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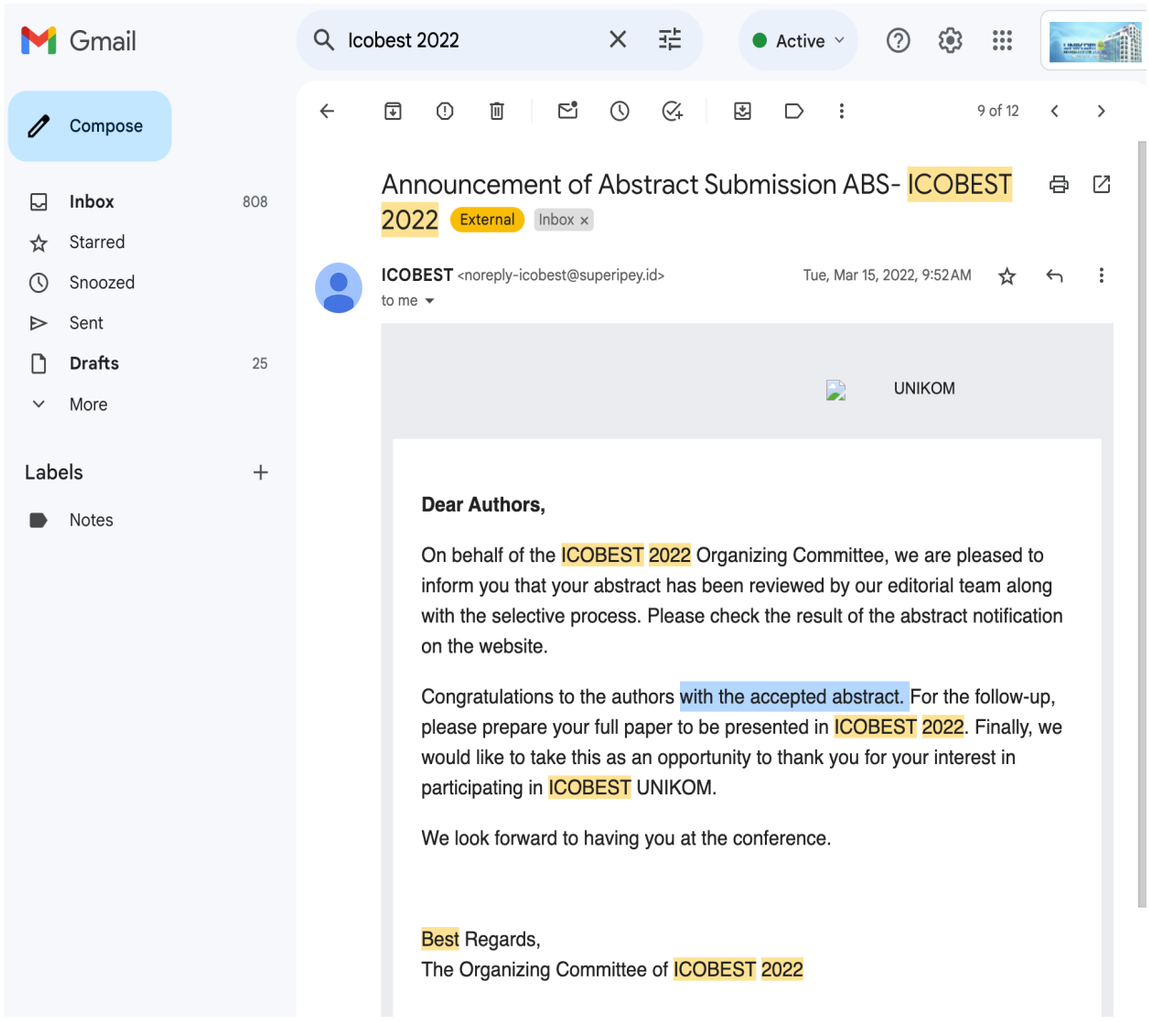

Digitalization and Informal SME: Digital Financial Inclusion for SME Development in The Formal Economy

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Abstract. The purpose of this study is to examine the digital financial inclusion ecosystem and the use of digital finance technology in overcoming the financing objectives of Informal MSMEs. This study is a challenge and opportunity for Fintech as Digital Financial Inclusion in encouraging MSME business. It ends with a study on the potential policies of the telecommunications sector and other related fintech. The research method used is a qualitative research method. Data collection techniques were carried out by means of a Group Discussion Forum and document review. The researcher also uses a qualitative-verification analysis strategy by conducting inductive analysis. The problem identification technique uses the DMAIC method (Define, Measure, Analyze, Improve, Control). Data collection was carried out from December 2021 to April 2022. Informants in this study were: a) Director of Telecommunications Kemkominfo, b) Analyst of Directorate of Fintech Licensing and Supervision OJK, c) Head of Bumdes Cibogo Hilir Plered. The results of this study indicate that digital financial inclusion is the main driver of the digitization of informal MSMEs. The novelty of the research is recommendations for the formulation of relevant authorities to encourage MSME business efficiency, and studies on potential policies in the telecommunications sector and other fields related to fintech.

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1. Introduction

The MSME sector is the main driver of the Indonesian economy with a contribution of more than 50% of GDP. MSMEs contributed 96.99% of employment opportunities, contributed to the addition of foreign exchange in the form of export revenues of 15% of total exports and 97.02% of workers were absorbed in this sector. The highest contributors to the growth of employment services are young entrepreneurs in developmental stages, who generally have few employees. MSME productivity growth is supported by the need for credit access.

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b.The second paragraph should explain the significances of at least five (5) previous researches related with your research, and describe how your research extend or different from the previous researches,

Financing is the main challenge for MSMEs, both in business planning, maintaining the business and developing the business. Informal MSMEs come from vulnerable groups and are underserved into a very large potential gap in financing applications. MSME financing is generally still in the development stage where the main funds come from personal funds. Access to MSME credit at formal financial institutions is still small. This financial gap is an obstacle to the progress of MSMEs. The financing gap occurs due to information asymmetry and/or weak creditor protection. This makes financial institutions more stringent in assessing MSME credit risk, and high monitoring of business processes. Information asymmetry arises because generally MSMEs do not provide financial reports to

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be evaluated and monitored for credit risk. Another factor that causes this financing gap is the high cost of reaching and serving MSMEs compared to the potential income earned by banks and financial institutions from MSMEs. The limited availability of appropriate financial products and the lack of collateral are also obstacles for MSMEs to obtain financing. Another obstacle for MSMEs is economic activity which generally does not have a permanent organization, a physical place of business and employees with irregular work periods. Formally, banks are regulated not to serve entities that are not legally registered or do not have the necessary documents for identification/verification, or are unable to provide reliable information. One way that financing can be given to MSMEs that are not creditworthy without causing losses is subsidized loans.

As a new response to the challenges of credit to MSMEs, a digital financing model has been introduced. Digital financing services have transformed the traditional loan process by automating the task of underwriting and lending services making it significantly cheaper, faster and easier to provide financing to MSMEs. The use of alternative data in digital financing helps eliminate information asymmetry, thus creating new credit products and digital payments can help informal businesses build credit histories, potentially opening the door to formal financing. The adoption of mobile applications makes it easier for informal businesses to obtain digital financial services.

Many studies related to the use of digital financing for MSMEs can affect financial stability so that MSMEs continue to operate in a sustainable manner [1]. When financial products are accessible to the public, financial inclusion shows a high level of accessibility, high enough equity can support MSME business operations. Digital financing service products are an alternative to overcome restrictions on access to formal financial institutions, lack of knowledge and the complexity of financial institution products [2]. In fact, the results of Capri's research [3] conclude that there are still many MSMEs that use digital technology poorly to obtain financing and funding, so this is the biggest challenge in getting financial support, in addition to the lack of trust and lack of information for MSMEs in obtaining information on where and how to get financial support. funds [3]. In addition, most companies are not aware of assistance from government agencies, NGOs, and private companies to improve their internet infrastructure, e-commerce, and digital business activities. The main technology platform used for company operations is mobile applications [3].

According to the results of Mehrotra's research [4] the volume of MSME credit is considered very small compared to its contribution to GDP, where the number of loans received by MSMEs is disproportionately smaller than corporations even though MSMEs' contribution is more significant to GDP and employment. Less than 60% of SMEs use bank loans as a means of financing, personal funds continue to be the dominant source [4]. Most MSMEs in developing countries state that access to finance is the most binding, so MSME financing programs will be an important channel to achieve growth and create more jobs [5].

Digital Financing inclusion for MSMEs can increase user traffic and can obtain potential borrowers with risk profiles according to measurable targets, which in turn will provide benefits, and will create a healthy digital economy ecosystem. MSMEs will get access to credit opportunities, thus through Digital Financing can open up opportunities for Informal MSMEs to develop.

The purpose of this study is to examine the digital financial inclusion ecosystem and the use of digital finance technology in overcoming the financing gap for Informal MSMEs. This study covers the challenges and opportunities of Fintech as Digital Financial Inclusion in encouraging MSME businesses. It ends with a series of studies on the potential policies of the telecommunications sector and other fields related to fintech. The urgency of research is important to provide solutions to the development of fintech business trends, products and business models, including regulatory and policy frameworks by utilizing digital financing services for MSMEs to get easy access.

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2. Method

The research design which is prepared to obtain answers to the research questions objectively, validly and effectively, is in the form of a comprehensive scheme that includes a research program. The type of research used is qualitative research. Qualitative research is used to obtain a complete picture of the use

of digital finance by MSMEs in the Informal Economy as financial inclusion from the point of view of financial authorities, developers of digital financing services, financial institutions, telecommunications authorities, MSME authorities and MSME actors. This research is designed to provide understanding by capturing meaning in the field through direct interaction involving researchers with digital financing service developers, financial institutions and MSME actors as well as the study of related documents.

Sources of data for this research are key informants consisting of: a) Director of Telecommunications Kemkominfo, b) Analyst of Directorate of Fintech Licensing and Supervision OJK, c) Head of Bumdes Cibogo Hilir Plered. Determination of data sources in this study was carried out purposively, by adjusting to the problem and research objectives where the informant had knowledge of the required data.

Research data collection was carried out including making rapport activities, selecting informants purposively and recording the results of data collection. Data collection is carried out from December 2021 to April 2022. Data collection techniques are carried out by Forum Group Discussion (FGD) and document review. Forum Group Discussion (FGD), held in a structured manner in the formulation of research achievement indicators and research achievement targets. The frequency of holding FGDs is at least 3 times in the research process. Document review is carried out by digging up information through facts stored in regulations and journals.

The researcher uses the technique of testing the validity of the triangulation data, in verifying the validity of the data, namely by (i) the triangulation method, to compare information so that there are no errors in data collection; (ii) Theory triangulation, to compare information with relevant theoretical perspectives.

The researcher also uses a qualitative analysis-verification strategy by conducting inductive analysis, which is an approach by drawing general conclusions from real facts in the field. This inductive analysis was carried out throughout the study, with the aim of simplifying the data into a simpler form. The procedures in analyzing the data obtained include (i) the performance of data reduction, by selecting data relevant to the research, and focusing attention on the main problem in the research; (ii) Presentation of summary data in descriptive form; and (iii) Draw conclusions to provide problem solving solutions.

The problem identification technique uses the DMAIC method (Define, Measure, Analyze, Improve, Control). Define is an activity to identify problems that arise. The data used is primary data as input to determine the cause of the problem. Measure is an activity of grouping data that has been obtained and then processed according to existing variables. Analyze is a data analysis activity using the problem tree method (problem tree). The problem tree helps to find solutions by mapping the anatomy of cause and effect around the problem (structured mind map). The problem tree analysis is done by forming a more structured mindset regarding the causal components related to the prioritized problems. Improve is an activity that focuses on the causes of the problems found and which have been analyzed previously. At this stage, proposals or ideas are given to parties related to the research. Control is an activity carried out to maintain or maintain the condition of the room.

3. Results and Discussion

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3.1 Indonesia's Digital Financial Inclusion Ecosystem

3.1.1 Overview of Financial Inclusion in Indonesia

Indonesia's banking credit distribution as one of the important roles of financial services shows an increase in 2021 with banking credit growth of 5.2% yoy, exceeding the projection of 4% - 5% yoy. This growth was followed by an improvement in the ratio of bad loans (NPL) in 2021 gross 3%, better than in 2020 (gross NPL 3.06%). Likewise, the increase in stock market capitalization as an alternative source of financing in 2021 will reach 49.65% of GDP, higher than in 2020, which is 45%. Indonesia's financial services sector is growing with the development of new financial products such as Crowdfunding which makes it easier for MSME actors to access business capital in 2021 reaching Rp. 412 billion.

The uptake of formal credit for MSMEs in Indonesia is another important issue related to financial inclusion that needs to be addressed. There are 65 million MSMEs or 99.9% of the total business actors

in Indonesia, which contribute 97% of the employment (120 million workers), and contribute 60.51% or Rp. 8,573 trillion to GDP. 60.2% of MSMEs only have capital to last a maximum of 3 months. On the other hand, in 2020 the financing of Microfinance Institutions has reached Rp749.42 billion, an increase of 21.68% compared to the previous year. Meanwhile, MSME loans in 2021 have reached more than IDR 1,102.7 trillion. Loan distribution to the productive sector in 2021 has reached 47.26% (Rp. 54.71 T).

The increasing income of the people is indicated by the GDP per capita over the last 10 years which has increased in line with the level of financial inclusion of 76.19% which exceeds the target of the National Strategy for Financial Inclusion (SNKI) of 75%. Financial inclusion is the availability of access to various financial institutions, products and services in accordance with the needs and abilities of the community. While the Digital Literacy Index in 2021 is 3.49, where Digital Culture is 3.90; Digital Ethics 3.53; Digital Skill 3.44 and Digital Safety 3.10. Although access to formal finance has shown a large increase, only 23% have an account number, 51% of the population is untouched by financial and banking services or has a bank account (unbanked), and 26% of the population is not fully served by banks (underbandked) [6]. The underbanked group is directly correlated with the growth rate of MSMEs, because many MSME actors are in this group. Meanwhile for individuals with access to bank accounts, active use of limited financial products and services remains a challenge. Active use is an important criterion for achieving financial inclusion. Active use is defined by the World Bank's Global Findex survey as making at least one deposit or withdrawal from a bank account in the past year. Based on this definition, approximately 80.27 million Indonesians have a formal financial account [7].

3.1.2 Importance of IT Innovation for Financial Inclusion in Indonesia

The use of IT innovation and blockchain (DLT) in financial services is a technological innovation that provides convenience, efficiency, convenience and broad access to financial products from anywhere and anytime, with the potential to increase financial inclusion. Fintech can enable old companies and new companies to be able to provide financial services economically for those who do not have bank accounts. Fintech as a financial service is delivered through digital infrastructure including cellular phones and the internet that connects individuals and businesses to digital payment infrastructure so as to create unlimited transactions [8].

Most of the Fintech services are offered by startups. The ease of IT development has grown significantly Fintech companies and the growth of MSMEs as a share of the financial services market [9]. Fintech companies take advantage of IT products and capabilities such as cloud computing to quickly develop digital products and make Fintech companies focus on valuable businesses.

The increasing use of the internet in Indonesia (204.7 million people or 73.7% of the total population in 2021) encourages the use of electronic money transactions. The growth of the digital financial sector in Indonesia in 2021 will increase by 43.66% yoy, inseparable from the use of Fintech. One category of services that is growing rapidly is digital loan services (P2P Lending) which allow non-bank individuals or companies to provide loans. Until 2021, as many as 103 P2P Lending fintechs are registered with the OJK.

The Fintech industry has experienced growth with the increasing number of licensed providers, the increasing number and volume of transactions in the community, and the increasingly diverse types of digital financial services offered by Fintech providers. The low-touch concept offered by Fintech has encouraged its use in society in the digital economy. Given the challenges of accessing formal financial services through the traditional banking system, due to the distance from financial institutions, and limited access points such as ATMs (0.5 terminals per 1,000 people), bank branches (16 bank branches per 1,000 square kilometers) and Point of Terminal sales (POS) (0.4 terminals per 1,000 people), coupled with low credit and debit card penetration, suggest that there is a huge opportunity for Fintech to disrupt traditional financial systems.

From a digital infrastructure perspective, it shows that mobile phone penetration and internet penetration have been increasing rapidly. According to the Association of Indonesian Internet Service Providers, 55% of Indonesians access the internet and there are more than 400 million cellular phone

subscribers, or 140% of the cellular phone penetration rate. In addition, 45% of all mobile phones in Indonesia are smartphones and as many as 191.4 million or 68.9% of the total population of active social media users. According to the World Bank's Findex Survey [10], of the 95 million unbanked adults in Indonesia, 62 million own a mobile phone. Therefore, mobile phones can serve as an important distribution channel of formal financial products and services for the unbanked and unbanked. In fact, a Findex survey [10] showed that 35% of adults had made or received digital payments in 2017, but only 3% of adults had mobile money accounts.

3.1.3 Fintech Ecosystem in Indonesia

The Fintech landscape in Indonesia is dynamic, rapidly changing the financial services sector. The growth of Indonesian FinTech companies from 2017-2021 is 49%, with a total of 440 companies in 2017 then reaching 785 companies in 2021 [11]. Number of Fintech Companies in 2021, Payments Category as many as 237 companies (30%), Alternative Lending category as many as 179 companies (23%), Investment Tech category as many as 115 companies (15%), Finance and Accounting Category as many as 106 companies (14%) , Cryptocurencies category with 62 companies (8%), Banking Technology category with 38 companies (5%), InsureTech category with 26 companies (3%), RegTecs category with 14 companies (2%) and Blockchain in Financial Services category with 8 companies (1%). The company's dominance in the payments and loans category is due to the large number of productive age population who are unbanked and underbanked. The number of Indonesian Fintech Companies is the second largest among other ASEAN countries which is dominated by Singapore (1350 companies). Meanwhile, the use of Fintech is growing rapidly both in the payment system and other products. Bank Indonesia noted that the value of electronic money (EU) transactions during 2021 grew 49.06% yoy (reaching Rp305.4 trillion). The Financial Services Authority noted that the accumulation of new lending through Fintech P2P Lending in 2021 reached Rp.295.85 trillion (an increase of 89.7% yoy). Fintech Lending is certain to have advantages in reaching the wider community and higher speed in transactions, making it an excellent tool to increase financial inclusion and reach the unbanked.

Fintech startups, banks and major technology companies in Indonesia have been offering Fintech solutions to individuals and MSMEs, covering every aspect of the financial services sector. Fintech startups are one of the most important players in the Fintech ecosystem. These startups have a lightweight asset structure, are agile, flexible, and are more likely to develop innovative solutions faster than established companies and can quickly identify new consumer needs. The number of Fintech Lending startups in Indonesia in 2021 is 103 organizers from 362 Fintech startup members registered with AFTECH [12]. Fintech startups emerged in Indonesia by pushing the scale of digital transactions through relevant use cases such as transportation (ride-hailing), e-commerce, and social media. Go-Jek Indonesia has successfully expanded from ride hailing to offering digital payments, digital loans, and digital insurance through its subsidiary, Go-Pay. Bukalapak has partnered with digital payment company OVO and three P2P lending platforms (Amartha, Modalku and TreeDana) to offer financial products and services. Shopee as a marketplace has expanded by offering digital payment services with ShopeePay and digital loan services with Shopee Paylater.

Indonesian Fintech startups have attracted local and foreign investors. Local investors, who represent about half of the invested capital, have a clear advantage from a strong local presence and knowledge of the Indonesian market. Local investors tend to participate primarily in smaller early-stage deals. On the other hand, foreign investors from more developed markets bring global expertise and networks. International investors mainly participate in the larger next round of tranches. Mandiri Capital and Kejora are local Venture Capital companies active in Indonesia, while the rest are international companies.

Fintech startups force banks and other financial institutions to improve the quality of their business models by adopting IT innovations, improving service offerings, restructuring and streamlining business models. The digital transformation carried out by banking by adopting Fintech solutions has been carried out through cloud computing, AI, biometrics, and blockchain/DLT tests to improve its

business operations. In addition, digital channels such as the internet and cellular telephones are also adopted to provide financial products and services to customers.

The development of business models is also carried out by banks by creating corporate venture capital (VC) funds to be invested in new Fintech ventures. In 2021 Mandiri capital has participated in 7 (seven) funding rounds for Fintech startups, Fintech enablers, Insurtech, and Open Finance. In 2021, MCI's startup portfolio, Mekari, received a Series D funding of IDR 280 billion led by Money Forward. MCI's funding participation for: (a) Bukalapak (Pre-IPO funding led by GIC and Standard Chartered, with an undisclosed amount); (b) Ayoconnect (Pre-Series B funding with Patamar Capital and HabibieFoundation, totaling Rp143 billion); and (c) startups in the insurtech sector. In addition to providing follow-on investments for: (a) Amartha (led by Women's World Banking and MDI Ventures worth Rp510 billion); (b) iSeller (Pre-Series B funding led by AppWorks and Openspace Ventures, valued at Rp120 billion); (c) Crowde (Series B funding led by Monks Hill, for an undisclosed amount); and (d) PrivyID (Series B funding led by GGV Capital, amounting to Rp251 billion). Mandiri Capital Indonesia together with four other BUMN CVCs provided support to the Merah Putih Fund (Red and White Venture Fund or MPF). MPF is an initiative from the Ministry of SOEs as a managed fund that supports the acceleration of local startups that have the potential to become unicorns through business and capital collaboration, with a first closing target of more than IDR 4 trillion.

In 2022, BCA will allocate IDR 400 billion to Central Capital Venture to support investment in the startup ecosystem. CCV is claimed to have invested in 26 startups. CCV's portfolio includes Akseleran, Qoala, and Oy! has disbursed an investment of Rp157 billion during 2020. BCA established BCA Digital which focuses on being a tech incubator with the 'blu' mobile banking application. A number of other Corporate Venture Capital (CVC) in Indonesia are still actively investing throughout 2021. The emergence of a new CVC formed by PT Bank BTPN Tbk and PT Bank BTPN Syariah Tbl, namely BTPNS Ventura. Several CVCs are starting to innovate, MDI Ventures offers an eMerge platform to connect a network of angel investors and startups in Indonesia. MDI Ventures collaborates with cryptocurrency exchange platform Binance to form a consortium through a joint venture to develop a digital asset exchange platform in Indonesia.

3.1.4 Landscape Fintech Payment in Indonesia

Fintech Payment is a digital financial service category that is dominantly used by the community. The adoption of digital payments in Indonesia shows gradual growth as new Fintech ventures, banks and MNOs introduce new business models and forms of digital payments, although the payment system in Indonesia still relies on cash. Fintech Payment products include: (a) Electronic Money; (b) Electronic Wallets; (c) Payment Gateways; (d) Paylater; (e) QRIS. E-money (80.2%) and paylater (68.9%) products are the two most widely used product variants in 2021 [13]. The growth of e-wallet usage in 2021 increased by 24% from the previous year where 43% of digital transactions used e-wallet [14].

The Fintech Payment business model that is being implemented has specific rules where the authorities have a testing mechanism to serve as the basis for new regulations (sandboxes). The Regulatory Sandbox regulated by Bank Indonesia includes Fund Transfer and Remittance. Meanwhile, those regulated by OJK include Aggregators, Blockchain, Credit Scoring, e-KYC, Financial Planners, Insurtech, Wealthtech and Project Financing. In addition, all Fintech Payment products require infrastructure that can empower financial services that are currently regulated with the National Open API Standard from Bank Indonesia.

Fintech companies operating in the digital payment space are referred to as Payment Service Providers (PSPs). BI requires PSP to have a license to operate in Indonesia. The PSP category as defined by BI is as follows [15]:

- E-Money, Issuer of e-money refers to a company that uses an electronic representation of cash that is issued by one party and received by one or many other parties. An e-money-based instrument involves the payer maintaining a pre-funded transaction account with a PSP (bank, mobile network operator (MNO), or Fintech startup). Electronic money storage can be server-based, which is based on hardware connected to the internet such as a smartphone or desktop computer; and Chip-based,

chip-equipped cards primarily used for off-line bookkeeping/transfers. There are currently 37 licensed e-money publishers in Indonesia, about 20 of which are new Fintech ventures; the rest are related to banks and MNOs.

- E-Wallet provider (e-wallet provider) – refers to the "carrier" of e-money and can tie up various sources of funds. Electronic wallets manage and direct payments to other sources such as electronic money and debit/credit cards. Currently, there are only 3 licensed e-wallet providers in Indonesia: Dana, an e-wallet co-developed by Ant Financial and Indonesian partner Elang Mahkota Teknologi; DokuPay, the first and leading e-wallet in Indonesia; and Yep! which is a JV between Bank Negara Indonesia (BNI) and BRI. It is important to note that most e-wallet providers are also licensed as e-money issuers.
- Payment Gateway Operators. BI has licensed 11 payment gateway operators in Indonesia. The top organizers are Doku, Midtrans and Xendit. Of the top 3 payment gateway operators, two have been acquired: Midtrans was acquired by Go-Jek and Doku by Emtek, a media conglomerate in Indonesia. FinPay, the fourth largest payment gateway company, is a subsidiary of Telkomsel.
- Merchant Acquirers. The top 4 banks own about 90% of the POS terminals. There are only a few active Fintech companies that are merchant acquirers, the biggest 3 being: Cashlez, Moka and Pawoon. Quick Response, or QR, code is an emerging and new type of POS solution, which has attracted strong interest in Indonesia. Only a few Fintech companies are active in this field in Indonesia. In 2018, BI officially allowed 4 companies to use QR codes: DIMO, TCash (Telkomsel), Go-Pay (Go-Jek), and Yap! (BNI and BRI).

The e-money market remains fragmented in Indonesia, with new Fintech ventures, banks and MNOs introducing digital payment solutions via mobile, online and agents to gain customer acceptance and adoption. MNO pioneered e-money and e-wallet in Indonesia about a decade ago when Telkomsel launched TCash in 2007, followed by Dompetku Indosat in 2008 and Tunai XL Axiata in 2012. The introduction of smartphones, coupled with more reliable internet connectivity, has enabled payment processing times and user experience to improve, and enabled the embedding of e-money and e-wallet services into ride-hailing, e-commerce and social media services. OVO is the largest e-money publisher in Indonesia owned by the Lippo Group, enabling OVO to leverage Lippo's national retail footprint to drive mobile payments focused on food & beverage (F&B) and lifestyle. In addition, OVO signed a strategic partnership with online transportation giant Grab, helping to bring millions of new users to OVO. The second largest e-money issuer is GoPay, a subsidiary of Go-Jek which in December 2017 acquired three companies: Mapan, a financial and e-commerce service provider through arisan, Kartuku, a POS solution provider, and Midtrans, a payment gateway provider. This acquisition has the potential to make Go-Pay more widely accepted and also increase their reach to the unbanked. The third largest electronic money issuer is DANA, which is owned by Ant Financial and a local Indonesian company. Telekomunikasi Indonesia, Bank Mandiri, Bank Rakyat Indonesia (BRI), and Pertamina combined their e-money businesses to form LinkAja, in March 2019. Users can make cashless payments via QR codes and allow users to pay bills such as utilities. To address the unbanked population, LinkAja does not require a bank account, but instead has the option to top up balances at convenience stores and ATMs.

3.1.5 Landscape Fintech Lending in Indonesia

Fintech Lending registered and licensed in Indonesia based on data from the Financial Services Authority (OJK) in 2022 [16] as many as 103 providers. Fintech Lending Indonesia is grouped into 4 categories, namely: (a) Eduluon, focused on providing education fund loans (Danacita, Edufund, DanaBagus, Pintek, and Installment); (b) Cashloan/Paylater, providing cash loans online (there are 19 Fintech Lending from Findaya, Indodana, Julo to Kredivo); (c) Consumer P2P Lending, a lending category that brings together borrowers and lenders with the use of funds for consumptive needs (there are 27 Fintech Lending licensed by OJK such as Finmas, Adakami, EasyCash, 360Kredi to Danakini); and (d) P2P Lending Business, focusing its business on providing productive loan funds (there are 52 fintech lenders from Amartha, Investree, KoinWorks to Danamas). Consumer P2P Lending (13.9%) and

Productive P2P Lending (13.4%) and Paylater (11.3%) are the Fintech lending categories that occupy the top positions in the use of Financial Lending technology applications [13]. The ease of borrowing is the reason for using the application.

Loan distribution from Fintech Lending experienced a positive growth trend. Data from the Financial Services Authority (OJK) shows that the funds disbursed for special loans to the MSME sector in 2021 amounted to Rp.42.27 trillion. Meanwhile, funds provided by Fintech Lending lenders were recorded at Rp13.58 trillion in the same year (an increase of 48.9% compared to the previous year). Throughout 2021 Daily Social recorded funding for Fintech Lending of US $ 454.6 million. Kredivo, which focuses on Paylater products, received US$226 million in funding. Amartha, which focuses on P2P schemes with funding of US$ 85.5 million. AwanTunai is in third position with the acquisition of funds of US $ 45 million. Followed by Alami and Pintek with a total funding of US$37.5 million and US$21 million, respectively.

