Chapter 1 Introduction

The recent emergence of various broadband, 4G, High-Speed Downlink Packet Access (HSDPA), and 3G services by the telecommunication companies has brought mobile services to another enhanced level of competition. The impressive adoption of mobile devices such as iPhone, Blackberry and the Android based smart phones as well as the tablets computer by the consumers has created a new market for mobile application services. According to statistics released by Malaysian Communications and Multimedia Commission (MCMC), the mobile phone penetration rate in year 2010 was at 119.2%, and by the fourth quarter of year 2011, the penetration rate showed a percentage of 127.7% (Malaysian Communications and Multimedia Commission [MCMC], 2011). In 2010, smart phones sales have contributed 72% of total mobile phone sales of RM4.5 billion in Malaysia (Ganesan, 2011). It is expected that by 2014, Malaysia's mobile penetration rate to increase to 133%, with 30.1% of total mobile phone shipments sold in Malaysia are smart phones (Biese, 2010). The 3G cellular network subscription for year 2010 is recorded at total of 9.2 million. This number has a trend of increasing steadily quarter by quarter in year 2011 whereby the subscription rose to 9.6 million, 7.7 million and hit a new record of 10.3 million by fourth quarter of the year (MCMC, 2011). Smart phones together with the current mobile networks have revolutionized the way people communicate and manage their day to day personal as well as social lives. Mobile phones are increasingly popular as a channel for various activities beyond phone call and text messaging. In current era, almost everyone is using mobile phone for messaging via Whatsapp, updates in Twitter, Facebook, check their emails, read e-

books, making online purchases, surf internet and an array of different services provided via mobile applications.

The phenomenal growth in mobile phones and the advantages such as ubiquity and immediate access have created a new model and platform for the business. For example, airline passengers are now able to book their air ticket and even perform self flight check in with their mobile phones through the mobile applications provided by airlines. Cinemas are now providing mobile applications for consumers to buy movie tickets without having the hassle to queue at the ticket box counters by just charging a minor fee. This impressive trend has also attracted the banking industry to actively move towards mobile banking in order to stay competitive. By providing mobile banking services, the banks are attracting a huge number of mobile phone users as their new customers while retaining their existing internet banking customers to continue using their services. Industry analysts have predicted that 2011 is the year where mobile banking will be the mainstream delivery channel (Dernovsek, 2011).

Mobile banking is defined as the use of mobile phones to access banking facilities via mobile networks such as 3G and HSDPA even 4G or via wireless networks such as WiFi or WiMax. It is another fast, convenient and innovative way for customers to interact with their banks (Luo, Li, Zhang, & Shim, 2010). Mobile banking is specially designed for mobile devices whereby it is an application which rides on the mobile phone built in features to provide a proper display and ease of navigation. Through mobile banking, users can perform an array of common banking transactions such as accounts' balance inquiry, fund transfer, top up mobile prepaid card, bill payment and even make payment for movie tickets. Users can access to their accounts anytime and

anywhere using their mobile phones, which they might be carrying it for almost 24 hours by 7 days as compared to personal laptops. As such, mobile banking offers even more convenience and lesser constraint access compared to internet banking where users are required to have computers and internet in order to access to internet banking.

Currently, there are 14 banks in Malaysia offering mobile banking services as shown in Table 1.1. Leading banks like Citibank, Standard Chartered, Maybank and CIMB bank have developed their own designated mobile banking applications for the widely-used iPhone, Android-based smart phones and also mobile version interface for other mobile phones. Clearly, there are no doubts that the banking sector in Malaysia sees mobile banking as a new powerful channel with high growth potential to reach and serve more customers. In year 2010, it was reported that there were 848,500 mobile banking subscribers, which was only 3.2% of penetration to population; meanwhile as at 2011, the numbers of subscribers have steadily increased to 1.5 million, whereby the penetration to population is 5.4%. By March 2012, the number of subscribers has risen by 0.2 million to record at 1.7 million, which is 6.0% of penetration to population (Bank Negara Malaysia [BNM], 2012).

Table 1.1
List of banks offering mobile banking services

No	Banks offering mobile banking services
1	Al Rajhi Banking & Investment Corporation (Malaysia) Berhad
2	Alliance Bank Malaysia Berhad
3	AmBank (M) Berhad
4	Bank Islam Malaysia Berhad

continue from Table 1.1	
No	**Banks offering mobile banking services**
5	Bank Simpanan Nasional
6	CIMB Bank Berhad
7	Citibank Berhad
8	Hong Leong Bank Berhad
9	HSBC Bank Berhad
10	Malayan Banking Berhad
11	OCBC Bank (Malaysia) Berhad
12	Public Bank Berhad
13	RHB Bank Berhad
14	Standard Chartered Bank Malaysia Berhad

1.1 Problem Statement

Previous researches illustrated mobile banking adoption factors in Malaysia based on diffusion of innovation (Sulaiman, Mozehar, & Jaafar, 2007), customers' attitude and expectations (Hanudin, Abdul Hamid, Tanakinjal, & Suddin, 2006) as well as barriers to adopt mobile banking (Sivanand, Geeta, & Suleep, 2004). These researches were conducted more than 5 years ago and mainly focusing in urban area such as Klang Valley and Labuan. Based on the past researches and literature reviews, the research results varies for each country where the research was carried out with different types of measures. In addition to factors of mobile banking adoption, there were also researches on how trust plays a role in the adoption, customers' usage intention and usage continuance towards mobile banking.

Previous studies that were being carried out in Malaysia did not research on the key success factors of mobile banking that will impact customers' usage intention to use the service. Furthermore, the role of trust was also not being taken into consideration as part of the framework in the previous researches in Malaysia. Globally, there were not many studies that focused on the role of trust in the inter relationship of key success factors and customers' usage intention towards mobile banking.

1.2 Purpose and Significance of the Study

As mentioned previously, smart phones are getting popular among Malaysians and 3G mobile network services almost covered every part of Malaysia. In fact, it was even reported that the next generation 4G Long Term Evolution (LTE) will be introduced in 2013 (MCMC, 2012). However, the 6.0% penetration rate of mobile banking is still lower and slower than expected. As a comparison, in March 2012, there were 12.4 million internet banking subscribers and the penetration to population rate of internet banking was recorded at 42.0% (BNM, 2012). The penetration rate of mobile banking is much slower than internet banking despite the readiness of infrastructure, facilities and convenience of access. In the context of usage growth, it is seen that mobile banking services in Malaysia are slow; if it were to compare with the usage growth of mobile services on other applications such as Facebook, which has a record of 13.46 million subscribers, yielding 47.61% penetration to population (Socialbakers, 2012) by November 2012.

A new study of mobile banking should be carried out throughout the country instead of focusing in the urban areas as in previous researches. Besides, it is important to identify the key success factors that will impact customers' usage intention towards mobile banking in Malaysia for the purpose of increasing the customers' usage. Moreover, in order to attract and gain customers' commitment to make mobile banking a success, it is very important for banks to take into consideration how the trust of customers plays a role in this context.

This has led to the motivation for this research paper to investigate further on the role of trust in mediating the inter relationship of the key success factors which then impacts the customers' usage intention towards mobile banking. As mentioned earlier, despite the readiness of technology in mobile banking, the penetration rate is still fairly low. Previous literatures have shown that low penetration rate is related to trust (Min, Ji, & Qu, 2008) (Eze, Goh, Ademu, & Tella, 2008) (Siau, Sheng, & Nah, 2003). Customers have to be convinced by the different aspects of quality factors of mobile banking so that they feel safe to use the service. The findings in a study by Koo and Wati (2010) demonstrated that trust is a significant mediating variable that influences customers' usage intention towards mobile banking.

The aim of this study is to tentatively suggest a framework for the mediating role of trust in the success on implementing mobile banking, in Malaysia context. The findings of this study could assist the Malaysia banking industry in understanding the role and importance of trust in mobile banking, and to identify the factors that will encourage customers to use mobile banking. Hence, provide practical insights for the banking industry in terms of promotion strategies to the successful implementation of

mobile banking in Malaysia. This research also fills the gap for the existing literatures whereby it focused on the inter relationship of key success factors, and trust on mobile banking as well as customers' usage intention towards mobile banking.

1.3 Research questions

i. What are the success factors for the users' usage intention towards mobile banking in Malaysia?
ii. Does trust plays a mediating role in the interrelationship of success factors in Malaysia's mobile banking?

1.4 Research objectives

i. To identify the success factors of users' usage intention towards mobile banking in Malaysia.
ii. To determine the trust level of Malaysia populations towards mobile banking.
iii. To analyze the role of trust in mediating the interrelationships of the success factors in Malaysia's mobile banking.

1.5 Scope of the Study

This scope of this study will cover the usage of mobile banking services via smart phone with the use of 3G network or wireless network. The mobile banking defined in this study does not include phone banking service whereby customers call in to bank service desk to perform their transactions via the help of service desk officers. This

study also excluded the SMS banking service, which customers can perform financial transactions by sending SMS to the bank. The study is targeted at Malaysians only.

This research is based on one of the most prominent models employed to explain the success of information system which is the DeLone and McLean IS success factors model. This model was studied and discussed in many studies to evaluate the success of information system. In the context of mobile financial transactions, there were several studies that further explored the DeLone and McLean model.

