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PREDICTORS OF ACCEPTABILITY OF DIGITAL MORTGAGE SERVICE OF UNIVERSAL BANKS IN THE PHILIPPINES: AN EMPIRICAL STUDY

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Abstract: *The transition to digitization of bank services is aimed at reducing costs, improving services, and increasing effectiveness and efficiency. This technological evolution has become a popular focus of many banks around the world. This quantitative study investigated the predictors of behavioural acceptability of bank's digital mortgage service using a sample size of 250 respondents who are either current or prospective users of digital mortgage service. The results showed that age, education, technology experience of the mortgage clients moderate the impact of the three determinants: performance expectancy, effort expectancy and social influence on clients' digital mortgage service acceptance.*

Keywords*: mortgage loan, bank mortgage digitization, digital mortgage service, behavioural intention*

Introduction

One of the major challenges that confront businesses today is the advancement of technology. In fact, the digital revolution has significantly changed the overall business environment which includes among others the banking and financial services industry. The use of technology no matter how simple it is, revolves around the idea to make things simpler, and from a more strategic point of view, the integration of technology is aimed at making the entire operations friendly to both the company and the customers. However, a lot of organizations particularly banking and financial institutions are challenged with the shift from traditional processes to digitalization.

Historically, this technological transformation has existed in different format for the past decades and has evolved extensively in the 1980s. The invasion to business has continued up to the present and in the next years to come, we will probably witness more advanced

technologies fully integrated with the end goal of cutting costs and improving operation effectiveness and efficiency. This in turn will mutually benefit the company and the customers.

The signal of increasing use of technology that changes consumer behaviour is everywhere in Asia, and more specifically in the Philippines. One of the recent changes that is shaping the banking industry is that the consumer decision process has become increasingly multichannel (Chen et al., 2014). Although each Asian country may be at different phases of evolution toward complete digital-banking readiness, Asian market consumers are already using or interested in using alternative channels to interact with banks. And this development is also observed in mortgage banking. The BusinessWorld (2018 June 26) further stated that four in ten Filipinos in the workforce are digitally savvy. Technology therefore can change the way banks do business with the convergence of internet, wireless technologies and mobile advancement.

Most banks began their digital journey years ago and have developed clear digital strategies for some specific banking services. However, the bank mortgage processes have not yet embraced a full and comprehensive digital technology. Although information technology is a major trend and force that can impact the development of the mortgage processes, to the extent of the author's knowledge and extensive literature search, no single research study on the impact and implications of mortgage digitization was done using the perspectives of mortgage clients.

The new wave of digitization inherent in banking services therefore calls for more empirical and scientific research studies to enhance understanding of the impact of technology on the mortgage industry and how this expertise and knowledge can be used to advice bank leaders and other stakeholders involved.

As to the practical contributions of this study, it has highlighted the factors that the banking industry should focus on to increase the proportion of clients that have the potential to use the digital mortgage service. In the end, all stakeholders, particularly the mortgagor and mortgagee will benefit from such decision to digitize and shorten processing time and delivery of the mortgage loan.

Furthermore, the ultimate objective of this study is to develop a model on mortgage digitization applicable to Philippine universal banks using the UTAUT model.

Research Scope

This study investigated the behavioural intentions to accept digital mortgage service from the perspective mortgage clients covering five leading universal banks in the Philippines which implement partial mortgage digitization process.

The study areas will cover five leading Universal Banks offering housing loans in the Philippines. These are BDO Unibank Inc. (BDO), Bank of the Philippine Islands (BPI), Security Bank Corp., Union Bank of the Philippines and East West Banking Corporation.

These selected banks belong to the Top 15 universal banks ranked by the Bangko Sentral ng Pilipinas (BSP) according to their total assets as of March 31, 2018. The rankings and assets are as follows: BDO ranked as number one with a total asset of P 2,556,307.23; BPI ranked as

number three with a total asset of P1, 649,267.36; Security Bank ranked as number six with a total asset of P703, 319.61; Union Bank of the Philippines ranked as number nine with a total asset of P 547, 357.25; and East West Banking Corporation ranked as number twelve with a total asset of P301, 766.13.

