

Boosting financial inclusion through social assistance reform: evidence-based approach in selecting a payment system

Hilman Palaon, Sudarso Kaderi Wiryono,
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Abstract: *Digitizing social assistance for the poor has been proven to increase financial inclusion. The Indonesian Government initiated reform for non-cash social assistance disbursement in 2016. Evidence-based policy approach is an effective technique for informing the government on appropriate new regulations. A pilot project involving 4,295 participants was conducted to evaluate the following payment systems: debit card, mobile money, QR code (quick response), and NFC (near field communication). Beneficiaries utilized the funds for cash withdrawals and food purchases at bank agents. Quantitative and qualitative methods were employed in the analysis. The government decided to use debit card with multiple wallet features. A new regulation was made to support the implementation in 2017, and by the end of 2019, the government provided more than 12 million new savings accounts to the poor. Potential future improvements are proposed for the sustainability of the solution, which include a disbursement providers' revenue model, broader financial services involvement, bank agents' inventory system, and optimizing the latest innovations.*

Keywords: financial inclusion, social assistance, payment system, evidence-based policy, digitization, Indonesia

Background

INDONESIA IS THE FOURTH MOST populous country in the world with a population of 268 million in 2019. In 2007, the percentage of poor people in Indonesia was 16.58 per cent and continues to decline every year, finally becoming 9.22 per cent in 2019 (Statistics Indonesia, 2020). Since 2007, the Indonesian Government has allocated aid funds aimed directly at the poor and vulnerable through various programmes, which are commonly known as government to person (G2P) programmes for the poor. The programmes include social assistance and subsidies, which can be in the form of cash transfer, goods, and services. In 2017, there were 25 flagship G2P programmes that spread across several ministries or implementing agencies and targeted poor individuals and families with a total annual budget of IDR 204 tn (or equivalent

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to US\$13.6 bn). These programmes are grouped into eight sectors, namely, food, education, health, energy, social and economic, housing, agriculture, and marine and fisheries (TNP2K, 2018). Government policies, in providing various G2P programmes, are considered to have a significant contribution in reducing the poverty rate.

Since 2007, the distribution of aid in the form of cash was initially channelled through the post office. The post office was chosen as a distribution point because of its ability to reach all corners of Indonesia. Various obstacles were found during the disbursement of cash using this mechanism, including: high risk of fraud, leakage of funds, expensive distribution costs, duration to reach all beneficiaries, and so forth. Finally in 2016, the Indonesian Government decided to reform the disbursement of social assistance using a non-cash mechanism with the aim of accelerating both poverty alleviation and financial inclusion. Use of the payment system in formal financial institutions was adopted as the right solution to eliminate fraud for funds provided to the poor and to provide the unbanked with access to financial services. Zimmerman and Holmes (2012) argue that there are three benefits of channelling social assistance through savings accounts: beneficiaries are given access to savings and investment; financial institutions get additional capital flows and new customers; and the government can save costs and reduce fraud.

In-depth analysis and proof of concept are required in determining policies related to the non-cash solution to be used. Evidence-based policies can support effective implementation of a reform, in this context related to the selection of a payment system for social assistance disbursement. One approach is to conduct a pilot project to examine some options that will be used, in a limited scope, prior to the implementation on a national scale. The pilot must be complemented with in-depth evaluations to discern best practices that will contribute to evidence-based policy making (Sanderson, 2002).

The Indonesian Government decided to conduct a pilot project trying out payment system solutions available and ready to be implemented. It involved banks and telco operators, and four payment system solutions: debit card, mobile money, quick response (QR) code, and near field communication (NFC). Two forms of financial or payment products were used in this pilot: basic savings account and registered electronic money. Two types of government assistance programmes were tested, specifically funds that can be withdrawn in cash (conditional cash transfer programme), and funds that can only be spent for buying food (food assistance programme). Disbursement channels used ATMs and bank agents, which included local goods shops. ATMs can only be used to make cash withdrawals, while pilot participants using bank agents could purchase goods as well as withdraw cash. Bank agents are micro-enterprises that already have a business. They are expected to use funds from their business activities to provide financial services. They get additional profits from financial service providers in the form of transaction fees.

