled). Therefore, management decisions play a central role in how to channel and utilize resources towards areas of strategic importance to firms (Ravinchandran and Lertwongsatien 2005). For the purpose of this study, we conceptualize IT resource complementarity as the co-presence of IT resources and other organizational resources, investigating how fast growth SMEs deploy these resources to gain business success through the improvements of business process performance.

The RBV theory provides a lens to explain an indirect role of IT in business value creation. The basic logic is that IT affects intermediate business processes which, in turn, lead to competitive advantage (Wade and Hulland 2004). In line with this view, we investigate how IT resources can be complementary with other organizational resources to enhance fast growth SME performance through improving business process performance. Specially, we examine IT complementary resources from IT infrastructure, strategic planning (i.e., strategic IT alignment) and culture (i.e., market orientation) perspectives which are the pertinent resources identified in the IS and fast growth company literature. Figure 1 depicts a hypothesized model of IT complementary resources, business process performance and firm performance, and is followed by a discussion and formulation of testable hypotheses.

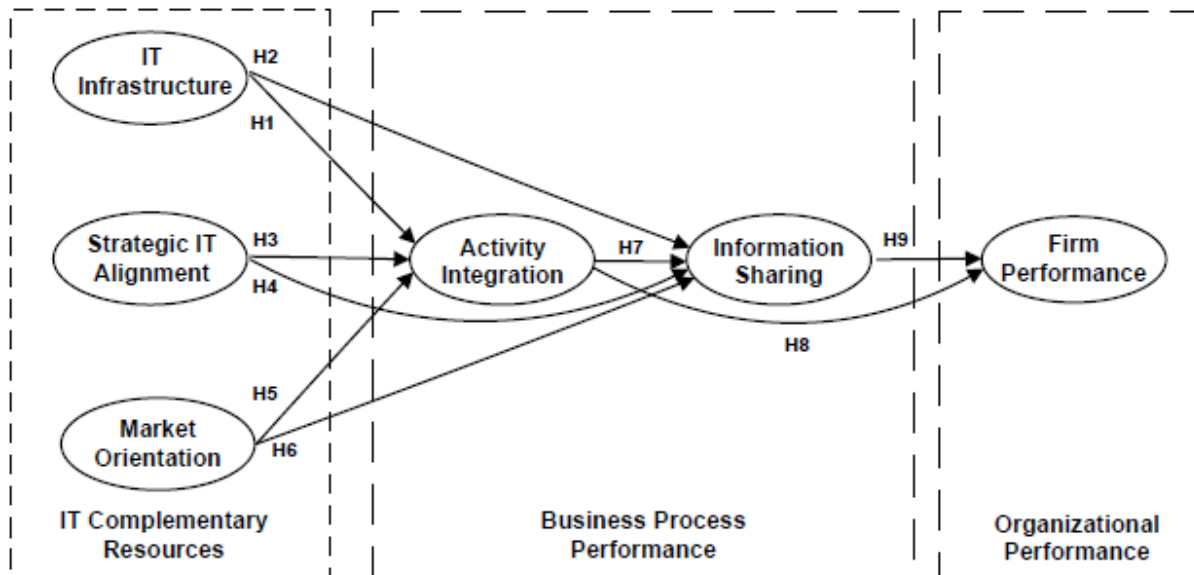


Figure 1. Hypothesized Model

IT infrastructure refers to a set of shared, tangible IT resources, including computers, network and telecommunication facilities, shareable technical platforms, and databases (Zhu 2004). Viewed from the RBV perspective, IT infrastructure is a key resource, enabling firms to innovate and to make continuous improvement to products in order to attain long-term competitive advantage. IT infrastructure provides not only a solid platform upon which firms develop and implement IT applications to conduct business activities, but also an agile and flexible technological structure for future business development (Bharadwaj 2000). A reliable technological platform ensures security and maintenance of firm-wide installations and applications, helping companies to do business with suppliers and customers (Weill et al. 2002). Flexible IT infrastructure facilitates rapid development and implementation of business applications which enable organizations to respond swiftly, to take advantage of emerging opportunities, and to neutralize competitive threats (Ray et al. 2005). Quality IT infrastructure fosters strong linkages, integration, and information sharing between firms and their trading partners (Zhu 2004). Thus, we hypothesize that:

H1: IT infrastructure impacts positively on activity integration.

H2: IT infrastructure impacts positively on information sharing.

