Decision Support Systems 53 (2012) 186–194

Contents lists available at SciVerse ScienceDirect

Decision Support Systems

journal homepage: www.elsevier.com/locate/dss

Information technology and organizational capabilities: A longitudinal study of the apparel industry

Jifeng Luo [a], Ming Fan [b,*], Han Zhang [c]

[a] Shanghai Jiao Tong University, China
[b] University of Washington, United States
[c] Georgia Institute of Technology, United States

ARTICLE INFO

Article history:
Received 29 April 2010
Received in revised form 20 December 2011
Accepted 2 January 2012
Available online 8 January 2012

Keywords:
Organizational capabilities
Information technology
Apparel industry

ABSTRACT

Business value of information technology (IT) is one of the most important research streams in information systems (IS) research. In this study, we follow the resource-based view (RBV) in strategy literature to study how IT enables firms to develop new organizational capabilities. Using structured content analysis, we have collected longitudinal data from news media for 49 publicly traded apparel firms in the U.S. over the period of 1995 to 2007. The financial data were collected from Standard & Poor's COMPUSTAT data. In this research, we study how IT assets affect apparel firms' organizational capabilities such as operational capability, customer service, and ability to innovate. The U.S. apparel industry is largely heterogeneous in its use of IT and organizational capabilities, and therefore provides a particularly interesting case to investigate the relationship between them. Our empirical results show that IT can lead to higher level of organizational capabilities. Firm financial resources are important in affecting the relationship between IT and operational efficiency as well as the relationship between IT and customer service. In addition, we find that operational efficiency plays a mediating role in how IT affects customer service.

1. Introduction

In the past few decades, information technology (IT) has enabled organizational transformation and allowed firms to lower costs and improve efficiency (e.g., [14]). Recently, the focus has evolved from whether IT affects firm performance to how IT transforms firms in different industries. For example, some information system (IS) researchers find that firms derive benefits from IT through its impact on business processes (e.g., [35]). This is consistent with the resource-based view (RBV) in strategy literature that firm specific resources are the source of sustainable competitive advantage [4] and allow firms to develop higher-order organizational capabilities [5, 54]. In this study, we attempt to link the literature in IS with the theories in strategic management on RBV and organizational capabilities. Based on a longitudinal dataset of more than 10 years for the public firms in the U.S. apparel industry, we examine how IT enables companies in this industrial sector to develop critical organizational capabilities.

Management literature defines organizational capabilities as the ability to perform the basic functional activities of the firm, such as logistics and marketing [1]. Capability researchers find that capabilities can be identified using a standard functional classification of the firm's activities, and therefore can be defined as one of the three value disciplines—operational excellence, customer intimacy, and product leadership [25, 55, 56]. Operational excellence is achieved by providing products or services at competitive prices and by delivering such products or services with the least difficulty or inconvenience. Customer intimacy means cultivating lasting relationships with customers and striving to satisfy their unique demands. Product leadership is achieved by offering leading-edge products and services. Tallon and Kraemer [53] find that each value discipline reveals how firms create value for their customers, which implies a different set of core business processes. In the current hyper-competitive environment, products and services can quickly become obsolete and competitive positions can be rapidly overtaken. Thus, firms need to be able to respond consistently and quickly to changing markets. Identifying, acquiring, and accumulating critical organizational capability in line with the three value disciplines are critical to firms' strategic renewal. Our study investigates how IT assets could contribute to the acquiring and accumulation of these organizational capabilities in the apparel retail industry.

First, retailers have seen dramatic changes in their fulfillment operations in the last decade. Efficient fulfillment integration is quickly becoming an operational standard for the retail industry. Firms without integrated cross-channel retailing could face high costs to deliver their products and can potentially lose revenue growth opportunities. Customers can switch to retailers that are able to meet their demands. Presently, the capability of fulfilling customer demand through multiple

* Corresponding author.
E-mail addresses: luojf@sjtu.edu.cn (J. Luo), mfan@u.washington.edu (M. Fan), han.zhang@mgt.gatech.edu (H. Zhang).

0167-9236/$ – see front matter © 2012 Elsevier B.V. All rights reserved.
doi:10.1016/j.dss.2012.01.003

channels (e.g. online order, in-store pick up) is a major driver of operational efficiency in the retail industry [43]. Efficient order fulfillment, independent of which channel a customer uses, is of critical importance to retailers. According to Forrester Research [21], about 55% of U.S. online consumers shop in multiple channels. Consumer expectations for order cycle time and service levels are extremely high, requiring significant changes in processes and procedures. However, without an integrated IT infrastructure, integrated fulfillment is impossible. Retailers who lack IT resources will have to accommodate consumer demands through inefficient manual processes and will often leave the customer unsatisfied.

