

Research on Factors Identification in FinTech Acceptance: Lithuania Context

The paper aims are to identify factors that have the influence on FinTech services acceptance in Lithuania. In order to collect the questionnaire data, several models and analyses were used: technology acceptance model (TAM), structural equation modeling, exploratory and confirmatory factor analysis, path analysis, and visualization. The study results state that perceived usefulness and trust in services have a statistically significant effect on consumers' attitudes towards financial technologies.

Keywords: confirmatory factor analysis, exploratory factor analysis, financial technologies, FinTech, Structural Equation Modeling, technology acceptance model.

Straipsnyje siekiama atskleisti veiksnius, lemiančius finansinių paslaugų priėmimą Lietuvoje. Tyrimo metu anketiniams duomenims pritaikytas technologijų priėmimo modelis (TAM), atliekamas struktūrinių lygčių modeliavimas, tiriamoji ir patvirtinančioji faktorinė analizė, kelių analizė ir vizualizavimas. Tyrimo metu nustatyta, kad suvokiamas naudingumas ir vartotojų pasitikėjimas daro statistiškai reikšmingą įtaką vartotojų požiūriui į finansines technologijas.

Reikšminiai žodžiai: finansinės technologijos, FinTech, patvirtinančioji faktorinė analizė, struktūrinių lygčių modeliavimas, technologijų priėmimo modelis, tiriamoji faktorinė analizė.

JEL Classifications: C12/C51/O30.

Introduction

FinTech is an abbreviation for financial technologies commonly used for 'a new financial industry that applies technologies to improve financial activities' (Schueffel, 2016). Financial technologies are also understood as technological innovations used in the financial sector to simplify and accelerate the performance of financial services. Recently, financial technologies

have been one of the most widely analyzed topics in the context of Lithuania's economic growth prospects. The financial sector has many expectations from the Fintech: not only the increase of the budget from the paid taxes but also the integration of the services into the daily life of Lithuanians, contributing to the smoother performance of daily financial services.

The adaptation of the population to technological innovations is often a

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difficult process caused by many factors. Some authors tried to distinguish FinTech acceptance factors and assess their impact: Ryu (2018), Chuang, Liu and Kao (2016), Hu, Ding, Li, Chen and Yang (2019), Ramos (2016) and others. In order to evaluate FinTech acceptance among residents are used: Technology Acceptance Model, extended Technology Acceptance Model, Theory of Reasoned Action model, and The Unified Theory of Acceptance and Use of Technology model.

The financial technology sector is consumer-dependent, thus it is important for FinTech start-ups to identify the factors that lead to the more frequent use of financial technology companies instead of regular banking services. FinTech acceptance research results allow us to adjust the company's service delivery model or eliminate the factors that cause unfavorable feelings for consumers and discourage them from further FinTech services usage.

The research object: identification of FinTech acceptance factors.

The aim: to identify and evaluate the factors determining the acceptance of FinTech in Lithuania.

The research methods: analysis of scientific literature, data collection by questionnaire, technology acceptance model (TAM), structural equation modeling (SEM), exploratory (EFA) and confirmatory factor analysis (CFA), path analysis, comparison, and summary of the results.

The objectives of the article:

1. To analyze and compare previous research done on financial technologies acceptance.

2. To identify and evaluate the factors of acceptance of Fintech in Lithuania.

Previous Research on FinTech Acceptance

In order to analyze consumer behavior in the process of technology acceptance, several theoretical models have been developed. The most commonly used theories when assessing technology acceptance are a Technology Acceptance Model, a Theory of Reasoned Action, an Unified Theory of Acceptance and Use of Technology, an Innovation Diffusion Model, a Technology-Organization-Environment model (Oliveira & Martins, 2016). 'A lot of research is done according to the traditional models, and the rest usually link previous models or add new features in order to create models during research' (Ribokas & Burinskienė, 2018).

Ryu (2018) conducted a study in Korea on the factors that determine consumers' behavioral intention to use or not to use FinTech. The author chose the Theory of Reasoned Action (TRA) model for this study. TRA was developed by Ajzen and Fishbein in 1967 and considered to be one of the oldest theories of technology acceptance. This theory assumes that consumers are the main decision-makers who continually count and evaluate relevant behavioral beliefs when formulating their attitudes toward behavior (Li, 2013). The author of the study chose to apply the TRA model to assess the acceptance of FinTech through perceived consumer benefits and risks, which were split into more factors: economic benefits, convenience, service process, financial risk, legal risk, security risk, operational risk.

Chuang et al. (2016) chose the Technology Acceptance Model (TAM) to evaluate the acceptance of FinTech services among the population in China. The TAM model was developed by Davis in 1989 based on

the TRA theory. TAM evaluates consumer behavior in terms of its perceived usefulness and ease of use. It is proposed to cover user attitudes as well as external variables in the model. The Technology Acceptance Model is one of the most successful theories examining the acceptance of new technologies (Pabedinskaitė & Šliažaitė, 2012). The authors of the study included not only factors of perceived usefulness and perceived ease of use, but also consumer trust in services and attitudes towards FinTech.

Hu et al. (2019) in China applied the Extended Technology Acceptance Model (TAM2) to the bank's consumer acceptance of FinTech services. This model was additionally named 'extended' by the authors because it is comprehensive, extending the applicability of the traditional TAM model, as the authors include more factors in the model that can encourage consumers to adopt new technologies. According to the authors, extended TAM covers factors such as: government support, perceived risk, consumer attitudes to FinTech, corporate brand awareness, perceived ease of use, perceived usefulness, trust, and consumer innovation.