Strategic IT alignment concerns the degree to which IS priorities, goals, and objectives are aligned with business plans (Sabherwal and Chan 2001). According to Powell and Dent-Micallef (1997), strategic IT alignment is a valuable planning resource, ensuring firms to use IT and implement IT-based strategies successfully. Strategic IT alignment represents patterns of deployment of IT applications to support business strategies geared towards reducing costs and increasing revenue (Tallon et al. 2000). While early studies suggest that when compared with their larger counterparts, SMEs are supposed to be less strategically-oriented when using IT investments, recent IS research diminishes this perspective. For example, Cragg et al. (2002) survey 250 UK manufacturing SMEs, suggesting that a significant proportion of enterprises achieve high levels of IT alignment and firms with this level of alignment gain better performance than those with lower levels. More recently, in a study of 110 manufacturing Canadian SMEs, Oh and Pinsonneault (2007) highlight that aligning IT investment in growth-orientated applications with business strategy is necessary for gaining strategic value of IT. Findings from these investigations imply that the success of IT use is strongly related to aligning IT strategy with business objectives, which is regarded as a crucial determinant of SME business success.

Fast growth company research suggests that this type of firms tends to integrate future-oriented planning into strategic planning processes in order to achieve substantive benefits. For example, Levy et al. (1998, p. 6) find that “IT strategy has been an integral and tightly woven part of business strategy” within innovative SMEs, enabling firms to achieve and sustain competitive advantage. Larsen et al. (2001) argue that the reason why high growth SMEs gain real benefit and value from IT is because they employ strategic IS planning for their future. These sufficient evidence highlight that the strategic use of IT in high growth firms, which implies a degree of IT alignment with business strategy in the SME context. IT alignment literature (Henderson and Venkatraman 1993; Segars and Grover 1998) posits that developing mutual coherence between IT strategy and business strategy is imperative for firms to prioritize IT plans and activities effectively and to channel IT complementary resources towards areas of strategic importance of firms. Firms with high levels of strategic IT alignment tend to focus IT efforts on critical areas, to effectively align IT resources and other organizational resources with strategic purposes and market positions, and to achieve sustainable IT-based competitive advantage (Kearns and Lederer 2003). Today’s information-intensive environments require firms to develop high levels of organizational ability to integrate resources across value chain processes in a synergistic manner and generate high rents for all partners along value chains. Strategic IT alignment provides a basis for such integration by bringing into line different business processes, facilitates information and resource sharing within and across firms, permits trading partners to codify jointly valuable market knowledge into explicit strategies, and helps firms to coordinate strategic planning processes that are critical for organizing and allocating resources effectively (Wu et al. 2006). Thus, we hypothesize that:

H3: Strategic IT alignment impacts positively on activity integration.

H4: Strategic IT alignment impacts positively on information sharing.

Narver and Slater (1990, p. 21) define market orientation as a firm’s culture that “most effectively creates the necessary behaviors for the creation of superior value for buyers and, thus, continuous superior performance for the business”, comprising three behavioral components: external strategic orientations toward competitors and customers, and an internal orientation toward inter-functional coordination. According to the RBV theory, organizational culture is a strategic resource, generating sustainable competitive advantage by promoting learning, risk taking, and innovation (Barney 1986). Zahra et al. (2004, p. 364) argue that culture is a significant strategic resource in SMEs, “providing a distinct advantage over their competitors by promoting and sustaining entrepreneurial activities”. A customer-oriented business emphasizes continuous efforts to understand customer needs and reach a comprehensive view of customers. It is well acknowledged that market-oriented businesses have an

ability to create superior customer value through monitoring, assessing, and disseminating information regarding customer needs across their organizations, and by delivering solutions to meet customer interests (Narver and Slater 1990). Among three dimensions of market orientation, customer orientation represents an organization's ability to understand target buyers in order to create superior value, to take proactive actions towards meeting customer needs, and to predict future market requirements. Fast growth company research (Tan 2007) suggests that customer-oriented behavior is strongly associated with SME success, helping them to achieve business advantage. Customer-oriented firms are likely to do boundary spanning and collaborative activities across firms to handle customer needs efficiently, and to develop collaborative value chains that are attuned to market changes (Li et al. 2010). Thus, we hypothesize that:

H5: Market orientation impacts positively on activity integration.

H6: Market orientation impacts positively on information sharing.

