Human Behavior, Development and Society
ISSN 2651-1762, Vol 22 No 3, December 2021

Innovative Banking Challenges in ASEAN-5 Countries and Their Effects on Cost-Income Reduction

Eric J. Nasution[1], Adventist International Institute of Advanced Studies, Philippines

Date Received: 17 June 2021 Revised: 12 July 2021 Accepted: 30 August 2021

Abstract

Marx-Schumpeter-Christensen parallelism posits that the need for prudent innovation management poses business challenges. By contrast, the entrepreneurship cycle holds that disruptive innovation does not pose great challenges. The main issue addressed in this study was what and how innovation challenges were evaluated in order to achieve better banking performance. To answer these questions, secondary data, non-parametric statistics, and the Delphi method of deriving meaning from interviews were utilized. The largest listed banks were surveyed in five Association of Southeast Asian Nations countries, or the ASEAN-5, which includes Indonesia, Malaysia, Philippines, Singapore, and Thailand. The presence of ASEAN financial technology companies, lack of manpower, unbanked populations, and lack of self-efficacy in digital technology challenged development among ASEAN-5 innovative banking institutions. Other findings indicated an association between the ASEAN-5 largest listed banks' financial performance indicators and cost-income ratio reduction, and revealed that Singapore and Indonesia were the leading regional banking innovators. Recommendations made were that ASEAN banks should continue to pursue the formulation and implementation of sustainable innovation practices to combat ongoing disruptive innovation posed by financial technology companies. They might also be actively engaged in the ASEAN Banking Integration Framework in order to optimize innovative banking.

Keywords: *ASEAN banking innovation, cost-income reduction, expertize challenges*

Introduction

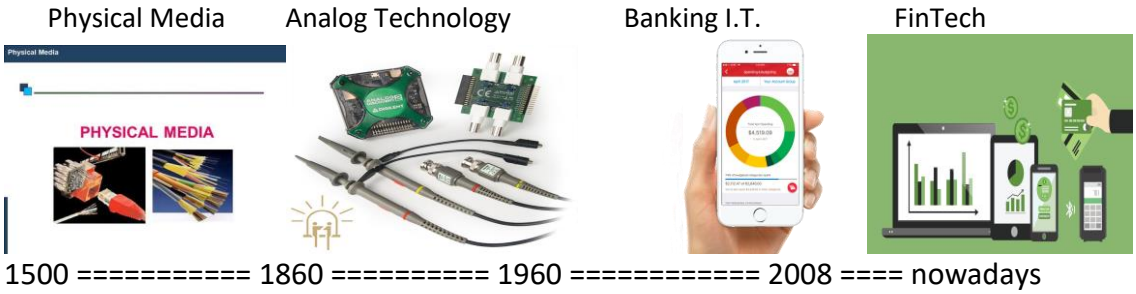
The Association of Southeast Asian Nations, or ASEAN countries, are home to 645 million people with a total GDP of US$ 7,908 billion in 2017. The region represents huge opportunities for the banking industry. ASEAN banking has been rapidly progressing with the adoption of digital technology in their innovative banking systems. The successful use of AliPay, PayPal, e-wallets in ASEAN banking, online-only banks in India (2016), along with Malaysia's CIMB Group Holding digital banks in Vietnam and the Philippines, are enriching the banking landscape.

Enders et al. (2006) reminded readers of the progressive shift from traditional banking practices to those of e-banking. For example, manual transactions at the Nordea Bank of Scandinavia showed a declining growth rate (9.7%), while Internet payments grew at a rate of 21.2% after the introduction of financial technology, or FinTech. This revolution has been outlined by Alt et al. (2018) in a simple set of milestones (Figure 1).

The challenges introduced by innovation must be addressed by the ASEAN banks. There are now fewer traditional bank customers, while smartphones and Internet banking pose exceptional challenges in a region where there is uneven digital banking penetration. In addition, FinTech startup companies are mushrooming, and this poses another challenge. FinTech investments in the ASEAN region grew from less than US$ 10 billion in 2012 to US$ 332 billion in 2018. In general, awareness of disruptive innovation in the banking industry is limited (Wilson, 2017). The FinTech companies in the ASEAN-5 region have forecasted more than 10% yearly growth in the next five years for a variety of products (Figure 1).

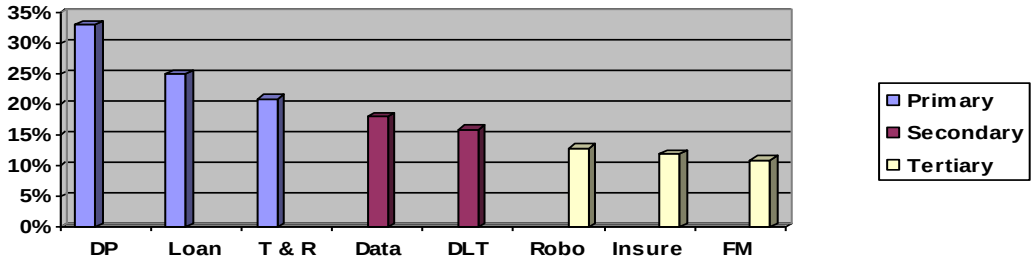
[1] Author's email address: nasution@aiias.edu

Figure 1 *Financial Technology Transformation in the Banking Industry Since 1500*



Three of the largest FinTech companies have offered digital payment systems, alternative loan disbursement, and transfers/remittances since 2018, accounting for 33%, 25%, and 22% of FinTech business transactions respectively (Figure 2). In addition, data analytics and blockchain distributed ledger technology represented some 18% and 16% of trade, respectively.

