

Are We Prepared for the Innovative Financial Technologies?

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Abstract: Considering the importance of financial technologies (fintech) for the economy and society in general, the aim of this research is to shed light on the student population and the financial sector (banks) in North Macedonia in relation to the EU trend of using new financial technologies. Through the statistical analysis of a survey among a sample of students of economics and other faculties from North Macedonia, the views on the use of fintech and their satisfaction with the current generation of innovative banking products are explored. Three main hypotheses were made for this research: Macedonian students who are familiar with the term "fintech" are more likely to use online banking (H1); women are less likely than men to use online banking in North Macedonia (H2); and students in North Macedonia at faculties of technical sciences are more likely than other students to use online banking (H3). The results of the survey support the hypotheses, which is in line with previous research, although H2 is partially supported. The results highlight the need

for more active engagement of banks, in the adoption of financial technologies, taking into account the preferences of the student population as consumers and future bank employees

Keywords: fintech; North Macedonia; student preferences; banking sector

1 Introduction

Financial technologies and innovations are important drivers of financial inclusion [1-4]. Financial inclusion is of utmost importance for the development of society and economies. By redesigning existing services to make them more individualized, transparent, and available through digital channels, fintech strives to enhance the customer experience and boost process efficiency in traditional financial institutions while also providing alternatives to the traditional services offered by the banks [5]. Financial inclusion influences banking, specifically on bank stability, performance, risk, nonperforming loans, concentration, shadow banking, and corporate performance [6].

Digitization of the banking sector (electronic payment, card payment system, extending the number and geographic reach of ATMs, enabling electronic payments, electronic, internet, and mobile banking, etc.) is not a new phenomenon; this process has been steadily advancing for 40 years. It is important to emphasize that the digitization process and the explosion in the number of smart devices are taking place at the same time. As a result of technological progress, consumers now have easier access to financial services through new, modern distribution channels [7] [8].

The current target market for mobile banking is young people under 30, according to the data. Today's students are members of the so-called "Generation Z", which includes people born between 1994 and 2005 (also known as Gen Tech). Therefore, the aim of this study is to identify the needs and preferences of Macedonian students, regarding the acceptance of financial technologies and innovations, as bank customers and future professionals, in the financial sector, as drivers of innovation and technological transformers of financial services [5] [9].

The main objective of this research was to identify the characteristics and constraints of students in North Macedonia as bank customers and future professionals in the financial sector (banking) using statistical analysis. In order to conduct this research, three main hypotheses were defined, among others: Macedonian students who know the terms "fintech" including blockchain technology are more likely to use online banking (H1); women in North Macedonia are less likely to use online banking than men (H2); students in North Macedonia at the faculties of technical sciences are more likely to use online banking compared to other students (H3). Data obtained by the survey were

analyzed graphically and numerically by using Pearson Chi-square test and by building logistic regression model to find relationship between students' familiarity with the terms »fintech« or »blockchain technology«, gender and field of study and their use of electronic banking. The survey was conducted in the period from 19 September 2020 to 29 January 2021 and covered a total of 9 universities and 49 faculties with a total of 1,002 students in Northern Macedonia. Due to the Covid 19 pandemic, the questionnaires were transferred in electronic form on Google Drive.

The path of the Republic of North Macedonia to the EU is expected to increase competitiveness, which will be difficult for Macedonian banks to cope with. This study addresses the growth of financial goods and services, the use of fintech or technical and scientific breakthroughs in banking services and products, the competitiveness of the banking system, the changing regulatory environment and the difficulties banks now face in developing user experience strategies and defining future operating models [5] [8].

The first part of the paper (introduction) presents the basic concepts and objectives of the research, while the second part of the paper is dedicated to the literature review. Based on a critical review of the literature, a statistical analysis of a survey among Macedonian students is conducted in the third part. The results and discussion precede the conclusion, which lists the main findings of the research.

2 Literature Review

Financial inclusion has three components: Use, Barriers and Access, but financial awareness and financial culture are not mentioned [10]. Financial socialization, i.e., the way someone perceives their financial situation, has a big impact on how people think about digital financial solutions. Childhood experiences have a huge impact on the current and wider environment, which includes the present and future of banking and new financial players in the digital space of the twenty-first century [11-13].

Digital solutions are being widely adopted and used, giving people options outside of traditional commercial banks. Today, students are members of the so-called "Generation Z", which includes people born between 1994 and 2005, and they are the most educated, mobile and connected consumers to date. This is because the process of digitalization is rapidly increasing every day in all areas of an individual's life and work, which is a "plus" argument for selecting this young target group in terms of age. This generation is the best educated, most mobile and best-connected consumer generation in the world. They are socially responsible and tech-savvy; constantly connected via smartphones and the Internet of Things (IOT); innovative and constantly looking for change. Therefore, students are

considered important category of bank customers, especially in terms of financial innovation, reflecting the level of awareness of financial technology usage. Moreover, young people of Generation Z consider economic and financial knowledge, as well as security-oriented behavior most important after the pandemic [14].

