

# How Fintech Peer to Peer Lending Affected MSMEs Financial Access: Case Study Amartha

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## ABSTRACT

The recent emergence of financial technology (FinTech) is believed to be able to solve SME problems related to access to capital sources. One of the popular fintech business models is the online lending platform (Peer to Peer Lending) which is growing rapidly in Indonesia. This research will focus on one of the Peer to Peer lenders registered in Indonesia which has helped MSMEs in rural areas, namely PT Amartha Mikro Fintek (amartha.com). This study will reveal how P2P lending empowers MSMEs to support their business. This research will use descriptive qualitative with a case study approach. The research results show that P2P lending is an integral part of the Indonesian financial system and increases MSME inclusion. PT Amartha Mikro Fintek's micro loan model expands access. However, long-term sustainability depends on wise regulation and governance to ensure consumer protection as well as innovation.

## 1. INTRODUCTION

The advancement of technology today leads to the improvement of digital financial services development. Rapid advances in digital technology are changing the economic and financial landscape (Gispert & Chatain, 2023; Rohma & Zakiyah, 2022). At least, there are three drastic changes caused by the rapid development of digital-based technological innovation. First, the digital revolution has changed the transaction behavior of economic agents. Second, the rapidly developing digitalization process has fundamentally changed activities in various fields. Third, data as "the new oil" is key in integrating the digital economy and finance (Bank Indonesia, 2019). The presence of financial technology (fintech) is a concrete manifestation of digital-based technological advances. Fintech utilizes technology in finance with the goal of making financial products and transactions more accessible and improving financial literacy (Ozili, 2018). In Indonesia, fintech companies are mostly startups in areas like crowdfunding, payments, lending, financial planning, and research (Suryanto & Dai, 2020). Fintech emerged from the digital transformation of the financial sector, using innovative technologies to offer user-friendly financial services compared to traditional lenders (Lestari et al., 2020; Ozili, 2018; Suryanto & Dai, 2020). Fintech startups in Indonesia apply new technologies to make financial services easier to access and manage than traditional options.

Fintech companies offer customer-centric services supported by internet technology to provide easier access (Wulandari & Ibrahim, 2023). In Indonesia, the online lending platform fintech industry has grown rapidly, with very high development originating from supporting increased lending to Small and Medium Enterprises (SMEs) (Gomber et al., 2017). The fintech industry in Indonesia has grown rapidly due to online lending platforms that provide customer-friendly, internet-based services, allowing fintechs to increase loans to SMEs. The emergence of fintech lending brought the challenge and opportunity for SMEs Entrepreneurs. Existence challenges related to infrastructure development, geography, and borrower eligibility (Suryono et al., 2019). Based on a survey by the Financial Services Authority (OJK) in Indonesia, lending through Fintech in 2018 has reached \$543 million over 7 months. This amount has tripled compared to the previous year. The recent emergence of fintech is believed to be able to solve the problems of SMEs related



to access to capital sources. One popular fintech business models is the online lending platform (Peer to Peer Lending), which is growing rapidly in Indonesia (Yusgiantoro et al., 2021).

Micro Small and Medium Enterprises (MSMEs) are the main drivers of national economic activities in most countries (Rohma & Wahyu, 2022). Based on history, in Indonesia MSMEs have played the main driver in Indonesia's economic development since it is contributed more than 50% to Indonesia's Gross Domestic Product (GDP). MSMEs also play an essential role in reducing the unemployment rate, promoting technological innovation, and maintaining the social stability (O'Regan et al., 2006; Suryani & Prasastic, 2022). Additionally, MSMEs have also been a primary source to provide employment creation. In other words, the significant contribution provided to governments to minimize unemployment among women, youths and low-educated workers (Tambunan, 2018). Considering the importance of MSMEs, however, they are still vulnerable and suffer from somonstraints such as lack of capital, which is even becoming a major constraint for the growth of MSMEs. In Indonesia, although the government has initiated some programs to help MSMEs finance, a large proportion of the total MSMEs do not meet the requirement to borrow money from banks or any other formal financial institution (Tambunan, 2015). MSMEs in Indonesia are often unable to obtain additional capital from financial institutions because they do not meet minimum credit requirements (Annur, 2019). Annur (2019) PricewaterhouseCoopers survey found that 74% of Indonesian MSMEs lacked access to financing. Without improved access to financing, MSMEs in Indonesia will struggle to become an engine of economic growth (PwC, 2019). As noted in an Asian Development Bank article, without formal financial services, underserved segments of society will be excluded from growth (PwC, 2019). The inability to access loans from banks and other institutions hinders the growth of Indonesian MSMEs and excludes many from economic progress, as most cannot meet lenders' requirements.

The fintech industry has the potential to address the financing challenges faced by MSMEs. Several studies have examined the role of fintech with different focuses. Liliana et al (2021) found financial technology significantly impacts financial inclusion for MSMEs in South Sumatra. Utami & Sitanggang (2021) interviewed 100 business owners and determined fintech adoption positively and significantly influences MSME performance. However, Eprianti (2021) revealed peer-to-peer fintech financing for MSMEs in Indonesia is not fully effective, as business owners often do not follow proper lending principles or comply with OJK regulations. Nevertheless, the number of fintech companies in Indonesia has grown significantly, despite questionable lending practices. Previous research on MSME fintech has shown potential benefits as well as risks, with positive impacts on financial inclusion and performance as well as issues with compliance. The emergence of fintech lending brought the challenges and opportunities for the SMEs Entrepreneurs. The challenges existence related to infrastructure development, geography, and borrower eligibility (Suryono et al., 2019).

Several studies discussed the general issue related to adoption of peer to peer (P2P) lending and its impact on MSMEs. A study discussed about the implementation of credit scoring related to Non-Performing Loans (NPL), the results stated that NPL in Peer-to-Peer Lending negatively affect the MSMEs lending decisions. In other words, high and low NPL did not affect the credit distribution determination to the public (Riwayati et al., 2022). Another study discussed about P2P lending in companies in Singapore, Malaysia and Indonesia. This study discussed related to credit scores used by those companies are almost the same, specific differences laid on regulations on its country and decision by management of core value business. The results stated that Malaysia regulations are stricter than Singapore and Indonesia (Rosdini et al., 2022). Another study discussed about the success of Amarnya in doing women empowerment in Indonesia to provide access for lenders and borrowers, data obtained by lenders testimonies from websites (Saputra et al., 2019). Studied related to credit risk scorecard identified by Franata et al. (2018) related to assessment model using 5C credit analysis, the research using historical data related to credit scoring model by using data from P2P Lending company in Bandung, Indonesia by indicating Credit Risk Scorecard.

