

Acceptance of Internet Banking Services with Respect to Security and Privacy Perceptions: An Application of TAM

¹Kashif Rashid, ²Fahad Zuberi, Fahad Sattar, Adnan Ahmed, Marium Najeeb Khan

^{1,2,3,4,5}Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology, Karachi, Pakistan

¹k.rashid@szabist.edu.pk

²fahad.zuberi@szabist.edu.pk

Abstract—The internet is playing a major role in providing financial services in Banking, leading to competitive edge in gaining banking customers, who would like essential banking services to be availed anywhere and at any time. The purpose of this research is to analyze the effect of Technology Acceptance Model (TAM) on internet banking in Pakistan, Perceived Security Concern and Perceived Privacy Concern on Intention to Use fulfilling the academic gap identified as there is a lack of organized and comprehensive studies analyzing practical implications of Technology Acceptance Model in Internet Banking in Pakistan. This cross-sectional study is based on the deductive approach and the explanatory strategy. Upon doing a correlation analysis between the variables, findings suggest a strong positive correlation between TAM, Perceived Security Concern, Perceived Privacy Concern and Perceived Trust on Intention to Use.

Keywords—Technology Acceptance Model (TAM), Perceived Security Concern, Perceived Privacy Concern, Perceived Trust, Intention to Use, Internet Banking in Pakistan.

I. INTRODUCTION

Information and Communication Technology (ICT) has broken down barriers and conjugated the world together. The IT revolution in the 1990s has revolutionized living standards and the way we interact with the environment, making everything faster and reliable [1].

This advancement in Information Technology is so rapid that it took the iPod only 3 years and the internet only 4 years to reach 50 million users while it took the Radio 38 years and the Television 13 years. In less than 9 months, Facebook added 100 million users and iPhone applications reached to one billion downloaders [1].

IT has not only changed our lives but also the way we do business. It has led to quicker transactions, ease of communication and integration throughout an organization. It allows for cross-functional integration leading to competitive advantage, enhanced productivity & reduction in anomalies and expenditure [2]. Cost effectiveness, brand name building, service customization and accessibility to geographically spread areas are the internet's added perks. According to a research by Morgan Stanley Dean Witters, Retail Financial Services on Web are more important than that for any other industry [3].

The banking industry's infrastructure has transformed completely due to technological advancement. Increased competition in the industry and from the non-banking financial services sector, led to banks offering multi-channel financing services changing the way how services were once provided. Previous, manual records are now integrated into the systems with services being quick and customizable.

A wide array of financial services is being provided through internet banking without any geographical or time constraints such as funds transfer, credit and debit card use, checking account balance, loans and treasury bonds, bills payments and portfolio management etc., making it convenient for customers. Online banking is more attractive for service providers and users with a high rate of acceptance of new technology and an understanding of the process. Banks use their products & services, to gain a large customer base, brand name and to have a higher market share to differentiate themselves and winning new customers [4].

These services also reduce human error and are accessible to anyone, anywhere. Banks use internet banking to reach a geographically spread customer base and to provide quality services with more customization according to preferences and needs, gaining competitive edge over

competitors [5]. In Pakistan, internet banking transactions are growing rapidly with a growth of 100% in volume from 235 million to 470 million and 62% growth in value, from Rs. 22.1 trillion to Rs. 35.8 trillion during FY 2010-11 to 2014-15 showing a great scope for internet banking.

Nearly, 89% of the population is still offline in Pakistan. Although internet banking offers numerous benefits, there are certain issues that banks must cater to, to enhance its usage. Furthermore, there are various other factors impacting the adoption of internet banking, such as security and privacy protection, along with technology acceptance.

Technology Acceptance Model is derived from the Theory of Reasoned Action (TRA) which was developed by Ajzen and Fishbein (1980) [6]. According to Davis [7], Technology Acceptance Model can be used to predict acceptance and rejection of technology as it explains the relationship between belief, attitude and action purpose. Researches on information technology agree that TAM is useful in predicting individual's acceptance of new technology [8].

This model consists of two constructs which affect adaptation or rejection of new technology; perceived usefulness and perceived ease of use. Perceived Usefulness (PU) of a product or service refers to usage of a product or service with the belief that it will increase his/her performance while Perceived Ease of Use (PEOU) is the degree to which a person using the product or service thinking that it will not require any mental or physical effort [7].

A study by [9] proved that PU and PEOU are positively related to behavioral intention to use mobile banking. Both, Perceived Usefulness and Perceived Ease of Use, are influenced by external variables such as Perceived Security Concern and Perceived Privacy Concern which together affect Perceived Trust and overall effect intention to use online banking. To understand adaptation of internet banking, in 2009 Lee combined Technology Acceptance Model with Planned Behavior, Perceived Risk and Perceived Benefits. Security and Privacy issues contribute towards Trust issue which is a vital factor impacting the usage of internet banking service. Therefore, it is necessary to reduce the risk and uncertainty. Trust plays vital role in banking industry when it comes to customer satisfaction. According to TAM, customers feel more comfortable in adopting internet banking if they find the usage easy and useful [5].

Although a lot of studies have been conducted previously related to TAM, there is a lack of application of TAM to specifically understand its implications with respect to the

Pakistani context. Some are conducted in relation to basic constructs such as Perceived Usefulness and Perceived Ease of Use specific to an industry sector while others only focus on the variable which impact directly, not taking other external variables into consideration which may affect acceptance or rejection of technology.