Related Literature

Age

There has been a vast literature that concludes that elderly people are often more indisposed to embrace the use of a specific (Morris & Venkatesh, 2000; Venkatesh et al, 2003; Czaja et al, 2006; Yao & Murphy, 2007.

Furthermore, Chung et al. (2010) found that age has direct and moderating effects on behavioral intention, adoption and acceptance of technology. The same findings were corroborated by Venkatesh et al. (2003) which revealed that age was a moderator to his UTAUT model. Additionally, Morris and Venkatesh (2000) established similar moderating effects of age in their study.

Gender

Gender has an important role to play in predicting usage behavior (Tarhini et al., 2014). The study of Venkatesh et al. (2003) revealed that women's intention to adopt and use a system is highly affected by effort expectancy to adopt and use a system than men.

Technology Experience

It has been empirically proven that technology experience is said to be more statistically significant for expert users compared to novice users with respect to the relationship between behavioral intention and usage (Venkatesh et al., 2004).

Banking

Mortgage bank system is a formal method of housing finance which is largely used by developed countries. In this system, a specialized institution called the mortgage bank grants loans to house buyers and funds these loans by selling the securities that they issue in the capital markets. This system requires well-functioning capital markets. The securities are the liabilities of the mortgage bank and the main purchasers of the securities are the financial institutions with long term sources of funds (Çobandağ, 2010).

An efficient housing finance system has significant importance both in meeting the housing needs of individuals and in reinforcing the development of the construction, finance and other related sectors of an economy. Today, developed countries have advanced housing finance systems in which funds flow from savers to home-buyers by the mortgage markets. On the other hand, despite its recognized economic and social importance, housing finance often remains under-developed in developing countries mainly due to the lack of macroeconomic stability.

Online Banking

Mortgage players have traditionally had difficulty harnessing accurate data for insightful management. The mortgage value chain is fragmented, making it extremely difficult to string together a holistic picture of costs, profits and risks associated with a particular customer or loan. Company infrastructures are massive and complex due to mergers of companies whose

unions were inconceivable to many until the deals closed. The principal, period and attention required to construct the infrastructure for fact-based results nearly always falls victim to the industry business cycle as financiers are always too busy seizing volume or cutting costs.

Fortunately, technology is now able to meet the business need for more accurate data, and rapidly accelerating speed-to-market on large-scale data management projects. A host of tools and data management strategies have evolved. Similarly, positioned industries are deploying them with alacrity to capture an enterprise view of information (Nyffeler & Kurt, 2014).

The cost-adequacy of tasks on the Web empowers money related administration firms to utilize Web innovation to supplant or generously diminish the requirement for individual cooperation in the arrangement of their administrations. Online banking is characterized as access to the managing an account procedure by means of an Internet entrance established by a physical bank, through which clients can use services as savings facilities, money administrations, and investment. Thusly, banks that utilize their sites just to unveil data, and don't offer any web based online banking, are barred from the money saving benefits of virtual interactions.

Mortgage Loan

Mortgage decisions have important consequences for consumers, lenders, and the state of the economy. Mortgage decisions are also prototypical of consumer financial choices that involve a stream of expenditures and consumption occurring across time (Atlas, Johnson & Payne, 2017).

Today, developed countries have advanced housing finance systems in which funds flow from people with fund surpluses to the ones that are in need of them by the aid of mortgage markets. On the other hand, despite its recognized economic and social importance, housing finance often remains (Çobandağ, 2010).

Banks the world over have been continuously deregulated; fiscal arrangements have experienced changes from an attention on the cash supply to an emphasis on loan costs; money related frameworks have been subjected to a scope of developments and the monetary condition of numerous countries has changed after the development of emerging countries, for example, China and India (Lim, Tsiaplias, & Chua, 2013).

Digitalization

The future of banking is digital. It is not just about digitizing loan applications to speed up the approval process. Transitioning from legacy systems at individual bank branches to one digital system spanning the entire organization has proven especially difficult Fister Gale (2015).