The purpose of this paper is to explain how the Indonesian Government succeeded in reforming the disbursement of social assistance from cash to a non-cash payment system and at the same time, increasing ownership of savings accounts to accelerate the financial inclusion index. Four types of payment system solutions are explained and successfully piloted. The analysis was conducted by comparing

each solution based on the stages of implementation, starting from opening an account, continuing with the distribution of assistance, and, lastly, when beneficiaries made a transaction. As a result, a new policy was made. The decision taken by the government to develop it is based on evidence from the pilot. Some lessons and findings from the pilot are included in several articles in the policy document. Furthermore, the implementation of non-cash social assistance reforms has implications for providing new savings accounts for the unbanked. This approach has proven to contribute to increasing the country's financial inclusion index. Discussions about the contents of existing policy are provided to gain insights for further improvement and future research.

Literature review

Most of the poor, who are the beneficiaries of government assistance programmes, are unbanked. G2P payment is considered to be a solution to expanding financial inclusion to the poor. This approach is used as the first step to introduce formal financial services to them. Some evidence from implementation shows that G2P beneficiaries will start using financial services if the services are proposed to them. Brazil, India, Mexico, and South Africa are the four countries that pioneered the distribution of G2P through financial institutions (Pickens et al., 2009).

Barca et al. (2013) analysed three successful payment systems implemented in Kenya for cash transfer social protection: smart cards, post offices, and M-Pesa mobile money. They suggest flexibility in designing cash transfer solutions by considering the readiness of beneficiaries, costs, and technology availability. A solution that has been successfully implemented in one country may not necessarily be easily implemented in another. Various supporting factors in the success of a payment solution needed to be considered. The experience of other countries could be used as a reference, but to determine which solution is most appropriate for Indonesia is a challenge. The problem was how to understand the conditions in Indonesia and to choose the most appropriate solution.

The debit card is one of the electronic forms of payment that has been widely used in the last three decades, and in many countries this solution continues to grow. This instrument is used to withdraw cash at ATMs and replace cash for payments at merchants with a POS (point of sale) system or EDC (electronic data capture) device. QR and NFC are new technologies for payments. They have evolved in the last decade due to the rapid growth of smartphones and payment apps. Today, users can make transactions very easily and comfortably using these two solutions. De Luna et al. (2019) conducted a study to identify factors that influence customer adoption of these two payment systems in Spain. The study revealed that users have no difficulties in using the systems, and that social influences and usefulness are the most important variables motivating them to use the solutions.

Mobile money is an innovation using cell phones for providing financial services. It was first introduced in the Philippines in 2001 and has achieved success through M-Pesa in Kenya since 2007. This solution has contributed greatly to the success of the financial inclusion agenda by providing financial services access to the poor

and unbanked (Aron, 2018). Currently, mobile money has been implemented in 90 countries. This solution grows rapidly in line with the increasing use of smartphones and the internet. In Africa, mobile money solutions are provided mostly by mobile network operators, whereas in Asia, collaboration between fintechs, technology providers, and financial institutions has begun to dominate. More than 60 per cent of the adult population have mobile money accounts in several countries in sub-Saharan Africa, while in eight countries in Southeast Asia, the level of ownership of this solution reaches only 20 per cent of the adult population (Pasti, 2019). Mobile money and digital financial services in Indonesia have been widely implemented since 2014, in line with the issuance of revisions to the central bank's regulation on electronic money (Indonesian Central Bank, 2014).

Branchless banking solutions contribute to serving the poor by utilizing banking agents as an extension of financial institutions, particularly those in rural areas. Cooperation with bank agents is a solution for presenting a point of financial transactions without the need to build new branch offices and allowing customers to conduct financial transactions at low cost (Ivatury and Mas, 2008). In the pilot, bank agents' services were distinguished based on their type of business. Grocery stores can provide cash withdrawals and food purchases, but other types of business such as cell phone credit sellers can only provide cash withdrawals.

Pilot project

Pilot projects were carried out in eight cities/districts in six provinces. The selection of pilot location was based on the following conditions: readiness of the solution provider, the availability of funds, the availability of bank agents, and representing the area of Indonesia. The distribution of pilot participants and solutions is illustrated on the Indonesian map in Figure 1. Nearly 60 per cent of the population lives on the Java Island, which is the reason why the largest number of pilot participants are in this region. Sumatra is the second most populous island located in western Indonesia, while Sulawesi is the representative for eastern Indonesia. Pilot participants were poor households that are beneficiaries of the rice subsidy programme. They are listed in the 2016 beneficiary data and have been verified by the village offices. There were 4,295 pilot participants and 62 bank agents spread across six cities (urban areas) and two districts (rural areas).