Second, firms are eager to develop customer intimacy and to enhance customer loyalty. In an increasingly competitive retail marketplace, the end-to-end customer experience has become a new battleground. The ability to effectively sense and subsequently tailor offerings to match customer demand through a customer's channel of choice is the retailers' new competitive differentiator. According to AMR Research Report [2], cross-channel shoppers typically spend nearly 30% more than single-channel shoppers. They want to ensure that they are satisfied, regardless of the channel. Leading retailers are harnessing both traditional and online channels to provide customers with new and more flexible ways of shopping. Largely because of rapid developments in IT, segmenting and targeting markets are becoming increasingly accessible and affordable. By providing excellent customer experiences across channels, retailers could develop stronger customer relationships, especially with cross-channel shoppers.

Third, together with other complementary organizational resources, a retailer's IT assets can be a catalyst for IT-related product and service innovations. For example, GAP Inc. has launched new product brands specifically for the online channel. In a competitive retail marketplace, more and more companies are leveraging their existing resources to introduce new products.

We collected longitudinal data on the apparel industry from 1995 to 2007 to investigate the following research questions:

- How do IT assets affect retailers' operational capability, customer service, and ability to innovate?
- How do complementary organizational resources influence the relationship between IT assets and organizational capabilities?
- How do different organizational capabilities affect one another at the competitive frontier?

The apparel industry provides a particularly interesting case to investigate the above research questions. Consumers often perceive apparel as products that must be seen, touched, and tried on before purchase. Therefore, the industry was initially slow to adopt the online channel. Despite its slow take-off, apparel is now one of the leading product categories sold over the Internet today [57]. Yet within the apparel industry, retailers' use of the online channel is heterogeneous, ranging from full, partial, to no integration with other channels. Organizational capabilities in terms of operations, customer service, and product leadership vary dramatically across various retailers. It will be interesting to examine how companies use IT assets to develop and leverage organizational capabilities to deliver superior customer value.

2. Prior literature and theory

2.1. Literature review

The business value of IT has long been hotly debated by both practitioners and IS researchers. Prior studies employed several theoretical paradigms to examine the performance impacts of IT, and the results have been mixed (e.g. [11, 14, 39, 47, 58]). Economic theories have been extensively used to provide empirical specifications for estimating the economic impacts of IT [14]. These studies investigated IT value at an aggregate level. Recent studies started examining the underlying mechanisms relating IT to firm performance. One important research stream applied RBV to explore how IT resources change business operations and create value [58]. Powell and Dent-Micallef [39], for example, find that IT resources have no effect on firm performance unless managers use IT to leverage the complementary human and business resources such as flexible culture and supplier relationships. Bharadwaj [11] proposes that firms can obtain superior performance by combining IT-related resources into a unique IT capability. Santhanam and Hartono [47] also find that firms with superior IT capability exhibit better firm performance. Ramirez et al. [41] discover a synergistic effect on firm performance from the combination of IT and process redesign.

From a theoretical perspective, RBV has proven particularly useful in opening the "black box" of IT's affect on firm performance. According to the RBV theory, resources and organizational capabilities are valuable sources of competitive advantage [5, 32, 54]. They are likely to be heterogeneously distributed across firms and are rent-yielding when they are valuable, rare, imperfectly imitable, and nonsubstitutable [4, 25]. Most empirical work of RBV, in both strategic management and IS literature, uses overall firm performance as the dependent variable. However, simply examining the relationship between a firm's resources and its overall performance could lead to misleading conclusions with respect to RBV [42]. Firms can have competitive advantages in some business activities while having disadvantages in others. Using a highly aggregated dependent variable such as firm performance may neglect the underlying mechanism of how IT combines with other organizational resources to change business processes and competitive tactics. Several studies in strategic management have addressed this problem by examining the implications of RBV on a firm's product development ability [28], manufacturing effectiveness [49], and customer service [42].

This study aims to examine how firms utilize IT resources to develop higher-level organizational capabilities. Our research framework draws upon IT business value (e.g., [11, 35]), RBV of the firm [4], and organizational capabilities [1, 25, 55, 56]. Our theoretical framework is illustrated in Fig. 1.

2.2. Theory development

We introduce an integrative model to tackle the question of how IT helps firms develop higher-order organizational capabilities. In our model, conceptual distinctions are made between IT assets and organizational capabilities. First, we take the view that IT creates business value by enabling business processes and routines and helps companies perform their functional activities and tasks better than their competitors. Commonly available IT resources cannot, by themselves, create a sustainable competitive advantage [19, 39]. Instead, IT assets, the investments in different types of IT, must be integrated into the organizational processes in order to develop higher-order capabilities, which can, in turn, create sustained performance. Mooney et al. [36] propose three impacts from the effective use of IT. Automational impacts result in efficiency and cost-reduction benefits from the role of IT as a capital asset being substituted for labor. Informational impacts emerge from IT's ability to process information efficiently. Transformational impacts come from transforming processes, which result in reduced times to conduct business. Thus, we propose that IT assets provide resources that enable organizations to efficiently and cost effectively build their capabilities.

Second, we investigate organizational capabilities from three functional areas of a firm: operations, customer service, and product development. Operational capability is defined as a firm's ability to provide "customers with reliable products or services at competitive prices delivered with minimal difficulty or inconvenience" [56]. This capability could also be blended with processes and routines to develop other capabilities like customer intimacy or product leadership. Customer service capability is identified as the ability to understand