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A CONCEPTUAL STUDY: E-BANKING CHALLENGES AND OPPORTUNITIES

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ABSTRACT

Banks drive the operations in the financial sector, which is vital for the economy of the country. The banks have passed through three stages after independence. With the nationalisation of banks in India in 1969, they also had emerged as engines for social change. They have moved from the character based lending to ideology based lending to today competitiveness based lending in the context of India's economic liberalisation policies and the process of linking with the global economy. So the operations of the bank are increasing as the banking frauds in banks are also growing, and fraudsters are becoming more and more complex and inventive. In a bid to keep moving with the unstable times, the challenge in the management of social responsibility with financial viability has progressed. Therefore, present conceptual study tries to find out what are the research gaps in different investigations conducted by the different researchers.

KEYWORDS

e-banking, telecommunication technology, security risk.

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INTRODUCTION

E-Banking has developed as a channel to accommodate banking services to customers electronically via banks' websites. E-banking services have obtained a lot of recognition due to its enormous advantages; many consumers are still not ready to use them because of the risk involved in handling transactions online. E-banking services have obtained a lot of recognition due to its enormous advantages; many consumers are still not ready to use them because of the risk involved in handling transactions online. There is a plenty of research carried on the real utility gains attributable to e-banking adoption or acceptance but the quantities of potential negative utility (perceived risk) have been ignored. Technology has become a valuable tool in organisations. Currently, banks operate in a highly globalised, privatised and liberalised environment with fierce competition. To exist in this harsh climate, banks have to use Information Technology. Information Technology has launched several new business dimensions. Day by Day Information Technology playing a more vital role in promoting the assistance or products in the banking industry in India.

The banking business in India has witnessed tremendous progress because of sweeping reforms that are taking place in the IT. E-banking has generated from such a creative environment. Modern technology is acknowledged as a support for most of the complaints that the banking industry faces today. Currently, India is a corresponding non-bank economy as the credit-to-GDP ratio is one of the moderates between different producing countries. So, Indian banks are covering the second difficulty of increasing acceptance and high growth adjustment. The banking sector can kill two birds with one stone that is with the use of technology. Mammoth the process took place in the area of technology which has examined the globe to a global village, and it has brought incredible transition in the banking sector. Branch banking conception in the brick and mortar style has been converted into click and order channel style.

THE IDEA OF E-BANKING IN INDIA

In India, E-Banking appeared in mid-nineties as newly proposed private sector banks came up with a new business model revolving around a strong information technology (IT) Backbone. E-Banking in India was launched by ICICI bank, a private bank, in 1996. 1996 to 1998 marked the adoption phase, while practice increased only in 1999, owing to inferior Internet Service Provider (ISP) online charges, increased PC penetration and a tech-friendly atmosphere. Recent development shows that most brick and mortar banks have evolved themselves by shifting their focus towards up gradation of their new e-banking Capabilities. And internet banking services are progressively turning as "need to have" rather than "nice to have" (Kesharwani, 2012). Indian Banks offer to their customers' various e-banking products and services like ATM, Debit Cards, Credit Cards, Electronic fund transfer (EFT), E-cheques etc. Throughout the previous few years, e-banking has made a conspicuous growth in India.

TABLE 1: VARIOUS E-BANKING DELIVERY CHANNELS AND THEIR GROWTH IN PER CENT

Type of electronic channels	No of Channels		Growth %
	Mar-12	Apr-18	
No. of ATM deployed	95686	2,05,288	114.54
No. of POS deployed	660920	3193356	383.16
No. of CREDIT CARDS issued	1,76,53,818	2,98,42,23	69.04
No. of DEBIT CARDS issued	27,82,82,83	90635678	225.69

Source: RBI website

TABLE 2: NEFT AND RTGS TRANSACTIONS

Transaction Type	Number of Transaction (in Millions)		
	2011-12	2017-18	Growth %
NEFT	27.11	1946.4	1846.4
RTGS	6.34	124.4	101.0138

Source: RBI website

Table 1 displays some data and illustrations related to ATM, POS (Point of sale) and electronic cards (credit and debit cards) disposed and issued by the commercial banks in India as on March 2018. According to it currently, 2,05,288 ATMs, 3193356 Point of sale devices, 2,98,42,23 million credit cards and 225.69 million debit cards are working in India, and it also shows the growth rate of these banking channels in five years (i.e. from 2012 to 2018), and it seems to be great in the Indian context.

Table 2 gives the growth rate of NEFT and RTGS transactions during these five years. According to IAMA-IMRB Report, Urban India with an estimated population of 444 million already has 269 million (60%) using the Internet but Rural India, with an estimated population of 906 million as per 2011 census, has only 163 million (17%) Internet users. Another release, titled "ENCASHING ON DIGITAL: Financial Services in 2020" further added that out of 269 urban internet users, only 45 million are active e-banking users which composes around 16% of urban population. With the ongoing digital drive in India and increased government focus on digital foundation, While the number of internet users are multiplying hardly one-fourth of them use internet banking in India. It may be due to lack of trust, fear of hidden charges, fear of account could be hacked or complicated information provided among others. So, this study is an effort to determine the risk factors which prevent customers to use e-banking in India.

OBJECTIVES OF THE RESEARCH

- To investigate the possibility to increase e-banking awareness.
- To examine the hurdles and risk factor associated with e-banking
- To illuminate the standards adopted for safe banking.
- To know the challenges in the adoption of e-banking.
- To scrutinise the breaks available in E-banking.
- To study the advantages and limitations of using e-banking services.
- To make recommendations as to how to improve e-banking usage.

RESEARCH METHODOLOGY

Various databases were examined including EBSCO Host and Academic Search Complete. Articles were limited to peer-reviewed and scholarly journal articles published between 1970 and 2018. Searches included combinations of the following keywords: Difficulties in the adoption of e-banking, factors inducing the adoption of e-banking, Cost-related factors in the adoption of e-banking, Gender-related factors in the choosing of e-banking, fraud associated e-banking, advantage to adopt e-banking, instructional strategies to motivate the choosing of e-banking, access of e-banking in the adoption of e-banking, financial factors affecting the adoption of e-banking, impact of social factors in the adoption e-banking, Security risk factors, Self-regulatory Learning Strategies, influence of Personality Traits in the adoption of e-banking.

An exhaustive exploration was administered to cover only studies adoption of e-banking and reviews with discrete thoughts, reliable methods, and well-reasoned conclusions that focused on performance within health profession education and general higher education. Studies that were empirical and research article both were included. More than hundred articles were selected for this literature review.