1.6 Organization of the Study

The first chapter is the introduction of this research, which consists of problem statement, purpose and significance of this study, followed by research questions as well as research objectives and scope of the study. The next chapter will present a comprehensive literature review derived from various prior studies. Chapter three will present on research methodology which will cover the research framework, proposed research model, selections of measures, development of hypotheses, sampling design, and data collection procedure as well as data analysis technique. Next, data analysis and research result will be presented in chapter four whereby descriptive statistics, analyses of measures, testing of hypotheses, and summary of research result will be discussed. Lastly, chapter five will summarize this research with a conclusion, discussion on the limitations of the study, suggestions for future research and implications for both theoretical and practical purposes.

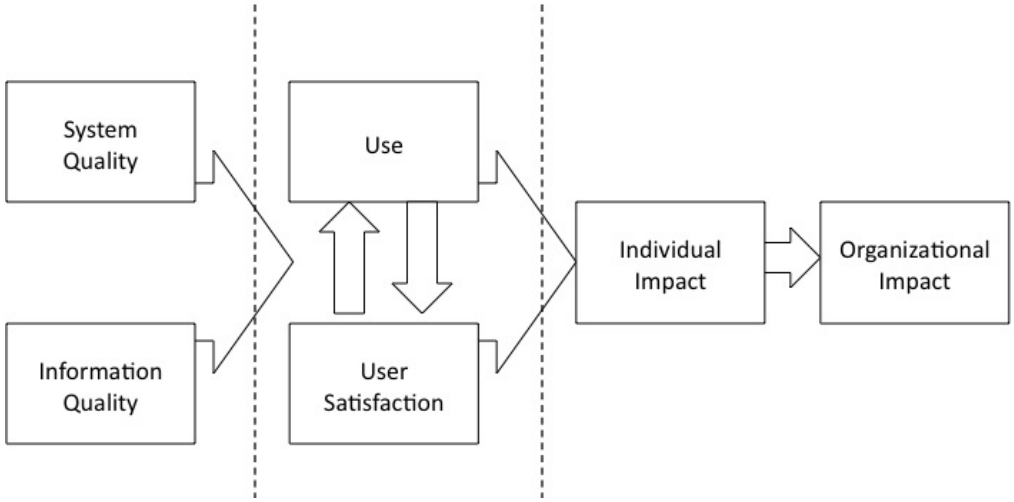
Chapter 2 Literature Review

2.1 DeLone and McLean's IS success model

DeLone and McLean's (D&M) IS success model was proposed back in 1992 as a framework to evaluate the success of information systems at organizational level. This model measured and explained a number of causal relationships that impact of IS success factors towards individual and organizational benefits. D&M model as shown in Figure 2.1, measured three levels for the success of IS. The technical level measured the technical quality based on both system's accuracy and efficiency. The semantic level measured the information quality, whereby intended meaning were successfully conveyed by the information. Finally, the effectiveness level is the effect of information on the receiver; measured by use, user satisfaction, individual impacts and organizational impacts (DeLone & McLean, 2003). The key success factors mentioned in the model are information quality, system quality, use and user satisfaction, which lead to individual and organizational impacts.

Figure 2.1

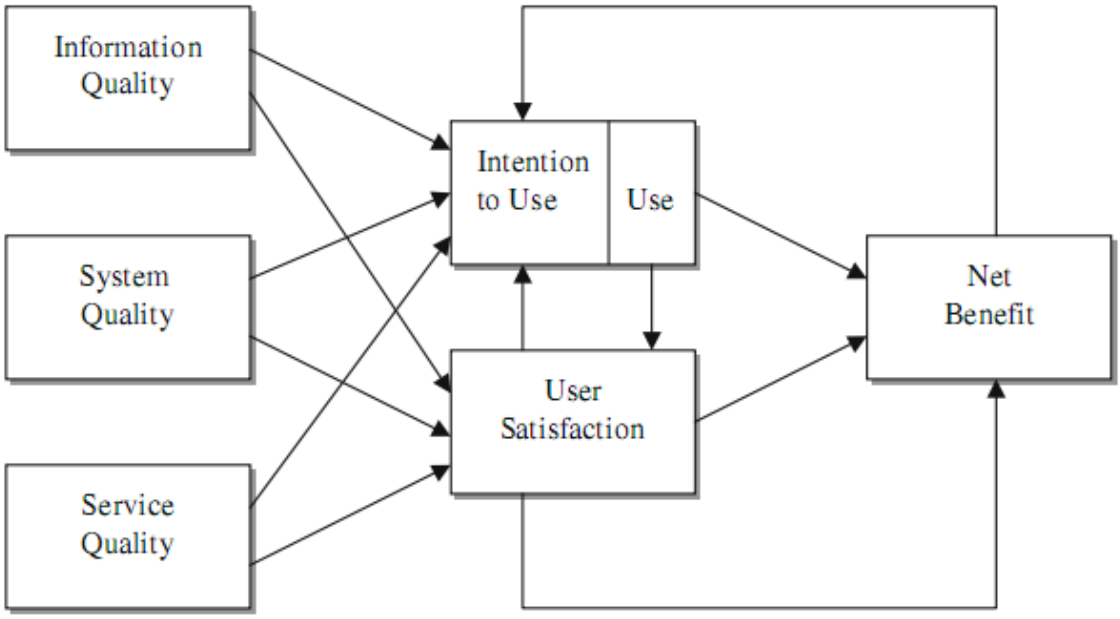
Information Systems Success Model (Delone & McLean, 1992)



The model was later refined and revised in year 2003 as an updated model by Delone and McLean. As shown in Figure 2.2, the revised model included a new factor which is service quality, in view that IS provider playing both role of information provider as well as service provider. The intention of use was added and linked together with the use. According to DeLone and McLean, intention of use is an attitude and use is the behavior; which both are linked. Other than that, the individual and organizational impacts were combined as one presented as net benefits (DeLone & McLean, 2003). D&M IS Success model has been further studied by many of researchers in various IS area including e-commerce, internet banking and mobile banking. In addition, many variations of extended models have also been presented.

Figure 2.2

DeLone and McLean Revised IS Success Model (2003)



However, service quality was excluded from the study of mobile banking as it is based on individuals and mobile banking system, rather than a whole IS department (Lee & Chung, 2009). Wixom and Todd (2005) mentioned that user satisfaction is an attitude towards an information system. The net benefits in this context refers to benefits to customers whereby the satisfaction and enjoyment of using mobile banking; meanwhile, customers' usage intention on mobile banking are benefits to banks. Customers' satisfaction which produces usage intention and continuance intention have been theorized as one of the important IS success measures (Kim, Hong, Min, & Lee, 2011).

2.2 System Quality

DeLone and McLean (1992) pointed out that system quality affects users' intention and customers' satisfaction. System quality is viewed as technical level effectiveness in IS; refers to adaptability, availability, reliability, response time, and usability, which are the desired characteristics of an IS system in internet environment and highly valued by users (DeLone & McLean, 2003). Adaptability defines the capability to accommodate to changes (Ross, Rhodes, & Hastings, 2008). Availability refers to the ease of accessing the system, whereby in this context, the ease to access mobile banking by users. Research by Sivanand, Geeta and Suleep (2004) revealed that ease of accessing mobile banking is one of the most important factors in adoption. Reliability refers to how dependable and credibility of the system is; for example, consistent, error free and secure.

With customers' privacy such as personal and financial information accessible through mobile banking, system security played an important role as the success factor for online transactions (Shah, Braganza, & Morabito, 2007). Eze, Goh, Ademu and Tella (2008) mentioned that perceived strength of system security positively impact consumers' trust in mobile payment. Research by Schierz, Schilke, and Wirtz (2010) also suggested that there is a positive relationship between the perceived system security and the attitude towards using mobile transaction services. Customers need to feel in control and protected so that they could trust and use the mobile system (Kassinen, 2005). Lin (2011) pointed that if mobile banking provider is able to develop effective service and protection from fraud and violation of privacy that customers trust, the usage intention will increase. Response time defines the turnaround time of requests (Koo & Wati, 2010). Usability refers to the ease of use and acceptability of a system or product (Bevan, Kirakowski, & Maissel, 1991). Usability, accessibility and reliability were also mentioned in the study by Siau et al. (2003) as the factors that will affect customers' intention to use mobile transaction.

System quality affects the customers' perception on performing financial transactions especially on a mobile device. If mobile banking services respond in an accurate and speedy way, it will increase customers' intention of using it (Gu, Lee, & Suh, 2009). Wang & Pho (2009) also mentioned that system quality is positively related to trustworthiness of online banking services, and this trust will affect customers' intention to use the system. Min et al. (2008) pointed that customers are sensitive to the system quality of a mobile information system and this will impact customers' attitude and satisfaction towards a mobile information system. When users think the system is of

high quality, they are more likely to postulate that the system has beneficial characteristics (Kim et al., 2011). Lee and Chung (2009) also mentioned that, if customers perceive the system to be high quality, they will have high trust on the system as well.

