BI INSTITUTE

PROCEEDING

INTERNATIONAL SEMINAR ON CURRENCY MANAGEMENT SYSTEM

Bank Indonesia Institute

Bali, Indonesia, 25th-27th June 2019

Editor :

Solikin M. Juhro
Bambang Arianto

Jakarta
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International Seminar on Currency Management System

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FOREWORD

Central banks are facing unprecedented new pressures: on the one hand from the rising costs of banknote production and management and on the other, from the general drive towards digitalization and the "less-cash" society; and all in a pervading climate of public sector accountability. As a result, many are redefining their role in the cash cycle.

Globally cash cycle models at central banks are being reengineered. The impact of these changes is being felt across the board, from infrastructure through to currency department competencies and the roles of different partners and third parties across the value chain.

A growing number of central banks have access to serial number data on their banknote sorting machines, making it possible to move beyond traditional aggregated data techniques and run both big data and data analytic software. When this happens, the use of averages, with the resulting margins of error, compared with tracking actual banknotes using their serial numbers, is not necessary.

The banknote industry is sitting at the start of a revolution in its approach to currency management. The key to unlocking this new era is the ability to gather and analyze banknotes based on their serial number data. Based on survey, it appears around 5-10% of Central Banks currently have access to serial number data. For the reminder, we estimate around 25-30% of Central Banks have machines with serial number reading capability but we cannot have access to the data for contractual or other reasons with their equipment supplier. Now that serial number reader capability is available to effectively analyze the data, thus access to serial number data is the priority.

That data is used to determine the life cycle, life time, circulation age and tracking systems of money. Big data can support Central Bank analysis in currency management policies. Digitalization of currency management can support digital inventory at banknotes printing, which is use a barcode recording end to end. Furthermore, digital inventory and digital logistics are expected to be able to support digital tracking in distribution of money. Digital tracking can detect cash service

locations and digital logistic can optimize the logistic path by using machine learning technology. Cash with a serial bank note reader will make it easy to identify at the time of the distribution of money. The serial number of banknote can be used to show tracking money mutations, money durability and knowing people's behavior in using money.

Data analytics is a new technology that is gaining acceptance and growing to fulfil its potential in the world of banknotes and the cash cycle. Central Banks have always collected and used data to model, forecast and manage their banknote needs. The serial number data of banknotes can used to answer well questions about topics such as cash cycle velocity and flows, cash performance in circulation, quality levels, specification performance and optimisation, supplier performance, etc. The ability to access information on banknote performance and the cash cycle based on high quality, high volume, detailed data down to the level of individual banknotes captured from the cash cycle is a new development allowing the full capability of data analytics. The use of Serial Number Reading (SNR) linked to sensor data. This is possible now due to the widespread use of optical cameras as part of the core technology platform in a very wide range of banknote handling equipment.

Central banks have reacted differently to these pressures. The "controlled" style central banks (e.g. Germany, Belgium and several eastern European countries) have reinforced their dominant role in the cycle by keeping processes in-house and negating the need for high-volume processing systems at commercial banks and Cash in Transit companies (CITs). At the other end of the spectrum, the "minimalist" central banks have withdrawn from the daily cash cycle entirely by delegating to the commercial sector. The "utility" and "hybrid" models sit in between these two poles, with varying degrees of process outsourcing, automation and digitalization.

Jakarta, December 2021

Dr. Solikin M. Juhro

Head of Bank Indonesia Institute

OPENING REMARKS AND KEYNOTE SPEECH

Currency Management System
June 25th - 27th, 2019

Hernowo Koentoadji
Deputy Director of Bank Indonesia Institute

Distinguished speakers, and participants, Mr. Yuserizal Mohd Noor from Bank Negara Malaysia; Mr. Sanjay Kumar from Reserve Bank of India; Mr. Rasül Atmaca from Central Bank of the Republic of Turkey; Mr. Christian Huber and Mr. Oliver Pannke from G+D; Mr. Andy Wijaya from Bank Central Asia; Bank Indonesia Officials; and the entire committee members and all parties with whom we collaborate to hold this event. Thank you for attending the International Seminar on Currency Management System held by Bank of Indonesia.

Good morning, Ladies and Gentleman. Assalamualaikum Warahmatullahi Wabarakatuh, may peace be upon you all.

Before I begin my speech, let us together express our sincerest gratitude to the Almighty God for His abundant blessings, that we are able to gather here today in this Seminar on Currency Management System in a good state of health. On behalf of Bank Indonesia Institute, allow me to warmly welcomed you to Bali, the Island of the Gods. It is both an honor and pleasure for me to have you here. As a part of integrated Flagship Program in Bank Indonesia, today marks the third year of this annual international seminar on Currency Management System. I hope this three-days seminar will serve as a good forum for us to share knowledge and experiences regarding ongoing issues on currency management. I believe that this seminar will provide an excellent opportunity for us to gain valuable understanding and learn from each other.

Ladies and Gentlemen, during the last decade, we have witnessed how the surge of innovation and the adoption of new technology have transformed the payment landscape. By 2021, it was forecasted that the emerging markets, especially Asia, will account for around half of all non-cash transactions worldwide, overtaking the

mature markets. With the strong demand for digital payment and the governments' attempts to pave the road to cashless society in many countries, this has left us with one important question on the importance of cash in the future.

Despite of the digital payment innovations took the center stage, the old adage "cash is king" still holds true in many countries. The World Cash Report conducted by G4S in 47 countries in 2018 showed that demand for cash continues to rise globally despite the increase in electronic payment, with cash in circulation relative to GDP has increased to 9.6% across all continents. The study also introduced other interesting findings, in which over 75% of e-commerce transactions in Asia is paid by cash-on-delivery, and that businesses that typically use electronic payment, such as Uber, have seen growth when they introduced option for cash payment.

With the role of cash has been found still increasingly important in many countries, this has led us to the next important question: why does cash remain the most widely used payment instrument in many countries? Public trust plays an important role in answering this question. Cash is considered as a trusted means of payment since it is backed up by central banks as legitimate authority. On the other hand, cash is a universal method of payment that is available for everyone. It is also inclusive, favoring the unbanked or underbanked people and also the visually impaired people. Cash also offers more privacy and protection of consumers' data and serves as major instrument for low-value payments.

In principle, freedom and flexibility of choice are highly important for consumers in choosing payment method that is most suitable for their needs. Therefore, the growing popularity and adoption of innovative payment technologies do not always translate into the replacement of cash as traditional payment method. On the contrary, cash will continue to co-exist with payment technology in the future to meet consumers' demand.

Responding to this challenge, the role of central banks as authority that controls cash supply and management have also undergone series of transformations. Central banks need to be equipped with appropriate strategy to deliver solutions to optimize cash management. The global trend shows that more and more central banks have been moving from fully-controlled to fully or partially-delegated model of cash management in cooperation with commercial banks and/or other financial institutions. Central banks also put more emphasis on automation to increase speed, efficiency and accuracy of cash management.

On the other hand, with the emergence of digital currency, the idea of converting cash into digital form has also begun to take place and currently being heavily researched. In terms of concept, digital cash is identical with banknotes and share similar characteristics of providing anonymity, privacy and transferability of payment. However, its anonymity will encourage potential risk of money laundering and there is also a growing concern regarding its security. Regulators still have a long way to go before digital cash could be officially introduced as future substitute for paper-based money.

Ladies and Gentlemen, similar trend is also seen in Indonesia. Despite rapid growth of non-cash payment instruments as seen in cards and electronic money, cash remains as an important means of payment in Indonesia. A research conducted by Bank Indonesia in 2018 in 6 (six) provinces in Indonesia has shown that even though respondents' preference for non-cash payment instrument is higher, cash still dominates as payment instrument in Indonesia in terms of value and volume, with 100% of respondents use cash in their daily transaction.

To ensure the availability, quality and authenticity of cash throughout Indonesia, currently Bank Indonesia's main objectives are focused on the improvement of quality of cash, efficient distribution, and infrastructures digitalization. Several important attempts are currently in progress to accomplish these goals, among which are the priorities for the expansion and integration of cash storage, distribution and processing to cater future growth of public demand for cash. Another attempt is also made to implement the less human less intervention technology, with the objective of improving the accountability and reducing potential opportunities for fraud.

Ladies and Gentlemen, during these three days seminar, we will look further into the aforementioned issues in cash management. We will begin the first day with knowledge sharing on current practice in currency management, including Bank Negara Malaysia's experience regarding the resources and competencies required in operating automated cash center and also Reserve Bank of India's experience in currency distribution and cash in transit (CIT).

We will then continue to second day that will focus on the future practice of currency management. Our distinguished speakers from G+D here will share their experiences on how the advancement of technology may help us to increase cash cycle efficiency and security through automation and big data. We will also listen to the experience of BCA as one of the leading commercial banks in Indonesia in

building and developing their cash center. The last session will also take a look at Bank Indonesia's perspective on the concept of digital cash and how it will potentially affect the cash management in the future.

Last but not least, the last day of this seminar will focus on counterfeiting issues. We will have knowledge sharing by Central Bank of Republic Turkey and Bank Indonesia's experiences regarding the new trend of counterfeiting in respective countries, and their strategies to prevent and overcome it.

Ladies and Gentlemen, to conclude, the relationship between cash and non-cash payment is not simple to explain. Whether the relationship is competitive or complementary, it all comes down to what the public actually needs, and as the regulators, central banks' main priority is to ensure that public needs for availability of wide-range payment instruments are appropriately met.

Before I end this speech, I hope you will experience not only a productive and fruitful seminar but also the beauty and warmth of Bali with you. Make the most of your visit here by exploring the local sights and tastes, so that you can bring together with your memorable moments when you return home.

Thank you very much.

- SESSION 1 -
COMPETENCIES AND SKILLS SET FOR AUTOMATED CASH CENTER OPERATIONAL: BANK NEGARA MALAYSIA (BNM) EXPERIENCE

Speaker: Yuserizal Mohd Noor, Bank Negara Malaysia

The title of our presentation is "Operationalizing an Automated Cash Centre: Competencies, Skill Sets & Reporting Line". We would like to share BNM's experience in the establishment and operationalization of an Automated Cash Centre (ACC). The outline of our presentation is first the introduction to discuss why we needed an ACC. Second is the transition from manual to automation, namely what we have done. Third, what benefits do we get from the ACC? Fourth, how we planned our readiness when we wanted to transition from manual to automation. Then, I will talk about our post go-live activities, the challenges we faced, our threats, reporting line, and the organizational structure of the ACC. Finally, I will share about some critical success factors for the transition to automation.

INTRODUCTION: BUSINESS CASE FOR AUTOMATED CASH CENTRE (ACC)

Why do we need an Automated Cash Centre? Basically, when we did our case study in 2016, Malaysia's Cash Centre was running at full capacity. Therefore, BNM needed to embark on a new cash center with bigger capacity. Although we know that cashless transactions are increasing rapidly, we still need banknotes in circulation. Until today, there is still a growing rate of banknote payments. However, the growth rate has slowed compared with the era when there were no cashless payments.

Next, we had to expand our processing capacity as well. While the currency payments using banknotes are still growing, we also need to expand our cash processing. Since our previous cash center had limited space, we sought to increase the capacity so BNM could install additional cash processing machines.

AUTOMATE MANUAL OPERATIONS AND REDUCE OPERATIONAL RISKS

In BNM, almost all processes are handled by robots. Humans are still involved in the operation, but only in the cash processing rooms. The rest, such as transposition or handling, are operated by robots or automated systems. Consequently, we can say that there is less human intervention in the process.

ENSURE MAXIMUM SECURITY

With the new cash center, we could design a new embedded security system throughout, from the loading docks to the cash processing area. To ensure maximum security, BNM also adopted the latest security system technologies.

TRANSITION FROM MANUAL TO AUTOMATION

Previous Operation is a lot of human intervention, every process needs human intervention. Automated Cash Operations is centralized in WMS (Warehouse Management System), human intervention is limited to the cash processing area. At the receiving step in the loading bay, we previously needed a Cash-in-Transit (CIT) company to manually handover the banknotes from the loading bays to BNM staff and the staff would need to recheck and count the bags manually one by one. The latest systems are self-service, which mean no more BNM staff at the loading docks, only the CIT. The CIT employee has to login to the system with their biometrics, which the system then captures. CIT needs to inform the ACC at t-1. For example, if they want to deposit today, they had to key-in the order yesterday so the system can automatically assign a dock number and sign the schedule for when the CIT must come to the ACC. When the CIT arrives, only the assigned person can open the gate and login to the system, including the vehicle number to be registered. That is what BNM means in terms of an embedded security system in the design. If a different person or different vehicle comes to the ACC, they would have to go back because the system will not authorize that person. In that case, BNM would be suspicious why there was a last-minute change in order to avoid fraud.

After they have been inducted, if the right person comes to the ACC, the new system will check the pin number, serial number, barcode number and everything that has been registered in the system prior. Only a validated number or barcode could go through to the system, whereby the rest will be rejected. This prevents a random person from breaking into the BNM cyber security system.

All of the movement is processed from the docks (loading bay) to the storage room. BNM uses a conveyor and automated guided vehicle for the material handling system. When we want to process the banknotes, the Cash Processing Machines (CPM) staff will key-in the order number and the system will automatically send the banknotes to the processing area.

The withdrawal process is similar to the receiving process, if the banks want to withdraw banknotes, they need to key-in the order one day in advance. However, the system can also handle some agents' orders. If they want to make an agent order, they have to key-in the specific number of bins because everything is done by robots. The robot will handle the order overnight to do the sorting for the next day's withdrawals. If they want to take an agent order, they have to take one full pallet of a single denomination or they should key-in multiple orders to take another denomination.

BENEFITS OF ACC ESTABLISHMENT

The first benefit of establishing an ACC is to highly automate the process. The manpower per machine is reduced from 4 to 1.5. (57% reduction in manpower due to automation). The new setup configuration for the new system is named "1 2 3". It stands for 1 room, 2 machines, and 3 people.

Second, higher performance. It means higher processing capacity and more banknote handling. BNM's new machine can process up to 100,000 banknotes per hour. The issue of sophisticated machines needs the right skillset, technical knowledge, capabilities and competencies from the person operating the machine.

Third, BNM designed the ACC to be scalable for future expansion. It can hold 8 billion banknotes. However, for the time being, BNM only uses around 30% of that capacity. Therefore, the building design needs to cater for future expansion and the BNM's ACC can cater at least for the next 20 years. BNM thinks that it is better to build now rather than later. That way, BNM can incorporate all the items they need for the future.

Fourth, robust security system. During this project, BNM hired a security consultant to identify the security needs, current threats, future threats, current risks, and emerging risks. Those things were taken into consideration when BNM designed this project.