The pilot project conducted in 2016 was coordinated by the National Team for the Acceleration of Poverty Reduction (TNP2K) supported by Presidential Staff Office, Coordinating Ministry for Human Development and Culture, Ministry of National Development Planning, Ministry of Social Affairs, Central Bank of Indonesia (BI), and Financial Services Authority (FSA). Five banks and one telco operator participated in this pilot. Other methods examined included a debit card solution proposed by two banks, a mobile money solution proposed by one bank, a QR code solution proposed by one bank, and an NFC solution proposed by one bank in collaboration with the telco operator. Descriptions for the four payment methods used in the pilot are provided in Table 1. Evaluations of payment solutions were performed to identify and compare limitations, strengths, and readiness for implementation on

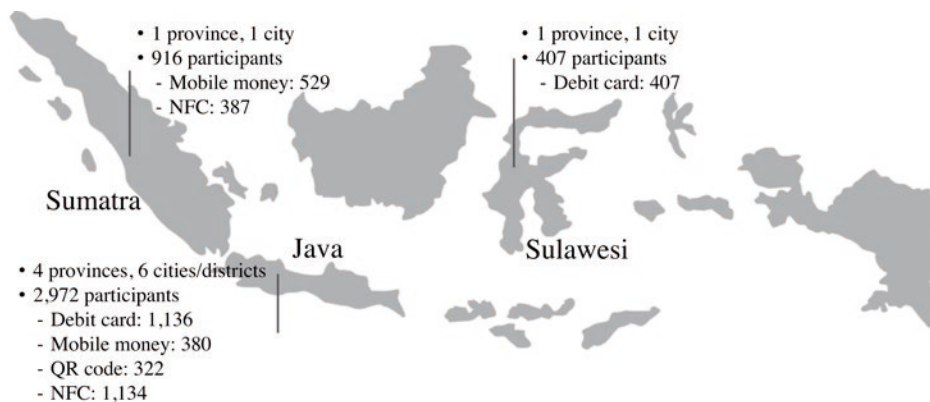


Figure 1 Distribution of pilot participants and solutions

Table 1 Payment mechanism description

Payment method	Description	Requirement/Note
Debit card	A plastic card that is given to savings account holders and can be used for cashless payments to make purchases and for cash withdrawals at ATM. POS (point of sale) system/EDC (electronic data capture) device is required for transactions at bank agents.	Savings account at the bank.
Mobile money	Using the concept of electronic money as a means of payment where the value of the money is stored in certain electronic media. Users must first deposit their money, and their mobile number is an electronic money account number that can be used for payment using a cell phone.	Cell phone (feature phone, not necessarily smartphones) and mobile number.
QR (quick response) code	Payment method by scanning the QR code using a mobile application on a smartphone/tablet. Beneficiaries are given a unique QR code that is printed on a piece of paper. The bank agent will scan the QR code using the camera on a smartphone/tablet when a transaction is made.	QR code as an account number.
NFC (near field communication)	Payment using NFC technology to exchange data between payment devices and NFC readers. The beneficiary is given an NFC sticker as a means of payment, and the agent uses a smartphone that has an NFC reader feature. In conducting transactions, the NFC sticker must be close to the smartphone used by the agent, usually less than 5 cm.	NFC sticker and mobile number. The NFC sticker is connected to the beneficiary’s mobile number; the cell phone is required to initiate a transaction and to receive SMS notifications.

a broader scale. Sources of funding for the pilot were from participating banks and telco and were mostly allocated from their corporate social responsibility funds.

The entire pilot study took nine months, the first five months for preparation and coordination, two months for disbursement with two phases of transaction, and the

last two months for evaluation and report development. During the disbursement period, if in the first phase the beneficiary had not utilized the funds or if there were remaining funds, then the total funds were carried over to the second phase. Three main processes were evaluated: registration, distribution, and transaction.

The registration process included opening and activating the savings accounts of the participants. Two concepts were used for opening an account, namely mass or bulk registration and individual online registration. For bulk registration, data required for KYC (know your customer) were gathered and given to the bank for multiple beneficiaries, and the bank opened an account for all beneficiaries at the same time. In the other concept, each beneficiary was required to come to the bank agent to fill KYC data through a smartphone application. After that, the beneficiary's data were uploaded to the online registration system. After the savings account had been opened by the bank, each beneficiary had to activate the account. There were three methods of account activation: at a special counter prepared by the bank at the village office; through a workshop with beneficiaries; or at the bank agent.

