

Mobile money for local benefit-sharing in forest emission reduction programs

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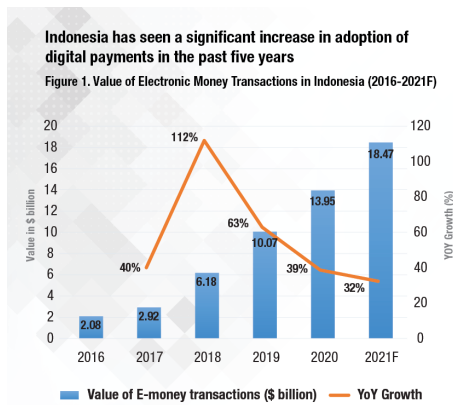
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1. Introduction

Indonesia's recent success in reducing deforestation has attracted broad international donor interest to support this development and fill the funding gap of the FOLU Net Sink 2030 Operational Plan (estimated at 1bn USD per yearⁱ), which is key to achieving Indonesia's NDC. In support of this strategy, various initiatives and forest emission reduction programs are being implemented by several donors. Local communities play an important role in achieving these objectives and therefore need to be fairly rewarded through benefit-sharing mechanisms. Similarly, innovative incentive schemes, such as Basic Income for Nature and Climate,ⁱⁱ will require efficient and equitable distribution of financial benefits on the ground. Several examples around the world have shown that incentivising forest conservation through conditional direct payments is an effective way to reduce deforestation at the local level while improving rural livelihoods (see **Box 1**). However, in Indonesia the implementation of such incentive mechanisms has been limited to local initiatives led by the private sectorⁱⁱⁱ and current benefit-sharing approaches for forest emission reduction programs use top-down mechanisms that channel financial resources through all levels of government, raising concerns about equitable distribution of funds and accountability. At the same time, the use of mobile money is common for a large part of society and its penetration has been steadily increasing, reaching \$18.5 billion worth of transactions in 2021 (see **Figure 1**). The penetration rate of the digital payments industry in Indonesia was 57.41% in 2021 and is expected to rise to 85.47% in 2027 (**Figure 2**). Experience from other countries, such as Kenya (M-Pesa), has demonstrated the suitability of mobile money transfers for rural areas as well as their great potential for poverty alleviation^{iv}, while beneficiaries of digital cash transfers in the Philippines have emphasised the ease of withdrawals and reduction in time costs, such as travel, waiting and processing time^v. Similarly, charity NGOs such as GiveDirectly are building on mobile money to alleviate poverty in Africa while contributing to the growing body of research on universal basic income^{vi}. Despite the fact that different financial technology (fintech) solutions, such as mobile money transfer systems (also referred to as e-wallets) require different enabling environments (e.g. internet or mobile networks), they can facilitate the establishment of financial channels down to the individual level and could be used as benefit-sharing mechanisms for emission reduction programs in the forest sector. This discussion paper presents some of the benefits and challenges of using mobile money transfers for local benefit-sharing and aims to give guidance on how to address the "last mile question".

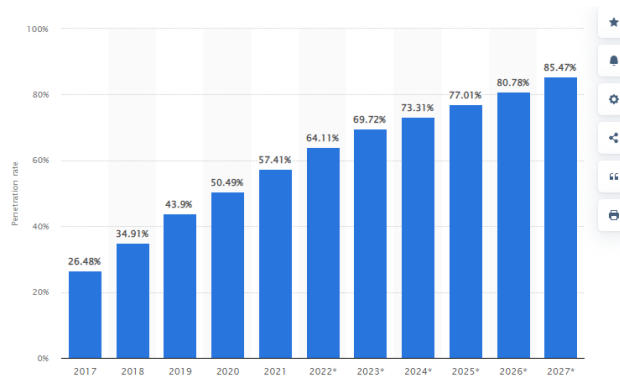


Source: Bank of Indonesia, Asian Banker Research

Figure 1: Adoption of digital payments in Indonesia (in USD).

