TAM3 MODEL: LEARNING ABOUT DIGITAL PAYMENT SYSTEMS IN "FINTECH" ACCEPTANCE

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Abstract

Although there are advances in the Technology Acceptance Model (TAM3), there is a need to measure the perception and behavioral attitude in the technology use or there is a lack of knowledge regarding the Fintech acceptance approach regarding ease of use as key external variable of the model. The purpose of this study was according to their socioeconomic stratum and gender, if they consider that learning in relation to the different digital payment systems facilitates their use. 370 graduate students at a private university participated, who completed the online instrument "Fintech acceptance regarding ease of use as a key external variable of the TAM3 model". The results show that there is a high percentage that are agree that learning in relation to payment systems, the analysis of Variance ANOVA showed that the effects help to identify the important factors that influence the perception regarding facilitation of the use of the digital payment system and provides information on the relationships between these variables. It is concluded that among certain factors and categories of the TAM3 Model, where the factors are relevant in the acceptance of digital payment systems in the context of Fintech, such as the reputation of the provider, previous experiences, time reduction and lack of physical presence when designing strategies.

Keywords*: Technology acceptance model "TAM3", digital payment systems, fintech.*

INTRODUCTION

In the past, technologically enabled financial innovation such as the introduction of Automated Teller Machines, electronic payment systems and online banking have significantly changed the manner in which banking services are provided. (Huibers, 2021). There has been a significant change in the way people manage their finances as a result of the rapid technology advancement and the increasing digitalization of financial services, which has been understood by financial technology companies, known as Fintech, offering cutting-edge solutions ranging from automated investment management to mobile payments and online lending. FinTech provides digital payment solutions and cryptocurrency technologies to help companies, banks, and financial institutions disintermediate. Financial innovation is critical for CleanTech companies, and data-driven business models may help them contribute to a more sustainable economy. (Metawa et al., 2022). The evolution of financial technology has, in a very short time, had a noticeable impact on how to carry out financial activities and transactions with customers. (Chaudhry et al., 2022).

Indeed, Fintech has significantly changed the way in which companies interact with their customers and carry out financial transactions. This has changed the financial experience and the advantage is that financial activities are carried out in a very short time. As the adoption of Fintech technologies

continues to increase, it is essential to understand the factors that influence the acceptance and adoption of these types of services by users, who must have knowledge about finances and understand the risks and benefits of these services. To use FinTech services, the consumer must have the necessary financial literacy to assess the risks and benefits of the financial operations and the digital literacy required to perform them. (Koroleva, 2022). Technology Acceptance Model (TAM) has been widely used to analyze technology adoption, and its previous versions, TAM and TAM2, have proven effective in predicting user behavior. Technology acceptance models such as Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) have proven essential for predicting the acceptance of information technology. (Schretzlmaier et al., 2022). More and more often, technology is part of our lives. Individual skills related to the use of Information and Communication Technologies (ICT) have become a necessary condition for professional success, as well as a crucial factor in private life. (Urquidi et al., 2019).

Therefore, users look for systems that are intuitive, easy to learn and use, which greatly influences their decision to adopt or reject a new technology. Technology acceptance model (TAM) is a commonly adopted theoretical framework that is used to analyze and understand users' behaviors toward a certain technology type. (Moon et al., 2022). Likewise, the constant evolution of technology and the great importance of factors that have been generated in the adoption of Fintech services, creates the need to complement with a model that facilitates technological acceptance, this is how the research project focuses on the incorporation of the variable "ease of use" as a key external factor in the TAM Model, giving rise to the TAM3 Model.

TAM suggests that beliefs, usefulness and ease of use perceived are influenced by external variables and jointly determine the attitude towards their use. (Araiza & Pedraza, 2019). It is evident that the TAM allows us to understand a users attitude towards to technology adoption, it is necessary to consider the beliefs they have about that technology, their perception of how useful it is and their perception of how easy it is to use. For its part, TAM 3 is an extension of TAM2 and postulates that perceived ease of use is determined by some new affective variables such as enjoyment and anxiety regarding technological novelty, among others. (lobos et al., 2022).