Participating banks prepared an escrow account for the funds. The distribution process was performed by transferring funds from the escrow account to the beneficiary's savings account in real-time online. Several aspects were analysed for each solution: the payment/savings instrument given to the beneficiaries; the supporting device used by the beneficiaries; and type of funds transfer notification provided to beneficiaries. The transaction process is when the beneficiaries use funds for food purchases at bank agents or make cash withdrawals at a bank agent or ATM. Some aspects assessed in this process are related to the tools used by beneficiaries and bank agents, the form of transaction notifications, ease in conducting transactions, and any costs incurred.

Methodology

Data were collected using quantitative and qualitative methods. A face-to-face survey using a questionnaire was conducted to collect quantitative data. This survey aims to obtain information related to the experience of beneficiaries with banks and cell phone usage. Qualitative data were obtained by using samples from interviews and observations during the pilot. Interviews were conducted using the semi-structured technique. The interview focused on the experience of beneficiaries using the solution, starting from registration process, the distribution of funds, to conducting transactions. The number of respondent samples was determined based on the number of pilot participants for each solution. Observations through a spot check mechanism were conducted to assess problems that arose. A survey using a Likert scale was conducted to assess the satisfaction of recipients and bank agents regarding payment solutions. Descriptive analysis was used to describe the data and to compare the four solutions. Pilot findings are the basis for decision making and for creating a new policy. The contribution of the successful implementation of non-cash social assistance to financial inclusion was assessed through an increase in the financial inclusion index. Further analysis of the developed policy was carried out to propose potential improvements that were needed and for future research.

Findings

Debit card

The government provided information about the beneficiary's personal data required for the KYC. The banks opened new savings accounts in bulk. The following information is required for completing simplified KYC: name, national ID card number, address, place and date of birth, occupation, and mother's maiden name. However, for confidentiality, the mother's maiden name was obtained during face-to-face meetings with the beneficiaries at account activation. The savings account can be used after the activation process. The account activation was carried out by opening a special counter at the village office. Beneficiaries were required to come in accordance with a predetermined schedule and to bring their national ID card. Bank employees conducted data validation and face-to-face meetings to complete the KYC requirements. Then, the beneficiaries received a passbook, debit card, and PIN. The savings account became active no later than 24 hours after completing the activation process.

The debit card solution lacked real-time funds transfer notification from the banking system sent to the beneficiary. Funds transfer information was given verbally. The bank cooperated with the village office in communicating it to the beneficiaries. Funds could be checked at the bank branch office by bringing a passbook or using a debit card through an ATM or bank agent. An EDC device was provided to the bank agent for cash withdrawals and food purchases with a debit card. With this solution, there were no costs incurred when conducting transactions, and beneficiaries did not need to use additional devices.

Funds could be used at ATMs and bank agents. ATMs only provided cash withdrawals by using the common method in which beneficiaries came to the pilot participant bank's ATM, then entered a debit card followed by a PIN and selected the desired nominal value. The total amount that could be withdrawn from ATMs had to be in accordance with the cash denomination available at the ATM machine. Any left-over funds beyond what could be withdrawn could be withdrawn from bank agents. Beneficiaries came to the bank agent to buy food and/or to make cash withdrawals using a debit card with a PIN on EDC. If the transaction was successful, the beneficiaries received a receipt from the EDC device. The receipt showed the transaction amount and the remaining funds from each wallet that could still be used (if any). Funds in the beneficiaries' account from the food wallet and/or cash wallet were debited after the transaction succeeded. A problem that often occurred during transactions was the beneficiary not remembering their PIN. The account was blocked if the customer entered the wrong PIN three times, requiring the beneficiary to visit the bank branch office to unblock the account and get a new PIN.

Mobile money

The account registration and activation process was carried out in the form of a workshop at the village office, attended by bank employees, beneficiaries, and village officials. The bank performed the KYC and beneficiaries received a new

SIM card. A new SIM card was given to simplify the registration process. After the pilot was complete, the SIM card will remain active if the beneficiary wants to continue using it. The new mobile number was used as the savings account number for the mobile money solution. Beneficiaries performed two types of activation, first for the newly provided SIM card and then to activate the mobile money account. The activation process required beneficiaries to use cell phones. Beneficiaries who did not have cell phones borrowed them from their neighbours or family. The mobile money account was activated immediately after the process was successful, and beneficiaries received SMS notification. Two types of security were required for this solution: a PIN for logging into the mobile money account and a one-time password (OTP) sent via SMS for conducting transactions.