Multiple factors affect acceptance of technology according to dynamics of the industry. In banking, customers are mostly concerned about security and privacy of their financial transactions and are reluctant in dealing with banks that are perceived as unsecure or may have privacy breaches. An attempt was made by [10] in 2008, to address this issue by combining different variables associated with using the internet banking acceptance, although this research addresses many of the concerns with application of TAM in the Pakistani context, it did not explore the variables of Perceived Privacy and Perceived Security as well as Trust independently. [10] limited its inquiry to Security and Privacy as a single construct. Also, since [10] conducted its research in 2008, it will be interesting to note the differences in consumer inclinations that may have occurred over the time, since the penetration of internet has increased substantially in Pakistan during the period in question.

Hence, there is great need to check the relation of Perceived Security Concern (PSC) and Perceived Privacy Concern (PPC) in the adaption or rejection of online banking. [5] has set an agenda for research in the context of internet banking acceptance in the context of Jordan, they have integrated privacy, security and trust perceptions with TAM to discover its impact in the Jordanian context. This present research takes the propositions made by [5] as a base for its inquiry in Pakistan.

Findings of this research will help banks identify customers' security and privacy concerns and develop products and services to maximize Perceived Trust, increase customer base and increase loyalty. It will also identify individual's attitude in accepting or rejecting new technology in banking industry and the importance security and privacy for them.

Various studies are conducted on factors that impact online business transactions and e-commerce, intention to use internet banking or online transactions however studies on integrating trust issues are mostly related to the general online environment or general internet application. Trust in internet banking is an emerging issue that needs to be discussed.

Internet banking allows users to make financial transactions online. It is also known as "online banking" or

"web banking." It offers customers to buy financial services, fund transfer and payment of utility bills via internet. At a smaller level internet banking could also provide information regarding products and services on the banks' websites [11].

Technology Acceptance Model (TAM) clarifies how a new technology and a range of its aspects are received and used by the user. Though there are many other models in the IT field to describe the relationship, TAM is the most commonly used model.

There is a critical question in past researches whether internet banking will be accepted by the customers [12]. Banks and other financial institutions are also not certain of the customers' reactions towards internet banking services [13]. The ultimate driver of e-banking will be the customers' acceptance more than the banks' offerings [14].

TAM is considered applicable in this study for analyzing customer acceptance towards a relatively new form of services by commercial banks. This inquiry tries to address the research question: "Does the perceptions of Security and Privacy impact the Trust of Consumers to Use Internet Banking Services?" This research question was previously addressed by [5] in the context of Jordan, where Internet Banking Customers were gauged for their perceptions of Security and Privacy and its impact on Intention to Use. This present study creates geographical novelty by applying the model of proposed by [5] on data collected in a Pakistani context.

The world is evolving, and the internet is revolutionizing with Internet banking as a new way of banking. Although different studies from across the world explain the customers' reaction to these new banking services, there is not much work done in Pakistan on it. Being a developing country it's something new for the people of Pakistan. With the acceptance of the new technology there is also a margin of reluctance. In case of internet banking this reluctance might be because of different factors such as security and privacy.

As a developing country, Pakistan has to go through many societal changes owing it to rapidly evolving technology. The banking industry is adapting to these changes through internet banking. However, the success depends on the customers' acceptance.

II. LITERATURE REVIEW

A. Overview:

Internet banking mainly refers to a bank's website which provides information about its products and services while fund transfer, account access and purchase of financial services come under advanced banking [11].

The Internet banking service channel lets customers avail the bank's services from anywhere, giving banks access to new customers who use the internet for other reasons [15]. It is convenient, increases performance and cost effective [16].

However, consumers are reluctant to accept e-commerce [13]. Instead, they prefer banks with multiple branches, to allow access wherever they are. A physically present service provider is preferred [15]. Technology has increased customer involvement in the banking transactions making it burdensome for them [17].

One of the emerging economies with a rapidly growing and technologically adept banking sector in the early 2000s was Turkey. By 1997, several banks of Turkey had introduced internet banking. Though, their culture hindered in acceptance of internet banking services as customers needed personal relationships. It seemed perfect for US culture, as online shopping was a trend in the US [16].

A business always analyzes on the basis of initial cost recovery which meant that internet banking services would incur a high initial cost. This issue has affected economies. [16] considers internet banking strategically vital to an emerging economy. But, high initial cost and lack of demand in emerging countries like Africa and Middle Eastern countries has been discouraging for financial institutions' interest in internet banking [17]. However, for some banks, this move would have allowed them to minimize their operating cost [11]. The cost of online banking was lower than that of traditional banking [18].

Certain studies believe that customers could be attracted by reducing their cost burden. The cost savings for the bank are directly proportional to the duration a customer uses the self-service internet banking leading to cost reduction as well as customer satisfaction [16]. Internet banking will save a huge margin of operating cost [19]. Garanti banks offer almost all banking services online at zero cost to consumers [16]. Many Thai banks also provide internet banking services at a lower cost [15]. Banks face great pressure from the market, to offer multi-channel services at low costs to its customers [4].

Low operating costs and high competition has influenced banks to adopt internet banking [20]. Consumer choose services that provide the best value for money [21]. Consumers must be informed about the value these services [11].

To beat the competition, retain old customers and attract new ones the banks used their large customer base and brand name [4]. They also used different programs to improve service quality [22]. According to [16], handling offline

customers traditionally together with getting internet savvy customers on board. Corporate clients preferred traditional banking. For the self-service to be efficient for corporate clients, the bank should research into their preference for traditional banking over new internet services [15].