Through Fintech Lending, transactions between borrowers and lenders can occur without the need for a direct meeting. This facilitates the process of financial transactions in meeting the financial needs of the community. In addition, the technology used by Fintech lending can reach people who are not connected to banking and this is the reason for the growing application of this technology. Data from the Cambridge Center for Alternative Finance (CCAF) [17] shows that 41% of Fintech Lending customers are underbanked and 21% are unbanked. CCAF also noted that 47% of users are individuals, and 38% of application users come from the MSME sector. Fintech Lending has great potential due to the large number of MSMEs and individuals in Indonesia.

P2P lending has shown exponential growth since 2016, as the number of borrowers and investors continues to increase, and loan volumes reach $1.6 billion. Over the past 3 years, the number of borrowers and lenders in Java, the largest island and home to the majority of the population, has increased at a CAGR of 898% and 252%, respectively. Outside Java, the growth is more impressive, with a CAGR of 2.234% for borrowers and 531% for lenders. A cumulative total of $1.6 billion in loans had been disbursed as of December 2018, with 85% of the loan value in Java. The average annual growth in loan volume was also higher outside Java by 1.020%, while in Java it grew 743%. It is interesting to note that the loan value is also very small; the lowest loan amount on record was 100 IDR, or $0.007. This figure shows that micro-loans are being created that can serve the poor and individuals with limited resources. The lowest average loan value over the past 3 years was $1,494, and the average value of all loans disbursed was $4,606.

While it has considerable potential, it is important to pay attention to the 90-day default rate (TWP90). The TWP90 that occurred in the use of the Fintech Lending application had reached 7.18%, even though the threshold for bad credit for financial institutions was 5%. By 2021 the TWP90 figure has decreased by <5%. In addition, the key factor that must be considered so that this industry can continue to grow is a clear regulatory framework in which regulations must be developed following the dynamics of fintech development.

3.2 Utilization of Digital Finance Technology in Overcoming the Informal MSME Financing Gap

The funding needs are very large and cannot be fully met by existing institutions, where the funding gap is USD 165 billion or around Rp. 2,300 trillion. OJK noted that in 2021 as many as 51% of the adult population or 95 million Indonesians were classified as not having a bank account or not having an account with a financial service institution. Indonesia is the country with the fourth largest population after China, India and Pakistan that does not have a bank account. According to Mandiri Institute records, 1 out of 4 households in Indonesia access loans from formal financial institutions. 25% of them have bank credit, 6% borrowed through People's Business Credit (KUR), 5% borrowed from non-KUR Commercial Banks, and 4% borrowed from cooperatives. Banks are formal financial institutions that are accessed by 58%. Debit card and credit card transaction volume in 2021 reached 73.9%. There are still a number of people who have not been touched by formal financial services.

Indonesia has a large MSME financial gap. BI's Money Supply Analysis noted that loans to the MSME sector grew 12.3% yoy to Rp1,147.3 trillion throughout 2021. Regulators continue to ask banks

to increase the portion of lending to MSMEs by up to 30%. Not all banks have the ability to disburse credit, especially if the 30% demand is to be achieved by the banking industry, not individual banks. So that all banks must contribute to MSMEs, by setting a strategy and projected time for achieving MSME credit ratios in their business plans. BI has issued Bank Indonesia Regulation [18] concerning Macroprudential Inclusive Financing Ratio (RPIM) for Conventional Commercial Banks, Sharia Commercial Banks and Sharia Business Units. BI requires banks to gradually increase the ratio of lending to the MSME sector (20% for 2022, 25% for 2023 and 30% for 2024). Sanctions if they do not meet these provisions are in the form of a written warning to a material fine of 0.1 times the value of the achievement of lending to MSMEs or a maximum fine of Rp. 5 billion. Formal financial inclusion for individuals and MSMEs in Indonesia, which is still relatively low, is an opportunity for Digital Fintech lending platforms to fill this gap.

The digital loan business model that caters to the unbanked, undebanked and MSMEs is categorized into: (1) partnerships between different companies (banks, MNOs and Startup Fintech) and (2) Startup Fintech platforms that facilitate lending. In the partnership category, three different business models form an alliance and each party performs a function in the cycle to provide loans. In developing countries, MNOs have partnered with financial institutions and Fintech startups to offer digital loans. MNOs provide customer data, whereas Fintech initiates loans using balance sheets and performs credit risk assessments based on non-traditional data mainly from MNOs (mobile airtime, data charging, mobile money transactions, applicant's age, previous loan status, etc.). Banks can also partner with Fintech companies or other technology platforms (e.g. e-commerce platforms) to offer digital loans. Another form of this model is banks partnering with technology companies that provide origination channels for loans, such as e-commerce platforms that allow merchants active on the platform to access loans from banks. The platform can also provide merchant activity information to banks which is useful in credit assessment.

Most of the Fintech Startups that offer digital loans in Indonesia adopt the Peer-to-Peer (P2P) intermediary model, where Fintech Startups function as a platform that connects borrowers and investors. The platform does not decide which borrowers get a loan or provide recommendations to lenders. Because the P2P lending business model is a platform, borrowers can be individuals or MSMEs, and investors/lenders can be individuals or financial institutions (banks or multi-finance institutions). P2P lenders can offer consumer loans and MSME loans. Types of consumer loans in Indonesia: (1) Payday loans are short-term loans < Rp 5 million and maturity < 30 days, with daily interest rates and are repaid in one full payment on maturity; (2) Multipurpose installment credit (<Rp 25 million) with a term of 3-12 months, where the principal is paid in installments plus interest, with an effective interest rate of 15%-60% per annum. There are two types of MSME loans: SME financing loans and microfinance loans. SME financing loans are used to finance working capital for SMEs, with a loan size of < Rp 2 billion. The loan tenor can range from 1-24 months, paid in installments. The annual effective interest rate is 5% - 30%. Microfinance loans are loans to micro-entrepreneurs who have never had access to credit in the past. The average size of microfinance loans is < IDR 15 million, but can reach IDR 50 million. The loan has a short term maturity, 1 - 12 months and has an effective annual interest rate of 15%-60%. As P2P lending platforms evolve, the digital lending landscape becomes highly competitive which can result in higher customer acquisition costs and potentially loosening of eligibility criteria by platforms and greater risk-taking by lenders, leading to higher non-performing loans (NPLs).). P2P lending platforms serve as intermediaries connecting lenders to borrowers. Basically, the platform performs a credit assessment of potential borrowers, and the assessment will be available in the market for all potential lenders. Lenders can read information about borrowers and make their own decisions about how much to invest in each loan; alternatively, lenders can instruct the platform to distribute funds to borrowers according to pre-defined criteria (usually including the platform's credit rating). In most cases, the loan collection process is carried out by P2P lending platforms.

Given the gap in funding for MSMEs, most of Indonesia's P2P lending platforms focus on lending to small businesses, offering a variety of products to meet MSME needs and requirements. OJK recorded borrower growth in P2P Lending by 29.69 million borrowers in 2021, an increase of 68.15% from the

previous year. OJK noted that the accumulation of credit distribution for the Fintech lending industry in 2021 reached Rp.295.85 trillion, an increase of 89.77% yoy compared to the previous year. The Indonesian Joint Funding Fintech Association (AFPI) noted that Fintech P2P Lending in Indonesia in 2021 experienced a performance growth of 89.77%. The driving factor for this performance is the credit gap in Indonesia, which is still high, according to the World Bank, amounting to IDR 1,500 trillion per year. This credit gap is an unbankable segment.

The P2P business loan platform offers a wide range of loan products for micro, medium and formal SMEs in Indonesia. Microbusinesses, which typically have an annual income of < $100,000, have the largest funding gaps, as they generally lack credible financial reports, limited assets to use as collateral, and lack of banking and credit history. This sub-segment is generally served by microfinance institutions (MFIs), as they have less stringent collateral policies and have deep local access which is essential to serving these businesses. There are several P2P lending platforms that provide loans to micro-enterprises in Indonesia. Established SMEs with annual revenues of between $1 million - $5 million, are relatively covered by financial service providers, but these SMEs require financing with flexible terms to manage the working capital gap. The sub-segment that has a significant unmet need is informal SMEs, which have an annual income of between $100,000 and $1 million. The Asian Development Bank estimates that this lack of access to SMEs is a missed opportunity for the wider Indonesian economy, or about 14% of GDP [19]. As such, informal SMEs are an important focus area for P2P business lending platforms in Indonesia.

3.3 Challenges and Opportunities for Fintech as Digital Financial Inclusion in Encouraging MSME Business Efficiency.

3.3.1 Challenge

Agents are a vital component in the distribution of digital financial products to the unbanked, underbanked and MSMEs in Indonesia. The Laku Pandai Program organized by OJK and the Digital Financial Services Report organized by Bank Indonesia are programs that support the pillars of the National Strategy for Inclusive Finance related to products, intermediation and distribution channels, namely the provision of branchless financial services. Laku Pandai and LKD utilize IT facilities such as cellular phones, electronic data capture and internet banking that support financial services by the Bank through agents, to be able to reach people in remote areas and reduce financial transaction costs. In 2019, fintech companies reported that 6.2 million agents served cash deposits, transfers, bill payments, digital technology-based credit and other digital technology-based financial services. This figure is sufficient to serve the total population of Indonesia, but there is still an unbalanced distribution where there are still many areas that do not have a sufficient number of agents so that services are still difficult to reach. In 2020, Bank Indonesia recorded the highest ratio of the number of LKD agents per 100,000 population on Sulawesi Island as many as 365 agents, on Java Island 313 agents, Bali and Nusa Tenggara 285 agents, Sumatra Island 278 agents and Maluku & Papua Island 248 agents.

Identity authentication for KYC is usually either staff accessing manually, or via the web, customer identity information using a personal identification number (NIK), which poses a data protection risk, or biometric authentication of a national identity smart card (e-KTP), which requires a device which is very expensive. This method is used by Government agencies, major financial service providers, and payment providers to verify the identity of individuals as part of the KYC process. Identity is a Fintech challenge in providing safe and fast financial services. Fintech's challenges are particularly in obtaining customer verification through electronic Know Your Customer (e-KYC), which involves many things regarding documents containing customer personal information. Security of customer data is the main challenge for Fintech in implementing e-KYC. The development of Fintech is in line with the increase in cybercrime, so customer data security is a challenge for Fintech companies to implement e-KYC. The convenience offered by Fintech comes with risks. Fraud by users by using other people's documents to apply for fintech services can be used for abuse. The process of correctly identifying customers and their identities is the main responsibility of fintech.

Most Fintech companies currently do not have access to the SIAK database for identity authentication, which makes it difficult for Fintechs to carry out the KYC process. Every company that wants to access Dukcapil currently needs to make a Cooperation agreement. This is a Fintech challenge in the efficiency of the financial service process. Several electronic signature service providers (e-signature) that have emerged can be utilized by Fintech for onboard customers through applications and the internet (ie without the need for face-to-face interaction). It is a fintech challenge in utilizing this service efficiently.

According to the OJK Survey, the 2019 Indonesian Financial Literacy Index reached 38.03% and the Financial Inclusion Index 76.19%. Only 38.03% of Indonesians have the knowledge, skills and confidence to understand financial products and services. Financial Literacy Index is knowledge, skills and beliefs that have an influence on attitudes to improve the quality of decision making and financial management in achieving prosperity. This low level of financial literacy is one of the most important demand-side challenges for financial inclusion in Indonesia. SNKI notes that there are various financial literacy programs, but many of them are not yet unrelated to digital financial awareness, which is also an important obstacle to overcome. The lack of financial literacy among the unbanked and the poor has also been highlighted as an obstacle to further growth and expansion by Fintech companies.

While progress has been made in smartphone and internet penetration, low and unreliable connectivity remains a problem, especially in rural and remote areas of Indonesia which have the highest rates of financial exclusion. Indonesia enjoys high levels of mobile and internet penetration, but this high penetration rate is mainly observed in urban areas and among the upper and middle classes. In 2020, household mobile phone users in Indonesia will reach 90.75% (BPS, 2021). Urban households owning mobile phones reached 94.13% while households owning mobile phones in rural areas were 86.45%. The province with the most mobile phone-owning households in 2020 is the Riau Archipelago, which is 98.4% of the total number of households in the province. Meanwhile, the percentage of mobile phone ownership in rural households is 86.45%. The province with the lowest number of households owning mobile phones in the same year was Papua (59.97%). Household cell phone owners in urban areas in Papua in 2020 amounted to 95.01% while in rural households it reached 47.07%. These results show that there is still a digital gap in Indonesia as one of the causes of digital financial literacy that is not optimal.

Unreliable and unstable internet network connectivity is a challenge, especially on the supply side for Fintech business growth in Indonesia, which has an impact on low transaction activity and user adoption. Due to Indonesia's geographical landscape as an archipelagic country (>17,000 islands), providing reliable internet and mobile phone connectivity is a challenge for Fintech growth and development.

Electronic Money Users according to the Fintech Report 2021 survey average 2-3 per month, this is triggered by the use of electronic money in various transactions such as top-ups, money transfers, e-commerce, and investments. The adoption of Fintech customers is still not high because interoperability between electronic money issuers and other payment service providers is not yet high. Interoperability refers to the ability of different systems to be interconnected, so that all participants can operate on all systems. This electronic money issuer is led by banks, telecommunications and Fintech in Indonesia, which allows the use of digital payments. The challenge for this is because most electronic money issuers operate in a closed manner where they are limited in their own system. Therefore, it is very difficult to increase and increase customer adoption.

The challenges of mitigating the emergence of illegal fintech, especially fintech lending that are currently being faced include laws and regulations, detecting perpetrators, and the effectiveness of cyber patrols. There is no law related to Fintech Lending so that parties who run illegal fintech lending businesses cannot directly be subject to criminal action. Can be criminally charged if they commit violations in their operations. For example, when violating the Consumer Protection Law, the ITE Law, etc. Tracking illegal Fintech Lending actors is not easy, because operations are carried out via the internet and some actors operate from abroad. Illegal Fintech Lending applications that have been closed by the Ministry of Communication and Information, can come back with different names, logos, and

other characteristics. Google has made a policy that only companies that get OJK permission can upload applications on the Play Store. Illegal fintech lending does not register its license with the OJK. OJK does not have the authority to take action based on OJK regulations (POJK) because POJK only applies to industries that are supervised and the sanctions given are limited to administrative sanctions. The illegal Fintech Lending action was carried out by the Investment Alert Task Force, one of its members is the Indonesian National Police.

The potential of the digital economy and market share in the ecosystem is very large and is the key to the success and sustainability of the P2P Lending business. Illegal fintech lending requires the reliability of electronic systems and better support for big data & artificial intelligence in responding to the industry's main challenges. Public understanding regarding digital literacy still needs to be improved so that it is important to address the challenges of public education by increasing the effectiveness of public education regarding digital transactions, transaction risks as lenders and borrowers, and illegal fintech.

3.3.2 Opportunities

Digitization for Microfinance Institutions and cooperatives is an attractive opportunity to scale up and reach more Informal and Formal MSMEs. MFIs and cooperatives have played an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations have not leveraged digital which hinders the growth, scale and scope of product offerings unless the agency has a large number of resources available. Technology is a key driver for financial inclusion, and the digitization of MFIs and cooperatives is an opportunity for these organizations to leverage their customer base and outreach to rural areas and low-income clients. Digital solutions help financial institutions deepen customer engagement and product use, and in turn promote and improve finance.

The expansion of internet infrastructure development in Indonesia cannot be separated from the support of the existence of a telecommunications infrastructure ecosystem from upstream to downstream. The telecommunications infrastructure is not only built or provided by telecommunications operators through corporate financing, but is also the Government's commitment to build it especially in the 3T/Universal Service Obligation (USO) area through financing collected by BAKTI-Kominfo from USO fund obligations paid by customers. telecommunications operators and from state financing.

The Ministry of Communication and Informatics strives to ensure that the development and provision of telecommunication services is in accordance with the needs and topographic characteristics of the vast and diverse territory of Indonesia. On the First Mile side, currently a national fiber optic backbone network has been built for 342,239 km, of which 224,453 km is spread on land and 117,786 km is spread out at sea. The fiber optic cable, with details of 330,010 km, was built and owned by telecommunications operators, and the remaining 12,229 km was built and owned by BAKTI-Kominfo which is known as the Palapa Ring network.

While on the Middle Mile side, there are many terrestrial radio microwave links networks, both low capacity and high capacity, to support the fiber optic cable backbone network, both as a backbone and backhaul, as well as satellite telecommunications networks. The satellite network is currently provided by 9 satellite networks consisting of 5 national satellite networks and 4 foreign satellites, having a total capacity of 50 Gbps. In addition, the Ministry of Communications and Informatics will build and install the Satria-1 High Througput Satellite (HTS) technology which has a capacity three times that of the existing satellite, namely 150 Gbps. The Satria-1 satellite is planned to be operational in 2023 to serve 150,000 public service points in Indonesia.

Finally, on the last mile side, a network has been provided for customer service (end users) through the provision of access to mobile broadband services through cellular BTS/Node-B/gNode-B, of which a total of 533,988 (Kominfo Q1-2020 data) have been built by Cellular Telecommunication Operators, with 4G service coverage until 2021 based on sub-districts have reached 88% and total cellular subscribers based on simcard ownership has reached 355 million. For the fixed broadband end user service access network, Optical Distribution Point (ODP) has been spread for Fiber to Home (FTH),

Wifi and LAN access in order to access internet services in housing, offices, buildings and areas built by Fixed Telecommunication Operators. The distribution of ODP is still low, only available about 44.66% based on the sub-district area, so that by 2020 the penetration of Indonesian fixed broadband subscribers has only reached 14.2% (the number of fixed broadband connections in 8 million households) out of a total of 67.9 million households.

The Ministry of Communications and Informatics is also working to increase fixed broadband penetration to up to 30% (30 million household fixed broadband connections) in 2024 through a regulatory facilitation program to address the reasonableness of land rental fees and the right of way (RoW) for the deployment of telecommunications infrastructure with the Ministry of Communications and Informatics. Relevant Central and Regional Institutions and assistance in providing internet services to MSMEs and Public Facilities, which is targeted for 2022 assistance for 1500 MSMEs and Fasum, until 2024 is targeted cumulatively to 7000 MSMEs and Fasum spread across several parts of Indonesia.

The Ministry of Communication and Informatics is currently trying to solve the need for internet access services in the territory of Indonesia, by targeting 12458 villages/kelurahan to be served by 4G cellular networks until 2022 in order to encourage digital transformation. A total of 12458 villages/kelurahan with details of 9113 villages/kelurahan are in the leading, underdeveloped and outermost (3T) areas to be built by BAKTI-Kominfo and 3435 villages/kelurahan in non 3T areas which will be built and become the commitment of cellular telecommunications operators. So with this target, it is expected that a total of 83218 villages/kelurahan in Indonesia can all be served by the 4G cellular network.

The service provision program in 12548 villages/kelurahan will be a supporter for the provision of internet access for community economic activities, including support for MSME activities. Data from the Ministry of SME Cooperatives, currently recorded as many as 65.47 million MSMEs in Indonesia. Therefore, the provision of 4G services in 3T and non 3T areas in 12,548 villages/kelurahan will complement digital transformation efforts for 2,179,914 MSMEs spread across the region.

3.4 Recommendations

The use of digital technology is an effective way to conduct financial literacy programs, and Fintech companies can play a role in educating customers through innovative business models. Government programs to promote financial literacy should explore the use of innovative technologies to support these goals. Technology offers exciting opportunities to communicate with more people regardless of time and place. Indonesia's Fintech P2P lending platform should be able to increase the quantity and quality of education programs for customers, training them on understanding savings and how to best manage finances. Indonesian fintech that uses artificial intelligence (AI) also needs to help its customers manage their personal finances and develop investment strategies according to their financial capabilities. Fintech needs to focus on providing financial literacy to the poor and unbanked, it is important to design products that are relevant, targeted, and easy to use and understand. Alternative financial literacy programs offered by Fintech companies can complement the OJK and BI programs.

Two important components are needed for a digital lending platform to provide loans in Indonesia, namely KYC/identity and a credit risk assessment mechanism. As part of the loan application process, each financial institution must conduct a Know Your Customer (KYC) check, which consists of a number of customer identity checks that precede the decision to approve a new customer and initiate the on-boarding process. While this requirement may be easy for customers in developed countries, it is a significant barrier for the poor in developing countries. Currently, Indonesia has a national ID system that covers 96% of the population aged 17 years and over, and an estimated 92% of the entire population is in the national population database. To evaluate a borrower's credit risk, Fintech platforms use their own alternative credit scoring model and supplement it with data from established credit bureaus in the country. In an environment where unbanked persons have no credit history and have never accessed formal financial products and services, the use of alternative credit scoring mechanisms becomes essential to assess these individuals' credit risk and provide them with access to loans. Fintech companies develop their own credit risk mechanisms using non-traditional data such as payment transaction data,

insights based on psychometric tests, call data records from MNOs, and geolocation information. As a result, providers can now target previously untapped markets, while previously excluded borrowers can access formal credit instead of being limited to informal loans.

The government is intensively ensuring the availability of internet services for the community, both in urban and rural areas. Digital infrastructure development must be carried out comprehensively at the first mile, middle mile and last mile network layers in the context of digital transformation. The government, in this case the Ministry of Communication and Informatics, has realized that there are various challenges in providing broadband services, therefore collaboration is needed with Telecommunications Operators, relevant Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase broadband service subscriber penetration so that it is expected to encourage the realization of digital transformation to increase Indonesia's economic growth. The collaboration that is needed is not only in the form of facilitating the ease of doing business for telecommunications operators, it also requires certainty for telecommunications operators to cooperate with other business actors in the framework of cooperation in the use of passive facilities and infrastructure. Investment cost efficiency for business actors can be realized in a mutually beneficial, transparent and non-discriminatory cooperation scheme to get equal opportunities and compete fairly for access to infrastructure. The role and collaboration of Ministries/Agencies at the central and regional levels need to be strengthened because each economic sector supported by each of these Ministries/Agencies has the same interest, namely realizing digital-based sector activities, which of course can only be realized through the provision of reliable telecommunications infrastructure. and continuous adoption of advanced technology. The business world and the community really need it, so that they can overcome access gaps, especially in access to financial services, which in the end through the goal of financial inclusion, it is hoped that economic inequality in various levels of society can be overcome.

4. Conclusion

Based on the research background and research results, this research can be concluded as follows:

1) Indonesia's digital financial inclusion ecosystem represents a dynamic fintech landscape. The low-touch concept offered by Fintech has encouraged its use in society in the digital economy. Fintech startups, banks and major technology companies in Indonesia have been offering Fintech solutions to individuals and MSMEs, covering every aspect of the financial services sector. Fintech startups are one of the most important players in the Fintech ecosystem. Fintech Payment is a digital financial service category that is dominantly used by the community. The adoption of digital payments in Indonesia shows gradual growth as new Fintech ventures, banks and MNOs introduce new business models and forms of digital payments. Fintech lending is another dominant digital financial service category where the ease of borrowing is the reason for using the application. The use of digital finance technology can overcome the financing gap for Informal MSMEs, where Indonesia has a large MSME financial gap. Formal financial inclusion for individuals and MSMEs in Indonesia, which is still relatively low, is an opportunity for Digital Fintech lending platforms to fill this gap.
2) Given the gap in funding for MSMEs, most of Indonesia's P2P lending platforms focus on lending to small businesses, offering a variety of products to meet MSME needs and requirements. This lack of access to SMEs is a missed opportunity for the wider Indonesian economy, so informal SMEs are an important focus area for P2P business lending platforms in Indonesia.
3) The challenges of Fintech as Digital Financial Inclusion in encouraging MSME business efficiency include: (i) there are enough LP and LKD agents for branchless financial services by utilizing ICT but not yet distributed in a balanced manner throughout Indonesia; (ii) data security and no access to the SIAK database, in implementing e-KYC and e-signature of prospective fintech customers; (iii) The digital financial literacy index is still lacking so that fintech expansion is constrained; (iv) low connectivity in smartphones and internet penetration in rural areas; (v) interoperability between electronic money issuers (banks), telecommunications and Fintech companies is still low so that

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Please write acknowledgments after conclusion

the adoption of fintech customers is low. While the opportunities for fintech as digital financial inclusion include: (i) MFIs and cooperatives play an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations are not yet leveraging digital which is constraining the growth, scale and scope of product offerings; (ii) the construction of fiber optic cable, terrestrial radio microwave link network to support the fiber optic cable backbone network, satellite network, customer service network (end user) through BTS/Node-B/gNode-B cellular, Optical Distribution Points (ODP) for Fiber to Home (FTH) Wifi and LAN access, and increasing the penetration of the number of household fixed broadband connections, targeting 12458 villages to be served.

4) potential policies for the telecommunications sector and other fields related to fintech include: (i) Fintech needs to focus on providing financial literacy to the public so that it can complement the OJK and BI programs; (ii) Fintech companies can develop their own credit risk mechanisms using non-traditional data, in order to target previously untapped markets; (iii) Development of digital infrastructure must be carried out comprehensively at the first mile, middle mile and last mile network layers in the context of digital transformation. The Ministry of Communication and Informatics collaborates with Telecommunications Operators, related Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase penetration of broadband service subscribers. The collaboration that is needed is not only in the form of facilitating the ease of doing business for telecommunications operators, it also requires certainty for telecommunications operators to cooperate with other business actors in the framework of cooperation in the use of passive facilities and infrastructure.

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Digitalization and Informal SME: Digital Financial Inclusion for SME Development in The Formal Economy

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Abstract. The purpose of the research is to examine the digital financial inclusion ecosystem and the use of fintech in overcoming the financing gap for Informal MSMEs. The research method used is a qualitative research method with a qualitative analysis strategy-verification through inductive analysis. The problem identification technique is using the DMAIC method, and the data collection technique is through FGD and document review. Data collection is carried out from December 2021 to April 2022. The informants of this research are: a) Director of Telecommunications of the Ministry of Communication and Information, b) Analyst of the OJK Fintech Licensing and Supervision Directorate, c) Head of Bumdes Cibogo Hilir Plered. The results of the study show that Indonesia's fintech landscape makes MSMEs as a driver of the digital economy, so that they can overcome the financing gap in the informal sector. The challenges faced by fintech in encouraging MSME business efficiency in the form of unbalanced agency distribution, data security and data access problems, low digital financial literacy, low connectivity and interoperability, can be overcome by taking advantage of existing opportunities. Opportunities include the role of MFIs and cooperatives in driving financial inclusion, as well as the development of telecommunications infrastructure networks in Indonesia. The novelty of the research is the recommendation for the formulation of regulations on the relevant authorities to encourage MSME business efficiency.

1. Introduction

The MSME sector is the main driver of the Indonesian economy with a contribution of more than 50% of GDP. MSMEs contributed 96.99% of employment opportunities, contributed to the addition of foreign exchange in the form of export revenues of 15% of total exports and 97.02% of workers were absorbed in this sector. MSMEs tend to have the advantage of being able to adapt more easily to unstable economic conditions than large companies [1]. MSME productivity growth is supported by the need for credit access. Financing is the main challenge for MSMEs, both in business planning, maintaining the business and developing the business. Informal MSMEs come from vulnerable groups and are underserved into a very large potential gap in financing applications. MSME financing is generally still in the development stage where the main funds come from personal funds. Access to MSME credit at formal financial institutions is still small. This financial gap is an obstacle to the progress of MSMEs. The financing gap occurs due to information asymmetry and/or weak creditor protection. This makes financial institutions more stringent in assessing MSME credit risk, and high monitoring of business processes. Information asymmetry arises because generally MSMEs do not provide financial reports to

be evaluated and monitored for credit risk. Another factor that causes this financing gap is the high cost of reaching and serving MSMEs compared to the potential income earned by banks and financial institutions from MSMEs. The limited availability of appropriate financial products and the lack of collateral are also obstacles for MSMEs to obtain financing. Another obstacle for MSMEs is economic activity which generally does not have a permanent organization, a physical place of business and employees with irregular work periods. Formally, banks are regulated not to serve entities that are not legally registered or do not have the necessary documents for identification/verification, or are unable to provide reliable information. One way that financing can be given to MSMEs that are not creditworthy without causing losses is subsidized loans. As a new response to the challenges of credit to MSMEs, a digital financing model has been introduced. Digital financing services have transformed the traditional loan process by automating the task of underwriting and lending services making it significantly cheaper, faster and easier to provide financing to MSMEs. The use of alternative data in digital financing helps eliminate information asymmetry, thus creating new credit products and digital payments can help informal businesses build credit histories, potentially opening the door to formal financing. The adoption of mobile applications makes it easier for informal businesses to obtain digital financial services.