Funds transfer notification was received via SMS by beneficiaries as long as their cell phone was active, using the provided SIM card. Bank agents were equipped with EDC devices that had a cash withdrawal feature and a cashier POS system. In conducting transactions, beneficiaries used cell phones with their registered cell phone numbers and initiated transactions using the unstructured supplementary service data (USSD) mechanism. Accessing USSD via cell phone usually started with an asterisk (*), continued with numbers, and ended with the pound/hashtag symbol (#). The cost incurred for accessing USSD was 0.7 cents (US\$) and for receiving OTP was 3.8 cents, deducted from beneficiaries' cell phone credit according to the usage. To work around this charge during the pilot period, the bank provided credit assistance of 35 cents for each beneficiary's phone number.

Cash withdrawals and food purchases were done at a bank agent. The transaction process was initiated by the beneficiary using a cell phone to access the transaction menu via USSD and select the type of transaction. Thereafter, the beneficiary received an OTP code via SMS. The OTP is a dynamic password only valid for 15 minutes. The bank agent verified the customer and selected the type of transaction in the agent POS system using EDC. The agent then entered the beneficiary's cell phone number, total amount of transaction, and OTP code from the beneficiary. Finally, after a successful transaction, the customer received a notification via SMS and the EDC device printed the receipt. Challenges occurred during transactions due to the condition of the telecommunications network and the reliability of the POS system; for example, if a connection failure occurred when the beneficiary was accessing USSD, it would start from the beginning with a new charge. Also the EDC device sometimes took more than 15 minutes, causing the OTP code to expire so that the customer had to request a new one.

QR code

The QR registration process was conducted at the bank office. The central government and local governments provided validated data on beneficiaries, and the bank performed bulk account opening and simultaneously activated beneficiaries' accounts. The beneficiaries received a letter from the bank informing them of the pilot schedule and guidance for fund disbursement. The QR was printed on a letter sent to the beneficiaries along with the PIN. Beneficiaries' savings account numbers were converted by the bank in the form of a QR code. Each customer received a

unique QR complete with a PIN for transactions. Banks did not require additional activities of beneficiaries. The letter was used as a tool for making payment.

Similar to the debit card solution, the QR solution cannot provide real time notifications for beneficiaries regarding funds transfer. The bank was assisted by village officials in sharing the funds transfer information verbally to the beneficiaries. The beneficiaries did not require additional devices such as cell phones in conducting transactions. The bank agents were required to have a smartphone or tablet connected to the internet in order to serve customers.

To make a transaction, the beneficiary came to the nearest bank agent with a letter from the bank and a national ID card. The customer showed a letter with a QR code and an ID card for validation by the bank agent. Bank agents accessed a web-based application through their electronic devices and chose transactions based on the beneficiary's request. The QR code was scanned using a camera on a smartphone or tablet, and the customer entered the PIN in the agent application. Notification of a successful transaction appeared on the agent application, while the customer did not receive any receipt or notification from the system. The service was free. Some challenges arose during the disbursement process: for example, the letter could easily be damaged so that the QR code cannot be read; and some unscrupulous beneficiaries photocopied the letter and used it for transactions at other bank agents.

Near field communication (NFC)

Bank agents representing a bank and telco operator were responsible for conducting registration. Agent registration training was carried out intensively to enhance agent expertise in conducting KYC. Beneficiaries could bring their national ID card at any time to register with a bank agent. The beneficiaries were required to use a cell phone number issued by the participating telco operator. Beneficiaries had two choices: use their existing cell phone number, if issued by the same telco operator; or get a free new SIM card. A new SIM card was given to tag special treatment related to transaction fees for mobile numbers that were used as account numbers during the pilot. After the registration had been completed, the beneficiaries obtained an NFC sticker to attach to the back of their cell phones. Furthermore, the beneficiaries continued the activation process and PIN creation. They received SMS notifications explaining that the account is active.

Notification of funds transfer from the system was sent via SMS to the beneficiary's registered mobile phone number. The agent was required to have a smartphone with NFC feature and installed the mobile application developed by the bank and telco operator. This app could be used for cash withdrawals and purchases of food. Just like the mobile money solution, the beneficiaries must initiate transactions via USSD using their cell phone, or those beneficiaries who have a smartphone could use the app for customers. Conversely, in the NFC solution, there were no fees charged to customers for USSD access and also for SMS notifications. The telco operator as a solution provider waived these costs.