2.3 Information Quality

The information quality in IS refers to how the information output benefits users (Koo & Wati, 2010). The content of the information should be secure, complete, easy to comprehend, and personalized (DeLone & McLean, 2003). In addition, information quality such as information relevancy, accuracy and timeliness will also influence the trust of users which in turn impacts the evaluation of net benefits (Lee & Chung, 2009) (Susanto & Zo, 2011) (Chung & Soon, 2009) (Siau et al., 2003) (Min et al., 2008).

In order to improve users' trust in information system such as mobile banking, it is essential that the information delivered is of high quality (Liu, Min, & Ji, 2009). Naturally, users will doubt the capability and credibility of mobile banking if the information being provided to them is irrelevant, inaccurate and outdated. A research by Toh, Marthandan and Chong (2009) pointed that mobile financial transaction service provider should provide quality information to its customers in order to meet their needs, hence, improving the intention of use. Laukkanen & Kiviniemi (2010) mentioned that information and guidance by bank has the most significant effect in decreasing mobile banking resistance. Therefore, it is critically important for mobile banking system to provide precise and accurate information. Study by Wang & Pho (2009) also argued that information quality is positively related to the trustworthiness of financial service

provider. Siau et al. (2003) pointed that information quality is one of the fundamental factors that affects users' intention in mobile transaction systems. Furthermore, mobile banking relies on a small terminal screen on smart phone or mobile device to cater its services to the customer. Hence, information provided needed to be easy to apprehend. Therefore, information quality plays a significant role in bringing IS success (Lee & Chung, 2009).

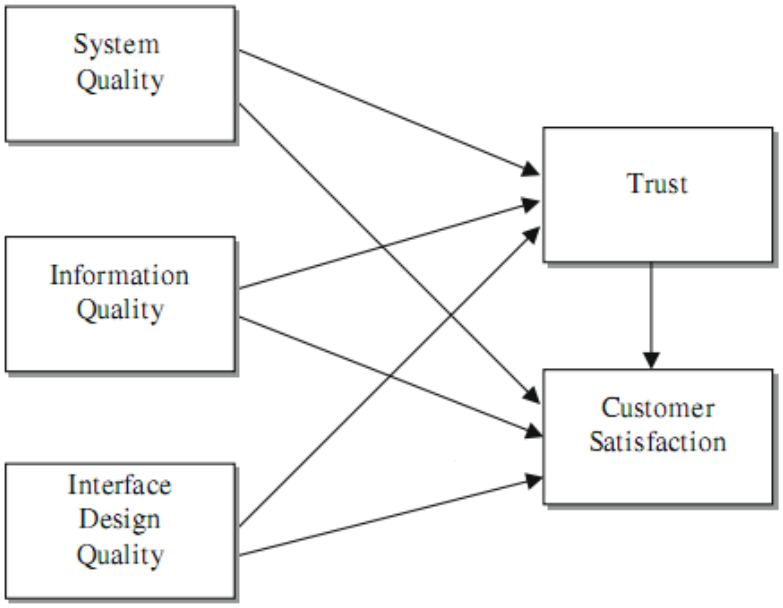
2.4 Interface Design Quality

The initial point of contact on mobile banking with customers is the user interface. Kassinen (2005) pointed that displaying information in a limited size screen is one of the main challenges for human-computer interaction design for mobile devices. Lee and Benbasat (2004) also mentioned that user interface is a crucial research issue in mobile commerce. To compensate for the lack of human touch, the interface design quality is an important aspect that online retailers should strive for (Ribbink, Streukens, van Riel, & Liljander, 2004). The interface design quality and presentation of information to customers can significantly affect their impressions of the mobile site based on the interface design (Everard & Galletta, 2006)(Siau et al., 2003) (Rehman & Coughlan, 2011). As the mobile banking service is catered through small screen which could be a hindrance (Sivanand et al., 2004), a well-designed user interface is exceptionally important to enable customers to use with ease (Chung & Soon, 2009). Chung and Soon (2009) also pointed that improperly designed user interface can cause inconvenience to customers, hence, negatively influence customers' perception towards mobile banking. Studies have shown that factors such as format of display, colors, and

even fonts are significantly interrelated to customers' satisfaction as well as their trusts with the system. This research included interface design quality as another dimension of the IS success model.

Lee & Chung (2009) have modified DeLone and McLean's IS Success model to incorporate the interface design quality in their research as one of the determinants that impacts the customers' satisfaction and trust, as shown in Figure 2.3. In their study, it was mentioned that the presentation and organization of information on a limited interface will have a significant impact on customers' trust towards the mobile banking system.

Figure 2.3
Lee & Chung's research model (2009)



Design aesthetics of a mobile site is an important channel to good virtual experience and develop customers' trust (Li & Yeh, 2010). Siau et al. (2003) pointed that the readability of display, ease of input and ease of navigation are essential designs of mobile site especially for financial transactions in order to gain trust from customers. The combination of colors is also one of the factors that impact the visual effects in this context. It is also particularly important for a mobile site to be user friendly (Li & Yeh, 2010). The mobile site needed to be adaptive to the different sizes of customers' mobile devices (Rehman & Coughlan, 2011). Li and Yeh (2010) mentioned that the higher level of design aesthetics quality of a mobile website will result in higher trust due to higher perceived usefulness and ease of use of the mobile website. Interface quality is exceptionally important in the case of mobile banking whereby improper design interfaces will actually cause customers troubles and hence, negatively influence their utilization environment.

2.5 Trust

Moorman et al. defined trust as 'a willingness to rely on an exchange partner in whom one has confidence', while Morgan & Hunt (1994) defined trust as 'when one party has confidence in an exchange partner's reliability and integrity'. Esmaili et al. (2011) pointed that trust is an important factor in interactions that involve dependency and uncertainties. Essentially, trust plays an important role in both online and offline environment for commercial transactions (Chung & Soon, 2009). Esmaili, Desa, Moradi and Hemmati (2011) also mentioned that establishing and maintaining user's trust is one of the success factors for online transaction. Koo & Wati (2010) mentioned that in

the context of mobile banking, trust is defined as 'the belief that allows individual to willingly become vulnerable either to bank or e-banking technology after taken the bank's characteristic embedded in its technology artifact'.

As mobile banking involves private and financial information; customers are sensitive and tend to shy away (Liu, Min, & Ji, 2009)**.** Customers do not easily trust electronic transactions due to the potential risk in online environment such as identify theft (Esmaili et al., 2011). Trust is crucial as it reduces worries and fears (Lu, Yang, Chau, & Cao, 2011). Eze et al. (2008) mentioned that trust is the foundation of most financial transactions. Esmaili et al. (2011) reported that establishing and maintaining trust between user and provider is known as an online transaction success facilitator. Hoffman et al. (1999) mentioned that the lack of trust is the main reason the hold back customers from online shopping; whereas on the contrary, high level of trust will encourage the customers' to perform online transaction. Trust is recognized as a significant factor that influences customers' attitude towards mobile banking by Chung & Soon (2009) as well as Eze et al. (2008).

In mobile environment, trust is viewed as customers' perception towards mobile banking providers' ability, integrity and benevolence in handling customers' transactions (Kim & Benbasat, 2003) (Gefen, Benbasat, & Pavlou, 2008). Ability refers to customers have faith and confidence in service provider is able to do the required task. Benevolence indicates that the service provider is believed to want to do good for customer; while integrity means customer truly believes that service provider caters promises, ethical and honest (Koo & Wati, 2010). Enos (2001) reported that trust is one of the critical success factors in virtual banking. The existing trust in online environment

can also impact the trust in mobile environment, whereby the trust is transfer from one familiar entity to another unknown entity (Lin, Lu, Wang, & Kwok, 2011). Prior literatures related to trust and usage intention is shown in Table 2.1.

