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Factors affecting the acceptance of gamification application in e-banking

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A B S T R A C T

Gamification is a popular trend that is applied in many fields such as marketing, advertising, education, administration, and communication. In the field of electronic banking (e-banking), gamification uses the available content of businesses, exploits in many different aspects and aims at the ultimate goal of increasing sales, achieving effective marketing. The objective of this paper is to study the factors affecting the adoption of gamification in the field of e-banking. Based on the Technology Acceptance Model (TAM), through a survey of 193 managers, bankers and customers, gamification application has had a positive impact on the acceptance of this new trend in e-banking. The research results show that: ease of use, usefulness, enjoyment, and convenience have an effect on acceptance of gamification. It also shows that clients can manage their investments and buy more mutual funds, thus increasing their chances of winning the game.

1. Introduction

Digital transformation is a common orientation in all socio-economic activities, which forces the activities of businesses, including banks, to adapt to the new technological environment, as well as to increase the competition with other competitors in the system. In addition, the change in user behavior and domination of technology has promoted the development of applications including gamification. Applied video games, also known as gamification for short (Gamification). English: Gamification) is a term for a new management trend that allows businesses and companies to bring real-life work applications into a game to help people learn, research, and play to increase work productivity. Nick Pelling, a British computer programmer, invented the term “Gamification” in 2002 but it only became widely used in 2010. Sebastian (2011) defined gamification as, “The use of device game design elements in a non-game context”. Seaborn & Fels (2015) stated that “it's a behavioral approach to foster consumer enthusiasm, interaction and non-gaming fun, over computer-mediated installation with real workgroup Early experiments confirm its potential for beneficial effects in a number of contexts”. Kim (2015), gamification is the process of thinking games and game mechanics to engage users and solve problems. In recent years, Gamification (gamification) has been seen as a bright spot in the communication plan of many fields and the financial - banking industry is no exception. Jain et al. (2020) argued that creating the correct game strategies will help cooperative banks retain customers and acquire customers. This is the ideal wire to connect businesses with potential customers and at the same time significantly increase revenue for the Bank. Gamification has existed for a long time in many fields, but it was not until recently that “gamification” began to spread in the banking and financial sector. In 2020, when fintech startup Momo introduces an interactive knowledge competition called “MoMo Academy”, the new Gamification application really “blooms” in Vietnam. The application of gamification also makes it easy to collect customer data, banks will have a treasure trove of customer information for the next

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campaigns. Although the game has an impact on economic and financial efficiency, reducing costs, increasing customer loyalty and increasing the bank's competitiveness (Roncone, 2022), through which banks have the opportunity to gain exposure. Understand customers and vice versa, customers feel the closeness and friendliness of the bank's brand. The data obtained from Gamification activities help accelerate the process of improving products and services of financial institutions and banks. Although games have an impact on economic performance, reducing costs, increasing customer loyalty and bank competitiveness (Roncone & Massari 2022), there are few research topics on this topic. factors affecting the acceptance of gamification in the field of e-banking, therefore, this study was conducted with the aim of determining the factors affecting the acceptance of using games in the field of e-banking and the benefits it brings to the banking business.

2. Literature Review and Theoretical Background

2.1 Literature Review

Davis (1992) also pointed out that usefulness and enjoyment are also factors that influence the use of computer facilities to perform activities in the workplace. The development of many web applications with video game features has given way to a new trend known as Gamification. Rodrigues et al. (2013) investigated the factors that affect the adoption of gamification in the field of e-banking. Based on the TAM model, the results show that the factors: ease of use, usefulness, enjoyment, social risk are factors that affect the research problem. The success of online gaming has encouraged the development of gamification software in e-banking. To assess the factors affecting the adoption of gamification in e-banking, Rodrigues et al. (2013) developed a study to propose a model illustrating the adoption of gaming applications by bank customers. gamification of business in the context of e-banking. Online banking customers are invited to rate the importance of variables related to: sociability, ease of use, usefulness, enjoyment and intention to use the e-banking system with game features and social cues. The results show that ease of use and enjoyment are related, and both have an effect on the use of e-banking. This study presents the theoretical basis of the conceptual model and discusses two empirical studies aimed at analyzing the effect of ease of use and enjoyment on bank customers. The rapid proliferation of software with video game features has led to a trend called “Gamification”. Rodrigues et al. (2013) introduced an existing concept related to human interaction. and machines, while introducing key factors such as usefulness and eye-catching design, ease of use, and sociality that influence the use of game features in e-banking. This makes customers more loyal and use more electronic channels in their banking interactions.

