

FinTech Business Models: an Investigation of Thai Banks

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Abstract FinTech stands for the combination of “financial” and “technology”. FinTech is not new, it has a long way of innovations. Information technology has been used by financial service industry to deliver solutions to consumers for half a century. Technology has always change the financial industry. Since 2008, this change accelerated greatly both in terms of disruptive and quantifiable. FinTech has disrupted financial industry in both the developed and developing world. Many new financial solutions have emerged from rapid developing technology. This evolution of FinTech poses challenges for institutions and consumers in harnessing the potential benefits of innovation. The research aims to contribute to a better understanding of FinTech development and diffusion. This paper uses the predefined taxonomy to identify business models of FinTech-based innovations. The paper uses the case of four major commercial banks in Thailand to obtain better understandings of FinTech development and diffusion.

Index Terms FinTech, digital business model, taxonomy, financial technology

I. INTRODUCTION

FinTech stands for the combination of “financial” and “technology”. FinTech is not new, it has a long way of innovations [1]. Information technology has been used by financial service industry to deliver solutions to consumers for half a century. Technology has always change the financial industry. Since 2008, this change accelerated greatly both in terms of disruptive and quantifiable. FinTech has disrupted financial industry in both the developed and developing world. Many new financial solutions have emerged from rapid developing technology at the retail and wholesale levels. This evolution of FinTech poses challenges for institutions and consumers in harnessing the potential benefits of innovation.

FinTech has introduced novel financial service models [2], new business structures [1], as well as enable financial firms to improve structures, processes, technologies and personnel in order to be able to survive in the dynamic financial services industry [3]. In banking industry, technology has been used to innovate financial services to provide cheaper, faster, and more reliable service solutions. Traditional financial services as payments, investment, lending, and insurance, are being innovated by cryptocurrencies, crowdfunding services, AI, big data and analysis, and block chain technology [4]. These innovations make financial transactions less bureaucratic, less expensive, more convenient, and more secure [5]. They also simplify consumers’ experience for financial services.

This study aims to contribute to a better understanding of FinTech business models. It is set out to address the research question: “What business model the traditional banks use to respond to FinTech?” This question was motivated because of two reasons. First, literatures argue that start-ups along with their innovations such as block chain pose a threat to traditional banks [6]. In the past, PWC proposed that by 2020, more than 20% of global financial institution earnings will be lost to new entrants [7]. However, others suggested that traditional banks are considered the dominant institutions who have opportunities in FinTech ecosystem. It is evidenced that the traditional banks, and telecommunication service companies are creating a new ecosystem of financial services [8] [9]. Thus, investigating the innovative FinTech business model of banks provides important insights into the nature and the future financial ecosystems.

Second, emerging FinTech literature have covered several aspects such as the evolution of FinTech [10], recognizing the banks’ opportunities [11], understanding start-up [12]. However, literature on understanding the phenomenon is still emerging. It was suggested that the banks should develop new digital infrastructure, or adopt cooperative approaches such as partnership [13] [14]. Nevertheless, there still lack of empirical evidences.

This research uses the predefined taxonomy of FinTech to identify business models of FinTech-based innovations. The study uses the case of four major commercial banks in Thailand to obtain better understandings of FinTech development and diffusion. The data are collected from public media texts. The study makes the following contributions. First, the study contributes to information systems research an emerging topic of research. Second, the study contributes to FinTech research, in particular a better understanding of FinTech business models. The remaining parts of the study are structured as follows: Theory, Methodology, Result, Conclusion and Limitation and Future research.

II. THEORY

This research employs two information systems theories: 1) the concepts of sensing and responding and 2) taxonomy of business model.

A. The Concepts of Sensing and Responding

Sensing is the firm’s ability to obtain sufficient knowledge rapidly and the relevant transitions it introduces in the firm. Responding is the firm’s ability to take action towards technology-enabled transformation. It was suggested that the firm that is able to sense opportunities or threat, but unable to take actions is at risk and even failure [15]. This study adopts concepts of sensing and

responding proposed by Oshodin et al. to explore the initiatives that Thailand banks are taking [16]. [16] has reported how traditional Australian banks respond to the FinTech ecosystem. They conduct a review of literature including organization reports, newspaper articles, organization web pages and press releases. Their study identifies nine main initiatives the Australian banks are taking to respond to FinTech ecosystem: five sensing and four responding initiatives. The sensing the opportunities and challenges of FinTech that the banks are taking are 1.Deep engagement with customers: is to identify and recognizing customer desires, 2.Technology scanning: involves seeking knowledge on technology innovations, 3.Crowdsourcing of FinTech ideas: is defined as obtaining FinTech related ideas from various internal and external sources, 4.Channels for inbound knowledge: refers to obtaining knowledge from external specialist, and 5 Actively monitor activities of FinTech players: deals with an attempt to understand the characteristics of other FinTech firms. Table 1 shows these sensing initiatives along with their sub-categories.

