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E-Supply Chain Capability: Theoretical Perspectives and Empirical Operationalization

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Abstract

Information Technology (IT) has been widely employed in supply chain operations, helping companies to respond to clients' needs in real time, facilitate paperless transactions, reach out to difficult-to-access markets, and outperform competitors. This paper presents a theory-driven, validated higher-order construct that measures e-supply chain capability, integrating typical procurement and order-taking functions within an organization's supply chain. It is a response to a call in information systems literature to develop and assess multidimensional IT capabilities. Drawing on tenets from both resource based view and relational view, we developed a conceptual definition of e-supply chain capability. Using structural equation modeling techniques, we constructed a measurement model of e-supply chain capability encompassing four dimensions: communication with customers, order taking, procurement, and communication with suppliers. The new validated measurement model of e-supply chain capability offers opportunities to expand IS research in supply chain management.

Keywords

Resource-based view of firms, relational view, e-supply chain capability, structural equation modeling

INTRODUCTION

Contemporary research on the impact of information technology (IT) on competitive advantage has been profoundly influenced by the resource-based view (RBV) of the firm (Barney 1991; Bharadwaj 2000). In this view, firms' main source of value creation stems from their valuable, rare, inimitable, and non-substitutable resources (Barney 1991). Although many studies have drawn on the RBV to examine the potential of IT as a competitive tool (Bharadwaj 2000; Ravinchandran and Lertwongsatien 2005), a gap exists in information systems (IS) literature with regard to theoretical development and empirical examination of higher-order constructs (i.e., latent communality underlying both measured items and unobserved dimensions) to measure IT capability (Zhu 2004). Santhanam and Hartono (2003) have called for development and assessment of IT capability in a systematic manner grounded on theories. Further, in e-business research, most extant research hinges heavily on case studies using small samples of organizations, with limited quantitative data to explore e-business initiatives or to gauge the scale and characteristics of e-business (Kauffman and Walden 2001). Zhu et al. (2004) attribute this limitation to difficulties associated with developing measures and collecting data.

This study aims to narrow these research gaps. Specifically we examine and measure IT capability in supply chain operations. For the purpose of this study, we view e-supply chain capability as the ability to utilize internet-based computing and communications technologies to link suppliers to customers and vice-versa (Lee and Whang 2001). This research strives to augment the body of knowledge in IS research in several ways. First, this paper heeds the calls from Santhanam and Hartono (2003), and Wade and Hulland (2004) to develop multi-dimensional IT capability constructs to better understand their underlying dimensions. Secondly, this paper extends IS research by introducing a new higher-order construct of e-supply chain capability which encompasses four dimensions: communication with customers, order taking, procurement, and communication with suppliers. Finally, this paper contributes to IS research methodology by developing a multidimensional theory-driven construct using latent variable modeling technique, offering opportunities to expand IS research in supply chain management.

The paper is organized as follows. The Theoretical Background and Framework section will discuss the links between RBV and relational view theories to conceptualize a higher-order construct of e-supply chain capability. The Research Method section will outline procedures adopted for data collection and validation of the measurement properties of constructs. Validation of second-order factor of e-supply chain capability will be described in the Results section. The paper will conclude with discussions on the value of the validated measurement model and suggestions for future research.

THEORETICAL BACKGROUND AND FRAMEWORK

Resource-based View (RBV), Relational View and E-Supply Chain Capability

RBV contends that enterprises succeed and achieve sustainable competitive advantage through treatment of resources and capabilities as central considerations in strategy formulation and as primary sources of profitability. According to RBV, resources and capabilities represent two distinctive entities. First, while resources are used by firms to create and produce products; capabilities are developed and emerge from utilization of resources in repeatable patterns (Sanchez et al. 1996). Second, while resources are generally regarded as inputs or outputs of organizational processes, it is difficult to embed resources within organizational processes. Capabilities 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 and 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 valuable, rare, inimitable, and non-substitutable resources and costly-to-build capabilities are regarded as commanding fundamental drivers of superior performance.