Findings in a study by Rahi and Ghani (2018) on the usefulness and user-friendly interface of games, the enjoyment of using new technology leads to the adoption of services. more electronic banking tools. Users can recommend online banking to a friend or other family member. The banking system can make customers feel more comfortable when using gamification services. In order for customers to accept games, games must have usefulness, compatibility, and ease of use. use. These are also factors that influence the decision to accept new services and they will recommend to others to join (Angelina et al., 2019). Emam and Abdel Aziz (2021) has shown that ease of use, website characteristics, website information and website design have an influence on customer acceptance of gamification. Salimon et al. (2021) argued that some research has been done in the field of technology application, however, little attention has been paid to how to use games to accelerate the use of electronic banking services. Most previous studies have ignored the cultural characteristics of banking service users. Based on technology acceptance theory, this study has identified usefulness, hedonic motivation and cultural factors as factors that have a strong impact on adoption of gamification.

2.2 Theoretical Background

2.2.1 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) was developed in 1967 and extended over time since the early 1970s by Ajzen and Fishbein (1975). The TAM technology acceptance model was introduced by Davis (1989). TAM is formed on the theory of rational action TRA (Theory of Reasoned Action) described by Fishbien and Ajzen (1975) and the theory of intended behavior TPB (Theory of Planned Behavior) was proposed by Ajzen (1991). TAM is designed to determine the relationship between external variables of user acceptance of the system. This model also shows that the acceptability of an information system is determined by two basic factors, perceived usefulness and perceived ease of use. (Chauhan et al., 2021; Bitrián et al., 2021; Napitupulu et al., 2021) all use the technology acceptance model for their research on customer acceptance of new technology applications.

2.2.2 Self-determination theory

Self-Determination Theory (SDT) is one of the prominent approaches to the study of human motivation (Weiner, 1990). Extrinsic motivation arises from external interest. These sources include the rating system, the evaluation of awards and praise, and the respect or admiration of others. On the other hand, Intrinsic Motivation comes from within and is tied to the task. There are inner urges that drive us to behave in certain ways, including our core values, interests, and personal sense of morality (Deci & Ryan, 1985). Bitrián et al. (2021) argued that customers use gamification applications to be able to receive prizes and receive praise from others.

2.2.3 Electronic bank game theory

Game theory was originally developed by Von Neumann (1928), known after John Von Neumann and Oskar Morgenstern's book "The Theory of Games and Economic Behavior" in 1944. Then in 1951, John Forbes Nash improved Game Theory with a modern concept. He analyzed the importance of game theory in electronic banking and confirmed that this was applied in electronic banking, its stock exchange and bond trading app between clients and brokers or in the financial sector.

2.2.4 Theoretical Framework or Analytical Framework

Online games have become important as an e-commerce application, experts and researchers increasingly believe that it is very important to understand the behavior of online game players. To determine variables affecting customer behavior in using gamification, the authors have applied TAM theoretical model and self-determination theory, the proposed research model is as follows:

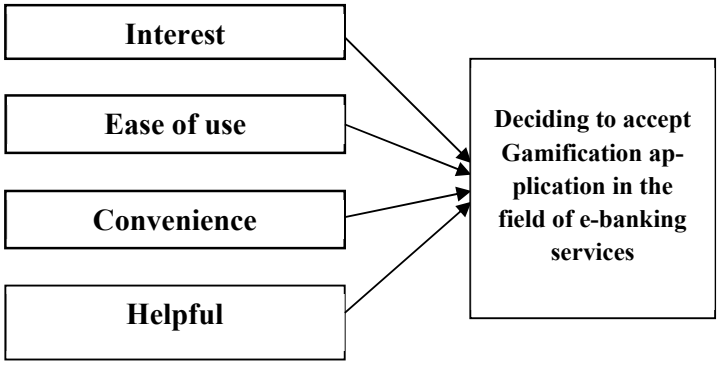

Fig. 1. Evaluation model of factors affecting the decision to accept Gamification application in the field of e-banking services

