User Acceptance of Biometrics in E-banking to improve Security
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Abstract
Online Banking has developed tremendously all over the world at a rapid pace but still there is a high amount of reluctance among the banking customers to adopt this system apart from the various security concerns they have. This research study seeks to evaluate the use of biometrics in the online banking industry for user authentication so that the banking consumers primarily make use of online banking. The study adopts qualitative method of data collection whereby it reveals the user perceptions and their intention to use biometric in online banking for further authentication. The study also recommends the various factors influencing the implementation of biometrics in online banking.

Key words: E-banking, Biometrics, Online banking, Online security, E-security

INTRODUCTION
Online services have gained a lot of momentum over the last five years and one such online service is E-banking. The E-banking system allows the banking customers to access their banking accounts and access the information regarding various products and services provided by their bank. By using this e-banking the customers can transfer the money, pay their bills and perform a wide array of tasks without being physically present in the bank. This e-banking has become a part of life among many consumers. But in spite of this tremendous growth there have been many concerns among the consumers related to security, whereby many organizations have suggested the use of Biometrics for authentication but still this has been hardly accepted by the consumers (Trocchian, Ainscough, 2006). Due to this rising gap there is an emphasis on the biometrics industry to investigate this issue further and the acceptance of the service from the perspective of the consumers so that the biometric industry can achieve commercialization (Toledano, Pozo, Trapote, Gomez, 2006). Based on previous research the acceptance of any e-service is largely dependent on the use and the environment of the application (Heckle, Patrick, Ozok, 2007). However there are still many gaps in the literature related to biometrics in the banking industry.

Biometrics
The use of Biometrics has become a common practice in many areas for the purpose of identification of a human and there are a number of researches related to this aspect whereby the system identifies the human by his individual anatomy such as his fingerprints and voice (Venkatraman and Delpachitra, 2008). The technology such as voice recognition and fingerprints or the iris detection is the most commonly used biometric systems in an application (Venkatraman and Delpachitra, 2008). The biometric system recognizes the various patterns of a system which is related to the acquired set of the stored information in the database. Based on the context of the data it is determined whether the context is in an identification mode or a verification mode.

The main reasons for having a biometric authentication in offering online services is that biometrics are traits of a person which can be hardly copied or shared thereby it becomes very difficult to forge the identity of a person and even can be recovered easily in case if it is lost and this system are highly reliable than other systems due to its nature (Toledano, Pozo, Trapote, Gomez, 2006). Many research experts personally believe that Biometrics will be the future of the authentication industry (Toledano, Pozo, Trapote, Gomez, 2006)

Over the past few years research has identified that the implementation of technology has remained limited across the globe and in the western countries like the USA it was revealed that the usability and the accessibility constructs has been the major contributor behind this barrier (Toledano, Pozo, Trapote, Gomez, 2006). The context of biometrics has been largely implemented in the Aviation industry in the last

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few years and with immigration which has also raised the awareness among the public about the benefits of a biometric implementation. According to a research study conducted by Furnell and Evangelatos (1989) though the users have a limited experience of biometrics but still a degree of acceptance of the technology was very high.

**E-Banking**

Many banks across the globe have started using internet as a distribution channels for the services they offer. But this distribution channel is influenced by many factors before the customer accepts them. Based on a research conducted by David (2006) the success of e-banking is largely dependent on the financial products and the quality of service which can answer the needs of the customers. David (2006) also mentioned that some of the factors which influence the use of online banking among the customers are the security involved in the transaction, user friendliness of the banking system and the speed of the network.

According to Peterson (2003) security is considered as the most influential factor when it comes to the acceptance of internet banking among the consumers. Whereas based on a study conducted by Lee (2006) revealed that the acceptance of online banking is influenced by demographic factors and the study also revealed that it is the younger generation which makes use of online banking facility provided by the banks.

A similar study was conducted by David (2008) and his result was different from the Lees report according to David’s research the customer relationship management is the single factors which influence the decision of the customer to opt for online banking. Suganthi, Balachandher and Balachandran’s study also highlighted that “Internet access, awareness, attitude towards change, computer and Internet access costs, trust in a bank, security concerns, ease and convenience are the main factors facilitating the adoption of Internet banking in Malaysia”.