In IS literature, RBV has been used to explain how firms create value from IT assets and organizational skills to leverage IT assets (e.g., Bharadwaj 2000; Wade and Hulland 2004). IT resources (e.g., hardware and software) rarely act alone in creating and sustaining competitive advantage (Clemons and Row 1991). IT payoffs depend more on a firm’s capability to “fit the pieces together”, i.e., on the ability to exploit relationships among complementary resources, rather than the strength of their resources. Firms generate competitive advantage not solely from their IT assets but from blending organizational resources with their e-business technologies to develop sustainable value that resides in organizational skills and processes rather than in IT assets (Bharadwaj 2000; Powell and Dent-Micallef 1997; Ravinchandran and Lertwongsatien 2005). In sum, RBV offers a theoretical perspective explaining why firms implementing e-business technologies without developing complementary IT capabilities may not necessarily achieve competitive advantage.

In this study, we view e-supply chain capability as a high level organizational capability emerging from a synergistic combination of IT assets with other organizational resources. From the RBV perspective, e-supply chain capability may thus be defined as the ability to combine e-business technologies with a firm’s resource endowments to enhance its supply chain operations, of which supply sourcing, product storage and distribution, and order fulfilment, are among the major components. E-supply chain capability, as such, is firm-specific, and could create highly differentiated value for firms.

Barua et al. (2004) and Rai et al. (2006) argued that e-business technologies can offer firms a variety of sourcing and collaboration approaches with supply chain partners. Johnson et al. (2007) added that the ability to use e-business technologies strategically as relational technologies to facilitate, for instance, private exchanges between buyers and suppliers could help firms to obtain more values than utilizing IT resources in a generic manner. From the view of relations exchange, e-supply chain capability is not only tightly linked to a firm’s information resources, but, more importantly, dependent upon how a firm’s information resources are channelled to different parts of its supply chain to bolster its relationships with suppliers as well as customers.

According to Johnson et al. (2007), the relational view (Dyer and Singh 1998) is one of the well-established theoretical perspectives that integrate supply chain management and e-business technologies. Extending the concepts of valuable, rare, inimitable, and non-substitutable resources of the RBV to a firm’s supply chain, the relational view posits that a firm’s critical resources are embedded in inter-firm processes (Dyer and Singh 1998). Relation-specific assets, such as an ability to communicate with customers and suppliers effectively in real-time or a routine to process e-transactions efficiently, are a major source of competitive advantages. Because resource endowments as well as supply chain configuration differ between firms, e-supply chain capability is a boundary-spanning, inter-firm process that cannot be easily substituted or imitated. In a highly networked environment, e-resources can be combined and integrated into various inter-organizational functionalities to produce resource complementarity and create performance advantages for supply chain partners.

Conceptualization of E-Supply Chain Capability

Supply chain capability represents an ability to meet customer needs flexibly and responsively by synergistically pooling resources from all supply chain partners (Christopher 2005). Two of the vital antecedents to developing such an ability have been identified as supply chain collaboration (Sanders 2007) and supply chain process integration (Flynn et al. 2010). IT resources have been identified as a key enabler in facilitating and enhancing these two operations processes (Ranganathan et al. 2004). In a simple web-enabled product supply chain, such as that of Dell Computers, which allows customers to place their orders directly online, supply chain collaboration would involve developing seamless procurement processes with suppliers to fulfil customer orders (Lee 2000), and supply chain process integration would cover the integration of materials, information and financial flows between suppliers and customers (Rai et al. 2006). E-supply chain capability thus implies an ability to leverage IT resources to ensure a seamless end-to-end flow of information, products, and finance between suppliers on the one end and customers on the other.