At the time of disbursement, beneficiaries came to the agent bringing cell phones and NFC stickers. The customers accessed USSD and selected the type of transaction,

then followed by attaching an NFC sticker to the agent's smartphone. Customer data were recorded in the agent's app via NFC. The customer completed the transaction stages via USSD and entered the PIN through USSD. After the transaction was successful, the customer received an SMS notification. Customers faced challenges in following and completing all transaction steps. Some customers, especially those who were old and not familiar with using USSD, required a companion for completing the transaction. The main advantage of this solution was that agents are able to check balances immediately after the transaction is completed through the agent app.

Discussion

Analysis

The author was involved directly in the pilot. The data presented in this article are based on the report issued by the Indonesian Government (TNP2K, 2019) and the author's observations during the pilot. Monitoring and evaluation were conducted during the pilot for all payment solutions to obtain an understanding of the problems encountered. Each payment solution has its own mechanism and instruments (Table 2).

The assessment was carried out using quantitative and qualitative approaches. An in-depth analysis was conducted through spot checks and interviews. According to Pawson and Tilley (1997), evaluation combining quantitative and qualitative data is considered more effective to elaborate in detail all the processes that have been carried out in achieving the results. The number of respondents for the quantitative method was 1,435 household members aged over 15 years old. Qualitative data was collected through interviews with 451 beneficiaries (debit card: 204, mobile money: 76, QR code: 53, NFC: 118) and 37 bank agents.

Data on beneficiaries' experience with formal financial institutions and cell phone use were obtained from quantitative data. Only 22 per cent of household members already had a savings account in a formal financial institution, while mobile phone ownership was quite large at 86 per cent. Of the respondents who owned a cell phone, less than 1 per cent had conducted financial transactions with mobile banking or SMS banking, and 32 per cent used cell phones to browse the internet.

Qualitative data were obtained from interviews and field monitoring as a basis for comparing the challenges during account activation. In the registration process, nearly 95 per cent of respondents of the three payment solutions (debit card, mobile money, and NFC) could not do it by themselves. They were assisted and accompanied by other household members, most of whom were their children. Many problems occurred for mobile money and NFC solutions due to the requirement to use cell phones for account activation. Obstacles for these two solutions were that beneficiaries need assistance from others to complete activation for the mobile money solution, and technical issues occurred with the agent mobile app for the NFC solution. The debit card account solution had an activation issue related to the administrative requirement that national ID cards must be brought in by beneficiaries. In-depth interviews were not conducted for respondents with regard to the

Table 2 Payment solutions summary

<i>Details</i>	<i>Debit card</i>	<i>Mobile money</i>	<i>QR Code</i>	<i>NFC</i>
Solution provider	2 banks	1 bank	1 bank	1 bank collaborating with 1 telco operator
<i>Registration</i>				
Account opening	Bulk at bank office	Meeting at village office	Bulk at bank office	Individual online at bank agent
Account activation	Special counter at the village office	Meeting at village office	Bulk at bank office	Bank agent
<i>Distribution</i>				
Payment instrument	<ul style="list-style-type: none"> • Passbook • Debit card 	SIM card (mobile phone number)	QR code (printed on letter)	<ul style="list-style-type: none"> • SIM card (mobile phone number) • NFC sticker
Security	PIN	<ul style="list-style-type: none"> • PIN • OTP 	PIN	PIN
Funds transfer notification	Verbal	SMS	Verbal	SMS
<i>Transaction</i>				
Transaction point	<ul style="list-style-type: none"> • Bank agent • ATM 	Bank agent	Bank agent	Bank agent
Payment instrument	Debit card	Phone number	QR code	<ul style="list-style-type: none"> • Phone number • NFC sticker
Device for beneficiaries	–	Mobile phone	–	Mobile phone
Device for bank agent	EDC	EDC	Smartphone or tablet with web-based app	Smartphone with mobile app
Transaction notification	Receipt from ATM and EDC	SMS to beneficiaries	Agent app	<ul style="list-style-type: none"> • SMS to beneficiaries • Agent app
Cost	0	USSD 0.7 cents OTP 3.8 cents	0	0 (waived by telco operator)

QR code solution because account opening and activation were carried out in bulk by the bank.