Source: Compiled by the author

Observed variables	Amount	Encode	Explain	Source
(Interest)	4	INT	This is a fun game	Rodrigues et al. (2013), Davis (1992), Rahi & Abd. Ghani (2019), Salimon et al. (2021)
(Ease of Use)	5	USE	Complete the game without too much effort	Angelina et al. (2019), Rodrigues et al. (2013), Emam (2021)
(Convenience)	4	CON	It can be installed and used at any time	Emam & Abdel Aziz (2021), Angelina et al. (2019), Rahi & Abd. Ghani (2019).
(Helpful)	4	HELP	Make more transactions	Emam & Abdel Aziz (2021), Davis (1992), Rodrigues et al (2013)

Source: Compiled by the author

2.3 Research Methods

According to Creswell et al. (2003), there are three research methods commonly used in scientific research: qualitative research, quantitative research and mixed research. To solve the set objectives, the team used both qualitative and quantitative methods to conduct the analysis. Quantitative research is used to test the scale and theoretical research model. The questionnaire here is a detailed questionnaire and the questions are mostly closed questions with responses measured on a clear scale level. The questionnaire consists of two main parts: the body of the question and the part of personal information. The object of data collection for the research is the customers of commercial banks. The tool used to process data in quantitative research is analysis using IBM SPSS Statistics 20 software. Based on the research objectives, survey and research model of proposed factors affecting the decision to accept Gamification application in the field of e-banking services, on the basis of the presented background theory. Above, the research hypotheses are defined as follows:

Hypothesis H_1: *Interest has a positive influence on the decision to accept Gamification applications in the field of e-banking services.*
Hypothesis H_2: *Ease of use has a positive influence on the decision to accept Gamification applications in the field of e-banking services.*
Hypothesis H_3: *Convenience has a positive influence on the decision to accept Gamification applications in the field of e-banking services.*
Hypothesis H_4: *Utility has a positive influence on the decision to accept Gamification applications in the field of e-banking services.*

On the basis of the influencing factors discovered during the research period, the survey questionnaire was deployed to the

identified survey subjects in the form of direct communication to the managers and employees of the Bank. customers, individual customers in Da Nang city. After distributing 200 questionnaires, 197 paper questionnaires were collected. In the returned questionnaires, there are 4 invalid tables (missing important information). Therefore, our group has eliminated these 4 questionnaires, the remaining number of questionnaires used for data processing and analysis is 193 questionnaires. The data used in the research of the topic is the data obtained directly from the survey tables that have been cleaned to eliminate the incomplete or unsatisfactory survey responses.

3. Results and Discussion

About gender

The results show that out of a total of 193 survey samples, there are 122 female customers, accounting for 63.2%, and 71 male customers, accounting for 36.8% of the total.

About age

The results show that out of a total of 193 samples, there are couples aged 18-25 accounted for 5.3%, those aged 25-40 accounted for 39.3%, those aged 40-60 accounted for 37.2% and finally Age over 60 accounts for 18.2%.

About the level of education

The results show that out of a total of 193 survey samples, at commercial banks in Da Nang city, 1.1% of customers have a high school degree, 61.4% and 36.5% of customers have a college degree. university, 1.1% of customers have a graduate degree. This part should have discussion on analytical interpretation and new findings. The authors should identify the relation of new findings with previous studies.