Figure 2 *ASEAN FinTech Company Transactions in Percent (2018)*



Note: DP = Digital Payments, Loan = Loan Applications, T&R = Transfers & Remittances, Data = Data Analytics, DLT = Blockchain, Robo = Robo Advisory, Insure = Insurance Tech, FM = Funds Management

Even though FinTech companies' pseudo-banking transactions are considered challenges, banking systems must strive for sustainable innovation (Achimba et al., 2014; Cajayon, 2019). Kurup (2018) confirmed that digitalization has fundamentally changed the way banking systems offer their services to customers. World mobile payment revenue earned US$ 450 billion and nearly US$ 1 trillion in 2015 and 2019, respectively. Smartphone payments with apps have empowered banking customers with real-time advantages in making transactions. He estimated that about 40% of the world's population would own a smartphone by 2021, making payment transactions easier. Competitive e-banking practices in Ghana have pointed to the importance of customer satisfaction in electronic banking (Ameme & Wireko (2016).

Underlying Theoretical and Conceptual Framework

Theoretical Framework

Several economic theories have inspired the thoughts behind disruptive innovation and innovation challenges. They represent building blocks of innovative economics that have led to a strong emergence of entrepreneurship. The thoughts of Marx-Schumpeter-Christensen parallelism on innovation challenge theories focused on wealth annihilation, creative destruction, and disruptive innovation (Table 1).

Marx-Schumpeter-Christensen theories focus on how capitalism and entrepreneurship are related. Drucker (1985) affirmed that innovation continuously reinforces entrepreneurship; it is hard to separate the two. Elliott (1980) clearly linked Marxian disruptive innovation with Schumpeterian creative destruction. Schumpeter (2003) concluded that entrepreneurship was supported by continuous research and development leading to the generation of new products, the creation of

new markets, and the consequential displacement of old products. This is how the creative destruction concept works.

Table 1 *Theories Associated with Innovation Challenges*

Economic Theories	Year	Economist	Linkage with the Concept
Key Theories *			
Marxian Economics	1987	Karl Marx	Wealth annihilation
Schumpeterian Economics	1950	Joseph Schumpeter	Creative destruction
Disruptive innovation	1995	Clayton Christensen	Disruptive innovation
Diffusion of innovation	1962	Everett M. Rogers	Innovation diffusion (spread)
Technology acceptance	1989	Fred Davis	Self-efficacy of ease to use

*Referred to as the Marxian, Schumpeterian, and Christensen, or MSC parallelism

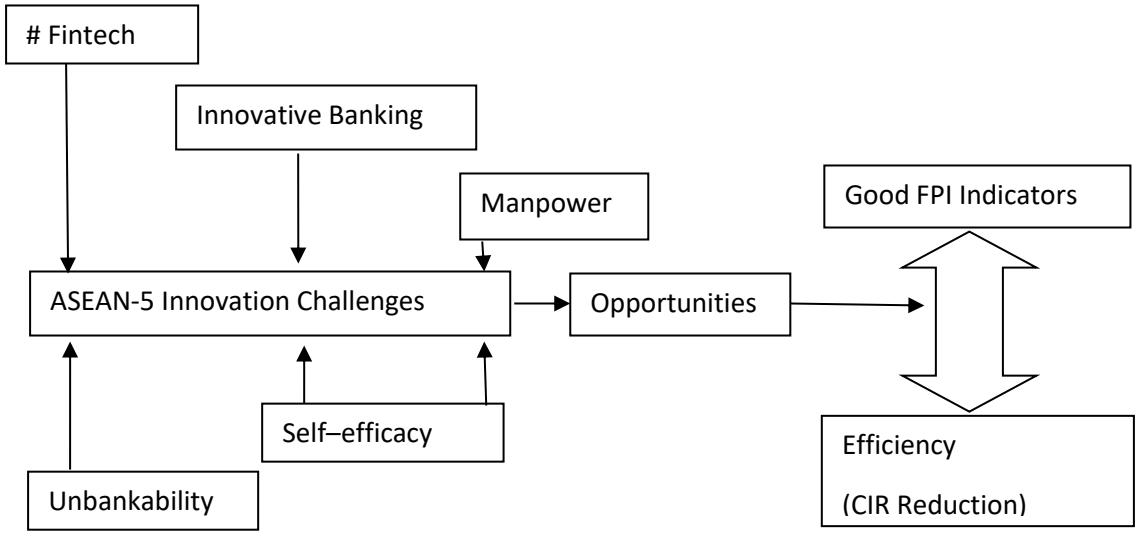
Parallelism has given rise to four important concepts. First, wealth accumulation routinely develops in uptrend business cycles, but wealth annihilation occurs in downtrend business cycles due to new market and product development. Second, innovation represents dead capital that is being resurrected. Third, wealth accumulation through good entrepreneurship leads to sustainable innovation. Fourth, wealth annihilation is realized through creative destruction and disruptive innovation. Khan (2015) noted the Schumpeterian concept that "change was essential for growth, which had triggered market and product development." This was when creative destruction was conceptualized. McCraw (2007) mentioned Schumpeter's saying that "creative destruction is the driving force of capitalism." Landstrom (2005) commented that the "entrepreneur is the key figure due to his ability as a creative organizer and whose role is to develop innovations and initiate new activities." However, these entrepreneurs have indeed caused "lost jobs, ruined companies and vanishing industries at the cost of growth, because of creative destruction coined by Schumpeter" (Alm & Cox, 1999). Hanusch and Pyka (2006) and Festre and Nasica (2009), in response to the emergence of this concept, formed what came to be known as Comprehensive Neo-Schumpeterian Economics, a branch of innovation economics that addressed how creative destruction must be overcome through the routine process of entrepreneurship.