By using the banking system, funds could be distributed efficiently on a large scale. All banks transferred funds from the escrow account to beneficiaries' accounts on the specified date. Real-time funds transfer notification received by beneficiaries in the form of SMS is an effective mechanism. Two payment solutions that require cell phone ownership can do this. On the other hand, debit card and QR code solutions required more effort for conveying fund transfer information to beneficiaries by word of mouth, requiring coordination with various parties. The delivery of this information was done in stages, starting from the bank to the village official,

continuing to the bank agent and head of neighbourhood until finally being received by beneficiaries.

Constraints during the transactions for cash withdrawals and food purchases at bank agents occurred more on mobile money and NFC solutions due to the unfamiliarity of beneficiaries with transaction via cell phones, specifically in using the USSD method. As many as 25 per cent of the total respondents for these two solutions experienced problems in the first stage of disbursement. The problem decreased in the second stage of disbursement to 18 per cent. For debit card solutions, 6 per cent of the respondents experienced transaction problems. The main obstacle is related to the transaction duration at the bank agent, which sometimes took more than 15 minutes. Cash withdrawal transactions through ATMs were not widely done. This pilot encouraged beneficiaries to make transactions at the bank agent. Meanwhile, for the QR code solution, only one respondent experienced challenges at the time of disbursement.

In interviews conducted for PIN usage, 54 per cent of the respondents could remember their PIN. Most of the pilot participants still do not understand the usefulness of the PIN and why it must always be kept confidential. Based on the observations, many beneficiaries still used the initial PIN received at the time of registration, even though instructions to change the PIN have been given before they make the first transaction. Only a few beneficiaries replaced the PIN and needed assistance when changing it. The PIN was written on a sheet of paper by many beneficiaries, and they carried it during the transaction and gave it to the bank agents. Likewise, in using OTP, the beneficiaries trusted the agents. They gave their mobile phones to the agents so they could be assisted in accessing USSD. Beneficiaries gave their PIN and cell phone to the agent. Then, the agent completed the transaction by entering the PIN and OTP number to the payment instrument.

Problems faced by bank agents are related to the agents' ability to conduct transactions using non-cash payment devices (EDC/smartphones/tablets), the availability of cash liquidity, and the availability of food stock. Problems with payment instruments occurred on EDC devices and the agent's app. These are caused by telecommunications network disruptions. Furthermore, 97 per cent of agent respondents stated that the provision of cash was the hardest obstacle. The non-cash payment solutions tested were not connected to the agents' inventory. All agents had to recap transactions manually by writing in their notebooks. Reconciliation from the bank to the agents' account took time. Even if there was a disruption in the banking system, the funds were credited to the agents' account by the next day.

The satisfaction survey for beneficiaries was conducted using the Likert scale with 380 respondents. Of the total respondents, 99 per cent expressed satisfaction with the non-cash mechanism. Those who were not satisfied felt that the process was complicated and that they were unfamiliar with the payment instruments. Similar results were found from bank agents. They were happy with the new payment solutions. Most of the agents who participated in the pilot also stated that they are willing to continue if the scheme were implemented. One of the benefits for them to participate in this pilot was to get additional customers who buy from their shop.

Results

This pilot succeeded in convincing the Indonesian Government to make a new policy. The results of this pilot comparing four payment solutions provided a basis for evidence-based policy reform by the Indonesian Government in the distribution of social assistance. A savings account with a debit card is the solution chosen for distributing non-cash social assistance programmes. Lessons learned from the pilot provided feedback into the formulation of a new Presidential regulation governing the non-cash disbursement of social assistance (President of the Republic of Indonesia, 2017). They are equally relevant to other countries that are seeking to streamline social payments using mobile money or other new technology platforms – although each country must assess the capabilities and perceptions of the intended beneficiaries (and agents). Limitations in this pilot are related to the duration in testing the non-cash payment mechanisms and the number of samples used for analysis. This is due to limited funds and also the government's target to obtain quick results.

The following important points from the pilot study were incorporated in the policy reform:

- Non-cash social assistance can be channelled effectively through banking institutions. Banks open savings accounts for beneficiaries and directly transfer the funds to their accounts.
- Banks can register and open new savings accounts in bulk, if the government provides data on beneficiaries as required for KYC.
- Banks need to work closely with social assistance providers (implementing ministries) and local governments in conducting socialization and education for the beneficiaries.
- Savings accounts that have been opened for recipients of social assistance can be utilized for other government support programmes and can be used according to the type of programme; i.e. cash withdrawals or goods purchases.
- Individual traders whose business locations are easily accessible by recipients of social assistance can act as bank agents for this purpose.
- The payment instrument selected for Indonesia is a combo card (a debit card that has multiple wallet features in one account).
- Withdrawals or purchases can be made at the point of transaction with ATMs and bank agents that can accept combo cards.

