Journal of Applied Finance & Banking, Vol. 13, No. 4, 2023, 31-46
ISSN: 1792-6580 (print version), 1792-6599(online)
https://doi.org/10.47260/jafb/1342
Scientific Press International Limited

A Principal Component Analysis of Digital Banking Development in Taiwan

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Abstract

In Taiwan, the digitalization of banks has imparted a future trend and a national financial technology (FinTech) policy. This paper aims to study which factors will affect the promotion of digital banking amongst digital accounts. Categorically, we applied the principal components analysis (PCA) method to analyze and identify the main factors of digital banking development. In addition, this study used three years of data from 2017 to 2020 since the data were relatively comprehensive and included all the large financial holding companies (15 in total) in Taiwan. The empirical findings can briefly be summarized as follows: a bank that wants to promote digital accounts must start with a credit card since that is what digital finance must be bound to. They also need to let people know that digital accounts have many advantages, such as no deposit limits or interest-free cross-bank withdrawals. There are a few crucial factors that need to be considered, including the number of free transfers, the card in force, active cards, and the number of free withdrawals. If banks effectively promote and attract people to apply for digital accounts, it could strongly contribute to the development of digital banking in Taiwan.

JEL classification numbers: C45, G10.
Keywords: Financial technology, Digital banking, Digital account, Principal components analysis.

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Article Info: *Received:* April 17, 2023. *Revised:* May 11, 2023.
Published online: May 15, 2023.

1. Introduction

In recent years, international banks have increasingly been transformed into digital banks. For example, Samenwerkende Nederlandse Spaar Banken (SNS Bank) in Utrecht, the Netherlands no longer allows physical cash processing transactions; all transactions are conducted via digital platforms. Today, banks seek to provide financial services that cost less, are more efficient, and are better quality. Financial technology (FinTech) can be used to provide these services. Thus, in 2021, the Taiwanese government created a FinTech policy to further develop the digital banking sector in line with its development focus.

Since November 2019, the COVID-19 pandemic has spread to over 120 countries and regions worldwide, with over 300,000 people infected by the virus. The speed with which the pandemic spread forced several countries to undertake quarantine measures, which had a severe impact on the global economy. The only way to fight the virus was for individuals to practice social distancing. Consequently, the government accelerated the development of the digital banking sector, thereby increasing the willingness of the people to utilize digital banking services.

According to the Financial Supervision and Administration Commission's (2020) statistics, the number of digital bank accounts in Taiwan reached 6.46 million, which represents not only an increase of 18.6% from the first quarter of 2021but also an increase of 45.5% from the 3.38 million accounts at the end of 2019 (Figure 1). By the end of 2021, the number of digital deposit accounts opened by Taiwanese people in various banks was expected to reach 10.47 million, an increase of 62%.

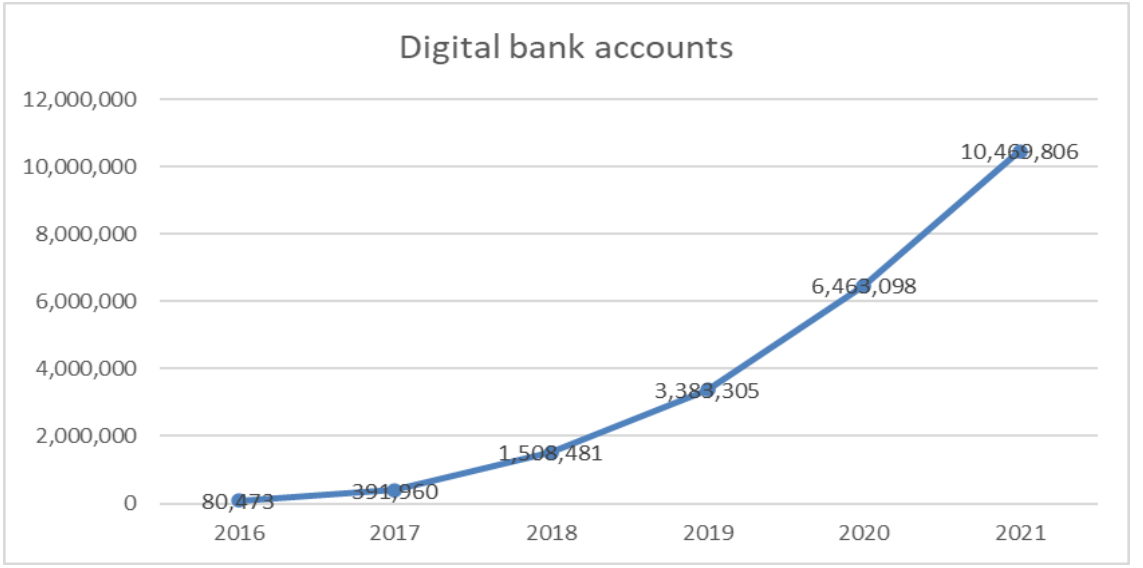

Figure 1: Number of digital bank accounts opened in Taiwan during the period 2016-2021