Table 2.1
Key variables from various studies

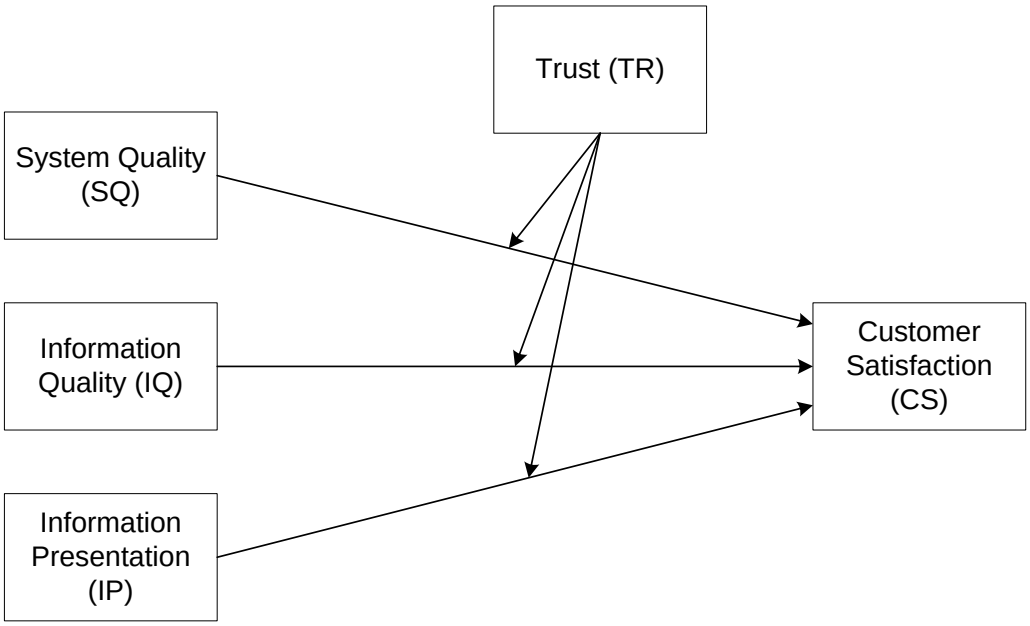
Studies	**Base Theory**	**Information System**	**Key Variables**	**Dependent Variables**
Kim et al. (2011)	D&M model	Application services	System Quality, Information Quality, Service Quality, Satisfaction, Trust	Continuance Intention
Chu and Lu (2009)	IDT	Mobile Banking	Trust, Satisfaction, Compatibility, Relative advantage	Usage intention
Wang and Pho (2009)	D&M model	Online banking	System Quality, Information Quality, Service Quality, Trustworthiness	Intention to use, Satisfaction
Kim et al. (2011)	D&M model	E-commerce	Trust, Satistaction, Functionality, Security, Cost	Loyalty
Esmaili et al. (2011)	TAM	Internet Banking	Trust, PEOU, cost, PU, attitude, influence	Usage intention
Luo et al. (2010)	TAM	Mobile Banking	Trust, PU, Structural assurance	Behavioral intention
Chung and Soon (2009)	D&M model	Mobile Banking	System Quality, Information Quality, Information Presentation, Trust	Customer satisfaction
Liu et al. (2009)	TAM	Mobile Banking	Trust, Structural Assurance, PU, PEOU	Intention

Continue from Table 2.1				
Studies	**Base Theory**	**Information System**	**Key Variables**	**Dependent Variables**
Koo and Wati (2010)	D&M model	Mobile Banking	Information Quality, System Quality, Trust, PU	Customer satisfaction
Lee and Chung (2009)	D&M model	Mobile Banking	System Quality, Information Quality, Interface Design Quality	Customer satisfaction
Lu et al. (2011)	IDT	Mobile Payment	Trust, Cost, Risk, Relative Advantage, Compatibility, Image	Behavioral intention
Gefen et al. (2003)	TAM	E-commerce	Trust, Structural Assurance, PU, PEOU	Usage intention
Zhou (2011)	D&M model	Mobile banking	System Quality, Information Quality, Trust	Usage intention
Gu et al. (2009)	TAM	Mobile banking	System Quality, PEOU, PU, Trust, Structural Assurance	Behavioral intention

Chung & Soon (2009) have further researched on the role of trust based on DeLone and McLean model as shown in Figure 2.4. Their study posited trust as a moderator which positively impacts the different qualities of mobile banking and customers' satisfaction. Chung and Soon (2009) mentioned that the trust level is rather dynamic in mobile banking environment and it can be difficult to build trust in mobile banking. However, once the trust is built, it will continue (Chung & Soon, 2009). Chung & Soon (2009) concluded that trust played a crucial intervening role in the relationship between quality factors and customer satisfaction.

Figure 2.4

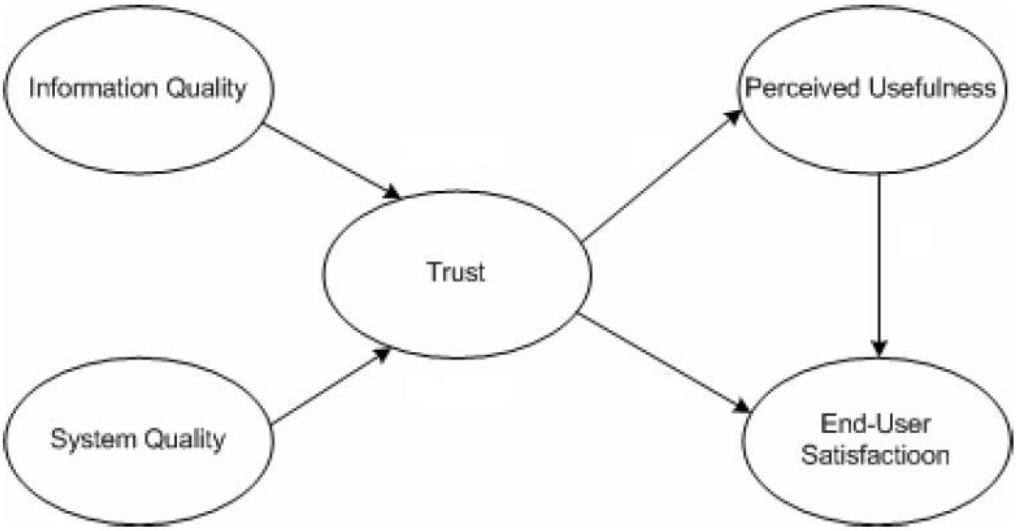
Chung & Soon's research model (2009)



To further investigate the role of trust in success of mobile banking, Koo and Wati (2010) proposed a research model on mobile banking based on DeLone and McLean's model as shown in Figure 2.5. Their study included trust as a mediator which effects both system and information quality on users' perception and satisfaction on mobile banking. Their findings revealed that trust mediated the inter relationship between the quality factors and perceived usefulness as well as user satisfaction.

Figure 2.4

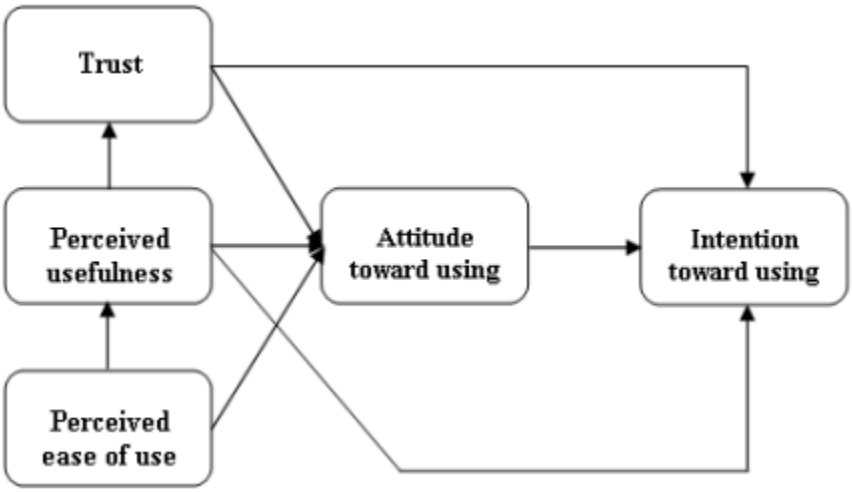
Koo & Wati's research model (2010)



Trust building needs time, and it is a gradual process whereby the trust is based on relevant and experimental samples (Esmaili et al., 2011). Esmaili et al. (2011) proposed a research model on the affect of trust on usage intention towards online banking, as shown in Figure 2.6. It was found that trust has a significant impact on the customers' attitude and intention towards performing online transactions. Their study also suggested that banks should improve their internet banking qualities to reduce the fear and increase customers' trust; which could encourage customers to use online banking. Wang & Pho (2009) mentioned that trust positively affect the customers' usage intention to online transactions. Gu et al. (2009) also supported that trust is crucial in improving customers' usage intention of mobile banking.

Figure 2.6

Esmaili et al. research model (2011)



2.6 Usage Intention

Usage intention was defined by Chen & Hsu (2007) as a user's willingness to use a system. The intention of a user to use has significant direct impact on the actual usage (Bagozzi, Davis, & Warshaw, 1992) (Tang & Chuang, 2009) (Ajzen, 1991). According to Liao (2006), if user has a strong usage intention, there is a high probability of performing the behavior.

The chances of customers' intention to use mobile banking are impacted directly and indirectly by their perceived value and attitude towards the service (Esmaili et al., 2011) (Tang & Chuang, 2009) (Gu et al., 2009). As mentioned by Koo and Wati (2010), customers' attitude influences their intention to perform the behavior. Research by Kim and Prabhakar (2000) shown that trust had a significant linear effect on the usage on online banking. According to Gu et al. (2009), trust is considered as a key construct of

influencing users' intention; whereby when customers believed in the mobile banking service, they are willing to use it.

Ribbink et al. (2004) suggested that the qualities of an information system directly and positively influence the trust of customers. Prior research in Malaysia by Toh et al. (2009) also mentioned that, in order to encourage customers' usage intention, service providers need to focus on building customers' trust by developing mobile information system with superior qualities and value added features. Koo and Wati (2010) mentioned that customers' perceived qualities of mobile banking can strongly influence then establishment of trust which then affects customers' intention. Existing studies have regarded trust as an important factor in mobile banking; whereby the result of trust is reducing perceived risk by customer, leads to a positive perception in acceptance and usage of online transactions. Kim et al. (2011) mentioned that system quality and information quality are positively related to trust. Cugelman et al. (2009) pointed that trust is a factor relates to usage intention through mediation. Research by Ribbink et al. (2004) also demonstrated trust played a mediating role between the quality factors and loyalty towards online retailers. Creating and maintaining customers' trust towards using new banking channels such as mobile banking have significant effects on intention towards using the service (Aladwani, 2001).