There are many research studies performed regarding acceptance of fintech. For example, the one of the studies indicates that wealthy nations see a greater Fintech effect than developing nations. The effect is considerably greater in developed countries than in developing ones when country competitiveness is considered for both types of countries [15]. Another study summarize that Fintech companies leverage customer data and advanced analytics to segment their audience and deliver targeted messages and offers, effectively addressing customer pain points and driving engagement and that by collaborating with traditional banks, fintech companies can leverage existing infrastructure and customer networks to reach underserved communities [16].

Furthermore, the study that examines the growth and evolution of Fintech in the US, the UK, and India and explores how the regulatory agencies across these countries have responded to the evolution of Fintech concludes that economies should work towards improving digital infrastructure, financial inclusion, and financial literacy and enhance the collaboration among regulators, Fintech firms, and other stakeholders [17].

Another study empirically investigated whether cooperation between banks and fintech companies would improve banks' risk-adjusted returns. The results from the study highlight that this relationship may depend on the types of fintech sectors and bank ownership and positive association between this cooperation and banks' risk-adjusted returns only holds in the comparison sector of fintech, whereas there is a negative relationship between them in the payments and mobile wallets sector. Furthermore, the study concludes state-owned commercial banks that engage in more bank–fintech cooperation tend to generate greater earnings. And that there is positive effect of bank–fintech partnerships on risk-adjusted returns still holds and listed banks and in the case of large banks [18].

Interestingly, the study from Bangladesh aims at investigating the role of social and facilitating influences and sociodemographic variables in Fintech user intention and gender gap. The results reveal that there is a significant interaction between user compatibility and experience of use in relation to Fintech and that perceived behavioral control negatively influenced females to adopt Fintech. Furthermore, the study found a gender gap in Fintech user intention [19].

Another study shows that blockchain provides transparent, secure financial record-keeping through its decentralized structure. Smart contracts help reduce costs and make financial services more accessible to underserved groups by automating processes. Machine learning enhances these blockchain applications by enabling predictive analysis and data-driven choices [20].

Unfortunately, there is very little research on the level of acceptance of fintech by university students in Europe. For example, a study on Romanian students' perceptions and behavior towards fintech concludes that Generation Z is very inclined towards innovation and continuous technological development and is ready to accept the challenges that the future might bring with these changes. Generation Z likes the freedom, mobility, coolness and ease that fintech products bring. In addition, most mobile banking users in 2015 were aged 25-34 (61%), followed by the 18-24 and 35-44 age groups, both in second place at 55%. The number of users in the 18-24 age group increased significantly in 2016, sharing first place with the 25-34 age group (68%). The survey shows that the number of mobile banking users in Europe has increased in all age categories. With 64% of users, the 35-44 age group is in second place. The older the respondents became, the fewer people used mobile banking. The data shows that young people under 30 are the current target market for mobile banking. Therefore, the selected group is extremely relevant for this research as students are expected to be the desired customers of the bank. Some of them will be future entrepreneurs, others will be business leaders. Therefore, banks should look for a way to attract this target group at a young age by offering a special range of products and services. Generation Z, which has grown up with regular use of the internet and especially mobile internet, is likely to be the most users and beneficiaries of this cutting-edge financial technology [21].

Although digital technology alone is not sufficient to promote greater financial inclusion, there is an opportunity to use the internet and mobile telephony to include those who do not have a bank account at all in financial transactions [22]. This is even more crucial in today's digitally transformed world, when people and families may conduct massive amounts of financial transactions via a variety of online platforms with hardly any face-to-face interaction [23] [24].

On the other hand, there are three factors that will affect banks' financial services and payment offerings. Driver 1: Changing consumer behavior: Consumer expectations have changed significantly over the last two decades due to the strong influence of digital technology in daily life. The internet has become a dominant force in the average retail purchase. Consumers now expect a seamless and personalized shopping and payment experience wherever they shop (online, offline, mobile). Driver 2: Technology-driven innovation, banks lag in fintech investments. Driver 3: European regulators European regulators have identified the dominance of banks and their limited activity in adopting payments innovation as a regional problem [25] [26].

The purpose of the PSD 2 Provisions on - Payment Initiation Account Access and Account Information Services (XS2A) is to speed up the digitization process by requiring banks to grant access to clients' payment accounts (transaction accounts). This will make it possible for TPPs (Third Party Providers), which are innovative, properly licensed (both banking and non-banking fintech companies), to make payments on behalf of clients who have previously given their permission

[27]. With the advancement of financial digitalization, financial inclusion has drawn more and more attention from researchers. There are various reasons why encouraging financial inclusion is crucial [28]. Reducing the number of financially excluded groups helps achieve sustainable development, which in turn leads to further social and economic advantages [29]. Families that are not financially excluded can establish enterprises, build their savings, and invest in education, all of which help to lower poverty [30] [31]. The beneficial effects of financial literacy on financial inclusion have been the subject of several studies and research projects for these reasons [32] [33]. However, the introduction of fintech is a lengthy process that requires the adaptation of the bank's core systems, the adaptation of business process principles and models, the training of bank staff and the training of customers/users of services, etc. [34].

