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FinTech as The Emerging Technologies in Banking Industry: Past, Present, and Future

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Abstract—In the last decade, it stated that the discourse and the role of Financial Technology (FinTech) as the emerging technology in the financial and banking industry attracted the attention of researchers, practitioners, regulators, and policymakers. Referring to the evolution of FinTech to date, FinTech influences business activities in the banking industry from the past, present, and future. In Indonesia, the opportunities and challenges for the emergence of financial technology in the banking industry are enormous. Therefore, analytical studies related to fintech in the banking industry in the past, present, and future are necessary. Based on these facts, this study aims to present a descriptive analysis of the emergence of FinTech which has had an impact on the banking industry in the past, present, and future, particularly in Indonesia, as a case study. This study uses a descriptive analysis research method and using qualitative method approaches. This descriptive analysis is carried out by critically analyzing various relevant scientific journals, the facts of the FinTech phenomenon in Indonesia, and documentation papers from banking institutions. This results analysis reveals what happened to FinTech as the emerging technology in the past, present, and future in the Banking Industry. The expected contribution of this study provides answers to opportunities and challenges related to FinTech and the banking industry in the past, present, and future in more depth.

Keywords—Banking Industry, FinTech, Future, Pas, Present

I. Introduction

Financial technology as an emerging technology is increasingly becoming a global trend created by innovators and closely followed by academics, which is now attracting the attention of past, present and future FinTech regulators in the banking industry. [1]. Today, FinTech is an industry that uses cell phone / smartphone centric information technology to improve the efficiency of the financial system. Meanwhile, the technology is connected to the Internet; for example, cloud computing or mobile Internet will promote established companies in the financial services sector, such as money loans or bank transactions [2]. Indonesia has many opportunities in the digital economy in terms of the size of its economy, population, and number of Internet and mobile phone users. In Indonesia, FinTech generally refers to a mobile payment product (mpayment). All major e-commerce sites or online shopping systems have a specific paid version of this fintech product built into their business [3]. The CBNC Indonesia survey found that FinTech payment products own 39% of all FinTech products in Indonesia [4]. Startups are developing very quickly as a FinTech service company in Indonesia. According to the most recent StartupRanking data for 2019, Indonesia ranks fifth in the list of countries in the world with the most technology-based startups with a total of 2,182 startups [5]. And in particular, this study refers to the concept of FinTech evolution, which was investigated by Prawirasasra in 2018 [6]. Additionally, Thakor [7] conducted a FinTech and banking study in 2019. By applying this IT innovation to banks through digital fintech platforms, financial services can be provided to the public at a lower cost than traditional banking [8]. Business factors influence the introduction of infrastructure technologies (FinTech) in the banking and financial services industry [9]. Fintech mechanism influencing technological innovation for banking and financial services [10]. Meanwhile, organizations can innovate as business drivers [11]. The perception is emerging that this industry will threaten the very existence of conventional financial institutions such as banks. This perception stems from concerns that FinTech has disrupted the bank. Many practitioners and researchers have said that FinTech is a financial services disruption. Prawirasasra [6] mentioned that FinTech involvement can work well with the bank in Indonesia. However, Dermine [12] showed in 2017 that many FinTech products are popular. He also said that FinTech is disruptive and revolutionary and can continue to bring down traditional financial institutions. The Indonesian government has promulgated various banking regulations through the Financial Services Authority to respond to the existence of FinTech in the banking system [13]. In the past, starting in the 1990s, Indonesian banks began to use many ATMs as financial technology innovations in transactions. The Indonesian Central Bank of Indonesia (BI, Indonesia for short) and the Indonesian Financial Services Authority (OJK, in Indonesia) are currently anticipating the negative effects of FinTech growth in the financial and banking sector in the form of guidelines, laws and regulations. Bank Indonesia, as the central bank, has developed a plan aimed at making Indonesia's payment system & in the digital age [14]. Therefore, the Indonesian Financial Services Authority has set the objectives of how FinTech works with the financial and banking industry in its master plan [15]. This disruption or collaboration in the fintech industry has become a problem and the Indonesian banking services industry is addressing it. Therefore, many things are considered related to the future impact of FinTech on Indonesian banks.

There are many previous FinTechs and banks related to research supporting this study. The AnneLaure mention [1], in a related study on the future of FinTech, FinTech highlighted the synergistic and focused efforts required by banks, fintech professionals and financial services regulators to advance the future of FinTech and take successful action . A study by Jakšič & Marinč [8] on the future of banking found that due to the rise of financial technology start-ups and IT companies in traditional banking, drastic changes can also be expected in the banking sector. In 2019, Stulz [16] stated that the presence of Fintech and BigTech in the future will help traditional banks lose their competitive and strategic advantage because they do not have access to clear information about loan applicants. Mutiara et al. [13] conducted studies on the growth of FinTech in Indonesian banking systems. carried out. In this study, he concluded that banking and fintech can continue to function optimally in the future and see themselves not only as competitors but also as business partners, thus requiring integrated regulation between the two regulatory authorities and politics. Broto Legowo and others [17] Study prepared from the FinTech conceptual model, which has the constructs of business drivers, fintech mechanisms and technological innovation. The results of this study show that FinTech will be a IT application for finance after to, different technological innovationsin the financial business sector, including a bank.