REVIEW OF LITERATURE

There is a visible increase in phishing statistics as is apparent from s data collected from different sources. It may be a due number of hosting of phishing sites or emails received about phishing, monetary loss either of the customers or to the organisations. Singh, N. P. (1970). The main reason for failures/ success of frauds is ignorance on the part of the client as well as service providers (bankers, ISPs, retailers etc.). It requires rigorous methods of educating customers and regular review of security-related information of individual customers. Nitsure, R. R. (2003). This study discusses some of the problems developing countries, which have a low penetration of information and telecommunication technology, face in realising the advantages of e-banking actions. Major attention such as the 'digital divide' among the rich and poor, the various operational situations for government and private sector banks, intricacies of protection and authentication, supervision and ordinance, and incompetent funding of small and medium scale enterprises (SMEs) are highlighted. Usman, A. K., & Shah, M. H. (1970). Nitsure, R. R. (2003). Online Banking scam is a problem encountered globally and is proceeding to prove costly to both banks and consumers. Frauds in e-banking services happen as a consequence of various trade-offs in security varying from weak authentication systems to inadequate native checks. The absence of investigation in this field is questionable for practitioners, so there is a necessity to research to support better security and check stakeholders from falling trust in the operation. The purpose of his study is to learn factors that could be dangerous in establishing fraud prevention operations in electronic banking. The study reviews relevant kinds of literature to help identify potential significant success factors of frauds prevention in e-banking. Findings show that exceeding technology, and other factors need to be examined such as interior restrictions, customer education and staff education etc. These findings will help assist banks and controls with knowledge in specific areas that should be approached to strengthen their current scam blocking systems Previous research on Indian banking sector has examined the service quality attributes of public, private, and foreign banks in India There is limited research to understand the of effect of customers' trust in the adoption of internet banking in India. (Angur, M.G.,1999) (Sureshchandar G.S.et.al.,2003)

(Sureshchandar G.S.et.al,2001) In their research on service quality of private, public, and foreign banks operating in India suggest that customers' perceptions are affected by technological aspects of service delivery. The banking sector reforms in recent years have focused on customer- satisfaction, asset-liability management, investments, training of human resources and technology adoption to make banking convenient and hassle-free. Bedi, M. (2010) these factors have contributed to the improvement in banking services (Khare, A.et.al,2012) the performance and comfort factors will only make understanding to customers if they are convinced about the protection features. The economic transactions through the internet perceived as unsafe because of the facelessness of the service provider. Maximum people are used to bank personnel. They can discuss their difficulties with the staff, and the internet does not assure physical contact.

Singh, M., & Kaushal, R. (2012). The means of deregulation and amelioration in the Indian of banking system appeared in the formulation of an efficient and aggressive banking system. The pay systems like card-based payment systems, ECS, EFT, RTGS, NEFT and CTS have offered a quality of services to the clients. During the last three years, all the computerised modes of payment have shown greater maturity than the material check-based system. The Reserve Bank of India is, therefore, considering significant steps to provide adequate and combined payment and contract system in the country and is also taking steps to decrease the loss and risk. The present paper primarily aims to explore the impact of electronic banking on payment and clearing system and recognises the critical factors for the customers to choose electronic banking as a mode of payment. (Kolodinsky, J.et al,2004) Americans are using online banking technologies including Mobile banking. Millions of others have not or will not. They investigated factors that influence the adoption or aim to adopt three Online banking technologies and variations in these representatives over time and implied that related resources, complexity/Simplicity, compatibility, observability, risk tolerance, and product involvement incorporated with the selection. Income, assets, education, gender and marital status, and age also affect adoption. Passage switched over the term, but the influences of other factors on choosing have not changed. According to him, barriers are a security concern, network problems, insufficient guidance and cost of transactions. (Bamoriya, D., & Singh, P. 2013). The primary concern among customers was the safety concern regarding mobile banking services which forms a real obstacle to use the service, followed by network problem and insufficient operating guidance. The investigation also noticed that even most of those who regularly practice the Mobile Banking services, usually do not conduct much of financial transactions, but find the service very useful for information based

deals mainly checking account status. This means that Mobile banking services is not solving the direction it was for, which is to accommodate consumer convenience and reduce customer appointments to the banks. Based on the findings, it is firmly believed that ensuring the security of Mobile banking and familiarising clients with how to utilise the service will positively enhance the degree of using Mobile banking service. The centre of this research are the various ways of security matters that are taken to e-Banking in order to lessen internet banking frauds at credit card purchases and also at Automatic Teller Machine (ATM). The time determinant is hard to be reached for expert data over the subject thanks managerial classification of some information as familiar ones, so financial commitment has been the inner boundary of this study. Using questionnaire contribution we have collected the necessary information to test the possible hypothesis and used Hi squared test to prove their genuineness. However, e-banking in global indications has not diminished the rate of bank fraud. People can now discover tricks of all kinds to get the PIN or items of introduction to online accounts of clients. Albania has a consumer with limited knowledge to the crime of cunning, and this is the reason why the number of thefts Albanian banks in the network of e-banking is minimal, not willing without indicating that Internet Banking is zero. e-banking Has increased banking profitability by a little number of positive, but this does not justify so easy the quite large amounts of money spent in such an industry. However, the reduction of unnecessary costs to the traditional sector and increased consumer satisfaction remains strong points of the e-banking.(FOTO, G.et al,2013) The alliance of fraud on all aspects of the online banking services needs a serious review of the old commercial models that prevailed for last years., the theoretical structure of this research is based on a conversation about principles and fraud, in common, and knowledge and information technology of the e-banking services, in particular. Empirical structure follows the applicability in this region of research related by banks with public data accessible on the Portuguese Banking Association. The conclusions of the research show several threats, vulnerabilities, incidents, impacts and response that face online banking services. To alleviate these risks, the main hurdle is the public dialogue that will encourage interception and disclosure evidence-based incidents, not only to endorse an adequate behaviour, also, to strengthen guidance on practical testimony on ethics and overcome fraud.

(Wei, W.et al, 2013) The researcher suggests an effective online banking fraud discovery structure that incorporates appropriate sources and consolidates various forward information mining procedures. He profiles the differentiating rate of each current transaction against the customer's behaviour inclination. A novel algorithm, contract miner, is introduced to efficiently mine contrast patterns and distinguish fraudulent from good behaviour, followed by an active pattern selection and risk scoring that combines predictions from different models. Results from experiments on large-scale real online banking data demonstrate that our system can achieve substantially higher accuracy and lower alert volume than the latest benchmarking fraud detection system incorporating domain knowledge and traditional fraud detection methods. (Internet world statistics,2018) In such a condition, information security is crucial to a financial institution's strength to deliver e-banking services. To guard the confidentiality and uprightness of customer information, and assure that answerability endures for modifications to the data and the processing and dissemination systems. A meaningful provocation for e-Banking that requires innovative entrances stems from the need to demolish the effects of rapidly growing cyber-crime. Current statistics reveal that internet usage has gone up dramatically since the last decade with Asia's penetration itself being 49.0%. Financial institutions are allowing Internet-based products and services should have safe and secure methods to verify their clients. Authentication practised by the financial institution should be relevant to the risks connected with those products and services.