Ramos (2016) assessed FinTech adaptation factors among young people in Portugal. The study was based upon the Unified Theory of Acceptance and Use of Technology (UTAUT). Venkatesh, Morris, Davis and Davis (2003) developed a unification theory in which they integrated the components of eight technology acceptance models and theories: TRA, TAM, the motivational model, TPB, combined TAM-TPB, the model of PC utilization, innovation diffusion theory and social cognitive theory (Alomary & Woollard, 2015). However, this theory is criticized for a large number of independent variables, while the author of the theory himself

argues that this model is the most reliable in estimating and predicting technology adoption (Venkatesh et al., 2003). In the meantime, Ramos (2016) in his study chose to include three factors in the design of the UTAUT model: perceived usefulness, perceived ease of use, and financial literacy. A comparison of the models is given in Table 1.

To be clear, all the models shown in Table 1 have their shortcomings. TRA is the earliest general model, which cannot be adapted to assess the acceptance of a particular technology. Momani and Jamous (2017) emphasize that the model has its' own limitations due to the lack of additional variables.

Based on the TRA theory and the TAM model has been developed to pay attention to the usefulness and easy use of technologies. Although this model is more accurate than the first one, it does not avoid its' own shortcomings. Ribokas and Burinskiene (2018) state: 'TAM does not assess the impact of unfulfilled consumer expectations on the consumer's further behavior'. TAM model is useful, but more and more researchers are trying to extend it, thus creating even more difficulties (Sharma & Mishra, 2014).

The extended TAM2 model was applied in the study carried by Hu et al. (2019). In addition to the factors inherent in the TAM model, such as perceived ease of use and perceived usefulness, the authors included factors that are related to personal characteristics. The extended TAM2 model is usually considered to be more complicated than the conventional one.

The unified theory of acceptance and use of technology is distinguished by the fact that it integrates both TRA and TAM theories and six other theories of

Table 1

Research on adaptation to financial technologies

Author	Research	Model	Factors
Ryu (2018)	'What makes users willing or hesitant to use Fintech?' (Korea)	Theory of reasoned action (TRA)	1. Economic benefit; 2. Convenience; 3. Service process; 4. Financial risk; 5. Legal risk; 6. Security risk; 7. Operational risk.
Chuang et al. (2016)	'The Adoption of Fintech Service: TAM perspective.' (China)	Technology acceptance model (TAM)	1. Trust in services; 2. Perceived usefulness; 3. Perceived ease of use; 4. User attitude.
Hu et al. (2019)	'Adoption Intention of Fintech Services for Bank Users: An Empirical Examination with an Extended Technology Acceptance Model.' (China)	Extended technology acceptance model (TAM2)	1. Government support; 2. Perceived risk; 3. Attitude; 4. Company brand awareness; 5. Perceived ease of use; 6. Perceived usefulness; 7. Trust; 8. User innovation.
Ramos (2016)	'Assessing the determinants of behavioral intention to adopt fintech services among the millennial generation.' (Portugal)	The unified theory of acceptance and use of technology (UTAUT)	1. Perceived usefulness; 2. Perceived ease of use; 3. Financial literacy. 4. Demographic characteristics.

technology acceptance. As mentioned above, the biggest drawback of the UTAUT model is a large number of independent variables. Venkatesh et al. (2003) state that the model is the most useful in assessing the probability of new technology implementation. It is worth noting that this model incorporates a number of volatile factors that may change according to different circumstances, thus the intention to use or reject Fintech may be temporary.

Given the notion that TRA is only a primary general model that cannot be applied to assess a particular technology and that UTAUT is best suited for assessing the

feasibility of new technologies and forecasting of their adoption, the TAM model was used in this work. It was decided to use a technology acceptance model identical to the model used by Chuang et al. (2016) in order to achieve comparability of the research.

Hypotheses of the Research

The factors covered by the TAM model in this research are perceived usefulness, ease of use, attitude, and behavioral intention to use.

Perceived usefulness is defined as ‘the user’s perceived conviction that the use of technology will increase the ability to better perform an action in a particular activity (Pabedinskaitė & Šliažaitė, 2012). Perceived usefulness is an important criterion in assessing the acceptance of FinTech among consumers. This factor commonly used in TAM, TAM2 and UTAUT models therefore it is also included in the research TAM.

H₁ – perceived usefulness has a significant positive effect on attitudes towards financial technologies.

Perceived ease of use is ‘the desire that the chosen system should not require much effort to perform a certain action’ (Pabedinskaitė & Šliažaitė, 2012). In other words, it is an easy-to-use financial services platform. The complex use of the financial technology platform can have a negative impact on service adoption, especially among older people. In previous scientific studies, ease of use is described as a simple app download, easy to learn service performance, and easy access to the necessary equipment. The perceived ease of use factor also is included in the FinTech acceptance model in Lithuania.

H₂ – perceived ease of use has a significant positive effect on attitudes towards financial technologies.

Another criterion that is widely used in the FinTech acceptance research is trust. This factor is closely related to perceived usefulness and perceived ease of use. The trust factor is considered to be a consumers’ belief that the FinTech sector is reliable, that their personal information is safe and all ordered services are performed correctly. ‘Many scholars have confirmed that users’ trust of services plays an important role in adoption decision-making in the context of Fintech.’ (Hu et al., 2019),

therefore this factor is included in the research model in Lithuania.