Many IS researchers (Santhanam and Hartono 2003) contend that a second-order factor presents a strong theoretical platform for capturing complex but inter-related measures that are ideally treated in a collective and mutually reinforcing manner. While there are multiple ways of defining e-supply chain capability, we adopt the relational view (Dyer and Singh 1998) and conceptualize e-supply chain capability as a second-order construct encompassing four dimensions: communication with customers, order taking, procurement, and communication with suppliers. This conceptualization provides a starting base on which to operationalize e-supply chain capability based on a simple configuration of three partners - supplier, focal firm (e.g., manufacturer or service provider) and customers - exemplified by the supply chain of Dell Computers. Communication with customers and suppliers would cover capability attributes relating to information and financial flows, while procurement and order taking would capture aspects facilitating product flow. These four variables are discussed below.

• **Communication with Customers:** Maintaining close communication with customers is a prerequisite for staging a demand-driven, customer-centric supply chain. Many supply chain strategies, such as vendor managed inventory, rely on having effective communication between vendor and retailers (clients). E-business technologies are the key facilitators of vendor-client communication (Sanders 2007). For example, web-based systems provide useful information about firms' products and services, and navigation and online purchase functionalities to customers. Web-based systems also provide a communication platform to enable customers to familiarize themselves with a firm's protocols, enabling direct online choice and purchase of customized products. The ability to facilitate the communication process with customers is thus considered an important dimension of e-supply chain capability.

• **Order Taking:** Two of the main objectives of offering web-based interfaces are to solicit online purchases and to facilitate business transactions (Zhu 2004). E-supply chain capability thus encompasses the ability to offer specific online transaction functions, order taking, accepting e-payments, and enabling customers to monitor their order status.

• **Communication with Suppliers:** In supply chain operations, firms need to collaborate with suppliers to fulfil customer orders (Sanders 2007). The ability to communicate effectively with suppliers is thus another dimension of e-supply chain capability. This ability includes working with suppliers to develop and deliver products and services on time that meet customers' specifications.

• **Procurement:** Part of the needs to communicate with suppliers is to be able to source supplies on time to support customer requirements (Wu et al. 2003). Abilities to search and locate potential suppliers online, to place and track orders with suppliers electronically, and employ online marketplaces to source suppliers are some of the needed features to enhance supply chain operations. E-procurement, as such, is also an indispensable part of e-supply chain capability.

RESEARCH METHOD

Participants

The data used for testing our proposed model was collected through an online survey of 1, 335 Australian fast growth small-to-medium enterprises (SMEs) selected from the Business Review

Weekly (BRW) Fast Growth Project file. Fast-growth SMEs are known to be early adopters of new technologies, which they leverage to develop innovative methods to achieve growth (Raymond et al. 2005). We expect e-supply chain capability to be a core competence of fast-growth SMEs. Key inclusion (and exclusion) criteria for entry in the BRW Fast Growth Project are that SMEs' previous year's turnover must exceed AUD$500,000; they must have fewer than 250 full-time employees; and are not a subsidiary of an Australian or overseas corporation. Unlisted SMEs must not receive more than 50% of their revenue from a single client. Except for the criterion on previous year's turnover, which is inflation-adjusted, all other criteria have remained constant. Fast growth companies comprising this sample fall within the SME definition in academic literature (Ghobadian and O'Regan 2000).

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. Data collection took place between April 2009 and June 2009. 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.

We first tested the sample for non-response bias, using the approach suggested by Armstrong and Overton (1977). Analysis of non-response bias was performed by comparing early responses (i.e., those returned upon the first invitation) and late responses (i.e., those received after follow-up emails). Independent samples t-tests on each construct failed to reveal significant differences between early and late responders (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). More significantly, all responses were filled by either the company founder or its CEO.

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

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.

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 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 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.

Constructs

Measurement items for 'Communication with Customers', 'Order Taking', 'Procurement', and 'Communication with Suppliers' were developed based on a review of the literature (Table 2). All items were assessed on a 7-point Likert-type Scale (1=Strongly Disagree, 7=Strongly Agree). Development of respective measurement models incorporate successive stages of theoretical modeling, statistical testing, and refinement (Straub 1989). Measurement scales can either be of reflective or formative nature. While formative models minimize the residual variances in the "inner" (structural) equation and should therefore be assessed at a construct level, reflective models minimize the residual variances in the "outer" (measurement) equations and thus internal consistency is important for reflective constructs.