Conceptual Framework

Stemming from Marx-Schumpeter-Christensen parallelism, these innovation challenges generally bear the fruits of opportunities that lead to sustainability and efficiency in banking performance (Figure 3). Laurenco et al. (2012) showed how market capitalization reflected the sustainability performance of an organization, including that of a banking system. In their study, market capitalization was associated with the percentage of the country's Gross Domestic Product (GDP). Market capitalization always comes with improved bank interest income as the upper line and net income as the bottom line. They referred to the financial performance indicators (FPI) indicators. The latter were supported by Laton et al. (2015), who empirically analyzed how innovation resulted in improved efficiency in the non-bank sector in terms of cost savings. In their study, cost saving was expressed in terms of reduced cost-income (CIR).

In banking and finance, disruptive innovation posed by FinTech companies is a great challenge (Figure 3). Nowadays, customers use mobile phones to make payments, check balances, and perform other banking transactions without going to the bank. Gada (2018), a financial adviser, shared that his clients used their smartphones when dealing with banks to avoid queuing in their premises. This allows seamless online shopping, transfers, and investments. He also shared the benefits of other FinTech transactions using chatbots and artificial intelligence for fraud detection. Those benefits included that of omni-channel banking, biometric uses, and blockchain databases for digital transactions.

Figure 3 *Conceptual Framework on ASEAN Innovation Challenges*



These disruptive innovation practices introduced by FinTech companies have generally motivated ASEAN-5 bank managers toward innovative banking (Table 2). Their efforts have been directed to two main financial objectives, better financial performance indicators (FPI) and cost: income ratio (CIR) reduction. FPIs involve the following indicators—increased market capitalization as a percentage of GDP, compounded annual interest income growth, net income plus depreciation and amortization, and Research and Development (R & D).

Constant reduction of Cost to Income Ratio, which is mostly comprised of banks' operational costs, can result from implementing innovative banking. It is comparable with the use of robots in place of manpower, and the expected reduction in manpower cost.

Table 2 *Disruptors and Disruptees in the Commercial Banking Transactions*

Disruptee Banking Transaction	Disruptor Banking Transaction
Inconvenient traditional banking	Innovative mobile banking
Cash/cheque/debit card/credit card	Mobile payment/remittance
Traditional remittances	Open GAFA* based banking using APIs
Desk customer service queries	Chatbots for financial advice
Money laundering human investigation	Artificial intelligence for money laundering detection
In the bank premise banking	Omni-digital channel banking
Traditional consumers bank credits	Peer-to-peer financing
Photo studio pictures	Biometric identification
Teller payment and money transfers	Cryptocurrencies with DLS
Excel-based financial analysis	Web-based financial planning tool

Source: FinTech (2017) *Note. *GAFA = Google, Amazon, Facebook, Apple application programming interfaces*

Research Problems, Questions and Methodology

The main problems addressed in the present study were what and how innovation challenges were evaluated in order to achieve better innovative banking performance (Kjellman et. al., 2019). The following research questions were asked:

1. What innovation challenges generally are faced by the ASEAN-5 banking system, and how could these challenges be turned into opportunities?

2. Was reduced CIR associated with selected ASEAN-5 listed banks' financial performance indicators: Market capitalization per GDP (purchasing power parity), compounded annual interest income growth (CAIIG), and net income plus depreciation, amortization, and R&D growth?
3. During the past decade, how have the ASEAN-5 listed banks positioned themselves in terms of leadership in innovative banking management?

To answer these research questions, three points were addressed: innovation challenges, innovation effects on CIR, and an innovation leadership matrix involving the selected banks. A descriptive research method was adopted, supported by secondary data analyzed with non-parametric statistics. Secondary data were gathered from the annual reports of selected listed banks from the ASEAN-5 nations. The Bankers Association of the Philippines (2017) added important information on financial inclusion needed in innovative banking development facilitated by the ASEAN Financial Innovation Network (AFIN). De Jesus and Torres (2017) studied innovative banking development by qualified ASEAN banks, and Ernst & Young (2017) offered FinTech products as the best strategy to turn challenges into opportunities.

Using a convenience sample, the author interviewed managers at the Oversea-Chinese Banking Corporation Bank (Singapore), Bank Central Asia (Indonesia), and Metro Bank (Philippines) separately to confirm the validity of the secondary data. The first research question was addressed using observations from the secondary data. The second research question was answered by investigating the association between CIR reduction with the banks' selected financial performance indicators using Spearman's rank order non-parametric statistics. It was noted that Weiers (2014) reaffirmed Spearman's rank order correlation as valid to measure the strength of association of variables with each other. He formulated the following expression to test the strength of the association:

$$r \text{ (observed)} = 1 - \frac{6\,(\sum d^2)}{n\,(n^2 - 1)}, \text{ where}$$

$\sum d^2$ = the sum of the squared differences between the ranks, and
n = number of observations.

The H_0 is rejected if the r (observed) is larger than that of the r (critical, at p = < .05 and a certain number of degrees of freedom).