H₃ – trust in services has a significant positive effect on attitudes towards FinTech.

Attitude is commonly determined by ‘perceived usefulness and ease of use’ (Chuang et al., 2016). These factors determine consumer attitudes, which, according to previous research, have a significant impact on consumer behavioral intention to use technology. Similar to Chuang et al. (2016) considerations, the attitude was determined by perceived usefulness perceived ease of use, and trust factors. The attitude factor is described as the belief that FinTech services are a good idea, good consumers’ experience with FinTech services, and consumers’ interest in FinTech services in general.

H₄ – consumers’ attitude towards FinTech has a significant positive effect on their behavioral intention.

The factors included in the model and their evaluation criteria are presented in Table 2.

Methodology

The aim of the research: to identify and evaluate the factors determining the acceptance of FinTech in Lithuania.

The research data: data was collected by conducting an online survey. The sample size was calculated using a calculator with the formula (Kardelis, 2002):

$$n = \frac{1}{\Delta^2 + \frac{1}{N}} \quad (1)$$

where: n – a sample size; Δ – the margin of error; N – a population size.

Table 2

Factor evaluation criteria and hypotheses

Hypothesis	Factor	Criteria
H ₁ – perceived usefulness has a significant positive effect on attitudes towards financial technologies.	Perceived usefulness (PU)	PU ₁ - I can use FinTech services anywhere and anytime. PU ₂ - FinTech services make life more convenient. PU ₃ - The services offered by FinTech meet my needs. PU ₄ - FinTech services are performed quickly and saves me time.
H ₂ – perceived ease of use has a significant positive effect on attitudes towards financial technologies.	Perceived ease of use (PEU)	PEU ₁ - Using FinTech services is not complicated. PEU ₂ - Easy to have the equipment needed to use FinTech services (mobile phone, tablet, computer, Internet). PEU ₃ - Learning to use FinTech services is easy and does not require much time. PEU ₄ - FinTech app is easy to download and install.
H ₃ – trust in services has a significant positive effect on attitudes towards FinTech.	Trust (TRU)	TRU ₁ - I believe the FinTech sector is reliable. TRU ₂ - I believe that FinTech companies protect my personal information properly. TRU ₃ - I believe that my ordered services are performed correctly.
H ₄ – consumers' attitude towards FinTech has a significant positive effect on their behavioral intention.	Attitude (ATT)	ATT ₁ - I have no negative experience with FinTech services. ATT ₂ - I am interested in the FinTech sector and the services it offers. ATT ₃ - I think offering services in a FinTech way is a good idea. ATT ₄ - I like FinTech services.
H ₄ – consumers' attitude towards FinTech has a significant positive effect on their behavioral intention.	Behavioral intention (BI)	BI ₁ - I tend to use FinTech services. BI ₂ - I intend to use FinTech services in the future.

According to the estimations, at least 384 respondents were needed to ensure the quality of the study with 95 % probability.

During the research, 416 respondents were interviewed. The questionnaire was posted online from March 17, 2020, to April 17, 2020. It consisted of the demographic characteristics of the respondents, five factors (perceived usefulness, perceived ease of use, trust, attitude, behavioral intention to use) that determine the acceptance of FinTech. Respondents were suggested to rate their opinion according to the five-point Likert scale in order

to express their consent to the statements presented (1 - agree; 2 - partially agree, 3 - has no opinion, 4 - partially disagree, 5 - disagree).

The stages of the study: 1) Survey of Lithuanian residents (online); 2) Processing of collected data and exploratory factor analysis; 3) Analysis of confirmatory factor and structural equations model paths coefficients.

Research model and hypotheses. The research model is based on the technology acceptance model (Davis, 1989) and it is shown in Figure 1.

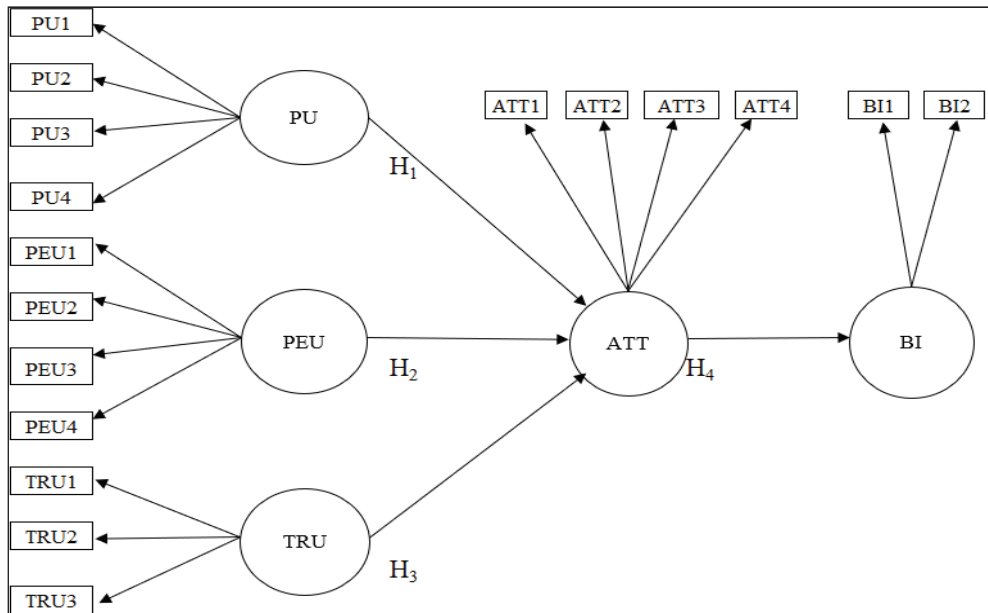


Fig. 1. Research model

Research hypotheses: H_1 – perceived usefulness (PU) has a significant positive effect on attitudes towards financial technologies; H_2 – perceived ease of use (PEU) has a significant positive effect on attitudes towards financial technologies; H_3 – trust in services (TRU) has a significant positive effect on attitudes towards FinTech; H_4 – consumers' attitude (ATT) towards FinTech has a significant positive effect on their behavioural intention (BI).