Additionally, in order to understand the development of fintech in North Macedonia, we have also analyzed the results of the 2018 survey on Macedonian banks' customers, which show that (i) most young and technologically advanced customers would use products and services from non-banks and technology companies, (ii) Customers would mainly use payment and remittance services from non-banking companies, but not loan and deposit products, (iii) Most customers trust traditional banks and have greater trust in technology companies than in other non-banking companies [35].

3 Empirical Research

The ability to use online banking services requires an understanding of financial technologies. Consequently, H1 has the following definition: Students from Macedonia who are familiar with the term "fintech" including blockchain technology are more inclined to use online banking.

Financial inclusion is about making sure that everyone has access to financial goods and may profit from using them [36]. In the study that has been done so far, women are less likely than males to use online banking. H2 is referred to as follows in this line: Women in North Macedonia are less likely to use online banking than men. The hypothesis's explanation is found in Macedonia's socioeconomic features, specifically in the unofficial institutions that influence women's positions and actions in society and are mirrored in their use of banking services. It is to be expected that this trait becomes less pronounced in younger and better-educated age groups, yet it still exists.

It is considered that using online banking should be favorably correlated with technological proficiency. Thus, H3 is assigned the following designation: Students in North Macedonia at the faculties of technical sciences are more likely to use online banking compared to other students.

3.1 Data and Methodology

After a qualitative analysis of previous research, a survey method was chosen. The survey was conducted between 19 September 2020 and 29 January 2021 and covered a total of 9 universities and 49 faculties with a total of 913 students in North Macedonia. Due to the Covid 19 pandemic, the questionnaires were transferred in electronic form on Google Drive. The questionnaire for students on innovative financial services in the field of banking is used.

Table 1
Composition of the sample

Characteristics	Value	N
Year of study	1	192
	2	219
	3	169
	4	261
	5	72
Gender	Female	630
	Male	282
Age	Mean (SD)	21 (1.695)
Do you use on-line banking?	Don't use on-line banking	233
	Use internet banking	141
	Use mobile banking	260
	Use both internet and mobile banking	279
Familiar with "fintech"	Yes	823
	No	90
Familiar with "blockchain technology"	Yes	833
	No	30
Familiarity with financial technologies during faculty education is very important!	Completely disagree	19
	Disagree	64
	Agree	409
	Completely agree	421
Type of study	Technical	152
	Non-technical	761

Source: Authors' own calculations

3.2 Descriptive Statistics and Chi-Square Test

In this paragraph sample is described accordingly to the type of variables, along with the variables of interest: use of electronic banking (EB) and types of electronic banking: internet banking (EBI) and mobile banking (EBM) along with variables who's influence on using electronic banking we want to research: gender (G), field of study: technical or non-technical (Fi) and familiarity with the terms related to financial technology: “fintech” (FIN) and “blockchain technology” (BC). We have also used Pearson Chi-square test to assess the relationship between above mentioned variables.

Somewhat above 16% of the surveyed students are studying technical science. There is strong relationship between gender and field of study (technical or non-technical), as it is known that mostly male are enrolled at technical studies. The relationship could be seen graphically in mosaic graph (figure 1) while Pearson Chi-square test $\chi^2(1, N=912)=62.131$, $p<0.001$ shows the relationship between (non)technical field of study and gender numerically.