Table 2. Constructs and Indicators

Construct	Indicator
Communication with Customers (**α**=.87) *Adapted from Wu et al.(2003) , Zhu(2004)*	COMC1: Our website provides customers with general information about our company.
	COMC2: Our website provides solutions to customer problems.
	COMC3: We send customers regular updates about new products and other developments.
	COMC4: Our website allows customers to locate and send information to appropriate contacts within our company.
	COMC5: We provide solutions to customer problems.
	COMC6: We provide information in response to customer questions or requests.
Order Taking (**α**=.70) *Adapted from Wu et al.(2003) , Zhu(2004)*	ORDT1: We accept orders electronically from customers.
	ORDT2: We accept payments electronically from customers.
	ORDT3: We allow customers to track and inquire about their orders electronically.
Procurement (**α**=.70) *Adapted from Wu et al.(2003)*	PROC1: We search and locate potential suppliers online.
	PROC2: We place and track orders with suppliers electronically.
	PROC3: We use online marketplaces to source suppliers.
Communication with Suppliers (**α**=.89) *Adapted from Wu et al.(2003) , Zhu(2004)*	COMP1: We send suppliers regular updates about new product plans.
	COMP2: We provide specific information about product specifications that our suppliers must meet.
	COMP3: We share product and inventory planning information with our suppliers.

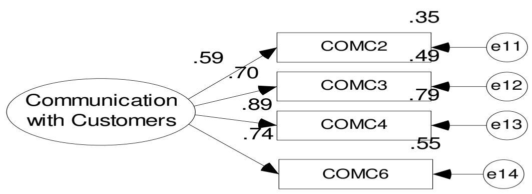
Note. *p<.05. **p<.01. ***p<.001. α= Cronbach's α

The scales of this research instrument are of a reflective nature and Cronbach's α was used to assess their reliability. According to Churchill (1979), Cronbach's α should be the first measure calculated to assess the quality of an instrument. The Cronbach's α threshold for this study was set at .7. The second measure to assess internal consistency reliability is "corrected inter-item correlation". Low correlation indicates that an item does not represent the same construct, and is producing measurement error (Churchill 1979). The threshold of corrected inter-item correlation was set at .4. Item-scales and Cronbach's α calculated for each variable separately show that all variables satisfy the above criteria. We next conducted an exploratory factor analysis (EFA) to ensure construct validity of the instrument used. A Direct Oblimin rotated EFA (Principal axis factoring) was employed to ensure that the items group together and load on the predicted variables.

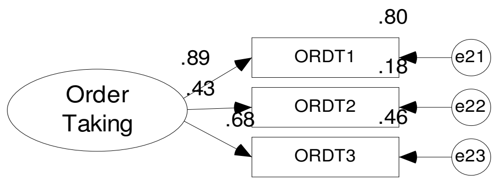
To further assess the measurement model, a confirmatory factor analysis (CFA) was conducted using AMOS 17.0 with maximum likelihood (ML) estimation method. CFA model fit was assessed using multiple indices (Hair et al. 2006), including the normed χ^2 index, that is, the ratio of χ^2 to degrees of freedom (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). According to Hair et al. (2006), a χ^2/df ratio below 3 indicates sound fit. Values of CFI and TLI above .90 are regarded as appropriate. A RMSEA of .05 or less indicates a close fit (Browne and Cudeck 1993) and SRMR should be less than .06.

For measurement model of Communication with Customers, items COMC1 and COMC5 were dropped to improve the model fit: χ^2 (2) = 3.562, p =.168, χ^2/df=1.781, CFI=.996, TLI=.989, SRMR=.017, RMSEA=.05 (.000, .134). The measurement models of 'Order Taking', 'Procurement' and 'Communication with Suppliers', have 3 items each. They are just-identified models. The model fits indicate a perfect fit. Therefore, no item was removed. Table 3 shows the factor measurement model for each of the four constructs.