Source: https://www.fsc.gov.tw/2021

In the current digital banking era, traditional domestic banks actively promote digital deposit accounts. According to the Taiwan Financial Supervisory Commission (TFSC), at the end of March 2022, the total number of digital deposit accounts in Taiwan reached 10.47 million, representing a quarterly increase of 62%. Moreover, the number of new accounts increased in the following banks, as presented in ranking (arrange in descending order) order: Taishin Bank (private bank), Cathay United Bank (private bank), Bank SinoPac (private bank), First Bank (public bank), and Line Bank (private bank). Thus, the development of a digital deposit banking business is not easy, even when banks have existing branches and depositors as their foundation.

Among the above banks, we found that Line Bank had a total number of about 6.238 million digital accounts, accounting for almost 65.3% of the total number. There was also only one state-owned bank, or public bank, that was willing to promote digital accounts, namely, First Bank (subsidiary of First Financial Group). The promotion of digital bank accounts has become part of the national FinTech policy as the digitalization of banks is indicative of an increasing trend. Why are Taiwanese banks not aggressively moving in this direction, and what are the reasons for their slow transformation? We sought to answer these questions by using principal component analysis (PCA) to explore factors that affect the promotion of digital accounts (Hotelling, 1933, Jolliffe & Cadima, 2016, Pearson, 1901). The empirical results of this study can provide more realistic information to highlight the critical factors related to the development of digital banking in Taiwan.

Furthermore, the results of this study may offer marketing and promotional strategies for the digital banking sector in Taiwan. The remainder of this paper is organized as follows. The second section discusses the status of digital banking development in Taiwan, while the third section presents the theoretical background of this study. These sections present the research model and hypotheses as well as the empirical analyses and findings of our research. The final section discusses the research implications and limitations and presents suggestions for future research.

2. Development status of digital banking development in Taiwan

The development of FinTech has introduced significant changes to the financial industry, moving the traditional banking business model towards digitalization (Lee & Chung, 2009). Following this trend, banks in Taiwan now integrate their services with FinTech to further optimize their service delivery. This integration provides customers with more convenient, more efficient, and better-quality digital financial services (also known as cashless payment services), e.g., Apple Pay, Samsung Pay, Line Pay, and Android Pay. Another new offering is that Taiwan dollar transfers can be conducted using Touch ID (i.e., Apple's fingerprint recognition technology). With the mature digital finance technologies, customers can not only exchange currency 24 hours a day but also buy foreign currency and traveler's checks online. These achievements have been made possible through digital finance, which will

further lead to the development of critical national industries, such as the Internet of Things (IoT), intelligent robots, green energy, and medical care. Thus, Taiwan's digital economy is expected to grow to NT$6.5 trillion by 2025.

In this study, before establishing the empirical model, we listed as many preliminary assessment factors as possible related to the development of digital banking in Taiwan. For the PCA in this study, we refer to the TFSC's statistics reports for the period 2017–2020 and various financial holding websites to identify relevant influencing variables, such as the number of digital accounts, cards in force, active cards, interest rates, number of free inter-bank transfers, number of free cash withdrawals, deposit limits, and account-opening age limits.

3. Literature review and conceptual framework

Chauhan (2018) observed that the wave of new technologies sweeping the financial industry transformed the structure of traditional banking services. Online banking, self-service kiosks, financial consolidation, and 24-hour access have changed the general perception about the need for digital banking services. Taiwan is no exception to this trend.

In recent years, the Taiwanese government has implemented the "Finance 3.0 Policy," to help domestic banks develop their digital financial services and align with international trends toward digitization. Thus, it is inevitable that banks will gradually change their traditional branch strategies and invest in digital development. Along with the progression of the internet, the banking system has had to reconsider its informational technology strategies and is now faced with the increased challenge of marketing its products using the internet as a platform (Al-Qeisi & Hegazy, 2015).