Biometrics introduces to spontaneous credentials of a person based on her physiological or behavioural characteristics. It provides a better solution for the increased security requirements of our information society. As biometric sensors continue to become less expensive (and miniaturised), the negative perception of biometrics as an encroachment on individual privacy continue to decline, and as the public realises that biometrics is an effective strategy for protection of privacy/fraud, this technology is suitable to be practised in practically every transaction needing authentication of personal identities. (Khan B et al 2010) These are: sensor, feature extractor, fingerprint/template database, and matcher and decision module. Fatima, A. (2011) Financial institutions attempting Internet-based products and services should have reliable and protected systems to validate their clients. Authentication employed by the financial institution should be accommodated to the risks connected with those products and services.

(Aburrou, M et al, 2010) Recognising and knowing any phishing websites in real-time, especially for e-banking, is a complicated and compelling problem including many determinants and measures. Because of the prejudiced thoughts and the vaguenesses involved in the disclosure, fuzzy data mining procedures can be a useful instrument in judging and recognising phishing websites for e-banking since it allows a more consistent way of administering with quality determinants rather than specific values. In this paper, we present a novel approach to overcome the 'fuzziness' in the e-banking phishing website assessment and propose an intelligent resilient and effective model for detecting e-banking phishing websites. The proposed model based on the fuzzy logic combined with data mining algorithms to characterise the e-banking phishing website factors and to investigate its techniques by classifying the phishing types and defining six e-banking phishing website attack criteria's with a layer structure. Our experimental results showed the significance and importance of the e-banking phishing website criteria (URL & Domain Identity) represented by layer one and the various influence of the phishing characteristic on the final e-banking phishing website rate. Villa-Real, A. E. C. (2014) All-in-one radio mobile telecommunication means, operations and systems contributing greater customer-control, instant-response anti-fraud/anti-identity theft protections with immediate warning, messaging and secured true-personal identity confirmations for various recorded customers/users, with biometrics and PIN protection, operating with standard, touch-screen and/or voice-controlled commands, achieving secured rapid personal/business e-banking, e-commerce, accurate transactional monetary control and management, having interactive audio-visual alarm/reminder preventing fraudulent usage of legitimate physical and/or virtual credit/debit cards, with checks anti-forgery means, curtailing medical/health/insurance frauds/identity thefts, having integrated cellular and/or satellite telephonic/internet and multi-media means, equipped with language translations, GPS navigation with transactions tagging, currency converters, with or without NFC components, minimizing potential airport risks/mishaps, providing instant aid against school bullying, kidnapping, car-napping and other crimes, applicable for secured military/immigration/law enforcements, providing guided warning/rescue during emergencies and disasters. One of the systems that have been analysed by many researchers to detect fraud in banks and financial institutions is data mining. Data mining that is an intergroup process can identify the hidden knowledge and information in a mass volume of data and use them to solve different puzzles. Some technologies like statistics, artificial intelligence, database, etc. form the theoretical support of data mining. Due to a large number of data in banks, data mining has had lots of functions in financial and monetary affairs so far. Credit risk management, fraud detection, money laundering, customer relationship management and banking services quality management are some examples of data mining function in banks. In this research, a new method was introduced for fraud disclosure in e-banking by employing the hybrid feature choice and genetic algorithm. According to the retrieved sequences, it can be said that the proposed system is very efficient for fraud detection in e-banking.

Sherif, A. (2017). In the Middle East, the Saudi Arabian Monetary Agency (SAMA), Central Bank of Egypt (CBE) and Qatar Central Bank (QCB) have served all banks contributing e-services to be submissive with their issued rules, and get prior permission if a bank wishes to implement transactions through internet banking. In these rules, regulators have endorsed principles and recommendations to protect against identity fraud, new account fraud, internal fraud and external fraud threats. For identity fraud, it has been advised that the financial institutions must use thorough authentication processes—such as dual factor authentication—to identify existing customers who access e-banking services. Local regulators have suggested that financial institutions should train their customers' awareness against phishing and pharming attacks. SAMA for instance, has explicitly compelled banks to defend their clients from online fraud efforts (phishing and pharming attacks) practising a reliable licensed process that facilitates the interception, apprehension and acknowledgement to these attacks. In extension to that, regulators have notified banks to encourage their customers to defend their credentials securely, generate secure passwords, and install proper security protection on their machines (e.g. antivirus and personal firewalls). CBE for instance, has suggested banks assess customer devices and be able to verify their transactions even if their device is compromised. The warning sketch has become more complex. Cybercriminals have been obtaining more data about the advanced protection counter-measures, and securities banks are performing, and how to efficiently avoid them. Latterly, Bahrain had accepted an extraordinary step forward, encouraging the adoption of these first protection technologies based on a cloud hosting infrastructure to consolidate, investigate and learn actionable global and local information about menace actors, their tactics, procedures, and systems.

The Associated Press. (2017) published report, A goal of this research was to conceptualize three types of semi-collaborative networks in the fraud detection activities of insurance subsidiaries and to measure the impact of information spill over via these networks on fraud recovery by these subsidiaries. With a focus on fraud detection, it was possible to isolate and study information spillover without confounding the spillover with rent-based spillover, as has been done in prior work on IT spillovers. The study faced empirical challenges, including one of finite masses at zeros for some of the key variables, which was resolved using a