B. Perceived Usefulness, Perceived Ease of Use, Intention to Use:

Technology Acceptance Model (TAM) considers Perceived Ease of Use as the fundamental factor for analyzing behavioral intention of customers in accepting and using technological innovations. PEOU was compared with factors like satisfaction, intention to use, intensity and trust [23].

PEOU is considered important by [21], for the adoption of internet banking services by the customers. Ease of use, awareness, security, cost of online services and accessibility to computers was considered for studying the customers' acceptance of internet banking services [11]. Failure of e-banking in USA depended on its difficulty of use [24]. Tingari et al. [25] used the Technology Acceptance Model (TAM) to analyze the acceptance of the new technology in banking. Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Perceived Service Quality and Perceived Security were studied.

Customers prefer ATMs due to convenience, service quality and ease of use while mobile banking users used service quality, benefits and ease of use as criteria and internet banking went for ease of use, benefits and credibility of the other mediums of banking systems [15]. Perceived Ease of Use lowers the perceived complexity of the product or service which is directly proportional to the slow adoption rate.

The distribution of online financial services should be considered an overall customer service, developing relationships to deliver product information [11]. Tingari et al. [25], provided sufficient evidence that the customers' intention to accept new technology in banking doesn't depend on demographics such as age, gender and income level. Rather, acceptance or rejection depends on knowledge about the product or service [26].

H1: Perceived ease of use will have positive relationship on intention to use toward Internet banking services.

Perceived Usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his/her job performance" [5]. The major influencing factors for the use of internet banking services were found to be perceived usefulness and information availability on the internet [27].

Usefulness of a new technology could have been communicated through proper information. Pikkarainen et al. [27], considered information available on the banks' websites and perceived usefulness as the reasons for acceptance of internet banking. Customers consider benefits over any other factor so; more information should be available on the bank's website. Care must be taken in providing appropriate and useful content on the website. Advertisements need to be more informative.

Customer looking for convenience shifted to internet banking [28]. It was interesting for customers who had higher acceptance of new technology and knowledge of using complex products, only 10% of the sample use internet from home. The slow penetration of internet might be a reason for slow penetration of internet banking services. Rise in computer literacy (both Perceived Ease of Use as well as Perceived Usefulness) and accessibility of internet (Perceived Ease of Use) in Turkey are the main factors for increase in the internet banking services [16].

H2: Perceived ease of use will have positive relationship with perceived usefulness toward Internet banking services.

H3: Perceived usefulness will have positive relationship with intention to use toward Internet banking services.

C. Perceived Usefulness and Trust:

Trust on the other hand is defined as the confidence of the consumer in the dependability and integrity of the service provider [29]. In applying the concept of Trust to the Technology acceptance model in the context of internet banking, [30] was able to accomplish that Perceived Usefulness has a positive impact on Trust. The results portrayed in the study [5]; also accomplish that Perceived Usefulness has a positive impact on Trust.

H4: Perceived usefulness will have positive relationship with perceived trust toward Internet banking services.

D. Security & Trust:

Perceived Security is the concern of authorization, confidentiality, availability, non-repudiation authentication and fraud detection for the user.

Security is the most critical element in internet banking services [5]. Security was a vital factor causing slow internet banking acceptance in Australia [31]. Consumers were also concerned about transaction security [32]. To get the customers to make their transactions online, security was key [21]. Customers wouldn't use online service until they felt

secure [5]. This and lack of awareness led to slow adoption of internet banking services [11]. Adesina et al. [33], also considered network and security concern as the important factors for customers.

Security concern was also a major reason for corporations not using the internet services. Transaction were huge but new customers still did not trust the service [34]. High uncertainty in the internet banking services restricted the customer's full acceptance of new technology [15].

There are two types of risks involved in e-banking, operational risks and technological risks. The technological risks include software defects, processing errors, hardware breakdown, malicious attacks, hacking incidents, network vulnerabilities, system failure and hacking attacks while operational risks are system disruptions and fraud [15]. When a service is a low-cost and low risk, customers love to try it [16].

H5: Perceived security concern will have positive relationship with perceived trust toward Internet banking services.

E. Privacy & Trust:

Lack of privacy in e-transactions was a major hurdle in the expansion of electronic commerce [34]. Gavish [35] and Kruck [36], analyzed the effect of security and privacy over the internet. Privacy Perception is a major concern for internet purchasers [37]. With the invention of information processing technologies, the fear of losing private information has increased [38].

Different systems have been developed by the private and public sectors to ensure the security and privacy of the user [39]. Lyman [40], explained that privacy protection can not only be provided by the law or behavioral guidelines, the reliability of information system also played an important role.

H6: Perceived privacy concern will have positive relationship with perceived trust toward Internet banking services.

F. Trust & Intention:

Trust was one of the most important factors that affected the customer acceptance of new banking services in Malaysia [41]. Developing trust online is difficult than offline. According to Flavian et al. [39], trust is driven by security and privacy provided by the website.

Consumers easily accept new technology when they observe something positive in it [16]. Banks should inform customers that in case of failed or unprocessed transactions,

the customer would not bear any cost. This may bring feelings of trust and security among customers. Although there might be no direct relation with technology, it would still affect customer psyche in a positive way [15].

