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## Effect of Internet Quality & Trust & Ease of Use & Usefulness factors on acceptance of Internet Banking services in Libya

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اثر عوامل جودة الانترنت ، والثقة ، وسهولة الاستعمال ، والفائدة

على قبول الخدمات المصرفية عبر الانترنت في ليبيا

### Abstract.

Online banking offers services around the world through Automated Teller Machines (ATM), Internet banking and telephone banking ... act . It helps banks to remain competitive and enhance customer service. Customer acceptance of online banking services in some developing countries is quite low. This paper reports on research based on the Technology Acceptance Model (TAM) which has been validated over several studies and has contributed to the research into technology acceptance by individuals in developing and developed countries. This study attempts to validate the integration of the TAM constructs Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) with the external factors of trust and internet quality with respect to their influence on customer intentions to use online banking in Libya. Using Structural Equation Modeling (SEM) on data from a survey of 536 customers from four banks in major cities in Libya, the study results indicate the significant role of Internet quality, trust, PEOU and PU in encouraging customers to adopt online banking in Libya. Conclusions and recommendations for future research are also provided.

**Key words:** Online Banking, Libya, Trust, Internet Quality, TAM.

## Introduction.

Since 1990s the Internet has experienced rapid growth and presented a host of new opportunities to e-business and e-banking services in particular (Mowery & Simcoe 2002; Odero & Mutula 2007). The Internet has become a fully-fledged delivery and distribution channel between organisations and consumers, and at the forefront of this evolution are internet banking products and services (Tan & Teo 2000). Many financial institutions have responded to this competitive environment by implementing e-services as part of their business strategies. The benefits of internet banking technologies include reduction in cost, increasing business opportunities, reducing effort and time, and providing a more personalized service to consumers (Sukkar & Hasan 2005). Online banking has been implemented in many developed countries such as the USA and Europe (Pikkarainen et al. 2004) and there is a growing trend in the adoption of online banking in developing countries as well (Chong et al. 2010). Libya is experiencing growth in investment in e-banking systems (Chong et al. 2010) but for these new systems to succeed it will be important to understand the factors for successful adoption by consumers (ISMAIL & OSMAN 2012; Veisi 2012). Outcomes of previous research suggest that the success of internet banking is determined by several factors that affect customers' willingness to use online banking (ISMAIL & OSMAN 2012; Veisi 2012; Yiu, Grant & Edgar 2007). The ultimate achievement of e-commerce adoption such as online banking still depends on consumers' perceptions and their attitudes toward using the online services technologies (Faraj 2011; Lassar, Manolis & Lassar 2005).

The customers of electronic services have a shown a trend to be unwilling to provide their personal information to any websites they may be browsing (Suh & Han 2003). In most instances, customers are happy to provide general information such as their preferences and/or to provide their email address, for example, to receive special offers. They are reluctant to provide sensitive information such as their bank account details or credit card numbers (Kim et al. 2010; Veisi 2012). This unwillingness to disclose this type of sensitive data is ascribed to e-banking security and distrust in the Internet (Suh & Han 2003). These perceptions persist despite the fact that in recent year's technologies relating to the Internet and online banking security such as data encryption have become more advanced and have decreased the possibility of Internet security breaches. Several cases of online Internet services involving major security lapses have increased customers' concern (Jahangir & Begum 2008). laws related to security and privacy issues remained unclear to many users, which could affect whether internet banking is trustworthy to the users (Chong et al. 2010). The trust factor in online banking services has reduced the usage of online banking, and has become the major obstacle to the adoption of online banking (Suh & Han 2003).

## Internet banking.

Internet technology has experienced rapid growth and online banking has played a key role in e-payment services which provides several online transaction channels to support e-commerce applications. Internet banking offers many advantages such as faster transactions, speed and lower cost (Kalakota R 1997), but there remains a large number of customers who reject the adoption of online services due to uncertainty and security concerns (Kuisma T 2007; Littler D 2006). An understanding of customers' perceptions regarding acceptance of Internet banking services will better inform the banking industry and help management develop appropriate strategies that are aimed at increasing the number of online banking users (Lee 2009).