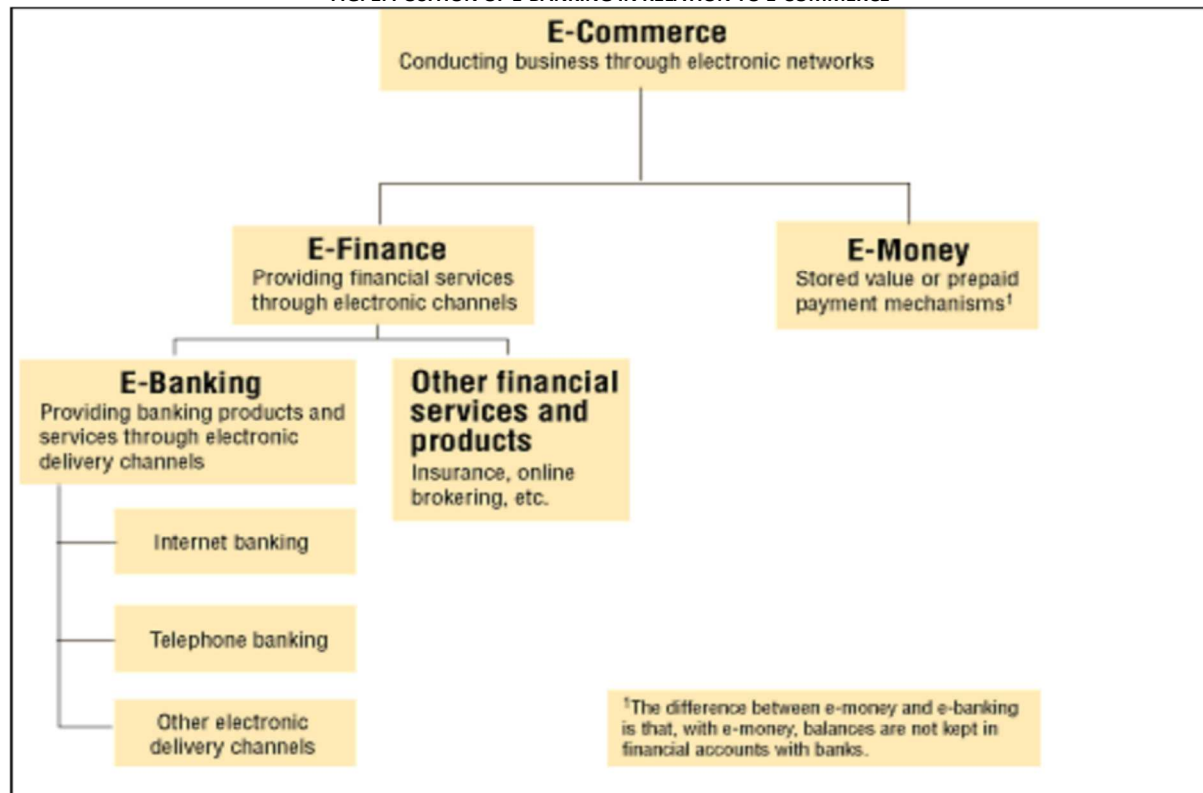
generalized linear model and a compound Poisson-gamma distribution. This approach has been used to analyze aggregate claims data in the insurance literature and has promise for future research looking at data analytics outcomes at the aggregate firm level rather than transaction-level outcomes. The next goal of this study was to verify the influence effect of learning spillover (i.e., whether benefits from semi-collaborative networks affected fraud detection investments in the insurance industry). This research, it is attempted to discuss the growth of E-banking along with growing difficulties of opportunity & Insecurity. Stress is given on information to be given to E-banking users and business of more security rules to avoid risks of misappropriation of supplies and cyber crimes. Online banking has a lot of extras which add value to customers' satisfaction in terms of better quality of service offerings and at the same time enable the banks to gain a more competitive advantage over other competitors. This research also discusses some challenges in an emerging economy and the benefits of E-banking. BALA, V. (2015). (Luo, X. et al. 2013) Corporate fraud is a serious issue in modern corporate risk management. This study used social media data from financial platforms and proposed a text analytic framework, rooted in the SFL theory, which aims to extract signals/cues to detect early signs of fraud. Social media are unique in their ability to generate and disseminate information by the general public, which traditional media lack. (Abrahams et al, 2015) His research determines that the latent features derived from financial, social media data have a leading effect on fraud detection. Also, researchers benchmark the performance of our model against those that use just the financial ratios and language-based features from MD&A sections and demonstrate that social media features perform better in our data set. By integrating financial ratios, language-based features, and social media features, our algorithm leads to 80 per cent prediction accuracy. Finally, conduct an applicability check of our algorithm. These findings not only demonstrate the efficacy of social media features for fraud detection but also verify that a social media-based method can supplement existing corporate fraud detection approaches. We note that the five sets of latent functions proposed in their study can be extracted from other types of social media data and applied to domains such as product defect discovery. (Beneish, M.D, 1997) fraudulent behaviour detection on crowd funding platforms, (Zhang, D et al, 2016) and fake online reviews detection. (Abbasi, A. et al, 2012) The advanced fraud disclosure system has the potential to significantly curtail the time lag from fraud inception to fraud enlightenment, thus substantially inhibiting financial losses to broad shareholders and financial disturbance to the economic system. Three stakeholders, in particular, investors, audit firms, and government regulators and policymakers can benefit from such a system. (Borgatti, S.P. & Foster, P.C, 2003)

Ezeoha, A. E. (2005) Still amidst the regulatory insufficiencies recognised earlier, the increasing cases of Internet-related frauds beginning from Nigeria have made the Internet banking environment very complicated. The banking industry in the country does not also at present enjoy that level of global union that may allow for full advantages of the Internet banking system. Even at home, the level of public confidence in the banks is not such that can ensure efficient customer support of Internet Banking services. Therefore, in interest to the cases of inadequate access to the essential facilities, very few customers businesses through the Internet. This demonstrates why the development of banks' web sites has not gone beyond information objects. A situation where banks would have to invest much on procuring information technology software without attracting enough customer assistance necessary to justify the enormous expenditure does not make for a reformist chance for rapid growth in Internet banking in Nigeria. With the deficiencies in the existing electronic banking guidelines and the apparent lack of proactive actions in other banking regulations in the country, the right climate for Internet banking remains presently not in existence. Soviany, C. (2018). The performance of artificial intelligence-based solutions for fraud management in financial applications could be further optimised were the fraud management solution development process augmented with the following operations, as best practices for the design and deployment. A reliable data analytics process to explore the most significant properties of the available data that are required to design the learning engine for fraud detection/prevention. Enlarging the training period to properly exploit the additional information about new fraud methods and newly detected vulnerabilities discovered at the customer application level. He developed solution, based on an advanced AI-based technology and platform increased fraud detection rate from 85 per cent to 90 per cent (in terms of number of transaction records) and to 95 per cent in related amount volume (in terms of transaction value), while the alert rate (the percentage of daily transactions investigated manually) was reduced from 40 per cent to 10 per cent. The solution falls under the category of explainable AI because it can explain the rationale behind the decisions.²In order to increase the E-banking, the banks need to work toward shift in the client's behavior by means of education, mainly toward e-banking security as the major tool disadvantage for its utilization. Moreover, these activities have potential positive impact on increased utilization of e-banking by the clients in near future. Furthermore, decreased costs for the banks in e-banking vis-a-vis traditional banking can widely provide adequate space for higher bank profitability. This research is based on two case studies that represent these alternative approaches. In contrasting these two approaches the purpose of the analysis is to provide empirical evidence that explores the marketing challenges for e-banking in the context of qualitative data from managers engaged in practice.