The third question was answered by using a four-quadrant matrix to determine the leadership position of innovative banking of the ASEAN-5's largest listed banks. The position was designated from the (x, y) coordinate as leader (upper right), challenger (lower right), follower (upper left), and potential innovator (lower left). The x-axis or financial performance indicators ranks were scaled (0–2 *highest*, 2–4 *high*, 4–6 *middle*, 6–8 *low*, and 8–10 *lowest*), and the y-axis or the ASEAN-5 banks' total income were scaled as follows: < US$ 6 billion, US$ 6–12 B, US$ 12–18 B, US$ 18–24 B, and US$ 24–30 B.

The third question on position was raised in response to the concern of Arnaboldi and Rossignoli (2015) on the level of financial innovation challenges felt in the field of financial economics. In innovative banking, efficient gadgets are sought to reduce operating costs. Morgan (2018) cited examples of innovations used by the world's leading commercial/investment banks, i.e., Bank of America with its artificial intelligence powered chatbot, Chase with its self-serve teller kiosks and express branches, Sberbank in Russia with its artificial intelligence-based Tips in customer behavior analysis, and many others (Koffi, 2016; Syahullah, 2018).

Results and Discussion

As indicated previously, three points were addressed: innovation challenges, innovation effects on CIR, and an innovation leadership matrix of the selected banks.

1st Question—Innovation Challenges

In addressing innovation challenges, a number of factors were considered—the presence of FinTech startup companies, degree of integration in innovative banking, lack of manpower with needed IT expertise, bankability of people in the ASEAN region, and lack of self-efficacy in the use of technology. Opportunities in innovative banking were further explored based on these challenges.

Presence of FinTech Companies

A total 1,191 FinTech companies in the five original ASEAN countries generated some US$ 75 billion on transactions from their US$ 332 billion investments in 2018, earning a handsome return on investment of 22.6%, even though ASEAN banks earned between 30%–34% gross profit margin (Nguyen, 2018). This author also reported that angel investors, venture capital firms, and private high-powered equity families financed FinTech industries in the ASEAN region in the proportion of 33%, 22%, and 45%, respectively. Table 3 gives their performance in 2018.

Table 3 *ASEAN-5 FinTech Companies' Investments and Transactions in 2018*

Description	Indonesia	Malaysia	Philippines	Singapore	Thailand
A - FinTech investments (US$ billion)	26	75	78	141	12
B - FinTech transactions (US$ billion)	32	11	7	12	13
C - Number of FinTech companies	262	196	115	490	128
Effects of FinTech deals:					
*FinTech deals/company (US$ billion)	0.12	0.06	0.06	0.02	0.10
**FinTech investments:					
- Investment per firm (US$ billion)	0.10	0.38	0.68	0.29	0.09
- Investment turnover (times)	1.2	0.15	0.09	0.09	1.1
Digital payment/user (US$)	220	520	150	3016	332

Source. ASEAN FinTech Census (2018) *Note.* *B/C, **A/C (per firm) and B/A (turn overs)

The ASEAN-5 countries have achieved a credible performance where FinTech have been introduced in the region. Singapore, with 490 FinTech companies, represented some 41.1% of the total in the ASEAN-5 region as of 2018. Cekindo (2020) reported that Indonesia (second in FinTech growth) had generated some 416 million mobile subscriptions, 130 million active social media users, and 143 million Internet users, in spite of 51% of the population not banking.

Malaysia, the Philippines, and Thailand came behind those two countries. Particularly in Thailand, with the second highest FinTech deals of US$ 0.1 billion per company in 2018, the giant companies located in the ASEAN region motivated the ASEAN banking to compete against these FinTech companies. Nevertheless, the ASEAN banking industries must not be complacent with what they have achieved. Nevertheless, these total ASEAN FinTech investments of US$ 332 billion in 2018, with total transactions of US$ 75 billion by the 1,191 FinTech firms, was still considered low compared to the US$ 3,315 billion total banking system investments in the ASEAN-5 region.

Integration of Innovative Banking System

Internalizing innovative banking systems versus those of traditional banking seemed to be a challenge in the ASEAN region. The ASEAN Banking Integration Framework (ABIF) was established in 2015 by ASEAN central banks; its objectives were to develop a larger number of qualified ASEAN banks with innovative banking systems, and to address FinTech threats. But the internalization process has taken time to implement. How is the innovative banking progressing? Has the banking system adopted cross-border payment interoperability network among countries, the real-time retail payment system, real time gross settlement, and automated clearing-house? These questions are worth pondering.

Lack of Manpower

The innovation challenges do not stop at the point of creating more FinTech startup companies. Manpower requirements seem to be a concern as well, in spite of the lower average shortages of 29% and 28% in Singapore and the Philippines, respectively. Technology and software skills were in demand in Indonesia, Malaysia, and Thailand as talent shortages represented some 71%, 73%, and 75%, respectively (Mittal, 2018). Several attempts to recruit foreign talent faced difficulty as well.

Bankability in the ASEAN Region

Another challenge is the status of the unbanked population, which varied among countries. Van de Werff et al. (2013) in the context of financial inclusion argued that "social factors are important part of the highly unbanked population," a point reinforced by the Global Findex of the World Bank (2017). This source affirmed that most respondents in unbanked populations offered the following explanations. They did not have accounts because they lacked sufficient money, while other family members had bank accounts already. Their educational level was low, and they were not in the labor force, etc. According to the World Bank, as of the end of 2017, the percentage of the population having bank accounts was as follows: Indonesia (36%), Malaysia (81%), Philippines (28%), Singapore (96%), and Thailand (78%).