The relationship between customer and the bank plays a vital role in implementing internet banking services. Trust also depends on the bank's policies. Thai Corporate clients were not using the internet banking services because of trust and security issues and the ones that also did not completely shift to online. Brand recognition is also vital in developing internet services. It was difficult for virtual banks to operate in Thailand because of consumer behavior and the initial development of law for online banking [15].

H7: Perceived trust will have positive relationship with intention to use toward Internet banking services.

There are certain factors related to internet services which also affect customer reaction towards services. The frequency of purchase is higher with computer-savvy people [39]. Computer savvy people also face some technical problems such as connectivity inaccessibility. Despite that, customers still used the inquiry service often [41].

Research found that use of IT causes stress and anxiety in a rapidly changing environment of technology [10]. It also created a little confusion in the minds of the users that how this new technology would have been used [20]. This created a kind of doubt before using it.

Though the internet banking services were supposed to be the future of the banking industry, some of the reasons to accept the internet banking services were reduced waiting time, cost saving, flexibility, enhancement of the bank's reputation, customization, quick service delivery and time saving [26].

Globalization also played an important role in implementation of the internet banking services. For the banks in Sudan the most important factors to introduce the internet banking services were to meet the global standards as the globalization is on its heights and the pressure from foreign banks which already have these new services. The other possible reasons were cost reduction because the competition within the market was rising among the local players also [17].

For the bank's marketers, regulators and the customer base, it is important to identify the technology acceptance factors. The main focus of the study was not about the new technology which would bring the online services to the customers, but to bring in the customers to use these services which would save their time [17].

Perceived ease of use as it is the degree to which person believes that using a specific product or system will be effort free. Similarly, perceived usefulness is the degree to which a person thinks that using a product or system will increase his or her job performance. Attitude to use system or product which influences individual's behavioral intention to use a system, which in turn describes actual system usage is called Intention to Use. Perceived security concern is the degree to which person believes that using a system or a product will be risk free and feels protected against security threats. Perceived privacy concern is individual's concern for losing control on personal information, its storage, disclosure, usage and tracking while using internet [7].

III. FRAMEWORK AND HYPOTHESES

- H1: Perceived ease of use will have positive relationship on intention to use toward Internet banking services.
- H2: Perceived ease of use will have positive relationship with perceived usefulness toward Internet banking services.
- H3: Perceived usefulness will have positive relationship with intention to use toward Internet banking services.
- H4: Perceived usefulness will have positive relationship with perceived trust toward Internet banking services.
- H5: Perceived security concern will have positive relationship with perceived trust toward Internet banking services.
- H6: Perceived privacy concern will have positive relationship with perceived trust toward Internet banking services.
- H7: Perceived trust will have positive relationship with intention to use toward Internet banking services.

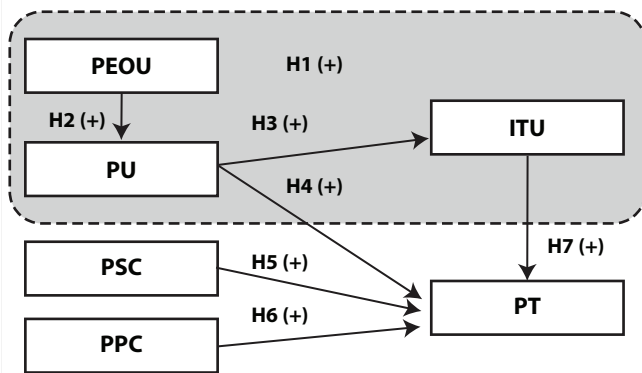


Fig. (1). Conceptual Framework, Adopted from [5].

IV. RESEARCH METHODOLOGY

Descriptive Research Design is used to describe the association between different variables. Since the model of the research is available, it is considered a Deductive design. It studies the different characteristics associated with the customers' acceptance towards the internet banking services in the light of Technology Acceptance Model (TAM). It also describes that how research variables are related with each other and what characteristic does population possess related to these variables in figure 1. As it's dependence on the technology acceptance model (TAM) it will be able to provide a theoretical base for future researches too.

Target group for this research study consists of both male and female above the age of 18, belonging to major metropolitan areas of Pakistan who use internet banking services. For this research study, a sample size of 230 male and female respondents is drawn from the population by using Random Probability Sampling Technique. Probability sampling is used in this research due to time constraints and also it removes the aspect of biasness and provides more reliable results. The sample size of 230 is selected on the basis of sample size taken in similar researches conducted earlier.

Data is collected through a comprehensive survey questionnaire containing structured questions to measure impact different variables of the research model. A study by [5] provided the questionnaire which is much suitable in the context of the present study. All questions will be measured by using five-point Likert scale reaching from (1) Strongly Agree to (5) Strongly Disagree. Questionnaire consists of six variables having 25 items. The internal reliability of these scales is found out by using Cronbach's alpha.

The research instrument's first part contains the Questions based on the demographic information of the respondent. Starting from the second part Questions 1 to 4 are studying the Perceived Ease of Usefulness (PEOU), Questions 5 to 8 are studying Perceived Usefulness (PU), Questions 9 to 13 are studying Perceived Security Concern (PSC), Questions 14 to 19 are studying Perceived Privacy Concern (PPC), Questions 20 to 22 are studying Perceived Trust (PT) and Questions 23 to 25 are studying Intention to Use (ITU).

The questionnaire provided by [5] provides validated questions which can be used in the Pakistani context to measure the constructs applicable in this study. Further, the results from the questionnaire will yield consistent basis on which the study can be compared to [5].