Table 1: FinTech sensing initiatives.

SENSING INITIATIVES				
Deep engagement with customers	Technology scanning	Crowdsourcing of FinTech ideas	Channels for inbound knowledge	Actively monitor activities of FinTech players
SUB-CATEGORIES				
-Interact with customers -Use live chat on mobile services -Obtain customer insights -Monitor customer desires with mobile devices -Explore ways for better customer services	-Explore the use of voice biometrics -Trial emerging technologies -Test block chain and cryptocurrencies -Realizing the benefits of big data -Recognizing sentiment to digital assets -Recognizing sentiment towards cryptocurrencies -Participate in novel technology events	-Attracts ideas across the firm -Harvest ideas from society -Participate in Hackathons	-Setting up advisory panels -Engage consultancy service -Consult on modular finance -Organize training course -Recruit staff with FinTech insight -Integrate promising FinTech ideas	-Learn FinTech culture -Looking for firms with specific business focus -Observe evolving FinTech scope -Identify ecosystem leaders -Monitor threats posed by FinTech -Abreast of development -Monitor FinTech from inception

The response initiatives that the banks are taking include 1.Setting up innovation labs: setting up innovative labs for in-house innovation development, 2.Investment: providing venture capital and invest in FinTech start-ups, 3.partnership: collaborating with other banks and FinTech start-ups, and 4.platform design and development: building, designing or redeveloping digital platforms. Table 2 shows these responding initiatives along with their sub-categories.

Table 2: FinTech responding initiatives.

RESPONDING INITIATIVES			
Setting up innovation labs	Investment	Partnership	Platform design and development
SUB-CATEGORIES			
- to develop and test - to foster investment - to foster partnership	-Acquire emerging FinTech -Launch venture fund -Replicable test investment -Finance rival for innovative solutions	-Partner with incubators/accelerators -Foreign collaboration -Collaborate with start-up -Partner with promising FinTech -Collaborate with tech firm -Collaborative sharing of data -Partner to improve in-house capabilities -Partner to enable innovation -Partnership to share experience -Partner analytic firm -Partner with other banks -Trial partnership -Consortium to test blockchain and cryptocurrencies	-Release regular platform updates -Build open API -Launch new digital channel for service application -Improve platform appearance/functionality -Build feature on modern digital technology -Adopt cloud platforms -Develop new platform -In-douse solution development -Overhaul core system -Build blockchain

B. Taxonomy of business model.

The taxonomy of FinTech business model proposed by Eickhoff et al. is adopted in this study [17]. The taxonomy is developed based on Nickerson et al. [18]. In their research, the term “taxonomy” is defined as “a set of dimensions each consisting of a set of mutually exclusive and collective exhaustive characteristics”. This definition is presented as follows:

$$T = \{Di, i = 1, \dots, n \mid Di = \{Cij, j = 1, \dots, ki, ki \geq 2\}\}$$

Di (i=1, ..., n) defines the n dimensions
Cij (j=1, ..., ki) ki (ki≥2) represents the mutually exclusive and collectively exhaustive characteristics.

The development of taxonomy is comprised of 4 iterations. For the first iteration, Matthias et al. purpose 6 dimensions for the taxonomy: D1=Dominant technology component, D2=Value proposition, D3=Delivery channel, D4=Customer segments, and D5=Revenue stream. The 2nd iteration draw a random sample of 150 companies that were labeled as FinTechs by the Crunchbase database. The sample was split into 50x3, and assigned to each of the authors to analyze 50 companies. The results of this iteration are the additional dimension, D6=Product/Service Offerings and the suitable characteristics for the dimensions obtained by the first iteration. The 3rd iteration draw on a random sample of 600 companies of which 200 per researcher. The objective of this iteration is to test whether the developed dimensions and characteristics are stable. The same as the 2nd iteration, the taxonomy involved significant changes. Then, the 4th iteration analyzed the remaining 1400 companies in the Crunchbase database with a FinTech label. The taxonomy required only marginal changes. The final taxonomy is presented in Table 3: FinTech Business Model Taxonomy.