From the perspective of trust as a mediator in this context, key qualities of information system such as system quality, information quality and interface design quality form customers' trust toward mobile banking, and this in turn impacts the customers' intention to start using or continue to use mobile banking services. Thus, this study aims to set up a research model by positing trust as a mediator in the inter

relationships of IS success factors towards usage intention and attempts to prove it empirically.

Chapter 3 Research Methodology

As mentioned in chapter two, the previous literatures suggested that the key characteristics of an information system build the trust which in turn encourages the usage intention of customers. Therefore, this study will investigate the key qualities of mobile banking that will establish customers' trust, and the mediation effect of trust on customers' usage intention towards mobile banking, as well as the impact of trust on usage intention towards mobile banking.

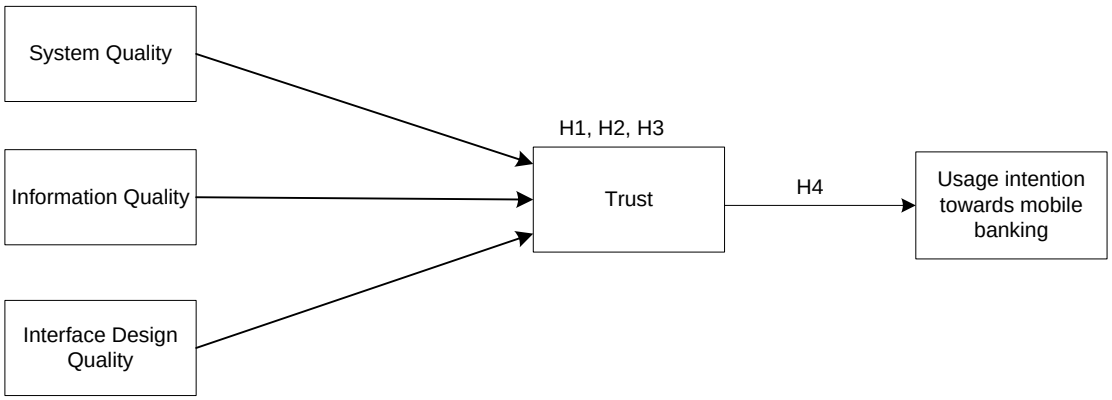
3.1 Research Framework

According to DeLone and McLean's IS success model (Software Education Associates Ltd., 2006), a model that explained the interrelationships between six IS success factors was presented in Figure 2.2. This research adapted the DeLone and McLean's IS success model, whereby to measure the success of an information system, system quality and information quality are the essential quality components. The proposed framework in this study is integrated with trust as a mediator and adding another success factor namely interface design quality. The information system in this context is mobile banking.

In this research framework, the independent variables are system quality, information quality and interface design quality. Within this model, the role of trust is being assess in mediating the correlations of the IS success factors. The dependent variable is the users' usage intention towards mobile banking. The proposed research framework for this research is shown in Figure 3.1.

Figure 3.1

Proposed Research Framework



3.2 Selections of Measures

The survey questions for this research were adopted and modified from various studies based on the literature review. Additional advices from research supervisor of this study were also taken into consideration during the preparation of questionnaire and appropriate amendments to the questions were made. The research variables were measured by a five point Likert scale, listed as Table 3.1.

Table 3.1

Five point Likert scale

Scale	Description
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

The validated measures of system quality, information quality, interface design quality, trust as well as consumers' usage intentions were adopted from various studies. These measurement items for each variable in the questionnaire were listed in Table 3.2. Several steps were taken to ensure the questionnaire's validity and reliability. Initially, a pre-test was carried out with five individuals who met the pre-requisites. The questionnaire was then being revised for potentially confusing items. Later, a pilot test with another ten individuals was carried out before the actual data collection. The comments from the pilot test were also being incorporated into the survey questionnaire prior to the actual data collection. The sample questionnaire is shown in Appendix A.

Table 3.2
Variable and Measurement items

Variable	**Measurement Items**	**References**
System quality	Mobile banking display all texts and graphics quickly Mobile banking responds to my request quickly Mobile Banking provides information in timely fashion Mobile Banking allows information to be readily accessible to me Mobile Banking makes information easily to access Mobile Banking performs transactions reliably and securely The operation of Mobile Banking is efficient The operation of Mobile Banking is dependable The system quality of Mobile Banking can earn my trust	Gu et al. (2009), Lee et al. (2009), Shan & Lu (2009), Schierz et al. (2010), Koo & Wati (2010), Lee et al. (2011), Lin et al. (2011), Zhou (2011)

continue from Table 3.2

Variable	Measurement Items	References
Information quality	Mobile Banking provides me with complete set of information Mobile Banking provides me with all the information I need Mobile Banking provides me with accurate information Mobile Banking provides me with up to date information Mobile Banking clearly displays the information on screen Mobile Banking presents well formatted information The information quality of Mobile Banking can earn my trust	Shan & Lu (2009), Koo & Wati (2010), Lee et al. (2011), Lin et al. (2011), Zhou (2011),Teo et al. (2012)
Interface design quality	Mobile Banking site is visually attractive Mobile Banking site is easy to navigate Mobile Banking site looks professionally designed The information is attractively displayed in Mobile Banking site The colors used in Mobile Banking site are appealing I like the overall look and feel of Mobile Banking site The design quality of Mobile Banking site can earn my trust	Li & Yeh (2010), Zhou et al. (2010), Schierz et al. (2010), Chong et al. (2010), Lee et al. (2011), Lin (2011), Teo et al. (2012)
Trust	I trust Mobile Banking is truthful in providing service I trust Mobile Banking is competent and efficient in providing service	Gu et al. (2009), Shan & Lu (2009), Li & Yeh (2010), Koo & Wati (2010), Chong et al.

continue from Table 3.2		
Variable	**Measurement Items**	**References**
	I trust Mobile Banking can provide me with good service I trust Mobile Banking to protect my financial information privacy I feel I can trust Mobile Banking	(2010),Susanto & Zo (2011), Lin (2011), Lin et al. (2011), Hernandez-Ortega (2011), Zhou (2011)
Usage intention to use mobile banking service	I intend to use Mobile Banking in the future I intend to use Mobile Banking rather than any alternative means I intend to frequently use Mobile Banking in future I intend to continue using Mobile Banking	Gu et al. (2009), Lee et al. (2009), Shan & Lu (2009), Schierz et al. (2010), Chong et al. (2010), Lee et al. (2011), Zhou (2011), Lin (2011), Hernandez-Ortega (2011), Teo et al. (2012)

3.3 Development of hypotheses

In mobile banking environment, the service providers are basically represented by the screen interface displayed on users' mobile devices. Chung & Soon (2009) pointed that users who trust mobile banking will evaluate the system's quality highly and on the contrary, users who do not trust mobile banking will give negative evaluation to the system's quality. In DeLone and McLean IS success model, it is pointed that system quality is one of the critical factors to measure the success of an individual system. Cugelman et al. (2009) mentioned that trust is a factor that relates to behavior both through mediation and direct affect. The reliability of the technology, adequacy and its correct functioning are very important factors to the technology trust, which will reflect the users' willingness to employ the information system to perform tasks.

This study has adopted five constructs used in previous studies to measure the system quality. These system quality attributes suggested the technological aspects that will form users' trust, which in turn will affect the usage intention of users (Koo & Wati, 2010). Koo and Wati (2010) also pointed that trust mediates the effect of system quality on perceived usefulness and satisfaction on mobile banking. The perceive usefulness is showed to have positive impact on usage intention towards mobile banking (Lee, Park, & Chung, 2009) (Ayo, Adewoye, & Oni, 2010). Study by Ramayah & Lee (2012) also supported that system quality is positively related to usage intention. In this context, it is argued that trust mediates the effects of quality attributes on users' usage intention towards mobile banking. Thus, the first hypothesis is formulated as follows:

H1: Trust mediates the effect of system quality on usage intention towards mobile banking

Information quality is another important trust building factor in online environment (Koo & Wati, 2010). Mobile banking is a service which carries sensitive and private finance information. Therefore, the completeness, timely and accuracy of information are absolutely needed to cater mobile banking service to customer. If the information provided is outdated or inaccurate, customers will doubt the mobile banking service and this will affect their trust (Zhou, 2011). When customers feel the quality of system and information are high, this in turn will promote the trust in the information system; and the trust is positively related to users' usage and continuance intention (Kim et al., 2011) (Wang & Pho, 2009). Similarly, when finance information catered by mobile banking is of high quality, this forms the trust in customers which will significantly affect their usage

of mobile banking. When customers trust the mobile banking service, they are willing to use it (Gu et al., 2009). Hence, the following hypothesis is proposed:

H2: Trust mediates the effect of information quality on usage intention towards mobile banking