The original purpose of this study was to present, as a case study, a descriptive analysis of the emergence of FinTech that has influenced the banking industry in the past, present and future, particularly in Indonesia. Therefore, FinTech as an emerging technology in the banking sector, analyzed based on the evolution of Fintech, is the novelty of this research. As far as we all know, technology, or later information technology, is the main driving force of business in various business areas, especially in banks.

A. FinTech

In current years, digitization in the banking sector reflects the rise of FinTech, which is a relationship or combination of finance and information technology. According to Prawirasasra [6], FinTech is a new sector in the financial industry that combines technology and financial functions. Fintech is a dynamic combination of finance and technology in the financial services sector [18]. Furthermore, Kim et al. [19] mentioned that FinTech is a service sector that uses IT technology focused on mobile devices to improve the efficiency of the financial system. According to Zavolokina et al. [20] found that the mechanism of a FinTech is the way to create / change / improve a business model. Furthermore, FinTech has an interruption or collaboration mechanism [6]. Finally, a true reference to fintech is the application of information technologies in finance [21].

IOSCO, an international organizing body for securities commissions, has stated that the term FinTech is used to describe various business models and new technological innovations that have the potential to transform the financial services industry [22]. The World Economic Forums also added that, as a new entrant, Fintech has the potential for transformation and innovation in the financial services business model [23]. However, this study, based on FinTech-related preferences at the bank, finds that FinTech is defining a new technological innovation aimed at improving the automation of the bank's financial services. In relation to its development, FinTech has evolved in the banking and financial industry [7]. The evolution of FinTech shown in Fig. 1

Fig. 1. Phases in FinTech Evolution[7].

FinTech 1.0, (18661967), where the transition from analog to digital took place in this era. FinTech 2.0, (1967-2008), where the development of digital financial services began in traditional banks in this era. FinTech 3.0 (2008 present) is the so-called democratization of electronic financial services. However, the Indonesian Financial Services Authority [15] mentions FinTech 3.03.5 (now to the future). In this era, many startups tend to offer a range of alternative traditional banking and Internet-based financial services managed by outsiders.

Frame et al. [24] mentioned types of FinTech innovations that are believed to change the future of finance and banking, namely: (1) Blockchain or Distributed Ledgers is a modern development system that has the potential to work with related technologies. Cause the banking revolution. Blockchains are an example of a distributed ledger that contains data that is shared across all points or nodes on the network. Lately, this distributed ledger technology seems to have the potential to disrupt other payment services through cryptocurrencies.(2) Artificial intelligence and machine learning are other important emerging technologies that have significantly influenced and applied the banking sector in recent years [24].

B.Banks

Banks are institutions that play an important role in the economy of a country. Banks are financial institutions run by the government or the private sector that deal with financial debt and credit problems. It lends, accepts, and deposits money, creating the gap between lenders and borrowers [25]. In general, the provision of deposit and loan products distinguishes banks from other types of financial firms. According to Trębacz [26], the name "bank" is also associated with medieval transactions, and in it was assumed that the term "bank" comes from the Italian word "bank" and means bank, counter where money merchants did banking operations . According to the Law of the Republic of Indonesia, Number 10 of 1998 in Article, Paragraph 2, related to the definition of banks in a study by Mutiara et al. [13] defines a bank as a financial institution that collects funds from the community in the form of deposits and distributes them to the community in the form of loans and other forms aimed at improving the lives of many people. From this agreement it concluded that the banking business comprises three activities, namely, fundraising activities, fund distribution activities and the provision of other banking services. In the past, banks were often referred to as traditional banks. At the moment, however, many banks are known as virtual banking, digital banking, or modern banking. In the future, the state of banking is likely to be different than it is today, which is why it is generally referred to as future banking.

II. Research Methods

The research methodology used in this study is a descriptive analysis research method with a qualitative approach. According to Loeb et al. [27] mentions that descriptive analysis is relevant for all types of research. It can work on its own as a full research project or complement the root cause analysis. This descriptive analysis was carried out by collecting data from various relevant scientific journals, data on the FinTech phenomenon in Indonesia, and documentation documents from banking institutions. Data analysis uses a descriptive approach to the secondary data collected. The analysis relates to the development of FinTech, which influences the past, present and future activities of the bank.

III. Results And Discussion

In the beginning, the results of this study provide an overview of the scope of this study. Referring to the FinTech evolution, then FinTech in the banking industry in the past, present, and future, illustrated as Table 1.