At present, there are two main types of digital payments: electronic payments and mobile payments. According to the TFSC (2022), these two payment methods have their own definitions, but they may overlap. For example, digital payments may facilitate mobile payments and electronic payments, along with non-cash transactions. These two payment methods allow customers to check out anywhere as long they have their mobile phone. Additionally, such payment methods require users to enter a password, fingerprint, or their face ID to unlock digital payments, which is more secure than swiping cards. Moreover, electronic payments can also be easily transferred to other individuals, thereby saving handling fees and the hassle of entering bank account numbers. The two forms of digital payments can be described as follows:

- Mobile payments: These include methods such as Apple Pay, Line Pay, and street payments, and they involve the use of a mobile device to employ a credit card as a payment means.
- Electronic payment: This involves the use of an independent electronic payment account for transactions or transfers. At present, Taiwan has nine specialized electronic payment institutions (e.g., JKO Pay [Jiekou Financial Technology Co., Ltd.] and Pi Pay [Chunghwa Telecom Co., Ltd.]) and 20

concurrently operating electronic payment institutions (e.g., First Bank, Cathay Pacific Bank). All the above payment systems require a digital account or a credit card to conduct transactions.

Sha and Mohammed (2017) recently searched for banking services to develop more advanced applications in pure digital banking (also known as virtual banking and pure internet banking). The research indicates that pure digital banking does not have any physical banks offering a wider variety of services, such as more flexible savings and investments or virtual credit cards. Online banking refers to undertaking various banking services (e.g., bill payments and investments) through an online platform. It benefits customers and enables banks to improve their delivery of financial products and reduce transactional costs, increasing their profitability, saving costs, and providing better overall service to their customers (Dash et al., 2011).

Unlike other technology-enabled banking services, digital-only banking is branchless, with no physical banks offering a wider variety of services yet. Consequently, the new banking service provides easier and faster banking and accomplishes some of the tasks of a physical wallet, such as holding personal information, facilitating cash and credit card payments, and storing temporary tokens (e.g., vouchers or transportation tickets) (Ebringer et al., 2000).

Furthermore, digital banking is an operating model based on the use of a technology platform to exchange information and conduct bank–customer transactions. This process is conducted via digital devices that connect to computer software in the internet environment. Customers do not have to visit physical branches of banks to conduct transactions and vice versa, i.e., bank personnel do not have to meet with customers to complete transactions (e.g., signing documents and tracking records). Hence, digital banking has emerged as a new way to offer similar services, including money deposits, transfers, cash withdrawals, current and savings account management, loan management, bill payments, applying for financial products, and account services (Don, 2016).

Digital banking has also led to the creation of new service models, such as mobile payment application software, thereby making digital payments more convenient. An example of a digital banking service is the mobile banking app, Taiwan Pay, which can be linked to a financial card, a credit card, or digital accounts. As such, consumers do not need cash or credit cards. In contrast to traditional banking activities, digital banking provides more features and functionalities at a lower cost (Fenu & Pau, 2015; Munoz-Leiva et al., 2012; Sampaio et al., 2017). Moreover, the practical implementation of digital banking reduces operating costs by about 20–25%, thus increasing the competitive edge of banks (Hussain et al., 2018).

In contrast, most traditional banks provide digital services, and the government has encouraged people to use cashless payments in their everyday life, particularly during the pandemic when the demand for avoiding physical encounters got higher. As such, the government had to speed up the promotion of digital banking and work towards increasing people's willingness to use it.

The literature shows that banks can benefit from a digital transformation. For example, banks were shown to be able to increase their earnings before interest, taxes, depreciation, and amortization margins by as much as 40% by going digital. Additionally, to increase competitiveness, digitization allows banks to reach a broader customer base and build closer relationships with tech-savvy users (Barquin & Hv, 2015).

The economics of digital banks provide them with a vast competitive edge over traditional banks. Consequently, it is fair to say that getting digital banking right is a do-or-die challenge. This technological transformation of the banking sector has resulted in a great deal of deliberation by researchers, and several studies have been conducted to study the significant growth of digital banking in recent years (Kaur et al., 2021; Mhlanga, 2020). However, regardless of the widespread popularity and many benefits of digital banking, there are a number of obstacles that hinder its adoption (Pikkarainen et al., 2004). These include lack of access to an internet connection, lack of social and personal touch in availing the services (Mattila et al., 2003), and security issues (Sathye, 1999). These factors will lead to a slower transformation of the banking sector. No existing literature has identified the factors that influence banks' willingness to invest in digital account promotion. Therefore, we utilized the PCA methodology to analyze and identify the main factors of digital banking development.