With the arrival of Financial Technology (Fintech), that is, the way in which the financial industry uses new technologies to carry out its work, a significant disruption begins, understood as a radical change, in digital finance applied to these products and processes. (Barrera Rubaceti et al., 2021).

Likewise, the arrival of Fintech has marked a major change in the way the financial sector uses new technologies to carry out its operations, that disruption refers to a radical change or fundamental transformation in the way digital finance is applied to the different financial products and the processes that are related to this. Fintech has effectively developed its position in the global financial sector due to its good features and advantages to the industry. (Shahzad et al., 2022). This is that financial technology has been effectively consolidated due to the advantages it offers in the financial sector and the ease of use.

Up to TAM 3, self-efficacy is only used to measure its effect on perceived ease of use. Even though there have been many studies in the field of acceptance of online information technology that use self-efficacy to test not only its effect on perceived ease of use, but also perceived usefulness, trust, perceived risk, attitude, and usage intention. (Sidanti et al., 2021)

Fintech companies are not newcomers in the financial markets, and smart cities implement quite successfully the opportunities, provided by these companies. (Popova, 2021). The technological transformation of fnancial services involves changes in business models and services that have been provided earlier through a vertical relationship and are now structured on digital multi-sided platforms. (Carbó-Valverde et al., 2022), it is evident that financial services are being reorganized into digital platforms that allow interaction through technology, which has generated fundamental changes in the way financial services are accessed.

The electronic financial service, involved in all types of financial services we use today, including retail banking, insurance, security, and trading, has allowed individuals and legal entities to access information about financial products and services and to execute transactions without physical contact with financial institutes. (Albarrak and Alokley, 2021).

Therefore, the research project sought to explore how ease of use is integrated into the TAM 3 Model and its impact on the acceptance of Fintech services because in recent research on the acceptance of technology, it is proven that self-efficacy has been used to evaluate its influence in various aspects, such as perceived ease of use, perceived usefulness, trust, perceived risk, attitude and intention to use.

METHODOLOGY

A comprehensive review of existing literature was conducted, data was collected from users of Fintech services and statistical analysis and modeling techniques were applied to evaluate the validity and effectiveness of the TAM3 Model in the specific context of financial technology. Regarding the methodology used, a theoretical process was used to identify the model to be worked on in this work along with the variables to be treated and the relationships between them; By studying the variables it has and their relationship, the results obtained were validated.

The instrument was applied to a population belonging to the postgraduate degree, it was possible to identify that «PEoU ease of use» as a dependent variable along with the independent variables immersed in the original TAM3 model and the proposed variable «technological security» explains the acceptance of this financial technology by users. Before making the survey public, it was subjected to a review process using the «content validity coefficient» method, where the objectives of the research were made known to a group of experts made up of peers (teachers from different areas) and based on this, they evaluated each and every one of the questions of the instrument under five indicators such as relevance, clarity, wording, relevance and scale; The result obtained under the measurement scale of this method was 0.90, which indicated that the validity and agreement of the instrument were excellent.

The representative sample amounted to 370 respondents with a confidence level of 0.95.

Figure 1.

Formula for calculating the sample knowing the population.

$$n = \frac{N * Z_{\infty}^2 * p * q}{e^2 * (N-1) + Z_{\infty}^2 * p * q}$$

Fuente: Aguilar-Barojas (2005)

The research was based on the Technological Acceptance Model, we proceeded with the design and creation of the instrument which was validated with an ordinary least squares model because a set of control variables was included in the model that allowed the improvement of the coefficient of trustworthy goodness of the model.