Table3: FinTech Business Model Taxonomy.

DIMENSIONS					
D1: Dominant Technology Component	D2: Value proposition	D3: Delivery Channel	D4: Customers	D5: Revenue Stream	D6: Product/Service Offering
CHARACTERISTICS OF EACH DIMENSION					
-Blockchain -Digital Platform -Decision support system -Database -Marketplace -Transaction processing system	-Automotive -Collaboration -Customization -Insight -Monetary -Financial risk -Transparency -Unification/Consolidation -Security -Convenience -Usability	-API -App -Physical -www +App -Instant message	-B2B -B2C -B2B, B2C	-Kickback -Pay per use -Revenue share -Sales -Subscription -Unknown -Free -Hybrid	-Inform. aggregation -Brokerage -Currency exchange -Payment Service -Current account -Device -Financial education -Financing - Investments -Payment service -Personal assistant - Lending/Credit -Fraud prevention -User identification

The definition of each dimension is as follows:

D1 Dominant technology component: Dominant IT artifact that is the driver for the IT-based business model

D2 Value Proposition: The value the firm creates for its ecosystem. i.e., customers, partners, etc.

D3 Delivery Channel: How the products and services are distributed to the customers

D4 Customers: To whom the firm intends to offer its products and services

D5 Revenue Stream: How the firm generates revenue from its products or services

D6 Product/Service Offering: What the firm offers to customers

Table 3 FinTech business models contains six dimensions, each of which has several characteristics. The researcher noted that the taxonomy represents the state of the FinTech industry at that time. Thus, additional dimensions and/or characteristics could be added to the taxonomy. The researchers recommend that the taxonomy is useful to describe business models of a FinTech company. Thus this study uses the taxonomy to explore FinTech-based innovations of five major commercial banks in Thailand to obtain better understandings of FinTech development and diffusion.

III. METHODOLOGY

A. Context of the study

Banks in Thailand are governed by the Bank of Thailand (BOT), the country's central bank. BOT is responsible for promoting monetary stability, and setting monetary policies [19]. BOT aims

to create FinTech-friendly ecosystems which support the use of advancement of FinTech innovations that enable the development of products and services that enhance institution efficiency and meet the need of customers. The central bank aims to promote the use of FinTech to improve efficiency and reduce costs of financial products and services. Its main policy revolves around FinTech development, the development of national financial infrastructure for free money transfers, data analyzing, cyber security, and interconnectivity. The central bank also plans to cooperate more with technology companies, to create financial and banking innovations. BOT has signed agreement with PBC (The People's Bank of China, the central bank of the People's Republic of China) to collaborate on FinTech including joint innovation projects and research, information sharing, and regulatory coordination. The World Bank reported that Thailand is regarded as an ASEAN country with rapid FinTech development [20]. There are 140 FinTech companies, which about half of them are new companies. The majority of them focus on developing digital transaction services. Most of these companies are under the supervision of large bank which purchase digital transactions system to innovate traditional financial products and services.

Few Thailand banks dominate the banking sector. They provide services including personal loans, home loans, payments, investment, and market capitalization. For this research, the author selects four major banks operating in Thailand. The banks selected offer comprehensive financial services. There has been a lot of news media publishing the bank activities. Thus, this study collects FinTech initiatives from practitioner literature and examined the literature for modelling business patterns indicating FinTech activities.

B. Research Method

IS Research suggest that practitioner literature from popular media is reliable in demonstrating business practices and ideas [16] [21] [22]. Besides, it is noted the practitioner literature present concepts which have not been addressed in academic [23]. Thus practitioner literature forms an important basis for analyzing FinTech initiatives. In order to provide substantial evidence on the activities of banks, this study examines media texts to identify FinTech business models.

C. Data Collection and Analysis.

This study uses Google search engine which cover variety of popular media. There are three stages of data collection and analysis which are Search, Selection, and Analyzing:

Stage 1: Search. The researcher searches on Google by using the bank's names and the term "FinTech". The years are limited to be between 2008 and 2020. The year 2008 is selected since it is the year that Bitcoin and blockchain, which are most important FinTech innovation are, introduced.