CURRENT CURRENCY MODEL

First, BNM does not have any printers. Like in Indonesia, BNM procure the banknotes from third parties, such as G&D (PT Giesecke and Devrient) or Crane Co. The next step, from the printers, they will deliver the banknotes that have a BNM specification to the ACC. The specification is such that every pallet must contain 36 boxes. From ACC, BNM then distributes the banknotes to its branch offices. From the branches, the supply of new banknotes fit for circulation will be distributed by a CIT company to commercial banks. The commercial banks can then distribute the banknotes to corporate clients and the public. While other banknotes will be distributed to ATM Centers and Retailers.

ROLES OF BNM

1. Plan, forecast and manage inventories.

   BNM has to keep minimum stock inventories and also a backup stock at the recovery center if anything happens to the ACC.

2. Procure and supply currency to the stakeholders.
3. Maintain and enhance public trust in BNM banknotes.
   a. BNM has to remove the counterfeit money and destroy the unfit banknotes. Since BNM has had the ACC, they have two categories of usable banknotes; fit and super-fit. Super-fit means nearly new, namely new banknotes that are often issued near the festive season, such as Eid-ul-Fitr.
   b. Monitor outsourced agents such as CIT companies.

ROLES OF PROCESSING AGENT (BNM OFFICES)

Agent for BNM in storage and processing of the banknotes. Destroy unfit banknotes on behalf of BNM.

OPERATIONAL READINESS (KEY MILESTONES AND CONTRIBUTING FACTORS)

We held the groundbreaking ceremony in January 2015. It took us 14 months from the groundbreaking until the soft launching in April 2016. We did everything in 14

months, from land carrying, constructing the building and installing the automated system. Before going live, we also did a comprehensive risk assessment and industry-wide testing together with the CIT company and other financial institutions to get more details about the transition process from manual to automated. During the first day of our operation in September 2016, many BNM employees did not go home because we needed to stabilize the system. We continuously stabilized the system and by April 2018, the system was stable and we started system enhancement to keep moving forward.

1. In short, before going live:
    a. Comprehensive Risk Assessment involving our risk department and senior management to gather support from all parties at BNM. Engage the industry because they need to learn and prepare their inventory for the new system, such as changing the plastic bags of the banknotes into barcode seal.
    b. We had to ensure adequate backup power supply. Since everything is automated, everything needs a backup, such as backup power, backup server and backup system.
    c. BNM has a rigorous User Acceptance Test (UAT) and Test & Commissioning (T&C) to ensure the systems are working.
    d. Stock and system migration activities, whereby BNM closed down the previous cash center and transferred all the stock into the automated cash center.
2. Post go-live:
    a. Establishment of internal committees composed of senior management to ensure a successful transition process. During the project, BNM had a steering committee. However, post go-live, BNM has AIC (ACC Implementation Committee) to ensure that all issues are resolved on time without much impact to our industry.
    b. Continuously undertaking system enhancement and integration.
3. Post Go-Live Phase
    a. During warranty, our Material Handling Equipment (MHE) receives two-year on-site support as well as our Cash Processing Machines (CPM). After warranty, the MHE, will be maintained by BNM. Nevertheless, the CPM

warranty was extended for three years of on-site support. That means G+D's staff will support our day-to-day operation in our cash center. Whereby the automation system is fully handled by BNM employees.

b. In terms of internal development, BNM established our internal technical capabilities and created their own roadmap. BNM also hired a few more engineers to handle the automation system, running Oracle and Structured Query Languange (SQL) . Then, BNM also had a formal learning session, such as on-site technical training by the automation supplier and cash processing supplier and also sent trainees to attend technical training by external parties (Siemens, SQL, or SCADA). The aim of the program was to teach employees how to troubleshoot the level-one problems of the system. Whereby any complex issue will be solved by the MHE supplier on-site. For the time being, BNM runs the ACC on two shifts and it can produce up to 2 million banknotes per year. If BNM operated a third shift, it could produce up to 3 million banknotes per year.

ORGANIZATION CHART

The organization chart shows us that ACC is under Currency Management & Operation. There are 66 staff in ACC, who work in groups, such as Administrative Assistants, Strategic, Risk & Compliance, Automation & Cash Operations, Cash Processing & Reconciliation, as well as Financial & Resources Management.

Talking about the skillset of BNM's staff in ACC. BNM do inter-department cross-learning or cross-teaching. Every staff member needs to understand another skillset. For example, if there is a member of staff who worked under the mechanical team, he still needs to know little bit about cash processing & reconciliation. These kinds of things also apply to the Strategic Risk & Compliance staff. Even though the staff have an auditor background, they also need to know a little bit about automation to make the regulations. It is just surface knowledge, but enough for them to create the Standard Operating Procedure (SOP).

CRITICAL SUCCESS FACTORS FOR TRANSITION TO AUTOMATION

BNM has five elements to ensure minimal disruption to currency operations in Malaysia:

1. Information Technology (IT) Management

   As I said before, it is about Information Technology (IT)/Operational Technology (OT). In this time, everything became a blur between factory automation and the IT side.

2. Automation & Engineering

   IT Management and Automation are now consolidated. People in automation need to know about IT things, such as servers, windows, or the cybersecurity system. On the other hand, people in IT Management also need to know about robotics language or the Programmable Logic Controller (PLC System).

3. Stakeholder Engagement

   We need to have a good stakeholder engagement to expedite the decision-making process.

4. Strategic Internal Collaboration

   We need to have strategic internal collaboration between various departments. Through synergy, we have a successful ACC operation.

5. Training Roadmap

   We need a training roadmap to reduce dependency on service providers. The world is evolving. For example, windows 7 will be shut down by Microsoft in 2020, replaced by windows 10. Therefore, BNM needs to take refresher ACC courses every 5 years.

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Q&A SESSION 1

Q: Can you explain Radio Frequency Identification (RFID) implementation in this automation process?

A: Yuserizal Mohd Noor

The top of the design of our dustbin, we designed it together with our automation supplier and we partnered with a manufacturer in Malaysia. We have two security items we use to track the bins. We have barcode seals/barcode numbers and RFID chips. Every commercial bank has to use their own barcode number. Inside the barcode number consists of information about the bank ID and the bank branches. The barcode number is used by them to key-in at t-1 (one day before). The plastic dustbin is the property of BNM. Inside this box, we embed an RFID chip so the plastic dustbins can be tracked by BNM. Only a validated dustbin from the ACC can enter the ACC.

Q: Are the RFID numbers self-made numbers or is BNM using a global system?

A: Yuserizal Mohd Noor

Our RFID number has sixteen characters and it is a global number. However, we customized it to meet our ACC requirements. We need to register the pin in the system first. When the manufacturer delivers to us, we assign a number and register it in the system. On the other hand, the Personal Identification Number (PIN) is also engraved so the engraved number will match the registered number.

Actually, for the new banknotes, we stick the RFID number on the cotton boxes. The sticker containing the RFID number is single use. Our system is intelligent enough to know which is a repeated RFID number. It is part of our security system.

Q: What is your opinion about the future for human resources if there will be no more employees anymore in the banking sector? Is it only a cycle or not? Is there any sharia perspective about financial technology, automation and digitalization?

A: Yuserizal Mohd Noor

In BNM's current activities, as the business processes become more digitalized, BNM trains all of the workers to fulfill the skillset to operate the newest machines or technologies. Then, BNM will only keep the best workers in the company. While other workers can find other companies using their newly acquired skillset which they got before leaving BNM.

Concerning sharia, BNM gave their concerns on it and also with sharia insurance (takaful). In Malaysia, every commercial bank has their own sharia team, involving a religious cleric inside the team as well.

Q: What was the biggest challenge when the BNM applied the ACC?

A: Yuserizal Mohd Noor

The biggest challenge came from the old workers who had already worked at BNM for 15-30 years. They found it difficult to unlearn the manual process and they kept comparing the manual process with the automated process. In the manual process, you could do whatever you wanted but automation must be followed step-by-step. BNM also found an adoption problem in the early stages of ACC implementation. The ACC machines suddenly stopped because, at that time, the workers were not used to the system. They wanted to look for shortcuts rather than follow the process. To solve that problem, BNM kept brief and continuous engagement with the staff about the automation process, namely that the business pattern was already shifting from labor-oriented into technical skills.

Q: Does BNM only have one ACC? Does BNM ever think to build another one or more ACC? From my country's perspective, if we plan to build an ACC, we would have a problem with our geography, so I think that one ACC is not enough.

A: Yuserizal Mohd Noor

Actually, we have one ACC, but we have a backup site to keep some stock of banknotes. If anything happens to the ACC, we still have a recovery center.

If we would talk about your country's perspective, I think you have to learn a lot from Indonesia about how they made a cash center and how they distribute their cash.

Q: Can you explain about the cash processing? Is the destruction process also automated?

A: Yuserizal Mohd Noor

BNM has nine cash processing machines from G&D that are capable of processing up to 100,000 banknotes per hour and one machine for reconciliation activity. If today, we want to process, then we need to create an order for which banknotes we want to process today: either single or multiple banknotes. For example, if we do multiple banknotes, we want to process paper and polymer banknotes. Then, we can specify what room to process paper and what room to process polymer. From this room, we plan the reconciliation, whereby previously the reconciliation had been performed in the room itself. The staff inside the room will know if there is excess or a shortage. The danger is if the staff are a little bit naughty to take one or two pieces of excess banknotes. If it is excess, we have to return it to the commercial bank. On the other hand, if it is shortage, we will charge the commercial bank. BNM also charges a processing fee to cover the operational process of ACC. During the deposit, we also give them overnight interest, which offsets the processing fee. When we process the banknotes in the processing room, the staff do not know the value of the banknotes because it is generated automatically by the G&D Machine and sent to the reconciliation room. The person working in the reconciliation room does not touch any banknotes, they just monitor the data.

For the destruction process, we developed in-house with the supplier about an online shredding module. The shredded banknotes are collected inside a roll-on and roll-off metal tank that can hold up to 10 tons. Every week, we destroy these shredded banknotes through co-processing with a cement kiln factory to recycle it as energy.

Q: How does BNM dispose of the shredded banknotes?

A: Yuserizal Mohd Noor

BNM disposes of the banknotes as a co-processing material. Co-processing is a unique process only possible using a cement kiln. They burn the shredded banknotes to become energy to produce cement. Co-processing is a better disposal process rather than an incinerator. In Europe, most of the countries are already using the co-processing model.

Q: In my country, an institution has a contract with us to pull our shredded banknotes. However, it is up to them how to dispose of it. Furthermore, it is still too costly for our bank. What is your opinion?

A: Yuserizal Mohd Noor

In BNM's case, the cement factory that became our partner for co-processing is certified by our institution. A cement kiln is an international cement factory, but we still periodically check our banknote disposal process. We also try to ensure that the shredded banknotes arrive at the cement plant by tracking the lorry with Global Positioning System (GPS). Yet, what we know about how to dispose of our shredded banknotes is only by co-processing, we have not explored any other means, such as recycling the banknotes.

Q: How long did it take from the planning process until the groundbreaking ceremony?

A: Yuserizal Mohd Noor

Management approved this plan in 2012 and the project team was assembled in 2013. In 2013, the project team tried to gain some knowledge from around the world and had a benchmark study in Coca-Cola, Nestle, Bank of Hungary and Bank of Japan. Once we got the information, we started to set up the project management team, hiring an automation consultant and building consultant. In 2014, we started to set up the automation system and cash processing system because we already knew what we wanted to do. Since we had done some benchmarking, we customized our design to be adjusted to our national needs. Along the process, we did some

revisions of our ACC design and building design because it continued to evolve and kept moving forward to be adjusted with our new ideas.

Q: In terms of the legal aspects, are there any regulatory aspects to take this action? Is it only at the decree of BNM management or up to the prime minister's level?

A: Yuserizal Mohd Noor

Basically, BNM has to issue the overall annual report for parliament. However, BNM's projects only reach the board of directors. The board of directors also consists of external parties, including one chair from the government, who is the Minister of Finance.

Q: As far as I know, Malaysia also has their central bank in Labuan. Does Labuan's central bank have a separate mechanism for cash movement with the BNM?

A: Yuserizal Mohd Noor

Actually, we do not have a branch in Labuan. Labuan area relies on Kota Kinabalu's branch. Therefore, the cash movement from will come from Kota Kinabalu to Labuan using the normal CIT arrangement. There is the Labuan Offshore Financial Services Authority (LOFSA). LOFSA is an offshore investment unit to facilitate offshore investment. In terms of the physical currency, Labuan still relies on Kota Kinabalu's branch. The mechanism in Labuan is not part of the ACC system but it is a part of the BNM currency management system. Labuan does not handle any related issues with the banknotes. They only handle investment.

Q: Talk about the ACC mechanism. Is the technological advancement still required by this mechanism in the future to advance the ACC operationalization?

A: Yuserizal Mohd Noor

This mechanism needs more technological advancement in IT/OT (Information Technology/Operational Technology). In the time being, everything in this world

is merging between IT and OT. All of the automation systems are a combination between IT and OT. If a system is run by a Windows PC (IT) and linked with a robot (OT), then we need to make a safeguard to ensure that the IT system is not crippled or affected by any cybersecurity risk. If the IT system is down, the OT side will be down too.

Q: Talk about the organization chart, what are the different duties between the 12 people in Automation & Cash Operation and the 41 people in Cash Processing & Reconciliation?

A: Yuserizal Mohd Noor

Through automation, the people will manage the command center and our server. Inside the cash operation, the people handle the operational cash center. The operational cash center is the nerve center of the system because we can monitor all of the system's health and all of the sub-systems through our command center. We can see what is happening in the ACC, including the security system. However, Cash Processing & Reconciliation consists of the people who manage the machines in the cash processing area. In both, there is also one engineer. The engineer in Automation & Cash Operation will take care of the conveyor, robotics, crane, and any other Automated Guided Vehicle (AGV). While the engineer in Cash Processing only takes care of the systems relating to the cash processing machines and the destruction machine.

Q: If, in the future, BNM covers Fintech, do you think Fintech will be the part of the ACC mechanism?

A: Yuserizal Mohd Noor

We do not see Fintech as part of the ACC. We are still studying the Internet of Things and big data. I think this is one of the new emerging future challenges.

Q: According to your slide, ACC implementation reduced 57% of the human resources. How do you manage the human resources at the beginning of the adaptation process? Do the people continue their manual tasks or do they receive different duties at that time?

A: Yuserizal Mohd Noor

When we embarked on this automation system, we tried to increase the skills of our staff. For example, previously they were just doing manual operations but we taught them about technology. They needed to unlearn a few things and learn new things. We gave them the opportunity so they could survive later on.

Q: What were the basic requirements from BNM in terms of printing banknotes before ACC implementation?

A: Yuserizal Mohd Noor

During the contract assignment with the printers, we give them our own banknote specifications. Before that, we had to develop the specifications internally. We also had a discussion with our supplier about future packaging. We designed two packaging boxes: Box A for small denominations and Box B for higher denominations. Beside the packaging boxes, we also ship the RFID/Barcode from BNM to the printers to stick the RFID code outside the box before they deliver it to our site. Only a verified RFID code can enter our site. We also created the specification of the boxes, such as the width, height, layers, etc. BNM just made the technical drawings and the printers fabricated the boxes.