Lack of Self-Efficacy in the Use of Digital Devices for Transactions

Several studies have indicated that the use of technologies to support innovative banking in the ASEAN-5 region show a relatively high level of self-efficacy. For example, Winarno et al. (2021) discovered that even rural banking consumers in East Java, Indonesia, were familiar and confident in using Bank Central Asia's mobile payment service, as well as other service providers like OVO, Go-Pay, TCash, Klikpay, and Doku wallet. Oh (2016) argued that higher self-efficacy correlated with acceptance and diffusion of innovation services. Davis (1989), known for introducing the technology acceptance model, previously had reinforced this correlation. He added that perceived usefulness and ease of use were important parts in the correlation. In the ASEAN-5 region, the use of smartphones and broadband respectively were recorded by the World Bank as follows: Indonesia (39%, 13%), Malaysia (35%, 10%), Philippines (15%, 4%), Singapore (85%, 26%), and Thailand (38%, 9%).

Opportunities in Innovative Banking

As described in the methodology, opportunities were explored based on challenges encountered by these ASEAN-5 banking. First, opportunities were taken advantage of through synergistic tie-ups with ASEAN FinTech firms, as American and European banks had been doing. Arnold (2018) has summarized the participation of European and US banks in merger and acquisition FinTech schemes with Asian banks. Second, opportunities are created when physical banking is combined with digital banking through open banking Application Programing Interfaces (APIs) and cloud technologies. Marous (2019) brought forward the idea of phygital branch banking (using technology to connect the digital world with the physical world), with four types of workable solutions. These included box branch (fully digital), standard branch (digital and one bank clerk), segment branch (relationship officers with specific psychographic segments like lifestyle, values, mind sets and aspiration), and flagship branch (full service on-premise branch system). Third, the adoption of Google, Amazon, Facebook, and Apple APIs was seen as another opportunity. Beliunas (2017) stressed the importance of this innovative personalization. Fourth, optimal implementation of the cross-border payment interoperability network was deemed to offer other opportunities in the ASEAN region. Fortunately, the ASEAN banking system has been operating cross-border payment interoperability network among countries. Real-time retail payment systems, real time gross settlements, and automated clearing houses have been actively pursued as reported by KPMG (2018). Please refer to Table 4.

Table 4 *Summary of Banking Innovation Challenges and Opportunities in the ASEAN Region*

Innovation	Challenges	Opportunities
Innovative banking	1. Use of APIs (culture and bureaucracy) 2. Lack of regulation/knowledge in APIs 3. High banks' operating cost with no mobile banking system	Improved business/operational models Product and market development (APIs) Lower operating cost & lesser fees Psychographic branch banking position GAFA-approach APIs for millennials XB-PIN system maximization
FinTech product dev.	Increased number of FinTech companies	FinTech-based banking products Synergistic M&A with FinTech firms
FinTech-based T & D	Manpower shortages	Improved operations at lower CIR
Financial inclusion	Unbanked population	Expanded bank market development Video teller machines Mobile banking systems
Financial diffusion	Lack of self-efficacy	Massive banking KYC with T&D programs

Note. T&D = Training & development; KYC = Know your customers, and train them on an MB system; M&A = Merger & acquisition; GAFA = Google, Amazon, Facebook, and Apple (to reach millennials); XB-PIN = Cross-border payment interoperability network

2nd Question—Innovation Effects on Reduced Cost to Income Ratios

From the innovation-driven financial performance indicators; specifically, the market cap/GDP, net income plus depreciation, amortization, and R & D growth, and Compounded Annual Interest Income Growth, only CAIIG would have a certain degree of dependency with the reduction of cost-income ratio in the past decade (2008–2018). After further evaluation, it was discovered that the impacts of innovative banking of the ASEAN-5 selected largest listed banks recorded significant CIR reduction per year; i.e., CIMB in Malaysia (1.6%), Siam Commercial Bank in Thailand (1.5%), Metrobank in the Philippines (1.1%), Bank Central Asia in Indonesia (1.1%), Krung Thai Bank in Thailand (0.3%), and Bank Rakyat Indonesia (0.2%). Surprisingly, none of the largest Singaporean listed banks implementing advanced innovative banking demonstrated these impacts.

The degree of association between each innovation-driven Financial Performance Indictors (FPI) with the CIR reduction is presented in Table 5. First, the Spearman correlation between market capitalization/GDP and CIR indicated that there was no significant positive association between the two as shown by the R (15) = .168 or lesser than the critical R = .456 (df = 14) at $p < .05$. The reduction of operating expenses would definitely affect profitability, whether it was return on investment or return on assets as empirically discovered, but it did not have any association with the market cap/GDP.