This study will focus on one of registered Peer to Peer lending in Indonesia which has been helping MSMEs in rural areas is PT Amarnya Mikro Fintek (amartha.com). The study will reveal how P2P lending empower MSMEs in supporting their business. The purpose of this research is, firstly, to identify the implementation of risk mitigation in the mechanism lending procedures including the process of applying for credit, disbursement funds and credit payments made by Amarnya towards MSMEs. Secondly, to find out the application of credit risk mitigation includes analysis assessment of creditworthiness and procedures in minimizing the credit risk conducted by Amarnya in handling loans. Finally, to identify the effectiveness and security of credit that has been delivered to MSMEs and investors. This research will absolutely con-

tribute to literature of MSMEs financing and alternative finance for MSMEs as well as the development of P2P Lending in Indonesia. In addition, this research will improve the knowledge of MSMEs business owners related to alternative finance especially P2P Lending and provide an opportunity for them to identify access finance for the growth of the business.

## 2. LITERATURE REVIEW

The development of financial technology (fintech) has become an important area of study in Indonesia, as fintech aims to reach underserved communities without access to traditional financial institutions such as banks. Fintech is defined by Ireland's National Digital Research Centre (NDRC) as innovation in the financial services industry that enables financial transactions such as payments, investments, loans, transfers, financial planning, and other monetary products through technology. The goal of fintech in Indonesia is to expand financial services to communities that are not served by the traditional banking sector (Lestari, 2023). Fintech represents innovation in the way financial transactions are performed through the application of new technologies. Fintech companies utilize digital technologies to help individuals access financial products and improve financial literacy (Amartha, 2019). More broadly, fintech refers to the use of technology in providing financial solutions (Arner et al., 2015). Recently, the growth of fintech lending in Indonesia has risen significantly. In 2021, there were 104 licensed peer-to-peer lending companies, providing an alternative financing option for SMEs to access funding (Amartha, 2019; Arner et al., 2015). According to Bank Indonesia, fintech involves using technology in the financial system to offer products, services, technologies and/or new business models that can impact currency stability, financial system stability, payment system efficiency, continuity, security and reliability (Amartha, 2019; Arner et al., 2015).

According to Suryanto & Dai (2020), there are five types of fintech business models: (1) Digital Payment, which provides online transaction payment services; (2) Account Aggregator, which offers customers access to all their transactions on one platform; (3) Personal Finance, which provides customers financial reporting and advice; (4) Financing and Investment, which offers services like peer-to-peer lending, crowdfunding, or a combination; and (5) Information and Feeder Sites, which provide information to prospective customers about available financial services. According to Bank Indonesia FinTech has several classifications (Eprianti, 2021; Linawati et al., 2020) there are (1) Crowdfunding and P2P Lending, in accordance with the function of the systems as a media for the investors to meet the capital seekers in the term of lending money. This platform provides simple lending and borrowing services by relying on technology, especially the internet. (2) Market Aggregator, it is a platform that collects financial data from many data providers and presents it to users. By using the financial information provided, people can more easily compare and choose the best financial products. (3) Risks Management and Investment, the classifications for services to users to do planning and recognizing the financial conditions in each and every circumstance. The Fintech in this term has the function as a digital financial planner which provide the user to urge the foremost best speculation item agreeing to their inclination. (4) Payment, settlement and clearing, this category is to facilitate users in making payments via online and can be done on the short time. The payment such as a payment gateway and e-wallet. Since the payment procedure involves the money turnover, which is the duty of Bank Indonesia, this classification is under BI's supervision. This payment gateway affords an opportunity of the customer to choose the desired payment method.

Peer-to-peer lending allows individuals or businesses to lend to and borrow from each other directly online, without going through a formal financial institution as an intermediary (Walter, 2023). It facilitates connections between lenders and borrowers online for various lending purposes. In peer to peer lending, anyone can provide loans or apply for loans from others peer-to-peer without the services of banks or other legitimate financial institutions acting as an intermediary (Walter, 2023). Another definition stated by Amartha that Peer to Peer Lending is an innovative product in financial technology (fintech) in the form of a marketplace to connect micro-entrepreneurs and MSMEs that require financing with investors who want to fund the business is based on consideration of the risk profile and the expected returns in accordingly (Amartha, 2021).

Micro, Small and Medium Enterprises (MSMEs) are businesses established by individuals with a maximum net worth of 200 million rupiah (Eprianti, 2021; Anwar & Syafiqurrahman, 2016). MSMEs play a crucial role in economic growth, especially in developing countries such as Indonesia (Suwarno et al., 2020; Aneswari, 2018). They are also important in reducing poverty by providing economic opportunities to low-income communities (Eprianti, 2021). The OECD defines SMEs as independent, non-subsidiary companies

with fewer than a certain number of employees, although this threshold varies by country (OECD, 1996). According to Indonesia's Central Bureau of Statistics (BPS), MSMEs are defined based on the total number of workers employed in each business unit (Liliana et al., 2021). Small enterprises are business units with 5 to 19 employees. Medium-sized enterprises are business units that have 20 to 99 employees.

**Table 1. MSMEs Criteria**

Criteria	Sub-size category of MSMEs		
	Microenterprises (MIEs)	Small enterprises (SEs)	Medium enterprises (MEs)
Annual turnover	≤300m	>300m - ≤2500m	>2500m - ≤50b
Initial assets (excl. land and building)	≤50m	>50m - ≤500m	>500m - ≤Rp10b

Source: Law No. 20/2008 on Micro, Small and Medium Enterprises (MSMEs), 2008

In Indonesia's 1995 law, micro and small enterprises (MSEs) were defined as businesses with initial assets (excluding land and buildings) of no more than 200 million Indonesian rupiah (IDR) or annual turnover up to 1 billion IDR. Medium enterprises (MEs) were defined as having between IDR 1-50 billion in annual turnover, or initial assets between IDR 200 million - IDR 500 million (Tambunan, 2020). In 2008, this 1995 law was replaced with Law Number 20 on MSMEs. Under the new law, MSMEs are businesses with annual turnover not exceeding IDR 50 billion and total initial assets excluding land and buildings under IDR 10 billion. Firms with over IDR 50 billion in annual sales or IDR 10 billion in assets are classified as large enterprises (LEs) (Tambunan, 2020).

