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Information systems and technology sourcing strategies of e-Retailers for value chain enablement

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ABSTRACT

In the e-Retail industry, a well-designed IT infrastructure is essential in creating a tightly integrated value chain and delivering high quality service. With intense competition for market share and profits, *information systems and technology (IST) sourcing* decisions are becoming increasingly important to e-Retail firms to support continued growth and market responsiveness. Drawing on the *contingency theory*, we examine organizational and environmental factors that influence an e-Retailer's IST sourcing strategy of *make versus buy* in enabling its value chain activities, and we also look at firm-level performance impacts of IST sourcing decisions that involve bundling across value chain activities. We test the proposed model and hypotheses using a panel data set of 307 firms over the period of 2006–2010. The results show that firms that make transformative IT investments tend to source a smaller portion of IST for their e-Retail value chain activities than firms that pursue automate or informate as their strategic role for IT investment. Capabilities are positively associated with IST sourcing. Firms experienced in e-Retail are more likely to build rather than buy their IST. In addition, we find mimicking behavior for IST sourcing among firms in the same merchandizer category. We find that IT strategic role is strongly associated with growth metric, whereas sourcing decisions predominantly impact operational performance measures. There is partial evidence that alignment between IT strategic role and IST sourcing decisions results in better performance effects. Moreover, complementary IST sourcing of synergistic marketing and sales activities positively impacts Web sales and conversion rate, but the sourcing combination of logistics, operations, and sales activities is associated with lower Web sales and conversion rate.

1. Introduction

The e-Retail industry has grown rapidly over the last five years and is projected to continue its upward trend. In March 2010, Forrester Research forecasted a 10% yearly growth rate for online retail sales over the next 5 years with e-Retail sales amounting to $249 billion by 2014. Technology is an inseparable part of e-Retailers' value chain activities. E-Retailers constantly seek to enhance consumer experience by updating their virtual stores with new features and capabilities, such as mobile commerce, dynamic imaging, social networking, site personalization, and videocasts. Recent industry surveys show 52.4% of respondents making more investments in their e-Commerce platforms and the look and feel of their websites, indicating that the focus on building new features and capabilities and the resulting demand for technologies have created an "arms race" in the e-Retail industry. For instance, the 2011 Internet Retailer Conference and Exhibition, the largest annual e-Commerce event, chose the theme, "E-Commerce Shifts into Overdrive, the Race is On" and focused on e-Retailers' demand for the latest "off-the-shelf" technology solutions from e-Commerce vendors (Love, 2011). Although buying off-the-shelf systems speeds up acquisition of new features, some e-Retailers have expressed concerns about the increased commoditization and reduced differentiation of store-front features.

For some e-Retailers (e.g., Amazon, Netflix, etc.), technology supports core competency. For others, technology and related infrastructure remain peripheral to the core business of merchandizing and selling. As a result, e-Retailers face the classic decision problem of whether to make or buy technology solutions. Technology sourcing as a research topic has received very little attention in Information Systems (IS) and Operations Management (OM) literature. Although extant OM literature has extensively studied sourcing strategies and decisions in manufacturing, IS literature has mainly focused on IT services and infrastructure and software development contexts to examine sourcing strategies and decisions (Handfield et al., 1999; Leiblein et al., 2002; Wade and Hulland, 2004). Both literature streams draw from similar theoretical frameworks and enrich our understanding of make versus buy decisions by separately exploring distinct contingencies.

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Outsourcing, a term most commonly used by practitioners and IS researchers, represents a special case of sourcing in which make or buy decisions pertain to the procurement of business process and IT infrastructure services as well as to the acquisition of software development expertise from vendors (Quinn and Hilmer, 1994; Bardhan et al., 2006, 2007; Loh and Venkatraman, 1992a; Whitaker et al., 2010). However, software product sourcing differs from outsourcing in that a firm seeks to build its capabilities by using "off-the-shelf" technology solutions from external vendors rather than to turn over its IST functions to another firm. Thus, one can consider technology sourcing as similar to the sourcing of products and components in manufacturing. In comparison to the sourcing of products and components in manufacturing contexts, sourcing "off-the-shelf" technologies often poses distinct challenges due to constantly evolving compatibility, integration, and interoperability specifications. As a result, make or buy decisions can either decelerate or accelerate e-Retailers' ability to acquire new features and capabilities.

Drawing on the *contingency theory*, we propose a model to explore the organizational and environmental factors that influence e-Retailers' IST sourcing strategy of *make* versus *buy* in enabling their value chain activities and to examine the firm-level performance impacts of IST sourcing decisions that involve bundling across value chain activities. Our model opens up the black box of internal firm operations by introducing a granular view of the IST sourcing decisions hitherto unexplored in the literature. *Contingency theory* states that a firm's choices are dependent upon its internal and external environments and stresses the importance of the alignment between organizational setting and strategy (Burns and Stalker, 1961; Lawrence and Lorsch, 1986). In developing our contingency framework as intended contribution to the extant literature, we follow the typical approach of contingency research outlined in Sousa and Voss (2008) by identifying important contingent variables for different contexts and by examining the alignment of internal decisions and external context. We consider multiple dimensions of context and different scenarios of contingency in constructing our research model.