Hughes, T. (2003). This research suggests a fraction of issues about the state of knowledge on how e-commerce is being operated and positions this piece of research in providing much needed empirical evidence from banking, a sector that is at the forefront of using the Internet for transacting with customers. In the past financial services has been criticised as a sector for lacking a market oriented approach. As e-commerce changes the nature of the customer interaction with the organisation in banking and also in other service sectors the challenge for marketers is to be involved in taking a leading role in directing the management of these relationships between organisations and their customers. This means that organisations will need to concentrate on effective customer management in this situation and will need to deal with it holistically, as a marketing and management issue, rather than purely as the application of a technological tool. (Liao, Z. 2002) the optimal growth approach for e-banking is likely to be the cultivation of the demand side along the pathways of least protection, in particular as regards consumer perceptions of transaction security, transaction accuracy, user-friendliness, and network speed. (Ziqi Liao et al, 2003) In the empirically most essential areas of transaction security and efficiency, encryption protocols such as the Secure Sockets Layer (SSL) and Secure Electronic Transactions (SET) have been widely adopted by e-banks. There is, however, a lingering resistance on the part of culture-bound individuals accustomed to 'physical' transactions, so that efforts to expand e-retail banking over the Internet must (among other things) surmount a perceived technological bias. Given such considerations, we submit that overall the most significant challenge facing Internet e-retail banking at present is not so much the application of new technology on the supply side, but the enhancement of consumer acceptance on the demand side. Angelakopoulos, G., & Mihiotis, A. (2011). This research explores the provocations and opportunities of e-banking for the Greek banking sector, during the e-commerce era, and also shows the results of a survey of banking officials managing at banks endeavouring e-banking services. The main findings show that banks develop to e-banking services to continue competing, to keep track of technological advancements and to profit from the lower cost of e-banking activities. The significant obstacles they front are the low acknowledgement rate from customers and the implementation of security and data protection tools. The relatively feeble Internet usage, the non-familiarity with technologically superior devices and difficulties concerning security and privacy are the main determinants that have a negating influence on the selection of e-banking services by customers in Greece. Security concerns This is probably the most critical factor that influences the prospective customers of e-banking services negatively. Every channel of e-banking has its own security problems, but it may be argued that when somebody concerns about security in e-banking, then the first that comes to his/her mind is the Internet. This is substantiated by the numerous articles in the press concerning Internet security breaches. People see and hear everywhere about hackers, crackers, computer viruses, identity theft, phishing attacks, spyware, malware and many more other terms which refer to security issues regarding the Internet. Nevertheless, it is not only the Internet that is fraught with security breaches. There are numerous incidents regarding frauds through the use of fake ATM cards or cases of theft of identity data through the infiltration of inadequately guarded information systems. Security Although security concerns are of greatest importance for the adoption of e-banking services, enhanced security of alternative channels benefits the customers. For example, fund transfers between accounts of different banks are safer when they are made through electronic channels than through cash transfers (a risk of robbery is minimized).

Electronic banking may be seen as a part of the larger picture of e-commerce. (Nsouli and Schaechter, 2002) depict this in Fig. 1. In this figure e-banking is part of e-finance which in turn is part of e-commerce.

FIG. 1: POSITION OF E-BANKING IN RELATION TO E-COMMERCE



Source: Nsouli and Schaechter, 2002 (<http://www.imf.org/external/pubs/ft/fandd/2002/09/nsouli.htm>)

(Al-Smadi, and Mohammad, 2012) Factors influencing E-payment system, its benefits and challenges has been discussed by widely many researchers. In order to motivate customers to use e-banking, organisations must many make key improvements that address the customers concerns and hence, it is necessary to understand the key factors that influence the adoption of e-banking among the customers. Besides there are several factors that a card holder or the user considers for opting Digital payment system like Technology of payment instruments, information accessed by third parties. Kazan, Erol, and Damsgaard (2014) ease of use, risk, security and trust, consumer awareness, convenience, availability of e-payment tools, Speed Internet Access, the consumer's experience in using, computer and their level of education the technical, protection, security statements, Government and Central Bank regulations, productivity in the transaction, easiness and flexibility in the transaction, the reason that their dear and near recommends were the factors, many identified and incentivizes the elements which can fillip the usage of e-payment system. Junadi, and Sfenrianto (2015). Vinitha, K., and Vasantha, S. (2017), Distinguished ease of use and perceived usefulness affect the behavior and attitude towards information system. Renny, Guritno, S. and Siringoringo, H. (2013). Cultural factors such as level of education, language and experience of the technology is very important in the adoption of new technologies. Yousafzai, S. J *Financ Serv Mark* (2012) By considering above literature review, we identify that the factors influencing the implementation and adoption of e-payments can be broadly grouped as below

- Technology & Infrastructure.
- Education, Training & Awareness.
- Behavior & Attitude.
- Cultural factors.
- Online Safety & Security factors.
- Motivational factors.

How and why people use Internet banking (IB) has attracted a great deal of academic attention. This article reviews the IB literature through the eyepieces of nine adoption theories. The review suggests that IB adoption is a complex and multifaceted process, and joint attention of clients' personal, social, psychological, practical and behavioural perspectives is more important than approval itself and will ultimately result in the intended behaviour. Therefore, managers and system developers should undertake a customer-centric approach focusing on managing belief formation rather than directly influencing behaviour. The review also concludes that IB research is in an uncertain state, and is far from unanimous regarding the approaches and conceptualisations used to understand the beliefs that truly influence IB behaviour. There is limited research dealing with the role of interventions that can assist managers in making effective decisions to speed the adoption process. Despite the ease of doing online banking, there are people that still sceptical in utilising it due to perception and its security. This research highlights the subject of online banking security in Malaysia, especially from the perspective of the end-users. The study is done by assessing human-computer interaction, usability and security. An online survey utilising 137 participants was previously conducted to gain preliminary insights on security issues of online banking in Malaysia. Following those results, 37 participants were interviewed to gauge a deeper understanding of the end-users perception of online banking within the context of proper security. The results suggested that most of the end-users are continuingly experiencing significant difficulties especially concerning the technical terminologies, security features and other technical issues. Although the security features are provided to provide a shield or protection, users are still incapable of coping with the technical aspects of such implementation. FN Mahmadi *et al* (2012) Data investigation revealed that perceived ease of use and perceived usefulness have a direct impact on the adoption of internet banking in Mauritius. Results have also shown that both support and security aspects are deemed crucial factors in defining internet banking adoption in Mauritius. Further investigation of the rational analysis highlighted that the level of teaching and income level of respondents might be a significant determinant in influencing the adoption of internet banking. The government of India (GOI) initialised financial inclusion campaign to quell exclusion. The campaign did not gain expected progress — government employed technologies to speed up the process. Among banking technologies, mobile banking appeared as a possible solution for financial inclusion with extensive mobile phone coverage. Inputs on rural people's intention toward technologies for useful financial inclusion were essential. Technology adoption factors, performance expectancy, effort expectancy, social influence, attitude, perceived risk, and behavioural intention (BI), were shortlisted after a literature review. Elements were subjected to reliability, exploratory factor analysis (EFA), multiple regression, and interaction analysis. Rural provinces in Karnataka state were surveyed. We used a mixed sampling technique to reach 959 samples. Multiple regression–interaction analysis revealed age and gender moderated attitude's path toward BI. Sharma, A., Kansal, V. (2012). Mobile phones are the future of financial transaction. It should reach average person Favourable attitude was found in rural people. These factorial relationships hold crucial information for technology diffusion. Rani, V., & Rani, A. (2018). In this study Customers' responses have been analysed about the e-banking service quality. The aim was to know what customers perceive about the e-banking service quality of banks. An analysis of the customers' responses to different e-channels has been made. The analysis shows that customers find ATM the most suitable channel for their banking. This analysis of reactions has also been made concerning different