Many studies related to the use of digital financing for MSMEs can affect financial stability so that MSMEs continue to operate in a sustainable manner [2]. When financial products are accessible to the public, financial inclusion shows a high level of accessibility, high enough equity can support MSME business operations. Digital financing service products are an alternative to overcome restrictions on access to formal financial institutions, lack of knowledge and the complexity of financial institution products [3]. In fact, the results of Capri's research [4] conclude that there are still many MSMEs that use digital technology poorly to obtain financing and funding, so this is the biggest challenge in getting financial support, in addition to the lack of trust and lack of information for MSMEs in obtaining information on where and how to get financial support. funds [5]. In addition, most companies are not aware of assistance from government agencies, NGOs, and private companies to improve their internet infrastructure, e-commerce, and digital business activities. The main technology platform used for company operations is mobile applications [4].

According to the results of Mehrotra's research [5] the volume of MSME credit is considered very small compared to its contribution to GDP, where the number of loans received by MSMEs is disproportionately smaller than corporations even though MSMEs' contribution is more significant to GDP and employment. Less than 60% of SMEs use bank loans as a means of financing, personal funds continue to be the dominant source [5]. Most MSMEs in developing countries state that access to finance is the most binding, so MSME financing programs will be an important channel to achieve growth and create more jobs [6].

Digital Financing inclusion for MSMEs can increase user traffic and can obtain potential borrowers with risk profiles according to measurable targets, which in turn will provide benefits, and will create a healthy digital economy ecosystem. MSMEs will get access to credit opportunities, thus through Digital Financing can open up opportunities for Informal MSMEs to develop. The purpose of this study is to examine the digital financial inclusion ecosystem and the use of digital finance technology in overcoming the financing gap for Informal MSMEs in Indonesia. This study covers the challenges and opportunities of Fintech as Digital Financial Inclusion in encouraging MSME businesses. It ends with a series of studies on the potential policies of the telecommunications sector and other fields related to fintech. The study was conducted through a qualitative method with a qualitative analysis strategy-verification through inductive analysis. The urgency of research is important to provide solutions to the development of fintech business trends, products and business models, including regulatory and policy frameworks by utilizing digital financing services for MSMEs to get easy access.

2. Method

The research design which is prepared to obtain answers to the research questions objectively, validly and effectively, is in the form of a comprehensive scheme that includes a research program. The type of research used is qualitative research. Qualitative research is used to obtain a complete picture of the use

of digital finance by MSMEs in the Informal Economy as financial inclusion from the point of view of financial authorities, developers of digital financing services, financial institutions, telecommunications authorities, MSME authorities and MSME actors. This research is designed to provide understanding by capturing meaning in the field through direct interaction involving researchers with digital financing service developers, financial institutions and MSME actors as well as the study of related documents.

Sources of data for this research are key informants consisting of: a) Director of Telecommunications Kemkominfo, b) Analyst of Directorate of Fintech Licensing and Supervision OJK, c) Head of Bumdes Cibogo Hilir Plered. Determination of data sources in this study was carried out purposively, by adjusting to the problem and research objectives where the informant had knowledge of the required data.

Research data collection was carried out including making rapport activities, selecting informants purposively and recording the results of data collection. Data collection is carried out from December 2021 to April 2022. Data collection techniques are carried out by Forum Group Discussion (FGD) and document review. Forum Group Discussion (FGD), held in a structured manner in the formulation of research achievement indicators and research achievement targets. The frequency of holding FGDs is at least 3 times in the research process. Document review is carried out by digging up information through facts stored in regulations and journals.

The researcher uses the technique of testing the validity of the triangulation data, in verifying the validity of the data, namely by (i) the triangulation method, to compare information so that there are no errors in data collection; (ii) Theory triangulation, to compare information with relevant theoretical perspectives.

The researcher also uses a qualitative analysis-verification strategy by conducting inductive analysis, which is an approach by drawing general conclusions from real facts in the field. This inductive analysis was carried out throughout the study, with the aim of simplifying the data into a simpler form. The procedures in analyzing the data obtained include (i) the performance of data reduction, by selecting data relevant to the research, and focusing attention on the main problem in the research; (ii) Presentation of summary data in descriptive form; and (iii) Draw conclusions to provide problem solving solutions.

The problem identification technique uses the DMAIC method (Define, Measure, Analyze, Improve, Control). Define is an activity to identify problems that arise. The data used is primary data as input to determine the cause of the problem. Measure is an activity of grouping data that has been obtained and then processed according to existing variables. Analyze is a data analysis activity using the problem tree method (problem tree). The problem tree helps to find solutions by mapping the anatomy of cause and effect around the problem (structured mind map). The problem tree analysis is done by forming a more structured mindset regarding the causal components related to the prioritized problems. Improve is an activity that focuses on the causes of the problems found and which have been analyzed previously. At this stage, proposals or ideas are given to parties related to the research. Control is an activity carried out to maintain or maintain the condition of the room.

3. Results and Discussion

3.1 Indonesia's Digital Financial Inclusion Ecosystem

3.1.1 Overview of Financial Inclusion in Indonesia

Indonesia's banking credit distribution as one of the important roles of financial services shows an increase in 2021 with banking credit growth of 5.2% yoy, exceeding the projection of 4% - 5% yoy. This growth was followed by an improvement in the ratio of bad loans (NPL) in 2021 gross 3%, better than in 2020 (gross NPL 3.06%). Likewise, the increase in stock market capitalization as an alternative source of financing in 2021 will reach 49.65% of GDP, higher than in 2020, which is 45%. Indonesia's financial services sector is growing with the development of new financial products such as Crowdfunding which makes it easier for MSME actors to access business capital in 2021 reaching Rp. 412 billion.

The uptake of formal credit for MSMEs in Indonesia is another important issue related to financial inclusion that needs to be addressed. There are 65 million MSMEs or 99.9% of the total business actors

in Indonesia, which contribute 97% of the employment (120 million workers), and contribute 60.51% or Rp. 8,573 trillion to GDP. 60.2% of MSMEs only have capital to last a maximum of 3 months. On the other hand, in 2020 the financing of Microfinance Institutions has reached Rp749.42 billion, an increase of 21.68% compared to the previous year. Meanwhile, MSME loans in 2021 have reached more than IDR 1,102.7 trillion. Loan distribution to the productive sector in 2021 has reached 47.26% (Rp. 54.71 T).

The increasing income of the people is indicated by the GDP per capita over the last 10 years which has increased in line with the level of financial inclusion of 76.19% which exceeds the target of the National Strategy for Financial Inclusion (SNKI) of 75%. Financial inclusion is the availability of access to various financial institutions, products and services in accordance with the needs and abilities of the community. While the Digital Literacy Index in 2021 is 3.49, where Digital Culture is 3.90; Digital Ethics 3.53; Digital Skill 3.44 and Digital Safety 3.10. Although access to formal finance has shown a large increase, only 23% have an account number, 51% of the population is untouched by financial and banking services or has a bank account (unbanked), and 26% of the population is not fully served by banks (underbandked) [7]. The underbanked group is directly correlated with the growth rate of MSMEs, because many MSME actors are in this group. Meanwhile for individuals with access to bank accounts, active use of limited financial products and services remains a challenge. Active use is an important criterion for achieving financial inclusion. Active use is defined by the World Bank's Global Findex survey as making at least one deposit or withdrawal from a bank account in the past year. Based on this definition, approximately 80.27 million Indonesians have a formal financial account [8].

3.1.2 Importance of IT Innovation for Financial Inclusion in Indonesia

The use of IT innovation and blockchain (DLT) in financial services is a technological innovation that provides convenience, efficiency, convenience and broad access to financial products from anywhere and anytime, with the potential to increase financial inclusion. Fintech can enable old companies and new companies to be able to provide financial services economically for those who do not have bank accounts. Fintech as a financial service is delivered through digital infrastructure including cellular phones and the internet that connects individuals and businesses to digital payment infrastructure so as to create unlimited transactions [9].

Most of the Fintech services are offered by startups. The ease of IT development has grown significantly Fintech companies and the growth of MSMEs as a share of the financial services market [10]. Fintech companies take advantage of IT products and capabilities such as cloud computing to quickly develop digital products and make Fintech companies focus on valuable businesses.

The increasing use of the internet in Indonesia (204.7 million people or 73.7% of the total population in 2021) encourages the use of electronic money transactions. The growth of the digital financial sector in Indonesia in 2021 will increase by 43.66% yoy, inseparable from the use of Fintech. One category of services that is growing rapidly is digital loan services (P2P Lending) which allow non-bank individuals or companies to provide loans. Until 2021, as many as 103 P2P Lending fintechs are registered with the OJK.

The Fintech industry has experienced growth with the increasing number of licensed providers, the increasing number and volume of transactions in the community, and the increasingly diverse types of digital financial services offered by Fintech providers. The low-touch concept offered by Fintech has encouraged its use in society in the digital economy. Given the challenges of accessing formal financial services through the traditional banking system, due to the distance from financial institutions, and limited access points such as ATMs (0.5 terminals per 1,000 people), bank branches (16 bank branches per 1,000 square kilometers) and Point of Terminal sales (POS) (0.4 terminals per 1,000 people), coupled with low credit and debit card penetration, suggest that there is a huge opportunity for Fintech to disrupt traditional financial systems.

From a digital infrastructure perspective, it shows that mobile phone penetration and internet penetration have been increasing rapidly. According to the Association of Indonesian Internet Service Providers, 55% of Indonesians access the internet and there are more than 400 million cellular phone

subscribers, or 140% of the cellular phone penetration rate. In addition, 45% of all mobile phones in Indonesia are smartphones and as many as 191.4 million or 68.9% of the total population of active social media users. According to the World Bank's Findex Survey [11], of the 95 million unbanked adults in Indonesia, 62 million own a mobile phone. Therefore, mobile phones can serve as an important distribution channel of formal financial products and services for the unbanked and unbanked. In fact, a Findex survey [11] showed that 35% of adults had made or received digital payments in 2017, but only 3% of adults had mobile money accounts.

3.1.3 Fintech Ecosystem in Indonesia

The Fintech landscape in Indonesia is dynamic, rapidly changing the financial services sector. The growth of Indonesian FinTech companies from 2017-2021 is 49%, with a total of 440 companies in 2017 then reaching 785 companies in 2021 [12]. Number of Fintech Companies in 2021, Payments Category as many as 237 companies (30%), Alternative Lending category as many as 179 companies (23%), Investment Tech category as many as 115 companies (15%), Finance and Accounting Category as many as 106 companies (14%) , Cryptocurencies category with 62 companies (8%), Banking Technology category with 38 companies (5%), InsureTech category with 26 companies (3%), RegTecs category with 14 companies (2%) and Blockchain in Financial Services category with 8 companies (1%). The company's dominance in the payments and loans category is due to the large number of productive age population who are unbanked and underbanked. The number of Indonesian Fintech Companies is the second largest among other ASEAN countries which is dominated by Singapore (1350 companies). Meanwhile, the use of Fintech is growing rapidly both in the payment system and other products. Bank Indonesia noted that the value of electronic money (EU) transactions during 2021 grew 49.06% yoy (reaching Rp305.4 trillion). The Financial Services Authority noted that the accumulation of new lending through Fintech P2P Lending in 2021 reached Rp.295.85 trillion (an increase of 89.7% yoy). Fintech Lending is certain to have advantages in reaching the wider community and higher speed in transactions, making it an excellent tool to increase financial inclusion and reach the unbanked.

Fintech startups, banks and major technology companies in Indonesia have been offering Fintech solutions to individuals and MSMEs, covering every aspect of the financial services sector. Fintech startups are one of the most important players in the Fintech ecosystem. These startups have a lightweight asset structure, are agile, flexible, and are more likely to develop innovative solutions faster than established companies and can quickly identify new consumer needs. The number of Fintech Lending startups in Indonesia in 2021 is 103 organizers from 362 Fintech startup members registered with AFTECH [13]. Fintech startups emerged in Indonesia by pushing the scale of digital transactions through relevant use cases such as transportation (ride-hailing), e-commerce, and social media. Go-Jek Indonesia has successfully expanded from ride hailing to offering digital payments, digital loans, and digital insurance through its subsidiary, Go-Pay. Bukalapak has partnered with digital payment company OVO and three P2P lending platforms (Amartha, Modalku and TreeDana) to offer financial products and services. Shopee as a marketplace has expanded by offering digital payment services with ShopeePay and digital loan services with Shopee Paylater.

Indonesian Fintech startups have attracted local and foreign investors. Local investors, who represent about half of the invested capital, have a clear advantage from a strong local presence and knowledge of the Indonesian market. Local investors tend to participate primarily in smaller early-stage deals. On the other hand, foreign investors from more developed markets bring global expertise and networks. International investors mainly participate in the larger next round of tranches. Mandiri Capital and Kejora are local Venture Capital companies active in Indonesia, while the rest are international companies.

Fintech startups force banks and other financial institutions to improve the quality of their business models by adopting IT innovations, improving service offerings, restructuring and streamlining business models. The digital transformation carried out by banking by adopting Fintech solutions has been carried out through cloud computing, AI, biometrics, and blockchain/DLT tests to improve its

business operations. In addition, digital channels such as the internet and cellular telephones are also adopted to provide financial products and services to customers.

The development of business models is also carried out by banks by creating corporate venture capital (VC) funds to be invested in new Fintech ventures. In 2021 Mandiri capital has participated in 7 (seven) funding rounds for Fintech startups, Fintech enablers, Insurtech, and Open Finance. In 2021, MCI's startup portfolio, Mekari, received a Series D funding of IDR 280 billion led by Money Forward. MCI's funding participation for: (a) Bukalapak (Pre-IPO funding led by GIC and Standard Chartered, with an undisclosed amount); (b) Ayoconnect (Pre-Series B funding with Patamar Capital and HabibieFoundation, totaling Rp143 billion); and (c) startups in the insurtech sector. In addition to providing follow-on investments for: (a) Amartha (led by Women's World Banking and MDI Ventures worth Rp510 billion); (b) iSeller (Pre-Series B funding led by AppWorks and Openspace Ventures, valued at Rp120 billion); (c) Crowde (Series B funding led by Monks Hill, for an undisclosed amount); and (d) PrivyID (Series B funding led by GGV Capital, amounting to Rp251 billion). Mandiri Capital Indonesia together with four other BUMN CVCs provided support to the Merah Putih Fund (Red and White Venture Fund or MPF). MPF is an initiative from the Ministry of SOEs as a managed fund that supports the acceleration of local startups that have the potential to become unicorns through business and capital collaboration, with a first closing target of more than IDR 4 trillion.

In 2022, BCA will allocate IDR 400 billion to Central Capital Venture to support investment in the startup ecosystem. CCV is claimed to have invested in 26 startups. CCV's portfolio includes Akseleran, Qoala, and Oy! has disbursed an investment of Rp157 billion during 2020. BCA established BCA Digital which focuses on being a tech incubator with the 'blu' mobile banking application. A number of other Corporate Venture Capital (CVC) in Indonesia are still actively investing throughout 2021. The emergence of a new CVC formed by PT Bank BTPN Tbk and PT Bank BTPN Syariah Tbl, namely BTPNS Ventura. Several CVCs are starting to innovate, MDI Ventures offers an eMerge platform to connect a network of angel investors and startups in Indonesia. MDI Ventures collaborates with cryptocurrency exchange platform Binance to form a consortium through a joint venture to develop a digital asset exchange platform in Indonesia.

3.1.4 Landscape Fintech Payment in Indonesia

Fintech Payment is a digital financial service category that is dominantly used by the community. The adoption of digital payments in Indonesia shows gradual growth as new Fintech ventures, banks and MNOs introduce new business models and forms of digital payments, although the payment system in Indonesia still relies on cash. Fintech Payment products include: (a) Electronic Money; (b) Electronic Wallets; (c) Payment Gateways; (d) Paylater; (e) QRIS. E-money (80.2%) and paylater (68.9%) products are the two most widely used product variants in 2021 [14]. The growth of e-wallet usage in 2021 increased by 24% from the previous year where 43% of digital transactions used e-wallet [15].

The Fintech Payment business model that is being implemented has specific rules where the authorities have a testing mechanism to serve as the basis for new regulations (sandboxes). The Regulatory Sandbox regulated by Bank Indonesia includes Fund Transfer and Remittance. Meanwhile, those regulated by OJK include Aggregators, Blockchain, Credit Scoring, e-KYC, Financial Planners, Insurtech, Wealthtech and Project Financing. In addition, all Fintech Payment products require infrastructure that can empower financial services that are currently regulated with the National Open API Standard from Bank Indonesia.

Fintech companies operating in the digital payment space are referred to as Payment Service Providers (PSPs). BI requires PSP to have a license to operate in Indonesia. The PSP category as defined by BI is as follows [16]:

- E-Money, Issuer of e-money refers to a company that uses an electronic representation of cash that is issued by one party and received by one or many other parties. An e-money-based instrument involves the payer maintaining a pre-funded transaction account with a PSP (bank, mobile network operator (MNO), or Fintech startup). Electronic money storage can be server-based, which is based on hardware connected to the internet such as a smartphone or desktop computer; and Chip-based,

chip-equipped cards primarily used for off-line bookkeeping/transfers. There are currently 37 licensed e-money publishers in Indonesia, about 20 of which are new Fintech ventures; the rest are related to banks and MNOs.

- E-Wallet provider (e-wallet provider) – refers to the "carrier" of e-money and can tie up various sources of funds. Electronic wallets manage and direct payments to other sources such as electronic money and debit/credit cards. Currently, there are only 3 licensed e-wallet providers in Indonesia: Dana, an e-wallet co-developed by Ant Financial and Indonesian partner Elang Mahkota Teknologi; DokuPay, the first and leading e-wallet in Indonesia; and Yep! which is a JV between Bank Negara Indonesia (BNI) and BRI. It is important to note that most e-wallet providers are also licensed as e-money issuers.
- Payment Gateway Operators. BI has licensed 11 payment gateway operators in Indonesia. The top organizers are Doku, Midtrans and Xendit. Of the top 3 payment gateway operators, two have been acquired: Midtrans was acquired by Go-Jek and Doku by Emtek, a media conglomerate in Indonesia. FinPay, the fourth largest payment gateway company, is a subsidiary of Telkomsel.
- Merchant Acquirers. The top 4 banks own about 90% of the POS terminals. There are only a few active Fintech companies that are merchant acquirers, the biggest 3 being: Cashlez, Moka and Pawoon. Quick Response, or QR, code is an emerging and new type of POS solution, which has attracted strong interest in Indonesia. Only a few Fintech companies are active in this field in Indonesia. In 2018, BI officially allowed 4 companies to use QR codes: DIMO, TCash (Telkomsel), Go-Pay (Go-Jek), and Yap! (BNI and BRI).

The e-money market remains fragmented in Indonesia, with new Fintech ventures, banks and MNOs introducing digital payment solutions via mobile, online and agents to gain customer acceptance and adoption. MNO pioneered e-money and e-wallet in Indonesia about a decade ago when Telkomsel launched TCash in 2007, followed by Dompetku Indosat in 2008 and Tunai XL Axiata in 2012. The introduction of smartphones, coupled with more reliable internet connectivity, has enabled payment processing times and user experience to improve, and enabled the embedding of e-money and e-wallet services into ride-hailing, e-commerce and social media services. OVO is the largest e-money publisher in Indonesia owned by the Lippo Group, enabling OVO to leverage Lippo's national retail footprint to drive mobile payments focused on food & beverage (F&B) and lifestyle. In addition, OVO signed a strategic partnership with online transportation giant Grab, helping to bring millions of new users to OVO. The second largest e-money issuer is GoPay, a subsidiary of Go-Jek which in December 2017 acquired three companies: Mapan, a financial and e-commerce service provider through arisan, Kartuku, a POS solution provider, and Midtrans, a payment gateway provider. This acquisition has the potential to make Go-Pay more widely accepted and also increase their reach to the unbanked. The third largest electronic money issuer is DANA, which is owned by Ant Financial and a local Indonesian company. Telekomunikasi Indonesia, Bank Mandiri, Bank Rakyat Indonesia (BRI), and Pertamina combined their e-money businesses to form LinkAja, in March 2019. Users can make cashless payments via QR codes and allow users to pay bills such as utilities. To address the unbanked population, LinkAja does not require a bank account, but instead has the option to top up balances at convenience stores and ATMs.

3.1.5 Landscape Fintech Lending in Indonesia

Fintech Lending registered and licensed in Indonesia based on data from the Financial Services Authority (OJK) in 2022 [17] as many as 103 providers. Fintech Lending Indonesia is grouped into 4 categories, namely: (a) Eduluon, focused on providing education fund loans (Danacita, Edufund, DanaBagus, Pintek, and Installment); (b) Cashloan/Paylater, providing cash loans online (there are 19 Fintech Lending from Findaya, Indodana, Julo to Kredivo); (c) Consumer P2P Lending, a lending category that brings together borrowers and lenders with the use of funds for consumptive needs (there are 27 Fintech Lending licensed by OJK such as Finmas, Adakami, EasyCash, 360Kredi to Danakini); and (d) P2P Lending Business, focusing its business on providing productive loan funds (there are 52 fintech lenders from Amartha, Investree, KoinWorks to Danamas). Consumer P2P Lending (13.9%) and

Productive P2P Lending (13.4%) and Paylater (11.3%) are the Fintech lending categories that occupy the top positions in the use of Financial Lending technology applications [14]. The ease of borrowing is the reason for using the application.

Loan distribution from Fintech Lending experienced a positive growth trend. Data from the Financial Services Authority (OJK) shows that the funds disbursed for special loans to the MSME sector in 2021 amounted to Rp.42.27 trillion. Meanwhile, funds provided by Fintech Lending lenders were recorded at Rp13.58 trillion in the same year (an increase of 48.9% compared to the previous year). Throughout 2021 Daily Social recorded funding for Fintech Lending of US $ 454.6 million. Kredivo, which focuses on Paylater products, received US$226 million in funding. Amartha, which focuses on P2P schemes with funding of US$ 85.5 million. AwanTunai is in third position with the acquisition of funds of US $ 45 million. Followed by Alami and Pintek with a total funding of US$37.5 million and US$21 million, respectively.

Through Fintech Lending, transactions between borrowers and lenders can occur without the need for a direct meeting. This facilitates the process of financial transactions in meeting the financial needs of the community. In addition, the technology used by Fintech lending can reach people who are not connected to banking and this is the reason for the growing application of this technology. Data from the Cambridge Center for Alternative Finance (CCAF) [18] shows that 41% of Fintech Lending customers are underbanked and 21% are unbanked. CCAF also noted that 47% of users are individuals, and 38% of application users come from the MSME sector. Fintech Lending has great potential due to the large number of MSMEs and individuals in Indonesia.

P2P lending has shown exponential growth since 2016, as the number of borrowers and investors continues to increase, and loan volumes reach $1.6 billion. Over the past 3 years, the number of borrowers and lenders in Java, the largest island and home to the majority of the population, has increased at a CAGR of 898% and 252%, respectively. Outside Java, the growth is more impressive, with a CAGR of 2.234% for borrowers and 531% for lenders. A cumulative total of $1.6 billion in loans had been disbursed as of December 2018, with 85% of the loan value in Java. The average annual growth in loan volume was also higher outside Java by 1.020%, while in Java it grew 743%. It is interesting to note that the loan value is also very small; the lowest loan amount on record was 100 IDR, or $0.007. This figure shows that micro-loans are being created that can serve the poor and individuals with limited resources. The lowest average loan value over the past 3 years was $1,494, and the average value of all loans disbursed was $4,606.

While it has considerable potential, it is important to pay attention to the 90-day default rate (TWP90). The TWP90 that occurred in the use of the Fintech Lending application had reached 7.18%, even though the threshold for bad credit for financial institutions was 5%. By 2021 the TWP90 figure has decreased by <5%. In addition, the key factor that must be considered so that this industry can continue to grow is a clear regulatory framework in which regulations must be developed following the dynamics of fintech development.

3.2 Utilization of Digital Finance Technology in Overcoming the Informal MSME Financing Gap

The funding needs are very large and cannot be fully met by existing institutions, where the funding gap is USD 165 billion or around Rp. 2,300 trillion. OJK noted that in 2021 as many as 51% of the adult population or 95 million Indonesians were classified as not having a bank account or not having an account with a financial service institution. Indonesia is the country with the fourth largest population after China, India and Pakistan that does not have a bank account. According to Mandiri Institute records, 1 out of 4 households in Indonesia access loans from formal financial institutions. 25% of them have bank credit, 6% borrowed through People's Business Credit (KUR), 5% borrowed from non-KUR Commercial Banks, and 4% borrowed from cooperatives. Banks are formal financial institutions that are accessed by 58%. Debit card and credit card transaction volume in 2021 reached 73.9%. There are still a number of people who have not been touched by formal financial services.

Indonesia has a large MSME financial gap. BI's Money Supply Analysis noted that loans to the MSME sector grew 12.3% yoy to Rp1,147.3 trillion throughout 2021. Regulators continue to ask banks

to increase the portion of lending to MSMEs by up to 30%. Not all banks have the ability to disburse credit, especially if the 30% demand is to be achieved by the banking industry, not individual banks. So that all banks must contribute to MSMEs, by setting a strategy and projected time for achieving MSME credit ratios in their business plans. BI has issued Bank Indonesia Regulation [19] concerning Macroprudential Inclusive Financing Ratio (RPIM) for Conventional Commercial Banks, Sharia Commercial Banks and Sharia Business Units. BI requires banks to gradually increase the ratio of lending to the MSME sector (20% for 2022, 25% for 2023 and 30% for 2024). Sanctions if they do not meet these provisions are in the form of a written warning to a material fine of 0.1 times the value of the achievement of lending to MSMEs or a maximum fine of Rp. 5 billion. Formal financial inclusion for individuals and MSMEs in Indonesia, which is still relatively low, is an opportunity for Digital Fintech lending platforms to fill this gap.

The digital loan business model that caters to the unbanked, undebanked and MSMEs is categorized into: (1) partnerships between different companies (banks, MNOs and Startup Fintech) and (2) Startup Fintech platforms that facilitate lending. In the partnership category, three different business models form an alliance and each party performs a function in the cycle to provide loans. In developing countries, MNOs have partnered with financial institutions and Fintech startups to offer digital loans. MNOs provide customer data, whereas Fintech initiates loans using balance sheets and performs credit risk assessments based on non-traditional data mainly from MNOs (mobile airtime, data charging, mobile money transactions, applicant's age, previous loan status, etc.). Banks can also partner with Fintech companies or other technology platforms (e.g. e-commerce platforms) to offer digital loans. Another form of this model is banks partnering with technology companies that provide origination channels for loans, such as e-commerce platforms that allow merchants active on the platform to access loans from banks. The platform can also provide merchant activity information to banks which is useful in credit assessment.

Most of the Fintech Startups that offer digital loans in Indonesia adopt the Peer-to-Peer (P2P) intermediary model, where Fintech Startups function as a platform that connects borrowers and investors. The platform does not decide which borrowers get a loan or provide recommendations to lenders. Because the P2P lending business model is a platform, borrowers can be individuals or MSMEs, and investors/lenders can be individuals or financial institutions (banks or multi-finance institutions). P2P lenders can offer consumer loans and MSME loans. Types of consumer loans in Indonesia: (1) Payday loans are short-term loans < Rp 5 million and maturity < 30 days, with daily interest rates and are repaid in one full payment on maturity; (2) Multipurpose installment credit (<Rp 25 million) with a term of 3-12 months, where the principal is paid in installments plus interest, with an effective interest rate of 15%-60% per annum. There are two types of MSME loans: SME financing loans and microfinance loans. SME financing loans are used to finance working capital for SMEs, with a loan size of < Rp 2 billion. The loan tenor can range from 1-24 months, paid in installments. The annual effective interest rate is 5% - 30%. Microfinance loans are loans to micro-entrepreneurs who have never had access to credit in the past. The average size of microfinance loans is < IDR 15 million, but can reach IDR 50 million. The loan has a short term maturity, 1 - 12 months and has an effective annual interest rate of 15%-60%. As P2P lending platforms evolve, the digital lending landscape becomes highly competitive which can result in higher customer acquisition costs and potentially loosening of eligibility criteria by platforms and greater risk-taking by lenders, leading to higher non-performing loans (NPLs).). P2P lending platforms serve as intermediaries connecting lenders to borrowers. Basically, the platform performs a credit assessment of potential borrowers, and the assessment will be available in the market for all potential lenders. Lenders can read information about borrowers and make their own decisions about how much to invest in each loan; alternatively, lenders can instruct the platform to distribute funds to borrowers according to pre-defined criteria (usually including the platform's credit rating). In most cases, the loan collection process is carried out by P2P lending platforms.