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Banks use the infrastructure of the Internet and the World Wide Web (WWW) to allow their clientele to conduct their financial activities electronically. Customers who log on to their bank's website have the opportunity to perform a great number of banking services by electronic means (Tan & Teo 2000). In terms of usage rate, Internet banking services is the most successful alternative business delivery channel compared to the traditional banking (Martinez GM 2007). For withdrawing money, ATMs are used widely as a distribution channel for the past ten years. Internet banking has become the leader and most used distribution channel for banking services in several countries (Gounaris & Koritos 2008).

While Internet banking is wide-used in most industrialized countries, online banking is still in its early stages of maturity for many developing nations. This is particularly true in Libya, which is in the process of developing its information and communication technology (ICT) infrastructure. Because banking services are a significant part of the service trade, it is important for banks to manage themselves efficiently through the application of Internet banking (Chong et al. 2010). Customers should be encouraged to accept and use the technology for online banking. Research on online banking adoption has been conducted in several urbanized countries and Western nations but there are few studies regarding developing nations such as Libya.

Internet banking has not yet been well adopted in Libya (Emzio 2010; Guides 2006; Twati & Gammack 2006). There has been little research on the impact of customers' perceptions of barriers to adoption of Internet banking in Libya (Abukhzam & Lee 2010; Emzio 2010; Rfieda & Kartiwi 2013; Twati 2008). This research aims to explore and identify important factors affecting bank customers' attitudes toward Internet banking technology in Libya—an essential step in recognizing what constitutes the effective introduction of Internet banking projects in Libya.

#### **Internet banking in Libya.**

Online banking is a technology that has witnessed significant adoption in several developing and developed countries, and the rate of adoption of online banking differs among these countries (Gikandi & Bloor 2010; Moga et al. 2012). The adoption level of online banking is still relatively low in many developing countries generally, and in Libya in particular. Over recent years, the Libyan banking industry has experienced very significant development by using electronic systems. For example, the Bank of Commerce and Development (BCD) in Libya was the first Libyan bank to offer online banking services to its customers in 2005. According to the BCD annual report 2009, a total of 1.33% of BCD customers in Libya used online banking services in 2009 (BCD 2012). Twati (2008) pointed out that Libyan banking customers continue visiting their bank's branches to conduct their banking services via traditional banking channels (Twati 2008). The international banking community is placing significant pressure on Libyan banks to provide electronically channels: this has increased pressure on the Libyan banking sector to improve its banking services (Abukhzam & Lee 2010). The Libyan banking system is currently undergoing a substantial modernization program to upgrade its banking services and facilitate the use of non-cash payment instruments in line with the rest of the world. Furthermore, the Central Bank of Libya established a National Payments System (NPS) in 2008 and opened a new institute for standards of accounting and training (Twati 2008).

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### The research model and hypotheses.

The TAM model has been widely used to explain factors influencing users' attitude toward acceptance of technology (Suh & Han 2003). The model of this study has been designed based on the relationships between the four constructs (Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Trust (T) and Internet Quality (IQ)). The model is an extension of the Technology Adoption Model (TAM) which measures an individual's intention to use a technology. There are five relationships to be examined and formulated as hypotheses.