Stage 2: Selection. The hits are screened to identify sources that are relevant. The researcher screens every hit until the Google search message "If you like, you can repeat the search with the omitted results included". is reached. The irrelevant or reoccurring sources are excluded.

Stage 3: Analyzing. Each source is examined to identify business models of banks FinTech activities. The business models are identified based on the concepts of sensing and responding [16],

and the FinTech business models taxonomy [17]. The next section presents the results derived of the study.

IV. RESULT

Table 4 presents the results of stage 1 (search) and stage 2 (selection). The banks are referred to by using pseudonyms. Table 5 and Table 6.1-6.3 (in the Appendix) show the analyzing of banks' FinTech business models.

Table 4: Results of search and selection.

	BANK 1	BANK 2	BANK 3	BANK 4
Stage 1 (Search)	90	77	80	96
Stage 2 (Selection)	84	67	32	54

Table 5 Sensing initiatives. As shown in table 5, banks ensure proper knowledge in FinTech space. The author identifies four areas of sensing initiatives.

A. Deep engagement with Customers:

Banks try to understand the desires of customers to provide proper financial services. The results in tables 5 indicate that banks engage more deeply with their customers to understand more about their needs. The review of practitioner literature shows that banks are interacting more with their customers. For example, bank 2 uses chat bot on mobile devices to communicate with customers, while bank 1 uses facebook chatbox and line as channels for customer interaction. In addition, The results show that bank1 and bank3 are taking steps to obtain deep insights about their customers. Through user-generated content extracted from inquiry and transaction service, banks can have more and timely knowledge of their customers' expectations and attitude, thus can obtain regular insights about their customers' needs. This knowledge enables banks to learn new ways in which customers want to obtain financial services.

B. Crowdsourcing of FinTech ideas:

This indicate the sourcing for FinTech knowledge and supply of innovations. One approach is through hackathons. This enables young people to suggest future innovations. The participants in hackathons can use any available software to achieve business solutions. For example, bank 1 cooperates with academics to test the practical use of AI, block chain, and data analytics in areas such as robo advisor and lending and credit. Also, there is evidence bank 2, bank 3 and bank 4 attract novel ideas by setting up FinTech idea repositories to encourage bank employees to contribute and advocate for ideas to be implemented. Also, evidence associates bank 2 with harvesting ideas from the society as an approach to crowd-source ideas.

Besides the evidence shown in Table 5. The researcher also identifies the other two initiatives from the media text include:

C. Technology Scanning:

Banks attempts to learn novel financial technologies and their functionalities. Results indicate that the common approach is by participating in novel technology events to ensure technology scanning, in order to be able to indicate the functionalities of emerging technologies. The evidence show that all banks are

realizing the benefits of AI, block chain, and data analytic technology. There is also evidence that bank 4 are taking steps to recognize the use of agile development and develop skills for transformation leaders.

D. Channels for inbound FinTech knowledge:

Banks aim to obtain knowledge from external sources to be up-to-date with novel technologies.

Evidence suggests that There is also evidence of bank 1, bank 2 and bank 4 recruiting professionals with knowledge of FinTech as well as the ability to address business change. There is also evidence of bank 3 setting up advisory panels to understand future strategies and obtain knowledge on FinTech to address business change.

In summary, Thai banks attempts to obtain knowledge and innovative ideas through customer engagement, technology scanning, crowdsourcing and channeling of inbound knowledge.

Table 6.1-6.3 Responding initiatives. Table 6.1-6.3 show that Thai banks respond to the FinTech by pursuing several approaches. The responding initiatives include

A. Setting up of innovation labs:

Innovation labs is for carrying out research and development in FinTech in order to enable the banks to adapt to the continuous changing FinTech ecosystem. he labs are used to develop and test financial technologies and solutions. Also, banks use their innovation labs to foster investment or partnership with other players in FinTech ecosystem. The results show that all banks have set up the innovation labs to foster innovation through development and test, investment and partnership. All banks have development and tested solutions for payment and lending/credit service. All banks involve technology as AI and modern mobile technology. In addition, bank 2 and bank 4 include blockchain, while bank 3 includes bio-metrics authentication in their scopes.