Given the gap in funding for MSMEs, most of Indonesia's P2P lending platforms focus on lending to small businesses, offering a variety of products to meet MSME needs and requirements. OJK recorded borrower growth in P2P Lending by 29.69 million borrowers in 2021, an increase of 68.15% from the

previous year. OJK noted that the accumulation of credit distribution for the Fintech lending industry in 2021 reached Rp.295.85 trillion, an increase of 89.77% yoy compared to the previous year. The Indonesian Joint Funding Fintech Association (AFPI) noted that Fintech P2P Lending in Indonesia in 2021 experienced a performance growth of 89.77%. The driving factor for this performance is the credit gap in Indonesia, which is still high, according to the World Bank, amounting to IDR 1,500 trillion per year. This credit gap is an unbankable segment.

The P2P business loan platform offers a wide range of loan products for micro, medium and formal SMEs in Indonesia. Microbusinesses, which typically have an annual income of < $100,000, have the largest funding gaps, as they generally lack credible financial reports, limited assets to use as collateral, and lack of banking and credit history. This sub-segment is generally served by microfinance institutions (MFIs), as they have less stringent collateral policies and have deep local access which is essential to serving these businesses. There are several P2P lending platforms that provide loans to micro-enterprises in Indonesia. Established SMEs with annual revenues of between $1 million - $5 million, are relatively covered by financial service providers, but these SMEs require financing with flexible terms to manage the working capital gap. The sub-segment that has a significant unmet need is informal SMEs, which have an annual income of between $100,000 and $1 million. The Asian Development Bank estimates that this lack of access to SMEs is a missed opportunity for the wider Indonesian economy, or about 14% of GDP [20]. As such, informal SMEs are an important focus area for P2P business lending platforms in Indonesia.

3.3 Challenges and Opportunities for Fintech as Digital Financial Inclusion in Encouraging MSME Business Efficiency.

3.3.1 Challenge

Agents are a vital component in the distribution of digital financial products to the unbanked, underbanked and MSMEs in Indonesia. The Laku Pandai Program organized by OJK and the Digital Financial Services Report organized by Bank Indonesia are programs that support the pillars of the National Strategy for Inclusive Finance related to products, intermediation and distribution channels, namely the provision of branchless financial services. Laku Pandai and LKD utilize IT facilities such as cellular phones, electronic data capture and internet banking that support financial services by the Bank through agents, to be able to reach people in remote areas and reduce financial transaction costs. In 2019, fintech companies reported that 6.2 million agents served cash deposits, transfers, bill payments, digital technology-based credit and other digital technology-based financial services. This figure is sufficient to serve the total population of Indonesia, but there is still an unbalanced distribution where there are still many areas that do not have a sufficient number of agents so that services are still difficult to reach. In 2020, Bank Indonesia recorded the highest ratio of the number of LKD agents per 100,000 population on Sulawesi Island as many as 365 agents, on Java Island 313 agents, Bali and Nusa Tenggara 285 agents, Sumatra Island 278 agents and Maluku & Papua Island 248 agents.

Identity authentication for KYC is usually either staff accessing manually, or via the web, customer identity information using a personal identification number (NIK), which poses a data protection risk, or biometric authentication of a national identity smart card (e-KTP), which requires a device which is very expensive. This method is used by Government agencies, major financial service providers, and payment providers to verify the identity of individuals as part of the KYC process. Identity is a Fintech challenge in providing safe and fast financial services. Fintech's challenges are particularly in obtaining customer verification through electronic Know Your Customer (e-KYC), which involves many things regarding documents containing customer personal information. Security of customer data is the main challenge for Fintech in implementing e-KYC. The development of Fintech is in line with the increase in cybercrime, so customer data security is a challenge for Fintech companies to implement e-KYC. The convenience offered by Fintech comes with risks. Fraud by users by using other people's documents to apply for fintech services can be used for abuse. The process of correctly identifying customers and their identities is the main responsibility of fintech.

Most Fintech companies currently do not have access to the SIAK database for identity authentication, which makes it difficult for Fintechs to carry out the KYC process. Every company that wants to access Dukcapil currently needs to make a Cooperation agreement. This is a Fintech challenge in the efficiency of the financial service process. Several electronic signature service providers (e-signature) that have emerged can be utilized by Fintech for onboard customers through applications and the internet (ie without the need for face-to-face interaction). It is a fintech challenge in utilizing this service efficiently.

According to the OJK Survey, the 2019 Indonesian Financial Literacy Index reached 38.03% and the Financial Inclusion Index 76.19%. Only 38.03% of Indonesians have the knowledge, skills and confidence to understand financial products and services. Financial Literacy Index is knowledge, skills and beliefs that have an influence on attitudes to improve the quality of decision making and financial management in achieving prosperity. This low level of financial literacy is one of the most important demand-side challenges for financial inclusion in Indonesia. SNKI notes that there are various financial literacy programs, but many of them are not yet unrelated to digital financial awareness, which is also an important obstacle to overcome. The lack of financial literacy among the unbanked and the poor has also been highlighted as an obstacle to further growth and expansion by Fintech companies.

While progress has been made in smartphone and internet penetration, low and unreliable connectivity remains a problem, especially in rural and remote areas of Indonesia which have the highest rates of financial exclusion. Indonesia enjoys high levels of mobile and internet penetration, but this high penetration rate is mainly observed in urban areas and among the upper and middle classes. In 2020, household mobile phone users in Indonesia will reach 90.75% (BPS, 2021). Urban households owning mobile phones reached 94.13% while households owning mobile phones in rural areas were 86.45%. The province with the most mobile phone-owning households in 2020 is the Riau Archipelago, which is 98.4% of the total number of households in the province. Meanwhile, the percentage of mobile phone ownership in rural households is 86.45%. The province with the lowest number of households owning mobile phones in the same year was Papua (59.97%). Household cell phone owners in urban areas in Papua in 2020 amounted to 95.01% while in rural households it reached 47.07%. These results show that there is still a digital gap in Indonesia as one of the causes of digital financial literacy that is not optimal.

Unreliable and unstable internet network connectivity is a challenge, especially on the supply side for Fintech business growth in Indonesia, which has an impact on low transaction activity and user adoption. Due to Indonesia's geographical landscape as an archipelagic country (>17,000 islands), providing reliable internet and mobile phone connectivity is a challenge for Fintech growth and development.

Electronic Money Users according to the Fintech Report 2021 survey average 2-3 per month, this is triggered by the use of electronic money in various transactions such as top-ups, money transfers, e-commerce, and investments. The adoption of Fintech customers is still not high because interoperability between electronic money issuers and other payment service providers is not yet high. Interoperability refers to the ability of different systems to be interconnected, so that all participants can operate on all systems. This electronic money issuer is led by banks, telecommunications and Fintech in Indonesia, which allows the use of digital payments. The challenge for this is because most electronic money issuers operate in a closed manner where they are limited in their own system. Therefore, it is very difficult to increase and increase customer adoption.

The challenges of mitigating the emergence of illegal fintech, especially fintech lending that are currently being faced include laws and regulations, detecting perpetrators, and the effectiveness of cyber patrols. There is no law related to Fintech Lending so that parties who run illegal fintech lending businesses cannot directly be subject to criminal action. Can be criminally charged if they commit violations in their operations. For example, when violating the Consumer Protection Law, the ITE Law, etc. Tracking illegal Fintech Lending actors is not easy, because operations are carried out via the internet and some actors operate from abroad. Illegal Fintech Lending applications that have been closed by the Ministry of Communication and Information, can come back with different names, logos, and

other characteristics. Google has made a policy that only companies that get OJK permission can upload applications on the Play Store. Illegal fintech lending does not register its license with the OJK. OJK does not have the authority to take action based on OJK regulations (POJK) because POJK only applies to industries that are supervised and the sanctions given are limited to administrative sanctions. The illegal Fintech Lending action was carried out by the Investment Alert Task Force, one of its members is the Indonesian National Police.

The potential of the digital economy and market share in the ecosystem is very large and is the key to the success and sustainability of the P2P Lending business. Illegal fintech lending requires the reliability of electronic systems and better support for big data & artificial intelligence in responding to the industry's main challenges. Public understanding regarding digital literacy still needs to be improved so that it is important to address the challenges of public education by increasing the effectiveness of public education regarding digital transactions, transaction risks as lenders and borrowers, and illegal fintech.

3.3.2 Opportunities

Digitization for Microfinance Institutions and cooperatives is an attractive opportunity to scale up and reach more Informal and Formal MSMEs. MFIs and cooperatives have played an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations have not leveraged digital which hinders the growth, scale and scope of product offerings unless the agency has a large number of resources available. Technology is a key driver for financial inclusion, and the digitization of MFIs and cooperatives is an opportunity for these organizations to leverage their customer base and outreach to rural areas and low-income clients. Digital solutions help financial institutions deepen customer engagement and product use, and in turn promote and improve finance.

The expansion of internet infrastructure development in Indonesia cannot be separated from the support of the existence of a telecommunications infrastructure ecosystem from upstream to downstream. The telecommunications infrastructure is not only built or provided by telecommunications operators through corporate financing, but is also the Government's commitment to build it especially in the 3T/Universal Service Obligation (USO) area through financing collected by BAKTI-Kominfo from USO fund obligations paid by customers. telecommunications operators and from state financing.

The Ministry of Communication and Informatics strives to ensure that the development and provision of telecommunication services is in accordance with the needs and topographic characteristics of the vast and diverse territory of Indonesia. On the First Mile side, currently a national fiber optic backbone network has been built for 342,239 km, of which 224,453 km is spread on land and 117,786 km is spread out at sea. The fiber optic cable, with details of 330,010 km, was built and owned by telecommunications operators, and the remaining 12,229 km was built and owned by BAKTI-Kominfo which is known as the Palapa Ring network.

While on the Middle Mile side, there are many terrestrial radio microwave links networks, both low capacity and high capacity, to support the fiber optic cable backbone network, both as a backbone and backhaul, as well as satellite telecommunications networks. The satellite network is currently provided by 9 satellite networks consisting of 5 national satellite networks and 4 foreign satellites, having a total capacity of 50 Gbps. In addition, the Ministry of Communications and Informatics will build and install the Satria-1 High Througput Satellite (HTS) technology which has a capacity three times that of the existing satellite, namely 150 Gbps. The Satria-1 satellite is planned to be operational in 2023 to serve 150,000 public service points in Indonesia.

Finally, on the last mile side, a network has been provided for customer service (end users) through the provision of access to mobile broadband services through cellular BTS/Node-B/gNode-B, of which a total of 533,988 (Kominfo Q1-2020 data) have been built by Cellular Telecommunication Operators, with 4G service coverage until 2021 based on sub-districts have reached 88% and total cellular subscribers based on simcard ownership has reached 355 million. For the fixed broadband end user service access network, Optical Distribution Point (ODP) has been spread for Fiber to Home (FTH),

Wifi and LAN access in order to access internet services in housing, offices, buildings and areas built by Fixed Telecommunication Operators. The distribution of ODP is still low, only available about 44.66% based on the sub-district area, so that by 2020 the penetration of Indonesian fixed broadband subscribers has only reached 14.2% (the number of fixed broadband connections in 8 million households) out of a total of 67.9 million households.

The Ministry of Communications and Informatics is also working to increase fixed broadband penetration to up to 30% (30 million household fixed broadband connections) in 2024 through a regulatory facilitation program to address the reasonableness of land rental fees and the right of way (RoW) for the deployment of telecommunications infrastructure with the Ministry of Communications and Informatics. Relevant Central and Regional Institutions and assistance in providing internet services to MSMEs and Public Facilities, which is targeted for 2022 assistance for 1500 MSMEs and Fasum, until 2024 is targeted cumulatively to 7000 MSMEs and Fasum spread across several parts of Indonesia.

The Ministry of Communication and Informatics is currently trying to solve the need for internet access services in the territory of Indonesia, by targeting 12458 villages/kelurahan to be served by 4G cellular networks until 2022 in order to encourage digital transformation. A total of 12458 villages/kelurahan with details of 9113 villages/kelurahan are in the leading, underdeveloped and outermost (3T) areas to be built by BAKTI-Kominfo and 3435 villages/kelurahan in non 3T areas which will be built and become the commitment of cellular telecommunications operators. So with this target, it is expected that a total of 83218 villages/kelurahan in Indonesia can all be served by the 4G cellular network.

The service provision program in 12548 villages/kelurahan will be a supporter for the provision of internet access for community economic activities, including support for MSME activities. Data from the Ministry of SME Cooperatives, currently recorded as many as 65.47 million MSMEs in Indonesia. Therefore, the provision of 4G services in 3T and non 3T areas in 12,548 villages/kelurahan will complement digital transformation efforts for 2,179,914 MSMEs spread across the region.

3.4 Recommendations

The use of digital technology is an effective way to conduct financial literacy programs, and Fintech companies can play a role in educating customers through innovative business models. Government programs to promote financial literacy should explore the use of innovative technologies to support these goals. Technology offers exciting opportunities to communicate with more people regardless of time and place. Indonesia's Fintech P2P lending platform should be able to increase the quantity and quality of education programs for customers, training them on understanding savings and how to best manage finances. Indonesian fintech that uses artificial intelligence (AI) also needs to help its customers manage their personal finances and develop investment strategies according to their financial capabilities. Fintech needs to focus on providing financial literacy to the poor and unbanked, it is important to design products that are relevant, targeted, and easy to use and understand. Alternative financial literacy programs offered by Fintech companies can complement the OJK and BI programs.

Two important components are needed for a digital lending platform to provide loans in Indonesia, namely KYC/identity and a credit risk assessment mechanism. As part of the loan application process, each financial institution must conduct a Know Your Customer (KYC) check, which consists of a number of customer identity checks that precede the decision to approve a new customer and initiate the on-boarding process. While this requirement may be easy for customers in developed countries, it is a significant barrier for the poor in developing countries. Currently, Indonesia has a national ID system that covers 96% of the population aged 17 years and over, and an estimated 92% of the entire population is in the national population database. To evaluate a borrower's credit risk, Fintech platforms use their own alternative credit scoring model and supplement it with data from established credit bureaus in the country. In an environment where unbanked persons have no credit history and have never accessed formal financial products and services, the use of alternative credit scoring mechanisms becomes essential to assess these individuals' credit risk and provide them with access to loans. Fintech companies develop their own credit risk mechanisms using non-traditional data such as payment transaction data,

insights based on psychometric tests, call data records from MNOs, and geolocation information. As a result, providers can now target previously untapped markets, while previously excluded borrowers can access formal credit instead of being limited to informal loans.

The government is intensively ensuring the availability of internet services for the community, both in urban and rural areas. Digital infrastructure development must be carried out comprehensively at the first mile, middle mile and last mile network layers in the context of digital transformation. The government, in this case the Ministry of Communication and Informatics, has realized that there are various challenges in providing broadband services, therefore collaboration is needed with Telecommunications Operators, relevant Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase broadband service subscriber penetration so that it is expected to encourage the realization of digital transformation to increase Indonesia's economic growth. The collaboration that is needed is not only in the form of facilitating the ease of doing business for telecommunications operators, it also requires certainty for telecommunications operators to cooperate with other business actors in the framework of cooperation in the use of passive facilities and infrastructure. Investment cost efficiency for business actors can be realized in a mutually beneficial, transparent and non-discriminatory cooperation scheme to get equal opportunities and compete fairly for access to infrastructure. The role and collaboration of Ministries/Agencies at the central and regional levels need to be strengthened because each economic sector supported by each of these Ministries/Agencies has the same interest, namely realizing digital-based sector activities, which of course can only be realized through the provision of reliable telecommunications infrastructure. and continuous adoption of advanced technology. The business world and the community really need it, so that they can overcome access gaps, especially in access to financial services, which in the end through the goal of financial inclusion, it is hoped that economic inequality in various levels of society can be overcome.

4. Conclusion

Indonesia's digital financial inclusion ecosystem represents a dynamic fintech landscape. The low-touch concept offered by Fintech has encouraged its use in society in the digital economy. Fintech startups, banks and major technology companies in Indonesia have been offering Fintech solutions to individuals and MSMEs, covering every aspect of the financial services sector. Fintech startups are one of the most important players in the Fintech ecosystem. Fintech Payment is a digital financial service category that is dominantly used by the community. The adoption of digital payments in Indonesia shows gradual growth as new Fintech ventures, banks and MNOs introduce new business models and forms of digital payments. Fintech lending is another dominant digital financial service category where the ease of borrowing is the reason for using the application. The use of digital finance technology can overcome the financing gap for Informal MSMEs, where Indonesia has a large MSME financial gap. Formal financial inclusion for individuals and MSMEs in Indonesia, which is still relatively low, is an opportunity for Digital Fintech lending platforms to fill this gap. Given the gap in funding for MSMEs, most of Indonesia's P2P lending platforms focus on lending to small businesses, offering a variety of products to meet MSME needs and requirements. This lack of access to SMEs is a missed opportunity for the wider Indonesian economy, so informal SMEs are an important focus area for P2P business lending platforms in Indonesia. The challenges of Fintech as Digital Financial Inclusion in encouraging MSME business efficiency include: (i) there are enough LP and LKD agents for branchless financial services by utilizing ICT but not yet distributed in a balanced manner throughout Indonesia; (ii) data security and no access to the SIAK database, in implementing e-KYC and e-signature of prospective fintech customers; (iii) The digital financial literacy index is still lacking so that fintech expansion is constrained; (iv) low connectivity in smartphones and internet penetration in rural areas; (v) interoperability between electronic money issuers (banks), telecommunications and Fintech companies is still low so that the adoption of fintech customers is low. While the opportunities for fintech as digital financial inclusion include: (i) MFIs and cooperatives play an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations are not

yet leveraging digital which is constraining the growth, scale and scope of product offerings; (ii) the construction of fiber optic cable, terrestrial radio microwave link network to support the fiber optic cable backbone network, satellite network, customer service network (end user) through BTS/Node-B/gNode-B cellular, Optical Distribution Points (ODP) for Fiber to Home (FTH) Wifi and LAN access, and increasing the penetration of the number of household fixed broadband connections, targeting 12458 villages to be served. Potential policies for the telecommunications sector and other fields related to fintech include: (i) Fintech needs to focus on providing financial literacy to the public so that it can complement the OJK and BI programs; (ii) Fintech companies can develop their own credit risk mechanisms using non-traditional data, in order to target previously untapped markets; (iii) Development of digital infrastructure must be carried out comprehensively at the first mile, middle mile and last mile network layers in the context of digital transformation. The Ministry of Communication and Informatics collaborates with Telecommunications Operators, related Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase penetration of broadband service subscribers. The collaboration that is needed is not only in the form of facilitating the ease of doing business for telecommunications operators, it also requires certainty for telecommunications operators to cooperate with other business actors in the framework of cooperation in the use of passive facilities and infrastructure.

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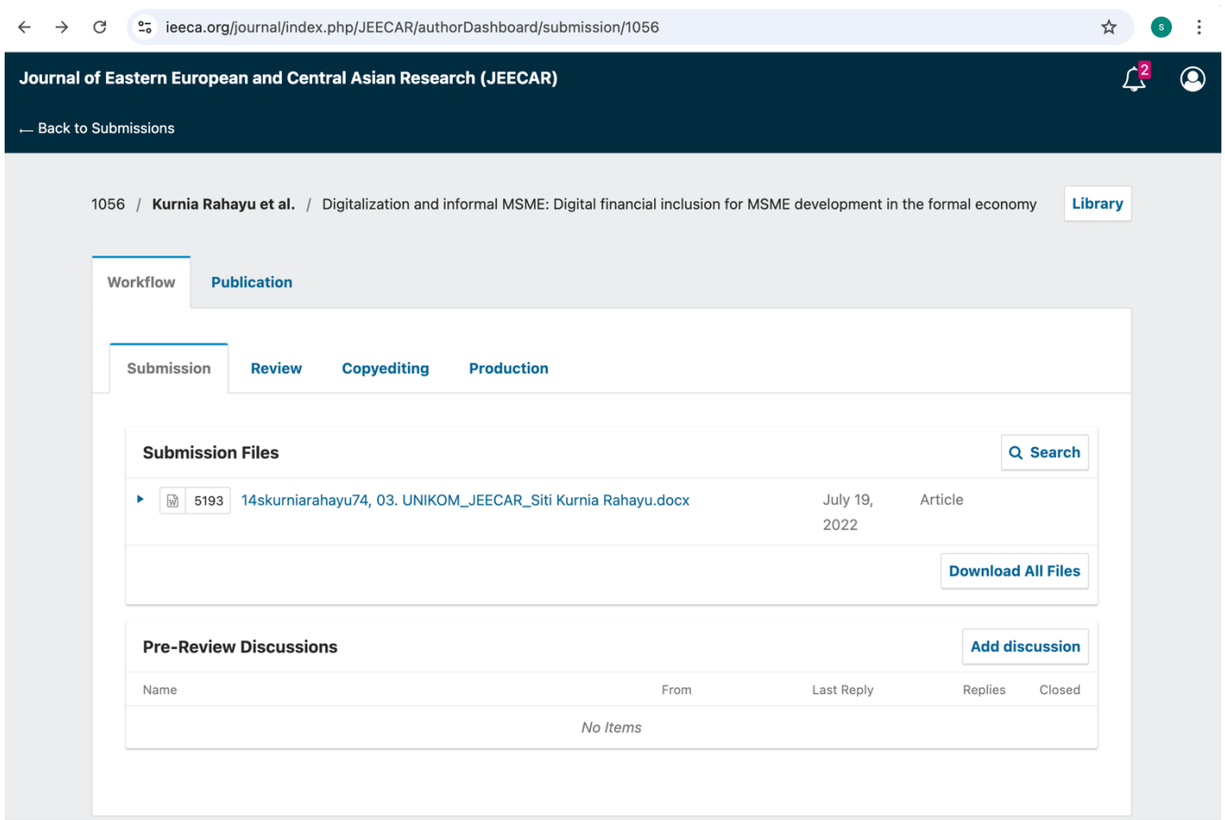
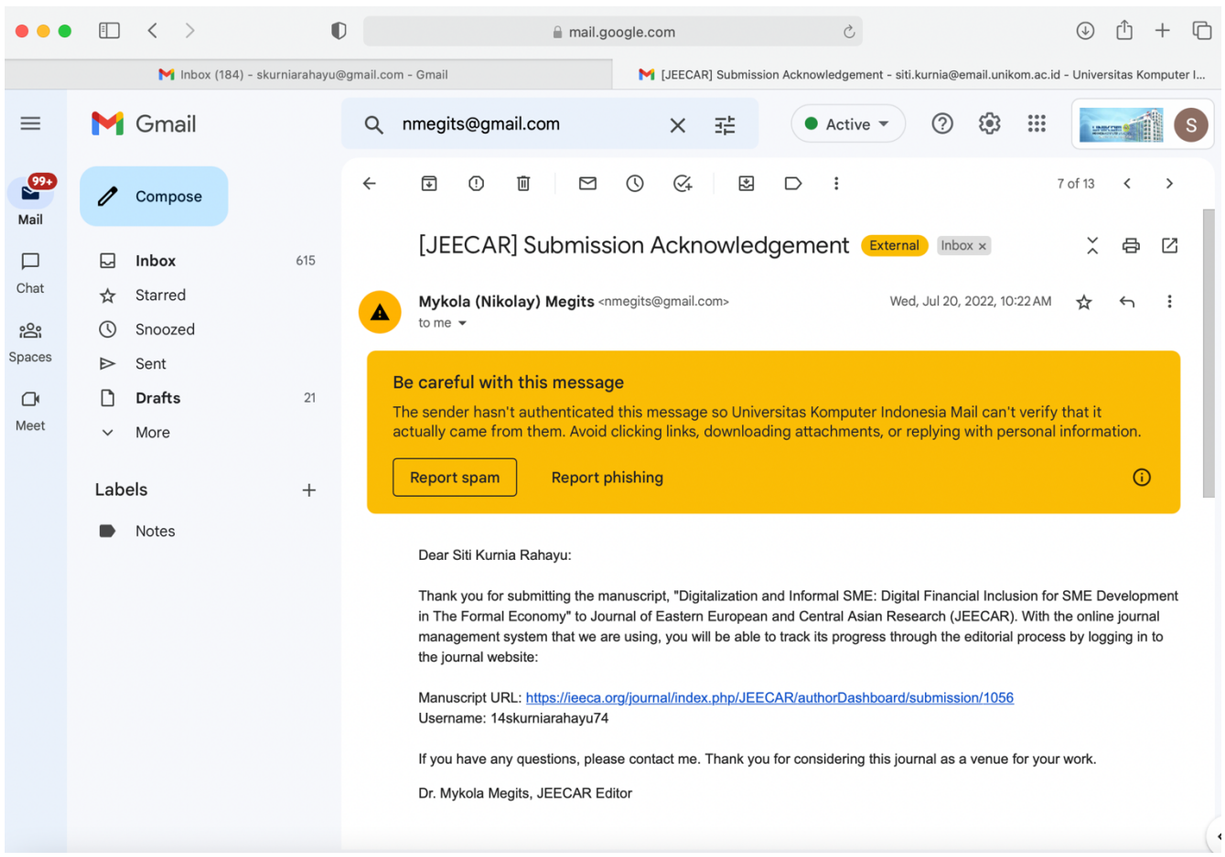
1. Bukti Konfirmasi Submit Artikel dan Artikel yang Disubmit di web JEECAR

a. Bukti Artikel yang Disubmit (19 Juli 2022)



b. Konfirmasi Submit Artikel (20 Juli 2022)