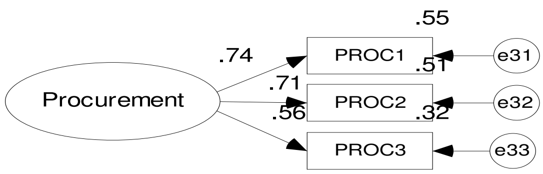
Table 3. One Factor Measurement Model for each construct



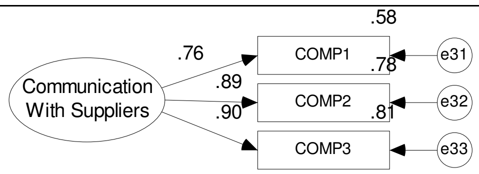
Model goodness-of-fit indexes:
χ^2 (2)= 3.562, p =.168, χ^2/df=1.781, CFI=.996, TLI=.989, SRMR=.017, RMSEA=.05(.000,.134)



Model goodness-of-fit indexes:
χ^2 (0)= .000, CFI= 1



Model goodness-of-fit indexes:
X^2 (0)= .000, CFI=1



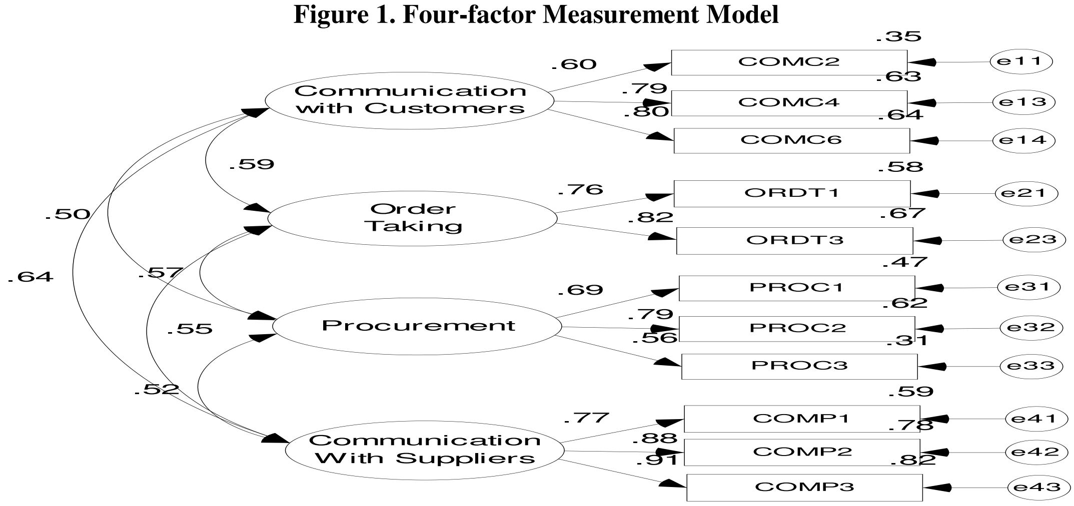
Model goodness-of-fit indexes:
χ^2 (0)= .000, CFI=1

After fitting each factor measurement model, we performed a further assessment of the four-factor measurement model - 'Communication with Customers', 'Order Taking', 'Procurement', and 'Communication with Suppliers'. The result showed a poor model fit. The output modification indices revealed that two items, COMC3 and COMP1, had high standardized residual covariance. Therefore, item COMC3 was deleted. In addition, the standardized factor loading for item ORDT2 was too low (.43). This item was also deleted. When the model was respecified and analysed, the data fit the model well: χ^2 (38)=71.445, p=.001, χ^2/df=1.880, CFI=.977; TLI=.967, SRMR=.037, RMSEA=.053 (.034, .072). Figure 1 shows the resultant four-factor measurement model.

Instrument validation proceeded in two steps: calculation of construct reliability and variance extracted estimates, evaluation of convergent and discriminant validity.