Investment: All banks have set up venture funds which fund either in their innovative labs or startups or external funds to find the innovative FinTech solutions. The outside funds are used to explore new market opportunities as well as prospects. In fact, the investment involves process of acquiring, trialing and replicating. The process ensure that innovation is continuous. Bank can respond to future needs by learn from prior knowledge. The four banks have hugely invested in innovative FinTech firms. The result shows that all banks have invested in FinTech startups and funds which provides better service delivery to customer through ease of use and faster transaction. Banks also focus on firms that provide flexibility and transparency. Also, the investments have gone to the firms that leverage on using new technology as blockchain. The result indicates that bank 1 and bank 4 have invested in both foreign and local firms, while bank 2 and bank 3 have focused more on local investment.

In addition, bank 1 has invested in a foreign FinTech start-up that has implemented blockchain on payment systems, while bank 4 has invested in another foreign fund which rivals on better trade finance service.

B. Partnership:

The results show several approaches that banks do to create partnership in response to FinTech including: bank with incubator,

bank with start-up, bank with FinTech firms, and bank with another bank. Some of the intended or actual purpose of various partnerships were not indicated in practitioner literature but can be explored in future studies. Despite the limitations resulting from using practitioner literature to understand bank partnership, the result reflects that the reasons for partnership are to share experience, improve in-house capabilities, and enable innovation. The result indicates that bank 1 partners with a local incubator, local and foreign start-ups, a local FinTech firm, bank 2 collaborates with a local and a foreign FinTech firm, and a local startup, bank 2 collaborates with local FinTech firms, and a local startup, and bank 4 collaborates with a local and a foreign start-up, a local FinTech and foreign firms. As such, all banks indicate their desire to partner with promising FinTech firms. There are also indications of collaboration efforts among bank 4 and two other banks as part of an online payment platform enhancing user experience.

C: Platform design and development:

Banks use their innovation labs to foster in-house capability, as well as investment and partnership. The labs enable banks to develop and release innovative digital platforms. Most of the legacy systems are upgraded with modern technology. Results show that all banks had improved the systems for better customer service. This involves redesigning the system and integrating new digital technologies such as data analytics, modern mobile, biometrics, AI, and blockchain. The identified initiatives include the building of open API, and development of new features and platforms. Evidence shows that all banks have always released regular platform updates to improve platform features and functionalities, as well as set up new digital channels for personal payment and credit services.

In summary, all the four banks show efforts to harness the opportunities emerging in the FinTech ecosystem. All banks attempt to collaborate and partner with other firms to enhance innovativeness. In addition, banks try to utilize their competencies, which reflect in the development of in-house solutions. To respond to the phenomenon, the in-depth knowledge is required. Thus, industry experts have jointly developed solutions through obtaining access to data amongst peers, investment and collaboration with other players, or jointly developing platforms with other organizations. It is also evidenced that smaller firms are more open to radical technology and innovative culture. The responding through partnership, collaboration, investment, and setting up innovation hubs, show that the sensing and responding is a continuous process. Banks carry out ongoing in-house testing and trials of technology for better banking solution initiatives.

V. CONCLUSION, LIMITATION AND FUTURE RESEARCH

The author conducts the research by collecting practitioner data from media text to answer "What business model do traditional banks use to respond to FinTech?" To address the research question, the research employs the concepts of sensing and responding together with the taxonomy of business model. The author identifies that deep engagement with customers, technology scanning, crowdsourcing of ideas, and channels for

inbound FinTech knowledge as examples of how Thai banks are sensing the opportunities and challenges of FinTech. In addition, setting up innovation labs, investment, partnership and platform design and development are identified as the response initiatives of Thai banks.

The study has several limitations. Firstly, the data source, which is popular media text, could be biased. Secondly, the use of the search terms may also have an impact on the research outcome. Further study for future research could include 1) field study which is important to verify the initiatives reported in this paper 2) carry out the iterations in identifying FinTech business models 3) explore how banks continue improvement in the sensing and responding process involved with the selection of FinTech business model.