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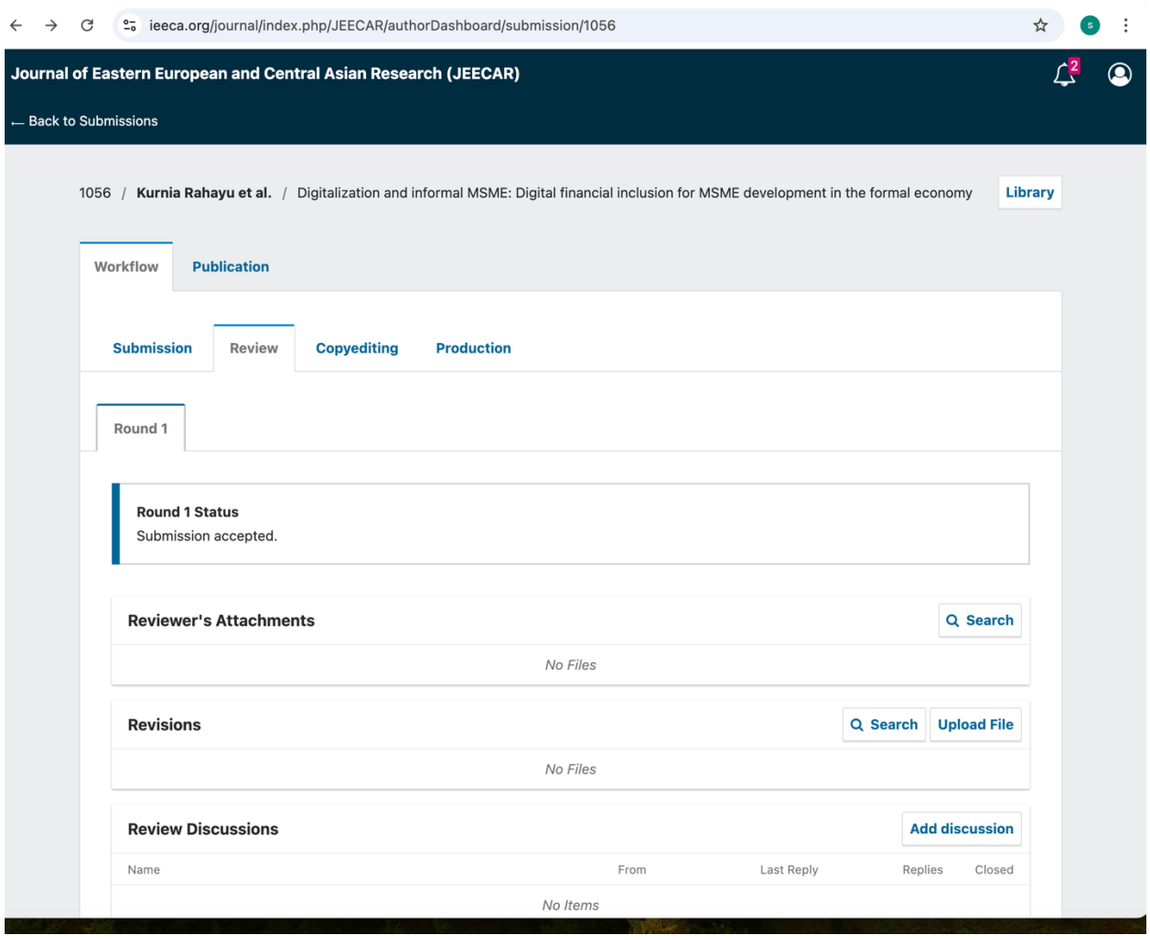
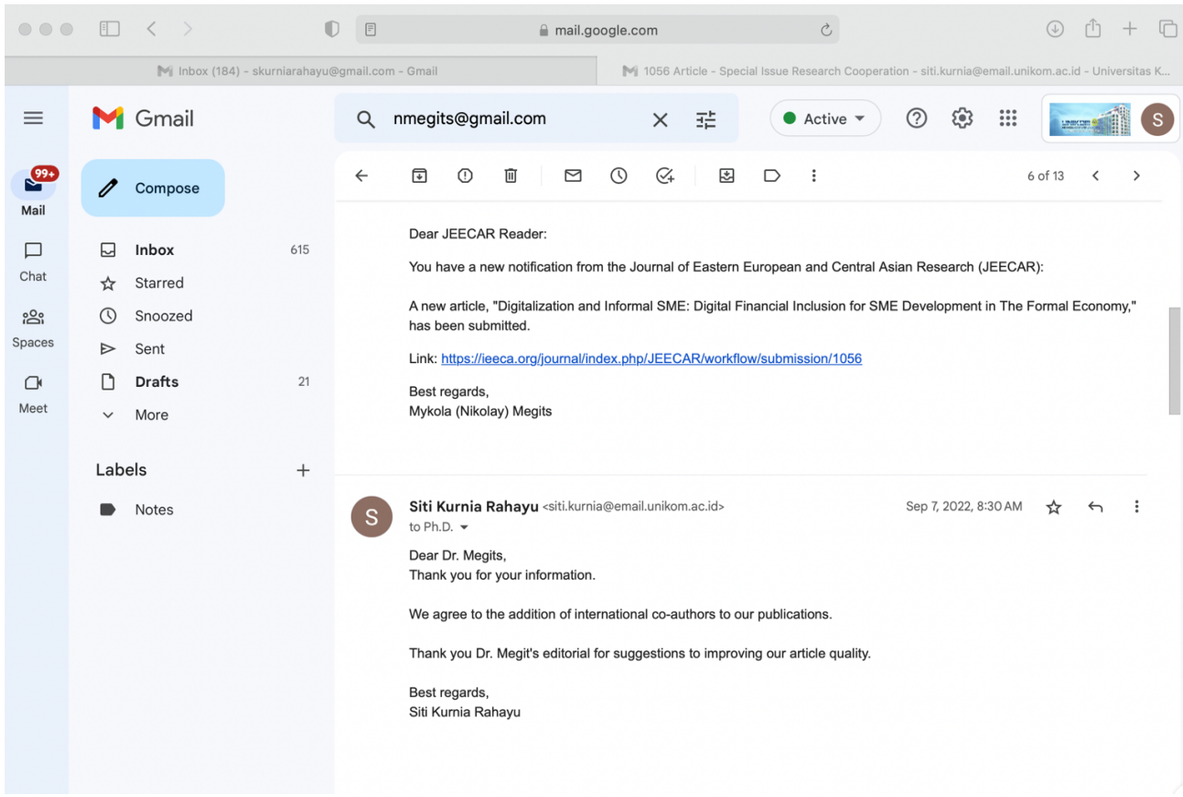
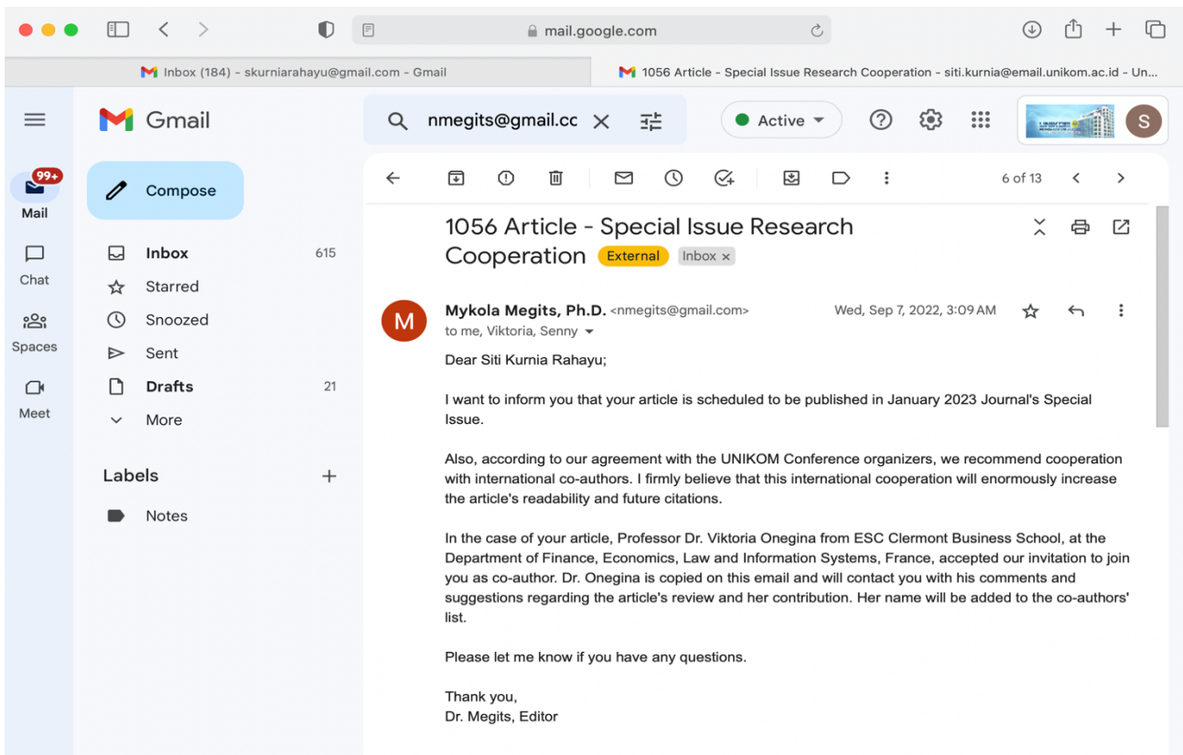


5. Bukti Konfirmasi Review/Comment (7 September 2022)





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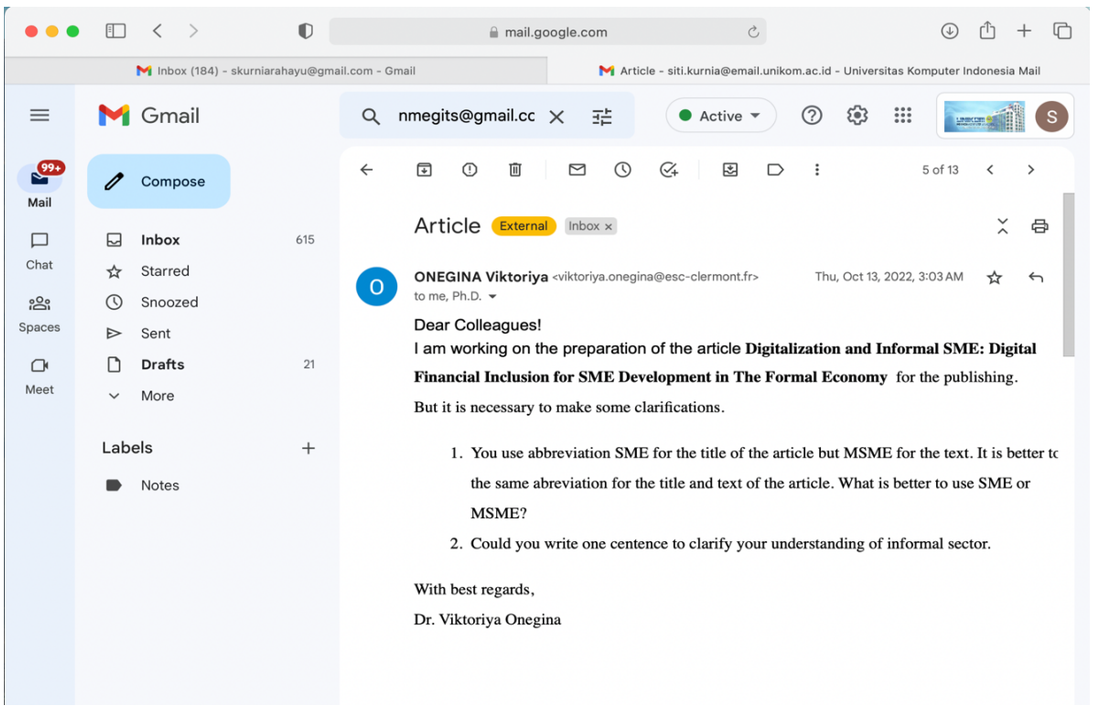
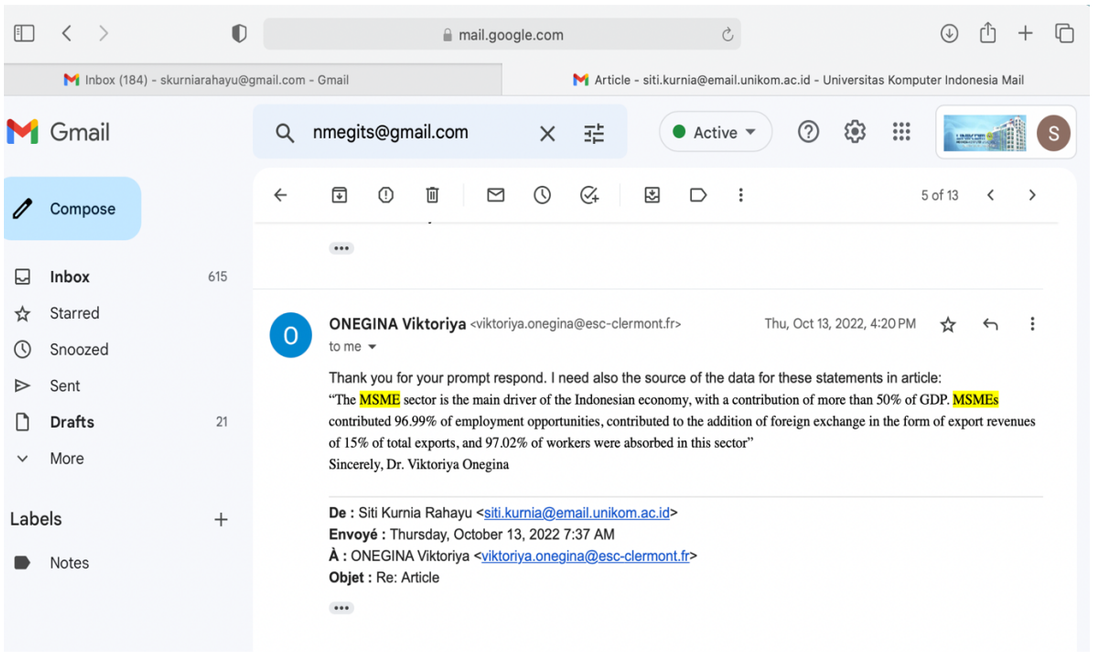
   - Are the variables defined and measured appropriately?
   - Are the study methods valid and reliable?
   - Is there enough detail in order to replicate the study?
4) Results
   - Is the data presented in an appropriate way?
   - Tables and figures relevant and clearly presented?
   - Appropriate units, rounding, and number of decimals?
   - Titles, columns, and rows labelled correctly and clearly?
   - Categories grouped appropriately?
   - Does the text in the results add to the data or is it repetitive?
   - Are you clear about what is a statistically significant result?
   - Are you clear about what is a practically meaningful result?
5) Discussion and Conclussions
   - Are the results discussed from multiple angles and placed into context without being overinterpreted?
   - Do the conclusions answer the aims of the study?
   - Are the conclusions supported by references or results?
   - Are the limitations of the study fatal or are they opportunities to inform future research?

6. Bukti Konfirmasi Review/Comment (13 Oktober 2022)





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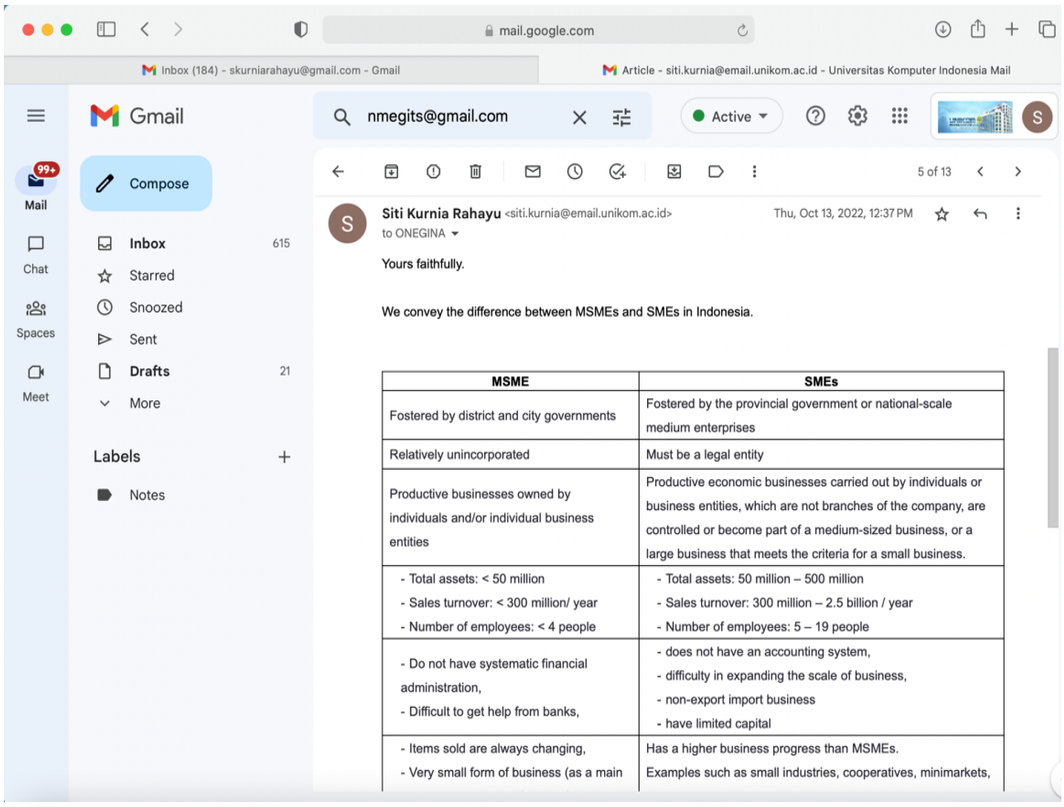

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Siti Kurnia Rahayu <siti.kurnia@email.unikom.ac.id> Thu, Oct 13, 2022, 12:37 PM
to ONEGINA

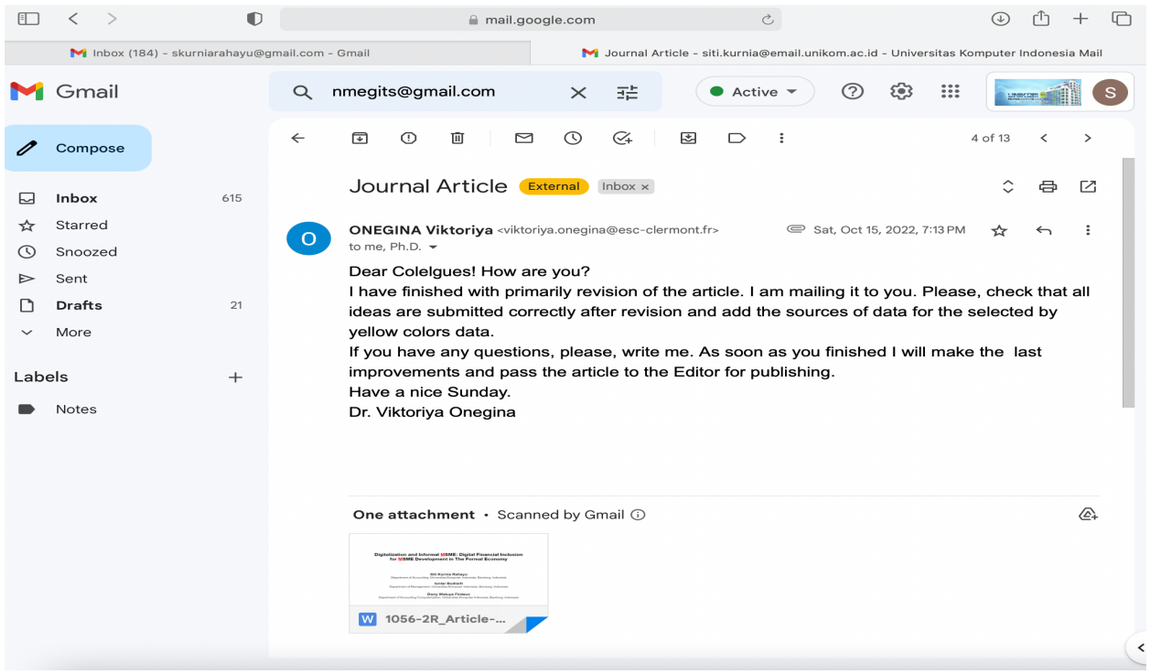
Yours faithfully.

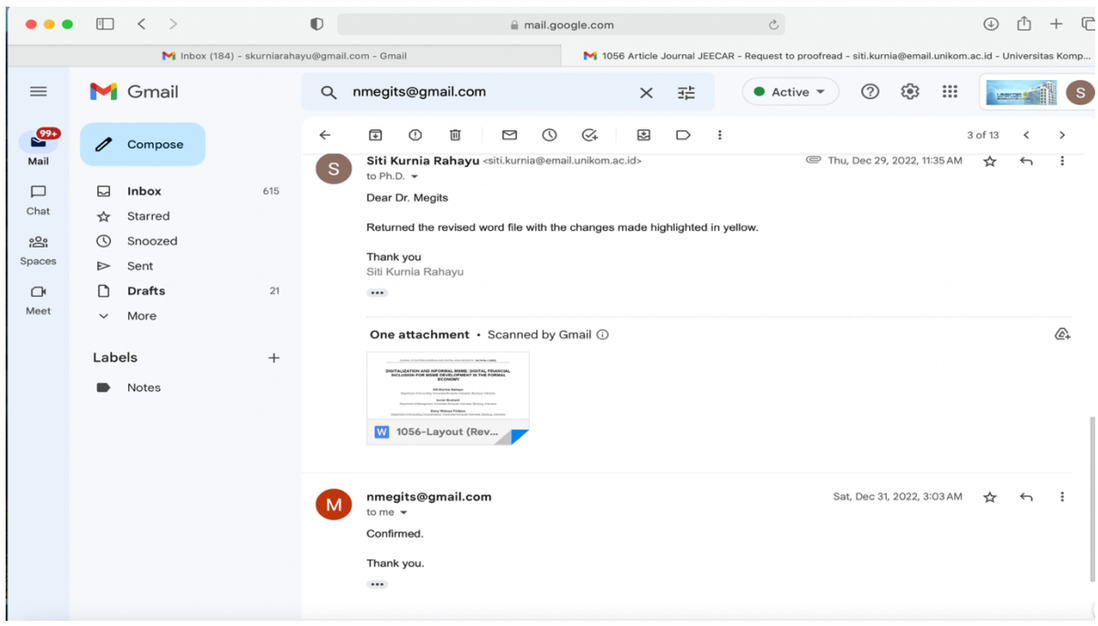
We convey the difference between MSMEs and SMEs in Indonesia.

MSME	SMEs
Fostered by district and city governments	Fostered by the provincial government or national-scale medium enterprises
Relatively unincorporated	Must be a legal entity
Productive businesses owned by individuals and/or individual business entities	Productive economic businesses carried out by individuals or business entities, which are not branches of the company, are controlled or become part of a medium-sized business, or a large business that meets the criteria for a small business.
- Total assets: < 50 million - Sales turnover: < 300 million/ year - Number of employees: < 4 people	- Total assets: 50 million – 500 million - Sales turnover: 300 million – 2.5 billion / year - Number of employees: 5 – 19 people
- Do not have systematic financial administration, - Difficult to get help from banks,	- does not have an accounting system, - difficulty in expanding the scale of business, - non-export import business - have limited capital
- Items sold are always changing, - Very small form of business (as a main	Has a higher business progress than MSMEs. Examples such as small industries, cooperatives, minimarkets,

8. Bukti Konfirmasi Review-2

15 Oktober 2022

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Siti Kurnia Rahayu <siti.kurnia@email.unikom.ac.id>
to Ph.D.
Thu, Dec 29, 2022, 11:35 AM
Dear Dr. Megits
Returned the revised word file with the changes made highlighted in yellow.
Thank you
Siti Kurnia Rahayu
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to me
Sat, Dec 31, 2022, 3:03 AM
Confirmed.
Thank you.

Digitalization and Informal MSME: Digital Financial Inclusion for MSME Development in The Formal Economy

Siti Kurnia Rahayu
Department of Accounting, Universitas Komputer Indonesia, Bandung, Indonesia

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ABSTRACT

This study aims to examine a digital financial inclusion and the use of fintech in overcoming the financing gap for informal MSMEs (micro-, small and middle enterprises). The researchers used primarily qualitative methods namely a qualitative analysis strategy-verification through inductive analysis. The obtained results show that Indonesia's fintech landscape makes MSME a driver of the digital economy so that they are possibilities to overcome the financing gap in the informal sector. The challenges faced by fintech in encouraging MSME business efficiency in the form of unbalanced agency distribution, data security, data access problems, low digital financial literacy, low connectivity, and interoperability can be overcome by taking advantage of existing opportunities. These opportunities include the role of MFIs and cooperatives in promoting financial inclusion and the development of telecommunications infrastructure networks in Indonesia. The novelty of this research is the comprehensive evaluation of achieved progress in digital financial inclusion for MSME in Indonesia, the developed recommendation for regulations by relevant authorities to encourage the business efficiency of MSMEs through facilitating digital financial inclusion.

Keywords: Digitalization, Financial Inclusion, Informal Micro-, Small and Middle Enterprises, Innovation

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INTRODUCTION

The micro-, small and middle entrepreneurship sector is the main driver of the Indonesian economy, with a contribution of more than 50% of GDP. MSMEs contributed 96.99% of employment opportunities, contributed to the addition of foreign exchange in the form of export revenues of 15% of total exports, and 97.02% of workers were absorbed in this sector (source of Data?). MSMEs tend to have the advantage of being able to adapt more easily to unstable economic conditions than large companies (Dalitso & Peter, 2000). But MSME productivity growth needs to be supported by the reliable access to credit. Financing is the main challenge for MSMEs, both in business planning, maintaining the business, and developing the business. Informal MSMEs (please, explain the meaning of informal) come from vulnerable groups and are underserved into a very large potential gap in financing applications. MSME financing is generally still at the development stage, where the main funds come from personal funds. Access of MSME to loans at formal financial institutions is still limited. This financial gap is an obstacle to the development of MSMEs. The financing gap occurs due to information asymmetry and/or weak creditor protection. Another factor that causes this financing gap is the high cost of reaching and serving MSMEs compared to the potential income earned by banks and financial institutions from MSMEs. The limited availability of appropriate financial products and the lack of collateral are also obstacles for MSMEs in obtaining financing. Another obstacle for MSMEs is an economic activity that generally does not have a permanent organization, a physical place of business, and employees with irregular work periods.

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Formally, banks are regulated not to serve entities that are not legally registered or do not have the necessary documents for identification/verification, or are unable to provide reliable information. One way that financing can be given to MSMEs that are not creditworthy without causing losses is subsidized loans. Digital financing services have transformed the traditional loan process by automating the task of underwriting and lending services, making it significantly cheaper, faster, and easier to provide financing to MSMEs. The use of alternative data in digital financing helps eliminate information asymmetry; thus, creating new credit products and digital payments can help informal businesses build credit histories, potentially opening the door to formal financing. The adoption of mobile applications makes it easier for informal businesses to obtain digital financial services.

Many studies related to the use of digital financing for MSMEs can affect financial stability so that MSMEs continue to operate in a sustainable manner (Yulvan et. al, 2021). When financial products are accessible to the public, financial inclusion is high, adequate capital provision supports MSME business operations. Digital financing service products are an alternative to overcome the restrictions on access to formal financial institutions, lack of knowledge and the complexity of financial institution products (Nugroho & Purwanti, 2018). In fact, the results of Capri's research (Capri, 2019) conclude that there are still many MSMEs that use digital technology poorly to obtain financing and funding, so this is the biggest challenge in getting financial support, in addition to the lack of trust and lack of information for MSMEs in obtaining information on where and how to get financial support. funds (Mehrotra, 2015). In addition, most small and middle size firms are not aware of assistance from government agencies, NGOs, and private business to improve their internet infrastructure, e-commerce, and digital business activities. The main technology platform used for many company operations is mobile applications (Mehrotra, 2015).

According to the results of Mehrotra's research (Mehrotra, 2015) the volume of MSME credit is considered very small compared to its contribution to GDP, where the number of loans received by MSMEs is disproportionately smaller than corporations even though MSMEs' contribution is more significant to GDP and employment. Less than 60% of SMEs use bank loans as a means of financing, personal funds continue to be the dominant source of financing for them (Mehrotra, 2015). Most MSMEs in developing countries state that access to finance is the most binding, so MSME financing programs will be an important channel to achieve growth and create more jobs (Kumar, 2017).

The digital financial inclusion for MSMEs can increase user traffic and potential borrowers with risk profiles will obtain financing according to measurable targets, which in turn will provide benefits, and will create a healthy digital economy ecosystem. Through the digital financing MSMEs will get wide access to loans, and Informal MSMEs can open up opportunities for their development.

The purpose of this study is to examine the digital financial inclusion ecosystem and the use of digital finance technology in overcoming the financing gap for Informal MSMEs in Indonesia. This study discovers the challenges and opportunities of the Digital Financial Inclusion in encouraging MSME businesses. It ends with a series of studies on the potential policies of the telecommunications sector and other fields related to fintech. The study was conducted by means of qualitative methods: a qualitative analysis strategy-verification and inductive analysis were applied. The urgency of research is important to provide solutions to the development of MSMEs as well as the fintech business, its products and business models, the regulatory and policy frameworks to expand MSMEs access for the digital financing services.

LITERATURE REVIEW

The digital financial inclusion is essential for the creation of the healthy digital economy ecosystem. These system increases the financial opportunities for the informal MSMEs development.

Financial inclusion contributes to the financial stability under implementation of risk management technologies and strong financial supervision. The financial inclusion increases the level of accessibility of MSMEs to financial products. Blancher (2019) proves that extending credit to MSMEs can contribute to financial stability because it allows banks to diversify their credit portfolios and better risk exposure.

Many studies related to the digital financing MSMEs show the effect of financial stability so that MSMEs continue to operate in a sustainable manner (Yulfan et al., 2021; Le et al., 2019). When financial products are accessible to the public, financial inclusion shows a high level of accessibility.

But only mobile applications are the main technology platform used by MSMEs (Capri, 2019).

Based on research conducted by Baranauskas & Raišienė, 2021; Kurniati & Suryanto, 2022; Valiyev et al., 2022, digitization is the processing of data into information for both organizations and other end users so that services can be answered quickly and effectively.

Entrepreneurs have turned to digital technology to maintain and develop their business, to desighn and implement the startegies in the face of competition in digital era. (Rusdana et al., 2022; Soegoto et al., 2021).

MSME access to finance is in the focus of developing appropriate monitoring and evaluation systems to report

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whether the intervention is having the desired effect. Basing on the specific financing constraints of MSMEs the startups growth can demonstrate better results. It is important to provide training and capacity building for MSME managers. Systemic interventions aimed to improve the financial sector operation through policy and regulatory reforms are a necessary prerequisite for the success (Kumar, 2017).

The experts of OECD (2022) stressed the importance of financial inclusion for the SMEs under conditions of significant economic shocks (for example, pandemic), because the SMEs were at the centre of the crises impact. Their research has demonstrated the importance of support measures of financial accessibility to all SMEs operation and reduction of bankruptcies declining.

METHOD

The research design is prepared to obtain answers to the research questions objectively, validly and effectively. It is developed in the form of a comprehensive scheme that includes a research program. Qualitative research is used to obtain a complete picture of financial inclusion trough the digital finance use by MSMEs in the informal economy from the point of view of financial authorities, developers of digital financing services, financial institutions, telecommunications authorities, MSME representatives. The research program is designed to provide understanding clue issues through direct interaction involving researchers with digital financing service developers, financial institutions and MSME representatives as well as the study of related documents.

The sources of data for this research includes: a) the Director of Telecommunications Kemkominfo, b) the analyst of Directorate of Fintech Licensing and Supervision OJK, c) the Head of Bumdes Cibogo Hilir Plered. Determination of data sources in this study was carried out purposively, by taking into account the problem and research objectives, the professional knowledge of informants.