Source:

<https://www.theasianbanker.com/updates-and-articles/big-tech-platforms-heat-up-competition-in-indonesias-digital-payments-landscape>



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Figure 2: Penetration rate of digital payments market in Indonesia from 2017 to 2021, with forecasts to 2027. Source:

<https://www.statista.com/forecasts/1326599/indonesia-digital-payments-market-penetration-rate>

2. Conceptualization

A fintech approach to benefit-sharing would require each individual participant or household to register with the scheme implementers (typically an NGO or government agency) and with the financial service provider by using an ID card (e.g. *Kartu Tanda Penduduk* – KTP in Indonesia). Upon verification of progress or the conditionality agreed upon in the contract, (e.g. that forest cover is maintained at plot or district level), the transaction would be made to each mobile account registered with the project on a regular basis (e.g. monthly). The sophisticated fintech ecosystem in Southeast Asia provides an opportunity to use this financial infrastructure to incentivise forest conservation while contributing to poverty alleviation. In particular, digital wallets (see technical explanation below) may be used to receive these payments.

2.1. Digital wallets

Digital wallets or mobile money can be used to transfer cash to individuals who do not have access to traditional banking services. They can also be used to make payments at local retail stores, or online, and to withdraw cash from banks, ATMs, and kiosks (see **Figure 3**). These services can be accessed via mobile phones and linked to a bank account, while the balance can be topped up with cash at a physical location, such as a convenience store. They typically require the user to register with their mobile phone number and provide some form of identification.

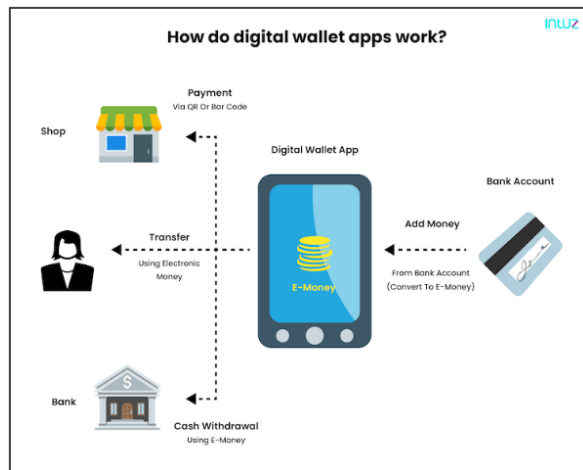


Figure 3: Financial transfers using digital wallets. Source: <https://www.businessofapps.com/insights/digital-wallets-in-2021-for-the-tech-savvy-generation/>

On the African continent, the use of digital transfers has spread rapidly over the past decades, facilitating transactions and promoting financial inclusion. Recipients of digital transactions now have the options of saving, paying bills, or cashing-out at a local mobile money agent (see **Figure 4**). In Kenya these local mobile money agents, who are paid on commission by the mobile operator Safaricom, play a central role in facilitating various services^{viii} (see **Figure 5**). They



Figure 4: M-PESA agent in Kibera, Nairobi, Kenya. Picture credit: Fiona Graham / WorldRemit^{vii}

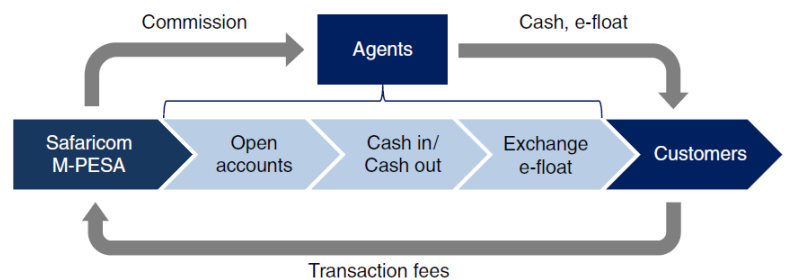


Figure 5: Value chain of M-PESA transactions. Source: Omigie, N. O., Zo, H., Rho, J. J., & Ciganek, A. P. (2017)

serve as one-stop-shops for opening accounts, cash-in/out and exchanging virtual money (e-float). However, it should be noted that M-Pesa is a transfer system that is based on mobile network operators, which is not common in SE Asia.

2.2. Digital wallets in Indonesia

In Indonesia the most popular digital wallets include DANA, LinkAja, GoPay and OVO. Besides cash withdrawals and cash transfers, the e-float saved in digital wallets can also be used as a payment method in stores that have adopted QRIS (Quick Response Code Indonesia Standard). This allows owners of different digital wallets to pay via a QR-code, which needs to be scanned by the buyer to finalise the payment.