Our primary objective is to enhance knowledge of IST sourcing among e-Retailers, a topic which has received limited attention (Kishore et al., 2004). Extant research on sourcing has mainly focused on antecedents of the sourcing decisions but not so much on their performance effects (Kauffman and Tsai, 2009; Smith et al., 1998). In this regard, our study develops new knowledge on the performance impacts of IST sourcing decisions by explicitly identifying and aggregating sourcing decisions across value chain activities. This enables us to examine complementarities between different parts of the value chain from a sourcing perspective in the e-Retail context. This research specifically addresses the following research questions to better understand the emerging issues of IST sourcing strategies among e-Retailers:

- How do organizational and environmental characteristics affect make versus buy IST sourcing decisions for particular activities in the e-Retail value chain?
- How do complementarities in IST sourcing choices impact firm performance?

Our findings, based on a panel analysis of e-Retail firms' IST sourcing decisions and performance, reveal that firms that make transformative IT investments tend to source a smaller portion of IST for their e-Retail value chain activities than do firms that pursue automate or informate as the strategic role for IT investment. Capabilities are positively associated with IST sourcing. Firms experienced in e-Retail activities are more likely to build rather than buy their IST, and evidence exists of mimicking behavior for IST sourcing among firms in the same merchandizer category. Further, our findings reveal partial evidence of performance effects when alignment occurs between IT strategic role and IST sourcing decisions. We find that IT strategic role is strongly associated with growth metric, whereas sourcing decisions predominantly impact operational performance measures. E-Retail firms face trade-offs in adopting an overarching buy approach across the value chain; that is, any benefits of synergies between marketing and sales have to be weighed against the negative effects of sourcing logistic and operations technologies.

2. Theoretical model and research hypotheses

2.1. E-Retail value chain and IT infrastructure

To set the context and scope for this research, we begin with a typological overview of e-Business, e-Commerce and e-Retail, and discuss the role of technology in e-Retailers' value chain. E-Business is the coalescence of the Internet and supply chain integration and captures all processes involving customers, employees, vendors, and business partners (Johnson and Whang, 2002). E-Commerce, on the other hand, is a subcategory of e-Business and refers to the purchasing, selling, and exchanging of goods and services over the Internet. It includes business-to-business (B2B), business-to-consumer (B2C), consumer-to-business (C2B), and consumer-to-consumer (C2C) transactions. E-Retail, also known as eTail, focuses on the selling of retail goods and services on the Internet to consumers and refers solely to business-to-consumer (B2C) transactions of e-Commerce.

The many types of e-Retail firms range from Web only e-Retailers to traditional "brick-and-mortar" retailers that offer online storefronts (i.e., "click-and-mortar"). By transitioning to a click-and-mortar business approach and creating stronger cooperation across channels, retail chains, catalog/call centers, and brand manufacturers are able to achieve benefits including cost savings, improved differentiation, enhanced trust, and market extensions (Steinfield et al., 2002). This study focuses on how e-Retailers' IST sourcing strategies enable the primary value chain activities of input logistics, operations, output logistics, marketing, and sales.

Several systems and technologies are required to enable an e-Retailer's value chain activities. Examples include customer relationship management, business intelligence, supply chain management, content management, e-Commerce platform, and Web analytics, among others. One can capture the complex enterprise of e-Commerce using a three-level hierarchical framework that places infrastructure at the lowest level, followed by services at the mid-level, and products and structures at the top (Zwass, 1996). The *infrastructure* consists of all the hardware, software, databases, and telecommunications required to establish the technological infrastructure for e-Commerce. The *services* level, which provides the business with the infrastructure for e-Commerce, includes secure messaging and service enablement. The *products and structures* level of e-Commerce is focused on enabling the value chain activities of the e-Retailer (Gunasekaran et al., 2002).

We utilize Porter's (1985) value chain framework to develop a conceptual understanding of interrelationships in the e-Retailer IST infrastructure. Fig. 1 illustrates the value chain model proposed by Porter (1985). Highlighted in gray are the value chain activities covered in our study. In essence, the *value chain* is "a model that describes a series of value-adding activities connecting a company's supply side (raw materials, inbound logistics, and production processes) with its demand side (outbound logistics, marketing, and sales)" (Rayport and Sviokla, 1996). The five primary activities of the value chain include inbound logistics, operations, outbound logistics, marketing and sales, and service. *Inbound logistics* refer to activities associated with receiving, storing, warehousing, and