Table 1: FinTech in Banking: Past, Present, and Future

PAST	PRESENT	FUTURE
FinTech 1.0 – 2.0	FinTech 2.0 – 3.0	FinTech 3.0-3.5
1866→2008	2008→Present	Present→Future
Traditional Banks	Modern Banks	Future Banks

A. FinTech in Banking Industry in Past

FinTech in the past (FinTech 1.0 - 2.0). In short, in the past for FinTech development closely related to the development of basic technologies. During this era, the community began with the introduction of ATMs, which marked a transition from the analog to digital industry [6]. In the past, technology has played a role in providing information across borders, including information in the financial sector. [7] The retailer must order products by phone and travel with their assets around the world with ease and difficulty. In addition, Thakor [7] said: Installation of the first transatlantic cable and use of the telegraph, as well as fast transmission of transactions and payment of financial information.

Bankng Industry in the Past(1866-2008). In the past, the function of banks in providing savings and loan service products, which usually distinguishes banks from other types of financial companies, is what referred to as traditional banks[28]. Besides, Mishra[28]referred to technical advances in banks in this era as described in the following:

(1960)-Mechanical banking introduced,

(1970)-Computer-based banking industry introduced,

(1980)-Release of computer-based banking communication.

Financial technology in the past has not had a significant value for the banking industry when compared to its present condition. In the past, the response to the implementation of this financial technology in the Indonesian banking industry is deemed very slow, especially for traditional banks. The challenge in this era is that Indonesia is still growing a lot in the banking industry.

B. FinTech in Banking Industry in Present

FinTech in the present (FinTech 2.0 - 3.0). At present, in the transition from the FinTech 2.0 era to the FinTech 3.0 era [29]. In this age of evolution, the automated teller machine (ATM) is one of the technological innovations of the global financial sector [6]. The ATM is the most important financial innovation. Therefore, this era is a transition from the analog to digital industry. Payment and compensation systems to improve products and services in traditional financial banks [7].

The bank in the present (2008 today). Currently, Commercial Bank is a quick change to virtual banking. A Virtual banks, defined as banks that are not branches, as providers of banking services through electronic means such as ATMs, telephones, computers personal, Internet [28]. In addition, many people currently refer to the existence of the Modern Bank as a variety of aspects in the application of technology, p. Eg B. mobile banking, online banking and ATMs [30]. In addition, the presence of mobile banking and the use of mobile devices will send messages and financial information, as well as consumer transactions, p. In the last decade, startups that are innovations in fintech have developed very rapidly until now. In Indonesia, the current level of financial services activity by startups is likely to disrupt the financial and banking industries. Indonesian FinTech and Rural banks have almost the same market segmentation that peer-to-peer lending offers to SMEs and the retail market. However, not all facets of rural banks are affected by the emergence of FinTech. The results of the Anggreini and Singaporewoko [31] studies showed that the emergence of fintech affects the asset quality and profitability of rural banks. Therefore, the Bank of Indonesia and the Financial Services Authority must react quickly to anticipate the risks that may arise.

C. FinTech in Banking Industry in Future.

The 2008 global financial crisis occurred and affected the banking and finance industries [6]. In this era, it can be described as the advent of the democratization of digital financial services [6]. The use of technological advances by these market participants will offer clients financial services without direct intermediaries [7]. In the FinTech 3.0 era, the latest technology such as the Internet and Internet of Things (IoT) is growing, while more and more data analytics technologies will evolve in the banking industry towards the FinTech 3.5 era. The cooperation mechanism is an opportunity to further develop financial technology in the banking industry in the future. Without a cooperation mechanism, nearly 95 percent of fintech companies will fail in the upgrade phase. Fintech companies will always compete with banks for certain activities. Future banking-related FinTech products include: Bitcoin, Blockchain is a distributed ledger, Cryptocurrency, and Robo-Advisor [24].

Banking industry in the future (present future). In the future, there will also be FinTech Bank and BigTech [16] companies in the banking business. FinTech Bank is a fintech company doing business like online banking. FinTech Bank is also a FinTech company that offers synergies and collaboration with traditional banks. FinTech Bank can compete with traditional banks in user interface applications with a variety of transactional products with broad financial access. Note that Big Tech Firm is a technology company whose business model is oriented to the use of digital technologies [16]. The rise of BigTech in financial services provided by technology companies with a proven presence in the digital services sector [32]. BigTech businesses often start with payments. Some then expand the offering of credit, insurance, savings, and investment products, either directly or in partnership with financial institution partners. Amazon is an example of this in the US and Alibaba is BigTech in China. The unique advantages of BigTech Company allow them to replace traditional banking activities. BigTech's true strength lies in banking, especially when it comes to consumer finance and SME bank loans.