Table 5 *Spearman Association between CIR, and Growth of Financial Performance Indicators*

Variable	Statistics	CIR	Mkt. Cap/GDP	CAIIG	NIDAR&D
CIR	*R* (observed)	1.000	0.168	0.803	-0.038
	R (critical)	0.456	0.456	0.456	0.456
	Sig. (2 tails)	0.05	0.05	0.05	0.05
	N	15	15	15	15
Mkt. Cap/GDP	*R* (observed)	0.168	1.000		
CAIIG	*R* (observed)	0.803		1.000	
NIDAR&D	*R* (observed)	-0.038			1.000

Note. Market Capitalization/GDP (Mkt Cap/GDP), Compounded Annual Interest Income Growth (CAIIG), Net Income plus Depreciation, Amortization, and Research and Development NIDAR&D)

Musara and Fatoki (2010) reaffirmed that an innovation-driven operation would tend to generate efficiency and cost savings. Akhisar et al. (2015) reinforced this finding by revealing that

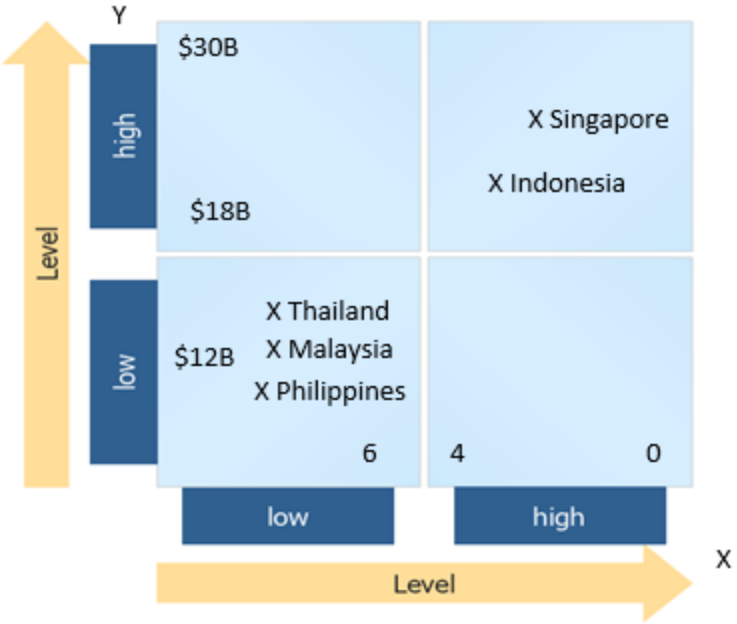
innovative banking in the European Union, United Arab Emirates, and parts of Latin America had generated a good return on investment and return on assets due to reduced operating expenses.

Second, unlike market cap/GDP, CAIIG was significantly associated since R (15) = .803 was higher than the critical R = .456 (df = 14) at $p < 0.05$. The higher the CAIIG due to the excellent practice of innovative banking, the higher the possibility of CIR being reduced. Third, net income plus depreciation, amortization, and R&D growth did not indicate any degree of association [R (15) = -.0375 at $p < .05$].

3rd Question—Leadership Matrix of the Largest Asean-5 Banks' Innovative Banking

The innovation-driven leadership of selected ASEAN-5 listed banks were positioned as shown in Figure 4. Singapore (3.0, 26.5) and Indonesia (4.0, 17.8) were positioned as leaders in innovative banking as innovation-driven Financial Performance Indicators revealed convincing coordinates for the year 2018. This situation could change if these banks do not continue their innovative banking practices.

Figure 4 *Innovation-driven Leadership Matrix of ASEAN-5 Banks in 2018*



Note. The x-axis scales (FPI rank: 0–2 *highest*, 2–4 *high*, 4–6 *middle*, 6–8 *low*, & 8–10 *lowest*) and y-axis scales for ASEAN-5 banks' total income (< USD $6 B, USD $6–12 B, USD $12–18 B, USD $18–24 B, & USD $24–30 B). Upper right = leader innovator, lower right =challenger, upper left = follower, and lower left = potential innovator

First, the three largest Singaporean listed banks reported combined total income of US$ 26.5 billion and an average rank order of 3.0. They were the Development Bank of Singapore, Ltd., Oversea-Chinese Banking Corporation, Ltd., and United Overseas Bank. The Development Bank of Singapore had particularly excelled in all growth FPIs, as they were ranked number one. Second, the three largest Indonesian listed banks (Bank Mandiri, Bank Rakyat Indonesia, and Bank Central Asia) were positioned at the borderline at the (4.0, 17.9) coordinate in the leader innovator quadrant. Bank Central Asia showed the best FPIs among the three. Third, in another quadrant, Thailand (8.4, 11.4), Philippines (6.3, 5.8), and Malaysia (8.0, 10.0) were positioned as potential innovators in the ASEAN-5 region.

This leadership position was particularly obvious with Singapore, as it achieved a more advanced level of innovative banking, including teaming up arrangements with FinTech firms to capture unbanked and uninsured markets. Choudhury (2019) further reported that Singaporean banks have enabled the integration of various FinTech products in their divisions. In the Philippines, the

Philippine Long Distance Telephone group entered into a US$ 215 million merger deal with Voyager Innovations in 2017.

Summary of Findings, Implications, Conclusion and Recommendations

Based on the analysis of the research questions, the findings of the study are broken down into major components and their implications considered.

Major Findings

First, prime challenges seemed to be the presence and growth of FinTech firms in the ASEAN region since 2012. Second, the biggest opportunity seemed to be further development of innovative banking systems, with special emphasis on training and development of FinTech experts in the banking system. Third, the innovative banking system adopted in the ASEAN-5 region has shown the capability to reduce CIR growth, particularly with an improved CAIIG. Fourth, based on evaluation of selected large ASEAN-5 listed banks' Financial Performance Indicators and interest income capacity, Singaporean and Indonesian banking systems were positioned as leading innovators, though Indonesia was positioned at the border line. The remaining original ASEAN-5 banks were positioned as potential innovators.