For the use of digital wallets, several preconditions need to be met:

- Adequate telecommunication infrastructure, such as network coverage and internet connectivity.
- Ownership of mobile phones by local individuals or households. Smartphones are required if the system is not SMS-based like M-Pesa.
- Network of ATMs, Indomaret/Alfamart, and Pegadaian who can accept digital payments.

To facilitate access to cash withdrawals and other financial services, several digital wallet providers have established a cooperation with banks or kiosks. As local ATMs and kiosks are taking the role of agents, the accessibility of cash withdrawals of e-float has already improved considerably. Nevertheless, the coverage of these cash-out points is generally lower in rural areas, where ATMs and kiosks are scarce. A map of agent distribution (non-exhaustive list) in Tanah Papua can be accessed [here](#).

As per March 2023, the following cash withdrawal services have been offered by the various fintech providers in Indonesia:

- **DANA:** users can withdraw their money at ATM BCA, Alfamart or Pegadaian.
- **LinkAja:** users can withdraw their money at ATM BNI, BRI, Mandiri, BTN, Indomaret or Alfamart.
- **GoPay:** users can withdraw their money at ATM BCA, BNI, BRI, Mandiri, Indomaret or Alfamart.
- **OVO:** users can withdraw their money at ATM (must use card), Indomaret or Alfamart.

GoPay, currently Indonesia's most popular e-wallet^x, offers the cash-out-option via ATMs operated by Bank Central Asia (BCA) without being required to have a BCA account or BCA card^x. Moreover, ATMs operated by BNI (Bank Negara Indonesia), BRI (Bank Rakyat Indonesia) and Bank Mandiri may also be used to

cash out e-float received via GoPay. In addition, kiosks like Indomaret and Alfamart serve the same purpose. As compared to other ATMs, BRI has a wide network in rural areas, making it a potential partner for piloting a benefit sharing system that builds on bank accounts but facilitates transfers via e-wallets and cash withdrawals via agents in these areas. The rapid growth and development of digital-wallets and the increasing integration with other fintech providers, banks and kiosks is likely to improve the coverage of these services in the future^{xi}.

To expand this network of agents, several banks in Indonesia have established partnerships with local communities, enabling individuals and small businesses like *warungs* (= local restaurants in Indonesia) to act as authorised agents. These agents provide various services to individuals in rural areas who lack easy access to bank branches. Some of the services offered include cash deposits and withdrawals, money transfers, bill payments and prepaid card top-ups. This initiative aims to enhance financial inclusion across Indonesia.

Here are a few examples of such agent services (agents working for Agen46 and BRILink are included in the agent map of Tanah Papua above):

- Agen46 by BNI (extensive coverage in Tanah Papua)
- BRILink by BRI (extensive coverage in Tanah Papua)
- Mandiri Agen by Bank Mandiri (coverage in Tanah Papua but data is unavailable)
- Laku BCA by BCA (discontinued its services in 2023)

2.3. Prepaid cards in Indonesia

As an alternative to digital wallets, prepaid cards such as Flazz, E-money, and BRIZZI offer a cashless transaction option for individuals without a bank account or access to a mobile phone. Conditional cash transfers could technically also be transferred to these cards, thus providing an incentive for forest conservation. However, the use of prepaid cards comes with the following conditions:

- Established local network of agents, such as convenience stores, or kiosks where people can top-up their prepaid card.
- Acceptance of prepaid cards as a payment method by merchants and stores.

In Indonesia, the prepaid card must be recharged using NFC (Near Field Communication) technology, thus requiring physical cards to be present for topping up the credit balance (see **Box 2**). One major disadvantage of using prepaid cards, as compared to digital wallets, is that the balance on the prepaid

card cannot be directly withdrawn in cash or transferred to a digital or bank account unless the card is deactivated. Also, the distribution of funds (=transfers) requires the physical proximity of the card to a transaction device. The so-called Family Welfare Card (*Kartu Keluarga Sejahtera - KKS*)^{xii} which is being used as a medium for distributing government aid funds has the advantage that cash withdrawals at ATMs at four traditional banks (BRI, Bank Mandiri, BNI and BTN) are also possible while the funds can be distributed to the connected bank accounts without NFC.

2.4. Digital remittance platforms

Digital remittance platforms such as MoneyGram or Western Union offer another way to send money digitally without the need for a bank account. These platforms can be accessed through a mobile app or website and allow users to send money to a recipient in another location. The recipient can then pick up the cash at an agent location by filling out the form and providing a reference number provided by the money sender (see **Figure 6**).