MSMEs make a significant contribution to Indonesia's GDP not only because of their wide geographic distribution in rural areas, but also due to their ability to employ a large labor force (Rosavina et al., 2019; Tambunan, 2015). The presence of MSMEs across Indonesia and their capacity to absorb many workers are key reasons why they contribute substantially to the country's overall economy. Studies have found that MSMEs face barriers in accessing finance, technology, and equipment (Yoshino, 2016). Any potential MSMEs in Indonesia lack adequate financial support (Rosavina et al., 2019). Ahmed et al (2016) argue that since few MSMEs receive loans from banks and formal institutions, lenders rely heavily on the characteristics of MSMEs when making lending decisions. These characteristics introduce more bias compared to large firms. Lenders must undertake more complex risk assessments for SMEs because they often lack audited financial statements that reflect performance and profit projections. The low number of SME loans from banks stems from both technical issues such as insufficient collateral, and non-technical issues such as complicated procedures and information gaps (Rosavina et al., 2019).

### 3. RESEARCH METHOD

This research uses descriptive analysis by using a qualitative approach. Descriptive research will describe fintech companies in supporting the growth of MSMEs in Indonesia. Qualitative explains a research procedure which makes descriptive data from statements and written words with observing the real situation. The design is to focus on what is happened rather than why something has happened (Suryani & Prasastic, 2022). This research uses a case study approach at PT Amarta Mikro Fintek, where researchers want to explain a program, activities and processes carried out by a person or group (Cresswell, 2010). In this study using literature studies by looking for reference sources that are relevant to the problem. Theoretical references are also the basis and supporting reasons for this research. In addition, this research also uses documentation studies, namely the recording of events in the form of writings, pictures or monumental works, both documentation carried out by researchers and from other parties. This study uses purposive sampling with considerations and criteria that have been set for determining the sample. The criteria set are as follows: Fintech company should officially registre and directly supervised by Financial Services Authority (OJK); Fintech company should focus on P2P Lending; Fintech company focuses on MSMEs sector; Fintech company should focus on microcredit; Fintech company which distributes the most funds and have many borrowers with the low NPL.

PT Amarta Mikro Fintek is the object of this research. The research uses secondary data obtained from various sources such as: information and news and documents on issues related to the topic obtained from various sources such as Bank Indonesia, the Financial Services Authority (OJK), (Indonesian Fintech Association) AFI, the official website of the company concerned, newspapers, journals, the internet and

other library sources. Primary data and secondary data in this study are in the form of various explanations regarding the mechanism of credit provision and risk mitigation, as well as the effectiveness of credit provision in accordance with the research objectives. In addition, the data analysis in this research uses a qualitative descriptive method. Data collection analysis includes searching for data, organizing, and then analyzing. In analyzing the data that has been collected, it is necessary to present a description. The description in this case is about the lending mechanism and risk mitigation carried out by Amarnya for MSMEs in Indonesia.

#### 4. RESULT AND DISCUSSION

##### P2P Lending Development in Indonesia

Peer-to-peer (P2P) lending first emerged in Indonesia around 2015, allowing individuals to borrow and lend money through online platforms without going through traditional financial institutions. Some of the first P2P lending platforms in Indonesia were Modalku, Investree, Danamas, and KoinWorks (Rusadi & Benuf, 2020). P2P lending was seen as an innovative way to provide financial access to more Indonesians. By 2018, P2P lending was growing rapidly, with more than 130 P2P platforms and total lending of more than \$440 million (Arner et al., 2020). However, there were also concerns about risks such as defaults, scams, and lack of investor protection. In 2018, Indonesia introduced new regulations like business licensing requirements and investment caps to provide more oversight of the P2P lending industry. Despite the new regulations, the P2P lending industry continued to grow. By 2020, total P2P lending reached \$3.7 billion (Sirait et al., 2022). The Covid-19 pandemic brought both challenges and opportunities. Loan defaults increased due to economic hardship, but demand also increased as small businesses needed quick financing (Arner et al., 2020). Leading P2P platforms such as Modalku, Investree, and KoinWorks introduced pandemic support programs while tightening risk management.

By the end of 2021, P2P lending had rebounded along with the broader economy, with more than 200 P2P platforms and total lending of \$4.8 billion (Candra et al., 2020). However, concerns remained about lending practices, transparency, and partnerships between P2P platforms and banks. The OJK continued to update regulations, such as limits on foreign ownership of P2P platforms. In 2022, P2P lending faces new challenges as interest rates rise globally, increasing the cost of borrowing and the risk of default (Lenz, 2016). However, the industry continues to innovate. Some P2P platforms are exploring partnerships with sharia banks to offer Islamic finance products that comply with religious law (Hassan et al., 2022). Automation and digital analytics tools are being used more to improve credit scoring and risk management (Sadok et al., 2022). Looking ahead, Indonesia's P2P lending industry is projected to continue growing, albeit at a slower pace due to regulation and uncertain economic conditions. However, analysts estimate that P2P lending could reach \$10 billion by 2025 (Medina, 2023). International expansion also presents an opportunity for Indonesian's leading P2P platforms. Government policy aims to balance financial innovation and inclusion with consumer protection and risk management.

Some key trends shaping P2P lending in Indonesia are increased use of artificial intelligence and big data analytics for improved credit analysis, partnerships between P2P platforms and banks, consolidation of platforms as the industry matures, and more specialized products such as sharia finance and micro-lending (Boston Consulting Group & AC Ventures, 2023). Consumer awareness and understanding of P2P lending risks and fees also need to be improved through financial education initiatives and transparent disclosure by platforms (Cankett & Farrell, 2020). Issues such as defaults, debt stress, and personal data protection require ongoing monitoring as more Indonesians access P2P loans. But overall, P2P lending is cementing itself as an important innovative financing channel for individuals and businesses lacking access to traditional banks.

The evolution of P2P lending in Indonesia reflects the broader growth of fintech, especially in payments, e-commerce, and ride-hailing platforms (Arner et al., 2020). Like P2P lending, these sectors emerged around 2015 and underwent rapid growth, with regulators rushing to catch up. Fintech represents an exciting opportunity for financial inclusion and economic growth in Indonesia, but it must be supported by smart policies and consumer protections. In conclusion, P2P lending has evolved from a novel idea in Indonesia in 2015 to an established industry integral to the financial system, despite facing regulatory challenges. It continues to adapt to economic cycles and evolving technology, while providing access to credit. Future trends point to increased integration with banks and sharia finance, more specialized products, and better data analytics for risk management. But the industry's long-term sustainability depends on finding

the right balance of innovation and regulation.