The mortgage lending industry is still largely powered by technology that was first introduced before the 2000 dot-com bubble. Even though 90% of prospective homebuyers search online as they look for a place to call their own, less than 10% of lenders offer a complete digital mortgage experience from application to closing (Chan & Hoyles, 2016). Online business modes offered by organizations should be integrally strengthened by cooperation with benefit agent outside the Web domain, and administrations directed at the physical branches of firms will at present affect online clients.

Acceptability of Digital Mortgage Service

According to the Connecting with Borrowers Online study, a whopping 92 percent of recent mortgage borrowers did online research before even speaking to a lender. This is an increase of 35% as compared to just 57 percent of borrowers who did online research 5 to 10 years ago.

The study also found that 72 percent of all borrowers researched where to find the best rate, while another 59 percent researched their loan options and how much cash they qualified for.

Additionally, a research conducted by The Annual Borrower Insights Survey from Ellie Mae® (NYSE: ELLI) found that nearly two-thirds of Americans expect to be able to apply for a mortgage and complete the application online.

Methodology

This study adapted the UTAT model as the theoretical foundation which was evaluated using a sequence of quantitative data and analysis. A self-made survey questionnaire was used to gather data from 250 mortgage clients who are either current or prospective users of digital mortgage service. The survey questionnaire was subjected to validity and reliability tests and results have shown that the Cronbach α coefficients for all scales that were used in the questionnaire have values greater than 0.7 which are acceptable for conducting research.

The survey method was used to gather the quantitative information of this research because a survey is an efficient way to collect information about a large group of people. The survey is a flexible data gathering tool, standardized and easy to administer and can be tailored exactly to the phenomenon being studied (Collie & Rine, 2009). A survey design provided a quantitative description of the perceptions of the population by studying a sample of that population (Creswell, 2013).

The survey was administered based on the schedule set by the participating mortgage clients. The survey with mortgage clients was conducted from January to March 2019. Retrieval of the survey questionnaires was done immediately to avoid misplacement. All of the completed surveys were organized, tabulated and encoded into the computer for statistical analysis.

Convenience sampling was used to select the 250 existing and previous mortgage clients of the five selected universal banks formed the first group of respondents. The mortgage clients were assumed to be the potential users of the bank's digital mortgage service. These mortgage clients were existing and previous customers of the selected banks.