Research data collection includes making report selecting informants and recording the results of data collection, their analysis and summarizing. Data collection was carried out from December 2021 to April 2022. Data collection techniques were apllyed by the Forum Group Discussion (FGD) and document review. The Forum Group Discussion (FGD) was held in a structured manner in the formulation of research achievement indicators and research achievement targets. The frequency of holding FGDs was at least 3 times during the research process. The documents review was carried out by digging up information through facts stored in regulations and journals.

The researchers used the technique of testing the validity of the triangulation data, namely (i) the triangulation method, to compare information and to avoid the errors in data collection; (ii) theory of triangulation, to compare information with relevant theoretical perspectives.

The researcher also uses a qualitative analysis-verification strategy by conducting inductive analysis, which is an approach for the general conclusions making on the base of real facts. This inductive analysis was carried out throughout the study, with the aim of simplifying the data. The procedures of analyzing the obtained data include (i) the performance of data reduction, by selecting data relevant to the research, and focusing attention on the main research problem; (ii) Presentation of summary data in descriptive form; and (iii) Conclusions making to provide problem solving solutions.

The problem identification technique was based on the DMAIC method (Define, Measure, Analyze, Improve, Control). Define is an activity to identify problems that arise. The data was used as input to determine the cause of the problem. Measure is an activity of grouping data that has been obtained and then processed according to existing variables. Analyze means a data analysis activity using the problem tree method (problem tree). The problem tree helps to find solutions by mapping the anatomy of causes and effects of the problem (structured mind map). The problem tree analysis was done by structuring the causal components related to the prioritized problems. Improve is an activity that focuses on the causes of the problems and their changes. At this stage, developed proposals are given to parties related to the research problem. Control is an activity to maintain the defined condition of goals achievement.

RESULTS AND DISCUSSION

Indonesia's Digital Financial Inclusion Ecosystem. Overview of Financial Inclusion in Indonesia

Indonesia's banking credit distribution as one of the important part of financial services showed an increase of banking credit by 5.2% in 2021, exceeding the projection of 4% - 5%. This growth was followed by an improvement in the ratio of bad loans (NPL), there is 3% in 2021 , 3.06% - in 2020). Likewise, the growth of stock market capitalization as an alternative source of financing in 2021 reached 49.65% of GDP, that is higher than 45% in 2020. Indonesia's financial services sector have been growing supplemented by the development of new financial products such as Crowdfunding which makes it easier for MSME actors to access business capital. It reached Rp. 412 billion in 2021.

The uptake of credit from formal sources is another important issue for MSMEs in Indonesia related to

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financial inclusion that needs to be addressed. There are 65 million MSMEs or 99.9% of the total business actors in Indonesia, which contribute 97% to the employment (120 million workers), and 60.51% or Rp. 8,573 trillion to GDP. 60.2% of MSMEs have capital for the maximum 3 months term. On the other hand, in 2020, financing of Microfinance Institutions reached Rp749.42 billion, the increase of 21.68% compared to the previous year. Meanwhile, MSME loans in 2021 have reached more than IDR 1,102.7 trillion. Loans for the productive sector has reached 47.26% (Rp. 54.71 T), in 2021.(Add! Source of data)

Importance of IT Innovation for Financial Inclusion in Indonesia

The use of IT innovation and blockchain (DLT) in financial services is a technological innovation that provides convenience, efficiency, and the broad access to financial products from anywhere and anytime, with the potential to increase financial inclusion. Fintech helps old companies and new companies that do not have bank accounts to receive the financial services economically. Fintech as a financial service is delivered through digital infrastructure including cellular phones and the Internet that connects individuals and businesses to digital payment infrastructure so creates possibilities of unlimited transactions (McKinsey & Co, 2016).

Most of the Fintech services are offered by start-ups. The IT innovation caused the significant growth of Fintech companies and the share of MSMEs of in the financial services market (Bosnia, 2020). Fintech companies take advantage of IT products and capabilities such as cloud computing to quickly develop digital products and make Fintech companies focus on valuable businesses.

Fintech Ecosystem in Indonesia

The Fintech in Indonesia is the dynamic, rapidly changing financial services sector. The growth rate of Indonesian FinTech companies during 2017-2021 is 49%, there were 440 companies in 2017, their amount reached 785 companies in 2021 (Fintech in ASEAN, 2021). The Fintech Ecosystem included following types of companies in 2021: companies of payments category – 237 companies (30%), alternative lending – 179 companies (23%), investment tech – 115 companies (15%), finance and accounting - 106 companies (14%), Cryptocurrencies category – 62 companies (8%), Banking Technology category – 38 companies (5%), InsureTech category – 26 companies (3%), RegTecs category – 14 companies (2%) and Blockchain in Financial Services – 8 companies (1%). The dominance of companies of the payments and loan types is explained by the large number of productive age population who are unbanked and underbanked. The number of Indonesian Fintech Companies is the second largest among the ASEAN countries where Singapore (1350 companies) dominates. Meanwhile, the use of Fintech is growing rapidly both in the payment system and in the areas of other products. Bank Indonesia noted that the value of electronic money (EU) transactions during 2021 grew up by 49.06% (reaching Rp305.4 trillion). The Financial Services Authority noted that the accumulation of new lending through Fintech P2P Lending reached Rp.295.85 trillion (an increase by 89.7%) in 2021.

Fintech start-ups force banks and other financial institutions to improve the quality of their business models by adopting IT innovations, improving service, restructuring and streamlining business models. The bank digital transformation carried out by adopting Fintech solutions have been went through cloud computing, AI, biometrics, and blockchain/DLT tests to improve business operations.

Landscape Fintech Payment in Indonesia

Fintech Payment is a digital financial service category that is dominantly used by the community. The adoption of digital payments in Indonesia shows gradual growth new Fintech ventures. The banks and MNOs introduced new business models and forms of digital payments, although the payment system still relies on cash in Indonesia. Fintech Payment products include: (a) Electronic Money; (b) Electronic Wallets; (c) Payment Gateways; (d) Paylater; (e) QRIS. E-money (80.2%) and Paylater (68.9%) products are the two most widely used product variants in 2021 (DailySocial, 2021). The growth of e-wallet usage in 2021 increased by 24% in comparison with the previous year, when 43% of digital transactions used e-wallet (Moses, 2021).

A lot of Fintech companies operating in the digital payment space are referred to the Payment Service Providers (PSPs). BI (Bank of Indonesia) requires PSP to have a license to operate in Indonesia. The PSP category is defined by BI as following (Peraturan BI Nomor 19/12/PBI/2017):

- E-Money, Issuer of e-money refers to a company that uses an electronic representation of cash that is issued by one party and received by one or many other parties.
- E-Wallet provider (e-wallet provider) – refers to the "carrier" of e-money and can tie up various sources of funds.
- Payment Gateway Operators. BI has licensed 11 payment gateway operators in Indonesia. The top organizers are Doku, Midtrans and Xendit.
- Merchant Acquirers. The top 4 banks own about 90% of the POS terminals. There are only a few active Fintech companies that are merchant acquirers, the biggest ones are; Cashlez, Moka and Pawoon. Quick Response, or QR, code is an emerging and new type of POS solution, which has attracted strong interest in

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Indonesia. Only a few Fintech companies are active in this field in Indonesia.

Landscape Fintech Lending in Indonesia

There are 103 registered and licensed Fintech Lending providers in Indonesia in 2022 due to the data of the Financial Services Authority (OJK) (OJK, 2022). The Indonesian Fintech Lending providers are grouped into 4 categories, namely: (a) Eduluon, focused on providing education fund loans (Danacita, Edufund, DanaBagus, Pintek, and Installment); (b) Cashloan/Paylater, providing cash loans online (there are 19 Fintech Lending from Findaya, Indodana, Julo to Kredivo); (c) Consumer P2P Lending, a lending group that brings together borrowers and lenders with the use of funds for consumer's needs (there are 27 Fintech Lending agents licensed by OJK such as Finmas, Adakami, EasyCash, 360Kredi to Danakini); and (d) P2P Lending Business, focusing its business on providing productive loan funds (there are 52 fintech lenders, including Amartha, Investree, KoinWorks, Danamas and others). The Consumer P2P Lending (13.9%), the Productive P2P Lending (13.4%) and Paylater (11.3%) are the Fintech lending categories that occupy the top positions in the use of Financial Lending technology applications (DailySocial.id, 2021). The ease of borrowing is the reason for using this application.

Through Fintech Lending, transactions between borrowers and lenders can occur without the need for a direct meeting. This practice facilitates the process of financial transactions to satisfy the financial needs of the society. In addition, the technology used by Fintech lending are available for people who are not connected to banking and this is the reason for the growing application of this technology. Data from the Cambridge Center for Alternative Finance (CCAF) (Le, et al., 2019) shows that 41% of Fintech Lending customers are underbanked and 21% are unbanked. CCAF also noted that 47% of users are individuals, and 38% of application users come from the MSME sector. Fintech Lending has great potential due to the large number of MSMEs and individuals in Indonesia.

Utilization of Digital Finance Technology in Overcoming the Informal MSME Financing Gap

The Indonesian MSMEs have a large financial gap. BI's Money Supply Analysis noted that loans to the MSME sector grew up by 12.3% to Rp1,147.3 trillion throughout 2021. Regulators continue to ask banks to increase the portion of lending to MSMEs up to 30%. Not all banks have the ability to disburse credit, but 30% of demand is to be covered by the banking industry, not individual banks. So, all banks must contribute to MSMEs credit provision, by setting a strategy and projected time for achieving MSME credit ratios in their business plans. Bank Indonesia has issued Regulation (Peraturan BI Nomor 23/13/PBI/2021) concerning Macroprudential Inclusive Financing Ratio (RPIM) for Conventional Commercial Banks, Sharia Commercial Banks and Sharia Business Units. BI requires from the banks to gradually increase the ratio of lending to the MSME sector (20% for 2022, 25% for 2023 and 30% for 2024). The sanctions for the banks those portfolio does not correspond to this requirements are in the form of a written warning or even a material fine (0.1 times the value of lending to MSMEs or a maximum fine of Rp. 5 billion). The development of financial inclusion for individuals and MSMEs in Indonesia, which is still at relatively low level, is an opportunity for Digital Fintech lending platforms to fill this gap.

The digital loan business model that caters to the unbanked, underbanked, and MSMEs is categorized into (1) partnerships between different companies (banks, MNOs and Startup Fintech) and (2) Startup Fintech platforms that facilitate lending. In the partnership area, three different business models form an alliance and each party performs a function in the cycle to provide loans.

Challenges and Opportunities for Fintech as Digital Financial Inclusion in Encouraging MSME Business Efficiency.

Challenge

Agents are a vital component in the distribution of digital financial products to the unbanked, underbanked and MSMEs in Indonesia. The Laku Pandai Program organized by OJK and the Digital Financial Services Report organized by Bank Indonesia are programs that support the pillars of the National Strategy for Inclusive Finance, related to products, intermediation and distribution channels, provides the branchless financial services. Laku Pandai and LKD utilize IT facilities such as cellular phones, electronic data capture and Internet banking that support financial services by the Bank through agents, to be able to reach people in remote areas and reduce financial transaction costs. In 2019, fintech companies reported that 6.2 million agents served cash deposits, transfers, bill payments, digital technology-based credit and other digital technology-based financial services. This amount is sufficient to serve the total population of Indonesia, but there is still an unbalanced distribution where there are many areas that do not have a sufficient number of agents so that services are still difficult to reach. In 2020, Bank Indonesia recorded the highest ratio of the number of LKD agents per 100,000 populations on Sulawesi Island as many as 365 agents, on Java Island - 313 agents, Bali and Nusa Tenggara – 285 agents, Sumatra Island - 278 agents and Maluku & Papua Island – 248 agents.

According to the OJK Survey, the 2019 Indonesian Financial Literacy Index reached 38.03% and the

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Financial Inclusion Index 76.19%. Only 38.03% of Indonesians have the knowledge, skills and confidence to understand financial products and services. Financial Literacy Index is knowledge, skills and beliefs that have an influence on attitudes to improve the quality of decision making and financial management in achieving prosperity. This low level of financial literacy is one of the most important demand-side challenges for financial inclusion in Indonesia. SNKI notes that there are various financial literacy programs, but many of them are not yet unrelated to the digital financial awareness, which is also an important obstacle to overcome. The lack of financial literacy among the unbanked and the poor has also been identified as an obstacle to further growth and expansion by Fintech companies.

Opportunities

Digitization for Microfinance Institutions and cooperatives is the real opportunity to scale up and reach more Informal and Formal MSMEs. MFIs and cooperatives have played an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations have not leveraged digital technologies which hinders the growth, scale and scope of product offerings unless the agents have a large number of resources available. Technology is a key driver for financial inclusion, and the digitization of MFIs and cooperatives is an opportunity for these organizations to leverage their customer base and outreach to rural areas and low-income clients. Digital solutions help financial institutions deepen customer engagement and product use, promote and improve finance.

The Ministry of Communications and Informatics is also working to increase fixed broadband penetration up to 30% (30 million household fixed broadband connections) in 2024 through a regulatory facilitation program to address the reasonableness of land rental fees and the right of way (RoW) for the deployment of telecommunications infrastructure with the Ministry of Communications and Informatics. Relevant Central and Regional Institutions provide assistance in Internet services for MSMEs and Public Facilities, which is targeted to 1500 MSMEs and Fasum for 2022, and until 2024 it should reach 7000 MSMEs and Fasum spread across several parts of Indonesia.

Recommendations

The use of digital technology is an effective way to conduct financial literacy programs, and Fintech companies can play a role in educating customers through innovative business models. Government programs to promote financial literacy should explore the use of innovative technologies. Technology offers exciting opportunities to communicate with more people regardless of time and place. Indonesia's Fintech P2P lending platform should increase the quantity and quality of education programs for customers, provide training them on understanding savings and how to manage finances best way. Indonesian fintech that uses artificial intelligence (AI) also needs to help its customers manage their personal finances and develop investment strategies according to their financial capabilities. Fintech needs to focus on providing financial literacy for the poor and unbanked market agents, it is important to design the financial products that are relevant, targeted, and easy to use and understand. Alternative financial literacy programs offered by Fintech companies can complement the OJK and BI programs.

Two important components are needed for a digital lending platform to provide loans in Indonesia, namely KYC/identity and a credit risk assessment mechanism. As part of the loan application process, each financial institution must conduct a Know Your Customer (KYC) check, which consists of a number of customer identity checks that precede the decision to approve a new customer and initiate the on-boarding process. While this requirement may be easy for customers in developed countries, it is a significant barrier for the poor in developing countries. Currently, Indonesia has a national ID system that covers 96% of the population aged 17 years and over, and an estimated 92% of the entire population is in the national population database. To evaluate a borrower's credit risk, Fintech platforms use their own alternative credit scoring model and supplement it with data from established credit bureaus in the country. In an environment where unbanked persons have no credit history and have never accessed formal financial products and services, the use of alternative credit scoring mechanisms becomes essential to assess these individuals' credit risk and provide them with access to loans.

The government is intensively ensuring the availability of internet services for the population and business, both in urban and rural areas. Digital infrastructure development must be carried out comprehensively in the context of digital transformation. The government, in this case the Ministry of Communication and Informatics, has realized that there are various challenges in providing broadband services, therefore collaboration is needed with Telecommunications Operators, relevant Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase broadband service subscriber penetration so that it is expected to encourage the realization of digital transformation to increase Indonesia's economic growth. The collaboration that is needed is not only in the form of facilitating the ease of doing business for telecommunications operators, it also requires certainty for the telecommunications operators to cooperate with

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other business actors in the framework of cooperation in the use of passive facilities and infrastructure. Investment cost efficiency for business actors can be realized in a mutually beneficial, transparent and non-discriminatory cooperation scheme to get equal opportunities and compete fairly for access to infrastructure. The role and collaboration of Ministries/Agencies at the central and regional levels need to be strengthened because each economic sector supported by these Ministries/Agencies has the same interest, namely realizing digital-based sector activities, which of course can only be realized through the provision of reliable telecommunications infrastructure. and continuous adoption of advanced technology. The business world and the community really need it, so that they can overcome access gaps, especially in access to financial services, that will contribute to the financial inclusion and overcoming the economic inequality among the various levels of society.

CONCLUSION

Indonesia's digital financial ecosystem is based on the dynamic fintech landscape. The low-touch concept offered by Fintech contributed to the development of digital economy. Fintech startups, banks and major technology companies in Indonesia have offered Fintech solutions to individuals and MSMEs, covering many aspects of the financial services sector. Fintech startups are one of the most important players in the Fintech ecosystem. Fintech Payment as a digital financial service is widely used by the communities. The adoption of digital payments in Indonesia shows gradual growth as new Fintech ventures, banks and MNOs introduction and high speed spread of new business models and forms of digital payments. Fintech lending is another dominant digital financial service category where the ease of borrowing is the reason for using the such application. The use of digital finance technology can overcome the financing gap for the informal MSMEs, especially for countries like Indonesia with a large financial gap for MSME. Formal financial inclusion for individuals and MSMEs in Indonesia is still relatively low, Digital Fintech lending platforms gives the opportunity to fill in this gap. There are observed the growth of numbers of MSMEs that use its services, increasing variety of products to meet MSME needs and requirements.

The informal MSMEs are an important focus area for P2P business lending platforms in Indonesia. The challenges of Fintech as Digital Financial Inclusion in encouraging MSME business efficiency include: (i) there are relatively enough LP and LKD agents for branchless financial services by utilizing ICT but they have not yet distributed in a balanced manner throughout Indonesia; (ii) the weaknesses of data security and access to the SIAK database, in implementing e-KYC and e-signature of prospective fintech customers; (iii) the digital financial literacy index is still low so that fintech expansion is constrained; (iv) low connectivity of smartphones and internet penetration in rural areas; (v) interoperability between electronic money issuers (banks), telecommunications and Fintech companies is still weak so that the adoption of fintech customers is low. While the opportunities for fintech as digital financial inclusion include: (i) MFIs and cooperatives play an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations are not yet leveraging digital which slows the growth, scale and scope of product offerings; (ii) the construction of fiber optic cable, terrestrial radio microwave link network to support the fiber optic cable backbone network, satellite network, customer service network (end user) through BTS/Node-B/gNode-B cellular, Optical Distribution Points (ODP) for Fiber to Home (FTH) Wifi and LAN access, and increasing the penetration of the number of household fixed broadband connections, targeting 12458 villages have to be served. Potential policies for the telecommunications sector and other fields related to fintech include: (i) Fintech needs to focus on providing financial literacy to the public so that it can complement the OJK and BI programs; (ii) Fintech companies can develop their own credit risk mechanisms using non-traditional data and procedures, in order to target previously untapped markets; (iii) development of digital infrastructure must be carried out comprehensively and successively at the first mile, middle mile and last mile network layers in the context of digital transformation. The Ministry of Communication and Informatics collaborates with Telecommunications Operators, related Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase penetration of broadband service subscribers. The collaboration is needed not only in the form of facilitating the ease of doing business for telecommunications operators, it also requires certainty for telecommunications operators to cooperate with other business actors to use the necessary facilities and infrastructure.

We express our deepest gratitude to the LPDP Kemenkeu RI, the Director of Telecommunications Kemkominfo RI, Analysts of the OJK Fintech Licensing and Supervision Directorate, and the Head of Cibogo Hilir Village Plered Purwakarta, for their support during the research process.

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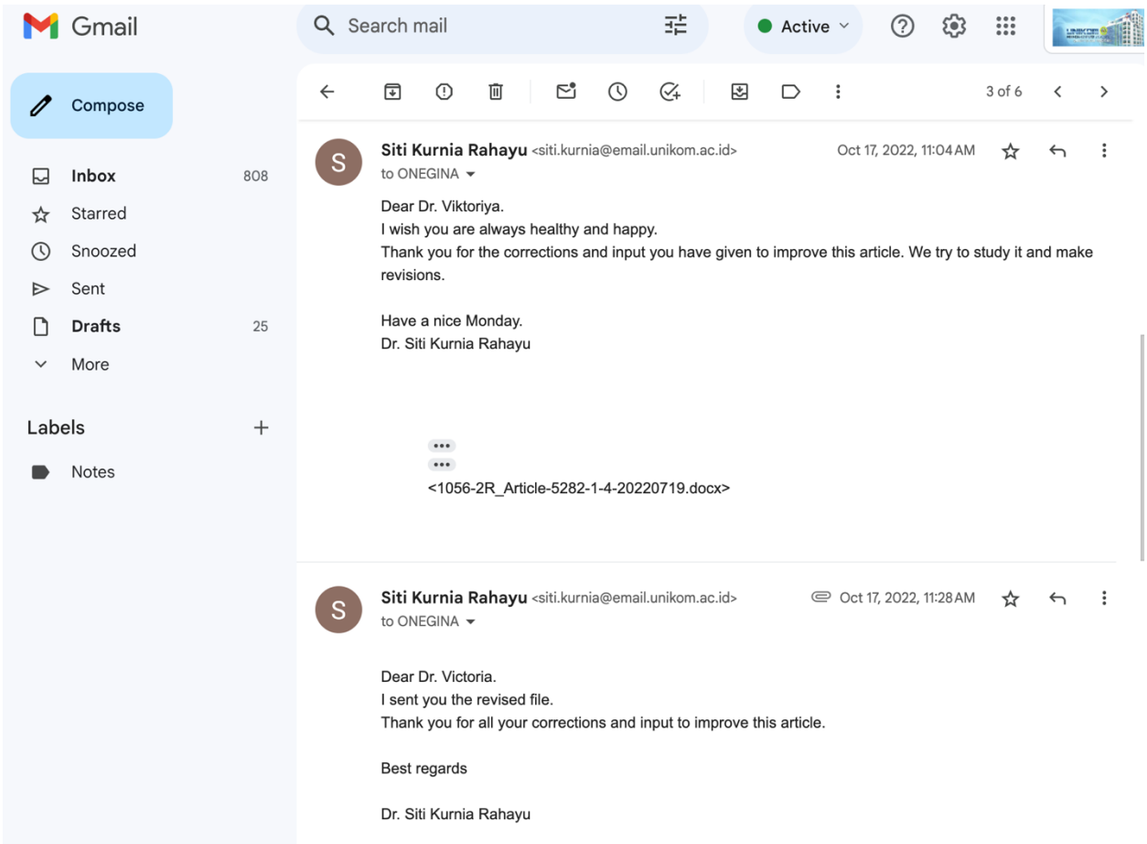

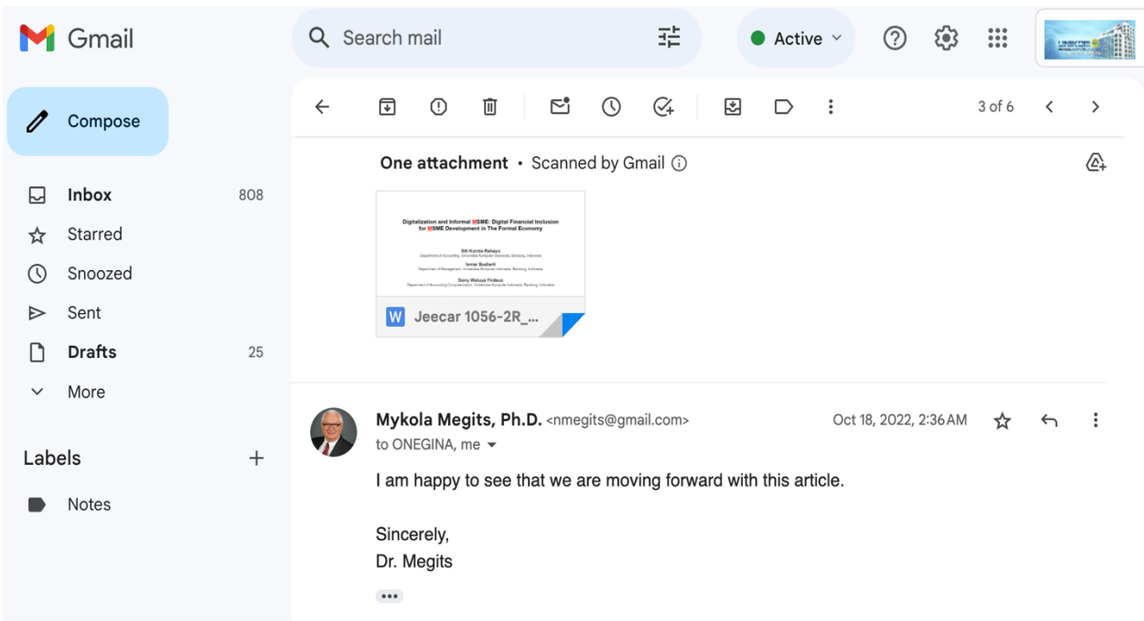

Digitalization and Informal MSME: Digital Financial Inclusion for MSME Development in The Formal Economy

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ABSTRACT

This study aims to examine a digital financial inclusion and the use of fintech in overcoming the financing gap for informal MSMEs (micro-, small and middle enterprises). The researchers used primarily qualitative methods namely a qualitative analysis strategy-verification through inductive analysis. The obtained results show that Indonesia's fintech landscape makes MSME a driver of the digital economy so that they are possibilities to overcome the financing gap in the informal sector. The challenges faced by fintech in encouraging MSME business efficiency in the form of unbalanced agency distribution, data security, data access problems, low digital financial literacy, low connectivity, and interoperability can be overcome by taking advantage of existing opportunities. These opportunities include the role of MFIs and cooperatives in promoting financial inclusion and the development of telecommunications infrastructure networks in Indonesia. The novelty of this research is the comprehensive evaluation of achieved progress in digital financial inclusion for MSME in Indonesia, the developed recommendation for regulations by relevant authorities to encourage the business efficiency of MSMEs through facilitating digital financial inclusion.

Keywords: Digitalization, Financial Inclusion, Informal Micro-, Small and Middle Enterprises, Innovation

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INTRODUCTION

The micro-, small and middle entrepreneurship sector is the main driver of the Indonesian economy, with a contribution of more than 50% of GDP. MSMEs contributed 96.99% of employment opportunities, contributed to the addition of foreign exchange in the form of export revenues of 15% of total exports, and 97.02% of workers were absorbed in this sector (source of Data?) ekon.go.id, 2021. MSMEs tend to have the advantage of being able to adapt more easily to unstable economic conditions than large companies (Dalitso & Peter, 2000). But MSME productivity growth needs to be supported by the reliable access to credit. Financing is the main challenge for MSMEs, both in business planning, maintaining the business, and developing the business.

Informal MSMEs are generally micro-enterprises that do not have a legal entity, the form of business is very small, the goods sold are always changing, it is difficult to get assistance from banks because they do not have systematic financial administration. Informal MSMEs generally have total assets < Rp. 50 million, with an average sales turnover of under Rp. 300 million/year, and the number of employees it has does not exceed 4 people.

Informal MSMEs (please, explain the meaning of informal) come from vulnerable groups and are underserved into a very large potential gap in financing applications. MSME financing is generally still at the development stage, where the main funds come from personal funds. Access of MSME to loans at formal financial institutions is still limited. This financial gap is an obstacle to the development of MSMEs. The financing gap occurs due to information asymmetry

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and/or weak creditor protection. Another factor that causes this financing gap is the high cost of reaching and serving MSMEs compared to the potential income earned by banks and financial institutions from MSMEs. The limited availability of appropriate financial products and the lack of collateral are also obstacles for MSMEs in obtaining financing. Another obstacle for MSMEs is an economic activity that generally does not have a permanent organization, a physical place of business, and employees with irregular work periods. Formally, banks are regulated not to serve entities that are not legally registered or do not have the necessary documents for identification/verification, or are unable to provide reliable information. One way that financing can be given to MSMEs that are not creditworthy without causing losses is subsidized loans. Digital financing services have transformed the traditional loan process by automating the task of underwriting and lending services, making it significantly cheaper, faster, and easier to provide financing to MSMEs. The use of alternative data in digital financing helps eliminate information asymmetry; thus, creating new credit products and digital payments can help informal businesses build credit histories, potentially opening the door to formal financing. The adoption of mobile applications makes it easier for informal businesses to obtain digital financial services.

Many studies related to the use of digital financing for MSMEs can affect financial stability so that MSMEs continue to operate in a sustainable manner (Yulvan et. al, 2021). When financial products are accessible to the public, financial inclusion is high, adequate capital provision supports MSME business operations. Digital financing service products are an alternative to overcome the restrictions on access to formal financial institutions, lack of knowledge and the complexity of financial institution products (Nugroho & Purwanti, 2018). In fact, the results of Capri's research (Capri, 2019) conclude that there are still many MSMEs that use digital technology poorly to obtain financing and funding, so this is the biggest challenge in getting financial support, in addition to the lack of trust and lack of information for MSMEs in obtaining information on where and how to get financial support. funds (Mehrotra, 2015). In addition, most small and middle size firms are not aware of assistance from government agencies, NGOs, and private business to improve their internet infrastructure, e-commerce, and digital business activities. The main technology platform used for many company operations is mobile applications (Mehrotra, 2015).