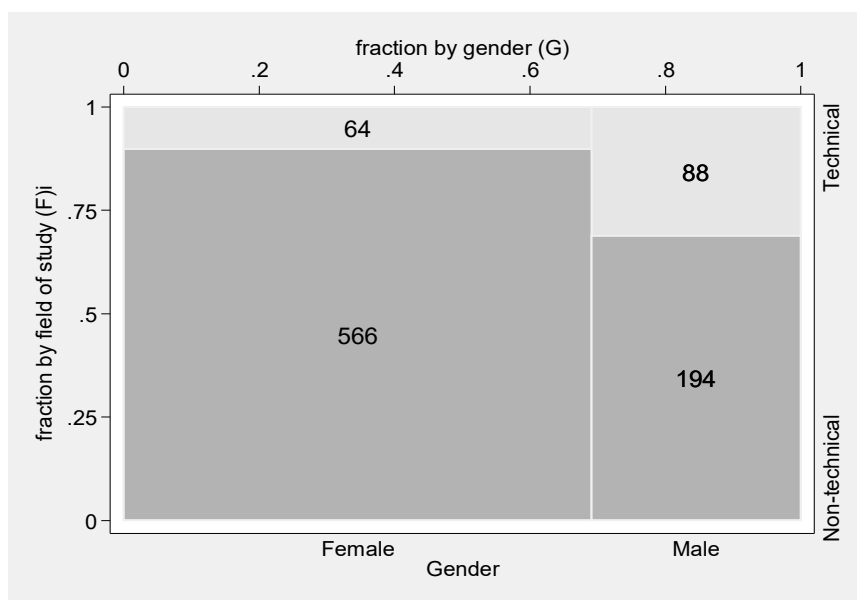


Figure 1

Field of study (technical or non-technical) and gender (developed by authors)

As far as the age of the respondents is concerned, students are of age between 18 and 26, the mean age is 21, most often age of the students surveyed is 20 years. The mean year of study is 2.8. Descriptive statistics of age and year of study is presented in Table 2.

Table 2
Descriptive statistics of age and year of study

Variable	Range	M (SD)	Mdn (IQR)	Mo
Age	18-26	21.0 (1.7)	21.0 (20.0-22.0)	20
Year of study	1-5	2.8 (1.3)	3.0 (2.0-4.0)	4

Source: Authors' own calculations

Data about using online banking are shown if mosaic chart (Figure 2). The data were transformed so we can have information whether students are using online banking (in any form) or not.

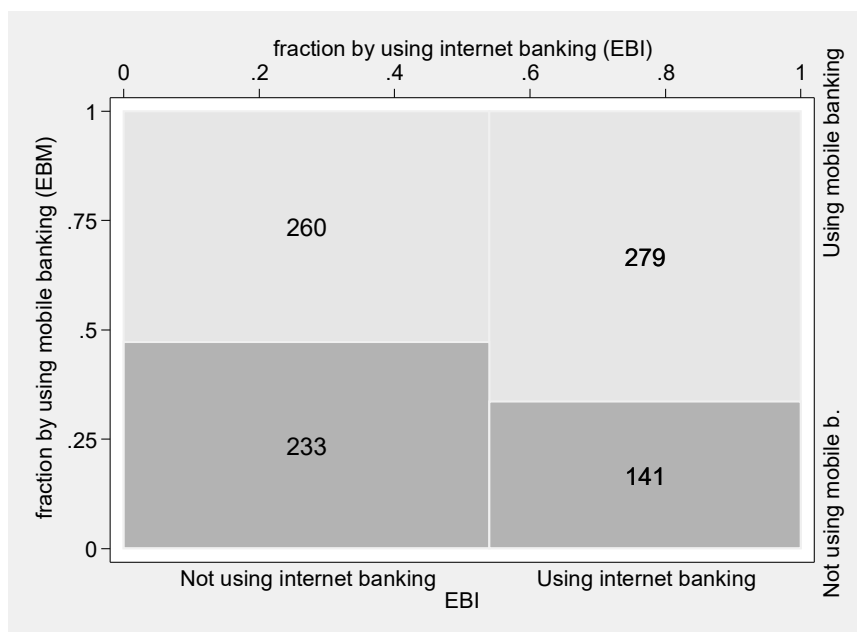


Figure 2
Using online banking by type (developed by authors)

Students are classified as using online banking if they stated to use internet banking only, mobile banking only or both internet and mobile banking (variable EB). Additionally, we have classified students as using internet banking and students using mobile banking. Students were classified as internet banking users (EBI) if they were using internet banking only or both internet and mobile banking. Those who were using mobile banking or both internet and mobile banking were classified as mobile banking users (EBM). Distribution of students according to their use of electronic banking is given in Table 3.

Table 3
Use of electronic banking

Variable	Not using	%	Using	%
EB-electronic banking	233	25.5	680	74.5
EBI-internet banking	493	54.0	420	46.0
EBM-mobile banking	374	41.0	539	59.0

Source: Authors' own calculations

We can see that almost tri quarter of students are using electronic banking in some form. Students prefer mobile banking to the internet banking, but we have researched whether use of internet banking and mobile banking is related. Pearson Chi-square test indicates the relationship between using internet banking and mobile banking $\chi^2(1, N=913)=17.576$, $p<0.001$.

Almost tri quarter of the surveyed students use online banking in some form, much more than 27% of the general population [21]. Students are more open to innovation in financial technologies, especially the use of technologies such as mobile devices. This is also in line with expectations.