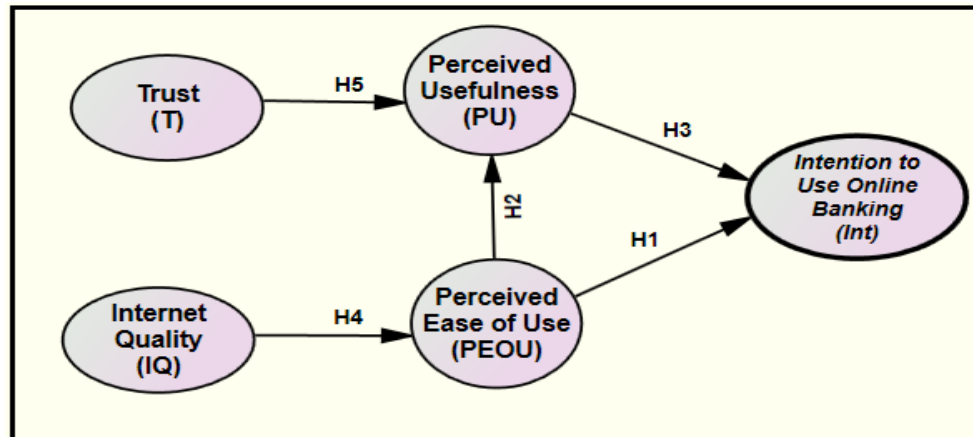


Figure (1): Research model

Based on previous studies (Abukhzam & Lee 2010; Emzio 2010; Twati 2008; Twati & Gammack 2006), and to generate a new insight into Internet banking adoption among the customers of Libyan trade-banks, this research proposes the framework in Figure 1 with the following discussion of the constructs and hypotheses:

### Perceived usefulness and Perceived ease of use.

In the last three decades, much research has focused on the perceived usefulness and perceived ease of use factors as the determinants of the individual's attitude toward using new technologies (Amin 2007; Jahangir & Begum 2008; Joo, Lim & Kim 2011; Shen & Chiou 2010; Suki & Suki 2011). These constructs are the most important factors supporting the Technology Acceptance Model (TAM) (Davis 1986). Amin (2007) conducted a study of technology acceptance of internet banking in Malaysia. The study is based on a modified version of the Technology Acceptance Model (TAM) and it develops a technology acceptance model for internet banking. The results suggest that PU and PEOU had a significant relationship with behavioural intention and a good determinant for acceptance of internet banking (Amin 2007).

### Perceived Ease of Use.

For customers who have limited experience on the Internet, ease of use of the bank's website will reduce the likelihood of non-adoption of Internet banking. A system that is perceived to be easier to learn than another is highly expected to be adopted by users (Pikkarainen et al. 2004). The Perceived Characteristics of the Innovation model (PCI) applied in the study of online banking has concluded that PEOU was capable of improving the forecast of consumers' agreement to embrace e-banking (Gounaris & Koritos 2008). In Libya, people have, generally, little experience with the use of the Internet so any system provided over the



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Internet will have to be designed to be uncomplicated and as simple and straightforward to use as possible; thus, ease of use of an e-banking website would likely influence their adoption judgment.

Perceived ease of use is derived from TAM. While the customers may consider the given application is useful, but at the same time they might consider that the system is difficult to use (Davis, 1989). Besides perceived usefulness, perceived ease of use has also been validated as important determinant in adoption of a lot of information technology, for example intranet (Chang 2004), online banking (Wang et al. 2003) and World Wide Web (WWW) (Lederer et al. 2000). The hypotheses formulated in this research study are:

**H1:** Perceived ease of use is positively related to the preparedness of Libyan banking consumers to adopt Internet banking.

**H2:** Perceived ease of use is positively related to perceived usefulness.

### Perceived Usefulness.

Perceived usefulness (PU) is the degree to which people believe that Internet banking is more beneficial compared to established ways of conducting banking business (Amin 2007). These benefits include allowing customers to conduct banking activities anywhere, anytime (Al-Somali, Gholami & Clegg 2009). Several studies on technology acceptance have shown that PU has a strong impact on bank customers' intention to adopt IT (Al-Somali, Gholami & Clegg 2009; Chong et al. 2010; Lee 2009; Wu et al. 2010). PU is a familiar factor in existing Internet banking literature, and studies of e-banking have established that PU is a significant control on the intention to use Internet banking among bank clients (Gounaris & Koritos 2008; Lassar, Manolis & Lassar 2005; Pikkarainen et al. 2004). In addition, Amin (2007) found that this factor is a key determining element regarding users' likelihood to accept electronic transactions (Amin 2007). Based on the literature, this research considers the following hypothesis:

**H3:** Perceived usefulness is positively related to the preparedness of Libyan banking consumers to adopt Internet banking.

