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Article

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Impact of the Mobile Banking Application Ratings on the Vietnamese Bank Service Income

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Abstract

Based on the relationship between fintech and bank performance and the role of mobile applications in bank operations, we investigate the impact of mobile banking application (MBA) ratings on bank service income. The quarterly data from the 15 biggest Vietnamese commercial banks in 2019–2020 were extracted from the public financial statements and the Google Play Store. The Generalized Least Squares method is applied to process the proposed regression models. We find a positive impact of MBA ratings on bank service income. We additionally explore the MBA quality of a large bank that does not meet customer expectations and how the interaction between MBA ratings and leverage harms bank service income. Finally, users generally appreciate the MBA quality, and COVID-19 does not affect the link between MBA ratings and bank service income. The study provides novel knowledge on customer behavior through MBA ratings and their effect on bank service income in an emerging country.



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Introduction

Under the growth of internet infrastructure and mobile devices, especially smartphones, smartphone applications have become indispensable. In the banking industry, besides automated teller machines (ATMs) and telephone and Internet banking, mobile banking applications (MBAs) are the latest technology used to deliver traditional banking products, such as transfers, savings, and credits (Safeena et al. 2012; Shaikh and Karjaluoto 2015). MBAs are one of the outcomes of bank fintech, reflecting banks' adaptation to and competition with fintech companies in the digital world.

According to Lee and Shin (2018) and FindeXable (2020), mobile payments and peer-to-peer lending are the two largest segments of fintech, which are also the main banking segments (basic segment). A fintech company does not need a physical transaction office to distribute its products. Through fintech mobile applications, a fintech company can reduce operating costs resulting in fewer (or no) physical offices, and transactions via smartphone are handled and completed quickly; it is an advanced factor of fintech companies that allows them to compete with the incumbents in the banking industry. The rise of fintech companies increases the pressure to digitize banking (Niemand et al. 2021). We argue that MBA development is the best solution for the current context and long-term banking strategy regarding banks' information technology (IT) investments. There is a positive relationship between MBA and an increase in customer needs, customer satisfaction, and bank performance (Shaikh and Karjaluoto 2015; Daniyan-bagudu et al. 2017; Tam and Oliveira 2017; Shanmugam and Nigam 2020; Meena and Parimalarani 2020).

Additionally, MBA quality and customer satisfaction are critical factors in customer behavior (Sampaio, Ladeira, and Santini 2017; De Leon, Atienza, and Susilo 2020). We argue that if users feel satisfied with the MBA, they will continue to use it; if not, they will stop and find another one to replace it. Therefore, customer satisfaction with the MBA decides the use frequency and might affect the bank's income (from commission and transaction fee).

According to Pagano and Maalej (2013) and Genc-Nayebi and Abran (2017), user feedback on satisfaction and application quality is beneficial. User reviews and ratings on mobile app stores are trusted and reliable feedback. Most scholars are only interested in using mobile app store feedback to evaluate MBAs; in particular, they use MBA ratings to investigate the influence on bank performance. Therefore, in this study, we use

app store ratings for MBAs to examine the effect of MBAs on bank performance, namely bank service income.

The study contributes novel knowledge on the effect of customer behavior on bank performance. Specifically, MBA ratings are used to measure bank customer satisfaction and investigate its effect on bank service income in Vietnam, an emerging country. The key finding is that banks increase service income if customers highly appreciate the MBA quality. Furthermore, based on the findings, we suggest that the relationship between MBA quality, MBA user experience, and bank characteristics should be considered carefully to enhance bank service income.

Literature review

The impact of mobile banking applications on bank performance

MBA development is part of a bank's IT investment (Shaikh and Karjaluoto 2015). The empirical results of the relationship between IT investment and bank performance are varied. Beccalli (2007) found that acquiring the technology negatively affects IT investment, but it is positive with outsourcing. Pham et al. (2021) found that IT investment decreases bank efficiency in Vietnam and Pakistan. In contrast, Wang et al. (2020) explored the positive effect of IT investment on bank performance in Turkey.