Data was collected through Convenience Sampling Technique by using survey questionnaire consisting of

numerous structured questions covering up all the research questions and hypothesis raised in our research study.

Data was collected personally as well as through internet. Google Forms was used to collect the responses online. The respondents from which the data was collected personally are mostly working professionals' residents of Karachi. The respondents who were approached online were from different metropolitan cities of Pakistan.

Data is statistically analyzed by using the following tests;

- Pearson's Correlation Analysis to analyze the relationship between variables of the construct. Although the sample is non-probabilistic, the sample size is considered large enough (greater than 200) under the Central Limit Theorem to assume that conditions of normality are met.
- Reliability Analysis is to measure the reliability of the construct by using Cronbach's Alpha.

These tests have provided the results for reaching on a conclusion of this study. Total Number of respondents are 230, of which 74.78% are male and 25.22% are female.

Apart from that 80.43% are in the age bracket of 21 to 30, 14.35% are in the age bracket of 31 to 40, 3.04% are in the age bracket of 41 to 50, 2.17% are in the age bracket of 51 to 60 and there isn't any respondent above the age of 60 years.

Considering the education level of respondents, 0.87% are with their matriculation, 3.48% are with their Intermediate, 40% are with their Bachelors, 48.26% are with their Masters, 6.52% are with MS/M.Phil. & 0.87% are with their PhD.

Table 1. Reliability Analysis

Variables	Cronbach's Alpha
PEOU	0.865
PU	0.863
PSC	0.850
PPC	0.837
PT	0.843
ITU	0.857

Reliability is the degree to which measurements are error free. Cronbach's alpha is the test used to check the reliability of the measurement. Construct Reliability is measured in this research to analyze the uniformity of the items of constructs used in this research. The value of Cronbach's alpha must be greater than 0.7 in order to be acceptable. The maximum value of alpha is 1, closer its value to 1 better would be the

reliability. The move of alpha value below 0.7 will drive it to the criteria of unacceptable. In Table 1, all the values of Cronbach's alpha are greater than 0.8, which imply that the acceptance of the construct is at a good rate.

Table 2. Mean and Standard Deviation

Variables	Mean	Std. Deviation
PEOU	2.034	0.824
PU	2.160	0.767
PSC	2.317	0.871
PPC	2.330	0.773
PT	2.308	0.849
ITU	2.021	0.800

Standard deviation describes the deviation of values from the mean. The maximum deviation in the variables shown in Table 2 is of Perceived Security Trust (PSC) and that is 0.87125. The standard deviations of all the variables state that the values of responses are close to the mean. These results are based on the sample size of 230 respondents. The Likert scale used was from 1 as Strongly Agree and 5 as Strongly Disagree. The mean value revolving near 2 implies that the average responses are on agreeing with construct.

V. DISCUSSION

Main purpose of this conducting this research is to check effect of PEOU, PU, PPC and PSC on perceived trust of Pakistani banking sector customers. After all, to check the effect of Perceive Trust of consumers on behavioral intention to use internet services. Along with the findings of research given in previous section, this section will discuss the results of correlation analysis and how these results explain the relation among variables and explains study questions of hypotheses. Values of Correlation analysis (table 3) are rated on the bases of scale Strong $> \pm 0.7$, Moderate ± 0.3 --- ± 0.6 and Weak $\leq \pm 0.2$.

Table 3. Correlation Analysis and Coefficient of Determination

Hypothesis	Model Variable	Correlation	R ²	Sig.	Result
H1	PEOU → ITU	0.448	0.200	0.00**	Supported
H2	PEOU → PU	0.584	0.341	0.00**	Supported
H3	PU → ITU	0.413	0.170	0.00**	Supported
H4	PU → PT	0.473	0.224	0.00**	Supported
H5	PSC → PT	0.617	0.380	0.00**	Supported
H6	PPC → PT	0.702	0.492	0.00**	Supported
H7	PT → ITU	0.607	0.368	0.00**	Supported

** Correlation is significant at the 0.01 level (2-tailed).

A. PEOU & ITU:

Perceived ease of use is a major factor which influences the user's behavior to accept or reject new technology [8]. In this study relation between PEOU and ITU is tried to be determined. Value of correlation analysis between PEOU and ITU is 0.448. It shows that there is moderate positive relation between PEOU and ITU to use internet banking. This relation is found to be statistically significant, as significance level is less than 0.001.

Result of this analysis shows that increase of perceived ease of use among customers of banking sector will increase their intention to use internet banking services. Value of coefficient of determination shows that change in PEOU will create 20% change in ITU internet banking service. According to the study conducted by [5] PEOU was not found to have a significant relationship with ITU.

Result of the present study yields the implication that the industry must focus on improving the ease by which internet services can be used, this is expected to have a moderately positive impact on the intention to use internet banking services.

Results of correlation analysis support H1 which is:

“Perceived ease of use has positive relationship with behavioral intention to use Internet banking services”.

B. PEOU & PU:

Results of correlation analysis show that there is moderate positive relation between perceived ease of use and perceived usefulness of using internet banking services, as value of correlation test is 0.584. This relation is found to be statistically significant as significance level is less than 0.001. Value of coefficient of determination shows that change in PEOU will change PU by 34%. Mean value is of PEOU is 2.034, which means that consumers perceive that using internet banking is easy and clearly understandable to them. While means of PU is 2.160 which means consumers are agree too that it is useful for them. [5] also found that the relationship between PU and PEOU to be statistically significant. From a managerial perspective, increasing PU of Internet Banking will increase PEOU and vice versa. This is an important implication for those banks, who do not have marketing expertise to make their internet banking perceived in a favorable light; by improving PEOU these banks can alternatively impact the PU positively.