Research method. Structural Equation Modeling (SEM) consists of three parts: 1) Exploratory factor analysis (EFA); 2) Confirmatory factor analysis (CFA); 3) Path analysis.

The exploratory factor analysis responds to the correlation between the data and divides the observed variables into groups that have a unifying factor (Čekanavičius & Murauskas, 2002). The purpose of the exploratory factor analysis

is to check the suitability of the latent factors used in the study and to perform corrective factors if necessary. The Maximum Likelihood method is used to separate the factors. This method maximizes the likelihood of excluding the most similar criteria. Promax was used as the rotation scheme for non-orthogonal factors. This rotation scheme is considered to be mathematically simpler and more commonly used in the factor analysis. The purpose of **the confirmatory factor analysis** is to evaluate the parameters and validity of the research model. When performing the **path analysis**, the coefficients and significance of the relationship between the considered factors are determined.

Structural equation modeling is a statistical method that seeks to elucidate the relationship between multiple variables using a variable variation matrix, multiple regression analysis, path analysis, and

confirmatory factor analysis. This method can explain the causal relationship between independent and dependent variables and is widely used in the fields of behavioral science of individuals (Hu et al., 2019).

The minimum significance level at which the hypotheses are confirmed is 0.05.

Limitations. The survey sample does not cover the entire Lithuanian population. The sample consists of 16.3% men and 83.7 % women. It should be noted that 50.2 % of survey respondents were persons aged from 16 to 24 years. The study was conducted on the internet – this could be the cause of the lack of responses from the elderly and those without computer literacy.

Results

Results are presented according to the research methodology:

- 1) Data analyses;
- 2) Model construction and hypothesis testing;
- 3) Comparison with the results of Fin-Tech acceptance study in China.

In order to achieve the aim of the research, 416 respondents were interviewed and the results obtained were processed. The distribution of respondents by demographic data is presented in Table 3.

The age distribution of respondents was uneven. There were 83.7% were women and 16.3% men among the respondents. Half of all surveyed persons were 16-24 (50.2%), 29.3% - 25-34 years old. According to the education criteria, the respondents were distributed as follows: basic education - 2.9%, secondary education – 18.5%, vocational education - 6.5%, incomplete higher education - 23.8%, higher education – 48.3%. Thus, it could be considered that the majority of respondents have higher education.

Table 3

Distribution of respondents by demographic data (N = 416)

Variable	Description	Distribution	Distribution (%)
Gender	Female	348	83.7
	Male	68	16.3
Age	16-24	209	50.2
	25-34	122	29.3
	35-44	57	13.7
	45-51	17	4.1
	≥ 52	11	2.6
	Education	Basic	12
Secondary	77	18.5	
Vocational	27	6.5	
Incomplete higher	99	23.8	
Higher	201	48.3	
Household income	≤ 1000 eur.	227	54.6
	> 1000 eur.	189	45.4

According to the received monthly income, the largest part of the respondents received 501 - 1000 Eur (32.45%) and 1001 - 2000 Eur (30.29%). Combining households receiving up to 1000 Eur and more than 1000 Eur income, an even distribution of respondents was obtained. Less than 1000 Eur receiving households accounted for 54.6% out of the sample, more - 45.4%. Out of all respondents, 65.9% indicated that they had used the services of FinTech, 31.5% - did not use, and 2.6% of respondents were not sure whether they had used FinTech services or had not.

The reliability of the developed questionnaire used in the study was checked by calculating the coefficient Cronbach's alpha. The Cronbach's alpha coefficients of the factors used in the study are: PU - 0.940, PEU - 0.925, ATT - 0.790, TRU - 0.856, BI - 0.897, their values are higher than 0.7, that is why it is concluded that the questionnaire was designed correctly,

and the answers can be used in the following steps of the research.

During the exploratory factor analysis, 5 factors were distinguished according to similar indicator variables. Adjustments are made to the resulting model matrix until a clean model matrix is obtained (Table 4). PEU2, PEU4, TRU3, ATT1 indicator variables were removed during adjustments. The correction did not affect the number of evaluating hypotheses.

Kaiser-Meyer-Olkin (KMO) test was performed during the exploratory factor analysis – the results of the analysis showed that the collected data correlate with each other and can be used in the factor analysis (KMO - 0.946, χ^2 -5306.146, df -78, p-value - 0.000).

After removing the correlating indicator variables and making sure that the data was suitable for further investigation, confirmatory factor analysis was performed in the AMOS program.