One of the outcomes of IT investment is MBAs. However, to date, research into the impact of MBAs on bank performance has attracted little interest. Interviewing 301 respondents using MBAs from Egypt, Mostafa (2020) found the positive effect of MBA quality on customer loyalty and the chance to penetrate niche markets, especially the retail banking market. Using primary data from a survey, Daniyan-bagudu et al. (2017) found a positive effect of MBAs on the financial performance of 22 banks in Nigeria. Meena and Parimalarani (2020) stated that the banking products distributed via smartphone applications reduce the banking workforce, helping to save operating costs and increase banks' profit. However, they create new challenges for the bank, such as cybersecurity and new requirements of the workforce. The review study by Tam and Oliveira (2017) indicated a causality between MBA development and customer behavior change. MBAs change customer behavior in using banking products and shopping online (e-commerce). Increasing customer needs and more transactions via MBAs motivate banks to improve the MBA. Overall, we discuss how the customer factor moderates the relationship between MBA and the bank. The customer attitude with the MBA is a critical factor in bank performance.

User feedback on the app store

Technological innovation is a critical factor in firm competitiveness, and mobile apps are one of the outcomes of technology innovation. Ye and Kankanhalli (2020) found that the customer plays a critical role in mobile app performance, deciding a firm's success, especially in a service industry like the banking sector. Pagano and Maalej (2013) stated that user ratings and reviews about applications are valuable information to application developers and potential users. User feedback reflects the application's quality and user behavior. In 2016, a survey of 301 MBA users in Egypt showed that MBA quality positively correlates with customers' value co-creation intentions (Mostafa 2020).

Mobile application reviews and ratings on app stores have been used in academic research in various fields. For example, in the healthcare industry, Plante et al. (2018) and Schumer, Amadi, and Joshi (2018) used reviews and ratings on the Google Play Store and Apple App Store to evaluate dietary and nutritional apps and a blood pressure-measuring smartphone app, respectively. Consulting mobile app developers, Hu et al. (2019) suggested that the star ratings of apps (cross-apps) on a specific platform (Google Play Store or Apple App Store) is significant for comparison. However, there is a difference in particular app ratings between platforms. Jisha, Krishnan, and Vikraman (2018) found a substantial relationship between security risk and user reviews of mobile apps on the Google Play Store platform. Kapoor and Vij (2020) showed that login time, visual design, navigation design, information design, collaboration, and service quality are significant factors in MBA ratings and reviews in the banking sector.

Consequently, based on the existing publications mentioned above, using users' ratings and reviews on app stores is a valuable tool for measuring MBA quality. Therefore, this study investigates how MBA ratings influence bank service income.

Research methodology

Study scope

Vietnam's commercial banks were selected for investigation for the following reasons. Firstly, Vietnam is an emerging country where numerous people do not have a bank account. However, the IT infrastructure is highly developed, which is suitable for the development of fintech companies and MBAs (Demirguc-Kunt et al. 2018; Nguyen, Dinh, and Nguyen 2020). Secondly, the policy for promoting cashless payments, e-banking activities, and the fintech development of the Vietnamese Government was revealed, which is the background for MBA development (MBSecurities 2018). Finally, finance is a pioneering industry in Vietnam's economic transformation (Vo 2016; Nguyen, Ho, and Vo

2018). We believe that MBAs play a crucial role in bank performance during the transformation. Therefore, we argue that Vietnam's banks are suitable for the study.

The two largest smartphone operating systems globally are Android and iOS, with many applications on Google Play and Apple's App Store. Most smartphones in Vietnam run Android; hence, we selected Vietnamese commercial banks' MBAs on Google Play to collect the reviews. There are fewer constraints about application updates and publishing user reviews on Google Play than on the App Store (Ye and Kankanhalli 2020); thus, users' thoughts are more valuable. Furthermore, we feel free to access the public information about users' reviews on Google Play; it is very useful and suitable for the proposed study.

In December 2019, the first infection of COVID-19 was confirmed in Wuhan, China. The number of infected cases rapidly increased, and COVID-19 became a global pandemic that is still going on. The socio-economic effects of COVID-19 have attracted many scholars. Regarding the primary banking products, Pham and Popesko (2020) gave that in the context of COVID-19, mobile payment has a chance to develop. Zachariadis, Ozcan, and Dinckol (2020) revealed that during COVID-19, there was a significant increase in the number of fintech applications that were downloaded. We believe that users' experience of COVID-19 might differ from the pre-COVID-19 times. Therefore, the time scale consists of two stages: from 2019q1 to 2019q4 (pre-COVID-19) and from 2020q1 to 2020q4.