Results of correlation analysis support H2 that:

“Perceived ease of use has positive relationship with perceived usefulness to use Internet banking services”.

C. PU & ITU:

Consumer's intention to use technology is also affected by another factor which is perceived usefulness [8]. This finding is also true for internet banking. Result of correlation analysis between perceived usefulness and intentions to use internet banking service is 0.413 and significant level is 0.00. Finding of this analysis shows that there is moderated positive relation between PU and ITU. This relationship is significant as significance level is less than 0.001.

Furthermore, value of coefficient of determination shows that change in PU will just create 17% change in ITU. Mean value of ITU is 2.07 which shows that most of the customers agree that they intention to use internet banking. This result corresponds with most of the TAM study including [5], Perceived Usefulness has a direct effect on Intention to Use, hence Banks are encouraged to include features which are particularly useful, such as online bill payments, funds transfer etc.

Findings of these analysis support hypothesis H3, which is: “Perceived Usefulness has positive relationship with behavioral intention to use Internet Banking”.

D. PU & PT:

Result of correlation analysis between perceived usefulness and perceived trust shows that there is moderate positive relationship among these values as value of correlation is 0.473. Relation among these variables is found to be statistically significant, because value of significance is 0.00 which is less than 0.001. Change in PU will create a positive change of 22% in PT. Means value of PT is 2.31 which means that many of the customers are agree that they trust using internet banking. So, all these results support hypothesis H4, which is

“Perceived Usefulness has positive relationship with customer's trust in online transactions”.

E. PSC & PT:

Consumers seem to place much value on security of their transactions placing through internet. Hence, their perceived security concern has significant moderate positive relation with perceived trust. Result of correlation analysis among PSC and PT is 0.612. This relation among PSC and PT is statistically significant to as values of significance is 0.00 which is less than 0.01. Value of coefficient of determination is 0.38 means that change in PSC will create 38% direct change in PT.

This result of coefficient of determination shows that PSC has strong relation with PT and create significant change

in PT which is of worth consideration. This result corresponds with the results of [5], PSC assumes importance since it has a significant relationship with PT, and PT itself seems to have a significant relationship with ITU. Banks must focus on avoiding any situations which may increase PSC.

Result of these analysis support hypothesis H5, which is: “Perceived security of Internet banking has positive relationship with Internet banking customers trust”.

F. PPC & PT:

Perceived privacy is of great importance for consumers of online banking services as they are concerned about their information present online. Value of correlation analysis is 0.702. Finding of this analysis suggests that there is strong positive relation between PPC and PT.

Results of this analysis are statistically significant too as value of significance level is 0.00, which is less than 0.00. Furthermore, coefficient of determination is 0.492 which means that change in PPC will create a direct 49% change in PT. Like PSC, PPC also has a significant relationship with PT, which in turn has a significant relationship with ITU, banks must focus on making sure that customer privacy is ensured, and their personal data remains confidential. Finding of these analysis support hypothesis H6, which is:

“Perceived privacy of Internet banking has positive relationship with customer’s trust in their online transactions”.

G. PT & ITU:

Most important factor which affects consumer’s intention to use internet banking services is their perceived trust about on banking online services. So, the value of correlation analysis is 0.607 which means that there is moderate significant relation among PT and ITU. Finding of analysis suggest that PT is significantly correlated with ITU as significance value which is 0.00 is less than 0.001.

Coefficient of determination is 0.368. It means that change in PT will create direct 37% change in ITU. This is a particularly important finding since it seems that Perceived Trust has higher Coefficient of determination as compared to PU with ITU and PEOU with ITU. Hence, we would like to suggest that banks work on providing assurance to customers that they can trust the banks internet banking facilities. Findings of these analyses support hypothesis H7, which is:

“Trust in Internet banking has positive relationship with intention to accept and use Internet banking”.

VI. FINDINGS AND CONCLUSION

This research has contributed more in growing body of literature and technology acceptance model (TAM). Perceived ease of use, perceived usefulness, perceived security concern, perceived security concern, and perceived trust are some key factors which has significant positive impact on intention to use internet banking services. And these variables are studied in this research in detail. This study also provides a thorough background of literature and its findings could be used for practical implication.

Main focus of this study is to find relation of PSC & PPC on PT & ITU. Along with these basic variables TAM is also implied to check that how consumers respond to technological changes and advancement. Findings of this study have proved that PEOU and PU has significant positive relation with ITU. It means that if consumers perceive that internet banking is easy to use and it is also useful for them to conduct their financial transactions online than they will have strong intention to use internet banking. Consumers also think that if internet banking is easy to use than it will be useful for them and it will save their time, decrease effort level and enhance performance and productivity.

Privacy and security are key concerns for consumers while conducting their financial transactions through internet. They are concerned about privacy of their activity done through internet banking and want to avoid from any kind of scan of privacy theft. Findings of this study proved that per these two variables PSC & PPC has positive significant relation with PT which than has positive relation with ITU. In other words, these finding suggests that banks should work more on PSC and PPC of consumers in order to makes them satisfied and to increase consumer base.

