

## Chapter 61

# End-Users' Acceptance of Biometrics Authentication to Secure E-Commerce within the Context of Saudi Culture: Applying the UTAUT Model

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### ABSTRACT

*This book study presents recent findings from an ongoing cross-cultural study exploring the acceptance of a new security method based on biometrics authentication systems to be applied to an e-commerce application within the context of Saudi culture. The aim of the study was to explore factors affecting users' acceptance of biometrics authentication system. The authors conducted a large scale experiment of 306 Saudis using a login fingerprint system and examined a proposed conceptual framework based on the Unified Theory of Acceptance and Use of Technology (UTAUT) with moderating variables. The findings from Structural Equation Modeling (SEM) analysis indicate that education levels are significant moderating factors, while gender and age do not record as significant. The findings of this study propose the need to take cultural background and disposition into consideration when applying biometrics technology.*

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## INTRODUCTION

Developing a secure e-commerce system is becoming gradually more important. Fraud via the web, Identity theft, and phishing are raising intimidation to users and financial organizations. In UK, online banking fraud has doubled in 2008 compared to 2007 as more users took to e-shopping and banking online, but failed to take the necessary protection. According to figures released by the payments group (Apacs), there was an increase in card fraud losses of 14% in 2008; however a more shocking 132% increase in online banking fraud totalling £52.5m<sup>1</sup> also took place in 2008. For non western cultural, figures for web security of the 2008 illustrated that Saudi Arabia was ranked ninth worldwide in the figure of users who have been attacked over the web<sup>2</sup>. This might harm not only the consumers but also the reputation of the institutions whose names were used in these illegitimate acts. All the above statistics reflect the significant of information security with e-commerce systems.

Biometric technologies are one of the most significant innovation in the IT industry and the biometric industry has grown from a \$ 600 million market in 2002 to a \$ 4 billion market in 2007 (Mordini and Petrini 2007).

The most commonly used device for biometric authentication is the fingerprint sensor. Fingerprints are well known to be unique for each individual, moreover, for this motive, they are considered a safe technique of authentication (Jain 2004). Fingerprints are used in this work due to their low cost, ease of use, reliability and high accuracy (Jain 2004). Using fingerprint sensors could allow us to overcome some cultural obstacles such as the prohibition of women's facial recognition in some Muslim countries such as Saudi Arabia (AL-Harby, Qahwaji et al. 2009). AL-Harby, Qahwaji and Kamala (AL-Harby, Qahwaji et al. 2008) revealed that the majority of Saudis would have a preference to use fingerprint recognition. As a result, fingerprint biometric

systems are being developed in many countries for ID management, online banking and e-payments system, immigration and access control.

Online banking is a possible application for biometrics authentication (Liu & Silverman, 2001). Many financial institutions hope that the use of biometric technologies for authentication may reduce the amount of money spent for fraud cases. (James, Prim et al. 2006). Biometrics authentication system can assist to avoid illegal e-transactions and identity theft (Jain, Hong et al. 2000; Herman 2002). Nowadays, many financial institutions use biometrics methods to secure their services such as the United Banker's Bank (UBB), Affinity plus Federal Credit Union, California Commerce Bank, LendingTools.com, Dutch bank ING, and Banco Azteca Mexico.

To fighting these security concerns, especially ID theft, fraud, and phishing, several organizations have approved new legislations as well as innovative technological advances. One of possible solutions to improve security could be biometric authentication methods. User's acceptance of this technology is limited, however it is growing regularly. Many organizations are paying attention along with user's acceptance of biometric authentication technology such as financial institutions, government agencies, and retailers.

The acceptance of new and innovative technologies is often difficult to gauge. For this work, our research was accomplished of consumer acceptance of biometrics authentication within e-commerce application in Saudi Arabia. This research focuses on Saudi Arabia, which has the leading regional economy. Moreover, even though it is still comparatively young, it has a young and fast growing population, about 60% of the population is under the age of 30 years. Along with 51% of the population are male and 49% are female. This figure makes Saudi Arabia an attractive prospective market for all sort of online banking systems (Png, Tan et al. 2001). The findings of this study will assist the financial and government organizations to develop strategic

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