A typical value chain network involves collecting, interpreting, storing, and sharing data through effective activity integration and information exchange between members in order to improve efficiency in coordination activities (Lee 2000). While activity integration is the extent to which firms collaborate on strategic planning and forecasting activities with their business partners and suppliers in value chains, information sharing refers to the effective and efficient exchange of knowledge between firms and their trading partners (Kim et al. 2006). In the digital business environments, it is imperative for firms to have an ability to effectively integrate strategic value chain activities with partners in order to achieve high level of information sharing efficiency. Studies show that firms employing strategic integration with trading partners are likely to improve inter-firm coordination and information exchange activities (Lee et al. 2000), and to increase the overall efficiency of production or exchange through closer integration of decisions and operations (Dong et al. 2009). Thus, we hypothesize that:

H7: Activity integration impacts positively on information sharing.

A high level of activity integration and information sharing among value chain members helps firms to improve forecasts, synchronize production and delivery, coordinate inventory-related decisions, and develop a shared understanding of performance bottlenecks (Kim et al. 2006). Collaborative activity integration improves operational performance by reducing inventory costs, enhancing capital and cash flow utilization, and improving cycle times. By improving the precision of demand estimation through collaborative forecasting, and facilitating supply and demand alignment, information sharing strengthens bonds with customers and generates increased revenues from existing products and new products and markets (Lee et al. 2000). Thus, we hypothesize that:

H8: Activity integration impacts positively on business performance.

H9: Information sharing impacts positively on business performance.

### **3 RESEARCH METHODOLOGY**

#### **3.1 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.

### **3.2 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. 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 (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 they represent 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%.

### **3.3 Common Methods 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 and 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 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 structural equation modeling (SEM) procedures recommended by Podsakoff et al. (2003) to examine the influence of social desirability on the research constructs. We found no significant relationships between the social desirability construct and the research constructs (all *p*-values > .05). Accordingly, social desirability does not contribute significantly to the model, suggesting that there is no common method bias.



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

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

Table 1. Profile of Responding Firms

### 3.4 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).

Constructs	Indicators
<b>1. IT Infrastructure (ITIF)</b> <i>Adapted from Zhu (2004)</i>	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.
<b>2. Strategic IT Alignment (SITA)</b> <i>Adapted from Kearns and Sabherwal (2006)</i>	Our IT plan is strategically integrated with the overall business plan. Our IT plan reflects our company's mission, goals, objectives, and strategy. Our IT plan is based on a review of the business plan and supports our business strategy. Our company priorities major IT investments by the expected impact on business performance.
<b>3. Market Orientation (MO)</b> <i>Adapted from Narver and Slater (1990)</i>	Our company's competitive advantage is based on understanding customer's needs. Our company closely monitors and assesses our level of commitment in serving customer's needs. Our company frequently measures our customers' satisfaction. Our company always pays close attention to after sales' service.
<b>4. Activity Integration (AI)</b> <i>Adapted from Kim et al. (2006)</i>	Our company collaborates actively in forecasting and planning with our business partners/suppliers. Our company projects and plans future demand collaboratively with our business partners/suppliers. Our company always does collaboration in demand and forecasting and planning with our business partners/suppliers.
<b>5. Information Sharing (INFS)</b> <i>Adapted from Kim et al. (2006)</i>	Our company exchange more information with our business partners/suppliers than our competitors do with theirs. Information flows more freely between our company and business partners/suppliers than between our competitors and theirs. Our information sharing with business partners/suppliers is superior to the

Constructs	Indicators
	information shared by our competitors from theirs.
<b>6. Firm Performance (FP)</b> <i>Adapted from Wu et al. (2006)</i>	Compared with our competitors, the market share of our products has increased. Compared with our competitors, the sales volume of our products has increased. Compared with our competitors, the sales area has widened.

Table 2. Constructs and Indicators

### 3.5 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.

	Mean	SD	1	2	3	4	5	6
<b>1. ITIF</b>	5.53	1.08	<b>.80</b>					
<b>2. SITA</b>	5.31	1.40	.43**	<b>.86</b>				
<b>3. MO</b>	5.78	0.96	.20**	.37**	<b>.73</b>			
<b>4. AI</b>	4.35	1.61	.27**	.33**	.26**	<b>.95</b>		
<b>5. INFS</b>	4.36	1.36	.35**	.46**	.15**	.44**	<b>.87</b>	
<b>6. FP</b>	5.41	1.20	.22**	.39**	.25**	.36**	.41**	<b>.92</b>

Note. (1) \* $p < .05$ . \*\* $p < .01$ .

(2) The diagonal elements are the square root of the AVE.