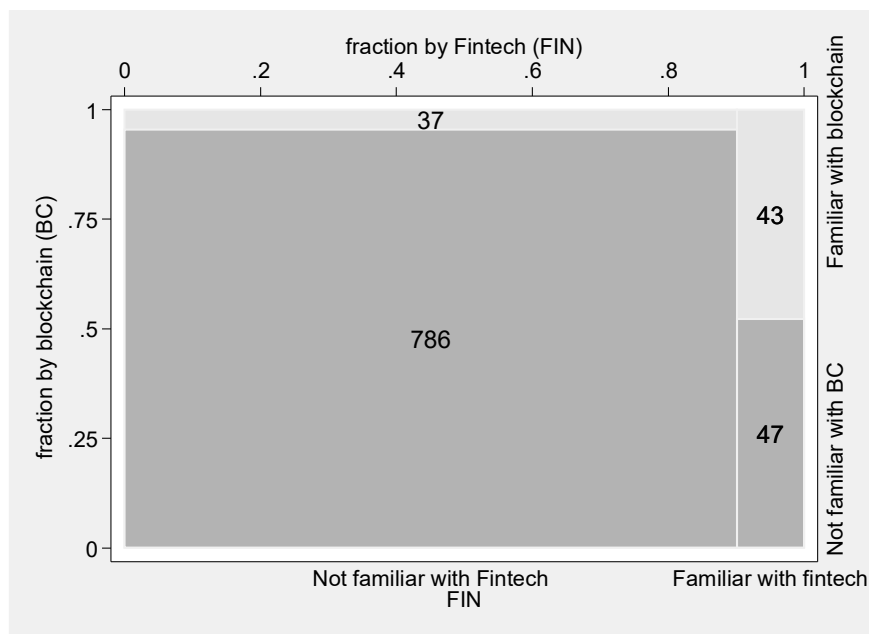


Figure 3

Familiarity with the terms "fintech" and "blockchain technology" (developed by authors)

In terms of awareness of the existence and use of "fintech", i.e., familiarity with the term "fintech" and of the term "blockchain technology" as part of financial technology, a small proportion of students knows about it. There are less than 10%

of students familiar with the term »fintech«, moreover familiarity with the term »blockchain technology« is even less than 9%. Combining this, in total there are less than 14% of students who are familiar with at least one of the terms »fintech« and »blockchain technology«. Mosaic chart (Figure 3) shows the distribution of familiarity with these terms of interest.

There is a relationship between familiarity with the terms “fintech” and “blockchain technology” as indicated by Pearson Chi-square test $\chi^2(1, N=913)=190.105, p<0.001$.

The adoption of innovations can be greatly influenced by this motivating context [37]. The only way fintech services will become operational and reach customers is through the adoption of the PSD2 directive, which will enable open banking, i.e., a way in which banks will be able to securely connect via APIs with fintech companies, the so-called “new players” in the banking industry.

There is low familiarity of Macedonian students with the terms fintech and blockchain technology. This is very important as we assumed that the familiarity with fintech has a positive impact on the use of online banking. Furthermore, the relevance of financial innovation is prerogative for sustainable development of small open economies as Macedonian [5]. Statistical analysis shows that 14.4% of students who are familiar with the term "fintech" do not use online banking, compared to 26.7% of those who are not familiar with it. Table 4 shows relationship numerically using Pearson Chi-square test.

Table 4
Chi-square test of familiarity with the term “fintech” and electronic banking

Electronic banking		Fintech		Pearson Chi-square	
		Not familiar	Familiar	χ^2	p
EB	Not using	220	13	6.444**	0.011
	Using	603	77		
EBI	Not using	454	39	4.571**	0.033
	Using	369	51		
EBM	Not using	345	29	3.155*	0.076
	Using	478	61		

Source: Authors' own calculations

Accordingly, familiarity with the term “blockchain technology” is another important term regarding financial technology. Relationship between familiarity of the term blockchain technology and use of online banking is tested with Pearson Chi-square test. Results indicating relationships are presented in Table 5.

Pearson Chi-square test is used to numerically show the relationship between familiarity with the terms “fintech” or “blockchain technology” with using online banking. The results are presented in the Table 6.

Table 5
Chi-square test of familiarity with the term “fintech” and electronic banking

Electronic banking		Blockchain technology		Pearson Chi-square	
		Not familiar	Familiar	χ^2	p
EB	Not using	223	10	7.820***	0.005
	Using	610	70		
EBI	Not using	461	32	6.916***	0.009
	Using	372	48		
EBM	Not using	353	21	7.850***	0.005
	Using	480	59		

Source: Authors' own calculations

Table 6
Chi-square test of familiarity with the term “fintech” and electronic banking

Electronic banking		Fintech of blockchain technology		Pearson Chi-square	
		Not familiar	Familiar	χ^2	p
EB	Not using	217	16	12.959***	<0.001
	Using	569	111		
EBI	Not using	441	52	10.118***	0.001
	Using	345	75		
EBM	Not using	338	36	9.711***	0.002
	Using	448	91		

Source: Authors' own calculations

The process of modernizing banking requires a parallel modernization process, i.e., the restructuring of university education study programs. This process can be realized through the modification of study programs, the introduction of new specialized programs on these subjects, the use of modern specialized literature, the provision of relevant resources of any kind with a newer date, and all this with the aim of training future potential employees and users of the innovative banking products and services to be competitive in the modern labor market. Descriptive statistics of the responses to the questions on the importance of financial technology during education is given in Table 7. We can conclude that students consider familiarity with financial technologies during faculty education as very important.