If consumers think that is secure to conduct their transactions online and their privacy is secured than they would have more intention to use internet banking services. Hence overall finding of this research suggests that all variables of TAM, PSC and PPC has positive relation with intention to use. So, in Pakistan banks should work on these factors in order to increase their consumer’s base who would use their online platform to avail their services. Educated consumers who perceive that it is easy to use internet banking also have more intention to use online banking.

VII. RECOMMENDATIONS

This research comprises of the perception of only individual customers towards internet banking. Perception and behavior of corporate and businesses would be different towards these services. This research is geographically

limited and most of its data is collected from Karachi only. The potential of internet banking could be different in different regions of Pakistan. Since technology is revolutionizing itself and the world at a very faster pace, the future of internet banking could be different from its present.

REFERENCES

- [1] R. T. Kreutzer and K-H. Land, *Digital Darwinism: Branding and Business Models in Jeopardy*. Berlin Heidelberg: Springer, 2015.
DOI: 10.1007/978-3-642-54401-9
- [2] G. Sarma and P. K. Singh, "Internet Banking: Risk Analysis and Applicability of Biometric Technology for Authentication," *International Journal of Pure and Applied Sciences and Technology*, vol. 1, no.2, pp: 67-78, 2010.
- [3] R. Misra. (2002). *Pay to Play in the Municipal Bond Industry* [Online]. Available: <http://www.business.illinois.edu/broker/pdf/muni.pdf>
- [4] J. Hagel III, T. Hewlin and T. Hutchings, "Retail Banking: Caught in a Web?" *The McKinsey Quarterly*, vol. 2, pp: 42-56, 1997.
- [5] M. A. Al-Sharafi, R. A. Arshah, E. Abu-Shanab, M. Fakhreldin, and N. Elayah, "The Effect of Security and Privacy Perceptions on Customers' Trust to Accept Internet Banking Services: An Extension of TAM," *Journal of Engineering and Applied Sciences*, vol. 11, no. 3, pp: 545-552, 2016.
DOI: 10.3923/jeasci.2016.545.552
- [6] I. Ajzen, and M. Fishbein, *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice- Hall, 1980.
- [7] F. D. Davis, and V. Venkatesh, "A Critical Assessment of Potential Measurement Biases In the Technology Acceptance Model: Three Experiments," *International Journal of Human- Computer Studies*, vol. 45, no. 1, pp: 19-45, 1996.
DOI: 10.1006/ijhc.1996.0040
- [8] P. Legris, J. Inghamb, and P. Collerettec, "Why Do People Use Information Technology? A Critical Review of the Technology Acceptance Model," *Information and Management*, vol. 40, no. 3, pp: 191-201, 2003.
DOI: 10.1016/S0378-7206(01)00143-4
- [9] N. Chung, and S. J. Kwon, "The Effects of Customers' Mobile Experience And Technical Support On The Intention To Use Mobile Banking," *Cyber Psychology & Behavior*, vol. 12, no. 5, pp: 539-543, 2009.
DOI: 10.1089/cpb.2009.0014
- [10] M-C. Lee, "Factors Influencing The Adoption of Internet Banking: An Integration of TAM and TPB with Perceived Risk and Perceived Benefit," *Electronic Commerce Research and Applications*, vol. 8, no. 3, pp: 130-141, 2009.
DOI: 10.1016/j.elerap.2008.11.006
- [11] M. Sathye, "Adoption of Internet Banking by Australian Consumers: An Empirical Investigation," *International Journal of Bank Marketing*, vol. 17, no. 7, pp: 324-334, 1999.
DOI: 10.1108/02652329910305689
- [12] S. Oliver, "A Model for the Future of Electronic Commerce," *Information Management & Computer Security*, vol. 5, no. 5, pp: 166-169, 1997.
DOI: 10.1108/09685229710187221
- [13] *Technology in Banking Survey*, Ernst & Young, Sydney, 1998.
- [14] N. P. Mols, "The Behavioral Consequences of PC Banking," *International Journal of Bank Marketing*, vol. 16, no. 5, pp: 195-201, 1998.
DOI: 10.1108/02652329810228190
- [15] S. Rotchanakitumnuai, and M. Speece, "Barriers to Internet Banking Adoption: A Qualitative Study among Corporate Customers in Thailand," *International Journal of Bank Marketing*, vol. 21, no. 6/7, pp: 312-323, 2003.
DOI: 10.1108/02652320310498465
- [16] V. N. Polatoglu, and S. Ekin, "An Empirical Investigation of the Turkish Consumers' Acceptance of Internet Banking Services," *International Journal of Bank Marketing*, vol. 19, no. 4, pp: 156-165, 2001.
DOI: 10.1108/02652320110392527
- [17] I. H. F. Mansour, A. M. A. Eljelly, and A. M. A. Abdullah, "Consumers' Attitude towards E-Banking Services in Islamic Banks: The Case of Sudan," *Review of International Business and Strategy*, vol. 26, no. 2, pp: 244-260, 2016.
DOI: 10.1108/RIBS-02-2014-0024
- [18] Booz-Allen and Hamilton, *Internet Banking: A Global Study of Potential*, New York: Booz, Allen & Hamilton Inc, 1997.
- [19] J. Hagel III and T. R. Eisenmann, "Navigating the Multimedia Landscape," *The McKinsey Quarterly*, vol. 3, pp: 39-55, 1994.
- [20] J. Hagel III and W. J. Lansing, "Who Owns the Customer?" *The McKinsey Quarterly*, vol. 4, pp: 63-75, 1994.
- [21] *The Financial System Inquiry Final Report*, Commonwealth Information Services, Aus. Gov. Pub. Ser. 1997.