### **The Impact of P2P Lending on SMEs**

Small and medium enterprises (SMEs) are a vital engine of economic growth and job creation in Indonesia, accounting for over 60% of GDP and 97% of domestic employment (Tambunan, 2019). However, many SMEs face persistent challenges accessing the affordable credit needed to sustain and expand their operations. P2P lending has emerged since 2015 as an innovative alternative financing channel that can expand credit access for underserved SMEs in Indonesia (Sadok et al., 2022). The number of SMEs in Indonesia has continued to grow in recent years. From 2018 to 2020, amidst the Covid-19 pandemic, the SME population increased from 64 million to 66 million micro, small and medium enterprises. This growth reflects Indonesia's entrepreneurial culture, with many new startups emerging in sectors such as e-commerce, food services, and creative industries. However, SMEs received only about 20% of total bank loans in 2021 (Arner et al., 2020). Most SMEs struggle to provide the strict collateral, financial records, and credit histories needed to qualify for traditional bank loans in Indonesia (Aristanto et al., 2022). As a result, over 50% of SMEs rely heavily on internal funds or high-interest non-bank informal loans for financing their business operations and expansion plans. Without sufficient access to affordable formal credit, SMEs face constraints in investing to grow their ventures, such as purchasing new equipment, adding inventory and staff, or upgrading technology.

The Indonesian government has introduced various policies and programs aimed at directing more credit to SMEs, such as targeted lending initiatives and loan guarantees. However, banks remain conservative in lending to smaller enterprises they perceive as higher risk. SMEs in Indonesia continue accessing far less financing from banks compared to neighboring countries (Tambunan, 2020). This underscores the need for innovative new financing channels tailored to SME credit profiles and requirements. P2P lending has emerged as a promising financing alternative for SMEs in Indonesia, allowing them to borrow from individual and institutional lenders through online platforms. P2P lenders use alternative data sources, including e-commerce transaction records to better evaluate the creditworthiness of underserved SME borrowers. Moreover, P2P lending can deliver loan decisions faster than traditional banks. Leading P2P platforms have introduced dedicated SME lending programs that provide flexible repayment options aligned with business cash flows, fast online application processes, and advisory services (Abbasi et al., 2021). By catering specifically to SME financing needs, P2P lending helps fill the persistent SME credit gap in Indonesia. While still a small share of overall lending, P2P loans to SMEs have already grown from almost nil in 2015 to an estimated \$500 million in annual lending volume by 2021 (Medina, 2023). Major platforms like Uang-Teman report that over 60% of their borrowers are SMEs. So P2P lending is serving as a vital credit lifeline for underserved small enterprises lacking access to traditional bank financing channels.

However, experts also highlight risks that require monitoring as the P2P lending industry evolves (Suryono et al., 2021). P2P lending in Indonesia lacks longevity, having only emerged since 2015. The Covid-19 crisis led to an increase in loan defaults as SMEs experienced a decline in revenue. Critics warn that the high interest rates and short repayment periods of some P2P loans could push SMEs into over-indebtedness. There are also concerns about whether platforms provide sufficient transparency and fair treatment to lenders/investors. Therefore, prudent regulation is required as the P2P lending industry matures. OJK has already implemented licensing requirements and capped maximum interest rates allowed. Debates continue regarding issues like appropriate investor limits and capital reserve policies (Abbasi et al., 2021). Clear guidelines and judicious oversight mechanisms are essential to foster responsible, sustainable P2P lending industry practices. Industry associations also have an important role to play in developing and enforcing standards that balance innovation with integrity protections for both lenders and borrowers. In addition, targeted financial education initiatives are critical to ensure that SME owners clearly understand the terms, risks, fees and alternatives before taking out P2P loans. SME associations and government agencies need to provide accessible resources and advisors to guide SMEs in prudent borrowing and debt management. With appropriate precautions and supportive policies, P2P lending represents a significant opportunity to provide Indonesian SMEs with alternative financing channels to unlock their growth potential.

Indonesia's P2P lending development mirrors the broader rise of fintech, which has attracted over \$1 billion in investment since 2015 spanning payments, e-commerce, ride-hailing and other sectors (Arner et al., 2020). Much of this technology-enabled innovation aims to serve key underserved groups like SMEs and rural populations. Alongside P2P lending, fintech innovations like crowdfunding, digital wallets, and

mobile payments solutions can help Indonesian SMEs by streamlining business operations, enabling e-commerce, and opening up new fundraising avenues. However, realizing the promise of fintech requires policies that carefully balance financial inclusion, stability, integrity and consumer protections (Cankett & Farrell, 2020). Looking ahead, Indonesia's SME population looks poised for further growth, with an estimated 7 million new SMEs likely to emerge between 2021-2023. This expanding business landscape will heighten the need for enhanced SME access to affordable financing to thrive and boost Indonesia's economy. While still in its developmental phase, P2P lending stands to play an integral role in expanding credit access for underserved SMEs. With prudent regulations and industry practices, P2P lending can provide Indonesian SMEs with alternate online financing options that help spark promising business growth (Abbasi et al., 2021).

One of P2P lending platform which having relation with SMEs is PT Amarta Micro Fintek. Amarta is one of Indonesia's leading P2P lending platforms, focused specifically on serving the financing needs of micro, small and medium enterprises (SMEs). Founded in 2014, Amarta pioneered an innovative microlending model designed to expand access to capital for underserved Indonesian SMEs (Amarta, 2021). As a P2P platform, Amarta connects SME borrowers directly to individual and institutional lenders, facilitating faster and more affordable loans compared to traditional financial institutions. A core aspect of Amarta's microlending model is the use of joint liability group lending (Amarta, 2021). Amarta requires SME borrowers to form groups with other entrepreneurs that provide social collateral for loans by co-guaranteeing each other's debt. This reduces risks by leveraging mutual support within communities. Amarta also provides financial literacy training and business development assistance to improve SME capabilities alongside increasing access to financing. As of 2022, Amarta had disbursed over \$100 million in loans to Indonesian SMEs and claimed a 99% on-time repayment rate (Agenda & Forward, 2022). By tailoring P2P lending solutions specifically to SME financing needs, Amarta demonstrates the potential for P2P platforms to expand formal credit access to underserved small enterprises in Indonesia. However, continued collaboration with regulators will be essential to ensure sustainable, responsible growth of P2P lending.