The results of these questions make it clear that it is necessary to change the courses of study, introduce new courses on the subject, use modern literature, provide relevant resources of all kinds with new data and with the aim of training future potential employees and users of innovative banking products and services to be competitive in the modern labor market.

Table 7

Descriptive statistics of Importance of familiarity with financial technology during faculty education

Variable	Range	Mdn (IQR)	Mo
Importance of familiarity with financial technology during faculty education	1-4	3 (3-4)	4

Source: Authors' own calculations

Number of researchers and studies have examined the positive impact of financial literacy on financial inclusion [38] [33]. It has also been found that the most financially excluded are those with low income and education [39], and that women are the most likely to be in these groups [40].

In order to better examine the relationship between gender and use of online banking we have used Pearson Chi-square test (Table 8). Results indicate significance between gender and use of mobile banking at the significance level of $\alpha=0.1$, while use of online banking in general and use of Internet banking does not show significance with gender even at the significance level of $\alpha=0.1$.

Table 8

Contains the result of comparing in pairs with the final result

Electronic banking		Gender		Pearson Chi-square	
		Female	Male	χ^2	p
EB	Not using	167	66	0.987	0.321
	Using	463	216		
EBI	Not using	350	142	2.121	0.145
	Using	280	140		
EBM	Not using	271	103	3.393*	0.065
	Using	359	179		

Source: Authors' own calculations

Several researchers and studies have examined the positive impact of financial literacy on financial inclusion [41] [42]. It has also been found that the most financially excluded are those with low income and education, and that women are the most likely to be in these groups [43].

With Pearson Chi-square test we have tested the relationship between field of study and online banking. Results presented in Table 9 indicate relationship between field of study and using online banking in general at significance level $\alpha=0.05$ and with using mobile banking at significance level $\alpha=0.01$, while there is no relationship with using internet banking even for level $\alpha=0.10$.

Table 9
Chi-square test of familiarity with the term “fintech” and electronic banking

Electronic banking		Field of study		Pearson Chi-square	
		Non-technical	Technical	χ^2	p
EB	Not using	205	28	4.835**	0.028
	Using	556	124		
EBI	Not using	419	74	2.073	0.150
	Using	342	78		
EBM	Not using	332	42	13.404***	<0.001
	Using	429	110		

Source: Authors' own calculations

3.3 Logistic Regression Model and Discussion

We are researching the influence of the gender, field of study and familiarity with the terms “fintech” or “blockchain technology” on using electronic banking. Since use of electronic banking is a dichotomous variable, we will build logistic regression model.

Because of the different number of students who are using online banking (in general, internet banking or mobile banking) than those who are not using those, the data are imbalanced which can influence the results and goodness of fit of the models. In order to solve this problem, we have used a two-stage approach. We have used stratified sampling and generation of synthetic data. We have first split the dataset into training and test datasets (70%:30% data) using stratified sampling. In this way both subsets have original distribution of the outcome classes.

In the next step we have used Synthetic Minority Over-sampling Technique (SMOTE) for the training set only. SMOTE uses interpolation between samples of the minority class and their nearest neighbors and thus generates synthetic cases of minority class, instead of just duplicating existing cases. In this way we have reduced the risk of overfitting and also improved the ability of the model to learn minority class samples.

We have not changed the test set, so the original class imbalance has remained. In this the assessment of the model reflex the real-world conditions. The evaluation of the predictive performance is thus unbiased.

We have done separate SMOTE balancing for three dependent variables: EB, EBI and EBM generating three sets of SMOTE balanced data. We have built logistic regression models using SMOTE balanced training datasets. We have evaluated the models on unbalanced test dataset, so the goodness of fit measures accurately represents the models in real-world scenarios.

Dependent variable is use of electronic banking (EB) additionally, we will also check how model fits use of internet banking (EBI) and use of mobile banking (EBM). Besides independent variables we are also included covariate variables in order to avoid spurious regression. Covariate variables included for all models are year of study, and questions regarding the electronic banking of the bank that respondent is using, is it very complex to use, is it interconnected in terms of services, is the choice limited, is it suitable to use and is bank offering innovation in the field of electronic assistant. Additionally, there are covariates for using electronic banking in general and using mobile banking: is bank offering innovation in the field of lending, using electronic banking of respondent's bank is fun and contents that deal with the field of financial technologies were covered during studying. There are additional covariates specific to the use of internet banking: electronic banking of the respondent's bank fully meets the respondent's needs, respondent's belief that bank takes care of its customer, bank's offering innovation in communication through social networks and respondent's attitude on the importance of the familiarity with financial technologies during the faculty education.