Scale test results

Preliminary assessment of the reliability of the scale by Cronbach's Alpha analysis

Table 1
Results of reliability analysis and factor analysis

Cronbach's Alpha	N of Items
.875	17

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
INT1	53.35	48.665	.472	.869
INT2	53.33	48.815	.441	.870
INT3	53.27	49.065	.453	.870
INT4	53.37	49.296	.398	.872
USE1	53.25	49.732	.378	.872
USE2	53.20	49.013	.429	.871
USE3	53.20	48.902	.452	.870
USE4	53.23	47.594	.522	.867
USE5	53.23	47.594	.522	.867
CON1	53.23	47.232	.606	.863
CON2	53.19	49.093	.442	.870
CON3	53.23	48.680	.498	.868
CON4	53.28	49.101	.451	.870
HELP1	53.31	46.328	.619	.863
HELP2	53.25	46.240	.627	.862
HELP3	53.30	46.709	.603	.863
HELP4	53.23	47.232	.606	.863

Source: Compiled by the author

The scale includes four groups of observed variables, all have Cronbach's Alpha reliability coefficient > 0.6, the total correlation coefficient is greater than 0.3, Through the analysis of Cronbach Alpha test for the scales. The sum of all the scales is of good quality.

Exploratory factor analysis

Table 2
Test of the appropriateness of the method and collected data (KMO and Bartlett's Test)

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.800
Bartlett's Test of Sphericity	Approx. Chi-Square	4250.315
	Df	171
	Sig.	.000

Source: Compiled by the author

KMO coefficient = 0.800, satisfying the condition: 0.5 < KMO < 1, exploratory factor analysis is suitable for real data.

Correlation test of observed variables in representative measure

Bartlett test has Sig = 0.00 < 0.05, which means that the representative factor and observed variables are linearly correlated. The Cumulative column shows that the extracted variance value is 69,052 %, which means that the observed variables explain 69,052 % of the variation of the factors, and the results show that the factors have Eigen values greater than 1. Thus, after conducting Cronbach Alpha reliability test and EFA exploratory factor analysis, the 17 initially observed variables were grouped into 4 factors and these 4 factors did not change much compared to the model. original proposed study. The results of the EFA model for the same group of dependent variables also give consistent results.

Regression analysis

According to the Rotation Factor Matrix, the model has formed 4 new factors (Component). Summarize each new factor (scale): USE, CON, INT, HELP. The new factor is different from the original hypothetical scale, rebuilding a new scale with 4 groups and 17 new factors as follows:

USE factor: Ease of Use consists of 5 observations.
INT factor: Interest includes 5 observations.
CON factor: Convenience includes 4 observations.
HELP factor: Helpful includes 3 observations.

The factors that really affect the decision to accept Gamification application in the field of e-banking services are shown by the linear regression equation:

$$DEC = B0 + B1* USE + B2* INT + B3*CON + B4*HELP$$

Table 3
Explanatory level of the model

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.753[a]	.567	.558	.66503071	.567	61.532	4	188	.000	2.152

a. Predictors: (Constant), HELP, INT, CON, USE
b. Dependent Variable: DECISION
c. Predictors: (Constant), HELP, CON, INT, USE
d. Predictors: (Constant), HELP, USE, INT, CON
e. Predictors: (Constant), HELP, CON, USE, INT
f. Predictors: (Constant), HELP, INT, USE, CON
g. Predictors: (Constant), HELP, USE, CON, INT

Source: Compiled by the author

The model results have $R^2 = 0.567$ and adjusted R^2 is 0.558. That is, the relevance of the model is 56.7% or in other words 56.7% is the variation of the degree of influence on the decision to accept the application which is explained by 4 influencing factors, and 43 .3% is explained by variables outside the model that have not been mentioned.