4. Methodology

This section explains the PCA methodology.

4.1 Principal components analysis

The PCA model is used to reduce a larger set of observed variables into a smaller set of "components" that explain a majority of the variance present in the original set of variables (Brauner & Shacham, 2000; Hotelling, 1933; Jolliffe & Cadima, 2016; Pearson, 1901). In brief, PCA involves performing eigen decomposition on either the correlation or covariance matrix that is associated with a set of variables. Eigen decomposition returns as many eigenvectors (components) as variables submitted to the PCA model, and the length of each eigenvector is equal to the number of variables in the original correlation/covariance matrix. Each eigenvector serves to project the data into a new feature space, and the eigenvalue associated with an eigenvector describes the magnitude within this new feature space. The eigenvalue for a component can also identify the amount of information kept (variance explained) by an eigenvector. Finally, multiplying a component's eigenvector by the square root of its eigenvalue will yield a set of loadings for a component. The calculation method can be described as follows.

Given a data matrix with p variables and n samples, the data are first centered on the mean of each variable. This ensures that the cloud of data is centered on the origin of the principal components but does not affect the spatial relationships of the data or the variances along the variables.

The linear combination of the variables indicates that the first principal component (Y_1) is given by the linear combination of the variables X_1, X_2, ..., X_P, which can be obtained from the following Equation (1):

$$Y_1 = a_{11}X_1 + a_{12}X_2 + \cdots + a_{1P}X_P. \quad (1)$$

In Equation (1), the principal component is calculated such that it accounts for the greatest possible variance in the dataset. Of course, one could make the variance of Y_1 as large as possible by choosing large values for the weights a_{11}, a_{12}, ... a_{1P}. To prevent this, weights are calculated with the constraint that their sum of squares is 1. This is obtained from Equation (2):

$$a_{11}^2 + a_{12}^2 + \cdots + a_{1p}^2 = 1. \quad (2)$$

The second principal component is calculated in the same way, with the condition that it is uncorrelated with (i.e., perpendicular to) the first principal component and that it accounts for the next highest variance, which is obtained from Equation (3):

$$Y_2 = a_{21}X_1 + a_{22}X_2 + \cdots + a_{2P}X_{P.} \quad (3)$$

This continues until P principal components have been calculated, equal to the original number of variables. The sum of the variances of all the principal components will equal the sum of the variances of all the variables, and all the original information has been explained or accounted for. Finally, the calculation values are called loadings. The variance covariance matrix of the principal components is known as the eigenvalue, which is the variance explained by each principal component and is constrained to decrease monotonically from the first principal component to the last. These eigenvalues are commonly plotted on a screen plot to show the decreasing rate at which additional principal components explained variance (Figure 2).