### Internet network quality.

Since the 1990s the Internet has spread rapidly worldwide. It has produced a comprehensive change for humans on a daily basis and greatly influenced the basic needs and entertainment activities of the global population (Shih 2011). Internet technology has become indispensable in almost all industries and modern facilities such as communications, business, aviation, energy, education, health, as well as in the scientific field (Shih 2011). The importance of adequate Internet connection and quality was raised in this current research via a focus group interview. Sathye (1999) also considered Internet access as one of the factors affecting the adoption of online banking in her research (Sathye 1999). Without a satisfactory Internet connection, the use of online banking is not possible (Pikkarainen et al. 2004).

Restrictions in access to the Internet are one of the possible causes for slow adoption of Internet banking in some countries. Accessibility of computers to Internet is a prerequisite for adoption of Internet banking (Sathye 1999). The more widespread access to computers/Internet, the greater the possibility of use of Internet banking. Daniel (1999) found the lack of customer access to appropriate PCs to be the reason for low usage of electronic banking in the UK and Ireland (Daniel 1999). Wallis report (1997) stated that if the Internet

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becomes easy to reach, individuals could be encouraged to conduct their banking activities. Hence, if Internet banking is not being accepted by users, it may be because of lack of access to computers or the Internet (Sathye 1999). The success of e-banking implementation by customers is dependent on the quality of the infrastructure of telecommunications system: the advance of IS/IT would be difficult to achieve without appropriate telecommunications systems that ensure quality Internet networks connection and speed (Al-Somali, Gholami & Clegg 2008).

Recently, Libya has attempted to introduce the SWIFT system of transferring funds through use of universal technology (Twati & Gammack 2006). This can be accomplished only by using up-to-date technology and high-quality communication systems to keep pace with the rest of the world (Twati & Gammack 2006). In addition, the banking system can be developed through private banking ownership, which will encourage the use of efficient services for customers (Pasiouras, Tanna & Zopounidis 2009). Further, such services will permit the banks to be as competitive as possible and encourage overseas investors (Twati & Gammack 2006). The increase of rights transfer plan of privatization will include the banking sector and aims to build up economic performance to increase profits and individual living standards (Libyan Investment 2007). According to previous literature, this study will include the hypotheses that:

**H4:** The availability of adequate quality Internet network is positively related to perceived ease of use.

#### Trust.

Trust is considered to be a key factor affecting consumer attitude toward using a new technology. Trust is an important factor in the successful adoption of technologies such as e commerce (Chen & Barnes 2007; Goles et al. 2009; Yang et al. 2009). Trust is defined as the extent to which an individual believes that using online banking is secured and has no privacy threats (Chong et al. 2010). Therefore, this study focuses on the factor of trust of the Libyan banking consumers' perceptions as to whether they believe transactions via internet banking are trustworthy. Eriksson et al. (2005) pointed out that 'trust is defined from the customers' perception on security and reliability of the online banking system' (Eriksson, Kerem & Nilsson 2005).

Because of the virtual environment of internet banking technology, trust has become an important and complex element affecting the adoption of internet banking by individuals compared to traditional banking transactions. According to Sathye (1999), 'security and privacy concerns are identified as the biggest obstacles' to the approval of online banking usage in Australia (Sathye 1999). In 2008 Grabner-Krauter and Faullant conducted a study in Brazil to investigate if trust in technology has a role in influencing the usage of internet banking. They established that based on the security of the system (i.e. secured or unsecured), trust is a key factor that influences customers in their decision to adopt Internet banking technology. The study recommended banks improve the security of their systems to increase the level of trust among consumers (Grabner-Kräuter & Faullant 2008).

Concerns regarding the lack of security and trust are the most important factors affecting the growth of Internet banking adoption (Amin 2007; Wang et al. 2003). As a result, customers need to trust online transactions with banks when completing purchase transactions via internet networks. Since most of the Libyan population has little experience

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in new banking technology, Libyan banking customers need to trust online banking transactions before making the change from face-to-face banking activities to Internet banking (Chong et al. 2010). Without trust, customers will continue to resist conducting transactions online.

