Measuring E-Commerce Technology Enabled Business Value: An Exploratory Research

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ABSTRACT

While a plethora of anecdotal evidence exists, there is little empirical evidence on the value-creating potential of e-commerce technologies. The present research investigates whether firms using e-commerce technologies are successful in generating business value and, if so, what e-commerce drivers determine success and how to best use these drivers. This work shows how diffusion theory can be used to analyze the wide-spread utilization of e-commerce technologies and how they create business value. It presents an exploratory model of e-commerce business value grounded in information technology (IT) business value and productivity literature. We use a sample from more than 550 company executives, identified as innovative and successful users of IT.

Keywords: B2B e-commerce; B2C e-commerce; e-business; e-commerce models; Internet-commerce

INTRODUCTION

Internet has been used to share information for quite some time, but the idea of using it for commercial exchange and as a supplier of commercial value matured in the mid to late 1990s. Reasons were that, initially, the Internet lacked both the necessary security and the degree of standardization needed to share data safely.

In the late 1990s, companies scrambled to create their online “shopping centers,” allowing them to bypass intermediaries. This enabled cost savings, often passed on to customers. Internet provided value by increasing processes effi-
ciency, shortening lead times, and automating processes that previously required personnel.

The ease of establishing companies online (e-business) and marketing products through the Internet became a tremendous lure for many technically inclined with entrepreneurial interests. This affected the economy through the proliferation of companies whose core competency is partially or fully associated with Internet. Despite the 1999-2000 demise of a number of dot-coms, many traditional brick-and-mortar companies have invested and continue to invest heavily in e-commerce technologies. The U.S. Census Bureau estimated that retail e-commerce sales for 2005 were $87.1 billion, an increase of 24.88% over 2004 (www.census.gov). Forrester Research forecasts that retail online sales will continue to grow at annual rates of up to 25% (Johnson, Delhagen, & Yuen, 2003). Measuring benefits from e-commerce initiatives is hard because some benefits are qualitative and the difficulty of collecting data.

The information technology (IT) productivity and business value literature suggests that these firms have achieved enormous performance and productivity gains by integrating e-commerce channels with their existing brick-and-mortar channels, transforming themselves into a click-and-mortar business. Cisco, Dell, and Boeing are examples of click-and-mortar organizations that have achieved significant economic benefits with e-commerce technologies. Cisco claims to be the single largest e-commerce user in the world, with 90% of its 2000 sales (about $18.9 billion), from online sales. 82% of its customer inquiries are handled online (McIlvaine, 2000) and 83% of questions concerning support are answered through Cisco’s Web-based self service tools (“Customer Care,” 2001). Cisco’s revenues and net income increased significantly since 1992 and its stock price soared to the point that Cisco is the company with the highest market capitalization in the world in 2000 (Kraemer & Dedrick, 2002).

Dell reported over 250% return on invested capital from its logistics and order fulfillment systems (Dell.com, November 2000). In July of 2004, the Dell site logged 9.2 million first time visitors and ranked 49th in the Top 50 Internet Properties (marketingfacts.nl, http://www.mediafact.nl/comments.php?id=9_0_1_0_C). Online PC sales are more than $1 million dollars every day. Boeing’s electronic intermediary, PART online, allowed it to process 20% more shipments per month in 1997 than in 1996 with the same number of data entry people while eliminating 600 phone calls per day (Teasdale, 1997). Boeing employs an information integration system, Exostar, to coordinate information between 11,000 suppliers. (Exostar, http://www.mediafact.nl/comments.php?id=9_0_1_0_C).

Despite these anecdotes and others, there is little empirical evidence in the IT productivity and business value literature regarding the payoffs from e-commerce business, especially for large click-and-mortar companies (Brynjolfsson & Kahim, 2000). Except for a study by Zhu (2004), we found no articles that investigated the business value of e-commerce. Zhu assessed the e-commerce payoffs indirectly via an interaction effect between IT infrastructure and e-commerce capability, which he found positive, concluding that this relationship positively contributes to firm performance in terms of sales per employee, inventory turnover, and cost reduction. Zhu’s study did not look at the stand-alone impact of e-commerce technologies on firms’ performance. He grounded his research on resource-based theory, whereas we used Rogers’ (1983) diffusion theory for ours.

The fundamental objective of this research is to assess the e-commerce technology enabled business value. Specifically, we investigate whether firms using e-commerce technology are successful in generating business value, what e-commerce drivers determine success, and how to best use these drivers. We propose using diffusion theory to analyze the widespread utilization of e-commerce technologies to better understand how these technologies create business value. We present an exploratory model of e-commerce business value grounded on IT business value and productivity literature (e.g., Kauffman & Kriebel, 1988; Mahmood &