Table 4

Model matrix

	Perceived usefulness (H ₁)	Perceived ease of use (H ₂)	Trust (H ₃)	Attitude (H ₄)	Behavioral intention (H ₄)
PU1	0.771				
PU2	0.955				
PU3	0.830				
PU4	0.834				
PEU1		0.952			
PEU3		0.640			
TRU1			0.660		
TRU2			0.999		
ATT2				0.830	
ATT3				0.854	
ATT4				0.505	
BI1					0.879
BI2					0.533

Table 5

Confirmatory factor analysis model fit indices

Indices	Value	Threshold	Conclusion
NFI	0,984	> 0,90	Value is acceptable
CFI	0,994	> 0,95 – great > 0,90 – good > 0,80 – sometimes permissible	Value is acceptable
GFI	0,970	> 0,95	Value is acceptable
RMSEA	0,039	< 0,05 – good 0,05 – 0,10 – moderate > 0,10 – bad	Value is acceptable
PCLOSE	0,880	> 0,05	Value is acceptable
χ^2 / df	1,645	< 3	Value is acceptable

In this analysis, the suitability of the model is assessed using the most commonly used indices: NFI, GFI, CFI, PCLOSE, RMSEA. The value of χ^2 is not appropriate for samples larger than 200, so the ratio of χ^2 square to degrees of freedom (df) is used instead. The values of the indices obtained, and their estimates used in practice are presented in Table 5.

The validity of the model helps to assess whether the model is suitable for the evaluation of the analyzed problems or not. The results of the model validity and reliability assessment are shown in Table 6.

Awang et al. (2015) separate the model validity into three parts: convergent validity, construct validity, and discriminant validity. The AVE (Average Variance

Extracted) value of all the factors is greater than 0.5, so the convergent validity is satisfactory. The validity of the construct is satisfactory due to the values of the model fit indices already analyzed in Table 5. The square root of the attitude factor AVE is less than the correlation between other values, so the discriminant validity of this factor is questionable. No more appropriate discriminant validity values were obtained during model adjustments. Given that the square root of the approach factor AVE is less than the maximum correlation of 0.004, it was decided not to exclude this factor from the study.

The CR (Composite reliability) value of all analyzed factors is greater than 0.7, which means that the data reliability is

Table 6

Validity and reliability assessment

	CR	AVE	PU	ATT	BI	PEU	TRU
PU	0.941	0.801	0.895				
ATT	0.858	0.672	0.874	0.870			
BI	0.900	0.818	0.865	0.849	0.904		
PEU	0.920	0.852	0.865	0.768	0.795	0.923	
TRU	0.861	0.756	0.687	0.752	0.722	0.679	0.870

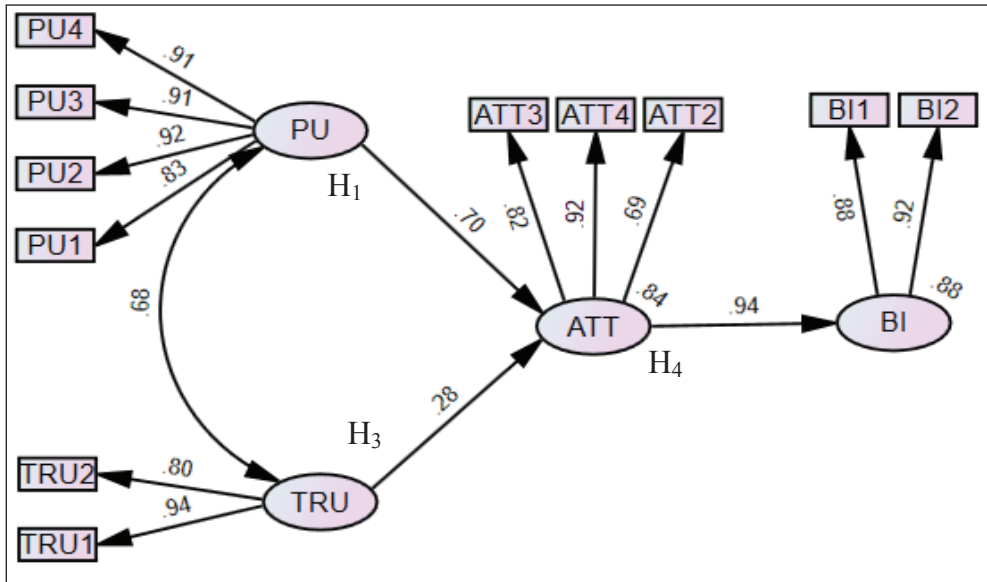


Fig.2. Structural equations model

satisfactory. After reviewing and evaluating all the criteria, it was decided to consider the model applicable for further modeling of structural equations - path analysis.

The structural equation model was drawn in the AMOS program and path coefficients were obtained, the results

showed that the path of perceived ease of use (PEU) and attitude (ATT) to FinTech is statistically insignificant ($p = 0.55$; $p > 0.05$), therefore the hypothesis H₂ is rejected. For a better model fit, this path is removed. A new model of structural equations was developed (Figure 2).

Table 7

Structural equations model fit indices

Indices	Value	Threshold	Conclusion
NFI	0,974	> 0,90	Value is acceptable
CFI	0,985	> 0,95 – great > 0,90 – good > 0,80 – sometimes permissible	Value is acceptable
GFI	0,951	> 0,95	Value is acceptable
RMSEA	0,048	< 0,05 – good 0,05 – 0,10 – moderate > 0,10 – bad	Value is acceptable
PCLOSE	0,150	> 0,05	Value is acceptable
χ^2 / df	2,376	< 3	Value is acceptable

The reliability of the developed structural equation model was assessed by the previously mentioned model fit indices (Table 7). After evaluating the obtained model suitability parameters, it was concluded that the performed path analysis is reliable, and the obtained coefficients can be analyzed.