Table 4
The fit of the model

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	108.854	4	27.214	61.532	.000[b]
	Residual	83.146	188	.442		
	Total	192.000	192			

a. Dependent Variable: DECISION
b. Predictors: (Constant), HELP, INT, CON, USE
c. Predictors: (Constant), HELP, CON, INT, USE
d. Predictors: (Constant), HELP, USE, INT, CON
e. Predictors: (Constant), HELP, CON, USE, INT
f. Predictors: (Constant), HELP, INT, USE, CON
g. Predictors: (Constant), HELP, USE, CON, INT

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.222	.048		.000	1.000
	USE	.238	.048	.238	4.968	.000
	CON	.292	.048	.292	6.076	.000
	INT	.309	.048	.309	6.430	.000
	HELP	.574	.048	.574	11.966	.000

a. Dependent Variable: DECISION

Source: Compiled by the author

As a result, Sig. < 0.01, it can be concluded that the model is consistent with the actual data. In other words, the independent variables are linearly correlated with the dependent variable with 99% confidence level.

Testing for violation of necessary assumptions in linear regression

The linear regression model by Enter method is performed with some assumptions, and the model is only really meaningful when these assumptions are guaranteed. Therefore, to ensure the reliability of the model, the study also has to evaluate the violation of necessary assumptions in linear regression.

From the results of the Durbin-Watson index, we have $1 < d = 2,152 < 3$ so we can conclude that the residuals are independent of each other and the independence of the residuals is guaranteed. (Trong & Ngoc, 2008).

Finally, we will consider the multicollinearity violation of the model. In the correlation coefficient analysis above, we have seen that between the dependent variable there is a fairly clear correlation with the independent variables, but we also see that there is also a correlation between the independent variables. This will create the possibility of multicollinearity of the model. Therefore, we have to detect multicollinearity by calculating the acceptability of the variable (Tolerance) and the variance inflation factor (VIF). Thus, the linear regression model built according to the above equation does not violate the necessary assumptions in linear regression.

Based on the results of the above table, ANOVA has Sig = 0.000 < 0.05, so we reject the H0 hypothesis and accept the H1 hypothesis. That is, the model exists.

In other words, at 5% significance level, it can be concluded that the decision to choose a savings bank of an individual customer is influenced by at least 1 of the remaining 5 factors:

The regression results show that the Durbin-Watson Statistics is 2.152. Thus, the model exists and with d = 2.152, it can be concluded that the model does not exist negative or positive autocorrelation.

DEC = 0.238 USE + 0.292* INT + 0.309*CON + 0.574*HELP*

4. Conclusions and Policy Implications

The results of this study have shown 4 groups of factors affecting the decision to accept Gamification application in the field of e-banking services, and also assess the importance of these factors. This is also the basis for commercial banks to come up with measures to attract customers to use their services. Based on the above research results, the authors make some recommendations to help banks come to the decision to accept Gamification application in the field of e-banking services, increase customer base, bring develop appropriate sales policies to increase the competitiveness of banks in the field.

Improve service quality to create enjoyment for customers: In addition to expanding the banking network, increasing investment in physical and technical facilities, developing many utility products to attract customers; banks are constantly trying to improve products, improve customer care and service quality, especially e-banking products. Products and services are the factors that affect customers' choice of banks. Therefore, improving aspects related to retail products and services that banks provide to customers, including product variety, simplifying procedures, saving time, and having different preferential policies depending on each customer is one of the issues that should be prioritized by banks.

Increase safety and ease of use for customers when making transactions and interacting: Banks need to build support channels to help customers easily use smart services, tools and utilities through gamification of transactions so that customers can easily access them anytime, anywhere such as at the counter. account balance confirmation service), Internet Banking channel (for customers registered to use iPay service) or automatic answering switchboard channel (TPIN, customers must also protect themselves to ensure the safety of their customers). when doing transactions through the implementation of the bank's recommendations.

Increase convenience for customers when making transactions: The bank needs to provide a solution for customers that should prioritize transactions in the form of electronic transactions, and participate in the gamification utilities that the bank issues. Along with that, banks need to expand their network by increasing the number of transaction points, banks also invest a lot in renovating the transaction space of existing branches, providing a spacious transaction space. page, spacious, creating maximum comfort for customers. At the same time, banks have also promoted digital banking and have gradually asserted themselves with recognition from international organizations. On the digital banking platform, customers can easily perform hundreds of services, from paying electricity, water, telecommunications, monthly insurance bills to fast money transfer within 5 minutes for bank accounts. other goods.

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