Model

To investigate the impact of MBA ratings on bank service income, a linear regression was formulated:

$$Service_{it} = \alpha + \beta_1 App_{it} + \beta_2 Contr_{it} + \mu_{it} + \varepsilon_t, \quad (1)$$

where, $Service_{it}$, App_{it} , and $Contr_{it}$ are the service income, MBA ratings, and control variables of bank i at quarter t , respectively. μ_{it} is time-varying across banks and over time. ε_t is the bank effect to cover the specific heterogeneity.

Data

The service income variable consists of the logarithm of service income, net service income, and net service income ratio on return before tax. The control variables consist of bank size and leverage, reflecting the commercial banks' unique features. According to the Vietnamese Stock Exchange Market Commission regulation, listed companies must disclose quarterly financial statements to the media. In Vietnam, Vietstock is the trusted statistical organization and a specialist in the stock market (Pham and Qud-

dus 2021); thus, we select Vietstock as the primary source to collect the financial statements and other important reports of the listed banks. Based on that, the variables were computed.

The MBA rating variables encompass the total star ratings' logarithm and the average star ratings (equal to the total of the star ratings divided by the number of users who rated the MBA). The variables are collected and computed based on public information about star ratings on Google Play.

The strongly balanced panel data from the 15 biggest listed banks (by total assets) in the Vietnamese Stock Exchange Market from 2019Q1 to 2020Q4 was used to investigate the effect of MBA ratings on bank service income.

Results and discussion

To understand the feature of the variables, the descriptive statistics are shown in Table 1.

Table 1. Descriptive statistics

Variable	Measurement	Obs.	Mean	SD	Min	Max
ICS	Logarithm of service income	120	5.813666	.4543262	4.806878	6.630461
NIC	Logarithm of net service income	120	5.622511	.4193595	4.51371	6.486932
ICR	Net service income on return before tax	120	.3519033	.2908266	.046569	1.854991
REV	Logarithm of number of star ratings	120	2.989731	.4701991	2.170262	3.893651
STA	Average of star ratings	120	4.083921	.3568899	2.992366	4.91731
SIZE	Logarithm of total assets	120	8.550459	.3345006	8.00414	9.180948
LEV	Ratio of liability on equity	120	11.88792	4.133809	.6855129	23.3133

Source: the authors' elaboration.

Table 1 shows some interesting data. Firstly, the ICR row shows that the average net service income accounts for over 35% of the return before tax in the sample period, which shows the critical role of service income in total bank income. We argue that with the support of fintech, the weight of service income will be higher in the future. An observation is that income service is the main contributor to bank profit (ICR_{max} is 1.85), or net service income is higher than return before tax, which might be explained by the loss of credit operation (a decrease

in interest income). Meanwhile, the bank can earn more money from fees and commissions. Secondly, the average star rating is so high that STA_{mean} is slightly over 4 stars. The STA_{min} and STA_{max} are rated nearly 3 and 5 stars, respectively. With 5-star rankings on Google Play, we believe that the users evaluate the MBAs as high quality and that they meet their needs. In fact, after reading the comments about the MBAs, we feel that most users are satisfied with using the MBAs. It is the necessary condition that influences bank performance.

Next, according to Gujarati and Porter (2009), if the maximum absolute value of the correlation coefficients between variables is over 0.8, there will be a multicollinearity effect in the regression model. Therefore, the correlation between variables is estimated before processing the regression model. Based on the correlation matrix, a suitable model will be proposed.

Table 2. The correlation between variables

Variable	ICS	NIC	ICR	REV	STA	SIZE	LEV
ICS	1.0000						
NIC	0.9788	1.0000					
ICR	0.2658	0.3060	1.0000				
REV	0.7898	0.7360	0.0561	1.0000			
STA	0.0614	0.1459	-0.1038	-0.1504	1.0000		
SIZE	0.8013	0.7461	0.1334	0.6247	0.0970	1.0000	
LEV	0.1389	0.1227	0.2843	0.0025	0.0382	0.4908	1.0000

Source: the authors' elaboration.