The results of the study show that perceived usefulness and trust explain 84% of the population's attitudes towards FinTech ($R^2 = 0.84$). Moreover, the attitude evaluated on the basis of perceived usefulness, trust, and the individual three latent factors, explains 88% population's behavior intention to use FinTech ($R^2 = 0.88$).

The conclusions of the hypotheses testing made out of the performed empirical analysis and the path coefficients are presented in Table 8.

Perceived usefulness has a statistically significant effect on consumers' approach to FinTech. The path coefficient of these factors is 0.70; $p < 0.05$, therefore the perceived usefulness and attitude have a strong and statistically significant relationship. Hypothesis: H_1 - perceived usefulness (PU) has a significant positive effect on attitudes towards financial technologies is confirmed. Therefore, we can conclude that the perceived benefits of the services offered by FinTech form a positive attitude towards financial technologies.

The impact of perceived ease of use on consumers' attitudes towards financial technologies is statistically insignificant. The significance of this path is 0.55 (higher than the significance level used in the study - $p < 0.05$), therefore the hypothesis: H_2 - perceived ease of use (PEU) has a significant positive effect on attitudes towards financial technologies is rejected.

Trust in FinTech is a statistically significant factor influencing consumer attitudes towards this innovation. The value of the trust and attitude path coefficient is 0.28, $p < 0.05$. Thus, the hypothesis: H_3 - trust in services (TRU) has a significant positive effect on attitudes towards FinTech is accepted. Trust in financial technologies influences attitudes towards them, which means that if trust falls, the consumer attitude towards FinTech will worsen.

The attitude of Lithuanian users towards FinTech services is a statistically significant factor that determines the behavioral intention to use them. The path coefficient of these two factors is -0.94, $p < 0.05$. A high standardized path coefficient indicates that there is a strong and statistically significant relationship between attitudes and behavioral intention to use FinTech services. Thus, the hypothesis: H_4 - consumers' attitude (ATT) towards FinTech has a significant positive effect on their behavioral intention (BI) is

Table 8

Hypothesis testing

Hypothesis	Path	Path coefficient	C.R./ p -value	Conclusion
H_1	PU \rightarrow ATT	0,70	9,95 / ***	Hypothesis supported
H_2	PEU \rightarrow ATT	-0,04	-0,59 / 0,55	Hypothesis rejected
H_3	TRU \rightarrow ATT	0,28	6,54 / ***	Hypothesis supported
H_4	ATT \rightarrow BI	0,94	20,34 / ***	Hypothesis supported

Note: *** - $p < 0,05$.

accepted. The majority (89%) of consumers' behavioral intention to use financial technologies is determined by their attitude towards this sector, the usefulness, and the trust of its services.

It should be noted that the influence of perceived usefulness on the attitude of consumers is 2.5 times higher than the influence of trust: the path of perceived usefulness - 0.70, trust - 0.28. As a result, we can admit that the usefulness of the services has a 2.5 times greater impact on consumer attitudes towards FinTech than consumer trust in these services.

The research on factors identification in FinTech acceptance in Lithuania showed that Lithuanians tend to use financial technologies more often due to their perceived usefulness, trust in the services, and general attitude towards the FinTech sector. The study confirmed three hypotheses:

H_1 - perceived usefulness (PU) has a significant positive effect on attitudes towards financial technologies.

H_3 - trust in services (TRU) has a significant positive effect on attitudes towards FinTech.

H_4 - consumers' attitude (ATT) towards FinTech has a significant positive effect on their behavioral intention (BI).

The perceived ease of use factor has been identified as a statistically insignificant factor determining the use of FinTech in Lithuania. For Lithuanians, easy financial transactions do not give them the trust and desire to use financial technologies. The hypothesis rejected during the research:

H_2 - perceived ease of use (PEU) has a significant positive effect on attitudes towards financial technologies.

To have a broader and comparable view, the study was conducted using a research model identical to Chuang et al.

(2016) model which was used evaluating the financial technology acceptance in China. The acceptance of FinTech among consumers in Lithuania was compared with the FinTech acceptance in China. In China the FinTech adoption rate is 87% (EY, 2019), this country stands out for its frequent use of FinTech. Lithuania are not included in the countries list which have highest FinTech adoption rates. Comparison of the results of FinTech acceptance studies in Lithuania and China, will show why this difference occurs.

In Lithuania and China, the study is conducted with 95% probability. The required sample of the population of both, Lithuania and China, is - 384. In the survey conducted in China, 440 respondents were interviewed, in Lithuania - 416. Although fewer persons were interviewed in Lithuania, the required sample size was achieved.

The research model in both Lithuania and China consists of five factors (perceived usefulness, perceived ease of use, trust in services, attitude, and behavioral intention to use). After the performed exploratory and confirmatory factor analyses, 11 latent factors remained in the Lithuanian model and 16 in the Chinese model.

A comparison of the obtained path coefficients and their significance in both studies is presented in Table 9.

Perceived usefulness in China has a greater impact on attitudes towards financial technology services than in Lithuania. The statement is reflected by the higher path coefficient in China than in Lithuania $0.84 > 0.70$. The perceived usefulness of the research has a statistically significant impact on attitudes towards innovative financial technology services.