Interface design of a mobile banking is an important tool as that is the store front that customers will interact with. Cyr, Kindra and Dash (2008) pointed that affective website design can attract customers, gain their attentions as well as develop their trusts. A proper presentation of information, fonts, graphical buttons, and well balance colors can positively affect the users' impression of the site. Research by Li and Yeh (2010) showed that higher level of design of a mobile site will result a higher level of users' trust. Their studies also pointed that interface design will significantly impact the customers' perceived ease of use of the mobile website and higher level of perceived ease of use will result in higher level of trust. Gu et al (2009) pointed that users perceived online vendors to be dishonest if the online interface is difficult and complicated to use. Users will perceive mobile banking to be trustworthy when mobile banking is easy to use. Vance, Christophe and Straub (2008) reported that users' trust in mobile commerce will be affected by navigational structures and visual appeal. Therefore, the following hypothesis is suggested:

H3: Trust mediates the effect of interface design quality on usage intention towards mobile banking

Trust building is a process of interactions between involved parties and this trust plays a vital role in customers' intention to use mobile banking service (Lu et al., 2011). Luo et al. (2010) pointed that trust significantly drive one's intention to use mobile

banking. Kim et al. (2008) also mentioned that trust is significant in users' intention on mobile banking adoption. Users will be willing to use mobile banking when they have developed their trust belief. The trust in banking channels has a positive relationship with customers' intention to use and continue using the service (Ayo et al., 2010)(Zhou, 2011)(Wang & Pho, 2009). Research by Gu et al. (2009) also showed that the trust of mobile banking service will have positive effect on customers' usage intention. Therefore, the following hypothesis is presented:

H4: Trust has a significant impact on usage intention towards mobile banking

3.4 Sampling Design

The target population was mass population of Malaysia, and the sampling frame was members who have prior experience in using internet banking services. Probability sampling method was used and for this study, convenient sampling method was chosen to reach out to the population. The primary benefit of using this method is there will be an equal probability of selection for all members in the population without bias (Ross K. N., 2005). Derived from the calculation of survey sample size (Raosoft, 2004); a minimum recommended sampling size of 200 people was needed. In order to achieve the required sample size, 500 invitations for survey were sent out, based on the estimated response rate, which was targeted at 50%.

3.5 Data Collection Procedure

Survey questionnaire is used as research instrument for data collection in this research. This questionnaire was self-administered and distributed to 500 randomly selected

respondents in Malaysia. This study used two ways to collect data; manually distributed questionnaires and online questionnaires. Manually distributed questionnaires were mostly targeted at the working populations in Klang valley recruited from public places inclusive of Masters of Business Administrations students from University Malaya. The online questionnaires were based on Google document format and were used with the aim of reaching out to a wider population throughout the whole country inclusive of East Malaysia. Respondents from the Klang valley have the option to choose whether to respond to the manual questionnaires or online questionnaires. The targeted return time frame was set at 6 weeks. For the manually distributed questionnaires, drop off method was used; whereby the questionnaires are distributed and will be collected after an hour. For online questionnaires, the URL was sent to respondents' email addresses and also shared in Facebook pages to gather more respondents.

An introductory page explaining the purpose of the study, the intended usage and the guarantee of confidentiality was presented to the respondents prior the questionnaire page. The questionnaire was segregated to three sections. The first section collects the demographics of respondents; the second section gathers the respondents' experience on internet and mobile banking, and last section describes the respondents' perceptions of mobile banking in different quality aspects, their trust belief as well as their usage intention towards the service.

3.6 Data Analysis Techniques

For data analysis, IBM SPSS Statistic version 18 for Windows was used for this study. In order to understand the distribution of trust among the mass Malaysia population, the

respondents are divided into two levels of trust groups namely low trust and high trust. The level of trust for mobile banking will be categorized using statistics based on the median of trust construct as suggested by Chung & Kwon (2009). The level of trust will also reflect the influence of respondents' demographics and usage experience on mobile banking (Chung & Soon, 2009).

The adequacy of the research model in this study was assessed by evaluating the reliability and internal consistency of each constructs convergent validity as well as the discriminant validity among the various constructs.

Validation of research model is tested using a combination of multiple regression analysis (MRA) and Sobel test. The model of this study consists of only one mediator which represents a case of simple mediation (Preacher & Hayes, 2004). Correlation coefficients between each variable were examined to ensure the significance of relationship. Multiple regression analysis is then used to establish the mediation model as recommended by Baron and Kenny (1986). The statistics from MRA are then derived to compute Sobel equation. Sobel test is used to assess the significance of a mediation effect. The result will display the estimated percentage of the total effect that is mediated and the ratio of the indirect to direct effect (UCLA: Statistical Consulting Group). There are several reasons to use Sobel test. Firstly, Sobel test is used in simple mediation by comparing the strength of the indirect effect of an independent variable to a dependent variable (Preacher & Hayes, 2004). Secondly, the performance of Sobel test was proven to be more superior and statistical powerful compared to the other methods in assessing mediation effects (Preacher & Hayes, 2004) (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

Chapter 4 Research Results

4.1 Descriptive Statistics

Of the 500 questionnaires that were being distributed, there were 211 responses, which yield a response rate about 42.2%. Almost 80% of the responses came from online questionnaires. Only the respondents who have prior experience with internet banking were included in the survey analysis. This is due to in order to access mobile banking; the customers will need to have an internet banking account. All of the 211 respondents were online banking users. Although not all the respondents have used mobile banking service, the respondents were fully aware of the existence of mobile banking service and the results from these respondents could be meaningful and valuable by helping the banks to understand the non mobile banking customers' perception and intention towards mobile banking service. The result from this study can also provide insights to the Malaysia banking industry in the aspect of continuous improvement to encourage the usage of mobile banking.

The descriptive statistics of the data collected for this study was shown in Table 4.1. The result in Table 4.1 displayed the respondents' demographic information in terms of gender, age group, ethnic group, education level, income level, working level, as well as their experience in using mobile banking. Based on the five measurement items for the trust construct shown in Table 3.2, a median was generated to categorize the respondents into different trust groups, as suggested by Chung and Kwon (2009); namely high trust and low trust. The aim of dividing respondents into trust groups is to reflect the distribution of trust level towards the service among the mass population of Malaysia. The median of trust construct in this study was 3.40; and based on this

median, the total number of respondents of 211 which was divided into two trust groups. This was also reflected in Table 4.1. The high trust group consisted of 113 persons, yielded 53.6% of total respondents; whereas there were 46.4% or 98 respondents in the low trust group. This result reflected a rather equal trust belief towards mobile banking among the respondents. Although there were 48 non mobile banking users, their responses were also being taken into consideration based on their knowledge and perception of mobile banking; as they may also be mobile banking users in the future.

The majority of respondents were from the age group of 25 - 29 and 30 - 34. It was noticed that there are more than 50% of respondents were degree holder and above. Majority of the respondents were working as executive or senior executive. The statistics also revealed that most of the respondents were with the income levels from RM2000 - RM5000 and RM5001 - RM8000. It was believed that majority of these respondents' groups had fairly easy access to internet as most of respondents came from online questionnaires. It was also noticed that although there were 163 respondents have experience using mobile banking, there were only almost 50% from the total number of respondents have a higher level of trust with mobile banking service. This may be seen from the respondents' usage frequency of mobile banking, which was mainly at the rate of monthly or once a few months.

Table 4.1

Respondents' demographics

	Full (n = 211)		Low Trust Group (n = 98)	High Trust Group (n = 113)
Demographics	**Frequency**	**%**	**Frequency**	**Frequency**
Gender				
Female	107	50.71	52	55
Male	104	49.29	46	58
Age				
20-24	14	6.64	8	6
25-29	74	35.07	29	45
30-34	71	33.65	35	36
35-39	27	12.80	14	13
40-44	14	6.64	6	8
>45	11	5.21	6	5
Ethnic				
Chinese	94	44.55	53	41
India	29	13.74	15	14
Malay	62	29.38	21	41
Others	26	12.32	9	17
Education				
High School	2	0.95	1	1
Diploma/ Certificate	14	6.64	8	6
Degree	136	64.45	61	75
Post Graduate	47	22.27	21	26
Professional Certificate	12	5.69	7	5
Income				
Less than RM2,000	3	1.42	1	2

continue from Table 4.1				
Demographics	**Frequency**	**%**	**Frequency**	**Frequency**
RM2,000 - RM5,000	91	43.13	50	41
RM5,001 - RM8,000	76	36.02	28	48
RM8,000 - RM10,000	24	11.37	12	12
RM10,001 & above	17	8.06	7	10
Working Level				
Clerical	6	2.84	2	4
Executive/ Senior Executive	132	62.56	59	73
Middle Management	66	31.28	33	33
Top Management	7	3.32	4	3
Mobile Banking User				
No	48	22.75	42	6
Yes	163	77.25	56	107
Usage Frequency				
Never	48	22.75	44	4
Rarely (Monthly/ Once a few months)	75	35.55	28	47
Occasionally (Weekly/ Once a few weeks)	59	27.96	23	36
Frequently (Daily/ Once a few days)	29	13.74	3	26

As shown in Table 4.2, of all 183 respondents who were degree holder and post graduates, a total of 146 persons of them were mobile banking users, yielded an aggregated percentage of 79.78. This result suggested that typically, mobile banking users are from higher educational background. The result is consistent with previous research in Malaysia done by Sulaiman et al. (2007).