Table 2 shows that the correlations between ICS and NIC, and ICS and SIZE exceed 0.8, i.e., they are 0.9788 and 0.8013, respectively. The correlations between the other variables are less than 0.8. Because ICS and NIC are the dependent variables, they are not being in the same model; thus, the correlation between ICS and NIC does not influence the estimation results. However, the correlation between ICS and SIZE is over 0.8, and SIZE is the control variable; thus, SIZE is excluded from the ICS regression model. Based on that and the proposed model above (equation 1), we formulate three models for the study:

$$\text{Model 1: } ICS_{it} = \alpha_1 + \beta_1 REV_{it} + \beta_2 STA_{it} + \beta_4 LEV_{it} + \mu_{it} + \varepsilon_t, \quad (2)$$

$$\text{Model 2: } NIC_{it} = \alpha_2 + \beta_4 REV_{it} + \beta_5 STA_{it} + \beta_6 LEV_{it} + \beta_7 SIZE_{it} + \mu_{it} + \varepsilon_t, \quad (3)$$

$$\text{Model 3: } ICR_{it} = \alpha_3 + \beta_8 REV_{it} + \beta_9 STA_{it} + \beta_{10} LEV_{it} + \beta_{11} SIZE_{it} + \mu_{it} + \varepsilon_t. \quad (4)$$

Next, the variance inflation factor (VIF) of models 1, 2, and 3 are estimated. Table 3 shows that all VIF statistics are very low, under 4.0, the threshold of VIF for a regression model having under ten independent variables (Gujarati and Porter 2009; Salmerón Gómez et al. 2020). Therefore, the proposed independent variables are suitable for models 1, 2, and 3.

Table 3. The variance inflation factor

	REV	STA	LEV	SIZE
Model 1	1.02	1.02	1.00	–
Model 2	2.27	1.12	1.69	2.94
Model 3	2.27	1.12	1.69	2.94

Source: the authors' elaboration.

Next, the fixed-effect (FE) and random-effect (RE) approaches were applied to estimate panel data regression, and the Hausman test was employed to choose the suitable estimation results between FE and RE.

Table 4. The estimation results by the GLS approach

	Model 1 (ICS)				Model 2 (NIC)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cons	2.501*** [10.96]	2.185*** [5.16]	1.578** [2.24]	2.409*** [11.36]	–2.001*** [–3.99]	–2.957*** [–4.95]	–2.949*** [–4.28]	–1.933*** [–3.71]
REV	.768*** [26.38]	.873*** [7.17]	.762*** [25.91]	.772*** [27.66]	.318*** [7.25]	.626*** [5.42]	.322*** [7.21]	.327*** [7.28]
STA	.211*** [4.14]	.203*** [3.92]	.440** [2.54]	.220*** [4.58]	.090* [1.89]	.102** [2.18]	.350** [2.53]	.097** [2.05]
LEV	.016*** [5.24]	.049 [1.31]	.101 [1.63]	.017*** [5.77]	–.020*** [–5.16]	.078** [2.27]	.057 [1.27]	–.019*** [–4.58]
SIZE					.764*** [10.60]	.749*** [10.61]	.747*** [10.40]	.748*** [9.76]
REV*LEV		–.010 [–0.88]				–.029*** [–2.88]		
STA*LEV			–.021 [–1.37]				–.018* [–1.72]	

	Model 1 (ICS)				Model 2 (NIC)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
COV				.070***				.016
				[2.58]				[0.60]
Wald statistic	752.72***	757.48***	769.07***	855.74***	749.75***	804.60***	736.98***	770.85***

	Model 2 (NIC)		Model 3 (ICR)					
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Cons	-18.835***	-15.459***	.903**	.726	1.568**	-4.863	6.123	.894**
	[-6.37]	[-2.96]	[2.11]	[1.42]	[2.17]	[-1.59]	[1.13]	[2.07]
REV	5.664***	.331***	.115***	.160*	.116***	1.943**	.122***	.114***
	[6.16]	[7.51]	[3.01]	[1.92]	[3.02]	[2.05]	[3.14]	[2.96]
STA	.106**	3.461***	-.031	-.029	-.173	.007	-1.260	-.032
	[2.51]	[2.69]	[-0.76]	[-0.69]	[-1.36]	[0.15]	[-0.97]	[-0.76]
LEV	-.0164***	-.0184***	.0150***	.030	-.043	.017***	.015***	.015***
	[-4.24]	[-4.11]	[4.35]	[1.22]	[-0.87]	[4.66]	[4.33]	[4.24]
SIZE	2.744***	2.335***	-.115**	-.113**	-.125**	.540	-.747	-.113**
	[7.97]	[3.75]	[-2.04]	[-2.00]	[-2.16]	[1.53]	[-1.15]	[-1.98]
REV*LEV				-.005				
				[-0.61]				
STA*LEV					.014			
					[1.17]			
REV*SIZE	-.630***					-.213*		
	[-5.85]					[-1.92]		
STA*SIZE		-.395***					.148	
		[-2.59]					[1.13]	
COV								.002
								[0.09]
Wald statistic	1039.73***	665.14***	28.33***	29.13***	28.71***	30.95***	27.50***	27.57***

Note: *, **, and *** are the significant level at 10%, 5%, and 1%, respectively

Source: the authors' elaboration.