- [22] T. Pikkarainen, K. Pikkarainen, H. Karjaluoto, and S. Pahlila, "Consumer Acceptance of Online Banking: An Extension of the Technology Acceptance Model," *Internet Research*, vol. 14, no. 3, pp: 224-235, 2004. DOI: 10.1108/10662240410542652
- [23] E. Daniel, "Provision of Electronic Banking in the UK and the Republic of Ireland," *International Journal of Bank Marketing*, vol. 17, no. 2, pp; 72-82, 1999. DOI: 10.1108/02652329910258934
- [24] P. A. Dover, "The Effect of Technology Selection on Consumer Adoption of In-Home Computerized Banking," *International Journal of Bank Marketing*, vol. 6, no. 2, pp: 31-7, 1988. DOI: 10.1108/eb010829
- [25] W. M. Tingari, and A. B. Abdelrahman, "Acceptance of Banking Technology in Sudan: An Analytical Study," In *Proceedings of 1st Taibah University International Conference on Computer and Information Technology (ICCIT)*, 2012, pp: 433-438.
- [26] E. M. Rogers, *Diffusion of Innovations*, New York: Free Press, 1995.
- [27] L. Salhieh, J. Abu-Doleh, and N. Hijazzi, "The Assessment of E-banking Readiness in Jordan," *International Journal of Islamic and Middle Eastern Finance and Management*, vol. 4, no. 4, pp; 325-342, 2011. DOI: 10.1108/17538391111186564
- [28] M. L. Meuter, and M. J. Bitner, "Self-Service Technologies: Extending Service Frameworks and Identifying Issues for Research," In *Proceedings of AMA Winter Educators Conference*, 1998, pp: 12-19.
- [29] J. Mou, D-H. Shin and J. Cohen, "Understanding Trust and Perceived Usefulness in the Consumer Acceptance of an E-Service: A Longitudinal Investigation," *Behavior & Information Technology*, vol. 36, no. 2, pp: 125-139, 2017. DOI: 10.1080/0144929X.2016.1203024
- [30] B. Suh, and I. Han, "Effect of Trust on Customer Acceptance of Internet Banking," *Electronic Commerce Research and Applications*, vol. 1, no. 3-4, pp: 247-263, 2002. DOI: 10.1016/S1567-4223(02)00017-0
- [31] B. O'Connell and P. M. Tremethick, "Australian Banking on the Internet: Fact or Fiction?" *The Australian Banker*, vol. 110, no. 6, pp: 212-14.
- [32] R. Cooper, "Examining Some Myths about New Product "Winners," in *Managing the Innovation Process in Organizations* (The Hum. Side Mana. Tech. Inn. A Coll. Read.), Ralph Katz, eds. Oxford: Oxford Uni. Press, 2003.
- [33] A. A. Adesina and C. K. Ayo, "An Empirical Investigation of the Level of Users' Acceptance of E-Banking in Nigeria," *Journal of Internet Banking and Commerce*, vol. 15, no. 1, pp: 1-13, 2010.
- [34] J. Lardner, "I know what you did last summer and fall." *US News & World Report*, vol. 126, no. 15, pp: 55, 1999.
- [35] B. Gavish, and J. H. Gerdes Jr., "Anonymous Mechanisms in Group Decision Support Systems Communication," *Decision Support Systems*, vol. 23, no. 4, pp: 297-328, 1998. DOI: 10.1016/S0167-9236(98)00057-8
- [36] S. E. Kruck, D. Gottovi, F. Moghadami, R. Broom, and K. A. Forcht, "Protecting Personal Privacy on the Internet," *Information Management & Computer Security*, vol. 10, no. 2, pp: 77-84, 2002. DOI: 10.1108/09685220210424140
- [37] G. J. Udo, "Privacy and Security Concerns as Major Barriers for E-Commerce: A Survey Study," *Information Management & Computer Security*, vol. 9, no. 4, pp: 165-7, 2001. DOI: 10.1108/EUM0000000005808
- [38] E. P. Kelly and G. S. Erickson, "Legal And Privacy Issues Surrounding Customer Databases And E-Merchant Bankruptcies: Reflections on Toysmart.Com," *Industrial Management & Data Systems*, vol. 104, no. 3, pp: 209-217, 2004. DOI: 10.1108/02635570410525762
- [39] C. Flavián, and M. Guinaliú, "Consumer Trust, Perceived Security and Privacy Policy: Three Basic Elements of Loyalty to a Web Site," *Industrial Management & Data Systems*, vol. 106, no. 5, pp: 601-620, 2006. DOI: 10.1108/02635570610666403
- [40] J. Lyman. (2004). *Symantec report puts corporations, consumers in crosshairs* [Online]. Available: <https://www.technewsworld.com/story/33142.html>
- [41] K. M. Nor and J. M. Pearson, "The Influence of Trust on Internet Banking Acceptance," *Journal of Internet Banking and Commerce*, vol. 12, no. 2, pp: 1-10, 2007.

© Author(s) 2017. CC Attribution 4.0 License. (<http://creativecommons.org/licenses/by-nc/4.0/>)

This article is licensed under the terms of the Creative Commons Attribution Non-Commercial License which permits unrestricted, non-commercial use, distribution and reproduction in any medium, provided the work is properly cited.