Table 4.2

Relationship between mobile banking user and education level

Education Level	Mobile banking user		Non mobile banking user		Total	
	Frequency	%	Frequency	%	Frequency	%
High School	1	50	1	50	2	100
Diploma / Certificate	8	57.14	6	42.86	14	100
Degree	111	81.62	25	18.38	136	100
Post Graduate	35	74.47	12	25.53	47	100
Professional Certificate	8	66.67	4	33.33	12	100

Table 4.3 reflected the relationship between mobile banking user and their income level. It was shown that the higher income respondents were mobile banking users, which was consistent with prior research by Sulaiman et al. (2007).

Table 4.3

Relationship between mobile banking user and income level

Income Level	Mobile banking user		Non mobile banking user		Total	
	Frequency	%	Frequency	%	Frequency	%
Less than RM2000	2	66.67	1	33.33	3	100
RM2000 - RM5000	69	75.82	22	24.18	91	100
RM5001 - RM8000	60	78.95	16	21.05	76	100
RM8001 - RM10,000	16	66.67	8	33.33	24	100
RM10,001 & above	16	94.12	1	5.88	17	100

By performing correlation analysis on the items on demographics, the result revealed that there were no significant effects of gender, age group, ethnic group and working level on the trust towards mobile banking. On the other hand, the result also

reflected that there were significant positive covariate effects of education level (r = 0.064), income level (r = 0.144), experience of using mobile banking (r = 0.364) and usage frequency (r = 0.424) towards trust on mobile banking.

Next, in order to assess the normality of distribution for the data in this study, skewness and kurtosis test are used; as suggested by Gerber and Finn (2005). The distribution result was shown in Table 4.4. The skewness statistics of the data was within the range of -0.49 to -0.274. According to Samah (2010), the skewness statistic within +1 to -1 would be considered as normal. Brown (1997) also pointed that data close to zero would be considered as normally distributed set of scores. The Kurtosis statistics for the measures fell between 0.069 and 0.993. According to Lewis-Beck et al. (2007), the Kurtosis statistic falls within the range of +2 to -2 can be considered normally distributed. Brown (1997) also mentioned that kurtosis value close to zero would be accepted as normally distributed. Therefore, it can be concluded that the data in this study have normal distribution and thus, parametric tests were used in the analysis.

Table 4.4
Normality of distribution

Measures	**Skewness**		**Kurtosis**	
	Statistics	**Std Error**	**Statistics**	**Std Error**
System Quality	-0.365	0.167	0.993	0.333
Information Quality	-0.300	0.167	0.986	0.333
Interface Design Quality	-0.313	0.167	0.804	0.333

Continue from Table 4.4				
Measures	**Skewness**		**Kurtosis**	
	Statistics	**Std Error**	**Statistics**	**Std Error**
Trust	-0.274	0.167	0.069	0.333
Usage Intention	-0.490	0.167	0.113	0.333

4.2 Analyses of Measures

In order to test on the reliability of measurements and internal consistency, Cronbach's coefficient alpha was used as suggested by Gerber and Finn (2005). According to Gerber and Finn (2005), the measures have high possible reliability at the reading of 1.0. The scales in Table 4.5 reflected that all the items for each constructs in this study have shown good reliability with Cronbach's alphas near to 1.0.

Table 4.5
Reliability result

Measures	**Cronbach's Alpha**	**Cronbach's Alpha Based on Standardized Items**	**N of Items**
System Quality	0.911	0.912	9
Information Quality	0.899	0.900	7
Interface Design Quality	0.951	0.951	7
Trust	0.936	0.938	5
Usage Intention	0.930	0.930	4

Prior to examine measures' validity using exploratory factor analysis, Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were used to assess the factorability of the respondent data. Factorability is assumed if the KMO index greater than 0.6 and Bartlett's test of sphericity is large and significant ($p<0.05$) (Ong & Coakes, 2011). The result in Table 4.6 reflected that the suitability of respondents' data for factor analysis as all measures for KMO index were greater than 0.6 and the results of Bartlett's test were significant at 0.00.

Table 4.6
KMO and Bartlett's Test result

KMO and Bartlett's Test						
		System Quality	**Information Quality**	**Interface Design Quality**	**Trust**	**Usage Intention**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.868	.803	.927	.804	.835
Bartlett's Test of Sphericity	Approx. Chi-Square	1309.601	1054.388	1456.504	1083.390	713.265
	df	36	21	21	10	6
	Sig.	.000	.000	.000	.000	.000

As shown in Table 4.7, the correlation of each constructs was greater than 0.3 indicating that the matrixes were suitable for factoring as suggested by Ong and Coakes (2011).

Table 4.7

Correlation Matrix of Constructs

Correlation Matrix						
		SQ	**IQ**	**DQ**	**T**	**UI**
Correlation	SQ	1.000				
	IQ	0.856	1.000			
	DQ	0.688	0.740	1.000		
	T	0.703	0.739	0.652	1.000	
	UI	0.569	0.556	0.541	0.625	1.000
SQ: Service Quality; IQ: Information Quality; DQ: Interface Design Quality; T: Trust; UI: Usage Intention						

For exploratory factor analysis, the principal component analysis (PCA) method was used on the five variables with VARIMAX rotation. Five factors with eigenvalue greater than 1.0 were identified, as shown in Appendix B. Convergent validity is suggested when the factor loadings exceeds 0.6 (Rao, 2006). As shown in Appendix C, all items had loadings greater than 0.6 except for two items to measure system quality and one item to measure usage intention. Nevertheless, these three items had loading greater than 0.5, which Chin et al. (1998) pointed, is acceptable.

According to Barclay et al. (1995), discriminant validity is present when variables relate more highly with their own factor than to another factor. For this research, the discriminant validity at item level was found per result shown in Appendix D. Thus, it was concluded that the conditions of both convergent and discriminant validity of the measures of this study were satisfactory met.

4.3 Testing of Hypothesis

Mediation occurs when the causal effect of independent variable on a dependent variable is transmitted by a mediator (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The next step for data analysis was to test the four proposed hypotheses. Regression analyses were performed with independent variables predicting the mediator, independent variables and mediator predicting the dependent variable, and independent variables predicting the dependent variable. This was followed by Sobel test testing the significance of mediation effect of trust, the mediator in this study.

The p value = 0.000 displayed in coefficient output result rejected the null hypothesis, $H_{0.}$ The results from regression analysis were shown in Table 4.8 and provided a good evidence of trust mediated the effects of system quality on customers' usage intention towards mobile banking, validating H1. Trust was also proven to mediate the effects of information quality on customers' usage intention towards mobile banking, supporting H2. H3 was also validated whereby trust mediated the effects of interface design quality on usage intention towards mobile banking. Finally, the coefficient of trust on customers' usage intention towards mobile banking was statistically significant, supporting H4. Figure 4.1 displayed the empirical results of testing hypothesis on proposed framework in this study.

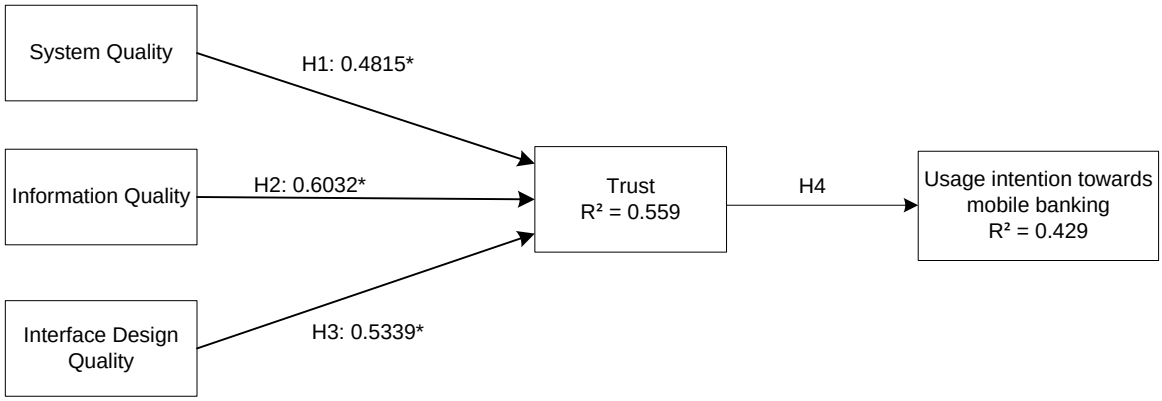
Table 4.8

Regression analysis coefficient

Hypothesis		Coefficient	t value	p value
H1	Trust mediates the effect of system quality on usage intention towards mobile banking	0.4815	5.508	p<0.001 (supported)
H2	Trust mediates the effect of information quality on usage intention towards mobile banking	0.6032	6.908	p<0.001 (supported)
H3	Trust mediates the effect of interface design quality on usage intention towards mobile banking	0.5339	6.924	p<0.001 (supported)
H4	Trust has a significant impact on usage intention towards mobile banking	0.6940	11.579	p<0.001 (supported)

Figure 4.1

Empirical results of testing hypothesis, *p<001



The mediation analysis result using Sobel test was shown in Table 4.9. The z value of Sobel test for H1, 5.21(p<0.01), H2, 6.32 (p<0.01) and H3, 6.07 (p<0.01) evidently reflected the significance of the indirect effect; validated the first three hypotheses; H1, H2 and H3. The result reflected the ratio of the indirect to the direct

effect towards the dependent variable; in this case, usage intention. The analysis also consists of measuring the extent of mediation ratio which Iacobucci et al. (2007) pointed that, a full mediation will require a ratio greater than 50%. Consequently, it was evident that trust fully mediated the effects of system quality, information quality and interface design quality on customers' usage intention towards mobile banking.