Table 3. Correlation Matrix, Mean Scores and Standardized Deviations

#### 3.5.1 Construct Reliability

Construct reliability, a measure of consistency, assesses the degree to which items are free from random error. Indicator and composite reliability are two measures of construct reliability (Fornell and Larcker 1981). While indicator reliability represents the proportion of variation that is explained by a construct it purports to measure, composite reliability reflects the internal consistency of indicators (Werts et al. 1974). In the present study, indicator reliability values range between .43 and .95, and composite reliability values exceed the recommended value of .70 (Nunnally and Bernstein 1994).

#### 3.5.2 Variance Extracted Estimate

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

Constructs	Cronbach's $\alpha$	Construct Reliability	Variance Extraction	Range of Standardized Loadings	Range of Indicator Reliability
<b>1. ITIF</b>	.83	.84	.64	.75 - .89	.55 - .79
<b>2. SITA</b>	.91	.92	.74	.67 - .96	.44 - .92
<b>3. MO</b>	.81	.82	.53	.65 - .84	.43 - .71
<b>4. AI</b>	.94	.94	.83	.85 - .95	.72 - .89
<b>5. INFS</b>	.94	.95	.85	.89 - .98	.79 - .95
<b>6. FP</b>	.92	.92	.86	.84 - .98	.71 - .96

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

Table 4. Confirmatory Factor Analysis: Standardized Loadings and Reliability

### 3.5.3 Construct Validity

Construct validity was established by measuring convergent and discriminant validity of measurement items (Phillips and 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 et al. 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.

### 3.6 Data Analysis

Confirmatory and full structural model fit were assessed using multiple indices (Hair et al. 2006), including the normed chi-square ( $\chi^2/df$ ), 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 (Hair et al. 2006):  $\chi^2/df$  ratio < 3; CFI and TLI > .90; RMSEA < .08; and SRMR < .08.

## 4 RESULTS

Given the acceptable measurement models, we estimated a full latent variable structural model (Anderson and 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 a reliable and robust fit between our theoretical model and sample covariances:  $\chi^2(158)=329.614$ ,  $\chi^2/df=2.086$ , CFI=.964, TLI=.957, SRMR=.072, RMSEA=.059. These indices suggest a good model fit. The squared multiple correlation (SMC) values, which are similar to *R*<sup>2</sup> in regression analysis, show that this model accounts for 15% of the variance in activity integration, 32% of the variance in information sharing, and 19% of the variance in business performance. Table 5 shows that all hypothesized relationships, except H6, are supported.

Hypothesis	Standardized Path Estimates	Conclusion
H1: IT Infrastructure → Activity Integration	.18**	Supported
H2: IT Infrastructure → Information Sharing	.12*	Supported
H3: Strategic IT Alignment → Activity Integration	.16*	Supported
H4: Strategic IT Alignment → Information Sharing	.34***	Supported
H5: Market Orientation → Activity Integration	.17*	Supported
H6: Market Orientation → Information Sharing	-.06	Not Supported
H7: Activity Integration → Information Sharing	.31***	Supported
H8: Activity Integration → Firm Performance	.13*	Supported
H9: Information Sharing → Firm Performance	.31***	Supported
<b>Model Fit Indices</b>		
$\chi^2(158)=329.614$		
$\chi^2/df=2.086$		
CFI=.964, TLI=.957		
SRMR=.072		
RMSEA=.059		

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

Table 5. Proposed Hypotheses and Test Results

## 5 DISCUSSION

Aiming to address the understudied issues about IT business value in the SME context, this research develops and empirically tests a hypothesized model integrating IT complementary resources, business process performance and firm performance. This study conceptualizes organizational resources as IT resources and IT complementary resources including IT infrastructure, strategic IT alignment, and market orientation. This study explores the synergistic role of these resources in improving business processes from activity integration and information sharing perspectives which lead to firm success. The RBV theory underpins the present research.

Results show that eight of nine hypothesized relationships are supported, the exception of which is that between market orientation and information sharing. Our study suggests the imperative role of resources as determinants of SME growth. Although having considerable resource constraints, fast growth SMEs are entrepreneurial-oriented, innovative, and know how to strategically employ existing slack resources to develop core competence and thus gain business success. Our results show that IT resources complementary with other firm resources have a substantial effect on improvement of activity integration and information sharing processes which is critical to effectively compete in rapidly fast changing environments. The development of such business competence needs firms to leverage and deploy resources effectively, requires significant time, and fits with firm social, structural, and cultural contexts. Taken together, this is a difficult set of competences for competitors to imitate and thus can be regarded as a source of performance. Regarding the significant link between market orientation and information sharing, a possible explanation is that direct effect of market orientation on information sharing is mediated through activity integration because of positive sequential links between market orientation, activity integration, and information sharing. This means that the impact of market orientation on information sharing is a causally sequential process that moves from activity integration to information sharing, both of which are positively related to firm performance.