According to the results of Mehrotra's research (Mehrotra, 2015) the volume of MSME credit is considered very small compared to its contribution to GDP, where the number of loans received by MSMEs is disproportionately smaller than corporations even though MSMEs' contribution is more significant to GDP and employment. Less than 60% of SMEs use bank loans as a means of financing, personal funds continue to be the dominant source of financing for them (Mehrotra, 2015). Most MSMEs in developing countries state that access to finance is the most binding, so MSME financing programs will be an important channel to achieve growth and create more jobs (Kumar, 2017).

The digital financial inclusion for MSMEs can increase user traffic and potential borrowers with risk profiles will obtain financing according to measurable targets, which in turn will provide benefits, and will create a healthy digital economy ecosystem. Through the digital financing MSMEs will get wide access to loans and Informal MSMEs can open up opportunities for their development.

The purpose of this study is to examine the digital financial inclusion ecosystem and the use of digital finance technology in overcoming the financing gap for Informal MSMEs in Indonesia. This study discovers the challenges and opportunities of the Digital Financial Inclusion in encouraging MSME businesses. It ends with a series of studies on the potential policies of the telecommunications sector and other fields related to fintech. The study was conducted by means of qualitative methods; a qualitative analysis strategy-verification and inductive analysis were applied. The urgency of research is important to provide solutions to the development of MSMEs as well as the fintech business, its products and business models, the regulatory and policy frameworks to expand MSMEs access for the digital financing services.

LITERATURE REVIEW

The digital financial inclusion is essential for the creation of the healthy digital economy ecosystem. These system increases the financial opportunities for the informal MSMEs development.

Financial inclusion contributes to the financial stability under implementation of risk management technologies and strong financial supervision. The financial inclusion increases the level of accessibility of MSMEs to financial products. Blancher (2019) proves that extending credit to MSMEs can contribute to financial stability because it allows banks to diversify their credit portfolios and better risk exposure.

Many studies related to the digital financing MSMEs show the effect of financial stability so that MSMEs continue to operate in a sustainable manner (Yulfan et al., 2021; Le et al., 2019). When financial products are accessible to the public, financial inclusion shows a high level of accessibility.

But only mobile applications are the main technology platform used by MSMEs (Capri, 2019).

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Based on research conducted by Baranauskas & Raišienė, 2021; Kurniati & Suryanto, 2022; Valiyev et al., 2022, digitization is the processing of data into information for both organizations and other end users so that services can be answered quickly and effectively. Entrepreneurs have turned to digital technology to maintain and develop their business, to desighn and implement the startegies in the face of competition in digital era. (Rusdana et al., 2022; Soegoto et al., 2021).

MSME access to finance is in the focus of developing appropriate monitoring and evaluation systems to report whether the intervention is having the desired effect. Basing on the specific financing constraints of MSMEs the startups growth can demonstrate better results. It is important to provide training and capacity building for MSME managers. Systemic interventions aimed to improve the financial sector operation through policy and regulatory reforms are a necessary prerequisite for the success (Kumar, 2017).

The experts of OECD (2022) stressed the importance of financial inclusion for the SMEs under conditions of significant economic shocks (for example, pandemic), because the SMEs were at the centre of the crises impact. Their research has demonstrated the importance of support measures of financial accessibility to all SMEs operation and reduction of bankruptcies declining.

METHOD

The research design is prepared to obtain answers to the research questions objectively, validly and effectively. It is developed in the form of a comprehensive scheme that includes a research program. Qualitative research is used to obtain a complete picture of financial inclusion trough the digital finance use by MSMEs in the informal economy from the point of view of financial authorities, developers of digital financing services, financial institutions, telecommunications authorities, MSME representatives. The research program is designed to provide understanding clue issues through direct interaction involving researchers with digital financing service developers, financial institutions and MSME representatives as well as the study of related documents.

The sources of data for this research includes: a) the Director of Telecommunications Kemkominfo, b) the analyst of Directorate of Fintech Licensing and Supervision OJK, c) the Head of Bumdes Cibogo Hilir Plered. Determination of data sources in this study was carried out purposively, by taking into account the problem and research objectives, the professional knowledge of informants.

Research data collection includes making report, selecting informants and recording the results of data collection, their analysis and summarizing. Data collection was carried out from December 2021 to April 2022. Data collection techniques were apllyed by the Forum Group Discussion (FGD) and document review. The Forum Group Discussion (FGD) was held in a structured manner in the formulation of research achievement indicators and research achievement targets. The frequency of holding FGDs was at least 3 times during the research process. The documents review was carried out by digging up information through facts stored in regulations and journals.

The researchers used the technique of testing the validity of the triangulation data, namely (i) the triangulation method to compare information and to avoid the errors in data collection; (ii) theory of triangulation to compare information with relevant theoretical perspectives.

The researcher also uses a qualitative analysis-verification strategy by conducting inductive analysis, which is an approach for the general conclusions making on the base of real facts. This inductive analysis was carried out throughout the study, with the aim of simplifying the data. The procedures of analyzing the obtained data include (i) the performance of data reduction, by selecting data relevant to the research, and focusing attention on the main research problem; (ii) Presentation of summary data in descriptive form; and (iii) Conclusions making to provide problem solving solutions.

The problem identification technique was based on the DMAIC method (Define, Measure, Analyze, Improve, Control). Define is an activity to identify problems that arise. The data was used as input to determine the cause of the problem. Measure is an activity of grouping data that has been obtained and then processed according to existing variables. Analyze means a data analysis activity using the problem tree method (problem tree). The problem tree helps to find solutions by mapping the anatomy of causes and effects of the problem (structured mind map). The problem tree analysis was done by structuring the causal components related to the prioritized problems. Improve is an activity that focuses on the causes of the problems and their changes. At this stage, developed proposals are given to parties related to the research problem. Control is an activity to maintain the defined condition of goals achievement.

RESULTS AND DISCUSSION

Indonesia's Digital Financial Inclusion Ecosystem.

Overview of Financial Inclusion in Indonesia

Indonesia's banking credit distribution as one of the important part of financial services showed an increase of banking credit by 5.2% in 2021, exceeding the projection of 4% - 5%. This growth was followed by an

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improvement in the ratio of bad loans (NPL), there is 3% in 2021 (3.06% - in 2020). Likewise, the growth of stock market capitalization as an alternative source of financing in 2021 reached 49.65% of GDP, that is higher than 45% in 2020. Indonesia's financial services sector have been growing supplemented by the development of new financial products such as Crowdfunding which makes it easier for MSME actors to access business capital. It reached Rp. 412 billion in 2021.

The uptake of credit from formal sources is another important issue for MSMEs in Indonesia related to financial inclusion that needs to be addressed. There are 65 million MSMEs or 99.9% of the total business actors in Indonesia, which contribute 97% to the employment (120 million workers), and 60.51% or Rp. 8,573 trillion to GDP (bkpm.go.id). 60.2% of MSMEs have capital for the maximum 3 months term (Reza Pahlevi, 2022). On the other hand, in 2020 financing of Microfinance Institutions reached Rp749.42 billion, the increase of 21.68% compared to the previous year (Vika Azkia Dihni, 2021). Meanwhile, MSME loans in QI/2022 have reached more than IDR 1,171.8 trillion (pip.kemenkeu.go.id, 2022). Loans for the productive sector has reached 47.26% (Rp. 54.71 T) in 2021.(Add! Source of data)

Importance of IT Innovation for Financial Inclusion in Indonesia

The use of IT innovation and blockchain (DLT) in financial services is a technological innovation that provides convenience, efficiency, and the broad access to financial products from anywhere and anytime, with the potential to increase financial inclusion. Fintech helps old companies and new companies that do not have bank accounts to receive the financial services economically. Fintech as a financial service is delivered through digital infrastructure including cellular phones and the Internet that connects individuals and businesses to digital payment infrastructure so creates possibilities of unlimited transactions (McKinsey & Co, 2016).

Most of the Fintech services are offered by start-ups. The IT innovation caused the significant growth of Fintech companies and the share of MSMEs of in the financial services market (Bosnia, 2020). Fintech companies take advantage of IT products and capabilities such as cloud computing to quickly develop digital products and make Fintech companies focus on valuable businesses.

Fintech Ecosystem in Indonesia

The Fintech in Indonesia is the dynamic, rapidly changing financial services sector. The growth rate of Indonesian FinTech companies during 2017-2021 is 49%, there were 440 companies in 2017, their amount reached 785 companies in 2021 (Fintech in ASEAN, 2021). The Fintech Ecosystem included following types of companies in 2021: companies of payments category – 237 companies (30%), alternative lending – 179 companies (23%), investment tech – 115 companies (15%), finance and accounting - 106 companies (14%), Cryptocurrencies category – 62 companies (8%), Banking Technology category – 38 companies (5%), InsureTech category – 26 companies (3%), RegTecs category – 14 companies (2%) and Blockchain in Financial Services – 8 companies (1%). The dominance of companies of the payments and loan types is explained by the large number of productive age population who are unbanked and underbanked. The number of Indonesian Fintech Companies is the second largest among the ASEAN countries where Singapore (1350 companies) dominates. Meanwhile, the use of Fintech is growing rapidly both in the payment system and in the areas of other products. Bank Indonesia noted that the value of electronic money (EU) transactions during 2021 grew up by 49.06% (reaching Rp305.4 trillion). The Financial Services Authority noted that the accumulation of new lending through Fintech P2P Lending reached Rp.295.85 trillion (an increase by 89.7%) in 2021.

Fintech start-ups force banks and other financial institutions to improve the quality of their business models by adopting IT innovations, improving service, restructuring and streamlining business models. The bank digital transformation carried out by adopting Fintech solutions have been went through cloud computing, AI, biometrics, and blockchain/DLT tests to improve business operations.

Landscape Fintech Payment in Indonesia

Fintech Payment is a digital financial service category that is dominantly used by the community. The adoption of digital payments in Indonesia shows gradual growth new Fintech ventures. The banks and MNOs introduced new business models and forms of digital payments, although the payment system still relies on cash in Indonesia. Fintech Payment products include: (a) Electronic Money; (b) Electronic Wallets; (c) Payment Gateways; (d) Paylater; (e) QRIS. E-money (80.2%) and Paylater (68.9%) products are the two most widely used product variants in 2021 (DailySocial, 2021). The growth of e-wallet usage in 2021 increased by 24% in comparison with the previous year, when 43% of digital transactions used e-wallet (Moses, 2021).

A lot of Fintech companies operating in the digital payment space are referred to the Payment Service Providers (PSPs). BI (Bank of Indonesia) requires PSP to have a license to operate in Indonesia. The PSP category is defined by BI as following (Peraturan BI Nomor 19/12/PBI/2017):

- E-Money, Issuer of e-money refers to a company that uses an electronic representation of cash that is issued

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by one party and received by one or many other parties.

- E-Wallet provider (e-wallet provider) – refers to the "carrier" of e-money and can tie up various sources of funds.
- Payment Gateway Operators. BI has licensed 11 payment gateway operators in Indonesia. The top organizers are Doku, Midtrans and Xendit.
- Merchant Acquirers. The top 4 banks own about 90% of the POS terminals. There are only a few active Fintech companies that are merchant acquirers, the biggest ones are: Cashlez, Moka and Pawoon. Quick Response, or QR, code is an emerging and new type of POS solution, which has attracted strong interest in Indonesia. Only a few Fintech companies are active in this field in Indonesia.

Landscape Fintech Lending in Indonesia

There are 103 registered and licensed Fintech Lending providers in Indonesia in 2022 due to the data of the Financial Services Authority (OJK) (OJK, 2022). The Indonesian Fintech Lending providers are grouped into 4 categories, namely: (a) Eduluon, focused on providing education fund loans (Danacita, Edufund, DanaBagus, Pintek, and Installment); (b) Cashloan/Paylater, providing cash loans online (there are 19 Fintech Lending from Findaya, Indodana, Julo to Kredivo); (c) Consumer P2P Lending, a lending group that brings together borrowers and lenders with the use of funds for consumer's needs (there are 27 Fintech Lending agents licensed by OJK such as Finmas, Adakami, EasyCash, 360Kredi to Danakini); and (d) P2P Lending Business, focusing its business on providing productive loan funds (there are 52 fintech lenders, including Amartha, Investree, KoinWorks, Danamas and others). The Consumer P2P Lending (13.9%), the Productive P2P Lending (13.4%) and Paylater (11.3%) are the Fintech lending categories that occupy the top positions in the use of Financial Lending technology applications (DailySocial.id, 2021). The ease of borrowing is the reason for using this application.

Through Fintech Lending, transactions between borrowers and lenders can occur without the need for a direct meeting. This practice facilitates the process of financial transactions to satisfy the financial needs of the society. In addition, the technology used by Fintech lending are available for people who are not connected to banking and this is the reason for the growing application of this technology. Data from the Cambridge Center for Alternative Finance (CCAF) (Le, et al., 2019) shows that 41% of Fintech Lending customers are underbanked and 21% are unbanked. CCAF also noted that 47% of users are individuals, and 38% of application users come from the MSME sector. Fintech Lending has great potential due to the large number of MSMEs and individuals in Indonesia.

Utilization of Digital Finance Technology in Overcoming the Informal MSME Financing Gap

The Indonesian MSMEs have a large financial gap. BI's Money Supply Analysis noted that loans to the MSME sector grew up by 12.3% to Rp1,147.3 trillion throughout 2021. Regulators continue to ask banks to increase the portion of lending to MSMEs up to 30%. Not all banks have the ability to disburse credit, but 30% of demand is to be covered by the banking industry, not individual banks. So, all banks must contribute to MSMEs credit provision, by setting a strategy and projected time for achieving MSME credit ratios in their business plans. Bank Indonesia has issued Regulation (Peraturan BI Nomor 23/13/PBI/2021) concerning Macroprudential Inclusive Financing Ratio (RPIM) for Conventional Commercial Banks, Sharia Commercial Banks and Sharia Business Units. BI requires from the banks to gradually increase the ratio of lending to the MSME sector (20% for 2022, 25% for 2023 and 30% for 2024). The sanctions for the banks those portfolio does not correspond to this requirements are in the form of a written warning or even a material fine (0.1 times the value of lending to MSMEs or a maximum fine of Rp. 5 billion). The development of financial inclusion for individuals and MSMEs in Indonesia, which is still at relatively low level, is an opportunity for Digital Fintech lending platforms to fill this gap.

The digital loan business model that caters to the unbanked, underbanked, and MSMEs is categorized into (1) partnerships between different companies (banks, MNOs and Startup Fintech) and (2) Startup Fintech platforms that facilitate lending. In the partnership area, three different business models form an alliance and each party performs a function in the cycle to provide loans.

Challenges and Opportunities for Fintech as Digital Financial Inclusion in Encouraging MSME Business Efficiency.

Challenge

Agents are a vital component in the distribution of digital financial products to the unbanked, underbanked and MSMEs in Indonesia. The Laku Pandai Program organized by OJK and the Digital Financial Services Report organized by Bank Indonesia are programs that support the pillars of the National Strategy for Inclusive Finance, related to products, intermediation and distribution channels, provides the branchless financial services. Laku Pandai and LKD utilize IT facilities such as cellular phones, electronic data capture and Internet banking that support financial services by the Bank through agents, to be able to reach people in remote areas and reduce financial transaction costs. In 2019,

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fintech companies reported that 6.2 million agents served cash deposits, transfers, bill payments, digital technology-based credit and other digital technology-based financial services. This amount is sufficient to serve the total population of Indonesia, but there is still an unbalanced distribution where there are many areas that do not have a sufficient number of agents so that services are still difficult to reach. In 2020, Bank Indonesia recorded the highest ratio of the number of LKD agents per 100,000 populations on Sulawesi Island as many as 365 agents, on Java Island - 313 agents, Bali and Nusa Tenggara – 285 agents, Sumatra Island - 278 agents and Maluku & Papua Island – 248 agents.

According to the OJK Survey, the 2019 Indonesian Financial Literacy Index reached 38.03% and the Financial Inclusion Index 76.19%. Only 38.03% of Indonesians have the knowledge, skills and confidence to understand financial products and services. Financial Literacy Index is knowledge, skills and beliefs that have an influence on attitudes to improve the quality of decision making and financial management in achieving prosperity. This low level of financial literacy is one of the most important demand-side challenges for financial inclusion in Indonesia. SNKI notes that there are various financial literacy programs, but many of them are not yet unrelated to the digital financial awareness, which is also an important obstacle to overcome. The lack of financial literacy among the unbanked and the poor has also been identified as an obstacle to further growth and expansion by Fintech companies.

Opportunities

Digitization for Microfinance Institutions and cooperatives is the real opportunity to scale up and reach more Informal and Formal MSMEs. MFIs and cooperatives have played an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations have not leveraged digital technologies which hinders the growth, scale and scope of product offerings unless the agents have a large number of resources available. Technology is a key driver for financial inclusion, and the digitization of MFIs and cooperatives is an opportunity for these organizations to leverage their customer base and outreach to rural areas and low-income clients. Digital solutions help financial institutions deepen customer engagement and product use, promote and improve finance.

The Ministry of Communications and Informatics is also working to increase fixed broadband penetration up to 30% (30 million household fixed broadband connections) in 2024 through a regulatory facilitation program to address the reasonableness of land rental fees and the right of way (RoW) for the deployment of telecommunications infrastructure with the Ministry of Communications and Informatics. Relevant Central and Regional Institutions provide assistance in Internet services for MSMEs and Public Facilities, which is targeted to 1500 MSMEs and Fasum for 2022, and until 2024 it should reach 7000 MSMEs and Fasum spread across several parts of Indonesia.

Recommendations

The use of digital technology is an effective way to conduct financial literacy programs, and Fintech companies can play a role in educating customers through innovative business models. Government programs to promote financial literacy should explore the use of innovative technologies. Technology offers exciting opportunities to communicate with more people regardless of time and place. Indonesia's Fintech P2P lending platform should increase the quantity and quality of education programs for customers, provide training them on understanding savings and how to manage finances best way. Indonesian fintech that uses artificial intelligence (AI) also needs to help its customers manage their personal finances and develop investment strategies according to their financial capabilities. Fintech needs to focus on providing financial literacy for the poor and unbanked market agents, it is important to design the financial products that are relevant, targeted, and easy to use and understand. Alternative financial literacy programs offered by Fintech companies can complement the OJK and BI programs.

Two important components are needed for a digital lending platform to provide loans in Indonesia, namely KYC/identity and a credit risk assessment mechanism. As part of the loan application process, each financial institution must conduct a Know Your Customer (KYC) check, which consists of a number of customer identity checks that precede the decision to approve a new customer and initiate the on-boarding process. While this requirement may be easy for customers in developed countries, it is a significant barrier for the poor in developing countries. Currently, Indonesia has a national ID system that covers 96% of the population aged 17 years and over, and an estimated 92% of the entire population is in the national population database. To evaluate a borrower's credit risk, Fintech platforms use their own alternative credit scoring model and supplement it with data from established credit bureaus in the country. In an environment where unbanked persons have no credit history and have never accessed formal financial products and services, the use of alternative credit scoring mechanisms becomes essential to assess these individuals' credit risk and provide them with access to loans.

The government is intensively ensuring the availability of internet services for the population and business, both in urban and rural areas. Digital infrastructure development must be carried out

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comprehensively in the context of digital transformation. The government, in this case the Ministry of Communication and Informatics, has realized that there are various challenges in providing broadband services, therefore collaboration is needed with Telecommunications Operators, relevant Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase broadband service subscriber penetration so that it is expected to encourage the realization of digital transformation to increase Indonesia's economic growth. The collaboration that is needed is not only in the form of facilitating the ease of doing business for telecommunications operators, it also requires certainty for the telecommunications operators to cooperate with other business actors in the framework of cooperation in the use of passive facilities and infrastructure. Investment cost efficiency for business actors can be realized in a mutually beneficial, transparent and non-discriminatory cooperation scheme to get equal opportunities and compete fairly for access to infrastructure. The role and collaboration of Ministries/Agencies at the central and regional levels need to be strengthened because each economic sector supported by these Ministries/Agencies has the same interest, namely realizing digital-based sector activities, which of course can only be realized through the provision of reliable telecommunications infrastructure. and continuous adoption of advanced technology. The business world and the community really need it, so that they can overcome access gaps, especially in access to financial services, that will contribute to the financial inclusion and overcoming the economic inequality among the various levels of society.

CONCLUSION

Indonesia's digital financial ecosystem is based on the dynamic fintech landscape. The low-touch concept offered by Fintech contributed to the development of digital economy. Fintech startups, banks and major technology companies in Indonesia have offered Fintech solutions to individuals and MSMEs, covering many aspects of the financial services sector. Fintech startups are one of the most important players in the Fintech ecosystem. Fintech Payment as a digital financial service is widely used by the communities. The adoption of digital payments in Indonesia shows gradual growth as new Fintech ventures, banks and MNOs, introduction and high speed spread of new business models and forms of digital payments. Fintech lending is another dominant digital financial service category where the ease of borrowing is the reason for using the such application. The use of digital finance technology can overcome the financing gap for the informal MSMEs, especially for countries like Indonesia with a large financial gap for MSME. Formal financial inclusion for individuals and MSMEs in Indonesia is still relatively low, Digital Fintech lending platforms gives the opportunity to fill in this gap. There are observed the growth of numbers of MSMEs that use its services, increasing variety of products to meet MSME needs and requirements.

The informal MSMEs are an important focus area for P2P business lending platforms in Indonesia. The challenges of Fintech as Digital Financial Inclusion in encouraging MSME business efficiency include: (i) there are relatively enough LP and LKD agents for branchless financial services by utilizing ICT but they have not yet distributed in a balanced manner throughout Indonesia; (ii) the weaknesses of data security and access to the SIAK database, in implementing e-KYC and e-signature of prospective fintech customers; (iii) the digital financial literacy index is still low, so that fintech expansion is constrained; (iv) low connectivity of smartphones and internet penetration in rural areas; (v) interoperability between electronic money issuers (banks), telecommunications and Fintech companies is still weak, so that the adoption of fintech customers is low. While the opportunities for fintech as digital financial inclusion include: (i) MFIs and cooperatives play an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations are not yet leveraging digital which slows the growth, scale and scope of product offerings; (ii) the construction of fiber optic cable, terrestrial radio microwave link network to support the fiber optic cable backbone network, satellite network, customer service network (end user) through BTS/Node-B/gNode-B cellular, Optical Distribution Points (ODP) for Fiber to Home (FTH) Wifi and LAN access, and increasing the penetration of the number of household fixed broadband connections, targeting 12458 villages have to be served. Potential policies for the telecommunications sector and other fields related to fintech include: (i) Fintech needs to focus on providing financial literacy to the public so that it can complement the OJK and BI programs; (ii) Fintech companies can develop their own credit risk mechanisms using non-traditional data and procedures, in order to target previously untapped markets; (iii) development of digital infrastructure must be carried out comprehensively and successively at the first mile, middle mile and last mile network layers in the context of digital transformation. The Ministry of Communication and Informatics collaborates with Telecommunications Operators, related Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase penetration of broadband service subscribers. The collaboration is needed not only in the form of facilitating the ease of doing business for telecommunications operators, it also requires certainty

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for telecommunications operators to cooperate with other business actors to use the necessary facilities and infrastructure.

We express our deepest gratitude to i) the Direktorat Jenderal Pendidikan Tinggi, Riset dan Teknologi Kemdikbud Ristek; ii) the LPDP Kemenkeu RI; iii) the Director of Telecommunications Kemkominfo RI; iv) Analysts of the OJK Fintech Licensing and Supervision Directorate, and v) the Head of Cibogo Hilir Village Plered Purwakarta, for their support during the research process.

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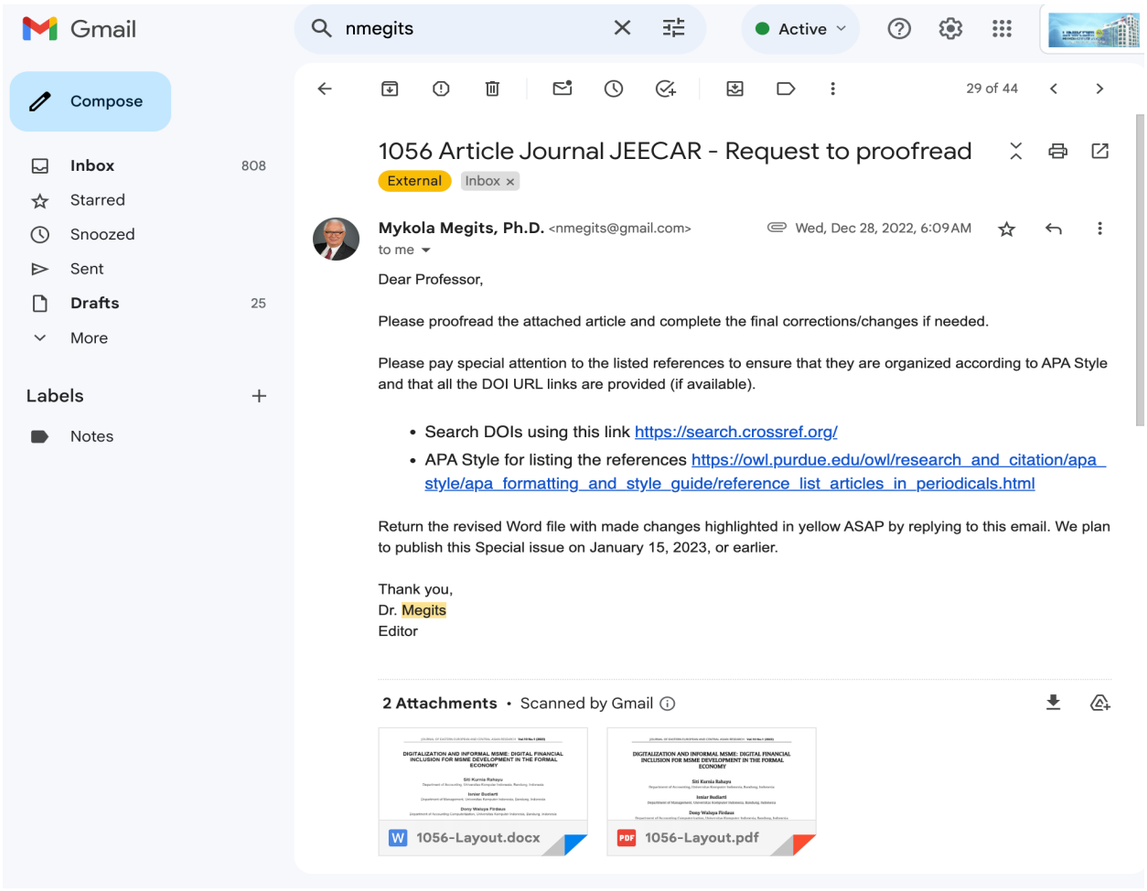

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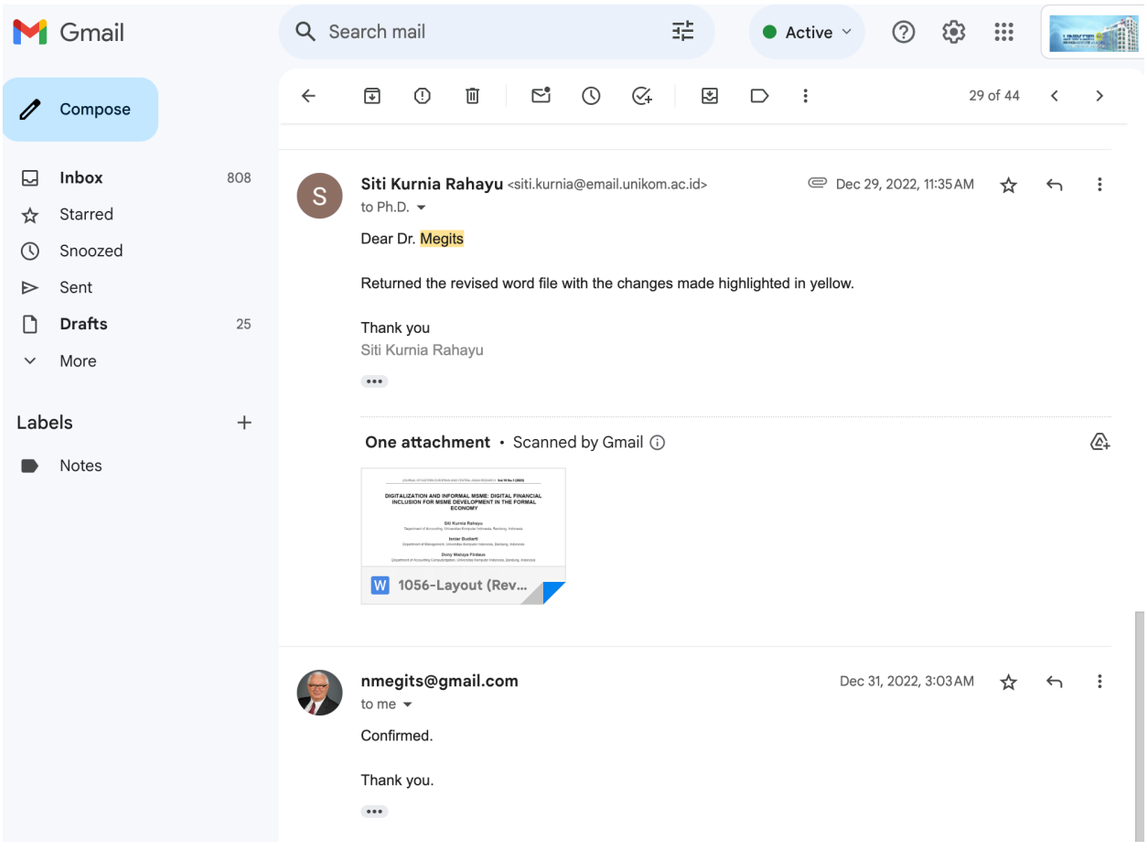

DIGITALIZATION AND INFORMAL MSME: DIGITAL FINANCIAL INCLUSION FOR MSME DEVELOPMENT IN THE FORMAL ECONOMY

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ABSTRACT

This study examines digital financial inclusion and uses Fintech for informal micro small and medium enterprises (MSMEs) to overcome the financing gap. The researchers used primarily qualitative methods, namely a qualitative analysis strategy verification through inductive analysis. The results show that Indonesia's fintech landscape makes MSME a driver of the digital economy so that they can overcome the financing gap in the informal sector. The challenges faced by Fintech in encouraging MSME business efficiency in the form of unbalanced agency distribution, data security, data access problems, low digital financial literacy, low connectivity, and interoperability can be overcome by taking advantage of existing opportunities. These opportunities include the role of MFIs and cooperatives in promoting financial inclusion and the development of telecommunications infrastructure networks in Indonesia. The novelty of this research is the comprehensive evaluation of achieved progress in digital financial inclusion for MSMEs in Indonesia and the developed recommendation for regulations by relevant authorities to encourage the business efficiency of MSMEs through facilitating digital financial inclusion.

