

# Chapter XIX

## Evaluating E-Commerce Trust Using Fuzzy Logic

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### ABSTRACT

Trust is widely recognized as an essential factor for the continual development of business to customer electronic commerce (B2C EC). Many trust models have been developed, however, most are subjective and do not take into account the vagueness and ambiguity of EC trust and the customers' intuitions and experience when conducting online transactions. In this article, we develop a fuzzy trust model using fuzzy reasoning to evaluate EC trust. This trust model is based on the information customers expect to find on an EC Website and is shown to increase customers trust towards online merchants. We argue that fuzzy logic is suitable for trust evaluation as it takes into account the uncertainties within e-commerce data and like human relationships; it is often expressed by linguistics terms rather than numerical values. The evaluation of the proposed model will be illustrated using two case studies

and a comparison with two evaluation models was conducted to emphasise the importance of using fuzzy logic.

### INTRODUCTION

Business to consumer (B2C) electronic commerce (EC) has seen a phenomenal growth since the development of the Internet, and there is a growing interest from many organizations to use it as a way to improve their competitiveness and reach a wider customer base. In B2C EC, the concept of trust is crucial because it affects a number of factors essential to online transactions, including security and privacy. It is widely acknowledged that without trust EC cannot reach its full potential (Cheskin Research Group, 1999). Among the most cited concerns of EC customers are the low level of personal data security, inconvenience systems, disappointing purchases, unwillingness to provide

personal details, and mistrust of the technology (Cheskin Research Group, 1999; Lewicki & Bunker, 1996; Matthew & Turban, 2001; Mayer et al., 1995; Shapiro et al., 1992).

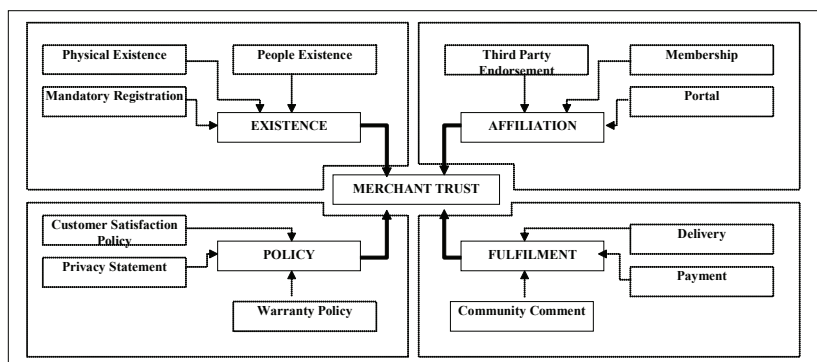
Kasiran and Meziane (2002) developed a trust model for B2C EC that is based on the kind of information customers are looking for on a vendor’s Website to help them decide whether to engage in a transaction or not. The model identified four major factors that need to be present on a merchant’s Website to increase customers’ trust when shopping online. These factors are: existence, affiliation, policy, and fulfilment. The information the customer needs to collect to satisfy the existence factor include physical existence, such as the merchant’s telephone number, fax number, postal address, mandatory registration, and peoples’ existence. These are known as variables. The affiliation factor looks at third-party endorsement, membership and portal and the policy factor looks at information with regards to customer satisfaction policy, privacy statement, and warranty policy. Finally, the fulfilment factor looks at delivery methods, methods of payment and the community comments. Hence, a total of 12 variables have been identified as summarized in Figure 1.

Given the large amount of information the model requires, an information extraction system

has been developed to automate the data collection process (Meziane & Kasiran, 2003, Meziane & Kasiran, 2005). Indeed it has been reported that users are finding it difficult to identify specific information on Websites (Center for the Digital Future, 2004). In addition, we do recognize that users may not be able to make proper use of the collected information. For this purpose, we developed tools to evaluate the trustworthiness of an EC Website based on the collected information. Two models have been developed in (Meziane & Kasiran, 2005) for evaluating the trust factor; the linear model and the parameterized model. More details about these two models will be provided in the comparison section.

However, for both models, we do recognize that this is not the natural way customers use to evaluate their trust towards online merchants or make the decision to buy or not. As with any other business transaction, customers develop in their mind some sort of ambiguity and uncertainties when purchasing online (Mohanty & Bhasker, 2005). The customer may wish to classify the merchants using different preferences or take into accounts other parameters such as the cost or the brand of the product. The decision to buy or not to buy online is often based on user’s human intuitions, common sense, and experience rather than on the availability of clear, concise, and ac-

*Figure 1. The trust model (Kasiran & Meziane, 2002)*



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