Thus, customers must trust Internet banking to conduct an e-transaction. Without trust, e-banking will not be perceived as useful and users will avoid making business deals via Internet banking (Chong et al. 2010). This element is essential in the Libyan culture whereby business has traditionally been conducted in branches, and the majority of people have little knowledge of Internet dealings (Twati & Gammack 2006). Compared to traditional banking services, e-banking is liable to experience a greater lack of confidence and require a higher value of trust than traditional banking (Frame 2010). Since the impact of trust on intention to accept cannot be ignored, the following hypothesis is formulated:

**H5:** Perceived trust is positively related to perceived usefulness.

#### Methodology.

In this study, the data-set was collected via 536 questionnaires distributed in four major commercial banks (Bank of Commerce & Development, Wahda Bank, National Commercial Bank and Jumhouria Bank) and their branches in two capital cities in Libya (Benghazi & Tripoli) where almost 65% of Libya's population resides (WFE 2013). The questionnaire consisted of closed-ended questions.

The Structural Equation Modeling (SEM) approach was used to describe the constructs of the study and to test the study's hypotheses. SEM is an important technique employed to test the study models and hypotheses (Shook et al. 2004). SEM is considered to be a multivariate method used in the social sciences fields. SEM includes the measurement model and the structural model (Byrne 2009). SEM is used in this study to test and modify the proposed model via the indicators of model fit and examine the ability of the selected observed variables in this study to significantly represent the construct. The suggested model in this study included a number of constructs and the number of relationships among them: 4 constructs and 5 relationships. To achieve the study purpose some statistical methods are adopted in this study. Confirmatory Factor Analysis (CFA) is employed to conduct analysis for each construct, and to conduct the measurement models. Squared Multiple Correlation (SMC) and Cronbach Alpha are used to test the reliability constructs. SPSS/AMOS was used for SEM to test the hypotheses.

#### Results.

##### Measurement model.

Confirmatory Factor Analysis (CFA) is employed in this stage. CFA allows the formulation of specific models to be tested and provides a chi-square test and other goodness-of-fit indicators of the ability of the different models (e.g., first-order vs. higher-order models) to fit the same data, and of the same model to fit the data from different groups (Marsh 1985). The measurement model was conducted on each construct in the study model, and Table 1 shows the results. These results confirm that all five factors selected in this study have good indicators of goodness-of-fit. The values of CMIN/DF, P, GFI, AGFI, RMR, and RMSEA, point to an excellent fit model of the five constructs and present evidence about the reliability of these constructs in measuring the adoption of Internet banking services.



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Table 1

CFA goodness-of-fit indicators of the model construct

Variables	N of item	CFA Goodness-of-fit indicators					
		CMIN	p	GFI	AGFI	RMR	RMSEA
T	5	7.801	.000	.978	.918	.026	.133
IQ	5	7.252	.000	.973	.919	.053	.108
PEOU	5	6.345	.000	.977	.931	.034	.100
PU	5	7.063	.000	.974	.923	.020	.106
Int	3	-	-	1.00	-	-	-

Validity and reliability

The validity and the reliability indicators of each construct were tested, and Table 2 shows the results.

Table 2

Validity and reliability indicators

Variable	item	SMC	Factor loading	Cronbach's Alpha
T	1	.669	.815	.914
	2	.681	.825	
	3	.615	.784	
	4	.769	.877	
	5	.694	.833	
IQ	1	.582	.763	.834
	2	.677	.823	
	3	.606	.779	
	4	.525	.724	
	5	.389	.537	
PEOU	1	.489	.699	.905
	2	.635	.797	
	3	.715	.846	
	4	.758	.871	
	5	.700	.837	

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PU	1	.658	.811	.905
	2	.782	.884	
	3	.742	.862	
	4	.783	.885	
	5	.720	.848	
Int	1	.747	.864	.921
	2	.891	.944	
	3	.757	.508	

Squared Multiple Correlation (SMC) and Cronbach Alpha tests were used to measure the reliability of each construct. Although the recommended level of SMC is  $> 0.50$  (Kline 2011), a SMC value of 0.30 is considered acceptable (Holmes-Smith & Rowe 1994). The values of SMC were between .389 and .891 which indicates the reliability of the constructs. These results of reliability were supported by the Cronbach Alpha values. The Cronbach Alpha values should reach the level of .70 and Table 2 shows Cronbach Alpha values are between .834 and .921, which exceed the acceptable level.