Q: What kind of information does the barcode provide?

A: Yuserizal Mohd Noor

The barcode only comprises of the printer code, denomination, banknote special series, and running number. That information identifies the right packaging.

Q: Does BNM use an Enterprise Resource Planning (ERP)/Oracle system?

A: Yuserizal Mohd Noor

BNM uses something like ERP that is embedded in the warehouse management system but supplied by the automation system.

Q: How does BNM coordinate with the printers about printing new banknotes?

A: Yuserizal Mohd Noor

We constantly monitor our minimum stock for every denomination. We must satisfy the minimum number. We set our target or our minimal stock level. Once we see that the stock level is below the target, we will issue a new tender to the printer to print new banknotes.

Q: This presentation refers to automated cash processing machines. I am assuming that these are machine-readable notes. How do you process the banknotes that are not machine readable?

A: Yuserizal Mohd Noor

BNM has a few types of banknote that can be processed by the machine. The ACC only accepts machine-readable, whereas non-readable are processed through the counter. We are also exploring the opportunity to reduce the manual processes and handling in certain areas of the automation system.

Q: As far as I know, automation systems increase exposure and vulnerability to cybercrime. Does BNM have any experience of this? If so, how to solve the problem?

A: Yuserizal Mohd Noor

Until now, we have not had any kind of experience like that but we know about these threats and we need to take care of them very well. At our ACC, we have certain rules, for example the staff cannot bring their electronic devices to production and we block access for some staff towards the inside of the automation system. BNM is also working with our cyber security team to make a rigorous firewall and conduct penetration tests to ensure that no one can get through our Wi-Fi system. BNM also implements five network layers that consist of external networks and internal-only networks. In addition, software upgrades have to go through certain tests before implementing to the production server. Only the successful and validated ones can be exported to the system.

Q: Can you tell me about the cash processing fee for the commercial banks?

A: Yuserizal Mohd Noor

BNM charges the cash processing fee directly to the commercial banks, not to the safeguard. For example, CIMB Bank has their own CIT agent (safeguard) such as G4S. The safeguard will take the banknotes deposited by CIMB Bank and deliver them to the ACC. All the dealings are between BNM and the commercial banks only.

Q: Do you mind sharing with us how to handle the coins?

A: Yuserizal Mohd Noor

The ACC system only manage banknotes. BNM manages the coins in another place, handled by the CIT company. The CIT company withdraws the coins from the cash center and distributes them to commercial banks and BNM's regional offices. This process is not integrated with the ACC.

Q: Based on your organizational structure, how many automated cash centers does BNM have?

A: Yuserizal Mohd Noor

Only one. BNM manages the risk with the recovery center by keeping stock there. If anything happens to the ACC, we still can operate through our recovery center. Maybe our operation is different from other countries' systems. When we did benchmarking prior to our ACC system, we found that every country has their own unique requirements and we built our ACC system based on Malaysia's needs.

Q: What does the BNM recovery center look like? I think it may be too expensive to maintain a second ACC just for emergencies.

A: Yuserizal Mohd Noor

BNM has not built a second ACC. BNM operate the recovery center using a manual warehouse system.

Q: What kind of machines does your ACC need? Does it need different machines to process the paper and polymer banknotes?

A: Yuserizal Mohd Noor

For the time being, we have nine machines, including M7 machines, two machines to process the fit banknotes and two machines to process the super-fit banknotes, and also a C4 Machine. Nevertheless, we have already prepared another space in our factory to accommodate 23 machines in total. Our ACC has ten loading docks. Currently, seven out of ten loading docks are equipped and the three other docks are in preparation for future expansion.

- SESSION 2 -
CURRENCY DISTRIBUTION THROUGH CHEST

Speaker: Sanjay Kumar, Reserve Bank of India

Good afternoon to all of you. Post lunch is a very difficult session to handle. So, let us see how difficult that is. I think we all are collected from the banking industry, so this subject is very relevant for us. I have been given a topic, which is currency distribution through CHEST.

I am Sanjay Kumar, general manager in the Reserve Bank of India. We have got our central office; we call it the central office. It is like the head office that is located in Mumbai. To deal with currency matters, we have got one specific department, namely the Department of Currency Management. The Department of Currency Management is the central office for 19 Regional Offices that are located across the country, primarily in the state capital. Although we have got more than 25 offices of Reserve Bank of India across the country, these 19 offices are managing the currency on behalf of Department of Currency Management at Mumbai.

As a central bank, we are the head office of the central office for those 19 regional offices located across the country. The 19 offices, as far as currency management is concerned, are supported by around 3,800 currency chests as of now. The currency chests are located across the country in every city, mostly in small towns. The space or the vault all depends on where it is located, so that is what I am going to talk about today. We have around 135,000 bank branches across the country. We have more than 25,000 ATMs across the country. These are the channels through which we are managing the currency on behalf of the Department of Currency Management located in Mumbai.

OUTLINE

There are the main topics covered here. Legal provisions and currency distribution landscape in India; cost-benefit analysis in the form of what the cost involved is to establish a currency chest or the expenditures that are bound to happen due

to maintenance of a currency chest. We also provide incentives for these currency chests. We give currency incentives because they are doing the work on behalf of the Reserve Bank of India. The Reserve Bank of India is facing the constraint that they do not have a presence across the country in every village, town or city. Therefore, they have appointed 3,800 currency chests as their agents and if somebody is working on my behalf as my agent, I need to support them and provide incentives to work for me by providing better customer services to the people of the country. That is the logic of giving incentives. There is also a penalty scheme, however. If you are doing a bad job or doing something not in accordance with my instruction, you will be penalized. This is one scheme and then the inspections of the currency chest that we do.

We do currency chest inspections of whatever instructions we are going to issue from time to time. We perform inspections by physically visiting the 3,800 currency chests periodically. That is defined based on risk profile of the currency chest. We do the risk profiling based on certain parameters and based on that, we decide the frequency of the on-site inspections. Obviously, we have got some regulations for doing these inspections and oversight is based on that. Operational aspects have been covered under security aspects, infrastructure maintenance, internal control and supervision, which have been defined and must be carried out within their setup. The internal inspectors are supposed to visit them periodically and check whether the instructions issued by Reserve Bank of India are being complied with by their own bank branches or not. The last topic covered here is record keeping and MIS is obviously an integral part.

CURRENCY MANAGEMENT – LEGAL PROVISIONS

Currency management is one of the most visible functions that touches the lives of each individual. Normally, as a central bank, we do not have any customers except bankers because bankers maintain accounts with the central bank. Nevertheless, 1.33 billion people across the country are customers of the Reserve Bank of India even though they do not maintain any account with us or have any relationship with us. In the form of cash, however, they are using the product of the Reserve Bank of India as a central bank. I am issuing my product and every citizen of the country is my customer because he or she is using my product. Therefore, I have the responsibility to see that currency or cash reach the last mile until it is withdrawn from circulation when no longer fit. That is my responsibility sitting in Mumbai at head office. Even though my 19 Regional Offices are there, I am responsible directly

since I am making each and every policy to be implemented by the 19 offices**.** That is why currency management is one of the most visible functions of the RBI, which touches the lives of each individual.

The bank has been directed to regulate the issue of banknotes. We have got some internal regulations that are mentioned in the preamble of the Reserve Bank of India (RBI) Act of 1934. Since the bank was established, we have been under obligation to issue cash under that Act. RBI is regulated under this Act to issue currency to the public.

Besides issuing banknotes, RBI also ensures an adequate supply of clean and genuine banknotes. The banknotes are not only genuine but also clean. Of course, we cannot give fresh banknotes everywhere but the cash should be clean and usable. The public should feel satisfied with the quality of the currency.

CURRENCY DISTRIBUTION INFRASTRUCTURE

As I was saying, there are 19 issuing offices, 3,700 currency chests and small coin depots. Small coins in India have almost ceased circulating. Historically, small coin depots where there and are still maintained because some currencies are being withdrawn from time to time. Slowly, in the end, this concept of small coin depots will vanish.

We have four banknote printing presses where we print the banknotes. Notwithstanding, the RBI only has two banknote printing presses and the other two are maintained by the Central Government of India. Therefore, four printing presses are there which print the banknotes for the country. India also has four government mints. That institution is owned by the Government of India not the Reserve Bank of India. RBI only has the obligation to issue the coins. In the case of banknotes, we are obliged to print the notes and maintain the printing presses. This is the infrastructure setup location to support currency management across the country.

CASH CYCLE

This is the cash cycle that I think most central banks are doing. Some central banks may have a concept of printing the notes and sending them directly to the banks. In our case, however, we either print at the Reserve Bank of India presses or at the Government of India presses, regardless, it will still come to us. We receive it across

the 19 offices in the country. From the printing press, the notes will not go to any other place but only to the Reserve Bank of India. Then, we will distribute it to the 3,800 currency chests across the country, which are acting as agents of the Reserve Bank of India**.**

Nineteen offices are responsible for sending the banknotes to the 3,800 currency chests. From there, the notes are issued to the bank branches, which issue to the customers and feed the ATMs. The same route is taken back for the currency to be deposited from ATMs and the public to the bank branches. From bank branches to the currency chest, then heading to the issuing offices of the Reserve Bank of India, where the destruction takes place.

ABOUT CURRENCY CHESTS

These are the storehouses of banknotes on behalf of the RBI. Either the notes or the coins are stored in these currency chests as the property of the Reserve Bank of India. Without the RBI's knowledge, the bank cannot withdraw or deposit any currency in the currency chests. At the end of the day, the information must reach RBI concerning how much they have withdrawn or how much they have deposited. Then, the RBI will either credit or debit the account. The currency is only maintained by the banks but remains the property of the Reserve Bank of India.

When the currency chest is established by the banking entities, we lay down certain parameters. This means that not any bank can come and ask to establish a currency chest. Those parameters are mainly financial in nature. That is why I am talking about eligibility or financial parameters. Not all these financial parameters are available with the currency management department at Mumbai. For these financial parameters, we have our department of banking supervision, which supervisors the banks not the currency chest. The bank branches are supervised by a specialized department that inspects each and every bank, primarily the major branches, to find out their financial health. We get information from that department regarding the financial health of the bank to give permission regarding establishment of a currency chest. Previously, only public sector banks were given a license. Nowadays, private-sector banks are also eligible for a license, even foreign banks can have a currency chest. Banks have a currency chest if their financial parameters are sound enough. The analogy would be like if I have got my storehouse at somebody's place. He should be able to support my trust. If someday, something happens to that place, I should be

able to recover that amount from that bank or branch. Basically, that is the financial health of the bank that we test when we are giving the license for a currency chest.

Since April 2019, we have been very strict granting the license. A new currency chest vault should be at least 1,500 square feet. Therefore, it is very difficult just to grant establishment of a currency chest with not less than 1,500 square feet of vault area. After April 2019, the rules became even stricter. The costs involved in establishing and maintaining a currency chest include land acquisition as a fixed cost. It is really difficult to get land in a good area because the location of a currency chest should be such that you are able to gather your needs. You have to maintain the currency chest as a profit center if you really want to maintain a currency chest and establish it. Establishment incurs costs. If you are going to establish a currency chest, your management is going to ask what the benefits are for investing so much money. This is the business model to be tested by any bank for the establishment of a currency chest.

ADVANTAGES OF CURRENCY CHESTS MAINTENANCE

These are some of the advantages associated with maintaining a currency chest. First, the flexibility to withdraw cash and deposit excess currency at will. Whenever I want, I can deposit or withdraw, this liberty and flexibility is a big advantage. Whatever has been deposited at the end of the day can be deployed as funds. They can invest those funds in the market. During the day, I can play with the money by withdrawing, depositing or giving it to the customers. Whatever excess amount is available at the end of the day, I will deposit it in the currency chest as a banker and inform the Reserve Bank of India the amount I have deposited. That amount will be credited to the account and they are free to deploy that amount. That is the biggest advantage banks have, at the end of the day they have a float which they can utilize.

Second, a currency chest eliminates the risk of frequent cash movement, resulting in a reduction of transportation and security costs. Obviously, from one place to another, they do not have to carry the cash and simply deposit to the currency chest and get the credit in their account in RBI. Third, we have got compliance to statutory Cash Reserve Ratio (CRR) requirements because in India we have certain cash reserves to be kept in the account of central banks. Fourth, a currency chest promotes efficient cash management. Fifth, serves as an indirect source of income through bank access cash deposit expenses. And sixth, earns direct income by way of incentives from the RBI.

INCENTIVES AND PENALTIES

We pay some incentives. We give incentives to banks maintaining a currency chest in the form of certain unbanked areas defined by the Government of India, where the population is less than 1 lakh. If a bank chooses to establish a currency chest in that area, they will be given the capital cost and also up to three years of certain revenue expenditure and recurring expenditure will also be reimbursed**.** These are two major things for the establishment of a currency chest. On a regular basis, we give a certain amount on exchange of unfit notes. As a central bank, we have the obligation to issue only clean and fit notes to the public. To maintain that, the soiled notes should be periodically removed from circulation and sent for destruction**.** If the banks are going to mop up this many soiled or unfit notes, the central bank will give them money. Therefore, we give them incentives for withdrawing the unfit notes from circulation. We also give a certain percentage for the distribution of coins also. These are the incentives we give the banks for the currency chest or providing efficient customer services to the public. That is why I told you if I am giving some incentive then I am also authorized to levy a penalty if they are not doing the work properly. This scheme is not aiming to find profit but to inculcate discipline. This scheme of incentives and penalties was introduced back in 2008 and from time to time, we improve it to make it more attractive.

CURRENCY CHESTS REGULATION AND SUPERVISION

Currency Chests (CC) regulation and supervision includes the regulations or the instructions that we have issued to the banks for the maintenance of a currency chest. The regulations and instructions include specific instructions. If you do not follow the instructions, a penalty will be imposed. This is very efficient because at the end of the day, if I am getting a benefit, I will simply deposit in the chest vault and report to the Reserve Bank of India, then get the benefit or the amount deployed and inform my treasury people, who can invest and seek profit out of that. This helps connect the people as far as currency is concerned to the last mile.

INSPECTION OF A CURRENCY CHEST & RISK PROFILING

We inspect the currency chest physically by visiting the promises. Based on the inspection and deficiencies found, we do risk profiling. If the security is not adequate, certain negative points will be given . If CCTV cameras are not functioning, certain

negative points will be given. All these negatives marks will add up. Depending on the negative marks, the currency chest will be listed as high risk, medium risk or lower risk. Inspections of high-risk currency chests are performed every six months. Just imagine the resources we would need to inspect all 3,700 currency chests every half year if they were all high risk. The frequency of the inspection is decided based on the risk profile of the currency chest.