### **Profile of PT Amarta Micro Fintek (Peer to Peer Lending)**

PT Amarta Micro Fintek (Amarta) was founded by Andi Taufan Garuda Putra in 2010 in Bogor Regency. He started with capital from his own pocket with a total of 10 million rupiah. Initially, Amarta was a Microfinance Institution (LKM) with the legal entity of the Amarta Indonesia Cooperative. The establishment of amarta began with a mission to connect business actors in rural areas who have difficulty getting business capital (Latuconsina et al., 2020). Amarta was founded to address the challenges micro-entrepreneurs face in accessing capital, as they often lack collateral, have inconsistent income, and no credit history. However, Amarta believes that with the right technology and community-focused approach, these micro-entrepreneurs can become qualified borrowers (Latuconsina et al., 2020). At the same time, investing in micro and small enterprises has been shown to provide social benefits (Latuconsina et al., 2020). By facilitating access to capital for such enterprises, Amarta aims to improve the lives of low- and middle-income families, build economic resilience, and promote social justice across Indonesia. The company sees its work as both a business opportunity and a way to create positive social impact (Latuconsina et al., 2020). PT Amarta Mikro Fintek has a mission to empower women in various corners of the country to have equal access to financial services, receive training in managing household economy and affordable capital, while enjoying technological advancements. In addition, Amarta also collaborates with decision makers in the field of regulation of the financial technology industry (fintech) (Wicaksono & Krisnadi, 2017).

In 2015 PT Amarta turned into a P2P lending platform. This change aims to make it easier for groups or individuals to fund small and medium enterprises. By using the name PT Amarta Mikro Fintek and officially registered and supervised by the OJK since May 31, 2017 with registered letter mark S-2491/NB.111/2017. Amarta is a company that provides peer to peer lending services, which brings together prospective borrowers with funders directly and becomes an intermediary who manages the debt contracts of both parties and supervises payments (Latuconsina et al., 2020). As of 2020, Amarta Mikro Fintek has disbursed IDR 1.18 trillion to 252,516 micro-entrepreneurs. Of this amount, NPL (non-performing loan) amounted to 1.21% or current financing amounted to 98.79%. This is an extraordinary performance for a company that has been established for less than 10 years (Latuconsina et al., 2020).

PT Amarta Mikro Fintek has won several prestigious awards. In 2017, they won the Republika Syari-



ah Award and Startup Award from the Jakarta Chamber of Commerce. In 2018, Amarththa won the Digital Inclusion Award for Fintech Startup at the Digital Innovation Festival in Jakarta, an event organized by MASTEL, Bekraf, and the Ministry of Communication and Information. That same year, Amarththa was selected by the Australian government's InnovationXchange and the UN Capital Development Fund for their innovative fintech addressing financial inclusion and women's economic participation. Overall, Amarththa has been recognized both in Indonesia and internationally for their groundbreaking fintech startup. In addition to receiving several awards, PT Amarththa is trusted by several financial institutions to work together. Among them, Bank Mandiri trusts Amarththa to provide access to financing for Micro, Small and Medium Enterprises (MSMEs). Bank Permata collaborates with Amarththa to finance Micro, Small and Medium entrepreneurs. In addition to these two banks, there are non-bank financial institutions such as Mandiri Tunas Finance which have collaborated with Amarththa (Latuconsina et al., 2020).

Amarththa Fintek has developed an innovative credit scoring system to increase access to finance for micro, small and medium enterprises (SMEs) in Indonesia through its peer-to-peer (P2P) lending platform. A key differentiator of Amarththa's model is the use of alternative data sources to assess creditworthiness. Amarththa analyzes mobile phone usage patterns, e-commerce transaction history, and business cash flow data to provide a more comprehensive view of borrowers' credit profiles than relying solely on financial statements (Agenda & Forward, 2022). By incorporating this broader set of behavioral data, Amarththa can assess the credit risk of small businesses, including nano- and micro-businesses with limited formal credit histories. In addition, Amarththa employs machine learning algorithms trained on historical loan repayment data to rapidly process these alternative data sources and generate customized credit scores for each SME borrower (Agenda & Forward, 2022). This automated, data-driven approach streamlines the underwriting process, allowing Amarththa to provide faster credit decisions to meet urgent financing needs. Manual underwriting methods used by traditional financial institutions can cause delays that restrict SMEs' access to capital.

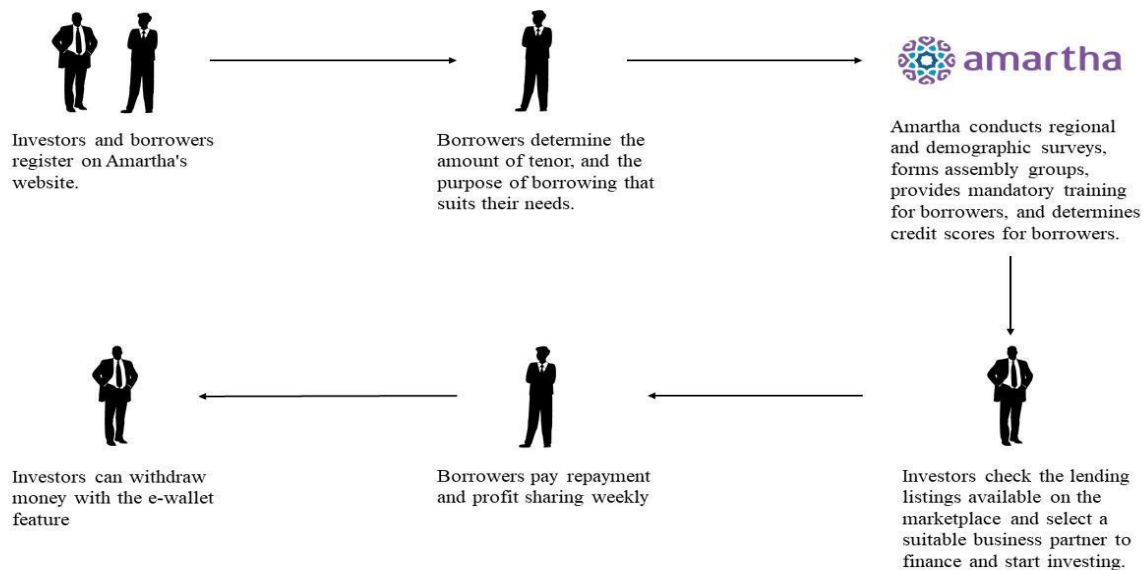
Another differentiating factor of Amarththa's model is the use of joint liability group lending. Amarththa requires SME borrowers to form community groups that collectively vouch for loans and provide social collateral by mutually guaranteeing each member's debt. This group accountability mechanism has proven effective in improving repayment rates for microloans and allows Amarththa to extend P2P loans to microenterprises traditionally perceived as too risky. Most Indonesian P2P lenders do not leverage this innovative lending technique pioneered in microfinance. Additionally, Amarththa aims to provide continuous personalized credit advisory services to borrowers before, during, and after loans to enhance financial literacy and promote proper use of financing (Agenda & Forward, 2022). This ongoing credit coaching helps minimize default risk and differentiates Amarththa's approach to responsible lending. Many P2P platforms focus solely on credit underwriting without supplementary borrower guidance.