parameters viz. Demographic characteristics which include gender, age, education, Occupation and household income. The hypothesis was designed, and ANOVA was applied as test of hypothesis to test that there is no significant disagreement between the attitudes of clients about e-banking service quality of banks with concerns to demographic variables. It was determined that there is no significant variation and the hypothesis stood accepted. Malarvizhi, V., & Geetha, K. T. (2017) Since customers' age group affects their choice of banks, the banks should conduct a marketing research to identify the factors that are considered pertinent by customers in specific age groups with a view to establishing a basis for effective segmentation and target marketing which will no doubt eventually enhance customer patronage. Non-availability or low-scale of information to potential customers may have intensified the psychological fear and anguish that keep many away from using e-banking services. The e-banking managements should fill in the gap by fostering appropriate education and publicity through mass media channels.

- To lessen the gap between the adopters and the non-adopters, governments should increase investment in education and infrastructural development to enable more customers to adopt the innovations.

- Governments should also improve the competitiveness among the e-banking providers by setting procedural standards in the service delivery and security system, which should subsequently be established as a benchmarking method nationwide.

- Enhancing and improving cyber law in the country is also one of the challenges that the governments should face to protect and regulate e-banking. Bucko, J. (2017). The great increase of smartphones and tablets method has produced an immense increase in the use of a different form electronic banking - Smart Banking, nowadays. This form of e-banking is suitable for small businesspeople or private usage and its usage increases with the rise of popularity of mobile phones with operating systems. The transmitted information is more sensitive and related to financial transactions in e-commerce or communication between the client and the bank. There is a critical question of security hidden on the background of these applications. Is the security of distributed Smart Banking applications in Slovakia sufficient? How secure are these applications and which features may influence the safety of these applications? The paper aims to analyse the security of Smart Banking applications distributed by Slovak banks. The outcomes of our research are the specifications of parameters which affects the protection of these applications. We also suggest a methodology for comparison of Smart banking applications depending on these parameters and comparison of particular analysed Smart Banking applications of Slovak banks which are used by the majority of Slovak clients. B. Shneiderman and C. Plaisant, (2004), (Kleinberg, 2007) The usage of smart phones has stretched profoundly. Various new smart devices, chiefly Android-based phones revolutionised the market, and the dilemma of smart phone applications' security became very prominent. (N. Leavitt, P. Kuper, 2003) Many articles about smart phone security and the potential risks of their usage were published in (M. Vejačka, 2014) Electronic banking is the common dynamically growing form of banking in Slovak banks. Its specific form - Smart Banking is called according to the device for which it is intended. With the growing fashionableness of smartphones and tablets, Smart Banking seems like a convenient solution to handle the necessary transactions and transfer orders. While using a smartphone, requests for payments or demands for loans can be placed. The advancement of mobile phones currently provides to the promotion of other forms of electronic banking services, such as the Internet Banking, in which for example exceptional security is achieved by sending a dynamically generated verification code via SMS. The number of clients using direct banking services originally began gradually. The reason was the high cost and lack of trust in these services due to low security perceived by customers.

(Han, et al., 2013) The level of user security and reliability knowledge affects the general security of these applications. Quantification and measuring of such parameters is very difficult and require further research conducted by questionnaire surveys. On the other hand, we can examine the security from the technological point of view. Quantification and measuring require setting up the relevant set of parameters or features of applications and finding the suitable methodology of evaluating these parameters or features. This way the comparison is based on statistical methods, which can help gain representative results of research. Authors of previous researches usually compare security of smart phone platforms. (R.M. Nabi et al, 2015). Basias, N et al (2012, June). Sarlak, M. A., & Hastiani, A. A. (2010), Shah, M., & Clarke, S. (2009) Banks adopt IT solutions and attempt to deploy integrated IT architectures, reduce technical complexity, and offer scalable and manageable environments. As a result, bank IT spending Investments by banks in secure-transaction technologies and robust IT practices make e-banking more reliable Banks look into advanced Information Systems (ISs), development tools, methods, and techniques to improve their business processes and services. New integrated systems, which are designed to improve efficiency and reduce operational costs, offer transparent processing for all commercial banking operations through an integrated working environment and a solid security framework.

Mohamad, R., & Ismail, N. (2009). The security of e-banking transactions and data is critical for banks, as it is a matter of high importance. The banking sector is based on a relationship of trust among clients and banks. Thus, any action that causes problems to this relation damages the image of a bank and its business-banking increases security risks as banking systems are available over the Internet and can be accessed from anywhere. This improves security risks as e-banking applications are often a target for hackers. When banks decide to integrate their e-banking applications with backend applications using service-oriented architecture (SOA), security risks are increased. Hackers can attack e-banking applications to gain access to the back-end and core-banking systems. For this logic, it is of crucial significance for banks to thoroughly investigate this issue before proceeding to service-oriented architecture (SOA) adoption.