Normally, low and medium-risk CC are inspected at least once every two years. High-risk CC are inspected more frequently. When we go for the inspection, our inspectors have around 100 items to check for compliance. Based on that, marks will be given and the frequency decided. We inspect every aspect, including the number of bins, sorting machine capacity, capacity utilization, holding capacity of the bins, number of other bank branches linked to the currency chest, whether they are providing a service to the linked branches or not; everything is captured. We cover everything because the currency chest is maintained on behalf of the RBI, therefore, our reputation is at risk.

If anything goes wrong, the name of the Reserve Bank of India will be in the media. Even if something goes wrong with a CIT company carrying the currency, the newspaper and media will say that RBI money has been looted. Nobody knows whose currency was there because a bank branch must be carrying it somewhere else using CIT services. In another case, a branch may be feeding some ATMs and CIT companies go taking that. After something goes wrong, clarification will be issued but the first impression is the lasting impression. The reputation of RBI is tarnished. That is why I am telling you we are so meticulous in everything we do.

DATA ON CHEST BALANCES

This is the data we captured and we see everything that is required to be captured by way of reporting. When we go there, we check what they are reporting, the data will be available with them what they have reported during the month or half year or year since the last inspection. When I go for the inspection, I randomly check any data belonging to those last one year or two years or 6 months, whatever the period was when my people last inspected. Obviously, during that period, we defined that their internal inspections should take place. Failure will result in penalties. We have many categories, like full-value paid notes, half-value paid notes and rejected notes. For this exchange, we are providing incentives. If they have done the exchange, I

am going to check the claimed incentives and on what basis they have claimed the incentives.

INFRASTRUCTURE AND MAINTENANCE

Regarding infrastructure, everything is defined, such as the validity of the fitness certificate of the strong room. Our strong room was made 30 years ago. The guarantee that it is still in a suitable condition now is based on a certificate from a competent authority that contains a statement that the building and strong room are sound and futureproof. Then, fitness and general condition and location of the CC from the viewpoint of flood and fire hazards, location of the building access, maintenance quality of the vaults and storage and all other infrastructure must be there and in working condition. All these things will be checked and certified by a competent authority that issues the certificates.

OPERATIONAL ASPECTS

Regarding sorting of notes and adherence to clean note policy, we issue reasonably good quality notes and remove soiled notes from circulation. That is called clean note policy. We do not have a fresh note policy. Based on that, nobody can demand fresh currency from the Reserve Bank of India.

DETECTION AND REPORTING OF FORGED NOTES

The requirements stipulate that every bank has to have a nodal officer in respect to counterfeit notes. The nodal officer does not only report to the Reserve Bank of India, they also have to report everything to the Financial Intelligence Unit that is under the authority of the Central Government of India. We also have the National Crime Records Bureau (NCRB) portal. The banks are also supposed to report counterfeit notes. We have a stipulation where to fill the FIR. It depends when you have to fill the FIR, not in every case. Issuance of acknowledgement receipts to the customers when you detect a counterfeit note. You have to give a receipt to your customers**.**

INTERNAL CONTROL AND SUPERVISION

Internally, when the inspectors come, they have to see all these aspects which all people will go and check as a very vital part of currency chest supervision. You

cannot check everything during a one or two-day inspection but you can rely on the certificate and the documents available, showing the things being done. You just check the records and see whether it has been done by the appropriate authority or not, then rely on that. Everything needs to be recorded. I just want to clarify, for the daily operation, there are no representatives from an RBI station in the currency chest area. That is why I am telling you when we go, we check every aspect that nothing is being missed because when my inspection team is gone after one year, I will not be aware of what happened last year but we can inspect at any time and we go without any information.

In there, the internal team also inspects without any information. The internal team is also checking in between periods when we are not going. We check those records when we go there about what has happened during the last one year or two years or within the six months. Actually, nobody from the Reserve Bank of India is sitting in the currency chest, although the entire property belongs to the RBI. Money is only a trust between the central bank and the banks and the entire banking fraternity itself. Only trust defines currency.

Regarding internal controls, bi-monthly verification is done for 2% of the chest balances. This is done by the bank officials not connected with the chest, namely some other branch. A person will come and randomly take two people and they will check. These are the controls and checks we have built into the system to minimize anything that can go wrong. Regarding half-yearly verification, 5% of the chest balances are checked by the officials from the controlling office. For both types of verification, we check the denominations of Rs100 and above. We do the verification through NSMs and maintenance records at the currency chest. A fear factor should always be in the mind of the persons working with currency. If the fear factor is gone, it means there is a chance of something going wrong.

The balance as well as transactions of notes and coins have to be reported on a daily basis to the RBI Issuing Office. Those reports are checked by us. At the end of the day, since it is a system, it is operated by human beings working in the currency chest. Whatever you feed into the system, the output would be like that only. Whatever the input, the output will be discharged accordingly. We check the input by randomly checking CCTV footage to see when they are doing what they are doing. Just a random check.

Regarding the linkage system, we only have 3,700 currency chests and all not banks maintain a chest. A bank or branch that does not have a chest is linked

to a particular currency chest within the region to avail the facilities provided by a currency chest**.** For that, we have stipulated some charges. They can leave the charge or recover the charge from the bank branches who come to avail the services of a currency chest. That is a well-defined system where the bank that does not have a chest can still avail the services, for which it will pay a service charge**.**

COMPLIANCE TO RBI INSPECTION REPORT

The aspects below are check for compliance to the RBI Inspection Report:

- Timely action to remove the deficiencies pointed out in the earlier inspection reports
- Delay, if any, in reporting of compliance
- Sustenance of compliance submitted
- Details of major deficiencies pointed out in the last inspection report, which have not been rectified by the chest so far
- Whether non-compliance, if any, was looked into during internal inspection or by the Controlling Office.

SECURITY ASPECTS

We have various guards that can be deployed. In the case one is not available, a second type will take over. If the second type is not available, the third type will take over and so on. If private security guards are deployed, we have already specified the requirements. Checking that and compliance are also used to ensure the various details and everything is defined. When we make our own home or flat, we take care of everything, including where the dining room will be, where the bedroom will be, and so on. It is the same for the currency chest of the Reserve Bank of India. I am going to decide where it will be located and what will be located and about the walls, floor, windows, and everything. It will all be decided by me, in the sense of the technical specifications of the wall, the ceiling and the floor above the chest. If not in the bank, what are the requirements? If the surroundings are not in the bank, what are the requirements? I am going to decide everything. If there are any deficiencies, the license may not be granted. Therefore, the bank has to keep this in mind if they are going to invest millions and billions of rupees. The license may not

be given, so that is very particular in terms of compliance. This has happened in our country. Once the full structure is ready and everything is ready, our people go in for the inspection and if they find any deficiencies, the license is not granted. The vault may have been used by the bank for general purposes and not given for the strong room. They have to be very particular regarding all these things. Everything has to be decided. As I told you, we have given so many things and all aspects contain elaborate specifications.

REPORTING SYSTEM & MECHANISM

At the end of the day, everything has to be reported. They have to receive permission about what the reporting structure should be and when they should be reporting. Everything is pre-defined. We also have a Management Information System that they have to maintain for the reports in the system and also the paper. The actions taken after the findings of the inspection are reported to the Issue Office. Based on the discrepancies/irregularities observed, a penalty is levied on the CC for shortages, mutilated notes, counterfeit notes, violation of terms of agreement, deficiency in customer services and non-compliance with operational guidelines. Based on the findings of the currency chest inspection, the risk rating of the CC is reviewed by the Issue Office. Compliance to major irregularities is required to be submitted by the banks within a month, while compliance in respect to the other observations is required within three months.

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Q&A SESSION 2

Q: In 2017, the Government of India declared to promote the digital economy and digital transactions. Hopefully, we won't see any transactions in the market anymore. Furthermore, in 2022, India will become a trillion-dollar digital economy. What was the progress of India's digital economy program? The second question, can the digital economy obviate the currency chest?

A: Sanjay Kumar

Since we are talking about currency, digital currency is also currency. I will answer the question with an example. Scandinavian countries, such as Sweden or Denmark, are the most advanced in terms of electronic payments. They use the least paper currency, but they have mandated that the presses will not be closed. As far as my knowledge is there, they have said this back-up will remain. No system is full proof. If you are going to have a CC, you will need a backup center. A Currency Chest (CC) backup center cannot be a full fledge back-up system. Therefore, what will happen if you declare that you are 100% digital from today onwards? You have to keep a system in place. If this goes wrong, what is the backup? That is why I said some of the more advanced countries have chosen not to discontinue the notes. This is one of the major reasons we are continuing and, of course, all the countries around the world are in thinking mode about whether to issue digital currency, but not much progress has been made. There is not much progress because across the internet, the materials are available for the digital currencies but you cannot find any major country who has introduced a digital currency. Do you think the major countries or big countries, which are ahead of everything, do not have the resources to introduce digital? No, they are waiting and watching the progress of small countries, which can take that risk but being the big brother, I cannot take the risk. So, I am waiting for you to see what you are doing. It is the same case in India, which is also waiting and watching the progress made in this direction.

Regarding the second question, the currency chests are for physical storage of the currency. When the currency is in physical form, you need to store it and you need to have the physical space/storage capacity/room/building or whatever you require.

You need something to physically store. When it comes to the digital form, only a server of adequate capacity with the linked nodes where the transactions are going to happen is required, nothing else. In the case of digital currency, I can guarantee that digital currencies will initially only be complementary, not supplementary.

Q: India is already advanced in terms of payment system infrastructure, such as Unified Payment Interface (UPI) and Quick Response (QR) Code, which can help people make non-cash payments more easily. How is the synchronization between planning the amount of cash that should be issued, the development of payment system infrastructure, and how the RBI handles that? In our case, we have two separate departments, namely the Payment System Policy Department that focuses on non-cash payments and the Currency Management Department that focuses on cash payments. Actually, we are thinking that it might be like non-cash, which exactly influences the amount of cash issued by the central bank, the payment system infrastructure plan and also the road map for cash infrastructure.

A: Sanjay Kumar

Payment system is a term that covers everything, and cash is only a component of the payment system. The payment system is doing a transaction in any form, either electronic or physical. When you are talking about electronic transactions, there is a payment and settlement system. In India, we also have an exclusive department that handles the electronic payments but not digital currency. On the other hand, we have the Cash Currency Management Department where I am working. Therefore, the payment and settlement systems are entirely different, which take care of all the non-cash payment parts. Cash and electronic payment modes are only two aspects of the payment system. I have read some papers from the World Bank or IMF around 10 years back that predicted for the next 20 years, the use of cash will go up and the use of electronic modes will also increase. These two are different things and with the increase in the global economy overall, the increase in the Gross Domestic Product (GDP), everything is going up, including the population. Everything is going up. Awareness is going up. The awareness of the new generation is going up. Talk about the new generation and everybody is leaning on cash transactions, such as debit cards or credit cards. They may not be using cash at all. Think about our parents, they are not at all comfortable using any electronic mode or online payment, they

still want cash. I predict that electronic payments and cash are going to increase until some point of time maybe 15 to 20 years down the line. After that, what will happen is these two will converge at the same level. From there onwards, cash use will come down and electronic will go up. We have not reached that stage yet, where electronic and cash are both at the same level. It is going to take 15-20 years to fill the gap between those two. For the time being, I can say that India will not implement digital currency but maybe 10 years down the line it will be the future.

Regarding coordination between two separate departments, when you have got cash use, the Currency Management Department will remain relevant. The relevance of that department will change with the usage. When the use of cash stagnates, the relevance of this department is going to move, but as I am aware, these two need to be separated and in future, these two will still need to be separated because the use of cash cannot be eliminated. I do not know about the future, maybe 20-25 years down the line, but the Scandinavian countries have said that the use of cash should remain along with the printing presses. That is there at the back of their mind, so when we reach a certain level, it is possible that the importance of the payment department will go up separately and the cash department, which is obviously a separate department, will come down slowly when the use of cash declines. I do not think they will be able to catch up with the developments in the world because when you are going to do something technical or something new, you have to have a separate research and development department. If you are going to keep everything with the same person in the same department, it is going to put hurdles in the development**.**

Q: Is there any roadmap for the infrastructure forecast? Do you have any plan to update the currency chest?

A: Sanjay Kumar

In April 2019, we issued an instruction which not only stipulated the requirement of 1,500 square foot strong rooms. We have come up with an instruction now in 2019 and we are saying not only that the new currency chest will be open with a 1,500 square foot strong room, we have also defined the processing capacity of new currency chests. This implies that the use of currency is not going to reduce. All of the innovation has to be there in cash and as the Reserve Bank of India, I am telling you we have done 3,700 currency chests across the country and we have started

the process of rationalizing. I told you some of the chests are just like a small room, but due to legacy issues, they are still being maintained. Now, we have to decide which chests should be closed. We should not have 3,700 currency chests across the country. We should have half the chests closed and around 2,000 chests equipped with a better processing system, equipment and infrastructure. Everything should be there to maintain system efficiency and cater to the needs of the country. Recently, we have been telling the banks all of the instructions that have been issued. Cash is going to be one of the vital modes of the payment system. As I told you before, we have 19 offices, we have a G+D Machine and we are in the process of replacing all the machines. Innovation and technology should be part of currency management. As the Reserve Bank of India, we are of the belief that cash is going to be the future at least for the coming 10 – 15 years.

Q: Regarding the capital of the currency chest, does RBI subsidize any capital for the currency chest and the daily operation of the currency chest?

A: Sanjay Kumar

We give the capital cost in places where the currency chest is established in a non-bank area. A non-bank area means where bank presence is very low or negligible. If the bank is opening a currency chest in such areas, we give 50% of the capital cost and we reimburse some of the revenue cost for up to three years. Once the bank is on its own feet, it will move further. This is the cost incentive and support we give to the currency chest. For the daily operations, we do not give anything. As I told you before, we have given some incentive schemes by which we exchange the unfit notes and mutilated notes. For the distribution of coins, we give a certain percentage, otherwise we do not give anything. Obviously, we also have a penalty scheme if you are not going to work properly.

- SESSION 3 -
THE REGULATION AND SUPERVISION OF CASH IN TRANSIT

Speaker: Sanjay Kumar, Reserve Bank of India

CASH IN TRANSIT (CIT) – AN OVERVIEW

Even though CIT is dealing with the currency chest, which is the property of the Reserve Bank of India, they do not deal directly with the central bank. They deal with taking out the currency from there, so our currency is brought to deposit in the chest.

Once the currency has been withdrawn from the currency chest, the central bank is no longer in the picture. Nonetheless, the reputational risk always involves the Central Bank. If anything goes wrong with the currency, the name of the central bank comes to the fore. That is why, previously CIT did not have much of a role to play and even though they were playing some role, they were not very active with the central bank or banks. Over the last few years, however, this relationship has developed a lot. Engagement between CIT companies and the Reserve Bank of India is at the beginning stages.