Keywords: digitalization; financial inclusion; micro small and midium enterprises (MSMEs); innovation; loans

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INTRODUCTION

The micro small and middle entrepreneurship sector is the primary driver of the Indonesian economy, contributing more than 50% of the GDP. MSMEs provided 96.99% of employment opportunities, contributed to the supply of foreign exchange in the form of export revenues of 15% of total exports, and 97.02% of workers were absorbed in this sector (Kementerian Koordinator Bidang Perekonomian Republik Indonesia, 2021). MSMEs tend to adapt more easily to unstable economic conditions than large companies (Dalitso & Peter, 2000). But MSME productivity growth needs to be supported by reliable access to credit. Financing is the main challenge for MSMEs in business planning, maintaining the business, and developing the business.

Informal MSMEs are micro-enterprises that do not have a legal entity, the form of business is very small, and the goods sold are always changing. In addition, it is difficult to get assistance from banks because MSMEs do not have systematic financial administration. Informal MSMEs generally have total assets less than

Rp. 50 million, with an average sales turnover of under Rp. 300 million/year, and the number of employees does not exceed four people.

Informal MSMEs come from vulnerable groups and are underserved by a large potential gap in financing applications. MSME financing is generally still at the development stage, where the main funds come from personal funds. Access of MSMEs to loans at formal financial institutions is still limited. This financial gap is an obstacle to the development of MSMEs. The financing gap occurs due to information asymmetry and/or weak creditor protection. Another factor that causes this financing gap is the high cost of reaching and serving MSMEs compared to the potential income earned by banks and financial institutions from MSMEs. The limited availability of appropriate financial products and the lack of collateral are obstacles for MSMEs in obtaining financing. Another obstacle for MSMEs is an economic activity that generally does not have a permanent organization, a physical place of business, and employees with irregular work periods. Formally, banks are regulated not to serve entities that are not legally registered, do not have the necessary documents for identification/verification, or are unable to provide reliable information. One way that financing can be given to MSMEs that are not creditworthy without causing losses is subsidized loans. Digital financing services have transformed the traditional loan process by automating the task of underwriting and lending services, making it significantly cheaper, faster, and easier to provide financing to MSMEs. Using alternative data on digital funding helps eliminate information asymmetry; thus, creating new credit products and digital payments can help informalbusinesses build credit histories, potentially opening the door to formal financing. The adoption of mobile applications makes it easier for informal businesses to obtain digital financial services.

Many studies related to using digital financing for MSMEs can affect financial stability so that MSMEs continue to operate sustainably (Yulvan et al., 2021). When financial products are accessible to the public, financial inclusion is high; adequate capital provision supports MSME business operations. Digital financing service products are an alternative to overcome the restrictions on access to formal financial institutions, lack of knowledge, and the complexity of financial institution products (Nugroho & Purwanti, 2018). Capri's research (Capri, 2019) concludes that many MSMEs still use digital technology poorly to obtain financials. This is the biggest challenge in getting financial support, in addition to the lack of trust and information for MSMEs in obtaining information on where and how to get financial support. funds (Mehrotra, 2015). In addition, most small and middle-size firms lack assistance from government agencies, NGOs, and private businesses to improve their internet infrastructure, e-commerce, and digital business activities. Mobile applications are the main technology platform used for many company operations (Mehrotra, 2015).

According to the results of Mehrotra's research (Mehrotra, 2015), the volume of MSME credit is considered very small compared to its contribution to GDP, where the number of loans received by MSMEs is disproportionately smaller than corporations even though MSMEs' contribution is more significant to GDP and employment. Less than 60% of SMEs use bank loans as a means of financing. Personal funds continue to be their dominant source of financing (Mehrotra, 2015). Most MSMEs in developing countries state that access to finance is the most binding, so MSME financing programs will be an important channel to achieve growth and create more jobs (Kumar, 2017).

Digital financial inclusion for MSMEs can increase user traffic, and potential borrowers with risk profiles will obtain financing according to measurable targets, which will provide benefits and create a healthy digital economy ecosystem. Through digital financing, MSMEs will get broad access to loans, and Informal MSMEs can open up opportunities for their development.

This study aims to examine the digital financial inclusion ecosystem and the use of digital finance technology in overcoming the financing gap for Informal MSMEs in Indonesia. This study discovers the challenges and opportunities of Digital Financial Inclusion in encouraging MSME businesses. It ends with a series of studies on the potential policies of the telecommunications sector and other fields related to Fintech. The study was conducted utilizing qualitative methods; a qualitative analysis strategy-verification and inductive analysis were applied. The urgency of research is important to provide solutions to the development of MSMEs as well as the fintech business, its products and business models, and the regulatory and policy frameworks to expand MSMEs access for the digital financing services.

LITERATURE REVIEW

The digital financial inclusion is essential for the creation of the healthy digital economy ecosystem. These system increases the financial opportunities for the informal MSMEs development.

Financial inclusion contributes to the financial stability under implementation of risk management technologies and strong financial supervision. The financial inclusion increases the level of accessibility of MSMEs to financial products. Blancher (2019) proves that extending credit to MSMEs can contribute to financial stability because it allows banks to diversify their credit portfolios and better risk exposure.

Many studies related to the digital financing MSMEs show the effect of financial stability so that MSMEs

continue to operate in a sustainable manner (Yulfan et al., 2021; Le et al., 2019). When financial products are accessible to the public, financial inclusion shows a high level of accessibility.

But only mobile applications are the main technology platform used by MSMEs (Capri, 2019).

Based on research conducted by Baranauskas & Raišienė, 2021; Kurniati & Suryanto, 2022; Valiyev et al., 2022, digitization is the processing of data into information for both organizations and other end users so that services can be answered quickly and effectively.

Entrepreneurs have turned to digital technology to maintain and develop their businesses and to design and implement strategies in the face of competition in a digital era. (Rusdana et al., 2022; Soegoto et al., 2021).

MSME access to finance focuses on developing appropriate monitoring and evaluation systems to report whether the intervention has the desired effect. Based on the specific financing constraints of MSMEs, the startups' growth can demonstrate better results. It is crucial to provide training and capacity building for MSME managers. Systemic interventions aimed to improve the financial sector operation through policy and regulatory reforms are necessary for success (Kumar, 2017).

The experts of the OECD (2022) stressed the importance of financial inclusion for SMEs under conditions of significant economic shocks (for example, a pandemic) because the SMEs were at the center of the crises impact. Their research has demonstrated the importance of support measures of financial accessibility to all SMEs operation and the reduction of bankruptcies declining.

METHOD

There are to the research questions objectively, validly, and effectively. It is developed in e-research design and is prepared to obtain a comprehensive answer scheme with a research program. Qualitative research is used to get a complete picture of financial inclusion through the digital finance use by MSMEs in the informal economy from the point of view of financial authorities, developers of digital financing services, financial institutions, telecommunications authorities, and MSME representatives. The research program is designed to provide an understanding of issues through direct interaction involving researchers with digital financing service developers, financial institutions and MSME representatives, and the study of related documents.

The sources of data for this research includes: a) the Director of Telecommunications Kemkominfo, b) the analyst of Directorate of Fintech Licensing and Supervision OJK, c) the Head of Bumdes Cibogo Hilir Plered. Determination of data sources in this study was carried out purposively, by taking into account the problem and research objectives, the professional knowledge of informants.

Research data collection includes making report, selecting informants and recording the results of data collection, their analysis and summarizing. Data collection was carried out from December 2021 to April 2022. Data collection techniques were apllyed by the Forum Group Discussion (FGD) and document review. The Forum Group Discussion (FGD) was held in a structured manner in the formulation of research achievement indicators and research achievement targets. The frequency of holding FGDs was at least 3 times during the research process. The documents review was carried out by digging up information through facts stored in regulations and journals.

The researchers used the technique of testing the validity of the triangulation data, namely (i) the triangulation method to compare information and to avoid the errors in data collection; (ii) theory of triangulation to compare information with relevant theoretical perspectives.

The researcher also uses a qualitative analysis-verification strategy by conducting inductive analysis, which is an approach for the general conclusions making on the base of real facts. This inductive analysis was carried out throughout the study, with the aim of simplifying the data. The procedures of analyzing the obtained data include (i) the performance of data reduction, by selecting data relevant to the research, and focusing attention on the main research problem; (ii) Presentation of summary data in descriptive form; and (iii) Conclusions making to provide problem solving solutions.

The problem identification technique was based on the DMAIC method (Define, Measure, Analyze, Improve, Control). Define is an activity to identify problems that arise. The data was used as input to determine the cause of the problem. Measure is an activity of grouping data that has been obtained and then processed according to existing variables. Analyze means a data analysis activity using the problem tree method (problem tree). The problem tree helps to find solutions by mapping the anatomy of the causes and effects of the problem (structured mind map). The problem tree analysis was done by structuring the causal components related to the issues prioritized. Improve is an activity focusing on the causes of the problems and their changes. At this stage, developed proposals are given to parties related to the research problem. Control is an activity to maintain the defined condition of goal achievement.

RESULTS AND DISCUSSION

Indonesia's Digital Financial Inclusion Ecosystem. Overview of Financial Inclusion in Indonesia

As one of the important parts of financial services, Indonesia's banking credit distribution showed an increase of banking credit by 5.2% in 2021, exceeding the projection of 4% - 5%. An improvement followed this growth in the bad loans (NPL) ratio, 3% in 2021 and 3.06% - in 2020). Likewise, the growth of stock market capitalization as an alternative source of financing in 2021 reached 49.65% of GDP, which is higher than 45% in 2020. Indonesia's financial services sector has been growing, supplemented by the development of new financial products such as Crowdfunding, making it easier for MSME actors to access business capital. It reached Rp. 412 billion in 2021.

The uptake of credit from traditional sources is another essential issue for MSMEs in Indonesia related to financial inclusion that needs to be addressed. There are 65 million MSMEs, or 99.9% of the total business actors in Indonesia, which contribute 97% to the employment (120 million workers) and 60.51% or Rp. 8,573 trillion to GDP (bkpm.go.id). 60.2% of MSMEs have the capital for the maximum three months term (Reza Pahlevi, 2022). On the other hand, in 2020, financing of Microfinance Institutions reached Rp749.42 billion, an increase of 21.68% compared to the previous year (Vika Azkia Dihni, 2021). Meanwhile, MSME loans in QI/2022 have reached more than IDR 1,171.8 trillion (Pip Kemenkeu, 2022). Loans for the productive sector reached 47.26% (Rp. 54.71 T) in 2021.

Importance of IT Innovation for Financial Inclusion in Indonesia

The use of IT innovation and blockchain (DLT) in financial services is a technological innovation that provides convenience, efficiency, and broad access to financial products from anywhere and anytime, potentially increasing financial inclusion. Fintech helps old companies and new companies that do not have bank accounts to receive financial services economically. Fintech as a financial service is delivered through digital infrastructure, including cellular phones and the Internet, that connects individuals and businesses to digital payment infrastructure so creating possibilities of unlimited transactions (McKinsey & Co, 2016).

Most of the Fintech services are offered by startups. The IT innovation caused the significant growth of Fintech companies and the share of MSMEs of in the financial services market (Bosnia, 2020). Fintech companies take advantage of IT products and capabilities such as cloud computing to quickly develop digital products and make Fintech companies focus on valuable businesses.

Fintech Ecosystem in Indonesia

The Fintech in Indonesia is the dynamic, rapidly changing financial services sector. The growth rate of Indonesian FinTech companies during 2017-2021 is 49%, there were 440 companies in 2017, their amount reached785 companies in 2021 (Fintech in ASEAN, 2021). The Fintech Ecosystem included following types of companies in 2021: companies of payments category – 237 companies (30%), alternative lending – 179 companies (23%), investment tech – 115 companies (15%), finance and accounting - 106 companies (14%), Cryptocurrencies category – 62 companies (8%), Banking Technology category – 38 companies (5%), InsureTech category – 26 companies (3%), RegTecs category – 14 companies (2%) and Blockchain in Financial Services – 8 companies (1%). The dominance of companies of the payments and loan types is explained by the large number of productive age population who are unbanked and underbanked. The number of Indonesian Fintech Companies is the second largest among the ASEAN countries where Singapore (1350 companies) dominates. Meanwhile, the use of Fintech is growing rapidly both in the payment system and in the areas of other products. Bank Indonesia noted that the value of electronic money (EU) transactions during 2021 grew up by 49.06% (reaching Rp305.4 trillion). The Financial Services Authority noted that the accumulation of new lending through Fintech P2P Lending reached Rp.295.85 trillion (an increase of 89.7%)in 2021.

Fintech startups force banks and other financial institutions to improve the quality of their business models by adopting IT innovations, improving service, and restructuring and streamlining business models. The bank's digital transformation carried out by adopting Fintech solutions has been going through cloud computing, AI, biometrics, and blockchain/DLT tests to improve business operations.

Landscape Fintech Payment in Indonesia

Fintech Payment is a digital financial service category that is dominantly used by the community. The adoption of digital payments in Indonesia shows gradual growth in new Fintech ventures. The banks and MNOs introduced new business models and forms of digital payments, although the payment system still relies on cash in Indonesia. Fintech Payment products include (a) Electronic Money; (b) Electronic Wallets; (c) Payment Gateways; (d) Paylater; (e) QRIS. E-money (80.2%) and Paylater (68.9%) products are the two most widely used product variants in 2021 (DailySocial, 2021). The growth of e-wallet usage in 2021 increased by 24% in comparison with the previous year, when 43% of digital transactions used e-wallets (Moses, 2021).

A lot of Fintech companies operating in the digital payment space are referred to the Payment Service Providers (PSPs). BI (Bank of Indonesia) requires PSP to have a license to operate in Indonesia. The PSP category is defined by BI as follows (Peraturan BI Nomor 19/12/PBI/2017):

- E-Money, Issuer of e-money, refers to a company that uses an electronic representation of cash that is issued by one party and received by one or many other parties.
- E-Wallet provider (e-wallet provider) – refers to the "carrier" of e-money and can tie up various sources of funds.
- Payment Gateway Operators. BI has licensed 11 payment gateway operators in Indonesia. The top organizers are Doku, Midtrans and Xendit.
- Merchant Acquirers. The top 4 banks own about 90% of the POS terminals. There are only a few active Fintech companies that are merchant acquirers, the biggest ones are: Cashlez, Moka and Pawoon. Quick Response, or QR, code is an emerging and new type of POS solution, which has attracted strong interest in Indonesia. Only a few Fintech companies are active in this field in Indonesia.

Landscape Fintech Lending in Indonesia

There are 103 registered and licensed Fintech Lending providers in Indonesia in 2022 due to the data of the Financial Services Authority (OJK) (OJK, 2022). The Indonesian Fintech Lending providers are grouped into 4 categories, namely: (a) Eduluon, focused on providing education fund loans (Danacita, Edufund, DanaBagus, Pintek, and Installment); (b) Cashloan/Paylater, providing cash loans online (there are 19 Fintech Lending from Findaya, Indodana, Julo to Kredivo); (c) Consumer P2P Lending, a lending group that brings together borrowers and lenders with the use of funds for consumer's needs (there are 27 Fintech Lending agents licensed by OJK such as Finmas, Adakami, EasyCash, 360Kredi to Danakini); and (d) P2P Lending Business, focusing its business on providing productive loan funds (there are 52 fintech lenders, including Amartha, Investree, KoinWorks, Danamas and others). The Consumer P2P Lending (13.9%), the Productive P2P Lending (13.4%) and Paylater (11.3%) are the Fintech lending categories that occupy the top positions in the use of Financial Lending technology applications (DailySocial.id, 2021). The ease of borrowing is the reason for using this application.

Through Fintech Lending, transactions between borrowers and lenders can occur without the need for a direct meeting. This practice facilitates the process of financial transactions to satisfy the financial needs of the society. In addition, the technology used by Fintech lending are available for people who are not connected to banking and this is the reason for the growing application of this technology. Data from the Cambridge Center for Alternative Finance (CCAF) (Le et al., 2019) shows that 41% of Fintech Lending customers are underbanked, and 21% are unbanked. CCAF also noted that 47% of users are individuals, and 38% of application users come from the MSME sector. Fintech Lending has excellent potential due to many MSMEs and individuals in Indonesia.

Utilization of Digital Finance Technology in Overcoming the Informal MSME Financing Gap

Indonesian MSMEs have a large financial gap. BI's Money Supply Analysis noted that loans to the MSME sector grew up by 12.3% to Rp1,147.3 trillion throughout 2021. Regulators continue to ask banks to increase the portion of lending to MSMEs up to 30%. Not all banks can disburse credit, but 30% of demand is to be covered by the banking industry, not individual banks. So, all banks must contribute to MSMEs' credit provision by setting a strategy and projected time for achieving MSME credit ratios in their business plans. Bank Indonesia has issued a Regulation (Peraturan BI Nomor 23/13/PBI/2021) concerning Macroprudential Inclusive Financing Ratio (RPIM) for Conventional Commercial Banks, Sharia Commercial Banks, and Sharia Business Units. BI requires the banks to gradually increase the ratio of lending to the MSME sector (20% for 2022, 25% for 2023, and 30% for 2024). The sanctions for the banks those portfolio does not correspond to these requirements are in the form of a written warning or even a material fine (0.1 times the value of lending to MSMEs or a maximum penalty of Rp. 5 billion). The development of financial inclusion for individuals and MSMEs in Indonesia, which is still at a relatively low level, is an opportunity for Digital Fintech lending platforms to fill this gap.

The digital loan business model that caters to the unbanked, underbanked, and MSMEs is categorized into (1) partnerships between different companies (banks, MNOs and Startup Fintech) and (2) Startup Fintech platforms that facilitate lending. Three different business models form an alliance in the partnership area, and each party performs a function in the cycle to provide loans.

Challenges and Opportunities for Fintech as Digital Financial Inclusion in Encouraging MSME Business Efficiency.

Challenge

Agents are vital in distributing digital financial products to Indonesia's unbanked, underbanked, and MSMEs. The Laku Pandai Program, organized by OJK, and the Digital Financial Services Report, organized by Bank Indonesia, are programs that support the pillars of the National Strategy for Inclusive Finance, related to products, intermediation, and distribution channels, provide the branchless financial services. Laku Pandai and LKD utilize IT facilities such as cellular phones, electronic data capture, and Internet banking that support bank financial services through agents to reach people in remote areas and reduce financial transaction

costs. In 2019, fintech companies reported that 6.2 million agents served cash deposits, transfers, bill payments, digital technology-based credit and other digital technology-based financial services. This amount is sufficient to serve the total population of Indonesia, but there is still an unbalanced distribution where there are many areas that do not have a sufficient number of agents so that services are still difficult to reach. In 2020, Bank Indonesia recorded the highest ratio of the number of LKD agents per 100,000 populations on Sulawesi Island as many as 365 agents, on Java Island - 313 agents, Bali and Nusa Tenggara – 285 agents, Sumatra Island - 278 agents and Maluku & Papua Island – 248 agents.

According to the OJK Survey, the 2019 Indonesian Financial Literacy Index reached 38.03% and the Financial Inclusion Index 76.19%. Only 38.03% of Indonesians have the knowledge, skills and confidence to understand financial products and services. Financial Literacy Index is knowledge, skills and beliefs that have an influence on attitudes to improve the quality of decision making and financial management in achieving prosperity. This low level of financial literacy is one of the most important demand-side challenges for financial inclusion in Indonesia. SNKI notes that there are various financial literacy programs, but many of them are not yet unrelated to the digital financial awareness, which is also an important obstacle to overcome. The lack of financial literacy among the unbanked and the poor has also been identified as an obstacle to further growth and expansion by Fintech companies.

Opportunities

Digitization for Microfinance Institutions and cooperatives is the real opportunity to scale up and reach more informal and formal MSMEs. MFIs and cooperatives have played an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations have not leveraged digital technologies, which hinders the growth, scale, and scope of product offerings unless the agents have many resources available. Technology is a crucial driver for financial inclusion, and the digitization of MFIs and cooperatives is an opportunity for these organizations to leverage their customer base and outreach to rural areas and low-income clients. Digital solutions help financial institutions deepen customer engagement and product use and promote and improve finance.

The Ministry of Communications and Informatics is also working to increase fixed broadband penetration up to 30% (30 million household fixed broadband connections) in 2024 through a regulatory facilitation program to address the reasonableness of land rental fees and the right of way (RoW) for the deployment of telecommunications infrastructure with the Ministry of Communications and Informatics. Relevant central and regional institutions provide assistance in internet services for MSMEs and Public Facilities, which is targeted to 1,500 MSMEs and Fasum for 2022, and by 2024 it should reach 7,000 MSMEs and Fasum spread across several parts of Indonesia.

Recommendations

The use of digital technology is an effective way to conduct financial literacy programs, and Fintech companies can play a role in educating customers through innovative business models. Government programs to promote financial literacy should explore the use of innovative technologies. Technology offers exciting opportunities to communicate with more people regardless of time and place. Indonesia's Fintech P2P lending platform should increase the quantity and quality of education programs for customers, training them on understanding savings and managing finances best. Indonesian Fintech, which uses artificial intelligence (AI), also needs to help its customers manage their finances and develop investment strategies according to their financial capabilities. Fintech needs to focus on providing financial literacy for the poor and unbanked market agents. It is essential to design financial products that are relevant, targeted, and easy to use and understand. Alternative financial literacy programs offered by Fintech companies can complement the OJK and BI programs.

Two important components are needed for a digital lending platform to provide loans in Indonesia, namely KYC/identity and a credit risk assessment mechanism. As part of the loan application process, each financial institution must conduct a Know Your Customer (KYC) check, which consists of a number of customer identity checks that precede the decision to approve a new customer and initiate the on-boarding process. While this requirement may be easy for customers in developed countries, it is a significant barrier for the poor in developing countries. Currently, Indonesia has a national ID system that covers 96% of the population aged 17 years and over, and an estimated 92% of the entire population is in the national population database. To evaluate a borrower's credit risk, Fintech platforms use their own alternative credit scoring model and supplement it with data from established credit bureaus in the country. In an environment where unbanked persons have no credit history and have never accessed formal financial products and services, the use of alternative credit scoring mechanisms becomes essential to assess these individuals' credit risk and provide them with access to loans.

The government is intensively ensuring the availability of internet services for the population and business, both in urban and rural areas. Digital infrastructure development must be carried out comprehensively in the context of digital transformation. The government, in this case the

Ministry of Communication and Informatics, has realized that there are various challenges in providing broadband services, therefore collaboration is needed with Telecommunications Operators, relevant Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase broadband service subscriber penetration so that it is expected to encourage the realization of digital transformation to increase Indonesia's economic growth. The collaboration that is needed is not only in the form of facilitating the ease of doing business for telecommunications operators. It also requires certainty for the telecommunications operators to cooperate with other business actors using passive facilities and infrastructure in the cooperative framework. Investment cost efficiency for business actors can be realized in a mutually beneficial, transparent, and non-discriminatory cooperation scheme to get equal opportunities and compete fairly for access to infrastructure. The collaboration of ministries and agencies at the central and regional levels needs to be strengthened. Each economic sector supported by them has the same interest, namely realizing digital-based sector activities, which can only be discovered through reliable telecommunications infrastructure and continuous adoption of advanced technology. The business world and the community need it to overcome access gaps, especially in access to financial services, that will contribute to financial inclusion and overcome the economic inequality among the various levels of society.

CONCLUSION

Indonesia's digital financial ecosystem is based on the dynamic fintech landscape. The low-touch concept offered by Fintech contributed to developing a digital economy. Fintech startups, banks, and major technology companies in Indonesia have offered Fintech solutions to individuals and MSMEs, covering many aspects of the financial services sector. Fintech startups are one of the most critical players in the Fintech ecosystem. The communities widely use Fintech Payment as a digital financial service. The adoption of digital payments in Indonesia shows gradual growth as new Fintech ventures, banks, and MNOs, introduction, and high-speed spread of new business models and forms of digital payments. Fintech lending is another dominant digital financial service category where the ease of borrowing is the reason for using such an application. The use of digital finance technology can overcome the financing gap for informal MSMEs, especially for countries like Indonesia, with a sizeable financial gap for MSMEs. Formal financial inclusion for individuals and MSMEs in Indonesia is still relatively low. Digital Fintech lending platforms allow for filling in this gap. The growth of the number of MSMEs that use its services is observed, increasing the variety of products to meet MSME needs and requirements.

Informal MSMEs are an important focus area for P2P business lending platforms in Indonesia. The challenges of Fintech as Digital Financial Inclusion in encouraging MSME business efficiency include: (i) there are relatively enough LP and LKD agents for branchless financial services by utilizing ICT, but they have not yet been distributed in a balanced manner throughout Indonesia; (ii) the weaknesses of data security and access to the SIAK database, in implementing e-KYC and e-signature of prospective fintech customers; (iii) the digital financial literacy index is still low so that fintech expansion is constrained; (iv) low connectivity of smartphones and internet penetration in rural areas; (v) interoperability between electronic money issuers (banks), telecommunications and Fintech companies is still weak so that the adoption of fintech customers is low. While the opportunities for Fintech as digital financial inclusion include: (i) MFIs and cooperatives play an important role in driving financial inclusion for the poor and micro-enterprises in rural areas. However, most of these organizations are not yet leveraging digital, which slows the growth, scale and scope of product offerings; (ii) the construction of fiber optic cable, terrestrial radio microwave link network to support the fiber optic cable backbone network, satellite network, customer service network (end user) through BTS/Node-B/gNode-B cellular, Optical Distribution Points (ODP) for Fiber to Home (FTH) Wifi and LAN access, and increasing the penetration of the number of household fixed broadband connections, targeting 12458 villages have to be served. Potential policies for the telecommunications sector and other fields related to Fintech include: (i) Fintech needs to focus on providing financial literacy to the public so that it can complement the OJK and BI programs; (ii) Fintech companies can develop their own credit risk mechanisms using non-traditional data and procedures, in order to target previously untapped markets; (iii) development of digital infrastructure must be carried out comprehensively and successively at the first mile, middle mile and last mile network layers in the context of digital transformation. The Ministry of Communication and Informatics collaborates with Telecommunications Operators, related Ministries/Institutions, and Local Governments to accelerate the expansion of service area coverage and increase the penetration of broadband service subscribers. The collaboration is needed not only in the form of facilitating the ease of doing business for telecommunications operators, it also requires certainty for telecommunications operators to cooperate with other business actors to use the necessary facilities and infrastructure.

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