For the future, the Indonesian banking industry has responded and anticipated the future advancements of financial technology in the banking industry. Deloitte [33] stated that digital financial services (DFS) could be present in Indonesia in the future. The next big step is to combine the current use of mobile phones and the growing global demand for financial services. The Indonesian Financial Services Authority is working with the Bank of Indonesia to issue FinTech-related regulations to minimize the risks of this new technology. The Indonesian government has a legal aspect for its application in the laws and regulations related to FinTech [13]. The central bank has developed a plan aimed at making Indonesia's payment system & # 40; IPS & # 41; in the digital age [14]. Therefore, the Indonesian financial services authority has set the goals of how FinTech works with the financial and banking industry in its master plan [15].

D. Discussion

The existence of FinTech and the bank in the past, present and future has been influenced by business drivers, FinTech mechanics and technological innovations. The explanation follows the fintech concept model developed in previous studies [17].

The development of FinTech and banks in Indonesia started in the past with the use of ATMs [6]. Furthermore, the rapid growth of Startup [5] is currently expected to have an impact on banks, especially payments [4]. Bank Indonesia as Policy Maker [14] and OJK [15] as Financial Services Regulator have anticipated the development of FinTech for the future. For the future, the entry of the great technological platform could radically change the banking industry. However, in the short term, big technologies could intensify competition for consumer benefits. In a few years, large technology companies were able to successfully monopolize the origin and distribution of credit to consumers and small and medium-sized enterprises (SMEs), forcing traditional banks to become "low-cost producers" and only finance loans negotiated by big technology companies. This situation in Indonesia can negatively affect competition, reduce financial inclusion and affect financial instability in the banking sector. Meanwhile, FinTech Bank and BigTech remain a talk in Indonesia and are predicted as the bank of the future [16].

Previous studies on Future of Fintech by Mention[1], The Future of Banking by Jakšič, M., & Marinč[8], FinTech, BigTech, and Future of Banks by Stulz[16] all supported this study.

Indonesia's financial sector has grown steadily now and in the future, becoming a resilient part of its post-crisis bank restructuring program and sustainable regulatory initiative. According to a Deloitte study [33], a future challenge in Indonesia is that digital financial services offer some 110 million banking citizens in the country the opportunity to access banking products and services. However, according to the Asian Development Bank Institute [34], there are two challenges for the development of financial technology in the financial services sector today and in the future. The first is the low level of financial inclusion in Indonesia. The second challenge is the large financing gap for SMEs and the difficult access to financing from banks. This challenge must be answered by researchers and professionals related to FinTech and banking both in the present and in the future to provide synergy solutions and fintech collaborations with the financial services sector, especially in Indonesia.

This study provides practical implications for the banking industry on how they can create technological innovations through FinTech in their business for the future. The advent of financial technology has had several effects on the banking industry. The first implication is that the banking industry must be able to change significantly over time with the rapid development of FinTech, a new technology that can affect new business models. Later on, FinTech will open up new opportunities for clients and banks. As a second implication with the arrival of FinTech, the bank and the banking system must be able to anticipate the risks that may arise (operational risk, strategic risk, compliance risk and cyber risk). The final implication is that banks, service providers, and other FinTech companies are increasingly deploying and using advanced technologies to deliver innovative financial products and services.

This paper has certain limitations: Firstly, this finding limited studies on the chosen banks and banking systems in Indonesia context. Then, sources of data in the form of literature from scientific journals and FinTech related information from financial organizations are limited and may have biases. Therefore, critical analysis and discussion must be done carefully.

IV. RESULTS AND DISCUSSION

In summary, this research purpose of presenting a descriptive analysis related to FinTech as the emerging technology in the Banking industry for the past, present, and future, especially in Indonesia as a case study.

The results of this critical analysis are significant statements related to the FinTech evolution phase in the banking industry in Indonesia, as follows:

First, the critical analysis of this study provides a clear statement regarding FinTech as an emerging technology in supporting financial services, whose role has been to improve and automate the use of financial services in the banking industry since the past. However, the response to the implementation of this financial technology in the Indonesian banking industry is deemed very slow, especially for traditional banks

Second, the results of another critical analysis state that at present, FinTech is considered to be disruptive and has the potential to disrupt the banking industry. However, this statement is not appropriate for the FinTech mechanism in banks and banking systems in Indonesia. In this phenomenon in Indonesia, it revealed that there is a better synergy through collaboration between the Fintech industry and the banking industry expected to increase financial inclusion.

Finally, the results of this critical analysis state that in the future, FinTech has many risks in its implementation, requires creativity in responding to the role of FinTech in supporting banking and has implications for monetary policy in the banking industry. In Indonesia, FinTech in the banking industry has a legal aspect in its application in-laws and regulations. Need to be a consideration for the Future Bank in-depth related to the presence of FinTech and BigTech companies in the future.

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