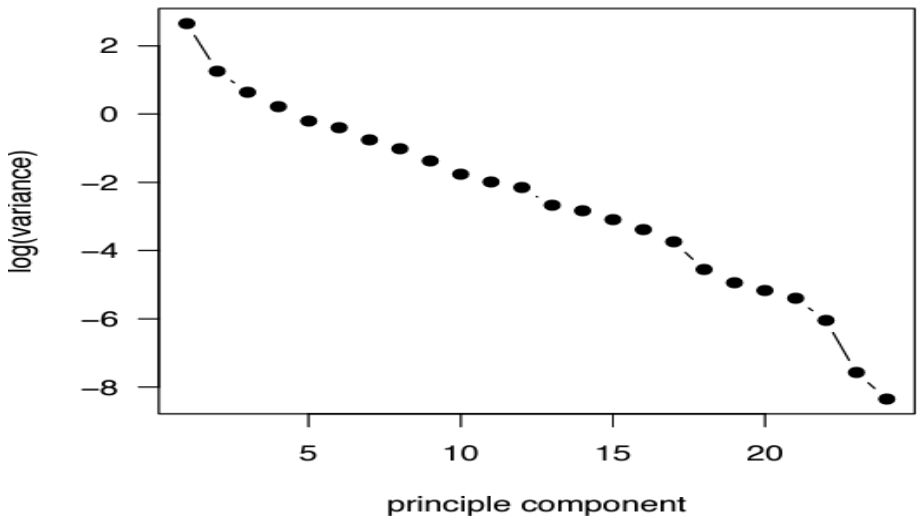

Figure 2: The decreasing rate of explained variance

Thus, the principal components are equivalent to major axis regressions. The PCA approach has the same restrictions as regression, particularly multivariate normality. The distributions of each variable should be checked for normality, and transforms should be used where necessary when they are highly skewed. Outliers should be removed from the dataset, since they can dominate the results of a PCA.
Therefore, we chose to use the factor analysis method. A weighted linear composition was created based on the coefficients of factor scores of the observed variables. We used the variance inflation factor (VIF) to validate the PCA and the metrics used for defining the disturbance index. The VIF is a statistical concept that indicates the increase in variance of a regression coefficient as a result of collinearity (Stine, 1995).
In Equation (4), we show the explained variance (eigenvalue: X_n) of the PCA model, which thereby explains the importance of the variables (eigenvalue: X_n). Hence, the rule of thumb for interpreting PCA grade results is as follows: 0-0.20 is negligible, 0.21-0.35 is weak, 0.36-0.67 is moderate, 0.68-0.90 is strong, and 0.91-1.00 is considered very strong (Taylor, 1990; Shavelson, 1996). The rankings of the PCA model coefficient results are presented in Table 1.

Table 1: The rankings of the PCA results

No	Eigenvalue	Variable correlation degree
1	0.91–1.00	Very strong
2	0.68–0.90	Strong
3	0.36–0.67	Moderate
4	0.21–0.35	Weak
5	0–0.20 (Contains negative values)	Negligible

Source: Authors' compilation

5. Empirical Results and Analysis

This section applies the PCA method to the way that maintenance strategy selection decisions are made using the proposed model. The empirical analysis of this section is mainly composed of two parts: a description of the study objects and variables and an application of the PCA model to analyze what the critical factors are.

5.1 Research objects and variables description

In this section, we first describe the study objects and then the variables.

5.1.1 Research objects

In Taiwan, banks are divided into three categories: commercial banks, specialized banks, and trust and investment companies. After implementing the Trust Business Law, all trust and investment companies in Taiwan have withdrawn from the market. Specialized banks have also been transformed into commercial banks due to

different business targets. However, commercial banks have different operating scales, and their operating costs and benefits are also different, meaning they should not be compared. Therefore, this study only analyzes financial holding companies in Taiwan.

This research analyzes the digital account operations of the 16 financial holding companies in Taiwan. The Guopiao Financial Holding (Taiwan bank) does not have a digital account business (no digital banking) and was thus removed from the research. This study uses three years of data (2017–2020), mainly because the data are relatively comprehensive and include all the large financial holding companies (15 in total) in Taiwan. The data are shown in Table 2.

Table 2: Bank names and number of digital accounts

NO	Bank name	Digital account operations
1	Hua-Nan Financial Holdings Co., Ltd.	Yes
2	Fubon Financial Holdings Co., Ltd.	Yes
3	China Development Finance Holdings Co., Ltd.	Yes
4	Cathay Financial Holdings Co., Ltd.	Yes
5	CTBC Financial Holding Co., Ltd.	Yes
6	Sino-Pac Financial Holdings Co., Ltd.	Yes
7	E.SUN Financial Holdings Co., Ltd.	Yes
8	Yuana Financial Holdings Co., Ltd.	Yes
9	Taishin Financial Holdings Co., Ltd.	Yes
10	Shin-Kong Financial Holdings Co., Ltd.	Yes
11	Mega Financial Holdings Co., Ltd.	Yes
12	First Financial Holdings Co., Ltd.	Yes
13	Jih-Sun Financial Holdings Co., Ltd.	Yes
14	Taiwan Financial Holdings Co., Ltd.	Yes
15	Cooperative Treasury Financial Holdings Co., Ltd.	Yes
16	Guopiao Financial Holdings Co., Ltd.	No

Source: Authors' compilation

5.1.2 Definition variables

Before establishing the empirical model, we listed as many preliminary assessment factors as possible. Therefore, the researchers referred to TFSC (2020) statistics reports and various financial holding websites to list the impact variables used for our PCA methodology analysis.