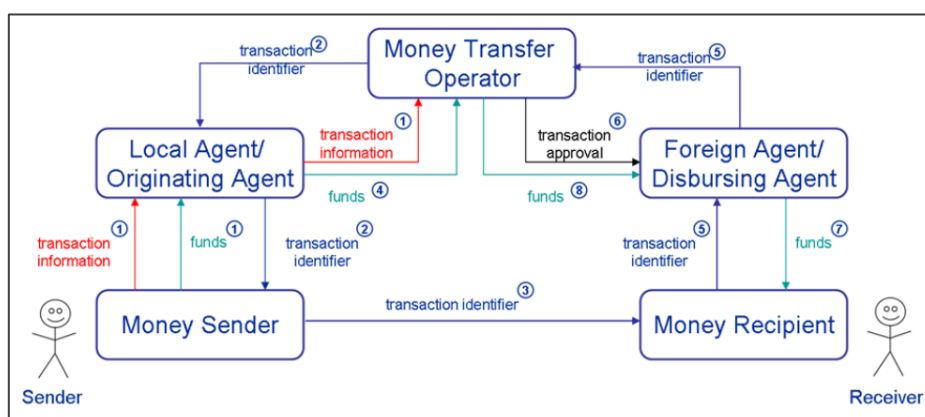


Figure 6: Transaction chain of digital remittance platforms

The table below shows the partner banks and institutions of MoneyGram and Western Union in Indonesia that facilitate money transfers and allow recipients to pick up their cash.

Platform	Partner	
	Banks	Non-Banks
MoneyGram	<ul style="list-style-type: none"> - BRI - BCA - CIMB Niaga - Bank Mega - Bank BTN 	<ul style="list-style-type: none"> - PT Pos Indonesia

Western Union	<ul style="list-style-type: none"> - BRI - BCA - BNI - Bank Mandiri - CIMB Niaga - Bank Syariah Indonesia - Maybank 	<ul style="list-style-type: none"> - Pegadaian - PT Pos Indonesia - JNE - TIKI
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3. Benefits and challenges of mobile money transfers

Local communities often live in remote villages with limited infrastructure and access to financial services, as well as informal land tenure. Here village governments often play a central role in distributing financial benefits to local people. In typical REDD+ or PES (Payments for Ecosystem Services) benefit-sharing arrangements funds are channelled through various levels of government or intermediaries (e.g. FONAFIFO in Costa Rica or CONAFOR in Mexico) before village governments are ultimately tasked with developing benefit-sharing plans and agreements with the local households or individuals. However, these arrangements are complex and often face challenges such as corruption, high transaction costs, illegitimacy of recipients and elite capture by intermediaries, government officials and community leaders. Fintech solutions, such as mobile money transfers could facilitate benefit-sharing through more direct transfers and remove actors or “middlemen” from the benefit distribution process (see **Figure 7**), thereby reducing ex-post transaction costs and the risks of corruption and elite capture^{xiii}. However, ex-ante transaction costs will remain as negotiating contracts with stakeholders, scoping project sites and developing environmental and socio-economic baselines requires significant start-up capital. Other potential benefits are financial inclusion of unbanked or underbanked communities in structurally weak rural areas, higher and more flexible payment frequencies than in conventional PES or REDD+ schemes, and improved confidentiality, as middlemen are removed from the transaction chain. Finally, the use of mobile money transfers could lead to positive socio-economic outcomes, promoting women’s empowerment and building on the success and experience of similar systems such as M-Pesa in Kenya, which has lifted 2% of Kenyan households out of poverty^{iv}. At the same time, standing forests could be given an economic value, potentially changing local land-use decisions.