The convergent validity is a measure of the magnitude of the direct structural relationship between an observed variable and latent construct (Holmes-Smith & Rowe 1994). The recommended value to achieve convergent validity is 0.70, and 0.50 is an acceptable level (Shook et al. 2004). The values of factor loading were between 0.508 and 0.944, which confirm the validity of the constructs. The validity test is supported by the construct validity. The indices of goodness-of-fit it measures indicate the construct validity. The five constructs in this study have achieved a goodness-of-fit model and the indices provide evidence of the validity of those constructs.

#### Testing the model and the hypotheses.

The proposed model has been designed to achieve the critical objective: to investigate the effect of internet quality and trust on PEOS and PU to adopt Internet banking. Thus, Internet quality, trust, PEOS and PU were considered as a foundation of Internet banking adoption. In addition, the relationships among the other constructs in the model are tested. The results of the SEM are depicted in Figure 2.

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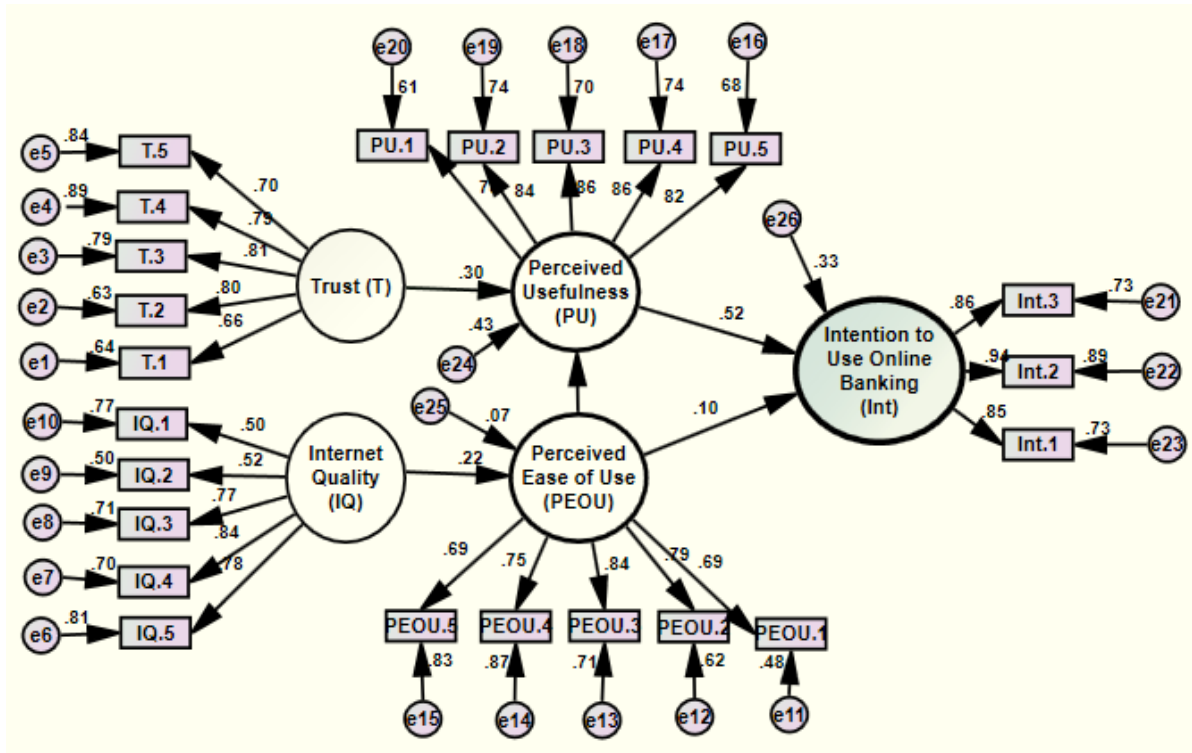


Figure 2 Results of SEM tests of study model

The results of the regression analysis among the constructs of the study model, and the decision about accepting or rejecting the hypotheses are summarized in Table 3.

