



The impact of e-commerce on Taiwanese SMEs: Marketing and operations effects

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ABSTRACT

The purpose of this paper is to distinguish the impacts of e-commerce on marketing and operations functions and investigate how these impacts have affected performance of Taiwanese SMEs. We also investigate the moderating roles of size and e-commerce experience of SMEs on the e-commerce impact–performance relationship. We have used resource-based-view of a firm to provide the theoretical underpinning to understand how e-commerce adoption is linked to firm performance. We have conducted a survey and obtained 110 usable responses from Taiwanese SMEs. We first verified our variables to check they get grouped to marketing and operations effects using confirmatory factor analysis. We then identified their influence on performance using regression. Finally, we verified the roles of size and e-commerce experience using moderated regression analysis. Our results show that operations and marketing aspects of e-commerce have strong impacts on performance of SMEs. Size of SMEs, measured using number of employees, moderates the impacts of operations and marketing aspects on performance, while e-commerce experience, measured using the length of time SMEs have adopted e-commerce, does not moderate. Our results will help SMEs in general and Taiwanese SMEs in particular to understand the influence of e-commerce on their performance.

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1. Introduction

Small and medium enterprises (SME) are generally characterized by the limited scale of their operations (Carson, 1995, p-61). SMEs play an important role in economic development of many countries around the world. Given the enormous benefits of e-commerce, many businesses are attempting to harness the benefits of e-commerce and SMEs are not exception to this trend. E-commerce is about using computer networks (including the internet) to conduct business like buying, selling, exchanging products, services and information (McKay and Marshall, 2004). In recent days e-commerce has also been used to improve operational aspects such as order processing, order fulfillment and delivery, and marketing aspects such as online advertising. There are a number of research studies in the literature that have aimed to identify how SMEs have benefited by adopting e-commerce. For instance, Santarelli and D'altri, 2003 have identified that e-commerce helped Italian SMEs to increase their customer base, develop new markets and improve communication with customers. In the context of some European and North American SMEs, Johnston et al. (2007) have found that e-commerce helped

to increase revenue growth and reduce cost. In a wider context, several research studies have attempted to understand the nature of influence of e-commerce adoption on performance of companies (e.g., Gunasekaran et al., 2002; Chen, 2004; Kumar and Petersen, 2006). For instance, Kumar and Petersen (2006) have reported that e-commerce adoption results in improved customer satisfaction, improved availability of information and reduced errors. From the literature, Gunasekaran et al. (2002) have identified various applications of e-commerce in the operations of manufacturing and services. Recently, Gunasekaran and Ngai (2012) have stressed that e-commerce will continue to shape the future of operations management. But, to our knowledge, studies that have focused on operations and marketing effects of e-commerce in the performance of firms are rare.

The term e-commerce is interpreted differently in different contexts (Chaffey, 2006; Gunasekaran et al., 2002; Sung, 2006). The term was earlier interpreted simply as transactions over the internet (Adam et al., 1999). However, over the years, e-commerce has been interpreted to include a variety of organisational activities including selling, buying, logistics, and/or other organization-management activities via the Web or doing business over information networks (Westland et al., 1999; Weill and Vitale, 2001). For the purpose of this study, we interpret e-commerce to include the use of electronic technologies for selling/advertising using the internet in B2B and B2C contexts, for improving internal

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functions (such as order processing/fulfilment), and for facilitating communications among supply chain partners. Our interpretation is based on several relevant previous studies including (Cagliano et al., 2003; Clayton and Waldron, 2003; George, 2001; Kumar and Petersen, 2006; Soliman and Youssef, 2003 and Turley, 2001).

In this paper, we focus on Taiwanese SMEs. It is said that Taiwanese SMEs experienced their golden age in the late 1970s and early 1980s. During this period, they accounted for 70% of total exports. They also accounted for nearly 97% of the total number of enterprises in Taiwan until (SMEA, 1991, 2007). Unfortunately, over the years, the numbers of SMEs and the amount of exports have started declining. Subsequently, SMEs in Taiwan have started realizing the importance of employing innovative business structures with opportunities to employ new technologies (Daniel and Grimshaw, 2002). Thanks to the enormous breakthroughs in Information Technology (IT) and e-commerce, several businesses have begun to harness its potential to achieve competitive advantage and SMEs also followed this trend (Taylor and Murphy, 2004; Oke et al., 2007). There are only a few studies on the adoption of e-commerce in the context of Taiwanese SMEs (Chen, 2004; Chu, 2009).