APPENDIX

Table 5: Banks' Sensing Initiatives and Business Models

Table 6.1-6.3: Banks' Sensing Initiatives and Business Models

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APPENDIX

Table 5. Banks' Sensing Initiatives and Business Models: A.Deep engagement with customers B. Crowdsourcing of FinTech idea C.Technology Scanning

BANK	Sub-Category	Archetype label	Technology Component	Value proposition	Customers	Product/Service Offering
BANK1	A.Interact with customers (facebook chatbox line)	1.Financial Market 2.Intermediary, Payment Service	Marketplace, Transaction Processing System	Convenience/Usability	B2C	1.Investment, Lending, Credit, Financing 2. Payment service, Brokerage device,
	A.Obtain customer insights	Information Extractor	NA	Insight	Bank	
	A.Monitor customer desires with mobile devices	Information Extractor	NA	Insight	Bank	
	C.Participate in novel technology events (mobile application)	1.Payment Service, Information Aggregator 2.Lending Community,	1. Payment Service, Transaction Processing System 2.Decision Support System	Convenience/Usability Automation	B2C	1.Payment Service, Information Aggregation 2.Lending
	B.Participate in Hackathons (AI, blockchain, data analytics)	Robo Advisor, Co-Creator of Financial Analysis	Blockchain, Decision support system	Monetary Convenience/Usability	B2C	Personal Assistant
BANK2	A.Interact with customers	NA	AI	Convenience/Usability	B2C	Chatbot
BANK3	A.Obtain customer insights (mobile application)	Data Analytics	Transaction Processing System	Insight	B2C	Payment service, Lending/Credit
	A.Monitor customer desires with mobile devices	Data Analytics	Transaction Processing System	Insight	B2C	Payment service, Lending/Credit

Table 6.1 Banks' Responding Initiatives and Business Models: Setting up Innovation Lab

BANK	Sub-Category	Archetype label	Technology Component	Value proposition	Customers	Product/Service Offering
BANK1	Innovation lab to develop and test, to foster investment, and to foster partnership	NA	Blockchain	NA	B2B B2C	NA
BANK2	Innovation lab to develop and test, to foster investment, and to foster partnership	1.NA 2.Cloud Security 3.Alternative Trading Venue 4.Social Commerce 5.Account Information System 6.Payment Service 7.Robo Advisor	1.AI, 2.Information Security 3.Marketplace 4.AI 5.Transaction Processing System 6.Transaction Processing System 7.AI	1.Automation, 2.Security service 3.Matching, Intermediation 4.Insight/Automation 5.Monetary 6.Automation 7.Convenience/Usability	1.NA 2.B2B 3.B2C 4.B2B, B2C 5.SME, Startup 6.B2C, B2B 7.B2E	1.NA 2.Cloud Security Service, 3.Brokerage Service, 4.Online store, 5.Accounting Information System 6.Payment Service 7.Personal Assistant
BANK3	Innovation lab to develop and test, to foster investment, and to foster partnership	NA	AI, Blockchain, Data analytics	NA	B2B B2C	NA
BANK4	Innovation lab to develop and test, to foster investment, and to foster partnership	1.Financial Service 2. NA	1.Blockchian 2. machine learning, IOT, mobile API	1.Monetary Convenience/Usability 2. NA	1.B2B 2. NA	1.Lending 2. NA

Table 6.2 Bank’s Responding Initiatives and Business Models: Partnership

BANK	Sub-Category	Archetype label	Technology Component	Value proposition	Customers	Product/Service Offering
BANK1	Partner with accelerators	Robo-Advisor	Decision Support System	Monetary Convenience/Usability	B2C	Personal Assistant
	Collaborate with start-up	1.Robo-Advisor 2.Payment Service 3.Lending Community 4.Lending Community 5.Lending Community 6.Information Aggregator, Information Extractor 7.Lending Community 8.Payment Service	1.Decision support system 2.Blockchain 3.Decision Support System 4.Decision Support System 5.Marketplace 6.Decision Support System 7.Decision Support System 8.Transaction Processing System	1.Monetary 2.Convenience/Usability 3.Convenience/Usability Automation 4.Insight 5.Matching/ Intermediation 6.Insight 7.Automation, 8.Convenience/Usability	1.B2C 2.B2C 3.B2C 4.B2B 5.B2C 6.B2B 7.B2B 8.B2C	1.Personal Assistant 2.Payment Service 3.Lending(information-based) 4.Information Aggregation 5.Brokerage Device 6.Information Aggregation 7.Lending(information-based) 8.Payment Service
	Partner with other banks	1.Accounting Information Systems 2.Security, Payment Service	1.Transaction processing systems(SME) 2.Authentication, Transaction Processing System	1.Convenience/Usability, Automation 2.Security, Convenience/Usability	1.B2B 2.B2B,B2C	1.Accounting Information Systems 2. Digital authentication, Payment Service
	Partner with other VC	Robo-Advisor	Decision Support System	Monetary Convenience/Usability	B2C	Personal Assistant
BANK2	Collaborate with start-up	Security	Authentication	security		Digital authentication
	Partner with promising FinTech	Security, Payment Service	Authentication, Transaction Processing System	Security, Convenience/Usability	B2B,B2C	Digital authentication, Payment Service
	Build feature on modern digital technology	Payment Service	Transaction Processing System	Convenience/Usability	B2C	Payment Service