The impact of perceived ease of use on attitudes towards financial technologies

Table 9

Comparison of path coefficients and their significance

Hypothesis	Path	Path coefficient in Lithuania	Path coefficient in China	C.R./ <i>p</i> -value (Lithuania)	C.R./ <i>p</i> -value (China)
H ₁	PU → ATT	0,70	0,84	9,95 / ***	4,66/***
H ₂	PEU → ATT	-0,04	0,31	-0,59/ 0,55	2,15/***
H ₃	TRU → ATT	0,28	0,42	6,54 / ***	3,07/***
H ₄	ATT → BI	0,94	0,86	20,34 / ***	9,08/***

in Lithuania was assessed as statistically insignificant, while in China the relationship between these factors is statistically significant. According to this statement, we can formulate a conclusion that the simple and easy use of FinTech services for Lithuanians does not affect the attitude towards these services, unlike persons living in China.

The influence of trust towards FinTech is statistically significant in both studies, but in China, it is stronger ($0.42 > 0.28$). The trust or distrust of China citizens in services has a stronger influence on the attitude towards them than Lithuania citizens. The more people trust the sector and are not disappointed with the services, the more favorable the attitude is.

The relationship between attitudes towards financial technologies and behavioral intention to use them is statistically significant and the strongest among the analyzed paths in both Lithuanian and Chinese studies. In Lithuania, compared to China, the relationship between these factors is stronger ($0.94 > 0.86$). Thus, the attitude defined as a factor consisting of three exogenous variables and three factors has a strong effect on the behavioral intention to use financial technologies. In Lithuania, the attitude to financial technologies has a stronger impact on people's use of financial technology services than in China.

A comparison of the model fit indices of the model developed in China with the model fit indices of the model conducted in Lithuania is presented in Table 10.

A comparison of the model's fit indices concludes that the fit of the study conducted in China is only satisfactory, but not excellent. According to the threshold of model fit indices used in the Lithuanian study, the values of NFI, GFI, RMSEA in the Chinese study would be unsatisfactory, but researchers Chuang et al. (2016) considered the model indices satisfactory for further study due to the small difference between the obtained values and required values.

Summarizing the results of the comparative analysis of Lithuanian and Chinese financial technology acceptance surveys, the number of respondents in both surveys was sufficient to draw conclusions about the countries' populations. A comparison of the research results showed that the factors promoting the acceptance of financial technologies in Lithuania and China are identical, except the factor of perceived ease of use, which was identified in the study as a statistically insignificant factor determining the acceptance of financial technologies in Lithuania. The model fit indices of the study model in Lithuania are better than the indices of the study model in China, so it is concluded that the results of the Lithuanian study are

Table 10

Comparison of model fit indices

Indices	Lithuanian model	Chinese model	Threshold
NFI	0,974	0,840	> 0,90
CFI	0,985	0,910	> 0,95 – great > 0,90 – good > 0,80 – sometimes permissible
GFI	0,951	0,820	> 0,95
RMSEA	0,048	0,070	< 0,05 – good 0,05 – 0,10 – moderate > 0,10 – bad
PCLOSE	0,150	-	> 0,05
χ^2 / df	2,376	1,960	< 3

more reliable than the results of Chuang et al. (2016) study.

Conclusions

The Fintech sector evaluation is one of the key factors for a country's economic development due to its profitability, competitiveness, and artificial intelligence environment creation. However, consumers' acceptance is one of the main aspects of Fintech growth. Evaluating these circumstances, it is crucial not only to identify but also accurately assess the factors determining the acceptance of FinTech in Lithuania.

In this article Technology Acceptance Model – TAM (Davis, 1989) is based on the survey of residents) and Structural equation modeling – SEM were used. The factors involved in this research are perceived usefulness, ease of use, attitude, and behavioral intention to use. In TAM and SEM modeling for each analyzed factor hypothesis was formed.

When performing the study, a statistically significant model was developed, based on which three hypotheses were confirmed and one rejected (about ease

of use factor). Research has shown that perceived ease of use has no influence on attitudes towards financial technology. On the other hand, the influence of perceived usefulness on the attitude of consumers is 2.5 times higher than the influence of trust. According to this, it is concluded that consumers' behavioral intention to use financial technologies is more strongly driven by the perceived usefulness of services than the trust factor in Lithuania. The highest path coefficient (0,94) of factors of consumer attitudes and behavioral intention to use FinTech services indicates that there is the strongest and the most statistically significant relationship between attitudes and behavioral intention to use FinTech services.

This research is compared with Chuang et al. (2016) study in China. The 'easy of use' factor is the main difference of these researchers because in Lithuania case it was statistically insignificant and in China significant. In both studies, the 'influence of the attitude' factor was the largest (0.86) and the 'influence of the perceived usefulness' factor on attitudes is twice as large as the 'influence of the trust' factor. This research differs from the Chuang et al.

(2016) study – the Lithuanian case showed greater model fit indicators results.

The future research could be developed using an extended Technology Acceptance Model, which would include more factors in research, such as: consumer financial literacy, innovation, financial

risk, government support, service process, etc. According to the literature analysis, these factors may be a good starting point for the model future development and better insight creation for Fintech sector progress.