Cash Replenishment Agency (CRA) is a company to replenish the cash at ATMs. The CRA refers to that part of the operation where it does not have direct engagement with the bank but is contracted by a Managed Service Provider (MSP). As far as India is concerned, MSP nowadays are playing a vital role in terms of cash in transit because they enter into an agreement with the banks to provide wholesale services. Wholesale services imply all of the cash-related operations under one agreement. They are further signing agreements with CITs or CRAs to provide a wholesale deal to the banks, for which they enter into an agreement with the bank.

SERVICES OFFERED BY CIT ENTITIES TO INDIAN BANKS

What do they do? They provide cash vans to transport the currency from one place to another or to load cash into an ATM, which are usually modified LCVs. LCVs

are Light Cash Vans. A bigger lorry normally runs from the printing press to the RBI offices, containing roughly 220 boxes minimum, with one box containing one million rupees. That is entirely different for the CIT. The CIT company has nothing to do with that. When the notes are coming from the Issue Department of the Reserve Bank of India and even from the Reserve Bank of India to the currency chest, there is no role played by the CIT company. We do not deal with CIT companies. When we send currency from the Reserve Bank of India to the currency chest, we hire our own cars or LCVs or maybe bigger vans that allow larger quantities of currency to be transported between the Reserve Bank offices and the currency chest. These shipments are always guarded by the government's armed security guards. When we transfer the currency from the printing press to the Reserve Bank of India and from the Reserve Bank of India to the currency chest, it is guarded by designated Special Forces, particularly from the printing press to the RBI offices. We have got a special agreement with Government of India to guard those notes in transit by Special Forces recruited or deployed for that purpose**.** When the Reserve Bank of India transports the currency from chest to RBI or RBI to chest, it is always guarded by the government's armed security forces not by private security guards. Private security guards are always engaged with the CRA or CIT, which are transporting from the chest to the branch or maybe the branch to the ATMs or vice versa. The CIT companies normally provide the vehicles and the crew. The crew includes custodians, drivers and security guards for cash shipments from one location of the bank to another.

Normally, the banks are doing retail cash management and doorstep banking and they are assisting in the process. Cash pickup and delivery is the collection of cash from points other than bank branches and delivery to other bank branches. For example, if a bank has the account of a big department store such as Walmart, the bank will collect the currency or notes from the premises. The bank has engaged the services of a CIT company to transport that cash. There may be a process where the CIT company brings the cash to their vault. They will sort the banknotes and deposit the currency into the chest. There is a chance that they will directly take it to the currency chest. Two types of services are there once they sort the currency. Obviously, they charge for sorting services per the agreement made between the CIT company and the bank.

They also provide bullion management/transit/movement services, including the transportation and vaulting of precious metals. CIT companies nowadays are engaged in the movement of precious metals and they do the vaulting. I have never

visited the vault of a CIT Company but I learned that their vaults are equivalent to the strong rooms maintained by banks for the purpose of the currency chest. They are investing a lot into this business and they know that the future is going to be more attractive for them. Therefore, they are not hesitant in terms of investing in the infrastructure.

Cash processing involves supplying staff to the currency chest. The banks do not deploy their own staff to the currency chest. Some activities, like currency processing, are outsourced to the CIT companies. CIT companies provide manpower to sort the currency in the currency chest. They enter into an agreement with the bank for the currency chest and they charge for that.

ATM CASH REPLENISHMENT AND FIRST-LINE MAINTENANCE (FLM) RELATED SERVICES

When a CIT company visits an ATM, they are able to repair and provide services. That is the first-line maintenance they provide and they charge the banks based on the number of ATMs or transactions or repairs. The charges depend on the how many services and the ways in which they are provided.

OTHER PARTICIPANTS IN CASH MANAGEMENT INDUSTRY

The cash management industry nowadays is growing really fast due to various factors. The industry is aware about the increase in currency volume. It is going to give them more opportunities. Consequently, more players are coming into this space. Many players are in India. Obviously, however, some major players remain the key players as market changers. Everywhere it happens like that. There may be many players but only a few key players play a vital role in changing the market. Managed Service Providers (MSP) provide ATM services. They provide hardware and software maintenance, incident management, servicing the machines, network management, real-time monitoring of ATM cash positions, Cash Replenishment Agency (CRA) and second-level maintenance. First-level maintenance is done by CIT companies, but the MSP are there for anything more serious. They have wholesale agreements to provide ATM services. They also perform technical problem solving in the form of engaging specialized engineers for this. They have contracts with specialized engineers who are responsible if anything goes wrong in the ATM. They also provide second-level

maintenance services because MSPs are always in the bigger picture and CIT is part of the MSP.

There are two models of outsourced ATM management:

a. Opex Based: MSP bears the operating expenditure of an ATM and it earns a fixed revenue per ATM. As the number of ATMs goes up, so does the income.

b. Capex Based: MSP deploys the machine and earns revenue per transaction. Since they depend on revenue per transaction, they choose to enter into an agreement with a bank to install the ATM in places with more transactions.

There are different aspects or different lookouts from the service providers from bank branches and they are getting into so many combinations. Another participant in the cash management industry is a Private Security Agency. It is one of the vital entities in the cash management industry because without providing the guards, they cannot move. We have the Private Security Agency Act (regulation) and it is a Government of India mandate that the private security agency is a certified agency with a clearly defined private security guard provider. That Act covers that they have to provide security guards to the ATMs, CIT companies, MSP and so on. All guards are provided under that Act. Not that anybody can be engaged and provided as a security guard. The parameters are defined not only for the persons specific to the companies, yet who the company is and how it will operate are also defined. As the industry progresses, things are becoming more complicated but at the same time the CRA and the CIT are entering into agreements keeping their benefits in view.

Nowadays, disputes are increasing due to numerous technical issues. For that purpose, we have the Currency Cycle Association (CCA). This is a self-regulatory organization (SRO) in the cash management business. This has been encouraged by the Reserve Bank of India because we are not dealing with CIT companies, so we cannot frame the rule for them but we can tell the industry to follow certain rules that are beneficial to all. Since it is a vital aspect of currency management, everybody should be under some sort of formal agreement to benefit and adhere to certain rules and regulations. There is the Currency Cycle Association (CCA), established in early September 2018 to develop quality standards pertaining to the currency management industry. The CCA is currently comprised of nine members. When we say that there should be a currency cycle organization or self-regulatory organization, we need to tell something about that. We have stipulated certain parameters and consequently only nine members are complying with the prevailing

requirements. The role of a self-regulatory organization is to ensure compliance with the minimum standards for the CIT industry. The industry is flourishing but there are no roots and parameters. Therefore, the self-regulatory organization will formulate some regulations and parameters, which will be binding for all players in the market to have a level playing field.

The Cash Logistic Association (CLA) was formed in 2012. The comprising entities operate ATM cash replenishment, cash branch delivery and pickup, and intercity bulk cash movement, representing around 95% of the total business. This was not recognized but CLA is an industry initiative. They formed due to the fact that everybody should know each other and should play together under certain rules. CLA works with the regulator and government authorities to find solutions to the issues. Although not recognized, we as a central bank recognize that an association is there. If we need to talk to somebody relating to the CIT industry, we should talk to some organization whether it was established based on certain vested interests of industry players.

GENESIS OF CASH MANAGEMENT IN INDIA

Cash movement by the banks in their own cash vans with bank guards and custodians. Partial outsourcing of cash activity to a third party (without regulatory blessings). Although we do not regulate, we have asked the banks that if they are outsourcing any of their activities, what should the requirements be? These guidelines for outsourcing were completed in 2006. We have a framework of certain rules. If you are outsourcing your work, which work should be outsourced and what parameters should be followed? Even if they are engaging the services of CIT or CLA or MSP, which are wholesale, they are still bound by the 2006 instruction from the RBI, for which we defined the outsourcing activities and how they are outsourced. Based on that, the processes of the private cash management industry have evolved over a period of more than one decade.

CIT BUSINESS IN INDIA

The key demand drivers of the CIT business include the increasing number of ATMs and ATM transactions, as well as the rapid uptake of digital currency. There is no question that innovation and technology will drive the cash market or demand in the cash market. There has been a surprise in India, namely a decrease in the number

of ATMs. Although cash in circulation continues to rise, demand is also going up and the banks are spreading their wings, but the number of ATMs went down. CIT business demand depends on the opening of new bank branches or an increasing number of organized retail shops, jewelers and hospitals. CIT are in the business of giving doorstep banking services on behalf of the banks to all these shops, jewelers, and hospitals. The continued use of cash in the country is also a key demand driver of the CIT business in India. Regarding the industry overview, 10 major players are there, maintaining more than 10,000 vehicles across the country that carry 150 billion rupees daily and vault about 40 billion rupees overnight. It is a big entity as far as currency is concerned.

REQUIREMENT TO SETUP CIT IN INDIA

Since RBI, as a central bank, does not recognize any CIT, the central bank does not enter into agreements with any of them. Consequently, the central bank does not stipulate the requirements. The general requirements to set up a CIT company are the minimum requirements we have under which any company can be formed. There is a rule under the Indian Companies Act/Partnership Act that is applicable to any company and will be founded based on this rule. CIT also has to follow the rules defined in the Companies Act or Partnership Act. The security guards provided to this CIT are covered under the Private Security Agencies Regulation (PSARA) Act of 2005. Various acts exist that do not specifically relate to CIT establishment and operation but the rules cover the overall opening and maintaining of CIT companies as well as other requirements similar to shops and establishments, goods and services tax registration, and the Contract Labor Act. If you contract the person or the people for work, you will have to adhere to the Contract Labor Act. These are the general rules that relate to the establishment of any company, which also cover CIT companies. There are no specific acts, rules or regulations, that is why I am mentioning these general rules which cover the ambit.

REGULATORY/SUPERVISORY FRAMEWORK FOR CIT IN INDIA

1. Reserve Bank of India

CIT regulation and supervision does not fall under the auspices of the Reserve Bank of India. Nevertheless, wherever there is currency, the reputational risk of the central bank is involved, which is something we cannot ignore. The RBI has no direct regulation and supervision. We do not regulate; we do not issue instructions,

so we do not supervise. The RBI also has no licensing requirements; they have to be covered under the general rule. However, banks need to put necessary safeguards in place to address the risks inherent to outsourcing activities through outsourcing agreements as per the guidelines on managing risk.

Banks should have in place a management structure to monitor and control outsourcing as part of the banks, under which they engage the services of CIT companies. This is applicable to the banks. Therefore, when RBI issues a regulation, we tell the banks about the regulation not the CIT. If a bank is outsourcing activity to CIT, it must see all these things. When banks use CIT services, they have to keep these requirements in mind. Consequently, all these things are guided by the outsourcing policy.

Banks need to ensure adherence to minimum standards while engaging service providers, such as eligibility criteria that set a minimum net worth requirement of at least 1 billion rupees. Last year, we issued the net worth criterion. There have been incidences regarding currency carrying when something has gone wrong on the way, which has a huge impact on the bank. What we try to cover is to determine the net worth of a CIT company, which the bank will see if the CIT company has a net worth of one billion if they want to provide CIT services to the banks. We have not directly stipulated that 1 billion should be the net worth but we told the banks to keep this in mind whenever engaging CIT services.

We have also defined the physical/security infrastructure. A minimum fleet size of 300 specifically fabricated cash vans. Now, indirectly for the last one year, we have started telling banks that whenever they engage CIT services, the CIT company should have a net worth of so much, at least so many vehicles, CCTV and GPS should be available, no cash vans can move without a guard, and so on. As a central bank, we regulate the banks only, so we are issuing the instruction only to the banks just to safeguard the interests of the banks. So many players are in the space, so initially we said that anybody fulfilling the requirements of the Companies and Partnership Act and shop establishment rules, they could form the CIT. For participation in currency management, however, a minimum requirement has been defined by the central bank. We have some rules for CIT, such as vans are not allowed to follow the same route and timing repeatedly, night movement of cash vans should be discouraged and staff associated with cash handling should be adequately trained, with certification carried out through the SRO. The SRO should be responsible and accountable for their activities.

ATM operations should be carried out only by certified personnel. Training should be provided by the Self Regulatory Organisation (SRO) since they are keeping and maintaining the training and qualification data for the CIT companies. The database has to be maintained by the SRO. The character and antecedent verification of all crew members associated with cash van movements should be done meticulously. Staff associated with cash handling should be adequately trained and duly certified through an accreditation process. Certification should be carried out through the SRO or other designated agencies. This will prevent incidences of persons with doubtful integrity from being hired by another CIT company. CIT and CRA are also responsible if something goes wrong and they need to inform the police. Therefore, the police database is also updated and maintained.

2. Government of India

We have got certain rules defined by the Government of India apart from the central bank. First, standard operating procedures for private security agencies and the rules they have to follow. Second, as per the rules, private security agencies are to ensure the following while providing private security: If they are to provide private security guards to the CIT companies, they have to follow certain rules and regulations that the Government of India has already defined. Indirectly, the central bank is also instructing the players whom they are regulating, namely the banks. Furthermore, the government also regulates the private security agencies since they play a vital role in the security of any aspect, including currency. Third, live GPS tracking of cash during operation. Fourth, minimum cash carrying limit of 1 million rupees and maximum of 50 million rupees. Fifth, cash handling includes counting, sorting and bundling activities to be carried out in secured premises and no cash loading of ATMs or cash transportation at certain times. There is no cash loading or cash transportation after 9 p.m. in urban areas because activity dies down after 9 p.m. Even in urban areas, there is a chance of getting things wrong, so it is better not to do this activity after 9 p.m. On the other hand, in rural areas, the curfew is at 6 p.m. In terms of special timing, there are also curfews before 9 a.m. and after 4 p.m. in Left Wing Extremism affected areas. That has been defined by the government and the carrying of cash and loading of ATMs should not be done after 4 p.m.. Even CIT which are recognized and regulated indirectly by the government or Reserve Bank of India will not perform any activities relating to this.

CIT BUSINESS MODEL IN INDIA

The CIT business model in India is similar and known to all of you because CIT companies are found across the world, working in close coordination with the banks.

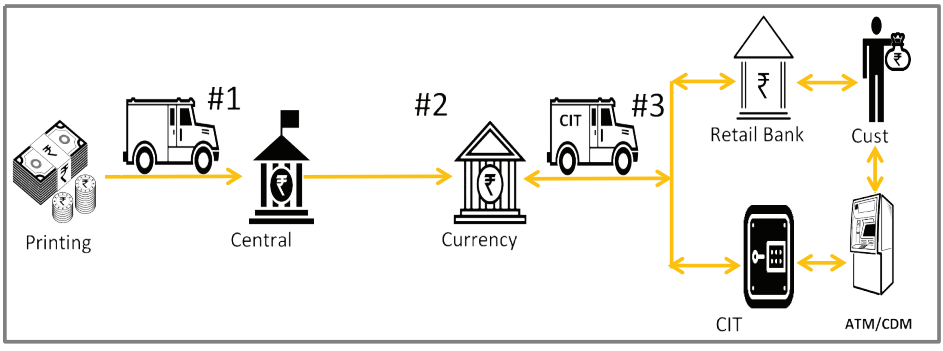

Figure 1 CIT Business Model in India

Key Operating Business Models – CIT

1. CIT relationship with the Banks

   CIT companies have contracts with the banks for cash-in-transit. Banks often have direct contracts with CIT for ATM replenishment and processing currency at a bank's currency chest by providing staff/machinery.