Implications

The ASEAN banking industries should observe these innovation challenges not as threats but as opportunities, including not being complacent with the progress that they have achieved, including that of reduced CIR. Innovation must be continually pursued, though the implications of labor rationalization must be given first priority. Other implications are further development of opportunities in sustainable innovations that would combat disruptive challenges. These must be taken into account in the ASEAN-5 banking system strategic plan, including that of determining the innovation-driven leadership position of the ASEAN-5 banking system toward innovative banking. It would be beneficial for the ASEAN-5 banking system to maintain–if not to step up–their initiatives, including those of other ASEAN members.

Conclusion

Based on the above findings, it was concluded that challenges of the ASEAN-5 region's banking sector seemed to be mainly in the area of improvements in innovative banking. This applies particularly to the banks' efficiency expressed in terms of the reduced CIR, increase in the level of CAIIG in the region, the sustainability of market capitalization growth in the past decade (2008-2018), and financial inclusion in banking development in general.

Recommendations

It is thus recommended that innovative banking systems continue to be developed in ASEAN-5 and other countries, targeting greater efficiency and sustainability. Here are some possible action plans.

First, develop a closer tie up between the Financial Innovation Network, ASEAN central banking industries, ASEAN Bankers Association, and the EU/US/Singapore/Japan central banks for developing rules and regulations on sustainable innovative banking to combat disruptive trends. Second, still in the spirit of cooperation, it is time for the ASEAN central banks to enhance the effectiveness of the regulatory sandbox system for ASEAN Financial Inclusion Programs. Third, initiate the formation of a FinTech skill training and development program within the ASEAN-5 or regional banking systems. Fourth, by virtue of close interaction with the ASEAN Banking Integration Framework, it would be beneficial to form mentoring programs to assist other ASEAN countries' banking systems to formulate, implement, and develop innovative banking practices.

References

Achimba, C., Ongonga, J. O., Nyarondia, S. M., Amos, A. L., & Okwara, M. (2014). Innovation in banking industry: Achieving customer satisfaction. *Open Journal of Business Management, 2*(4), 261–274. https://doi.org/10. 4236/ojbm.2014.24031

Alt, R., Beck, R., & Smits, M. (2018). Fintech and transformation of the financial industry. *Electronic Markets, 28*(4), 1–9. https://www.researchgate.net/publication/326991488_FinTech

Akhisar, I., Tunay, K. B., & Tunay, N. (2015). The effects of innovations on bank performance: The case of electronic banking services. *Procedia – Social and Behavioral Sciences, 195*,369–375. https://doi.org/10.1016/j.sbspro. 2015.06.336

Alm, R., & Cox, W. M. (1999). *Creative destruction.* The Library of Economics and Liberty. https://www.econlib.org/ library/Enc/CreativeDestruction.html.

Ameme, B., & Wireko, J. (2016). Impact of technological innovations on customers in the banking industry in developing countries. *The Business and Management Review, 7*(3), 388–397.

Arnaboldi, F., Rossignoli B. (2015) Financial innovation in banking. In E. Beccalli & F. Poli (Eds.), *Bank risk, governance and regulation* (pp. 127–162). Palgrave Macmillan. https://doi.org/10.1057/9781137530943_5

Arnold, M. (2018, November 12). Five ways banks are responding to FinTech threat. *Financial Times*. https://www.ft.com/content/d0ab6b84-c183-11e8-84cd-9e601db069b8

ASEAN FinTech Census. (2018). *Building a better working world*. Ernst & Young. https://www.ey.com/en_sg/ financial-services/asean-fintech-census-2018

Bankers Association of the Philippines. (2017, September 8). *Banking industry spurs discussions on AFIN industry sandbox advocacy*. https://bap.org.ph/advocacy/banking-industry-spurs-discussions-afin-industry-sandbox/

Beliunas, L. (2017, June 28). *The GAFA approach to banking. Part III.* International School Technology-LinkedIn. https://www.linkedin.com/pulse/gafa-approach-banking-part-iii-linas-beli%C5%ABnas

Cajayon, A. N. (2019, May 6). *Banks and FinTech: The next step.* Business World. https://www.bworldonline.com/ banks-and-fintech-the-next-step/

Cekindo. (2020). *Important points that you need to know about FinTech in Indonesia*. Cekindo's open-source publication. https://www.cekindo.com/blog/fintech-indonesia

Choudhury, S. (2019, July 3). Virtual banks could be bad news for small lenders in Singapore, Moody's says. CNBC Watchlist. https://www.cnbc.com/2019/07/03/virtual-banks-will-be-bad-news-for-small-lenders-in-singapore-moodys.html#:~:text=Banks-,Virtual%20banks%20could%20be%20bad%20news,lenders%20in%20Singapore%2C%20Moody%27s%20says&text=Singapore%27s%20decision%20to%20issue%20new,in%20a%20note%20on%20Tuesday.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008

De Jesus, F., & Torres, E. (2017). Analysis of the ASEAN Banking Integration Framework: The Philippines as a looking glass for consumer preference. *Journal of Global Entrepreneurship Research*, 7(24). https://doi.org/10.1186/ s40497-017-0082-2

Drucker, P. F. (1985). Innovation and entrepreneurship: Practice and principles. https://papers.ssrn.com/sol3/ papers.cfm?abstract_id=1496169

Elliott, J. E. (1980). Marx and Schumpeter on capitalism's creative destruction: A comparative restatement. *The Quarterly Journal of Economics, 95*(1), 45–68. https://doi.org/10.2307/1885348

Enders, A., König, A., Jelassi, T., & Hungenberg, H. (2006). The relativity of disruption: E-Banking as a sustaining innovation in the banking industry. *Journal of Electronic Research.* http://www.jecr.org/node/180