BANK	Sub-Category	Archetype label	Technology Component	Value proposition	Customers	Product/Service Offering
BANK3	Collaborate with start-up	HRS	Transaction Processing System	Convenience/Usability, Automation	B2B	HRS
	Partner to improve in-house capabilities (with FinTech and analytic firms)	NA	Blockchain, Quantum Computing, AI, Data Analytics, AR/VR, Cyber/Cloud Security	NA	NA	NA
BANK4	Collaborate with start-up	1.Online Store management systems 2.Payment Service, Information Aggregator 3.Lending Community	1.TransactionProcessing System 2.Payment Service, Transaction Processing System 3. Decision Support System	1.Convenience/Usability, Automation 2.Convenience/Usability 3.Automation	1.B2B 2. B2C 3. B2C	1.Account & store management systems 2.Payment Service, Information Aggregation 3.Lending
	Partner with promising FinTech	1.Financial Market Intermediary 2.Security, Payment Service	1.TPS 2.Authentication, Transaction Processing System	1.Convenience/Usability 2.Security, Convenience/Usability	1.B2B, B2C 2.B2B,B2C	1.Payment services 2. Digital authentication, Payment Service
	Collaborate with tech firm	Payment Service	Transaction Processing System	Convenience/Usability	B2C	Payment service, Lending, Credit, Financing
	Partner with other banks	1.Accounting Information Systems 2.Security, Payment Service	1.Transaction processing systems (SME) 2.Authentication, Transaction Processing System	1.Convenience/Usability, Automation 2.Security, Convenience/Usability	1.B2B 2.B2B,B2C	1.Accounting Information Systems 2.Digital authentication, Payment Service

Table 6.3 Bank’s Responding Initiatives and Business Models: Platform Design and Development

BANK	Sub-Category	Archetype label	Technology Component	Value proposition	Customers	Product/Service Offering
BANK1	Build open API	Financial Market Intermediary	Marketplace; Transaction Processing System	Marketing/Intermediation; Security	B2B, B2C	Brokerage service
	Use modern digital technology to improve platform appearance/functionality	1.Information Aggregator/ Robo-Advisor 2.Lending Commu. 3.Payment Service, Information Aggregator 4.Lending Commu.	1.Decision support system 2.Payment Service, 3.Transaction Processing System 4.Decision Support System	1.Monetary Convenience/Usability 2.Automation 3.Convenience/Usability 4Automation	1.B2C 2.B2C 3.B2C 4.B2C	1.Personal assistant Information aggregation 2.Lending 3.Payment Service, Information Aggregation, 4.Lending
BANK2	Build blockchain	Financial markets Intermediary	Blockchain	Convenience, intermediation, security	B2B	Trade finance service
BANK3	Build open API	Financial Market Intermediary	Marketplace, Transaction Processing System	Marketing/Intermediation; Security	B2B, B2C	Brokerage service
	Use modern digital technology to improve platform appearance/functionality	Information Aggregator/ Robo Advisor	Decision support system	Monetary Convenience/Usability	B2C	Personal assistant Information aggregation
	Build feature on modern digital technology	1.Co-creator of Financial Analysis 2. Payment Service 3. Payment Service	1.Decision support system 2. Transaction Processing System 3. Authentication (palm vein/biometrics)	1.Convenience/Usability 2.Convenience/Usability 3.security	1.B2B 2. B2C 3. B2C	1.Information aggregation 2. Payment Service, Lending/Credit 3. Digital Authentication
	Develop new platform	Accounting Information Systems	Transaction Processing System	Convenience/Usability	B2B	Accounting Information Systems
BANK4	Launch new digital channel for service application	Payment Service, Information Aggregator Lending Community,	Transaction Processing System	Convenience/Usability, Automation	B2C	Lending. Credit
	Build feature on modern digital technology	Payment Service	Transaction Processing System	Convenience/Usability	B2C	Payment Service for visually impaired