According to Cheruiyot (2017) and Pham et al. (2021), size significantly impacts a bank's IT activities and performance. The ratio of liability on equity is a unique characteristic of commercial banks compared with other companies, reflecting their risk-taking (Pasiouras, Tanna, and Zopounidis 2009; Buchak et al. 2018; Le 2020). The interaction of bank features (size and risk-taking) and customer behavior affect bank performance

(Ito and Sasaki 2002; Suh and Han 2002). Therefore, besides the original models 1, 2, and 3 mentioned above, we also investigate the effect of the interaction between MBA ratings and bank characteristics on bank service income; thus, $REV*SIZE$, $REV*LEV$, $STA*SIZE$, and $STA*LEV$ are added to the proposed models.

Furthermore, as we mentioned above about the time before and during COVID-19, we set up the dummy variable to express the COVID-19 factor (denotes COV); namely, $COV = 0$ for pre-COVID-19, and $COV = 1$ during COVID-19. The COVID-19 variable is added to the proposed models to estimate the effect of COVID-19 on the relationship between bank service income and MBA ratings.

The estimation results from the FE and RE approaches are then handled by the Hausman test to choose the suitable results between FE and RE. We use the Wald/Breusch-Pagan Lagrange and Wooldridge tests to check for heteroskedastic and autocorrelation problems, respectively. The outcome shows that all estimation results by FE or RE approaches have heteroskedastic and/or autocorrelation issues. According to Baltagi (2005) and Gujarati and Porter (2009), the Generalized Least Squares (GLS) approach is used to fix the problem(s). Table 4 shows the estimation results using the GLS approach, which is used to explain the effect of MBA ratings on bank service income. All models are significant at the 1% level, meaning the independent variables are suitable for explaining the change in the dependent variable.

The REV coefficients of all models are positive and significant, which means the number of star ratings on Google Play is a positive factor of service income, net service income, and the ratio of net service income on return before tax. The STA coefficients of model 1 (ICS) and model 2 (NIS) are positive and significant, but are not substantial for model 3 (ICR). The average star rating positively influences the service income (both gross and net service income). The contribution of the service income on the whole return is not affected by the average star rating. These findings are significant evidence that is consistent with the argument we mentioned in the literature review section. A high star rating increases bank service income, which mainly contributes to the whole bank's performance.

Two reasons might explain the positive effect of MBA ratings on bank service income. First, typically, after a few days of installing an MBA and completing a few transactions, users are asked to leave an evaluation of the app in the store. If they feel that the MBA is good and meets their demands, they will leave high ratings, and if not, they will not. As mentioned above, the data show that most MBAs are highly rated, and we argue that it positively affects customer intention for subsequent financial demand. Meanwhile, Mostafa (2020) found that MBA quality has a positive link with customer added value. Therefore, based on that, we believe that a high MBA rating increases the number of transactions and bank service incomes, especially regarding the revenue from mobile transaction functions. Second, besides earning directly from transactions through the app, the bank service income

might increase from cross-selling products when a customer is highly interested in using the app. The collaboration between banks and e-commerce platforms, banks and fintech companies, and banks and insurtech companies, are indispensable trends in the digital era (Puschmann 2017; Yan, Schulte, and Kuo Chuen 2018; Kumar et al. 2021). Based on that, MBA facilitates the development of the partners' products, and relying on it, the banks might expand their influence and benefit from the third parties.

Bank size increases net income service but reduces the net income service ratio before tax. Additionally, the interaction between bank size and mobile banking application review ($REV \times SIZE$ and $STA \times SIZE$) is positive with NIC and ICR. We believe that large banks are in the advanced stages of MBA development, and large banks are considered more trusted and reliable than small ones (Ito and Sasaki 2002; Suh and Han 2002). Thus, customers tend to select the MBAs of large banks, increasing bank income service. However, the quality of large banks' apps does not meet users' expectations; thus, the interaction between MBA ratings and bank size negatively affects net income service and service distribution in the whole return.