Familiarity with the terms “fintech” and “blockchain technology” is highly related, so as an explanatory variable we have used synthetic variable familiarity with the terms “fintech” or “blockchain technology” (FINBC) instead of two separate variables.

At first, we have treated gender and field of study as two separate variables, without interaction. Estimated models (Model 1) for using online banking (Model 1a), using internet banking (Model 1b) and using mobile banking (Model 1c) are given in Table 10.

Table 10
Logistic regression models 1

	Model 1a	Model 1b	Model 1c
Dependent variable	EB	EBI	EBM
Independent variables			
FINBC	0.875*** (0.333)	0.476* (0.265)	0.813*** (0.299)
G (Female)	-0.632*** (0.242)	-0.173 (0.203)	-0.450** (0.212)
Fi (non-technical)	-1.000*** (0.303)	0.0264 (0.245)	-0.880*** (0.277)
Constant	-1.307 (1.227)	-1.236 (1.470)	-0.650 (1.176)
LR χ^2 (df)	593.77 (30)	108.82 (36)	259.18 (30)
p	<0.001	<0.001	<0.001
Pseudo R ²	0.45	0.11	0.25

	Model 1a	Model 1b	Model 1c
Sensitivity	0.80	0.67	0.71
F1 score	0.83	0.63	0.74

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors' own calculations

Goodness-of-fit was assessed by likelihood ratio test, pseudo R^2 , sensitivity and F1 score. Chi-square statistics is significant for all tri models, pseudo R^2 are commonly lower than R^2 in OLS regression so direct comparison is not possible. We can see that model for general use of electronic banking has the pseudo R^2 , as well as sensitivity and F1 score higher than model for using electronic banking by mobile devices and both have higher measures of goodness of fit than model of electronic banking via internet. We can see that those who are familiar with the terms “fintech” or “blockchain technology” have greater probability than those who are not familiar with neither term for using online banking in general and for both components of online banking i.e., for using internet banking and for using mobile banking. The relationship is significant at the level of significance $\alpha=0.01$ for using electronic banking in general and using mobile banking and at the level of significance $\alpha=0.10$ for using internet banking. Coefficients are transformed in odds ratio which enables as to find the percentage change in odds. Coefficient of 0.875 is transformed into odds ratio of 2.399 which means that the odds of those familiar with the terms of interest are by 140% higher to use online banking compared to those who are not familiar with those terms. In similar way other coefficients are transformed into odds ratio and percentage change of odds. Familiarity with the terms “fintech” and “blockchain technology” increases odds of using internet banking and mobile banking by 61% and by 125% respectively, compared to students not familiar with the terms. Those results are in the favor of the H1 hypothesis.

As far as gender is considered it have significant effect on using online banking for using electronic banking in general at the level of significance $\alpha=0.01$ and for using mobile banking at the level of significance $\alpha=0.05$, while it does not have significant effect even at the level of significance at $\alpha=0.10$ for using internet banking. Female students have 47% lower odds for using electronic banking in general, and 36% lower odds of using mobile banking as compared to male students. Such results are in line with the results of the Pearson Chi-squared test that show only partially significant relationship. Those results are partly in line with the H2 hypothesis.

Studying non-technical field significantly decreases probability of using electronic banking in general and using mobile banking compared to those studying other fields, at the level of significance of $\alpha=0.01$, but it does not significantly influence use of internet banking even at the level of significance $\alpha=0.10$. Non-technical field of study decreases odds of using online banking in general by 63% and use of mobile banking decreases by 59% compared to the technical field of study.

At the paragraph 3.2. Descriptive statistics and Chi-square test we have seen that gender and field of study is related, so we want to see how does interaction of those to variables affect the use of online banking. We will not look at the effect of separate variables gender and field of study, but at the interaction variable Gender#Field of study. Interaction variable can have four levels: 1) male-technical, 2) male-non technical 3) female-technical and 4) female-non technical. We want to see the effect of the combination of variables to the use of online banking. The new models are called models 2 and are presented in the Table 11.