Risk is a function of the measurement or extent of goals that a person tries to reach and the seriousness of the atonement that one must endure while not reaching them (Mitchell, 1999). Stone and Winter (1987) defined risk as an individual expectation of potential losses. The higher probability of a loss, the more risk is perceived by the individual (Farzianpour et al, 2014). Perceived risk is considered a fundamental concept of consumer behavior and is often used to explain customers' risk perceptions and reduction methods (Mitra et al., 1987; Shin, 2010). Bauer (1960) initially presented the idea of perceived risk. He characterized risk as far as the instability and outcomes connected with a consumer's activities (Farzianpour et al, 2014). The influence of perceived risk has also been observed in Information System investigation, particularly in Internet banking literature (Gerrard & Cunningham, 2003; Lee, Kwon, & Schumann, 2005; Littler & Melanthiou, 2006; Pikkarainen, Pikkarainen, Karjaluoto, & Pahlila, 2004; Sathye, 1999). Research by Ho and Ng (1994) and Lockett and Littler (1997) empirically support the notion that the use of electronic banking involves risk. Consumers perceive that the use of electronic banking as a risky decision because technology-enabled services exhibit pervasive technological, unfamiliar and ambiguous stimuli (Davidow, 1986). Therefore, when consumers decide to use electronic banking, they are exposed to uncertainties such as the availability, compatibility, and performance of electronic banking channels (Sarin, Sego, & Chanvarasuth, 2003; Manzano et al, 2010). According to Featherman and Pavlou (2003), perceived risk is defined as "the potential for loss in the pursuit of a desired outcome of using an e-banking service". In the online context, past studies suggest the inclusion of perceived risk due to its importance in influencing online consumer behaviour (Cunningham et al., 2005; Pavlou, 2003; Salam et al., 2003; Schlosser et al., 2006) and more so in the area of e-banking (Cunningham et al., 2005; Wong et al, 2014). In the research on consumers' behavior, perceived risk is claimed to be a multidimensional construct. (Mitchell and Harris 2005; Crespo, Del Bosque,) and Sanchez 2009; Damghanian et al, 2016). Kaplan et al. (1974) identified five dimensions of perceived risk: performance, physical, financial, psychological and social. Roselius (1971) added time loss (Hoyer and MacInnis, 1997). However, research has tended to confirm that the dimensions of perceived risk may vary according to the product (or service) class (Featherman and Pavlou, 2003; Littler and Melanthiou, (2006).

TABLE 3

AUTHOR & YEAR	COUNTRY	OBJECTIVES	SAMPLE & RESPONDENTS	TECHNIQUES	FINDINGS
Featherman and Pavlou (2002)	USA	This study integrates the perceived risk factors with the basic TAM variables (perceived usefulness and perceived ease of use) to propose a comprehensive model of e-services adoption.	214 respondents	CFA, Regression	Results indicated that e-services adoption is adversely affected primarily by performance-based risk perceptions, while perceived ease of use of the e-service reduces risk perceptions.
Munene et al (2002)	Australia	The aim of this study was to explore the perceived risks associated with the use of online banking to improve our understanding of the barriers to adopting service delivery innovations.	1700 potential respondents in the different regions of Western Australia.	principal components analysis	The results demonstrate that consumers using online banking transactions may experience various forms of perceived risk including performance, psychological, and financial risks
Cunningham et al (2005)	France	To investigate the premise that purchasing e-banking services is perceived to be riskier than purchasing traditional banking services. This study also examines the dynamics of perceived risk throughout the various stages of the consumer buying process.	159 respondents	Multiple regression	The analysis indicates that financial risk drives the risk premium while psychological, physical and time risk play ancillary roles as risk drivers at certain stages of the consumer buying process.
Zhao et al (2008)	China	To identify risk factors that discourage Chinese consumers from adopting internet banking services and to compare cultural difference between Chinese consumers' and Western consumers' risk perception.	504 respondents from southern China	Exploratory factor analysis	Results clearly revealed that the significant risk barriers identified are influenced by culture and do not simply follow predominant Western patterns.
Lee (2009)	Taiwan	To explore and integrate specific risk facets – financial, security/privacy, performance, social and time risk with the technology acceptance model (TAM) and theory of planned behavior (TPB) model which explain customers' intention to use online banking.	368 users of e-banking	Structural equation model	The results indicated that the intention to use online banking is adversely affected mainly by the security/privacy risk, as well as financial risk and is positively affected mainly by perceived benefit, attitude and perceived usefulness.
Wong et al (2009)	Australia	To investigate the role of a customer's perception of risk in the internet as a moderator on the relationship between trust and the customer's willingness to use e-banking.	Non-probability sample of 218 respondents	Moderated regression	Results revealed that a customer's willingness to use e-banking depends on the customer's perception of risk in transacting on the internet. Trust of the specific e-banking website was found to be the moderator instead.
Demirdogen et al (2010)	Turkey	To assess differences in risk perceptions between customers using internet and those not using the internet and to determine levels of customer risk perceptions among users of internet banking	350 respondents	Correlation analysis, variance analysis	There is a significant difference between risk perceptions of users and non-users in terms of financial risk, psychological risk and security risk while there is no significant difference between users and non-users in terms of performance risk, time risk and social risk
Beikzad et al (2011)	Iran	To investigate the comparison of customers' perception of risk in E-banking process and traditional banking process in the branches of Tabriz Karafarin bank.	360 customers	Paired t-test	Results indicated that there is a meaningful difference between customers' risk perception in E-banking process and traditional banking process in the branches of Tabriz Karafarin bank.
Kesharwani and Bisht (2011)	India	To extend the technology acceptance model (TAM) in the context of internet banking adoption in India under security and privacy threat.	619 respondents	exploratory factor analysis, confirmatory factor analysis, SEM	The findings revealed that perceived risk has a negative impact on behavioral intention of internet banking adoption and trust has a negative impact on perceived risk.
Manzano	Spain	To analyze the role of satisfac-	254 Spanish inter-	CFA,	The results indicated that satisfaction