This study contributes to theory and research in four salient ways. First, a fundamental contribution relates to developing, theorizing, and empirically validating a theoretical model investigating nomological links among IT complementary resources, business process performance, and organizational performance. We empirically test the application of RBV theory, resource constraints, and slack resource arguments, thus offering a sharp theoretical lens to view the impact of resources on the creation of business value.

Second, this study contributes to IS research by providing initial empirical evidence from an investigation of the relationship between strategic IT alignment and fast growth company performance. While extensive empirical research has confirmed a direct positive relationship between IT strategy alignment and performance, understanding the strategic use of IT in the SME context still remains problematic. Recently, researchers (Tallon and Pinsonneault 2011, p. 480) have suggested that the link between alignment and performance could be revisited by examining the intermediate effects of business processes, highlighting “an advantage of conceptualizing alignment at the process level”. Our study heeds this call, suggesting that strategic IT alignment is a valuable planning resource, helping firms to create value by virtue of how IT is employed to support core process activities.

Third, this study highlights that market orientation is a distinctive cultural resource, provides source of advantage when fostering behaviours and activities that are necessary to exploit the appropriate assets to attain positional advantage. Market orientation is a well-established concept in the strategic and marketing research field. Extensive research has been conducted investigating the association between market orientation and firm performance. It is noteworthy, however, that this construct gains little attention from the IS community (Li et al. 2010). Our research might open up new research opportunities by investigating the complementary impact of market orientation and IT on firm performance.

Finally, this study bridges insights from the IS and fast growth SME literature to examine the role of IT in business processes and its consequences on SME success. As a major component of industrial economics, SME survival and growth is imperative. Understanding how IT impacts business processes is important for SMEs to achieve business advantage in dynamic business environments. However, most extant IS research targets larger companies with little attention paid to SMEs. Research related to IT issues in fast growth SMEs is still thin on the ground and the benefits they derive from IT are far from conclusive. This study provides insightful understanding how IT resources and slack resources can foster firm growth. Our results also highlight that IT business value hinges on how organizations strategically employ IT in improving intermediate processes such as strategic integration, timely information sharing, and effective collaboration activities among value chain members.

This study has four important implications for management. First, we offer a theoretical framework for managers to understand how IT investments help firms to achieve business success through the improvement of business processes. This study highlights that resources are determinants of firm growth only when they are exploited through effective and efficient collaboration and information sharing activities. For managers, identifying resource competencies that have high potential for facilitating specific business activities and focusing on proper business processes where these resources are deployed should be a priority.

Second, we investigate the links between strategic IT alignment, business processes, and firm performance. Firms can gain real benefits and value from IT if they employ strategic IT planning for their future. Digital technologies provide firms with new ways not only to receive and process information effectively, but also to respond to market changes quickly. Managers should understand the imperative role of aligning IT strategy with business strategy at the firm-process level in business success. Managers should continue to look to alignment as a way to boost firm performance in a short-term but also keep an eye to how this alignment can enable a future long-term advantage.

Third, market orientation is a valuable firm resource. The synergy of combining market orientation with other firm resources has positive effects on successful IT use in the value chains. Managers are advised to balance market orientation and innovativeness to promote cooperative activities with value chain members in order to increase customer value. In addition, managers should emphasize the importance of market orientation as a part of the firm's business strategy and culture and integrate their knowledge, belief, and participation in IT innovation by developing the firm's market orientation.

Finally, we show that activity integration and information sharing between firms and their business partners and suppliers exert a significant impact on organizational performance. In the contemporary dynamic and volatile environments, it is imperative for firms to build strategic collaboration with business partners in order to sustain business success. As digital technology connects businesses on a global scale, firms are no longer work in isolation. Managers should be aware that building such inter-firm collaboration is critical when doing business, particularly in dynamic environments.

## **6 LIMITATIONS AND FUTURE RESEARCH**

This study has a number of methodological and conceptual limitations. First, the present research adopts a static cross-sectional research design with data collected at a single point in time. This approach is limited in addressing processes-oriented issues or causal relationships. Future research might consider using longitudinal designs to address themes relating to the causal dynamics of processes.

Second, utilizing a single-informant (CEO and/or founder) data collection technique presents problems 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, production and operations 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 extend generalizability of the findings.

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