Based on a review of the literature, this study has found two important gaps. First, there are only a few studies (e.g., (Chen, 2004; Chu, 2009)) looking at Taiwanese SMEs on the impact of e-commerce on performance. Second, while most of the studies have focused on the general influence of e-commerce on firm performance, there seems to be relatively few studies that attempted to understand the influence of e-commerce on various functional aspects in a business. On the other hand, there are studies that have highlighted that e-commerce can be applied differently in different functions, such as sales or logistics planning and on time delivery (Barnes et al., 2004; Ramanathan, 2011). Hence, it makes sense to study the impacts of e-commerce on various functions of a firm. To fill these two gaps, we distinguish impacts of e-commerce on two major functions, namely marketing and operations, and study how these two influence performance of Taiwanese SMEs. In addition, we also test whether the length of experience of a firm after adopting e-commerce or its size have a moderating influence on the impact of e-commerce. To do our analysis, we have collected data from Taiwanese SMEs using specially designed questionnaire. In this research we have used resource-based-view as our theoretical underpinning, which is further explained in Section 2.

Rest of the paper is organized as follows. Section 2 outlines the existing literature and develops research hypothesis. Section 3 describes the research method used in this paper with specific importance to survey questionnaire. Data analysis and results are discussed in Section 4. Section 5 discusses the results further. Section 6 concludes this paper with details on managerial implications, limitations of our study and scope for future research.

2. Literature review and hypothesis development

An increasing number of small and medium sized enterprises use e-commerce worldwide at different levels of their business. The Department of Trade and Industry (DTI) in the UK has identified different levels of business benefits (such as e-mail, website, e-commerce, e-business, etc.) on implementing different IT applications (Martin and Matlay, 2001; Taylor and Murphy, 2004). It has been confirmed that ‘completely transformed organizations’ enjoy fullest benefit of incorporating these levels of IT (Martin and Matlay, 2001; Taylor and Murphy, 2004). E-commerce provides innovative ways of using resources available to a firm. Consequently, the resource based view (RBV) has been

used as the theoretical backdrop by many authors to study the impacts of e-commerce in organizations. In the next few subsections, we briefly review the literature that used RBV to study the impacts of e-commerce and highlight studies that focused on the impact of e-commerce in various functions of SMEs.

2.1. The resource-based-view and the impacts of e-commerce

The resource-based-view (RBV) recognises that the basis for a competitive advantage of an organization lies primarily in the application of the bundle of valuable resources at the firm's disposal (Wernerfelt, 1984; Rumelt, 1974). A number of studies have tested the RBV of the firm in different contexts. Using RBV as their theoretical backdrop, Nath et al. (2010) have recently shown that marketing capabilities and operations capabilities of logistics firms significantly influence firm performance. Some studies have employed the RBV to prove that marketing capability generally was significantly related to financial performance of firms (e.g., Ortega and Villaverde, 2008; Song et al., 2005). Using RBV, Ortega and Villaverde (2008) have shown that marketing capability had strong impact on performance for firms that invest on better assets to innovate in a dynamic business environment.

RBV has also been used in the strategic management literature to show that firm capabilities (marketing, operations, technological, supply chain, and/or their interactions) have significant impact on performance depending on the way in which firms align themselves with their business environment (McDaniel and Kolari, 1987; Song et al., 2005; Wu et al., 2006; Conant et al., 1990). In a recent article, Wong and Karia (2010) have used RBV to explain the competitive advantages of logistic service providers by identifying strategic logistics resources and characteristics.

2.1.1. Studies on the impacts of e-commerce

The RBV of a firm has been used previously to provide the theoretical underpinning to understand how e-commerce adoption is linked to firm performance. This theoretical paradigm seeks to explain firms' adoption of e-commerce and the subsequent performance (Barney and Clark, 2007). E-commerce adoption in recent years has helped many firms to exchange information and to integrate their operations well in order to serve their customers better. These firm-specific resources (e-commerce/information exchange) support RBV (Tanriverdi and Venkatraman, 2005).

RBV helps to understand how firms leverage their investments in e-commerce to develop capabilities that are valued, rare, inimitable and non-substitutable (Barney and Clark, 2007; Zhu, 2004). It should be noted that many e-commerce technologies (hardware and software) are available in the market, which make them to be easily imitated by competitors. However, RBV would argue that the way in which firms use these readily available technologies make it inimitable—usually based on other complementary resource capabilities and human resource capabilities existing in a firm. The continued accumulation of knowledge in a firm through innovative use of e-commerce technologies provides competitive advantage to the firm.

Initially, in late 1990s, Poon and Jevons (1997) have proposed a new business platform of IT-induced SMEs in the context of global operations involving multiple countries. Studies have found that SMEs that adopted e-commerce generally experienced benefits in terms of their sales growth in the UK (Daniel and Grimshaw, 2002; Barnes et al., 2004). It has also been observed that e-commerce in Italian SMEs help achieve cost efficiency, process enhancement, service quality, and profitability (Santarelli and D'altri, 2003; Love and Irani, 2004). Daniel and Grimshaw (2002) have found that e-commerce adoption brings in higher

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