Table 11
Logistic regression models 2

	Model 2a	Model 2b	Model 2c
Dependent variable	EB	EBI	EBM
Independent variables			
FINBC	0.910*** (0.336)	0.483* (0.267)	0.813*** (0.298)
Gender#Field of study ^a			
Male-non technical	-1.556*** (0.521)	-0.501 (0.344)	-0.784* (0.403)
Female-technical	-1.349** (0.586)	-1.040** (0.442)	-0.304 (0.493)
Female-non technical	-2.042*** (0.484)	-0.447 (0.305)	-1.265*** (0.368)
Constant	-0.901 (1.275)	-0.949 (1.477)	-0.717 (1.192)
LR χ^2 (df)	595.66 (31)	113.82 (37)	259.29 (31)
p	<0.001	<0.001	<0.001
Pseudo R ²	0.45	0.12	0.25
Sensitivity	0.80	0.68	0.74
F1 score	0.83	0.64	0.75

Notes: *** p<0.01, ** p<0.05, * p<0.1; ^a reference category: Male- technical

Source: Authors' own calculations

As in the first group of models, familiarity with the terms “fintech” or “blockchain technology” increases probability of using online banking at the significance level of $\alpha=0.01$ for using electronic banking in general and in mobile form and at the significance level of 0.10 for using electronic banking via internet. Familiarity with those terms increases odds of using online banking in general by 149%, while increasing odds of using internet banking by 62% and increasing odds of using mobile banking by 125% compared to those who are not familiar with the terms.

Results for the interaction of gender and field of study gives some additional results compared to the models 1. Reference value of combination of gender and

field of study is male-technical. All other combinations are compared to that reference value. We can see that male-non technical students have lower probability to use online banking compared to male technical students at the level of significance $\alpha=0.01$ for online banking in general and at the level of significance $\alpha=0.10$ for using mobile banking. Odds for male non-technical students of using online banking in general, and mobile banking decrease by 79%, and by 54% respectively compared to male-technical students. It is similar for female-non technical students, but in this case level of significance for online banking in general and for mobile banking is $\alpha=0.01$ in both cases, odds are decreased by 87%, and 72% for using online banking in general, and mobile banking respectively compared to male-technical students. Interesting combination is female-technical students, their probability for using internet banking in general and using internet banking is significantly lower at the level of significance $\alpha=0.05$ than of male-technical students and decrease in odds in this case is by 74% and 65% for online banking in general and for internet banking compared to male-technical students. There is no significantly different change in odds of using mobile internet at the level of significance $\alpha=0.10$.

Lower probability of using online banking (in any form) of male-non technical than male-technical could be comparable to the model 1 as the difference in the field of study. It is not so for the lower odds of using online banking of female non-technical students to the male non-technical students were this could be attributed to the gender. As for lower use of online banking of female-non technical than male-technical it is not so clear as to what part to attribute it, being female or being non-technical, looking at the other results we can suppose that it is mostly non-technical part, but female gender should also be taken into consideration.

Looking at this part of the model we can see that the interaction of gender and field of study is significant in the model and uncovers more complex influence of gender and field of study than looking at those variables separately. Not being male-technical student significantly lowers probability of using (at least) some type of online banking.

This groups of models are in line with the hypothesis H1 (students who are familiar with the terms “fintech” or “blockchain technology” are more likely to use online banking, and is also in favor of the hypothesis H3 (technical students are more likely to use online banking) and partially with the hypothesis H2 (women are less likely to use online banking than men).

Conclusions

The main objective of this research was to identify the characteristics and constraints of students in North Macedonia as online bank customers and future professionals in the financial sector (banking).

The importance of fintech is increasing dramatically in both economic and social terms, and the directions of influence are mutual. The increasing efficiency of businesses affects social relations in society, and the socio-economic characteristics of society are boundaries and indicators of institutional capacity to accept new financial technologies. The use of fintech makes it possible to change business practices and thus influences the reformulation of the economic sector, especially in the banking sector, which is increasingly exposed to competitive pressure.

Considering the above three factors influencing banking (Factor 1: changing consumer behavior, Factor 2: technology-driven innovation and Factor 3: European regulatory intervention) and the results of the survey, the following should be highlighted:

- The results of the statistical analysis of the data obtained with the survey confirm the hypotheses as follows: The groups of models are in line with the hypothesis H1 (students who are familiar with the terms “fintech” or “blockchain technology” are more likely to use online banking, and is also in favor of the hypothesis H3 (technical students are more likely to use online banking) and only partially with the hypothesis H2 (women are less likely to use online banking than men).
- Existing infrastructure (number of mobile phones among students), there is a great potential for the adoption of on-line and especially mobile banking in North Macedonia. Macedonian banks should find ways to motivate and encourage students to use electronic banking in order to increase financial inclusion.
- The process of modernizing the banking system presupposes a parallel modernization process, i.e., a restructuring of university curricula. The findings of the study suggest that more efforts should be made to introduce fintech programs into existing degree programs, but also that the socio-economic characteristics of society shape institutional capacity (the importance of informal institutions) in the acceptance of new technologies when it comes to the gender difference in the acceptance of the same.
- It is recommended that a similar study should be conducted at a later stage, when the regulation that will enable intensive development of Fintech in North Macedonia comes into force.

This work has certain limitations in that it only focusses on students, who are potential active users and professionals; the general public is not covered. Larger populations and cross-national comparisons should be the main topics of future research.

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