Festre, A., & Nasica, E. (2009). Schumpeter on money, banking and finance: An institutionalist perspective. *European Journal of the History of Economic Thought, 16*(2), 325–356. https://doi.org/10.1080/09672560902 891101

FinTech. (2017). *Unleashing the potential of FinTech in banking*. Ernst & Young. https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/banking-and-capital-markets/ey-unleashing-the-potential-of-fin-tech-in-banking.pdf

Gada, D. (2018, March 5). *Five ways FinTech is disrupting financial services industry*. Finextra. https://www.finextra. com/blogposting/15105/five-ways-fintech-is-disrupting

Global Findex–World Bank. (2018). *The unbanked*. Open source publication. https://globalfindex. worldbank.org/sites/globalfindex/files/chapters/2017%20Findex%20full%20report_chapter2.pdf

Hanusch, H., & Pyka, A. (2006). *Manifesto for comprehensive neo-Schumpeterian economics*. Volkswirtschaftliche Diskussionsreihe, No. 289. University of Augsburg, Institute for Economics. https://www.econstor.eu/ bitstream/10419/22812/1/289.pdf

Khan, L. (2015). *Schumpeter, entrepreneurship, and creative destruction*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2558433

Kjellman, A., Björkroth, T., Kangas, T., Tainio, R., & Westerholm, T. (2019). Disruptive innovations and challenges for banking. *International Journal of Financial Innovation in Banking, 3*(2), 232–249. https://doi:10.1504/ IJFIB.2019. 10023963

Koffi, H. W. S. (2016). The FinTech revolution: An opportunity for the West African financial sector. *Open Journal of Applied Sciences, 6*(11). https://doi.org/10.4236/ojapps.2016.611068

KPMG. (2018). Cross-bordered payment interoperability network. https://assets.kpmg/content/dam/kpmg/sg/pdf/2018/11/xbpin-feasibility-study.pdf

Kurup, N. (2018, May 30). *Digital disruption: How FinTech pushing banks to change*. Finextra. https://www.finextra. com/blogposting/15407/digital-disruption-how-fintech

Landstrom, H. (2005). *Pioneers in entrepreneurship and business research*. Springer. https://www.springer.com/ gp/book/9780387236018

Laton, M. Z., Yunus, H., & Abdul, R. M. A. (2015). Innovation and organizational cost saving: A case from Malaysia innovation projects. *Mediterranean Journal of Social Sciences, 6*(5), 499. https://doi.org/10.5901/mjss.2015. v6n5s2p495

Laurenco, I., Branco, M. C., Curto, J. D., & Eugénio, T. (2012). How does the market value corporate sustainability performance? *Journal of Business Ethics, 108*(4), 417–428.

Marous, J. (2019, November). Gaining a competitive edge during digital disruption. *Digital Banking Report, Special Edition*. https://www.opentext.com/file_source/OpenText/en_US/PDF/opentext-digital-banking-report-jm.pdf

McCraw, T. K. (2007). *Prophet of innovation.* Harvard University Press. http://www.hup.harvard.edu/catalogphp? isbn=9780674034815

Mittal, V. (2019, January). *ASEAN FinTech census 2018*. Ernst & Young. https://doi:10.13140/RG.2.2.27523.96804

Morgan, B. (2018, October 11). *10 examples of customer experience innovation in banking*. Forbes. https://www.forbes.com/sites/blakemorgan/2018/10/11/10-examples-of-customer-experience-innovation-in-banking/?sh=61654639729d

Musara, M., & Fatoki, O. (2010). Has technological innovations resulted in increased efficiency and cost savings for banks' customers? *African Journal of Business Management, 4*(9), 1813–1821. https://academicjournals.org/ journal/AJBM/article-full-text-pdf/C5541BC31993

Nguyen, T. L. (2018). Diversification and bank efficiency in six ASEAN countries. *Global Finance Journal, 37*, 57–78. https://doi.org/10.1016/j.gfj.2018.04.004

Oh, H. Y. (2016). Innovativeness or confidence? The effects of consumers' innovativeness and self-efficacy on the acceptance and diffusion of innovative technologies*. International Journal of Software Engineering and Its Application, 10*(8), 117–126.

Schumpeter, J. A. (2003). *Capitalism, socialism and democracy*. Taylor & Francis e-Library.

Syahullah, M. (2018). ASEAN banking efficiency review facing financial services liberalization: Indonesian perspective. *ADB Policy Review, Asian Economic and Social Society Journal, 6*(2), 88–99.

Van de Werff, A. D., Hogarth, J. M., & Peach, N. D. (2013). A cross-country analysis of financial inclusion within the OECD. *Consumer Interests Annual, 59*(1), 1–12. https://digitalcommons.georgefox.edu/cgi/viewcontent.cgi? article=1003&context=gfsb

Weiers, R.M. (2014). *Introduction to business statistics*. Cengage Learning Asia.

Wilson, J. D. (2017, April). *Is FinTech a threat or an opportunity?* Mercer Capital's Bank Watch. https://mercercapital.com/article/is-fintech-a-threat-or-an-opportunity/

Winarno, W., Mas'ud, I., & Palupi, T. (2021). Perceived enjoyment, application self-efficacy, and subjective norms as determinants of behavior intention in using OVO application. *The Journal of Asian Finance, Economic and Business, 8* (2), 1189–1200. https://www.koreascience.or.kr/article/JAKO202104142283653.view?orgId=kodisa