The variables of this study are as follows:

1. Digital account (y_1): An actual physical passbook does not exist, meaning internet operation is required.
2. Card in force (x_1): This denotes the total number of issued cards minus the total number of stopped cards. The card status is normal.
3. Active cards (x_2): This denotes cards with spending records in the last six months.
4. Interest rate (x_3): This is the interest on the currency deposited in a bank account for a certain period.
5. The number of free transfers (inter-bank transfer) (x_4): This refers to the transfer of money from an individual's own account to another account.
6. The number of free withdrawals (take out money) (x_5): This refers to the number of withdrawals from automated teller machines (ATMs).
7. Deposit limit (x_6): This refers to a limited deposit amount.
8. Account opening age limit (x_7): This refers to age restrictions of individuals opening an account.

Then, the basic model setup can be described in term of Equation (4) using the representative indicators selected by the PCA model before the factors that influence the promotion of digital accounts can be identified:

$$y_{it} = f\left(x_{1_{it}}, x_{2_{it}}, x_{3_{it}}, x_{4_{it}}, x_{5_{it}}, x_{6_{it}}, x_{7_{it}}\right) \quad (4)$$

5.2 Functional principal component analysis

The first step of this analysis involved checking whether the sample size was appropriate for the number of variables used in this study. For this purpose, we utilized the Kaiser–Meyer–Olkin (KMO) and Bartlett's tests. The KMO test measures the sampling adequacy (which should be greater than 0.5) for successful factor analysis. Bartlett's test is another indicator used to measure the strength of the relationship between variables. The results indicated that the KMO and Bartlett's Test resulted in a calculated value of 0.729, which is considered to be acceptable in most social science research situations, as shown in Table 3.

Table 3: Kaiser–Meyer–Olkin and Bartlett's test results

KMO Measure of Sampling Adequacy		**.729**
Bartlett's Test of Sphericity	Approx. Chi-Square	243.247
	df	21
	Sig.	.000

Source: Authors' compilation

Then, based on the PCA model, we used the empirical results to explain the total variance in Table 4. Finally, we identified the main factors of digital banking development, as presented in Table 5.

Table 4: Total variance

Component	Initial Eigenvalues		
	Total	**% of Variance**	**Cumulative %**
x_1	2.611	37.294	37.294
x_2	1.714	24.480	61.775
x_3	1.151	16.443	78.217
x_4	.837	11.955	90.172
x_5	.503	7.187	97.359
x_6	.144	2.054	99.412
x_7	.041	.588	100.000

Source: Authors' compilation

Table 5: The functional principal component

x_1	x_2	x_3	x_4	x_5	x_6	x_7
0.761	0.734	0.166	0.714	0.617	0.050	-0.756

Source: Authors' compilation

Following this, we used a different focus on the major variables to analyze and obtain the following findings:

1. The card in force (x_1):

The empirical results in Table 5 reveal that the effect of card in force on digital banking development (x_1= 0.761 in PCA) is strong. Studies have shown that when it comes to digitization, banks can use their existing customers as an effective promotion strategy; they can even promote their digital account business to existing credit card users, thereby increasing the number of digital accounts opened. There are two main reasons for this. First, digital account payments need to be bound to a credit card. Second, during the pandemic, people preferred cashless payments or electronic payments, which led to an increase in the amount of people willing to open digital accounts. Therefore, credit cards make it easier to promote digital accounts.

2. Active cards (x_2):

As Table 5 show, similar results were obtained in this category: the effects of active cards on digital banking development (x_2= 0.734 in PCA) is strong. As noted earlier, banks use existing credit card users to promote their digital account business. This will cause an increase in the number of digital accounts, even if the credit card users

do not use them. In addition, people need a credit card to apply for a digital account. Therefore, it is easier for users with credit cards to open an account. Meanwhile, during the pandemic, people preferred cashless payment or electronic payment because they reduced crowding problems and lowered the chances of catching COVID-19. This can be another factor that can be used to promote a digital financial business.

3. Interest rate (x_3):
As Table 5 also shows, interest rates have a negligible effect on digital banking development (x_3= 0.166 in PCA). Thus, interest rates may be not an important factor that influences the development of digital banks in Taiwan. At present, government units could address the business crisis and stimulate economic growth by reducing loan interest rates, which would alleviate financial pressure. In today's society, we have entered an era of low-interest rates; there is no significant difference in interest rates between digital banks and traditional banks. Therefore, people may not open digital accounts due to preferential interest rates, which suggests that interest rates do not affect people's willingness to open digital accounts.