Implementation of social assistance disbursement through combo cards began in 2017 targeting 1.2 million families who have been designated as recipients. The savings accounts opened use the name of the mother (Coordinating Ministry for Human Development and Culture, 2017). By the end of 2019, more than 12 million savings accounts had been used for disbursing non-cash food assistance. The total recipients targeted for this programme are 25 per cent of the poor and vulnerable, which are 15.6 million families (Coordinating Ministry for Human Development and Culture, 2019).

The growth in adult population owning an account at formal financial institutions in Indonesia based on the financial inclusion index issued by the World

Bank is from 19.6 per cent (2011), 36.1 per cent (2014), to 48.9 per cent (2017) (Demirguc-Kunt et al., 2018). Based on the financial literacy and financial inclusion national survey in 2019 conducted by the Indonesian FSA, Indonesia's financial inclusion index is 76.2 per cent (Indonesian FSA, 2019). This shows a significant increase, with the majority of contributions to this achievement coming from the implementation of non-cash social assistance through opening savings accounts for the poor.

Future improvement and recommendations

Despite the success, the existing policy requires enhancement, especially related to the payment solutions. At the moment, the distribution of non-cash social assistance can only be done by banks and is specifically assigned to state-owned banks. Involving other financial institutions as channelling entities can be a future option, including telco operators and fintech companies. From the profits perspective, the government does not give commissions to channelling banks. The approach provided is by transferring funds to the banks' escrow account 30 days prior to the banks' transfer to the beneficiaries. By applying this method, it is expected that the banks will receive income from the deposited funds to cover distribution costs, including the registration process and the procurement of combo cards. From the results of discussions with the banks, however, this solution cannot cover their costs as channelling institutions. Henceforth, a new concept for the revenue model needs to be considered by the government. In terms of beneficiaries, many have gained access to formal financial institutions, creating the potential for developing financial products that fit their needs. The challenge is how to educate them. Cell phone ownership is increasing and smartphones are more affordable. Mobile phone-based financial services can be the next option, and digital financial education can also be done using this device. Continued development of technology innovation in the payment system can improve the reliability of the solutions and simplify the transactions. A small-scale and low-cost inventory system integrated with a payment system is required to digitize bank agents' business. Lastly, the widespread utilization of biometric authentication with face recognition could be the next option for disbursing social assistance.

Conclusion

The government requires evidence to make new policy. This article compared four payment solutions for disbursing non-cash social assistance to the poor through a pilot project conducted by the Indonesian Government. Debit card, mobile money, QR code, and NFC were examined through an in-depth analysis using quantitative and qualitative methods performed to select the best solution appropriate with the existing requirements and capabilities of beneficiaries. Mobile money and NFC require the use of a cell phone for conducting transactions by accessing services through USSD. Although cell phone ownership

among the bottom of the pyramid is high, their literacy level for using it in financial transactions is still low. The QR code concept for payment transactions is considered easy in terms of usage, but it still needs a lot of improvement, particularly with regard to safety and potential for fraud. Supporting infrastructure, especially the quality of the telecommunications network, is a crucial factor during the transaction. Decentralized bank agents easily reached by beneficiaries, including shops, are the most appropriate point of disbursement. Finally, a debit card solution using bank agents for transaction points is considered the most suitable payment system for Indonesia. The Indonesian Government issued a policy to implement the distribution of non-cash social assistance based on the results of this pilot. The pilot approach proved to be an effective way to facilitate evidence-based policy. The results of the pilot can be used as a reference for developing new government policies. The implementation of non-cash social assistance disbursement using debit cards with multiple wallets feature started in 2017, and by the end of 2019, new savings accounts had been provided to more than 12 million beneficiaries. Most of the beneficiaries were unbanked, and the implemented solution contributed to increasing Indonesia's financial inclusion index to reach 76 per cent in 2019. Some potential improvements and a future research agenda should cover the improvement of the revenue model for banks, other financial solution providers as channelling entities, the use of smartphones, development of an agent inventory system, and the use of the latest technology (such as biometric authentication) to simplify the transaction process.

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