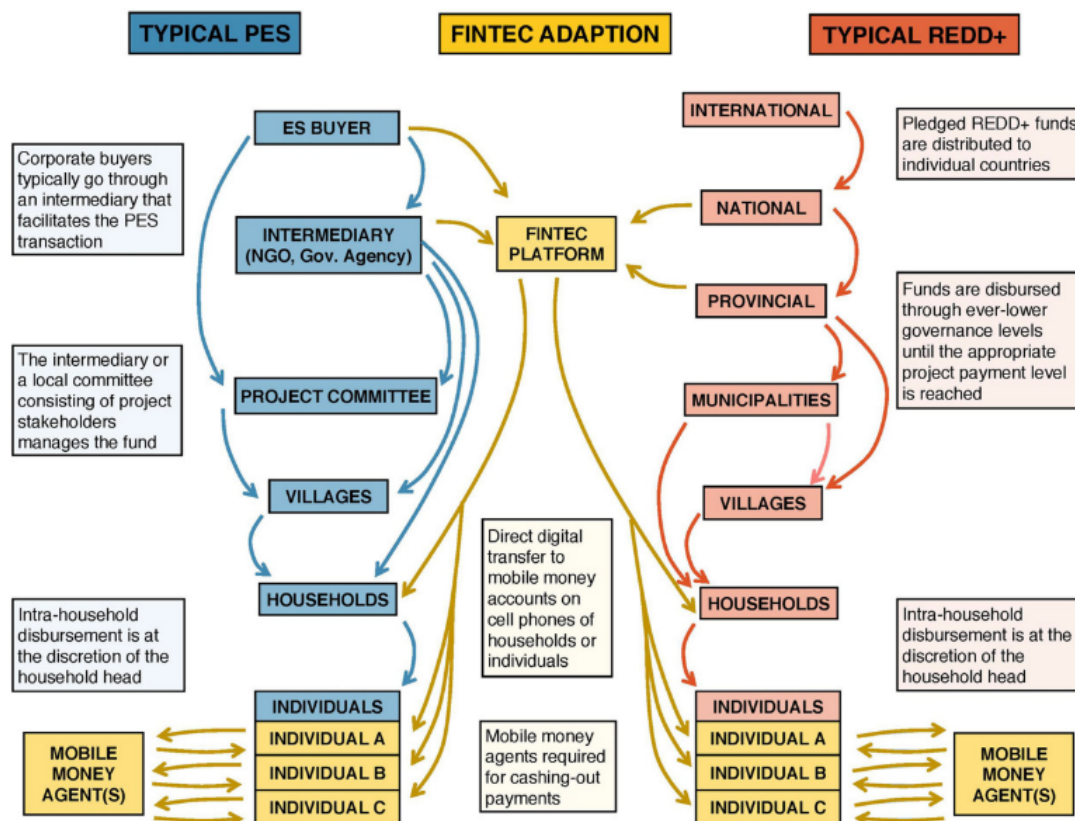


Figure 7: Schematic of typical benefit distribution chains in private sector PES schemes (Blue), the international REDD+ program (Red), along with the adaptations that would be available through fintech mobile payments (Yellow).
Source: Thompson, B. S. (2017)

On the downside, fintech approaches to benefit-sharing can also be subject to political complexities and manipulation, which can lead to misallocation of funds. Therefore, there needs to be a high level of integrity and the agency of an independent verification body to check forest conservation outcomes and financial disbursements. In addition, traditional banks and fintech platforms would need to be convinced, while the revenue from transaction fees (typically <1% of the amount transacted) could be low due to the small payment amounts. Nevertheless, the large number of beneficiaries (= sellers of ecosystem services) and hence transactions to be processed may attract the interest of these companies. Another challenge would be to establish an infrastructure of mobile money agents for cashing-out payments as rural economies are particularly dependent on cash transactions. The current network of ATMs and local kiosks may not be sufficient for beneficiaries of forest emission reduction programs in rural Indonesia if the distances are too great, especially considering the poor mobility in these areas. Partnering with multiple financial service providers (banks and e-money issuers) would improve the coverage of access points.

Experience from the Philippines has shown high satisfaction with digital cash transfers during a COVID-19 economic support program implemented through a partnership with six financial service providers, three of which were e-money issuers^v.

4. Conclusion

The high penetration of fintech, which offers mobile money solutions in Indonesia, combined with the increasing availability of forest climate finance, has the potential to facilitate local benefit-sharing using mobile money transfers. This could make benefit-sharing under forest emission reduction programs more effective, efficient and equitable by making financial incentives for forest protection directly accessible at the local level. At the same time, it could improve the financial inclusion of individuals who are currently unbanked and encourage the use of financial services. Nevertheless, having a bank account at one of the traditional banks (e.g. BRI) would be an important basis for harnessing the ease of transactions through fintech. A CSR (Corporate Social Responsibility) campaign that incentivises the opening of bank accounts for later financial disbursements for the maintenance of forest cover could achieve this for a high share of the population in a jurisdiction. In addition, existing government aid transfer mechanisms like the Family Welfare Card (KKS) could be used to transfer incentives for conservation to local beneficiaries.