Research Framework and Hypothesis

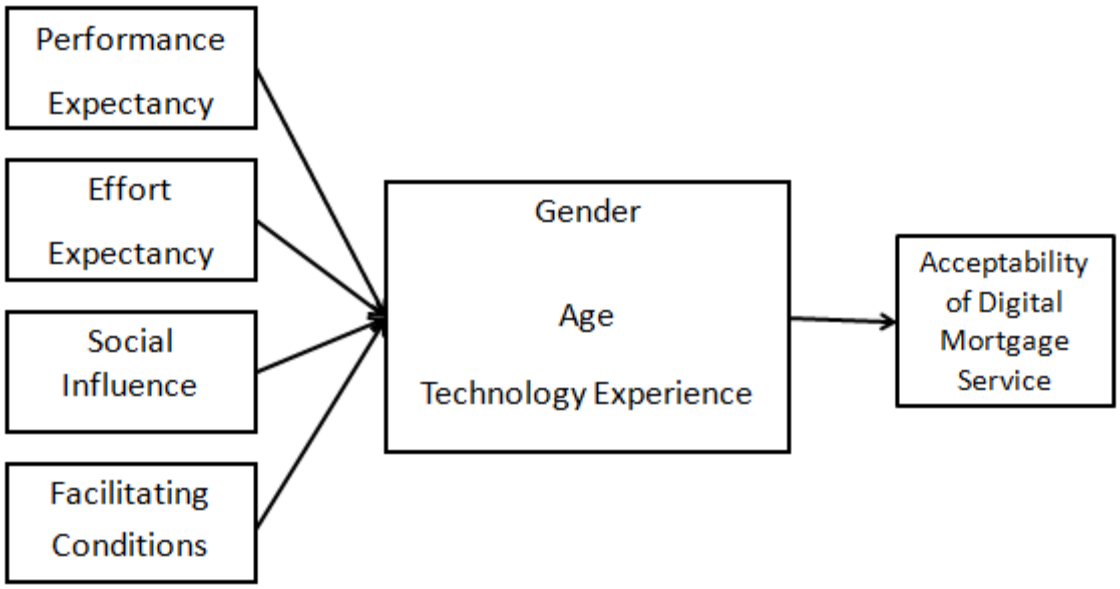

Figure 1: Research Framework

Figure 1 shows the four independent variables adapted from UTAUT model such as: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions while the dependent variable is the acceptability of the bank's digital mortgage service. On the other hand, gender, age, and technology experience are the moderating variables.

The conceptual framework of the study was heavily grounded on UTAUT model of Venkatesh et al. (2003). The Unified Theory of Acceptance and Use of Technology (UTAUT Model) is a synthesized conceptual model of technology use that contains four constructs that affect behavioural intention towards system use (Venkatesh et al., 2003). These four constructs are the four independent variables of the study.

Performance expectancy is the degree to which an individual believes that using a particular system would improve his or her job performance (Venkatesh et al., 2003). In this study, this is defined as the degree to which bank's mortgage clients believe that digitization of mortgage service will assist them in improving the mortgage service and processes.

Effort expectancy is the degree of ease associated with the use of the system (Venkatesh et al., 2003). In this study, this refers to the amount of effort the mortgage clients must expend for the use of the bank's digital mortgage service.

Social influence is the degree to which an individual perceives that others believe he or she should use a particular system (Venkatesh et al., 2003). In this study, this is the construct that refers to the degree to which the respondent perceives that important others believe they should use the bank's digital mortgage service. This construct is based upon the idea that the

respondents' behaviour is influenced by the way in which they believe others will see them as a result of their using the bank's digital mortgage service.

Facilitating conditions is the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. In this study, this is the mortgage client's belief that the bank has organizational support and technical infrastructure for full adoption of digital mortgage service.

Hypothesis

It is hypothesized that:

H1: Gender, age and technology experience affect behavioural intention of the respondents to accept digital mortgage service.

Results and Discussion

The results showed that age, education, technology experience of the mortgage clients moderate the impact of the three determinants: performance expectancy, effort expectancy and social influence on clients' digital mortgage service acceptance.

Table 1 presents the mortgage clients profile which are used as the moderating variables for this study. Overall, the sample was identified as either male or female composed of individuals over 40 years old with college degree.

A relatively equal gender distribution of mortgage clients participated in the surveys with males slightly higher (n = 126, 50.4%) than females (n = 124, 49.6%). The age distribution showed that most of them belonged to the oldest age groups of 51 years and older (n = 89, 35.6%) and 41 to 50 years (n = 83, 33.2%), respectively. Only few respondents belonged to 31 – 40 age group (n = 43, 17.2%) and 21 - 30 age group (n = 35, 14%). Majority of the respondents were college graduates (n = 171, 68.4%). The remaining respondents completed high school (n = 41, 16.4%), had post-graduate degree (n = 34, 13.6%) and had high school education or lower (n = 4, 1.6%), respectively. Data indicate that a typical bank mortgage client could either be female or male, more than 40 years of age with a college degree.

Table 1*:* Profile of the mortgage-client respondents

	Profile	**Frequency (n=250)**	**Percent (%)**
Gender	Male	126	50.4
	female	124	49.6
Age (in years)	21- 30	35	14.0
	31-40	43	17.2
	41- 50	83	33.2
	51 or older	89	35.6
Education	High school or below	4.0	1.6
	HS Diploma	41	16.4
	College / Bachelor's degree	171	68.4
	Post-graduate degree	34	13.6

The impact of age, education and technology experience to PE

This section used stepwise regression to determine the effect of moderating variables gender, age, education and technology experience) on performance expectancy, effort expectancy and social influence of the bank's digital mortgage service acceptance. The demographic profile (age, gender and education) was measured using binary code (1, 0). Technology experience was represented in scale metric. Initial ordinary least square (OLS) regression showed that some of the indicators were multicollinear to each other. The stepwise regression was used to remedy the violation in multicollinearity.