2. CIT relationship with Managed Service Providers (MSPs)

   MSPs take the wholesale agreement with the banks. Banks outsource ATM maintenance and related activities to MSPs. In this case, MSPs appoint CIT as vendors for ATM replenishment only.

CIT Business Model in India – Revenue Generation

1. ATM replenishment: pricing for such services is based on the average revenue realization per ATM. Some costs are considered by the MSP while entering into an agreement with a bank as average revenue realization per ATM per transaction.
2. Cash in Transit/Cash Pick up & delivery: Pricing more subjective and dependent on factors such as location, cash amount and time of day

CIT BUSINESS MODEL IN INDIA – RISK AND INSURANCE UNDERTAKEN IN CIT CONTRACTS

Here are the percentages that have been given for transit theft and fidelity for ATM/RCM/CIT.

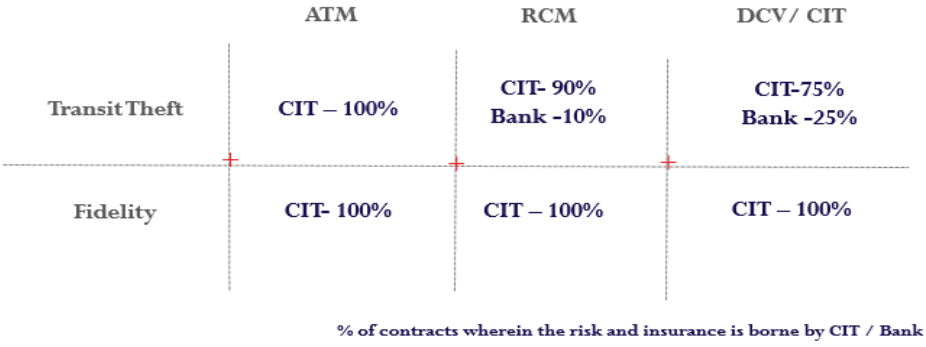

Figure 2 Percentages of Theft and Fidelity for ATM/RCM/CIT

CIT Business Model in India – Loss Events

Here is some of the insurance they do but if we talk about the currency chest, we do not have any insurance at all.

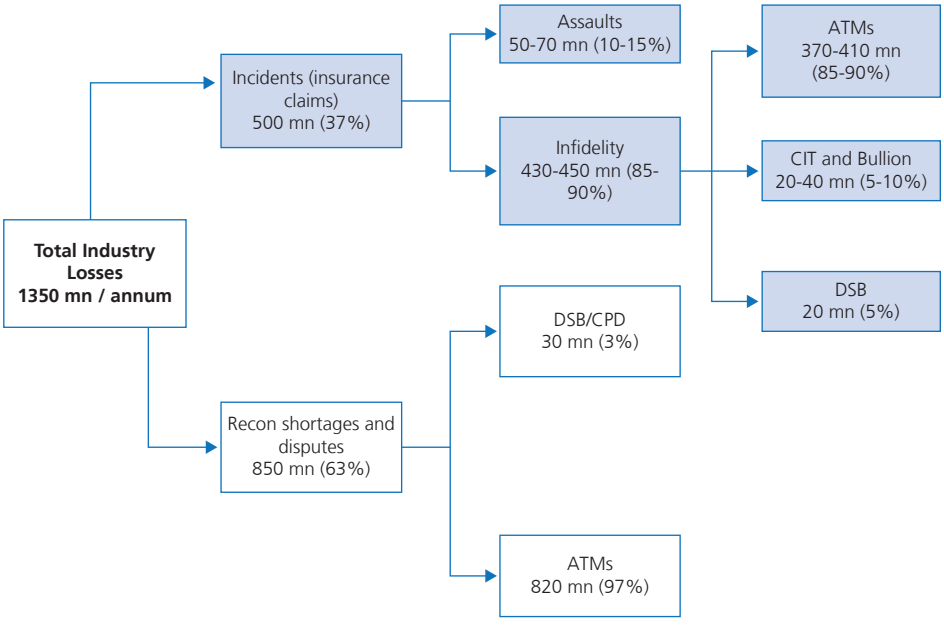

Figure 3 CIT Business Model in India – Loss Events

There is a huge amount of currency there, so getting insurance would have a massive impact on the balance sheet of the bank. Even when the money belongs to the Reserve Bank of India, the maintenance cost is still borne by the bank. If we force the bank to insure the currency chest money, from whom will they take compensation? They will obviously charge either the central bank or the customer. Therefore, there is no need to define that the currency chest must be guarded by so many people and that would require so much specification. We do not ask them to insure the money kept in the currency chest. At the same time, however, in the CIT business model, this is the data given for insurance purposes, who takes what, in the case of ATM assaults or infidelity.

On the other hand, total industry losses for the reconciliation/recon shortage are a major problem in our scenario. Therefore, we have issued certain regulations to the banks. Reconciliation should be done within a maximum of t + 3 days. We issued this instruction very recently because it was a matter of concern that reconciliation could take months to complete. It will take some time but this is the reconciliation situation in India, we do not know about other countries but we have got serious problems with this.

REPORTING REQUIREMENTS FROM CIT

There are no direct reporting requirements to RBI because we do not deal with them directly. Based on an outsourcing agreement, however, we have told the banks to report certain things and when we go to the banks as part of our inspection, we see whether these things are being followed or complied with or not. Obviously, the CIT companies should be giving access to the banks who are in agreement with them. They should be inspected periodically, so that the CIT companies are performing well, their vaults are maintained and the currency is kept secure. This is part of our outsourcing circular instruction issued to the banks. Even though we are not telling them directly, indirectly we are telling CIT many things and maybe they are not far away when there is a possibility that the Reserve Bank of India may like to instruct CIT companies directly.

Day-to-day operational reporting to banks include:

1. Cash withdrawn from bank branches/CCs
2. Cash replenished in ATMs

3. Cash collected from DSB business
4. Cash deposited in bank/CCs on behalf of the bank
5. Details of cash vans and crew deployed.

Expected reporting to self-regulatory organization (Currency Cycle Association) creates and maintains a database of CIT/CRA employees at the industry level to any unique mode/core identification by the Self-Regulatory Organization to ensure that they possess unblemished records.

Q&A SESSION 3

Q: The more rules and regulations you make as the cash department of the Central Bank means that the cost of cash will increase. Have you had this discussion? If so, what are your thoughts?

A: Sanjay Kumar

In general, you are making the rules. You are defining the things and you have to do many things today. Tomorrow, you are going to re-examine, analyze the situation and say these 'five rules' are not enough. There should be five more rules. Getting the entity to comply with those five rules will mean the entity has invested something. They make their own rules to comply with that. Now, the additional five rules are obviously going to define something else in compliance to that. There is a cost to everything, as long as the thinking is in your mind, there is no cost. But, when you put it on paper, the costs start. Because its already on paper, you have issued the instructions**.**

Just to give an example, we have not been instructing everything but indirectly we said that the self-regulatory organization should be there to maintain the database and should be responsible for the human resources to have adequate training. Providing training to staff will create a cost. The cost is going to increase for any regulation cost. However, I just said that this is not the consideration for thinking in the direction of digital currency. As the regulator, you are free to justify what is required. The entity should then follow that since they have to play their role and survive in the market, which has become so competitive. Unless you are non-compliant, you are not going to exist in the market. Some players are trying to be over compliant yet that is putting pressure on others and has led to a chain that involves a lot of costs in the system as a whole. The two major costs across the country are printing the banknote and logistics. In RBI case, printing is our highest expenditure. This item is at the top of our balance sheet. That is obviously one consideration when I am thinking about digital currency. When you are going digital, you can reduce operational costs. Maybe you have incurred a large cost in infrastructure but after ten years, the recurring cost will be very low.

Q: I just want clarification, what kind of special treatment does RBI provide for cash distribution in Left Wing Extremism (LWE) areas?

A: Sanjay Kumar

In such areas, we have inherent currency distribution risk. We have tried to ensure that more or less every town or city is covered by a currency chest. But the fact remains that suppose X place has a currency chest and Y place has a Reserve Bank of India office. In between both places is an LWE area. How could you reach that currency chest to distribute or send the currency? In India, therefore, the defined areas where terrorists or extremist wings are active, we have special arrangements to send the cash from the Reserve Bank offices to the currency chest. We use air services by way of helicopter. We do not go by road because even if the vehicle is guarded by police, security and armed guards consisting of 50 people, if they are surrounded by terrorists, what they will do? That is an area defined by the government as a terrorist area and we need to take care. But how to take care? If you send 10 people, then 20 people will come. If you send 20 people, then 50 people will come, etc. Just to avoid such cases, we use helicopter services. We send from the office to the currency chest by way of air, that is mandatory.

The next question is about distribution from the currency chest to the branches? In those areas, the government has introduced a mandatory curfew, namely that after 4 p.m. there will be no ATM replenishment in those areas. The government has realized that even in the late evening, such incidences may not be avoided. Consequently, distribution from such areas has to be completed during the daytime up to 4 p.m. only. Beyond that, we do not distribute and we do not allow the banks to carry notes.

- SESSION 4 & 5 -
CURRENCY PROCESSING INNOVATION

Speaker: Christian Huber, G+D Currency Technology

INTRODUCTION

Where do we see our position in the cash industry today? The Cash Cycle Seminar (ICCOS) conference concluded that the cash industry today is still not effective. It is still rigid, fragmented, manual, low tech, and paper based. It is merely not what people wanted. People expect a cash industry that is agile, integrated, automated, digital, and transparent. Now, the question is, how can we get there? What are the means to get to an efficient cash industry, which calls for a new structural reform. The lesson learned from Germany in creating a means to get into an efficient cash industry situation is when big Cash in Transit (CIT) in Germany was being manipulated, the central bank of Germany worked together with players to establish a new, more secure system that now is popularly called the Electronic Data Interchange (EDI) system. It introduced standards of how communication between the players should work with common software. Therefore, the cash cannot be shipped without standardization and registration from the system. Hence, the question is should it be a crisis that can transform us into an efficient cash industry? Of course, that is not what we want. So, what will help us get to the desired situation? The answer lies in making the software and digitalization. Also, a comprehensive portfolio is essential as a foundation for a solution in terms of banking processes. Intelligent automation will help us when it adds value to the processes. If it is considered more expensive than the manual work, it is not useful.

PROCESSING SOLUTION

The general trend in the industry is that central banks in several countries have started to think about what extent they need to be involved in the cash cycle. Two things happen in the lower part of the cash cycle. Firstly, there is local recycling of cash in the commercial market. This prevents cash going back to the cash center. In nature,

central banks are heavily involved in the cash cycle. That phenomenon, however, makes the central bank less involved. Prevailing trends in Europe and North America point to central banks not handling cash anymore because it is better to transfer the money to a Cash in Transit Company. If that happens, the Cash in Transit Company will get bigger in terms of handling the cash. This implies that if other institutions in the country get bigger in handling cash; it will need structure. The structure here refers to the establishment of more cash centers of a certain size depending on aggregate volume. That situation would discourage investment in a lot of smaller products, instead investing in a highly automated cash center environment. This is also the prevailing trend in Indonesia. These are the trends and the Giesecke and Devrient (GND) portfolio is aligned accordingly.

There are two types of comprehensive banknote processing solution. First is used by central banks, with the machines consisting of Banknote Processing System (BPS) M7, NotaTracc and NotaPack. NotaTracc is an automation module that feeds BPS. Whereas NotaPack allows to take, package, and shrink wrap ten bundles of banknotes. It shrink wraps in foil to make it tamper proof and possible to store for a longer period. Second, the machines that are used in the CMC and FLS consist of BPS M3/M5, NotaTracc, and NotaPack. All in all, the function of the machines is the same with the one used in central banks. In terms of BPS, however, the M3 and M5 have a lower performance than M7. As a company, GND products are aligned with growing demand for high-speed processing machines. Approximately 1,000 BPS M systems have been shipped around the globe, including BPS M7, M5, M3. Moreover, when accumulated with its predecessor, BPS 1000, there are around 2,000 high-speed processing systems installed and running globally.

The sensors are where the processing happens. Which sensor do you think is more important? Where the computer processing happens or the algorithms (where the decisions are made)? It is just like the sensors are the eyes, while the algorithm is the brain. Hence, the answer to the question might be all of it, both the sensor and the algorithm should go hand-in-hand to process the information. These days, sensor technology already provides much more data that we can really digest and evaluate in real-time because the decisions need to happen really fast in the machine. Within a couple of milliseconds, the machine needs to decide whether it is a genuine banknote or not. Today's computing power that is available in the market allows us to do much more than we could in the past. What has really changed in the sensor brain is that now we can do more complex algorithms than before, which allows us

to take the individual data from one sensor to the other sensors and quickly process a high-level comparison. Other than that, it also fills all the raw data to the sensor in the computing system and makes a decision. Thus, we can also give back the information that the image sensor has already captured and it can be sent in real-time. We can conclude that there are really big benefits from this sensor computing system.

The improvements in the sensor brain are sensor fusion and new algorithms, including serial number reading, stain detection 2.0, composed 2.0 and enhanced identification. Stain detection 2.0 is reducing the false unfit for circulation, for example when a new edition is going into circulation and printing tolerances occur. Composed 2.0 is possible to improve counterfeit detection at a low rejection rate. In addition, we can enhance identification in a different series with a similar design. It gets us to the next level in introducing a new complex algorithm and with that pre-requisite condition, we can apply artificial intelligence. Here, artificial intelligence refers to trusted AI, namely the ability to track what is happening in the algorithm. Hence, we can know why the machine decides why the banknotes are sorted as they are. Excursion in the sensor world is back to automation.

It consists of two components: the NotaTracc tray and NotaTracc loading module. NotaTracc tray is a pre-requisite for the NotaTracc loading module. The tray is not only good for storing and transporting banknotes, it also has a special format that the robotic gripper can easily remove or fill banknotes. Meanwhile, the NotaTracc loading module is an automation module to remove the trays. The benefits of deploying the loading module include productivity gains. Simply, it is because a robot never gets tired, it can work 24 hours per day at a constant speed. Moreover, in terms of ergonomics, the operators feel much more engaged with the NotaTracc loading module because now they are more like a machine operator rather than someone who just needs to feed the machines. They now manage the machines instead of just feeding the banknotes into the machine. It also increases efficiency. With a NotaTracc loading module, the operator only needs to be there to refill or remove the trays and rejects. Another benefit of a NotaTracc loading module is seamless logistics. They use the tray not only next to the machine, they also use the tray for a dedicated prepping area and even for storage in some cases. Therefore, the tray is part of the logistics. The NotaTracc loading module is also used by commercial players.