Technical constraints could be the establishment of the required infrastructure i.e. the coverage of agents or ATMs where beneficiaries can cash out financial benefits, which would be a challenge for its implementation in rural Indonesia. Partnering with several banks and fintech providers or expanding the GoPay services offered by kiosks such as Indomaret (currently only a payment and top-up option) could further improve this coverage. In addition, a suitable (government) actor would need to be identified to monitor forest cover on a monthly basis in a pilot district and trigger disbursements via a financial institution.

Field testing of mobile money transfers at spatially limited scales (e.g. at district level) has the potential to explore new financial channels to directly engage local communities in the benefit-sharing of national and sub-national forest emission reduction programs. As a first step, feedback from banks involved in government aid programs as well as fintech providers could be sought to clarify the technical feasibility and economic viability of integrating PES/conditional cash transfers into existing financial infrastructures. Once these technical issues have been resolved, other design principles, such as the conditionality of payments, need to

be discussed. If successful, the resulting scheme could be easily scalable and pave the way for a national PES scheme, which has often been advocated in the Indonesian context^{xiv}.

ANNEX

Box 1: The “Incentivo Forestal Amazónico” (IFA) in Colombia

The Incentivo Forestal Amazónico (IFA) is **being implemented** by three local environmental authorities (Corporaciones Autónomas Regionales - CARs) in the Colombian Amazon region CORPOAMAZONIA, CDA and Cormacarena, **and covers** the states of Caquetá, Guaviare, Meta, and Putumayo, where deforestation rates continue to be high. The incentive is a direct payment to individuals for forest conservation on private lands, based on conservation agreements between the CARs and members of local communities. For the spatial prioritization of the mechanism, population density and availability of forest resources are **taken into account**. The mechanism is a transitory measure to support local communities until alternative (forest-based) income opportunities are established.

In 2022 a total of over 2,000 conservation agreements were signed, which cover 114,000 ha of forest landscapes in the Colombian Amazon region. Through this financial mechanism 1,2 million EUR (6,000 million COP) have been disbursed since 2017. The verification of forest conservation (MRV) is done at the national level by the National Forest and Carbon Monitoring System (Sistema de Monitoreo de Bosques y Carbono - SMBYC), which is administered by an environmental entity (IDEAM) under the Ministry of Environment and Sustainable Development (MADS). The compliance with the conservation agreement is verified via the use of satellite images and field visits by the CARs. The conditional monthly payment is disbursed after the verification of compliance with the conservation agreement (i.e. if no deforestation is detected in the plots). So far, the rate of compliance has been at 97%, which reflects the effectiveness of this transitory measure for forest protection.

The transaction to local landowners is facilitated by BanCO2, which serves as the financial platform for the actors involved. Each beneficiary needs to establish a bank account at Bancolombia and if forest conservation is verified by IDEAM, the monthly payment will be disbursed to that account via BanCO2. At the same time, BanCO2 supports the communities in developing so-called “*planes de vida*” to make sustainable choices for the investment of these funds.

Box 2: The use of Near Field Communication for cashless payments

Near Field Communication (NFC) is a wireless communication technology that enables two devices to communicate when they are in close proximity. NFC is commonly used for contactless payments, allowing users to make purchases by simply tapping their NFC-enabled device or card on a compatible payment terminal. Popular mobile wallets, such as Apple Pay, Google Pay, and Samsung Pay as well as contactless debit and credit cards, tablets, and smartwatches, support NFC.

NFC requires close proximity between the devices in order to establish a connection. This makes NFC a secure option for transmitting sensitive data such as payment information. The maximum distance for NFC communication is typically around 4 centimetres. An NFC-enabled reader is needed in order to accept NFC payments.

NFC technology for payments has been widely adopted in Indonesia, particularly for NFC-enabled prepaid cards like Flazz (BCA), E-money (Mandiri), and BRIZZI (BRI). Prepaid cards can be topped up using NFC through a variety of methods, including ATMs, e-commerce, transportation stations, kiosks, and post offices. In addition to Alfamart and Indomaret, Circle-K is another popular retail chain that offers prepaid card top-up services in Indonesia.



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