Furthermore, while most Indonesian P2P lenders target formal SMEs, Amarththa's credit model and product design is customized specifically for nano and microenterprises (Agenda & Forward, 2022). Everything from the required documentation to the loan amounts and terms is tailored to microlending. This positioning addresses a major gap in financing access for informal microenterprises. By combining alternative data analysis, machine learning-powered automation, group lending mechanics, personalized credit advising, and a dedicated microlending focus, Amarththa's credit scoring and underwriting system enables P2P financing access for micro and small enterprises that have historically been underserved by mainstream financial institutions and standard fintech lending models. Continued partnerships with government regulators will be critical to ensure the sustainable development of this P2P lending innovation.

### **Peer to Peer Lending Flow at Amarththa**

According to the website provided by Amarththa, the P2P lending and borrowing mechanism provided is quite simple. There are three parties seen in Amarththa's pingam-borrowing cycle, namely group borrowers, namely Lending Groups, investors, and also Amarththa sendin. P2P lending at Amarththa is included in the first pattern that allows investors to choose their own prospective borrowers to finance (Amarththa, 2023).



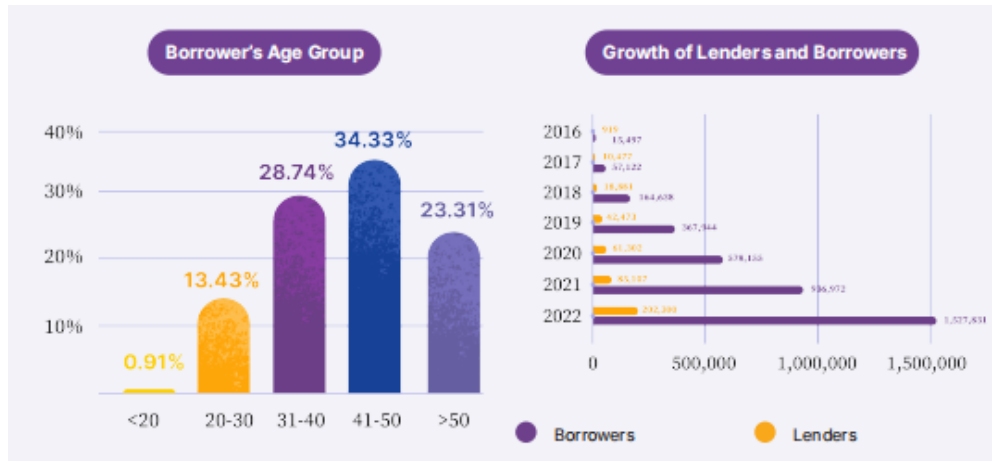


**Figure 1 Flow of Lending and Borrowing at Amartha**

Source: <https://amartha.com/>

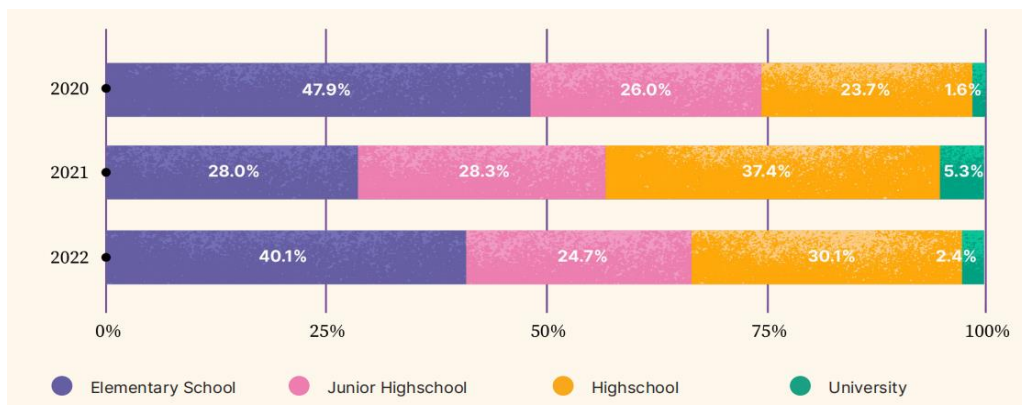
In accordance with the flow above, the most important thing for borrowers and investors to do as users is to register on the Amartha site. Furthermore, borrowers who already have Group Lending determine the loan amount and choose the loan tenor provided by Amartha, which is for three, six, to twelve months with a minimum ceiling of three million rupiah. After being surveyed and given a credit score, borrower data and information can be accessed on the marketplace on the Amartha website for investors to choose from and finance. Weekly training is also mandatory for borrowers both before and when they receive loans. Repayment and profit sharing must also be deposited by borrowers every week. After registration, investors are given the freedom to choose prospective borrowers who want to be financed and transfer investment funds into a virtual account provided by Amartha. Investors who have invested can receive payments and profit sharing starting one week after the investment funds are distributed to borrowers (Amartha, 2023). Being the organizer, what Amartha does is to carry out its business activities in accordance with Article 5 POJK No.77/2016 on its website. The period before lending by investors is the time for Amartha to survey prospective borrowers and provide regular and intensive training to improve loan credit scores. Credit scoring is the amount of the ability to return installments from each borrower designed to minimize risk and increase investor confidence in the investment given to borrowers (Amartha, 2023).

The credit score system is designed using an algorithm built based on the following indicators: previous payment history (for follow-up loan applications), attendance at group meetings, timeliness of payments, and psychometric analysis with a machine learning approach so that behavioral analysis can be made. Feasibility mapping that is useful in producing a more accurate credit score. Amartha uses machine learning to assign credit scores to each borrower profile on their marketplace. Borrowers with an A grade credit score are very likely to repay loans on time, with a 97-100% success rate. Borrowers with an A- grade are slightly less likely to repay on time, with a 95-97% success rate. In general, higher credit grade borrowers have a higher probability of on-time repayment and a lower risk of default (Amartha, 2023). Amartha also appointed a custodian bank to manage virtual accounts used for investors to transfer investment funds and provide e-wallets used by investors to withdraw payment funds and profit sharing (Gunawan, 2021).