Another component of the high-speed processing machine is NotaPack, which bundles and seals the banknotes and makes them tamper proof. There are 450 NotaPack systems, 150 of which are actually connected to printing work systems, so, about 300 are only to process notes. NotaPack is mainly used by central banks. The fact is NotaPacks are not being deployed widely in the commercial market. The main concept of the M system is modularity and modularity requires a platform to compile different things and connect to the BPS M platform. Another thing is we want to build in automation. Automation can help remove the bottlenecks in the processes.

Automatization requires standardization. Standardization aims to have an underlying format because if we expect robots to process many different things, it might become very complex. An example of an underlying standard is the NotaTracc tray. And with it, we can build a whole portfolio because the machine is always based on gripper technology, which if you do it once, you know how it works and you can do different modules much more easily. Therefore, standardization is a must for cost-efficient automation and the NotaTracc tray is believed to be the future standard. To secure the investments of our customers, everything should be backward compatible and the sensor brain can be upgraded into each existing BPS M system.

CUSTOMER USE CASES OF NOTATRACC

It is an example that some of you might already be aware of, the use case of NotaTracc in Austria. The Austrian national bank, which worked collaboratively with CIT (Loomis) to ship banknotes, started to introduce NotaTracc. It started with the introduction of the NotaTracc loading module in 2016. In this first phase, the Austrian national bank aimed to know how the operation worked and began to continue using the NotaTracc Trays in 2018. The operation of NotaTracc changed the processes at both players. The traditional process, before the introduction of NotaTracc at Loomis, included a process to obtain deposits from the retailer, count them, sort them by denomination, strap them into bundles and then put them in a box. Therefore, the banknotes were shipped as bundles in the box to the Geldservice Austria GSA (Central Bank). The banknotes go in default and they were unpacked in front of the machine for manual operation in the GSA. What has changed in the process today? In CIT, they already use the NotaTracc tray to put the banknotes after counting in the tray and the trays are shipped to the GSA (Central Bank).

To make sure that GSA can balance against each tray, a head card is introduced in the tray that ships from CIT, so no more prepping work is necessary at GSA. The trays are closed with the cover and sealed, then they put the trays on pallets, which are loaded onto a truck and shipped to the GSA. In the Loomis cash center, the operator runs the trays to a table stop system, balances it against the retailer, and then puts the banknotes into the trays. Once the tray is full, the operator has to edit the head card and also add a seal and scan the ID of the seal. Following that, the shipment is pre-announced to the GSA and the shipment is entirely pallets. At this stage, GSA receives the pallets at the GSA cash center. The pallet has one identifier, which tells the number of NotaTracc trays in the shipment. The operators scan the shipment ID and all the expected ID seals are popped up. There is no more prepping at this stage and the operator simply cuts and opens the seals. They open the cover and run the process. The NotaTracc with the gripper and the banknotes are automatically filled in the BPS system.

The existing technologies include loading modules, packaging systems, and trays. The trays add value by doing a lot more in the automation standards. What is also important are such things like pallets and alternative ways to transport the trays. Therefore, the trays can be used as a means to ship the banknotes. Moreover, a further step for us in terms of automation is a reject stacker, which is something we currently have in tray filling. In the current BPS system, there is a reject stacker that is useful to improve the bottleneck of the operation. Hence, we are working on a solution. Instead of stacking the reject banknotes into a pocket, they would instead be stacked into a tray. The question is why should banknotes be packed and then again after an hour be unpacked to be filled in the ATM? Why not put them into a NotaTracc tray, bring it to the person who fills the ATM cassettes and simply take it from the NotaTracc tray? It is called a tray filling module with two channels. One additional thing is that we run the stacker module typically in a tandem mode. Therefore, one stacker is filled, for example, with denomination ten. Once it has 100 banknotes, the second stacker starts to fill because the first stacker needs to put a strap on the first 100 banknotes. In the meantime, the second stacker is filled, so you always need two stackers to have a permanent operation for one denomination. This will permanently allow to run one denomination on one channel. If you have a typical ATM setup with four different denominations and if you want to have ATM cash in four denominations, you would only need these two-channel modules.

Another application is in the collaboration model. We have discussed with central banks a slight paradigm shift in terms of tray filling for the ATM money in the central bank cash center. Today, the product from the central bank is a bundle or a strap, loose notes are not a typical product coming from central bank. Why does it have to be a bundle when the customer needs loose banknotes as the final product? Why does the central bank not produce and put fit notes in a NotaTracc tray and ship them as loose notes to the cash cycle department? Who needs ATM money for the sake of the efficiency? If we recall the video of the operation of the BPS M system in Austria, if they want to ship the money back to the GSA, they can use a one-channel module and only the banknotes there, and they do not need to fill the banknotes manually.

The other application is a reject stacker. This is interesting for both commercial cash centers and central bank cash centers, where there is a need for a large reject pocket. Besides, a highly automated continuous flow is something of great interest. Back to the story of modularity, the BPS M system with a NotaTracc loading module and NotaPack or packaging system, and in the standard stacker modules that consist of two tray filling modules, one is for the rejects and one tray filling is for (CMC) putting unfit notes into the tray for shipping to the central bank. If a customer decides to have a tray filled of ATM fit money, they could replace some existing stackers or make the machine longer and introduce more tray filling modules. What this should indicate to us is where we are today with the BPS M system. Everything that comes can be integrated. It can be another module or another stacker module that can be integrated into the existing platform.

HOLISTIC CASH CENTER/CASH CYCLE SOLUTIONS

If we discuss cash center automation, there is a three-step process in automating and optimizing the cash center. It includes optimization, standardization, and synchronization. Optimization means looking at a new situation and understanding where you are coming from. If we want to optimize our existing process set up, we have to accept that those things are set in stone. We have to keep challenging it because if we take things set in stone that have a significant impact on the rest, and there is only a tiny thing we can optimize, sometimes we really need to open up and be open to change. Therefore, we can create a much more significant optimization step than if you keep it very tight. And this optimization process, for example, leads quickly to understanding the entire process. After you understand, you can consider

the particular design and standardization. It is essential to standardize the transport units. Since different countries have a different standard cash handling format, it is difficult to introduce automation. It calls for standardization, therefore. If you look into automating, improving and optimizing the cash center, it starts with a thorough look at the packaging format. If we have to standardize, the steps into automation are even more comfortable. An example of standardization is the pallet size system, like the European pallet size.

However, it is important that you consider this shipment format as an essential element because it all starts from there and, in the end, it would be decisive about the default, whether it is AGV, manual or conveyor belt. The starting point is where the cash is put in and how to deal with it. We can benefit from a standard pallet size that the logistics industry is already using. If we want to make a new size, greater costs will be incurred. The creation of a container indicates the logistic element that deals with it, be it the standard or product that deals with it in the storage environment. It starts with what the needs are and continues to pick a suitable technology. The technology can adjust to the customer's needs.

Another element is synchronization because, at the end of the day, you will have a complex system in the cash center, consisting of different areas, namely receiving, processing, wrapping and shipping. All of it must work together like clockwork and that is only possible through software that controls the entire system. One thing is the technology and the other thing is the project approach. We take the examples of much-automated cash center projects that are being developed around the world. Such a phenomenon requires us to know how to integrate different technologies and many players. It is essential to have a general contractor as the main counterpart to hand out the big project due to many departments and actors that should be coordinated under command. GND is working heavily on not being seen anymore as the person who has BPS, and they need to take care of the money in and out of the BPS but let GND help the central bank to move from the old cash world to a new automated cash world, with its core product, the BPS system.

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- SESSION 6 -
THE EXPERIENCE OF BUILDING CASH CENTER: LESSON LEARNT AND FUTURE PLANTS

Speaker: Andy Wijaya, Bank Central Asia

Good afternoon Ladies and Gentlemen,

It is an honor for me to be here, thank you Bank Indonesia, distinguished speakers and all attendees. At this opportunity, I would like to share BCA's experience of building an automated cash center. To start, BCA is not a central bank although the name stands for Bank Central Asia; however, it is a commercial bank rather than a central bank. BCA is one of the biggest commercial banks in Indonesia. It has 19 million accounts, around 17 million transactions each day, 1,249 branches spread all over Indonesia and 17,778 ATMs available throughout Indonesia.

As we saw in the video, this happened last year in June, after the feast of Eid Mubarak. Our customers flocked in through the door when we opened the gate of our bank branch in Surabaya for the first day of operation. The video showed big demand from our customers to use our services. This motivated us to improve our services. Although the capacity is being improved, the number of banknotes that we have to process each day is still much too large. We process around 82 million notes during the day. This number of banknotes processed each day reflects the ever-growing trend of cash circulation in Indonesia. Today, there is around Rp700 trillion of cash in circulation in Indonesia. This phenomenon should be supported by automation technology to ease the cash circulation process.

Based on our experience, the switch from a manual process to digital transactions is not really an issue because comparing the manual transactions at our branches to the digital transactions through e-channels, the composition of transactions through e-channels dominates 98% of total transactions, while the remaining 2% of transactions are processed manually at our branches. That being said, we are

already at the stage of digitalization. In terms of value, however, 54% is processed manually at the branches and 46% through the e-channel, implying that people tend to process high-value transactions manually rather than digitally through the e-channel. Before going further, let me introduce our cash ecosystem. The cash ecosystem differentiates central banks and commercial banks. In our cash ecosystem, we have around 17,778 ATMs. Through ATMs, all the transaction data is tracked and inputted into the system. Using that data, we can forecast transactions during the day. Such data management utilizes machine learning to convert the data, while also generating a cost optimization. There is a platform that connects all the stakeholders in the ecosystem, including CIT, branches and cash pulling. By integrating all the stakeholders, we use technology that also provides a data sharing feature. Consequently, all the stakeholders can forecast all the transactions, manage cash flow, optimize cash inflow, and also know when to draw cash from Bank Indonesia or deposit the cash at Bank Indonesia.

Currently, our cash center can process up to 12 million notes each day, store 225 million banknotes in our vault, equivalent to Rp12 trillion, and manage around 700 ATM orders per day. The system can operate 24 hours per day, seven day a week. We also provide the system with police and security services, including machine protection from fire in accordance with UL Class 3 Standards, artificial intelligence for an integrated security surveillance system, biometric recognition, bulletproof doors and windows, as well as other security barriers. That way, we can say our security system is robust. Also, we use some additional equipment for the process, including seven units of high-speed sorter, eight units of desktop sorter and an automated packaging system. For the material handling, we use a smart conveyor system, automatic storage system, and robots. You might be questioning the urgency to build a cash center with automation for us as a commercial bank, yet the reason lies in cost efficiency. Automation of the cash center cuts the costs of our operation. Failure to adopt technology and instead use conventional processes would incur high fees.

At our cash center, CIT does the transactions in the loading dock and, typically, the loading dock is self-service; therefore, obviating the need for a cashier within. We integrate the cash center with the Enterprise Resource Planning (ERP) so that we can send the pre-announced information to the CBC, such as who will come, the formats and what kind of transactions will be sent to the CBC. CIT could come and log in to the system using biometric verification. Furthermore, the system will

identify what kind of transaction should be processed by CIT. The conveyor is used to transport the notes. No trolleys are needed, only operators are required to stand at each station waiting for the boxes to come. A barcode is used to trace the boxes.

At our branches, we still use canvas bags. Therefore, there is an effort to convert the canvas bags to processing boxes that fit the M5 system. With that being said, we are very enthusiastic about using the NotaTracc Trays that the G+D showed us this morning. At the ATM, we put the ATM cassettes in the box and a robot will remove them to put on a shelf. In the processing area, we use ID cards to identify from which type of box, brand, and teller the note has come. We have also been using the BPS M Series, although we continue to face several challenges operating the machines. We use a desktop sorter to process small denominations.

As we see in the video, the condition of coins in Indonesia is not that good because customers will often tape the coins together. Therefore, it takes time for us to open and clear the coins. We cannot utilize the automation system to process the coins due to the high volume and low quality of the coins. Notwithstanding, we will apply an automation system to handle the coins sooner or later. In terms of packaging, we have two defaults for the manual and the M series. The manual system uses C4, with the notes packaged manually. The M series, however, is already integrated with the packaging system, meaning that the operators are only required to put the notes in the M system and the rest of the processes is completed automatically by the machines. In terms of cash delivery, CIT only needs to come and log in to the system. After that, the system will release the box or ATM cassettes or canvas bags, depending on the order.

In regard to our journey at the cash handling center, in 1999, we still processed the notes at our branches, with the shift to processing the notes using CIT in 2000 to put in cash pullings. Eleven years later, the same processes are still being implemented, even though the amount of cash that we need to handle has grown. In 2012, there was a management initiative to change cash cycle management. In 2014, therefore, we held a tender to build an automated cash center by inviting some industry players. The winning bid took all the cash processing projects. The winner is thus responsible for supplying the goods, providing the concept and offering consultancy services; the winner should take all the duties. There are three primary values that we adopted during the session, including secure, always-on, and efficient. Considering the fact that the machines are not cheap, we decided on the most efficient calculations to run and operate the project. We acknowledged the purchase of these machines

and projects as an investment, which was projected to have a ROI period of at least 5 to 7 years. This technology enables us to scale-up or scale-down in the event of unpredictable or unforeseen phenomena. In the case of a cashless society, for instance, we could scale the operation up or down without interfering with the number of the employees. We were already using CIT services as a cash processing intermediary, hence implementing an automated cash center would not impact our employees, only CIT in terms of adjusting themselves to the system.

Implementing an automated cash center is a new normal for us since we had no previous exposure to the system. Perhaps, the central banks are already familiar with the operation of the BPS M system. Nonetheless, as a commercial bank, we are still facing some difficulties adjusting to the system. For instance, the Indonesian rupiah has three emissions for a Rp100,000 banknote and two emissions for the rest, thus our partner explained that we needed two stackers for one orientation and denomination. This means that if we only had one denomination, we would require 16 stackers, yet because we have two emissions for one denomination, or three for a Rp100,000 banknote, we would require 32 stackers. However, there are no 32 stackers; the maximum is 20. Therefore, this is a problem for us.