4. Number of free transfers (x_4):
As the empirical results in Table 5 show, the effects of this factor on digital banking development (x_4= 0.714 in PCA) have been very strong. In the age of non-cash payment methods, people tend to use ATMs to obtain money for shopping or paying small amounts. However, there is a fee for general bank account transfers. With the exception of same bank transfers, the fee is 15 NTD. However, digital accounts are free, and transfers between different bank accounts are included, which will attract people to open digital accounts.

5. Number of free withdrawals (x_5):
The results also revealed that the number of free withdrawals had a moderate effect on digital banking development (x_5= 0.617 in PCA). A digital account is the same as a physical account; hence, when people need cash, they can use an ATM to withdraw money. However, physical accounts require processing fees, while digital accounts do not. Although there is a fee for general bank account transfers (usually 5 NTD in Taiwan, unless transferring within the same bank), since it is free to use a digital account, many people have been encouraged to open one.

6. Deposit limit (x_6):
The estimated results shown in Table 5 revealed the negligible effect of deposit limit on digital banking development (x_6= 0.050 in PCA). Studies have shown that deposit limits do not affect the promotion of a digital account business. The interest pertaining to digital accounts is usually higher than that of traditional banks, which generally have no limits or interest. Since traditional banks have deposit limits, they will not pay interest if the deposit amount exceeds the deposit limit. While the

interest rate of a digital bank is higher than that of a traditional bank, a digital account needs to be deposited into the account through an ATM. Banks then need to bear the usage fee of ATMs (the current bank fee is 15 NTD in Taiwan), which will deter the public from opening a digital account.

7. Account opening age limit (x_7):

As Table 5 shows, the effects of age restriction on digital banking development (x_7= -0.756 in PCA) are negligible. Age is not an important factor affecting the development of digital banking. In Taiwan, you must be over 20 years of age to open a bank account by yourself. Between the ages of 7 and 20, a consent form from a legal representative (e.g., parents) is required, along with two other documents. In addition, digital accounts do not differ from general savings accounts (at traditional banks) in terms of function, but since there is no physical passbook, all services must be available through the internet. Therefore, digital accounts are essentially the same as physical accounts. They show transactions (e.g., number of deposits) and the minuscule salary that young people are paid in Taiwan. Therefore, even lowering the age limit would not help with digital banking. Furthermore, young people are not interested in adding to their problems by transferring money from physical accounts to digital accounts. Ultimately, age restriction does not help in the promotion of digital financial business.

This study organizes the PCA methodology estimated weight relationship in terms of Equation (5):

$$x_1 > x_2 > x_4 > x_5 > x_3 > x_6 > x_7 \quad (5)$$

6. Concluding Remarks

This research explored the factors affecting the promotion of digital accounts. Specifically, we applied the PCA methodology to analyze the relationship between variables and weight relationships.

In this study, the PCA method highlighted those cards in force (x_1), active cards (x_2), number of free transfers (x_4), and number of free withdrawals (x_5) are strongly correlated with digital account promotion. Banks use existing credit cards to promote digital accounts, thereby increasing the number of digital accounts opened. The number of free transfers (x_4) also affects the development of digital banking in Taiwan, as it may lead to reduced handling fees. Moreover, the number of free cash withdrawals (x_5) has a strong relationship with digital account promotion since individuals can use ATMs to withdraw money whenever they need cash. However, physical accounts have processing fees, while digital accounts do not.

In contrast, the interest rate (x_3), account deposit limit (x_6), and account-opening age limit (x_7) do not significantly affect the promotion of digital accounts. Research shows that the interest obtained from digital accounts is higher than that obtained from traditional banks, which often have no limits or interest. However, while traditional banks have deposit limits, there is no significant difference in the interest

rates between digital and traditional banks. In addition, the account-opening age does not affect customers' willingness to open an account.

Thus, it can be concluded that if digital banks seek to promote digital accounts, they must utilize existing credit card users. Moreover, digital banks must pay attention to lowering fees and increasing the number of free transfers, thereby allowing customers to save on handling fees, typically associated with transfers or withdrawals. A digital account is free to use, which is attractive to anyone interested in opening one. However, other factors will not influence the promotion of bank digital account business.

Finally, the conclusions and recommendations presented here are based on the models constructed, sample data collected, and research methodologies employed in this study. Hence, the current situation and changes in Taiwan's digital banking environment must be considered, and any application of these findings must be further tailored to yield more accurate conclusions.

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