Table 2 shows the results of stepwise regression on the impact of age, gender and technology experience on PE. The results showed that internet knowledge, purchase of product via mobile device, and age group (41 – 50 years old) positively affect PE at 5% level of significance. This implied that respondents with internet knowledge, purchased product through mobile device and 41 – 50 years old have higher performance expectancy. The negative effect of education signified that respondents with less educational background (below high school) have lower performance expectancy of accepting bank's digital mortgage service. The above results showed that higher performance expectancy (convenience, economy (time saving), speed, and usefulness of digital mortgage service when doing bank transaction) in accepting digital mortgage service could be observed in older respondents (41 – 50 years old), literate in internet, purchase product via mobile device and at least high school graduate.

Table 2: The impact of age, gender and technology experience to performance expectancy

	Unstandardized Coefficients B	Standardized Coefficients Beta	Sig.
(Constant)	2.421		.001
internet knowledge	.164	.200	.002
purchase product via mobile device	.285	.182	.005
1 = 41 - 50 yrs old, 0 = 51 & older	.228	.158	.006
1 = diploma, 0 = HS & below	-.457	-.249	.001

a. Dependent Variable: performance expectancy

The significance of the predictors was proven by the rejection of the null (Ho) hypothesis that "There is no significant influence of the predictors (age, gender, education and technology experience) to performance expectancy" at 5% level of significance. That means, four (4) predictors of performance expectancy as represented by the b-coefficients were found to be significant at 5% level ($\rho < 0.05$). The stepwise regression corrected the incidence of multicollinearity or redundancy of the predictors in the multiple regression.

Table 3 shows the model summary and ANOVA for performance expectancy. The combined relationship of influence of predictors to performance expectancy showed a 49.5% relationship. The adjusted R-square signifies that the predictors have explained 23.2% of the variation in performance expectancy. The ANOVA, as explained by the F-value of 19.83, represents that more than 10% has been explained by the determinants of performance expectancy at a significant level of 0.001. Thus, the stepwise regression model was accepted and an appropriate estimate of performance expectancy.

Table 3: Model summary and ANOVA for performance expectancy

Model Summary					
R	R Square	Adjusted R Square			
.495	.245	.232			
ANOVA[a]					
Regression	28.291	4	7.073	19.828	0.001
Residual	87.393	245	.357		
Total	115.684	249			

The impact of age, education and technology experience to EE

Table 4 shows the effects of technology experience and demographic profile to effort expectancy. Higher effort expectancy (easiness of learning, comprehensiveness, skills development, and easiness of accomplishing mortgage loan) was observed in older age respondents (41 – 50 years old), with frequent purchase of product through mobile device, and high internet literacy. Lesser effort expectancy was detected in respondents with below high school level of education and lesser internet experience. Thus, effort expectancy could be seen in old age respondents, with internet literacy, and frequent purchase of product through mobile device.

Table 4: The impact of age, gender and technology experience to effort expectancy

	Unstandardized Coefficients B	Standardized Coefficients Beta	Sig.
(Constant)	3.030		.001
purchase product via mobile device	.394	.254	.001
internet knowledge	.206	.254	.001
1 = 41 – 50 yrs old, 0 = 51 & older	.220	.154	.006
internet time	-.226	-.178	.005
1 = diploma, 0 = HS & below	-.413	-.227	.001

Dependent Variable: effort expectancy

The significance of the predictors was proven by the rejection of the null (Ho) hypothesis that "There is no significant influence of the predictors (age, gender, education and technology experience) to effort expectancy" at 5% level of significance. That means, four (4) predictors of effort expectancy as represented by the b-coefficients were found to be significant at 5% level ($\rho < 0.05$). The stepwise regression corrected the incidence of multicollinearity or redundancy of the predictors in the multiple regression.