**Biometrics and E-banking**

According to Boukhonine et al., (2005) the main priority of every bank is to provide a safe and secure environment for their clients to perform online banking transactions. Based on the security policy of each bank the main considerations of framing a security policy are accountable, confidentiality, availability, integrity and non-repudiation are the primary concerns. Therefore the banks implement the access controls based on the concerns mentioned above by making use of physical devices such as the support access cards, and other automated monitoring system which has the ability to accept and deny the usage of any particular object in the system.

There has been hardly any development of biometrics in the commercialization of the banking sector. Many researchers have suggested the use of Iris biometric technology which has a greater security but again it requires the implementation of an iris recognition software in the phone device while making calls to identify the user whereas the other model of RBAC is restricted only to a limited number of tasks (Ferraiolo et al., 1999), therefore the Iris biometric system is more suited in comparison.

**Technology Adoption Model (TAM)**

TAM was the basic model being used in most of the research papers related to the acceptance of technology where the core constructs of the study being perceived ease of use (PEU), Perceive usefulness related to the intention of sue of technology. One such study which used this model was related to the adoption of Biometrics in banks (Tassabehji , & Kamala, 2009)

**Self Efficacy**

Self Efficacy can be defined as the beliefs of the individuals based on which he can accomplish set goals (Bandura, 1999). Many researches in the past have suggested that self-efficacy is a vital component when it comes to the acceptance of technology based on some studies it was Cleary revealed that there was a positive relationship between technology acceptance and intention to become an entrepreneur where self efficacy was a direct predictor (Carr, & Sequeira, 2007) and technology adoption being directly related to the adoption of technology and services apart from other variables like ease of use and perceived usefulness (Lee & Larsen , 2009)

**Perceptions of Biometrics -banking Security**

User perception to adopt biometrics in banking is closely related to the security being offered in this form of banking and how it influences the user’s perception to accept this technology (Sarker and Wells, 2003). This construct is related to the perceptions of the users to adopt the technology of biometrics in the
banking activities which suggests that adopting biometrics would make online banking more secured and offer him the best of services at the comfort of his own which again is in turn influenced with the construct self efficacy.

RESEARCH METHODOLOGY
This research study adopts a qualitative approach where previous studies related to e-banking and biometrics were analyzed and discussed. This study is completely based on the literature review and the findings and suggestions were recommended based on the analysis of the literature review. Various studies related to biometrics in the past were considered and critically evaluated in the context of the banking industry to develop the findings of the study.

FINDINGS
It was clearly identified that most of the studies related to acceptance of the technology considered the TAM model which clearly reveals that Still TAM is considered as a relevant model when it comes to the acceptance of technology to understand the attitude of human behavior and intention to accept the technology which is biometrics in the context of this study. The major determinants which relate to the intention to adopt the mentioned technology are perceived usefulness and the ease of use. Apart from this the concept of Self efficacy was also identified as a contributing factor in order to accept the technology. Therefore it is very clear that the perception of users towards the adoption of biometrics in e-banking is directly influenced by the attitude of users and their intention to make use of the technology.

CONTRIBUTION OF THE STUDY
The biometric technology has been in talks for a long time especially in the financial sector. Many studies have considered using finger prints as an additional security measure but since the development of mobile banking there is an emphasis on the voice enabled security which is an added advantage. According to a study by Mercator Advisory Group on payment authentication points out that “biometrics has been long on promise and short on delivery”. The scope of biometrics is large in financial service industry especially in countries like Latin America and Europe. Having a voice authentication as a biometric measure in the field of financial service would enhance the security and effectiveness of the system. The study has contributed both theoretically and academically, the paper bridges the gaps in the existing literature and also recommends to implement voice enabled biometric authentication for better banking operations.

CONCLUSION
Online banking has increased tremendously and so have the risks. This study has contributed towards the existing gaps in the literature related to biometrics in e-banking and to understand the user’s perception’s towards the acceptance of biometrics in e-banking. The study has also highlighted very clearly that once Again TAM is the model considered when it comes to user perception and attitudes towards adoption of technology. Some of the constructs identified can be beneficial during the adoption of biometrics in the banking industry and the organizations can also make use of this study while adopting this technology from the perspective of an end user.

REFERENCES
Sarker S. and Wells J.P. (2003), Understanding: mobile handheld device use and adoption, Communications of the ACM vol. 46, no.12, pp. 35–41