Table 3

Regression weights of the model

Variable		Variable	Estimate	C.R	p-value	Hypothesis	Decision
Int	←	PEOU	.098	1.898	.058	H1	Rejected
PU	←	PEOU	.605	11.483	<.001	H2	Accepted
Int	←	PU	.505	9.484	<.001	H3	Accepted
PEOU	←	IQ	.177	4.590	<.001	H4	Accepted
PU	←	T	.274	7.561	<.001	H5	Accepted

The results confirm the significant impact of PEOU, PU, Internet quality and trust on the adoption of internet banking services via enhancing the PEOU and PU. The effect of PEOU on intention to use internet banking was insignificant. Furthermore, PU had a significant effect on intention to use internet banking. PEOU and trust has a significant effect on PU. The effect of Internet quality was significant PEOU.

## Discussion.

The results provide support for the proposed model, especially on the subject of Internet quality, trust, PEOU and PU on the adoption of internet banking services. PEOU plays a critical role in PU for Libyan banking customers. The PEOU encourages Libyan banking customers to accomplish their banking services effectively. PEOU affects PU provided to those users willing to use online banking. Ease of use of the banking services can be considered an essential factor in supporting customers to conduct their banking services online. To achieve ease of using the online banking service, banks should ensure that customers who are contemplating the use of e-banking systems are able to use electronic banking channels to connect them with such services.

The ease of use of online banking systems can contribute to supporting the PU via providing a good internet connection for customers to obtain their banking information by sending and responding to their enquiries quickly. Integration between ease of use of the online banking systems and providing a very good internet network are considered one of the most important factors for online banking adoption in Libyan commercial banks (Bank of Commerce & Development, Wahda Bank, National Commercial Bank and Jumhouria Bank). Ease of use of online banking systems and providing a good quality internet network is considered significant factors in the successful adoption and improvement of e banking services in Libya.

The effect of trust on online banking services was found to have a significant positive influence on PU for customers in accepting the use of online banking services. Trust plays a vital role in PU for Libyan banking customers and their intention to use online banking. The results also suggest that PU has a significant positive influence on Libyan customer behaviour towards adopting online banking services. This is compatible with the findings of Chong et al (2010).

The results indicate that the PEOU has no influence on the intention to use online banking (Int). It does not support hypothesis 1—initially claiming that the PEOU of online banking services will not have a positive influence on customers' intention. This is similar to the findings of Tino Fenech. This study concludes that the construct of PEOU is inadequate for that purpose with the adjusted goodness of fit through application of the Technology Acceptance model (Fenech 1998). This indicates that the PEOU of online banking services alone cannot determine their adoption by the customers unless associated with the other attributes that can subsequently influence the customers' intention to use online banking (Int).

## Conclusion.

The research aimed to examine individuals' perceptions of online banking services in Libya. Particularly, this research attempted to explore the factors that may guide Libyan banking customers to use online banking by using TAM variables (PEOU & PU) and additional impacting factors, namely, Trust and Internet quality.

The findings of this study illustrate that Libyan banking customers are agreeable to the adoption of online banking services. This, , depends on their attitudes towards trust, internet quality, PEOU and PU of the online banking services.

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In the meantime, PU was found to be a major determinant of online banking services in Libya. As a result, Libyan banks need to highlight the quality of their online services, and retain existing customers and acquire new customers via the use of the online banking services.

The findings of this research significantly contribute to the body of existing knowledge and have implications for decision makers and policy makers in the Libyan banking sector. Indeed, this research is the first study that looks at the perspectives and prospects of online banking among Libyan bank customers by using TAM constructs. Moreover, the findings will provide more information to decision makers in the Libyan financial industry to support them in their attempts to provide and develop online banking services in Libya.

Researchers aiming to undertake more studies in this area are advised to take into account some additional variables such as banks' support, government contribution, security and credibility in order to provide more comprehensive results. Furthermore, future studies could be directed to other countries that have not yet introduced online banking services or where they are currently under-utilized.

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