et al (2011)		tion, trust, frequency of use and perceived risk as antecedents of consumer loyalty to banking websites.	net banking users	Hierarchical Regression analysis	correlates positively with loyalty but the effect is significantly less intense with high levels of perceived risk while trust correlates more positively with high levels of perceived risk.
Bazgosha et al (2012)	Iran	To explore the effect of consumers' perception of risk and uncertainty on the rate of using internet banking as a new service and enhancing knowledge scope in this area.	200 customers from the branches of Saderat bank in Mashhad city	Correlation coefficient analytical method along with multiple regression method	Statistical tests indicated that risk and uncertainty components have negative significant relationship with the rate of internet banking usage.
Hanafizadeh and Khedmatgozar (2012)	Iran	To examine whether bank customers' awareness of the services and advantages of IB is effective in reducing the negative effect of customers' perceived risk on their intention of IB adoption.	414 respondents	CFA, Structural Equation Model	It was found out that except for social risk, other dimensions of the perceived risk have significantly negative effect on the intention of IB adoption. Further, it was concluded that the dimensions of customers' perceived risk play a mediating role in the positive effect of IB awareness on IB adoption intention.
Manoranjan et al (2012)	India	The purpose of the study was to explore, describe and get a better understanding of the role that risk perception plays in consumers' adoption of the Internet banking.	260 bank customers	Independent t-test, Factor Analysis, Regression analysis	Results revealed that physical risk, financial risk, time risk, functional Risk negatively influences internet banking adoption.
Moradi et al (2012)	Iran	The main aim of this study is investigating the effect of customers' perception of risk and uncertainty on the rate of using Internet Banking.	200 respondents	Correlation analysis, multiple regression analysis	The findings indicated that the components of risk and uncertainty have negative significant relationship with the rate of Internet Banking usage.
Okeke (2013)	Nigeria	To ascertain which of the perceived risk/security factors of psychological risk, quality risk, time-loss risk, financial risk, physical risk and security that are dominant in classifying e-banking customers on the basis of high and low involvement.	908 respondents	Discriminant analysis	The results revealed that time-loss risk and security are the most dominant in classifying e-banking customers though these two factors are the dominant the discriminant structure matrix showed that the seven factors are important as they all contribute to the classification.
Farzianpour et al (2014)	Iran	To investigate the effect of perceived risk factors on the usage online banking services and to analyze the influence of total perceived risk and consumers' willingness to embrace innovation on online banking services adoption.	384 customers of MELLAT Bank	confirmatory factor analysis, Spearman test, Structural Equation Modeling (SEM)	Results revealed that the consumer's total perceived risk and willingness to accept innovation both have a direct effect on online banking services adoption, while willingness to adopt innovation has no significant influence on the consumer's total perceived risk.
Martins (2014)		To integrate unified theory of acceptance and use of technology (UTAUT) with perceived risk factors to explain behaviour intention and usage behaviour of Internet banking.	249 respondents	Structural equation model	The results supported some relationships of UTAUT, such as performance expectancy, effort expectancy, and social influence, and also the role of perceived risk as a stronger predictor of intention.
Siraye (2014)	Ethiopia	To analyze factors that influence customers' intention to adopt e-banking service channels in Ethiopia.	211 customers from six commercial banks	Regression analysis	Results revealed that the variables included in the models (attitude, subjective norms, perceived behavioural control, perceived usefulness, perceived ease of use and perceived risk) were significant in affecting users' behavioural intention to use e-banking services.

Wang et al (2014)	Taiwan	To examine the impact of perceived ease of use, perceived usefulness and sub-constructs of perceived risk on online banking services(OBS).	594 respondents	CFA, Structure equation model	Perceived ease of use and perceived usefulness are positively related to the adoption of OBS. Furthermore, the results revealed that the assumptive impact of perceived risk construct is negatively associated with OBS adoption.
Karimi & Davood (2015)	Iran	To examine the role of innovation and risk perceived by customers in using e-banking services.	270 respondents	Structural Equation model	Perceived risk of customers had a negative effect on e-banking usage. Customer innovation had a positive influence on the use of e-banking services. Innovation reduces customers risk perception in e-banking services.
Kassim & Ramayah (2015)	Malaysia	To extend the Technology Acceptance Model by incorporating seven risk constructs into the model to understand the impact of risks on intention to use internet banking in Malaysia.	413 respondents	Structural equation model	The results clearly indicated that perceived risk dimensions are strong determinants of intention to use internet banking.
Kassim & Ramayah (2015)	Malaysia	To investigate the influence of risk dimensions on the attitude towards the use of Internet banking.	413 respondents	PLS-SEM	The results revealed that social risk, time loss risk, opportunity cost risk and perceived usefulness are significant factors influencing attitude towards intention to continue using Internet banking.
Ong & Lin (2015)	Taiwan	To explain the relationships among trust, perceived security and perceived risk and to examine the effect of these three factors on inter-individuals' adoption of net banking.	188 students and faculty	Smart PLS	Two results were obtained: first is that perceived security is an important antecedent of trust and perceived risk; second is that perceived security has both direct and indirect effects upon individuals' adoption of internet banking.
Damghanian et al (2016)	Iran	To examine the relationship between perceived security and acceptance of online banking with the mediating effect of perceived risk and trust in Internet banking.	395 randomly selected customers	first- and second-order confirmatory factor analysis, SEM	Perceived security and trust in Internet banking had a significantly positive impact on the acceptance of online banking and perceived risk had a significantly negative impact on trust in Internet banking.
Fadare et al (2016)	Nigeria	To examine the impact of perceived risk on intention to use internet banking. Also, to investigate the effect of performance risk, social risk, time risk, financial risk and security risk on the intention to use internet banking.	120 students studying in UUM	Pearson correlation and multiple regression analysis	This study showed that perceived risk; performance risk, social risk, time risk, financial risk and security risk negatively influences intention towards the use of internet banking in this study.
Hussein & Saad (2016)	Egypt	To examine the perceived risk and behavioral determinants of using internet banking in Egypt.	200 bank customers	Structural equation model (SEM)	Perceived usefulness and perceived ease of use had a positive impact on the intention to use internet banking whereas financial, security and privacy risks had a negative impact on intention to use e-banking.
Roy et al (2016)	India	To integrate technology acceptance model and perceived risk theory in understanding Internet banking acceptance among Indian bank account holders.	270 respondents	Structural equation model	The study revealed that both external risk and internal risk inhibit customer acceptance of Internet banking.
Purmirasala et al (2017)	pakistan	To maintain Credit risk management, fraud detection, money laundering, customer relationship management and banking services quality management are some examples of data mining function in banks	Number of transactions to analyse risk and fraud	Artificial neural network method	Data mining is an intergroup process to detect the risk and fraud use it.

Source: Arora, Sangeeta, 2018

MAJOR CONTRIBUTION FROM LITERATURE SURVEY

From the analysing mentioned research gaps, the present research intends to analyse the factors and significant adoption challenges and factors that affect directly on the customer's adoption of e-banking. These research gaps have to be fulfilled:

- Banks can access new customers
- Personal Computer banking customers are consistently wealthier.
- Banks can access new geographical areas.
- Banks can reduce their operational costs.
- Banks can increase the quality of offered services
- Acquisition of knowledge
- Time and money costs
- Investments for establishing, maintaining and replacing the technological infrastructure.
- Training costs
- Security concerns

The effective factors were extracted from related theories to adoption on new technologies acceptance theory and diffusion of innovation theory adding the personal and behavioural characteristics of customers based on derived factor. What should be the adoption strategies for E-Banking? What should be the infrastructure requirement for the success of E-Banking.

The Internet has gained about a revolution, transforming the way that the businesses will communicate with their customer's business partners and suppliers in the future. Banks are competing to gain a large share of India's on line market. In India internet banking is new industry, customer acceptance and use of Internet Banking is still very low and the very little research has been conducted in India into the challenges and factors of the affects consumers to use Internet Banking. An understanding of different challenges and factors of the affects consumers to use Internet Banking and also how demographic characteristics like social influences and consumer's perception and attitudes towards Internet banking therefore influences the adoption of internet banking will enable banks to increase their market share by creating solutions and policies and strategies that attract consumers to use this type of banking therefore there is a need for a research of this nature.

This study has a practical value as the findings can be used by banks as guidelines to work with the customers in the future and serve them better by providing services as per their expectations and requirements.

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