Table 5 shows the model summary and ANOVA for effort expectancy. The combined relationship of influence of predictors to effort expectancy showed a 53.1% relationship. The adjusted R-square signifies that the predictors have explained 26.7% of the variation in effort expectancy. The ANOVA, as explained by the F-value of 19.14, represents that more than 10% has been explained by the determinants of effort expectancy at a significant level of 0.001. Thus, the stepwise regression model was accepted as an appropriate estimate of effort expectancy

Table 5: Model summary and ANOVA for effort expectancy

Model Summary					
R	R Square	Adjusted R Square			
.531[e]	.282	.267			
ANOVA[a]					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	31.912	5	6.382	19.143	0.001
Residual	81.352	244	.333		
Total	113.264	249			

The impact of age, education and technology experience to SI

Table 6 shows the impacts of technology experience and demographic profile to social influence. Higher social influence (people's encouragement to a respondent in using bank's digital mortgage service whenever available) was observed in respondents with higher internet knowledge and frequent purchaser of product through mobile device. While, respondents with lower social influence have lesser internet time, lower educational attainment (below high school level) and above 51 years old. The results indicated that higher social influence could be seen in younger and middle age respondents (21 – 40 years old), with more internet time, internet literate, and frequent purchaser of product through mobile device.

Table 6: The impact of age, gender and technology experience to social influence

	Unstandardized Coefficients B	Standardized Coefficients Beta	Sig.
(Constant)	3.697		.001
internet knowledge	.275	.276	.001
purchase product via mobile device	.400	.210	.001
1 = 31 - 40 yrs old, 0 = 51 & older	-.307	-.140	.007
1 = 21 - 30yrs old, 0 = 51 & older	-.482	-.202	.001
internet time	-.451	-.289	.001
1 = diploma, 0 = HS & below	-.744	-.333	.001

Dependent Variable: social influence

The significance of the predictors was proven by the rejection of the null (Ho) hypothesis that "There is no significant influence of the predictors (age, gender, education and technology experience) to social influence" at 5% level of significance. That means, six (6) predictors of social influence as represented by the b-coefficients were found to be significant at 5% level ($\rho < 0.05$). The stepwise regression corrected the incidence of multicollinearity or redundancy of the predictors in the multiple regression.

Table 7 shows that results reject the null (Ho) hypothesis that "There is no significant influence of the determinants (performance expectancy, effort expectancy, social influence and facilitating conditions) to behavioural intention" at 5% level of significance. That means,

three (3) of the four (4) factors of behavioural intention as represented by the b-coefficients were found to be significant at 5% level ($\rho < 0.05$). The variance inflation factor (vif< 5) indicated that no violation on multicollinearity or redundancy of the factors of behavioural intention were committed in the multiple regression.

Table 7: Determinants of Acceptability of Digital Mortgage

	Unstandardized Coefficients B	Standardized Coefficients Beta	Sig.	VIF
(Constant)	.011		.926	
performance expectancy	.400	.393	.001	3.061
effort expectancy	.150	.145	.010	3.089
social influence	.021	.025	.575	2.030
facilitating condition	.425	.400	.001	2.289

Dependent Variable: behavioural intention

Conclusion

The results of this study revealed that:

The results showed that internet knowledge, purchase of product via mobile device, and age group (41 – 50 years old) positively affect PE at 5% level of significance. This implied that respondents with internet knowledge, purchased product through mobile device and 41 – 50 years old have higher performance expectancy.

The negative effect of education signified that respondents with less educational background (below high school) have lower performance expectancy of accepting bank's digital mortgage service.

Higher effort expectancy (easiness of learning, comprehensiveness, skills development, and easiness of accomplishing mortgage loan) was observed in older age respondents (41 – 50 years old), with frequent purchase of product through mobile device, and high internet literacy.

The results of the study indicated that higher social influence could be seen in younger and middle age respondents (21 – 40 years old), with more internet time, internet literate, and frequent purchaser of product through mobile device.

The results of regression showed that performance expectancy, effort expectancy and facilitating conditions influence acceptability of digital mortgage at 5% level of significance.

Considering the results of this study, it is therefore incumbent upon banks in the Philippines to consider age, gender, and technology experience of their clients since the study revealed that these variables moderately influence the acceptability of digital mortgage service.

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