Construct Reliability and Variance Extracted Estimate: Construct reliability, as 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 measures, composite reliability reflects the internal consistency of indicators. In the present study, indicator reliability values range between .31 and .82, and composite reliability values exceed the recommended value of .7 (Nunnally and Bernstein 1994). Estimates of variance extracted reflect the overall variance in the indicators accounted for by a latent construct. In this study, all these estimates exceed the recommended value of .5 (Hair et al. 2006).

Figure 1. Four-factor Measurement Model



Construct Validity: Construct validity was established by measuring convergent and discriminant validity of measurement items (Straub 1989). Convergent validity assesses the consistency across multiple operationalizations. Values for *t*-statistics for all factor loadings are 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, (i.e., 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. Table 4 shows the confirmatory factor analysis for four-factor measurement model.

Table 4. Confirmatory Factor Analysis for Four-factor Measurement Model

Construct	Item	Standardized Loading	*t*-value	*p*	Indicator Reliability
Communication with Customers (α =.80, CR=.78, VE=.54)	COMC2	.60	9.82	***	.35
	COMC4	.79	15.01	***	.63
	COMC6	.80	13.92	***	.64
Order Taking (α =.77, CR=.77, VE=.63)	ORDT1	.76	13.35	***	.58
	ORDT3	.82	12.89	***	.67
Procurement (α =.70, CR=.72, VE =.50)	PROC1	.69	10.89	***	.47
	PROC2	.79	11.79	***	.62
	PROC3	.56	8.89	***	.31
Communication with Suppliers (α=.89, CR=.89, VE=.73)	COMP1	.77	14.27	***	.59
	COMP2	.88	13.53	***	.78
	COMP3	.91	18.12	***	.82
Model goodness-of-fit index: χ^2 (38)= 71.445, *p* =.001, χ^2/df=1.880,CFI=.977, TLI=.967, SRMR=.037,RMSEA=.053 (.034, .072)					

Note. *p<.05. **p<.01. ***p<.001. α= Cronbach's α, CR=Construct Reliability, VE= Average Variance Extracted

RESULTS

When the resulting latent variables from a CFA are themselves moderately to highly correlated, higher-order factors might be hypothesized as an explanation of the correlations that exist amongst the first-order factors. In this study, four first-order factors, 'Communication with Customers', 'Order Taking', 'Procurement' and 'Communication with Suppliers', are moderately inter-correlated, ranging from a low of .50 to a high of .64 (Figure 1). Therefore, we conceptualize e-supply chain capability as a higher-order construct consisting of these four first-order factors: ‘Communication with Customers’, ‘Order Taking’, ‘Procurement’, and ‘Communication with Suppliers’. Figure 2 indicates the resultant second-order measurement model of e-supply chain capability.

