A Security Framework for E-Marketplace Participation

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INTRODUCTION

The increasing trend in the use of Internet-based e-marketplace applications has created tremendous opportunities for businesses to manage effective supply chain management. An electronic market exists when a supplier provides goods and services to a customer in a transaction partially or fully automated by information technology. E-Marketplaces can be defined as a digital infrastructure that supports industrial commerce, such as auctions, catalogues and exchanges (Ivang & Sorenson, 2005). IDC predicts IT and e-marketplace spending will reach $496.7 billion in the U.S. and $1.3 trillion globally by the year 2009. Despite extensive research on this topic, there has been limited work in the realm of e-marketplace security. These e-marketplaces are generally implemented on the Internet, whose original purpose was to provide a robust heterogeneous distributed computing environment for applications that may not yet be developed.

Previous researchers have noted that the formation of electronic marketplaces has been declining and that the failure rates are high. For instance, Dai and Kauffman (2002) suggest that only one-fifth of the electronic marketplaces in operation would succeed since firms have to face serious technical challenges. Theoretically e-marketplaces should enable firms to trade and collaborate more efficiently. The reason for this is due to the proliferation of affordable technology and the explosive growth of B2B transactions that have allowed buyers and sellers to conduct transactions electronically and to generate substantial savings and revenue for participants and owners (Sharifi, Kehoe, & Hopkins, 2006). Nevertheless, in reality, many e-marketplaces disappeared during major consolidation phase (Tran, 2006).This study aims to examine the nature of security in e-marketplaces. We identify four types of risks, namely economic, technological, implementation, and relational risks in seven e-marketplace firms from a cross-section of different industries. We then present the control measures as in the responses that the seven firms enforced in order to reduce and manage their risks. The contribution of this study is the development of a security framework based on the findings for e-marketplace participation.

DEFINITION OF E-MARKETPLACES

White and Daniel (2003) describe e-marketplaces as Web-based systems that enable automated transactions, trading, or collaboration between business partners. According to Bakos (1998), an electronic marketplace is an interorganizational system that allows participating buyers and sellers to exchange information about processes, products, and services. O'Reilly and Finnegan (2005) defined e-marketplaces as an organizational intermediary that electronically provides value added communication, brokerage, and integration services to buyers and sellers of direct and/or indirect products and/or services in specific horizontal or vertical market functions, meeting management needs for information and process support, and/or operating the required IS/IT infrastructure.

Table 1 presents the definitions of e-marketplaces from different sources.

CHARACTERISTICS OF E-MARKETPLACES

Previous research has identified different types of e-marketplaces, including buyer-driven, seller-driven, vertical, horizontal, and enabling technologies that provide online buying services, auctions, functional exchanges, and net markets (Christiaanse & Markus, 2002, 2003; Kaplan & Sawhney, 2000; Lenz, Zimmermann, Hans-Dieter, & Heitmann, 2002). Bailey and Bakos (1997) suggest key roles of e-marketplaces as: matching buyers and sellers, aggregating and facilitating buyers' demand, sellers' product, and acting as an agent of trust. Similarly, Kaplan & Sawhney (2000) classified

Table 1. Definitions of e-marketplaces and types of e-marketplaces

Source	*Definitions of E-Marketplaces*
Bailey and Bakos (1997)	"a virtual place where buyers and sellers meet to exchange goods and services."
Bakos (1998)	is an "inter-organizational system that allows participating buyers and sellers to exchange information about processes, products, and services."
Choudhury, Hartzel, and Konsynski (1998)	"an inter-organizational system through which multiple buyers and sellers interact to accomplish one or more of the following market-making activities; identifying potential trading partners, selecting a specific partner, and executing the transaction."
Santos and Perogianni (2001)	"Internet destinations (built on a commerce platform) that bring diverse firms together to conduct e-commerce"
Zhu (2002)	"an infrastructure that creates a trading community linked by the Internet and provides the mechanism for B2B interactions using common standards and industry wide computer systems"
White and Daniel (2003)	"e-marketplaces are Web-based systems that enable automated transactions, trading or collaboration between business partners"
Christiaanse and Markus (2003)	"'spaces' where buyers can discover products and their prices by means of electronic catalogs, auctions or exchanges and IT capabilities that support negotiated pricing"
O'Reilly and Finnegan (2005)	"as an organizational intermediary that electronically provides value added communication, brokerage and integration services to buyers and sellers of direct and/or indirect products and/or services in specific horizontal or vertical market functions, meeting management needs for information and process support, and/or operating the required IS/IT infrastructure."
Garcia-Dastugue and Lambert (2003)	'an e-marketplace is an information system that allows buyers and sellers to exchange information about prices and product offerings and the firm operating the e-marketplace acts as an intermediary'
Skjott-Larsen, Hartzel, and Konsynski (2003)	"a place on the Internet, where many business buyers and suppliers meet, trade and collaborate. Our definition excludes EDI, fax or telephone linkages between two actors as well as simple information exchange…"

B2B marketplaces as a two-by-two scheme considering dimensions on what firm's purchases (manufacturing inputs or operation inputs), as well as how they purchase (spot buying or systematic buying).

Electronic marketplaces can be characterized according to goods traded (direct or indirect, single vertical industry, commodity or differentiated), type of trading mechanism (catalog, auction or exchange, negotiated pricing, or combination), types of support activities provided (inspection, warehousing, transportation, insurance, financing), or ownership (private trading exchanges, public independent e-marketplaces, or industry consortia). Some distinguishing attributes are core services offerings—transaction, interaction, and support services. E-Marketplaces that emphasize interaction services are known as collaboration services. Other types of e-marketplaces have been identified: Wise and Morrison (2000) —different functional foci; Malone et al. (1987) —different impacts; Bakos (1997) —different ownership structures and levels of price transparency.

E-MARKETPLACE RISKS

Risks associated with e-marketplaces are due to weak procedures in the software development process, deficiencies in protocols, and other technology-related problems. There are hosts of other risks that must also be addressed, such as accidental or erroneous processing of business transactions. Vaidyanathan and Devaraj (2003) suggest that there are administrative threats that create risks such as password sniffing, data modification, spoofing, and repudiation. Risks associated with fraud can also be due to the rapid growth of electronic exchanges and the lack of internal controls.

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