The LEV coefficients are different between the models, i.e., they significant and positive in columns (1), (6), (11), (13), and (15), significant and negative in columns (5), (9), and (10), and insignificant in the rest of the columns. It might be explained by the banks' different financial structures (Le 2019). According to SBV (2020), few Vietnamese banks meet the requirement of Basel III regarding capital adequacy and risk management. They focus on increasing bank service income, while other banks with high risk tend to earn interest. Additionally, the estimation result shows that the interaction between LEV and MBA ratings is negatively significant in columns (6) and (7), which means the combination of the high leverage and the increase in MBAs is harmful to the income service.

The COVID-19 factor does not influence net bank service income or the ratio of bank service income on return before tax. However, it significantly affects bank service income. During COVID-19, bank service income was positively correlated with star ratings. The Vietnamese Government's COVID-19 pandemic adaptation strategy was appreciated and suitable for the conditions in Vietnam. In fact, in 2020, the Zero-Covid strategy was executed very effectively in Vietnam. Vietnam is mostly in lockdown regarding international connections. However, domestic socio-economic activities are still happening in typical ways, and they seem to be less affected by the COVID-19 pandemic. Thus, there is no distinction between customer behavior in using MBAs between the two periods of the sample. Based on that, the findings on the influence of the COVID-19 factor on bank performance are suitable for the current Vietnamese economic context.

Conclusion

In the digital era, fintech has become a crucial sector in the finance industry; it is both an opportunity and a threat to banks. There are many ways that banks have adapted to the rise in fintech. Developing MBAs is one of the best solutions, and they are also the best result of banks' IT investments. The study is on the significant relationship between IT investment and bank performance and the emerging issue of user ratings on app stores. Based on the review of existing publications, the regression model is formulated to investigate the influence of MBA ratings on bank service income. The quarterly data from the 15 biggest listed banks in the Vietnamese Stock Exchange market from 2019q1 to 2020q4 is aggregated from Vietstock and Google Play. To process the proposed models, the FE and RE approaches were initially applied, but we explored the estimation results with the heteroskedastic and/or autocorrelation problems; thus, we then used the GLS approach to fix these problems.

The findings are: (1) the quality of MBAs on Google Play is highly appreciated by users; (2) there is a significant positive impact of MBA ratings on bank service income; (3) large banks are more advanced in enhancing service income than small banks; however, it seems that the quality of large banks' MBAs does not meet customer requirements; (4) banks have high leverage, and MBA ratings seem to be harmful to service income; and (5) COVID-19 does not affect the relationship between MBA ratings and bank service income in Vietnam.

The reviews on Google Play consist of star ratings and comments, which might be used to measure MBA quality. However, in this study, only star ratings were used to measure the MBA quality; we consider it a limitation. Therefore, we propose that future research should consider the aggregation measure of MBA quality by ratings and comments. In the digital era, the meanings of published comments (unstructured data from the website) are easily understood by powerful tools, such as crawl data, natural language processing, and text mining data (Kang et al. 2020; Xie et al. 2020). We propose that these tools should be used for any future study.

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Wpływ ratingów aplikacji bankowości mobilnej na dochody z usług bankowych w Wietnamie

Na podstawie zależności pomiędzy wynikami przedsiębiorstw FinTech i banków a rolą aplikacji mobilnych w operacjach bankowych zbadano wpływ ratingów aplikacji bankowości mobilnej (MBA) na dochody z usług bankowych. Kwartalne dane z 15 największych wietnamskich banków komercyjnych z lat 2019–2020 pochodziły z publicznych sprawozdań finansowych oraz ze sklepu Google Play. Zastosowano uogólnioną metodę najmniejszych kwadratów do estymacji parametrów proponowanych modeli regresji. Potwierdzono pozytywny wpływ ratingów MBA na dochody z usług bankowych. Dodatkowo zbadano jakość aplikacji MBA dużego banku, który nie spełnia oczekiwań klientów i określono, jak interakcja między ocenami MBA a mechanizmem dźwigni obniża przychody z usług bankowych. Ponadto użytkownicy ogólnie doceniali jakość MBA, a COVID-19 nie wpływał na związek między ocenami MBA a dochodami z usług bankowych. Opracowanie dostarcza nowatorskiej wiedzy na temat zachowań klientów poprzez ratingi aplikacji MBA i ich wpływ na przychody z usług bankowych w kraju wschodzącym.

Słowa kluczowe: aplikacja bankowości mobilnej, ratingi, dochody z usług, bank, Wietnam