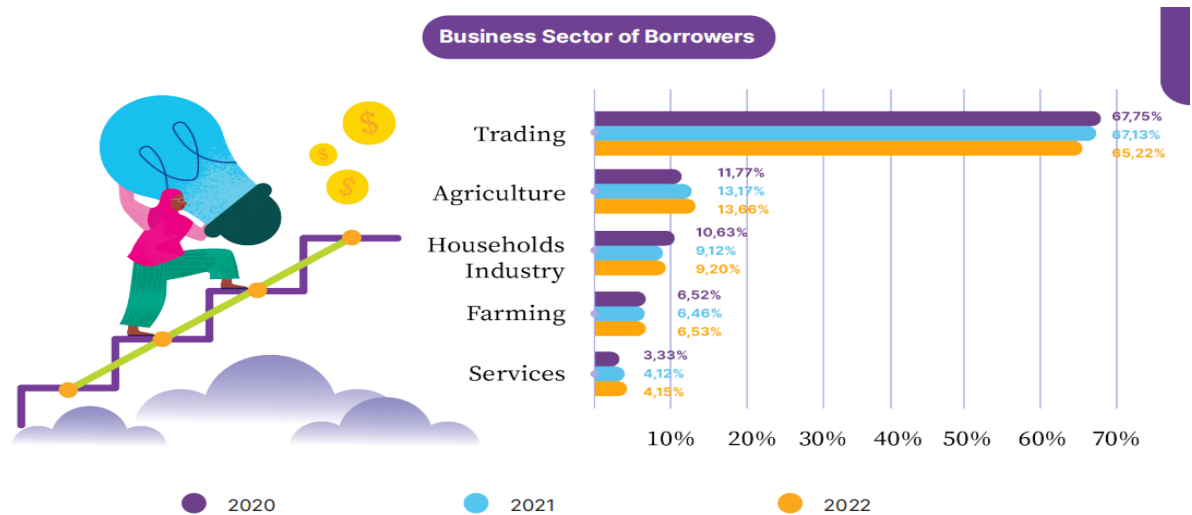
**Figure 2 Borrower's Age Group & Growth of Lender and Borrowers**  
 Source: ESG & Sustainability Report 2022 amartha, 2023

Amartha is dedicated to making a lasting difference. In 2022, their team working to create impact grew to over 6,400 people. This includes engineers, product managers, and other roles at their headquarters. It also includes over 6,000 field team members serving countless villages across Indonesia every day. Together, Amartha believes their large team can make a real impact by working together (Agenda & Forward, 2022). Beyond just Amartha's internal team, external stakeholders have been crucial in providing impact to communities. With the help of over 202,300 registered retail lenders and more than 40 institutional partners, Amartha distributed over 10.1 trillion IDR to 1.5 million women-led small businesses in 2022. Amartha's 1.5 million borrowers are mainly productive women aged 31-50 years old (62% total). This shows that Amartha's loans support women at their peak productive years to flourish and succeed (Agenda & Forward, 2022).



**Figure 3 Borrowers Education Level**  
 Source: ESG & Sustainability Report 2022 amartha, 2023

The chart shows that most of Amartha's borrowers (40.06%) have only finished elementary school. Since lower education levels can be seen as a disadvantage, Amartha makes it a priority to target this group as part of their empowerment program for women entrepreneurs. By providing loans to women with limited education, Amartha aims to help empower them through business ownership (Agenda & Forward, 2022). While high school is compulsory and tuition is government-funded in Indonesia, only 30% of Amartha's borrowers graduated high school. By providing loans, Amartha aims to increase borrowers' income so they can afford to send their children to higher levels of schooling. Even though high school is free, many families still struggle to pay associated costs. Amartha hopes its loans will allow the next generation to attain more education and improve their livelihoods in the future. Getting more education leads to more opportunities, so Amartha sees its loans as an investment in future generations (Agenda & Forward, 2022).



**Figure 4 Business Sector of Borrowers**

Source: ESG & Sustainability Report 2022 amarnya, 2023

Most of Amarnya's borrowers work in trading businesses (65.2%), operating small shops from home and selling to villagers. The next most common are smallholder agriculture (13.6%) and home industries like food processing (9.2%). Trading is prevalent because it's low risk, flexible, and generates daily cash flow. By running shops out of their homes, villagers can start trading businesses without much startup cost or risk. These small shops meet daily needs in rural communities while providing borrowers steady income (Agenda & Forward, 2022).

**Credit Scoring System**

Access to financial services, especially credit and related information, is a major barrier for SMEs. Only about 15% of SMEs in emerging markets can fully access the credit they require. The difficulty in obtaining funding often leads to bankruptcy, where SMEs cease operations due to external barriers rather than issues with skills or abilities (Marsella, 1992). Thus, the limitations of traditional banks raise the need for micro-finance to expand access to financial services like micro-banking and micro-insurance through financial technology companies. These fintech firms use a peer-to-peer model to fund SMEs by inviting upper-middle class people to sponsor registered business borrowers. One leading Indonesian fintech company, PT. Amarnya Mikro Fintek, established in 2010, currently does not access the central bank's system to check potential customers' borrowing history. In addition, Amarnya's SME customers typically do not have bank accounts. For this reason, Amarnya has developed a credit scoring system that uses psychology and behavioral science to assess borrowers' repayment behavior (Rabecca et al., 2018). Credit scoring calculates a risk index by estimating the financial capacity to repay loans. This paper aims to describe the credit score system Amarnya uses to ensure smooth lending processes between parties.

The use of credit scoring systems in financial services is not new. It began in 1993, yet by 1998, 90% of United States banks had adopted it (Len, 2000). Several institutions have developed their own specific credit scoring systems, including Entrepreneurship Financial Laboratorium Global (EFL Global), who pioneered the use of psychometric tools in credit scoring. Studies by Klinger et al., (2013) on repayment behavior across countries supported this approach, finding personality traits related to business performance and credit risk. The financial institution in the study, the fifth largest commercial bank in Peru, piloted the EFL tool to expand lending to SMEs (Klinger et al., 2013). Loan applicants were screened by the EFL tool, and those scoring above the bank's threshold were offered loans. Peru has private credit bureaus covering 100% of adults, so all applicants have traditional credit scores. However, for individuals without previous formal loans ("unbanked"), these rely largely on demographics rather than credit history. Applicants with acceptable traditional scores got loans even if EFL scores were low. This enabled testing two EFL uses: (1) as secondary screening of accepted entrepreneurs to lower SME portfolio risk; and (2) to offer more loans by accepting rejected applicants without increasing portfolio risk (Klinger et al., 2013).

EFL developed a psychometric credit-scoring tool by first quantifying the individual characteristics of people who had and had not defaulted on past loans, as well as people with high versus low profit small businesses (Klinger et al., 2013). The characteristics were categorized as personality, intelligence, and integrity. EFL hypothesized these assessments would identify two intrinsic risk determinants: ability to repay a loan, and willingness to repay it. Entrepreneurial traits, measured by personality and intelligence tests, determine an entrepreneur's ability to generate future cash flows for debt repayment. Honesty and integrity traits, measured by an integrity test, determine the willingness to pay independently of ability (Klinger et al., 2013).