RESULTS

The results of the survey are presented in relation to the factors that influence the acceptance of Fintech, starting with the general introductory questions on the topic. A questionnaire that includes multiple choice questions is provided below. Some of these questions allow for multiple responses, and in such cases, participants were asked to rate the response options on a scale of 1 to 4. On this scale, a value of 1 represents the least important option according to their perception, while a value of 4 indicates the most important option. Finally, the relationship between the factors identified in the survey and the categories of the TAM3 Model was explored, highlighting those that showed statistically significant correlations. Table 1 presents the relationship between factors and categories of the TAM3 model, showing the importance of each factor in relation to the determinants and categories of the TAM3 model, thus analyzing the factor “supplier reputation” is related to the determinant “objective usability” within of the fit category in the TAM3 model. This indicates a correlation between these variables with a 1% significance level. Additionally, the factor “negative experience” is related to the determinant “computer anxiety” within the anchoring category with a significance level of 10%. Furthermore, the “time reduction” factor is related to the “perceived enjoyment” determinant within the suitable category with a significance level of 10%. This 10% level

of significance in relation to the factors and categories of the TAM3 model indicates that there is a statistically significant correlation between the factor and the determinant within the respective category, therefore, the result is that there is a high probability that the relationship between the factor and the determinant represents a significant association, suggesting that the factor has a moderate impact on the determinant within the TAM3 model. Finally, the factor “no physical presence” is related to the determinant “perceived enjoyment” within the suitable category with a significance level of 5%, in other words, it is unlikely that the correlation between the variables has occurred solely due to chance. This level of significance suggests a strong association between the factor and the category, providing evidence to support the inclusion of the factor in the model.

Table 1. Relationship between the factors and categories of the TAM3 Model

Factor	Determinant	TAM3 Category	Significance
Supplier Reputation	Objective Usability	Adjustment	1%
Negative Experience	Computer Anxiety	Anchorage	10%
Time Reduction	Perceived Enjoyment	Adjustment	10%
No physical presence	Perceived Enjoyment	Adjusment	5%

The “supplier reputation” factor is related to the objective usability determinant” immersed in the TAM3 adjustment category; Here a correlation between the variables of 1% significance is evident. Davis (1989) Technology acceptance model “TAM3”, behavioral attitude, perceived ease of use, objective usability. Question 9 sought to have an approximation to Fintech acceptance regarding ease of use as a key external variable of the TAM3 model. Set to only respond to one option. Description of this data set, "Postgraduate university students", according to their socioeconomic level "They consider that learning in relation to the different digital payment systems facilitates their use."

Table 2 presents the results of the Bayesian ANOVA analysis, whose purpose is to compare different models and determine which one best fits the data. In this case, the table shows the comparison between different models. By this way the analysis calculates the Bayes factor (BF) for each model, which represents the strength of the evidence in favor of one model compared to another, the "P(M)" column represents the prior probability of each model, while that "P(M|data)" represents the posterior probability of each model given the observed data.

The BF(M) column shows the Bayes factor for each model compared to the null model (the model without predictors), while the BF10 column indicates the Bayes factor in favor of the alternative model compared to the null model. A BF10 greater than 1 indicates evidence in favor of the alternative model, while a BF10 less than 1 indicates evidence in favor of the null model. The % error column represents the error associated with the Bayes factor estimate. In general, Bayesian ANOVA analysis helps determine which model provides the best fit to the data based on the strength of the evidence.

Models with higher Bayes factors are considered to have stronger evidence and are more likely to be the best fitting models, therefore, according to the results in Table 2, model "P3" demonstrates the level highest resistance. This is indicated by the highest posterior probability (P(M|data)) of 0.742 and the highest Bayes factor (BF10) of 3.415 among all models.

Table 2. Bayesian ANOVA analysis.

Model Comparison					
Models	**P(M)**	**P(M|data)**	**BF_M**	**BF_{10}**	**error %**
Null model	0.200	0.217	1.110	1.000	
P3	0.200	0.742	11.499	3.415	0.006
P3 + P23	0.200	0.027	0.113	0.126	1.058
P23	0.200	0.008	0.034	0.039	0.006
P3 + P23 + P3 ✻ P23	0.200	0.005	0.020	0.022	1.809

JASP Team (2022). JASP (Version 0.16.3) [Computer software].