Table 4.9

Sobel test results

Mediation Analysis Results				
Measures	**Sobel, z**	**P value**	**Percentage of the total effect that is mediated**	**Ratio of the indirect to the direct effect**
System Quality	5.217947	0.000	55.269091	1.235591
Information Quality	6.320231	0.000	77.201389	3.386232
Interface Design Quality	6.070334	0.000	58.252160	1.395333

4.4 Summary of Research Results

Essentially, the empirical results have provided strong evidences for the proposed research model in this study. Firstly, system quality, information quality and interface design quality were significant factors that determine the success of mobile banking; which clearly met our first research objective.

Next, the second objective of this research is met whereby the total number of 211 respondents was divided into two different trust groups and from the results, it revealed that the percentages of respondents who have high trust and low trust level on

mobile banking. The result showed that there were slightly more than 50% of respondents were in the high trust group towards the mobile banking service. This may be due to the respondents in this study were mainly degree holder and above. As education level had positive significant effects on trust towards mobile banking, r = 0.064. Besides, among the users with mobile banking experience, the users in the high trust group, 107, doubled the number of users in low trust group, 56. It can be concluded that level of acceptance on mobile banking among the mass Malaysia population is progressing. However, the usage frequency was not high, 75 out of 211, as most of the customers used the service only at monthly or once in a few months rate. It is believed that despite the growing number to acceptance on mobile banking, internet banking is still the first choice of customers for performing online transactions and mobile banking only comes next to it when internet banking is not accessible. This result can be foreseen as all 211 participants of this study are subscribers of internet banking. Moreover, this might be due to the mobile banking services provided by the banks are not as comprehensive as the internet banking services in the country. This might also due to customers' trust towards mobile banking service is insufficient. The evidences also reflected that the education level (r = 0.064) and income level (r = 0.144), experience in mobile banking (r = 0.364) and usage frequency (r= 0.424) will impact customers' trust towards mobile banking service.

Thirdly, the result also reflected that trust played a mediator role on the effects of system quality, information quality as well as interface design quality on the customers' usage intention towards mobile banking. Consequently, H1, H2 and H3 were accepted. This has met our third research objective. This result also successfully demonstrated

the importance of trust in customers' perception if they were to use or when they are using mobile banking. It is evident that adaptability, availability, reliability, response time and usability are the key indicators of system quality that build the trust and leads to usage intention; consistent with prior literatures by Koo and Wati (2010), Gu et al. (2009), Kim et al. (2011) and Ribbink et al. (2004). Interface design is the key element to enhance the trust towards service providers and customers are willing to use an easy to use mobile banking (Li & Yeh, 2010) (Lin, 2011). Mediated by trust, it was shown that an easy to use, professionally design with appealing elements in the mobile banking site has impact on customers' usage intention towards the service. It should be also noted that, comparatively, the mediation effect of trust on information quality is significantly higher than both system and interface design qualities. The quality of information reflects the trustworthiness of the service provider (Zhou, 2011) (Wang & Pho, 2009). This shows that the complete, relevant, accurate and up to date information provided in mobile banking will significantly impact customers' trust towards the mobile banking. This trust in turn, will affect the customers' usage intention towards the service (Koo & Wati, 2010).

As suggested by Kim et al. (2011), trust is found to be the strongest determinant of customers' future usage intention. The significant direct effect of trust on customers' usage intention demonstrated by this study (H4), which ß=0.6940 at $p<0.001$, is consistent with findings in the previous literatures. Customers are willing to use the mobile banking if they trust the service (Gu et al., 2009) (Ribbink et al., 2004).

Chapter 5 Conclusion and Recommendations

5.1 Summary and Conclusion

As a summary, this research empirically examines the role of trust impacting mobile banking in Malaysia. Therefore, the findings of this study is fairly significant in reflecting the correlation between the key constructs namely system, information and interface design qualities, and the mediation role of trust on customers' usage intention towards mobile banking in Malaysia. This study has also demonstrated that each of the key success factors in the research framework has an important role in establishing customers' trust. The findings also indicated that trust plays a crucial role in customers' decision on the intention to use or continue to use the mobile banking services. Generally, these findings are consistent with previous literatures by Chung and Kwon (2009), Enos (2001), Lin (2011) and Kim et al. (2011). It can be interpreted that it is essential for customers to see the competency of the mobile banking service, to trust it; and therefore, they will feel comfortable and relieve to use the service.

The response rate for the survey is 42.2%. From the demographic statistics, there were about 77.25% of the respondents have the experience in using mobile banking, and the usage frequency is ranked at 'rarely' which is generally on monthly or once a few months basis. This might be due to customers need full fledge banking services as provided by internet banking, which mobile banking has yet to provide. Thus, internet banking is still the first option for online financial transactions compared to mobile banking, which is supported by the high penetration to population rate mentioned in chapter one. Additionally, this study also revealed that customers' education level,

income level, usage experience and frequency of use are correlated to the trust towards mobile banking.

5.2 Limitations of the Study

As all empirical research, this study has several limitations. Firstly, the penetration to population rate for mobile banking is not high, thus, the sample size in the survey was not large enough. Secondly, more than 90% of respondents are degree holder or above. As education level is correlated with customers' trust towards mobile banking, this may affect the generalization of this study. Thirdly, 90% of the data is only collected in Peninsular Malaysia, and the rest is collected from East Malaysia. Fourthly, even though the mobile network has improved tremendously on its coverage, there are still some places of the country are not having the high speed network coverage. These four factors may not be sufficient to generalize the findings in this study. Given the smart phone penetration and mobile network coverage today, mobile banking is also accessible by the residents in East Malaysia. Besides, there are only three success factors and a mediator being measured in this study. Future research may include other success factors as well as a larger sample size with larger geographical area.

5.3 Suggestions for Future Research

This study reveals that trust is relevant in mediating the inter relationships of success model for mobile banking. As customers will need to be a user of internet banking in order to use mobile banking, future research may investigate the correlations of trust transference from internet banking to mobile banking as one of the success factors

(Shan & Lu, 2009). With the presence of trust, the result from the study also shown that different quality aspects were significant to the success of mobile banking. Therefore, future research is required to extend the current research model by including other quality factors to proof the findings in this study. As this research limited the success factor outcome to customers' usage intention further research is called to verify the mediating role of trust on the customers' satisfaction as well as net benefits.

Next, with the current era's ever-changing mobile devices getting higher technical specifications and bigger screen size as well as resolution, future research may explore new success factors for mobile banking. Moreover, this study was conducted in Malaysia, where the mobile banking penetration rate is still low. Future research may research the relevance of this model in other developed countries. As suggested by Luo et al. (2010), cultural factors in developing countries like Malaysia may also affect the acceptance level of mobile banking. Thus, future research is called for to explore the role and impact of cultural factors on success of mobile banking. In addition, a larger scale of sample size with more representative sample is needed to be conducted in order to enhance the generalization of the research findings and to validate the research framework in this study.

5.4 Implications

Essentially, customers build their trust on mobile banking service based on their evaluation of the quality attributes as proven in this research. The success of mobile banking is dependent on customers' trust and the technological characteristics (Koo & Wati, 2010). The quality of mobile banking and customers' trust level affect the usage

intention on the service. All three system quality, information quality and interface design quality are important in meeting customers' demand to build and enhance the trust level.

This study provides both theoretical and practical contributions. For the theoretical contribution, this study introduced the mediating role of trust in mobile banking and validated the framework. Combining the system quality, information quality and interface design quality, the framework in this research has also provided a different insight to discover the effects on mobile banking.

From practitioners' perspective, the knowledge and practical insights gained through this research are useful for banks which aim to promote their mobile banking service and encourage customers' usage. As shown by the questionnaire results, majority of respondents used mobile banking at a monthly or once a few months. In order to encourage the usage, banks should focus on the key features that will attract customers. This study demonstrated the characteristics customers are looking for in a mobile banking service and what kind of role does trust play in this context. The findings from this study are beneficial for banks in planning their promotion strategy on mobile banking. The results from the study also implied that mobile banking providers need to be aware that customers' trust plays a very significant role in the intention of using mobile banking. Thus, apart from delivering a reliable and efficient system, banks need to pay attention on gaining customers' trust from different aspects. As indicated in the research result, the information quality has a larger effect on customers' usage intention with the presence of trust. This revealed that it is critically important for banks to deliver quality information through mobile banking. Besides, understanding the importance of

interface design quality from the findings, banks should also focus on designing and developing a user friendly system and easy to navigate, attractive interface in their mobile banking site.

Lastly, as mentioned in this study, the mobile devices and the network infrastructure are getting more advanced. It is also crucial for banks to explore how they can leverage on the advancement of these technologies in delivering a higher level of mobile banking service to their customers as well as for the purpose of continuous improvement in mobile banking.