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FINANSINIŲ TECHNOLOGIJŲ PRIĖMIMO VEIKSNIŲ ĮTAKOS NUSTATYMO TYRIMAS LIETUVOJE

S a n t r a u k a

Finansinės technologijos (santrumpa FinTech) – tai finansinių paslaugų ir informacinių technologijų integracija, svarbi ne tik įmonei, bet ir valstybės produktyvumui, užimtumui bei konkurencingumui. Įžvelgdamos finansinių technologijų inovatyvumą bei kuriamą vertę, pasaulio valstybės siekia sudaryti tinkamą mikroklimatą finansinių technologijų startuoliams kurtis. Finansų sektorius, FinTech įsiliejęs į Lietuvos rinką, tikisi ne vien biudžeto papildinimo iš sumokėtų mokesčių, bet ir įsiliejimo į šalies gyventojų kasdienį gyvenimą, prisidedant prie sklandesnio kasdienių finansinių paslaugų vykdymo. Finansinių technologijų sektorius priklausomas nuo vartotojų, dėl to FinTech startuoliams svarbu identifikuoti veiksniai, kurie sąlygoja dažnesnį pasirinkimą naudoti finansinių technologijų įmonių paslaugomis. Šiame straipsnyje siekiama nustatyti ir įvertinti veiksniai, lemiančius finansinių technologijų priėmimą Lietuvoje.

Mokslinėje literatūroje finansinių technologijų priėmimui įvertinti dažniausiai naudojamas Davis (1989) sudarytas technologijų priėmimo modelis – TAM. Šis metodas pagrįstas gyventojų apklausomis bei struktūrinių lygčių modeliavimu – SEM. TAM metodu tiriami veiksniai, darantys įtaką finansinių technologijų priėmimui ar atmetimui: suvokiamas naudingumas, suvokiamas naudojimosi paprastumas, vartotojų pasitikėjimas paslaugomis / suvokiama rizika bei vartotojų požiūris, kuriais remiantis keliamos hipotezės.

Gyventojų apklausa, vykdyta internetu, atskleidė, kad didesnę polinkį naudoti finansinėmis technologijomis turi 25–34 m. amžiaus asmenys, gaunantys didesnes namų ūkio pajamas (>1000 Eur), įgiję aukštąjį išsilavinimą ar šiuo metu studijuojantys vyrai. Lietuvos gyventojams trūksta pasitikėjimo finansinių technologijų paslaugomis, nes, gyventojų nuomone, FinTech įmonės neužtikrina tinkamos vartotojų duomenų apsaugos.

Siekiant įvertinti iškeltas hipotezes, surinkti duomenys buvo apdoroti taikant tiriamąją bei patvirtinančiąją faktorinę analizę, struktūrinių lygčių modelio kelių analizę. Tiriamosios faktorinės analizės metu atlikti Bartlett'o sferiškumo ir Kaizerio-Mejerio-Olkinio testų rezultatai atskleidė, kad išskirti

veiksniai paaiškina 94,6 proc. kintamųjų vertės nuokrypį nuo vidurkio, ir duomenys yra tinkami faktorinei analizei. Atlikus patvirtinančiąją faktorinę analizę, nustatyta, jog visi modelio tinkamumo indeksai (NFI, GFI, CFI, PCLOSE, RMSEA, χ^2/df) yra labai geri, todėl modelis puikiai tinka tolesnei SEM analizei. Po struktūrinių lygčių modeliavimo atmesta H_2 hipotezė, nes suvokiamas naudojimo paprastumas nėra statistiškai reikšmingas veiksnys tarp Lietuvos gyventojų, darantis įtaką vartotojų požiūriui į finansinių technologijų teikiamas paslaugas. Kitos tyrime keltos hipotezės yra statistiškai reikšmingos. Pastebėta, kad suvokiamo naudingumo įtaka vartotojų požiūriui 2,5 karto didesnė nei pasitikėjimo veiksnio įtaka, todėl daroma išvada, kad vartotojų polinkį naudoti finansinėmis technologijomis stipriau skatina suvokiamas paslaugų naudingumas nei patikimumas. Vartotojų susidaryto požiūrio ir polinkio naudoti FinTech paslaugomis veiksniių kelio koeficientas (0,94) yra didžiausias iš tyrime nagrinėtų ryšių, – vadinasi, vartotojų požiūris daro labai stiprią įtaką jų polinkiui naudoti ar nesinaudoti finansinėmis technologijomis.

Lietuvoje atlikto tyrimo rezultatus palyginus su Chuang, Liu ir Kao (2016) tyrimo rezultatais pastebėta, kad iš finansinių technologijų priimtumo veiksmių Lietuvoje ir Kinijoje išsiskyrė tik suvokiamo naudojimo paprastumo veiksnys. Jis statistiškai reikšmingas Kinijoje, nors Lietuvoje nustatytas kaip statistiškai nereikšmingas. Kinijoje, kaip ir Lietuvoje, požiūrio veiksnio įtaka (kelio koeficientas) yra didžiausia – 0,86, o suvokiamo naudingumo veiksnio įtaka požiūriui du kartus didesnė nei pasitikėjimo veiksnio įtaka. Lyginant tinkamumo indeksus, pastebimas Lietuvos tyrimo modelio patikimumo pranašumas.

Tolesniuose tyrimuose tikslinga finansinių technologijų priėmimą analizuoti naudojant išplėstinį technologijų priėmimo modelį. Šis modelis suteikia galimybę į tyrimus įtraukti daugiau veiksmių, būtent: vartotojų finansinį raštingumą, novatoriškumą, finansinę riziką, valstybės paramą, paslaugų procesą. Remiantis Ryu (2018), Hu ir kt. (2019), Ramos (2016) tyrimais, šie veiksniai gali daryti įtaką vartotojų požiūriui į finansines technologijas.