Table 3 shows the effects analysis, which is a statistical analysis applied to examine the impact or influence of different factors or variables on a particular result or dependent variable, helping to determine which factors have a significant effect on the outcome and to quantify the strength of these effects. For the research project, the effects analysis is performed specifically for the variable "P4" (representing the socioeconomic status of graduate students) and examines the effects of the other variables ("P3" and "P23") on the Perception of whether you know the different digital payment systems facilitates their use.

As a result, the different models that include or exclude specific variables are compared to determine which model best explains the data. The results of the analysis are presented in Table 3, where the effects of the variables "P3" and "P23" on the result variable "P4" are seen, presenting the probability of inclusion, posterior probability, Bayes factor and percentage of error for each variable.

Overall, the effects analysis helps to identify the important factors that influence the perception of graduate students regarding the facilitation of the use of the digital payment system and provides information on the relationships between these variables. For effect P3, the probability that the effect is included in the model is 0.600, while the probability that it is excluded is 0.400, likewise the probability that the effect is included in the model given the data is 0.774, while the probability of being excluded given the data is 0.226. Likewise, the Bayes factor (BFincl) for the effect is 2.286, indicating moderate evidence in favor of including the effect in the model. While for effect named "P23", the probability that the effect is included in the model is 0.600, while the probability that it is excluded is 0.400, and the probability that the effect is included in the model given the data is 0.041, while the probability of being excluded given the data is 0.959. The Bayes factor (BFincl) for the effect is 0.028, indicating anecdotal evidence against including the effect in the model.

The combined effect of "P3" and "P23" (P3 ✻ P23) has an inclusion probability of 0.200 and an exclusion probability of 0.800, and the probability that the combined effect is included in the model given the data is 0.005, while the probability of being excluded given the data is 0.995. The Bayes factor (BF10, U) for the combined effect is 0.020, indicating anecdotal evidence against including the combined effect in the model.

Table 3. Analysis of Effects - P4

Effects	P(incl)	P(excl)	P(incl|data)	P(excl|data)	BF_{incl}
P3	0.600	0.400	0.774	0.226	2.286
P23	0.600	0.400	0.041	0.959	0.028
P3 ✻ P23	0.200	0.800	0.005	0.995	0.020

JASP Team (2022). JASP (Version 0.16.3) [Computer software].

The analysis of Table 4, specifically the Post Hoc Tests, which allow to obtain results in the multiple comparison tests, being applied in the research project because a similar test indicates that there are significant differences between the groups, providing comparisons between different levels of the variable "P23" (Learning - facilitate use - Do you consider that learning in relation to the different digital payment systems facilitates their use?). This analysis includes the calculation of posterior probabilities and Bayes factors (BF10) to evaluate the strength of the evidence for each comparison. Therefore, Table 4 shows the comparisons between the different levels of "P23" (Totally disagree, Disagree, Agree, Totally agree). For each comparison, the table provides the prior probabilities, posterior probabilities, Bayes factor (BF10), and percentage error.

Table 4. Post Hoc Tests

Post Hoc Comparisons - P23					
		Prior Odds	**Posterior Odds**	$BF_{10, U}$	**error %**
Agree	Disagree	0.414	0.131	0.316	0.004
	Totally Agree	0.414	0.060	0.145	0.102
	Totally Disagree	0.414	0.105	0.253	0.021