Amartha also uses psychometric testing as part of their credit scoring to gain more comprehensive customer information rather than relying solely on economic ability measures. The addition of psychometric tests aims to improve the credit scoring system with better, multidimensional data on potential customers. Based on research on credit repayment behavior, Amарtha developed a psychometric credit scoring instrument called the Credit Repayment Behavior Inventory (CRBI) to measure entrepreneurial traits related to loan repayment ability. The CRBI is a 23-item scale with Likert response options from 1 to 4. The current version assesses neuroticism, cognitive ability, trust, and economic locus of control. Amарtha found neuroticism has the highest correlation with customers' actual repayment performance. Items were adapted from the International Personality Item Pool. Cognitive ability, an intelligence predictor of repayment ability (Klinger et al., 2013), is defined as information processing capacity. For honesty/integrity, related to willingness to repay (Klinger et al., 2013), CRBI measures trust as a tendency to trust others, given Amарtha's rural, collectivist customers. Finally, locus of control reflects beliefs that success depends on internal or external factors (Rabecca et al., 2018).

September 15, 2022 Amарtha Launched Ascore.ai as power credit decision to help lenders assess the creditworthiness of borrowers, particularly those from underserved segments of the population. It uses variety of data points, including borrower profile, industry, and telco to assess creditworthiness and identify potential risks. There are several key features of Ascore.ai such as (1) Advanced AI algorithms to analyze and interpret complex data sets. This allows the platform to identify subtle patterns and relationships that would be difficult or impossible to detect using traditional methods. (2) Extensive data coverage. This Ascore.ai has access to the vast amount of data, including borrower profiles, industry information and telco records or mobile network usage data such as payment history through mobile phone bills and payment patterns. (3) Real-time insights , when Ascore.ai able to provide real-time insight into creditworthiness. (4) Ascore.ai can provide the customized to meet the specific needs of the different financial institutions (Anthropic, n.d.)

In addition, Ascore.ai can analyze cell phone bills and payment patterns to assess a borrower's ability to manage debt obligations. Regular and timely payment of cell phone bills can indicate a borrower's financial responsibility and reliability. Related to financial stability, Ascore.ai can evaluate a borrower's mobile data usage patterns to assess their financial stability. Higher data usage, especially for non-essential services, can indicate higher disposable income and potential ability to repay loans. Even socioeconomic status: Ascore.ai can analyze a borrower's location, network provider and device type to infer their socioeconomic status. Individuals with access to high-speed data plans and more advanced devices may be associated with higher financial means (Anthropic, n.d.).

### **Fintech in relation to Financial Access for SMEs**

P2P lending has emerged as an innovative fintech model that can expand financial access for underserved SMEs in Indonesia. P2P platforms connect SME borrowers directly to retail and institutional funders via online networks and data-driven algorithms (Rabecca et al., 2018). This provides an alternative to conventional bank lending, which many SMEs struggle to access due to lack of credit histories and collateral (Atz & Bholat, 2016). P2P lending offers faster application processes, more customized loan amounts and terms, and supplemental business development support. A core innovation is P2P lenders' use of alternative data sources, including e-commerce sales, mobile wallet transactions, and accounting software data, to assess SME creditworthiness (Sharma et al., 2023). This provides a more comprehensive perspective, beyond just financial statements, to approve loans for early-stage ventures. Leading P2P platforms like Amарtha and Modalku also tailor their credit scoring models specifically to micro and small enterprise profiles that differ from larger SMEs.

Industry reports estimate P2P lending facilitated over \$500 million in loans to Indonesian SMEs in 2021, up from nearly zero in 2015 (Medina, 2023). P2P has become vital funding for microenterprises and young startups in sectors like food services, handicrafts, and apparel. During Covid-19, P2P lending provided an agile financing lifeline for SMEs as bank lending dried up. This demonstrates the potential of fintech innovations to drive financial inclusion. However, nurturing a responsible P2P lending ecosystem requires collaboration between platforms, regulators, banks and industry groups to implement prudent policies, financial education, and sector governance (Sharma et al., 2023). With balanced oversight and continued product development, P2P lending can sustainably broaden access to formal credit for productive micro and small enterprises in Indonesia.

## 5. CONCLUSIONS, LIMITATIONS, AND SUGGESTIONS

In Indonesia, P2P lending has expanded rapidly since 2015 as an innovative financing channel for underserved MSMEs lacking access to traditional bank loans. However, concerns exist regarding defaults, predatory lending, and consumer protections. The Covid-19 crisis further increased defaults. Ongoing regulatory debates continue around balancing innovation versus prudent oversight. Amartha pioneered an innovative microlending model combining alternative credit scoring using machine learning algorithms analyzing mobile and cash flow data, joint liability group lending mechanisms, and personalized advisory services. This expands formal credit access for micro and small informal enterprises previously excluded. By 2021, P2P lending facilitated over \$500 million in loans for Indonesian SMEs. For underserved enterprises, P2P lending provides faster and more customized financing compared to traditional banks. However, monitoring is required to ensure affordable loan terms and prevent over-indebtedness. Amartha's approach demonstrates how customized fintech credit innovations can serve microenterprises. But nurturing responsible P2P lending requires collaboration between platforms, regulators and industry to implement balanced oversight and financial education. In conclusion, P2P lending is becoming integral to Indonesia's financial system, increasing MSME inclusion. Amartha's microlending model expands access. However, long-term sustainability depends on prudent regulations and governance to ensure consumer protection alongside innovation.

The narrow focus on a single case study of Amartha fintech limits the ability to generalize findings more broadly across Indonesia's diverse P2P lending landscape. The research is confined to one segment of the industry and does not allow for comparative analysis against other platforms or products. The study also provides only a static snapshot of Amartha's microlending model at a point in time, rather than examining the dynamics of how it evolves. This exploratory case study of Amartha provides a starting point to analyze fintech microlending innovations in Indonesia. But significant opportunities exist to expand the research scope, collect additional data, and strengthen analytical methods. Broadening beyond a single-case study would allow comparing P2P models and products across multiple platforms to derive more generalized insights and best practices. Incorporating extensive primary data collection through surveys, interviews, and focus groups would enrich understanding of direct stakeholder experiences and perspectives. Adding quantitative analytical methods could reveal statistical relationships between P2P lending and measurable financial outcomes for borrowers, supplementing the qualitative analysis. Studying long-term impacts with control groups over time would better isolate the effects of P2P lending.

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