Chapter 14
Risk-Based Trust Management for E-Commerce

Soon-Keow Chong
Deakin University, Australia
Jemal H. Abawajy
Deakin University, Australia

ABSTRACT
Electronic commerce (e-commerce) offers enormous opportunities for online trading while at the same time presenting potential risks. Although various mechanisms have been developed to elevate trust in e-commerce, research shows that shoppers continue to be skeptical about buying online and lack of trust is often cited as the main reason for it. Thus, enhancing success in e-commerce requires eliminating or reducing the risks. In this chapter, we present a multi-attribute trust management model that incorporates trust, transaction costs and product warranties. The new trust management system enables potential buyers to determine the risk level of a product before committing to proceed with the transaction. This is useful to online buyers as it allows them to be aware of the risk level and subsequently take the appropriate actions to minimize potential risks before engaging in risky businesses. Results of various simulation experiments show that the proposed multi-attribute trust management system can be highly effective in identifying risky transaction in electronic market places.

INTRODUCTION
E-commerce is a relatively new form of trading and it is now a major strategic issue for many organizations. It has grown at a rapid pace over the last few years and has changed the way in which trading parties transact and businesses conducted. E-commerce has brought about a new set of opportunities and challenges to businesses. E-commerce has the capability of providing continuous service by offering access to information around the clock and globe in multiple languages. Theoretically, both consumers and businesses stand to benefit from e-commerce. For businesses, e-commerce enables them to target a wider variety of consumers as well as easily and cost effectively reaches a worldwide market. By enabling businesses to expand their customer base internationally, e-commerce opens markets and

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potential customers that were once inaccessible to businesses. As it permits the instant establishment of virtual branches anywhere, it removes the need for physical presence at every location where the business wants to conduct sales as such saving the businesses on the lease of expensive retail space and outfit stores. Also, it allows direct and immediate overseas market entry thus eroding the competitive advantages of scale economies while improving business competitiveness locally, nationally and internationally.

The consumers gain greater choice amongst a wider and more diverse range of products and services thus making them to no longer be restricted to what are available in their local store. E-commerce gives the consumers the ability to browse and purchase from many different service providers at competitive prices and greater value, making it easier to find exactly what they are looking for. However, for the on-line consumer, e-commerce has many characteristics which make it different from shop-front purchases. In an in-store purchase scenario, consumers generally carry their product with them, knowing what they have purchased, the size and texture all previewed to check the contents. This is usually not possible with an e-commerce purchase where the customer must wait until delivery to ascertain exactly what they have purchased and if it meets their expectations of quality and specifications.

On the negative side, e-commerce has also opened up more opportunities for unlawful activities. The open and anonymous nature of an e-commerce makes it an ideal medium for malicious activities. As a result, e-commerce is fraught with a whole new type of fraud, deception, theft and extortion. In addition to the illicit activities, factors such as the increased uncertainty about the identity and address of the retailer, inability to inspect goods prior to purchase, the requirements to pay in advance of receipt of goods have elevated uncertainty about the performance of the product. These factors have generally reduced consumer confidence that made establishing trust between retailers and consumers difficult (Cho, Cheon & Kang, 2006; eMarketer, 2007). As a result, it has hindered the uptake of electronic commerce and retarded e-commerce from reaching its full potential (Cho et al., 2006; Greenleaf & Lehmann, 1995).

The promises of the e-commerce are currently being constrained by their risks, be they real or perceived. Research shows that if for some reason the perceived risk (potential loss of resources) in a transaction is too high, consumers are likely to delay the transaction until some form of institutional mechanism is in place to reduce the associated risks. This explains the fact that also millions of consumers browse thousands of e-commerce sites daily, the majority of these consumers decide to buy the products or services from their local stores rather than completing the purchase process online (Salam, Iyer, Palvia & Singh, 2005). To mitigate this risk, mechanisms based on trust management systems to increase the confidence of online buyers have been suggested in the literature. We believe that exiting trust management systems are simplistic in a sense that they focus only on a single parameter to compute trust values. This is fine for services that are inexpensive as a buyer might not worry about losing nominal amount of money. Research shows that customers are more comfortable buying small items with greater frequency. There is very little work to make customers more comfortable buying larger ticket items with greater frequency. For example, many buyers are relatively comfortable buying simple services such as booking an event ticket that cost $10. However, a recent report shows that online shoppers are now venturing into expensive product buying online (eMarketer, 2007). For such products, the current trust management systems will not be sufficient and need to be extended. All consumers are generally risk averse, and will always attempt to try to reduce risk during the purchasing process. This is no different when
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