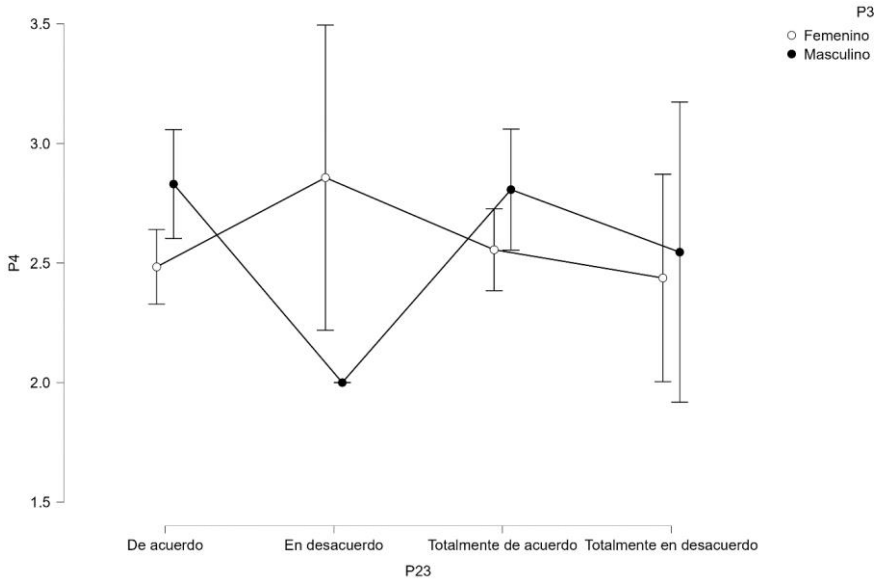
Disagree	Totally Agree	0.414	0.132	0.320	0.004
	Totally Disagree	0.414	0.153	0.369	0.003
Totally Agree	Totally Disagree	0.414	0.128	0.310	0.019

Note. The posterior odds have been corrected for multiple testing by fixing to 0.5 the prior probability that the null hypothesis holds across all comparisons (Westfall, Johnson, & Utts, 1997). Individual comparisons are based on the default t-test with a Cauchy (0, r = 1/sqrt(2)) prior. The "U" in the Bayes factor denotes that it is uncorrected.

JASP Team (2022). JASP (Version 0.16.3) [Computer software].

Figure 2 shows the description of this data set, "Postgraduate university students", according to their socioeconomic income "They consider that learning in relation to the different digital payment systems facilitates their use. The data is grouped according to their perception of learning in relation to the use of payment systems: 1) P4 – Socioeconomic stratum - (stratum 1, stratum 2, stratum 3, stratum 4, stratum 5) of university students. 2) P3 - Gender of University Students (female, male). 3) Q23 - Learning - facilitates use - Do you consider that learning in relation to the different digital payment systems facilitates their use? (Strongly disagree, disagree, agree, totally agree).

Figure 2. Descriptive graph



JASP Team (2022). JASP (Version 0.16.3) [Computer software].

CONCLUSIONS

The “supplier reputation” factor is related to the “objective usability” determinant immersed in the TAM3 adjustment category; Here a correlation between the variables of significance is evident. The study is carried out at a time when the adoption of Fintech services is increasing and competition in this sector is becoming stronger, as it is used in a diversity of services created to satisfy the needs and requirements of the people regarding their financial uses.

Due to the advancement in technology and financial innovations, financial technology or Fintech is the technology or innovation applied to financial transactions in various forms to meet the needs of people. (Phimolsathien, 2021). Understanding the factors that influence the acceptance of these services is essential for Fintech companies seeking to gain market share and for researchers interested in advancing the theory of technology adoption. It is identified that «PEoU ease of use» as a dependent variable together with the independent variables immersed in the original TAM3

model and the proposed variable "technological security" explain the acceptance of this financial technology by users.

The research was based on the TAM3 Technology Acceptance Model and in order to achieve this objective, we proceeded with the design and creation of the instrument which was validated with a model of ordinary least squares or multiple linear regression because a set of control variables was included in the model that allowed the improvement of the goodness of confidence coefficient of the model. Evidence of statistically significant correlations is provided between certain factors and categories of the TAM3 Model, which allows us to infer that the factors are relevant in the acceptance of digital payment systems in the context of Fintech, thus supporting the importance of considering factors such as provider reputation, previous experiences, time reduction and lack of physical presence when designing strategies to promote the successful adoption of digital financial services in the Fintech environment.

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