Figure 2. Second-order Model of E-Supply Chain Capability

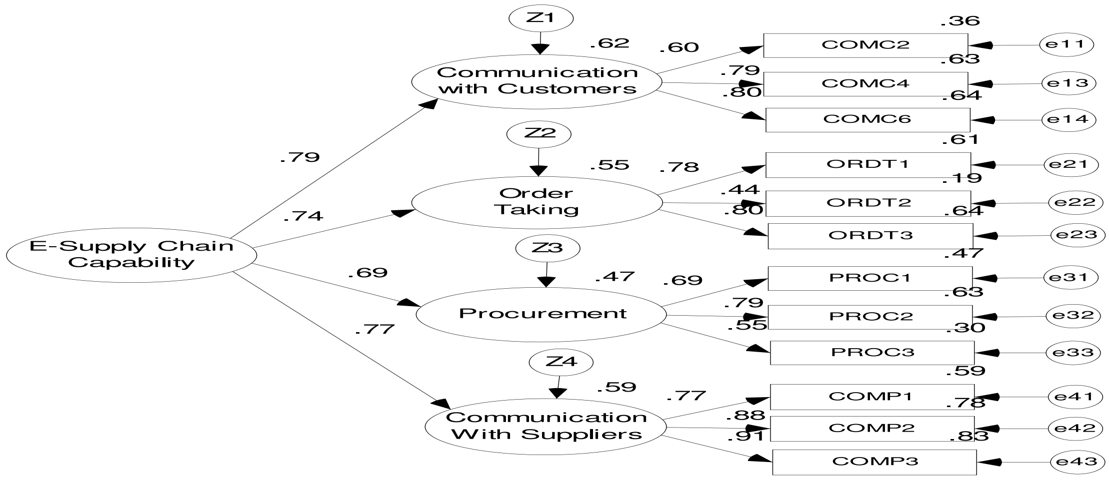


Table 5 shows the results of the confirmatory factor analysis for the second-order measurement model of e-supply chain capability. The data fit the measurement model well: $\chi^2(50)=84.836$, $p=.002$, $\chi^2/df=1.697$, CFI=.977; TLI=.970, SRMR=.041, RMSEA=.047 (.029, .065). Respectively, Cronbach’s α, construct reliability, and variance extraction for e-supply chain capability are $\alpha=.87$, CR=.84, and VE=.56. As theorized in the Conceptual Model section, e-supply chain capability is a higher-order construct comprising multiple dimensions with significant loadings (all p-values<.001). All paths from the second-order construct to first-order factors are of high magnitude, close to and exceeding a suggested cutoff value of .7 (Chin 1998). Marsh and Hocevar (1985) suggested that the efficacy of second-order models should be assessed by the target coefficient (T ratio) with an upper bound of 1. Our model displays high T ratios approximating .84, implying that relationships among first-order constructs are sufficiently captured by their respective second-order construct. Given solid theoretical and empirical grounds, and the parsimonious nature of the second-order factors, the conceptualization of e-supply chain capability as a high-order, multidimensional construct seems justified.

Table 5. Confirmatory Factor Analysis for Second-order Factor of E-Supply Chain Capability

Second-order Factor	First-order Factor	Standardized Loading	*t*-value	*P*	Indicator Reliability
E-Supply Chain Capability	Communication with Customers	.79	8.71	***	.62
	Order Taking	.74	9.90	***	.55
	Procurement	.69	8.24	***	.47
	Communication with Suppliers	.77	10.98	***	.59

Model goodness-of-fit indexes:
$\chi^2(50)=84.836$, $p=.002$, $\chi^2/df=1.697$, CFI=.977; TLI=.970, SRMR=.041, RMSEA=.047 (.029, .065).

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

CONCLUSION AND FUTURE RESEARCH

With increasing emphasis placed on the strategic value of IT in supply chain operations, a comprehensive understanding of the concept of e-supply chain capability is needed. E-supply chain capability is not merely a specific set of sophisticated inter-firm technological functionalities. It is a boundary-spanning business capability that leverages e-business technology to exploit the power of partnership with suppliers and develop close relationships with customers. Our findings confirm that the ability to utilize IT and IS resources to communicate with suppliers and customers, to procure supplies, and to receive orders constitutes the backbone of e-supply chain capability in the operations of a simple supplier-focal firm-customer supply chain.

Extending the valuable, rare, inimitable, and non-substitutable resource concept of RBV, this study has presented a relational view of e-supply chain capability operationalized as a second-order construct, with dimensions covering four distinctive, but inter-related, flow processes in typical supply chain operations. Treating e-supply chain capability as a relational asset represents a step toward measuring inter-firm, rather than intra-firm, IT collaborative performance. With competition between firms already extended to the efficacy of their supply chains and business networks, this research opens up another platform for extending IS research to more areas of supply chain management.

One of the limitations of the current model is that it has been validated using data based on a very exclusive group of companies, i.e., fast-growth SMEs in Australia. The model needs further validations using data for different types of companies. While additional tests and refinements of the proposed concept of e-supply chain capability are warranted, the validated second-order construct of e-supply chain capability presented in this study remains a research-ready instrument. It could serve as a starting point from which to examine antecedents of e-supply chain performance, explore sustained IT innovations across firms, study inter-firm strategic and operational e-business performance, and investigate impacts of IT use patterns on supply chain collaboration outcomes, among others.

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