Another issue is that we cannot connect a desktop sorter to the packaging system. In response, we tried to mix the orientation of our ATMs because that could reduce the stackers required by seven. Due to our lack of experience in operating an automated cash center, we decided to have a consultancy session with the manufacturing company. In 2014, we began the consulting phase before establishing the system. We acknowledged that building an automated cash center requires reforms in terms of the existing processes, therefore we decided to analyze the cash cycle first before jumping into the construction phase. In this sense, by analyzing the prevalent cash cycle, we knew the pattern and behavior of how the mechanisms worked. The shift to an automated cash center would thus require a behavioral change from upstream to downstream. Otherwise, optimization would be redundant. Quoting what Christian Huber said this morning "to have automation needs standardization" therefore, analysis would be useful for standardization. However, we cannot wait for all the stakeholders to apply the same standards; we had to go further and keep them to fit in with the standards. That is also the reason why our CBC was built in stages. Consequently, the reforms could not be taken promptly. Here is a space where the other stakeholders can take the time to fit in with the standards. For instance, we still unpack the banknotes manually but we

wish to use the automation robot to remove the boxes later. To get us there takes a lot of time and effort. Hence, our management encouraged us to execute this project with consistency.

Since we did not have adequate experience, we separated the consultancy session into two stages, namely low-to-medium and medium-to-high. In the low-to-medium phase, the old-fashioned techniques were still employed. For instance, we were still using a desktop sorter, carrying the notes from one point to another, and automation was not used entirely. Nevertheless, now, we have already implemented the latest technology in the industry. According to the data, to process around 12 to 13 million banknotes in a day requires 352 operators working for twelve hours. By using a high automation system, we expect to replace 2/3 of the manpower in the processing system.

Here is our blueprint. As we can see from the graph, there are a lot of divisions here that are involved in the cash center automation reforms. In the project, we cooperated with 28 suppliers and four consultants to help us execute the project. However, we still faced the problem of integrating the stakeholders involved in the project because each stakeholder has its own rules and standards for task implementation. To overcome that problem, we established a joint mini-company named Cash Procesing Centre (CPC) BCA. This mini company consists of all the stakeholders with their different responsibilities. We conduct regular meetings and briefings, while other informal activities are done to build a good relationship among the stakeholders because we believe that emotional engagement within our team will take us to our dreams.

In 2015, we began the construction of the project, commencing with a groundbreaking of CPC in Alam Sutera. It only took one year to complete the construction. In the subsequent two years, CPC Alam Sutera was completed and began operating. Moreover, now, the CPC is operating with a capacity of processing 10 million banknotes per day and supplying cash for 1,000 ATMs. On 26th June 2016, we celebrated our first milestone; our team had engaged all the stakeholders. At that time, we had not finished the building, yet our partners were reliable. Despite some technical issues, our partners were committed to delivering the system on time in accordance with the agreement. The problem at that time was that the building was not ready to operate the system. It is interesting that our suppliers set the penalties on the contract, hence a delay in the operation might result in us being sued for the penalties. Therefore, the unfinished construction of the cash center building

did not stop us from operating the system. In an attempt to install the system, we built a plastic tent to ensure the requisite temperature, humidity and others. At that time, we had no connection to the electricity grid, thus our team decided to build a temporary power line in order to maintain the operation. Another issue was a lack of sufficient human resources to operate the system. Consequently, we outsourced the staff through our CIT partner. Thus, we recruited team operators and provided them with training to operate the automated cash center system. The physical building of the cash center was not ready, however, so the operators were trained only using pictures. That was another challenge for us.

We still have four phases of milestones that we need to achieve. Starting with the establishment of the system and concluding with optimization. We have reached the first phase, namely the establishment of an operational baseline. We are currently working towards the second phase of ramping up, which includes activities such as improving throughput and volume, as well as expanding the number of branches and ATMs. The salient lesson learned from our previous experience of establishing the system is to work under common principles, namely to translate the information correctly to all stakeholders. We are now in the ramping-up phase. We ran five million pieces in the first phase and project to run 10 and 12 million pieces in the second and third phases respectively.

We divided into four divisions for operational management. The divisions consist of BCA employees and the outsourcing staff. All divisions are equipped with a steering committee as a decision-maker for any disputes that arise during the project. So, what is next? Considering that if all the sensors and the system are integrated, it could supply us the data to monitor the activity, our dream is to monitor the operation of the system through a computer. The principle would be similar to a sea ship. There is one captain and then chief officers for the navigation, logistics, and human resources. Such a structure translates into an efficient cash center, where only a few people are involved in the operation. We are projecting this concept to be implemented by next year. Our major task now is to standardize the behavior in our branches.

This is our blueprint, in 2019, we became a Cash Processing Center 4.0 because everything was connected. In the next year, we will reach the phase of smart operation, where the cash center does not need a manager to operate. In other words, all the processes will be conducted automatically by machines. Moreover, in 2021, we aim to achieve a world-class reputation for our cash center. As we see it,

the cash center is only a part of the entire system. In BCA, if the ATMs that connect to the CPC in Alam Sutera require a supply of cash, the ATM will automatically generate an order to CIT and CPC. Once the order has been received by the cash center, the system will automatically call for the ATM cassettes and the notes so the operator will transfer, fill in, close, and push back to the system. On the subsequent day, CIT will come and log in to the system and the system knows how many ATM cassettes should be given to CIT, which will bring the ATM cassettes for replacement. Everything is done automatically, no one sits at a table to run the operation. The interactions within the system might be categorized as the interconnection between sensors, human-to-machine interactions, machine-to-machine interactions, and real-time reconciliation. Overall, the interactions are done by machines, so almost everything is automated.

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Q&A SESSION 6

Q: Where did the initiative to build an automated cash center come from. Did Bank Indonesia give the mandate to BCA to build the cash center?

A: Andy Wijaya

It was actually BCA's initiative, however, not to mention that Bank Indonesia played a big role in this project. Recalling back to our condition where we had no previous experience of operating a high-speed operating machine, Bank Indonesia was there to provide insight and knowledge regarding the automation machines and introduced us to how the system operates. Currently, we are working under Bank Indonesia's commands to synchronize the cash cycle. For instance, if BI is mandating us to use BPS M7, we would use it anyway to ensure BI and BCA are synchronized. We have the machines with the same quality standard for the BPS, even the same configurations. BI encouraged us to use the high-speed operating machines. It is also adheres to the central bank regulation to have a clean note policy and transaction efficiency. Therefore, we do it together.

Q: Does BCA only process banknotes belonging to BCA? Also, you stated that the Return on Investment (ROI) only takes 5 to 7 years. I am wondering where that prediction is derived from and how does BCA ensure it gets back the ROI?

A: Andy Wijaya

Currently, we do not charge the customers for cash processing but we still pay CIT for the services. Therefore, we reallocated operational expenses to capital expenses to purchase the system. By our calculations, we will have a return on investment in 5 to 7 years. So, for us, it is a feasible project.

Q: You are collecting money from your retailers and customers' businesses so I assume you receive many mutilated banknotes. I was just curious about how you handle those mutilated banknotes? I believe that there are some of the mutilated banknotes, so how do you handle those?

A: Andy Wijaya

Indeed, we get many mutilated banknotes because we are using a sorter machine. We cannot do it manually, so we find a lot of mutilated notes. The mutilated banknotes should be reported to Bank Indonesia. Moreover, we also prevent mutilated notes in the recycling machine. Hence, we added a sensor to detect mutilated notes. When the customer tries to deposit mutilated banknotes, the machine will reject them.

Q: The consequence of automation is a reduction of manpower. What do you do, therefore, for the affected employees? Are they terminated or assigned to different tasks?

A: Andy Wijaya

Since 2000, we have not processed the banknotes by ourselves. We outsource that task to CIT. Therefore, this project impacted CIT. In Indonesia, there is a contractual worker for the operators. So, we gave time for CIT to wait until the end of the contract. It is a matter of cooperation. We encouraged CIT to reduce manpower capacity gradually. This might contradict your stance, however, because you still process your own banknotes, hence you might be concerned about this issue.

- SESSION 7 -
DIGITAL CASH AND THE IMPACT FOR CURRENCY MANAGEMENT

Speaker: Akhis R. Hutabarat, Deputy Director at Payment System Policy Department, Bank Indonesia

In this final session, we will discuss payment systems in the digital era. The session will cover three main issues, including payment system development in Indonesia, future challenges for cash, and future payment trends.

INTRODUCTION

The history of money started from bartering as a payment system. It continues to evolve now. In this era, we are at the stage of digital cash or even slight familiarity with cryptocurrency. In today's discussion, we will also focus on the function of money. Many of the attendees are central bankers and, thus, might already be familiar with the function of money. Money is a medium of exchange, a unit of account and store of value. Our regulations define the payment system as a system that includes regulations, institutions, and mechanisms to conduct the transfer of funds to fulfill obligations and induce economic activity. Money consists of cash and noncash. Cash is fiat money, currency, denominated in a sovereign currency, either coins or banknotes. For noncash, the source of money is the banks: narrow money or quasi money. It can be deposits, savings, term deposits and the means of payment can be cheques, ATMs, credit cards, and others. The difference between cash and noncash is the settlement processes involved. For cash, after a transaction between a buyer and seller is complete, there are no other processes to be completed. While noncash involves several processes before settlement, including switching, clearing, and settlement. Therefore, several players in the front end and also in the back end are involved. The growth of mobile or digital money depends on the policy of the central bank and also market forces. Even though market forces for noncash payments are growing, a recent study revealed that payments are actually changing towards noncash payments, however, cash remains dominant in the payment system.

Growth of noncash payments might be faster than expected. If we compare cash management in three different countries, Japan, China, and Sweden, we can see that the cash management policy relates to the degree of mobile diffusion. In Japan, they still use cash; so cash management is fully controlled by the central bank. In China, however, cash management is mixed, some is controlled by the central bank and the rest is decentralized through the private sector. China authorizes third parties to conduct cash management. While in Sweden, they have adopted a fully delegated cash management policy, with the central bank serving a minimal role in managing cash. Hence, it may be concluded that cash management policy relates to mobile and digital diffusion.

As we can see here, the axis shows us the value of card payments and cash in circulation. If the value of card (noncash) payments increases, cash in circulation also increases. In some countries, however, we see a contradictory phenomenon, namely that when the value of transactions increases, the cash in circulation decreases. This indicates that the correlation relates to the type of market that the country has constructed, whether it is an advanced economy or an emerging market. There is a recent publication from the World Bank, mapping payment systems worldwide, and they found that growth of noncash payments is faster in low-income countries compared with more advanced economies. There is space in Indonesia, as a low-income country, to boost noncash payments. Even though the value of transactions in those countries remained low compared to more advanced economies, in terms of noncash payment growth, low-income countries are faster than advanced economies. There was a study conducted by BIS (Bank for International Settlements) in 2015 and it found a negative correlation between account ownership and share of currency in broad money. Broad money consists of currency in circulation, narrow money and quasi money. The share is declining and that is why financial inclusion is so important. The World Bank compared the Financial Inclusion Index from 2011, 2014, and 2017. In Indonesia, for instance, we had 20% in 2011. This number represents adult account holders, either a bank account or mobile account. In 2014, the index reached 36% of adults, which then increased to 49% in 2017. In 2019, the Financial Inclusion Index is expected to increase to 75%. In most countries, there has been an increase in the Financial Inclusion Index.

It is suggested that the increase stems from a growing trend of digital payments. We can expect the share of currency in broad money will continue to decline. In some countries, we cannot expect that for some reason. In Japan, for example, a

country often beset by natural disaster, they need to have adequate cash ready for any emergency situation. Moreover, we see here that the growth of noncash payments in low-income countries is very high. In Kenya, for example, mobile payments are growing more slowly and the share of currency in broad money continues to decline from 13.6% to 6.9% in 2018. I think if payment system digitalization continues, they may expect to reach a peak in the amount of Currency Outside Banks (COB) in Kenya (currency ceiling). This will probably affect currency management. This needs to be anticipated by the authority of the country. If currency outside banks peaks or even declines after that, the currency will adjust accordingly.

China has also enjoyed rapid payment system development. We use the example of Alipay or WeChat Pay in China. The currency department in the country may expect to see the currency outside banks peak in the next 3 to 5 years. The share of currency in broad money is declining to 11% - 5 %. The extreme example is Sweden; where we see that in 2009, they have already peaked and after that started to decline. The share of currency in broad money is less than 2%. This country is now facing an ageing population and they have been thinking about the issue of central bank digital currency.

WHERE ARE WE NOW?

The decline of currency outside banks means that the money moves from the central bank to a commercial bank. If it is commercial bank money, it means that it is a kind of private pension for the bank, because they can get money and the bank will extend the loan from the loanable funds. If the currency outside banks remains large, then the central bank has enough liabilities and elements in the liabilities that can be used for monetary operations and central bank operations. Therefore, there is a subsidy from the state to the private sector, especially in the financial sector, if this phenomenon continues. That is why I understand when central banks are not happy with this. However, issuing central bank digital currency might not be the answer. That is why they are cautious about issuing digital cash, and they continue to comprehend the experiments in that issue. For now, however, this country is actually closest to the issue of digital cash or central bank digital currency because of declining currency outside banks and the senior age income of the state. Even with that condition, they are still very careful when considering the decision because there are certain risks that can occur if the central bank issues central bank digital currency.

In Indonesia, we will first see cash development and the role of noncash payments. We try to find indicators that are quite similar to the previous ones, namely the share of currency in broad money yet excluding the elements or components of broad money, which are now the rupiah. M2 consists of currency outside banks (rupiah), either in the form of banknotes or coins, and rupiah demand deposits and rupiah savings deposits. We see a slight decline actually, even though in the past 1.5 years it has continued to increase again. To understand this phenomenon, I think we can refer back to the function of money as a means of payment and store of value. It does not necessarily reflect that if the means of paying cash are increasing and its role as a means of payment is also expanding because at the same time the noncash payments are also growing fast. There are other factors, such as the role of money as a store of value. In general, the trend is declining to 20% compared with the previous three countries. That is why the trend of this country is that the people still prefer to use cash. Cash still has a considerable role in this country. Players related to cash payments might see this as an opportunity and good for them; however, payment system policy is promoting the noncash payment system.

PAYMENT SYSTEM DEVELOPMENT IN INDONESIA

In terms of noncash payment instruments, including cash and ATM cards, which can be used to withdraw cash but also to transfer money at the ATM/debit cards, the use of debit cards remains dominant at 95% in terms of value and still large in terms of transaction volume. However, noncash payments have grown very fast during the past five years, so other means of payment, like cheques, or other paper-based money, are experiencing slow growth, declining in 2018 from 6.7% to 3.5%. In terms of e-money, the role of nonbank players to issue e-money continues to increase. We see growing interest from the private sector and nonbank institutions to issue electronic money. Most of them are using mobile payment apps or server-based money. In the FinTech market, we also see growth, mostly in terms of FinTech lending and FinTech payments. Fintech also serve as payment system providers, with some issuing money. This is the pattern of noncash development in Indonesia.

We also have what is called 'on us' transactions and 'off us' transactions. We developed a national payment gateway that allows interoperability and interchangeability between providers, which is expected to boost the noncash payment system in Indonesia. This is the existing retail payment configuration. We are now advancing this by designing an extension of the configuration. For example,

using QR code to standardize the system, so different providers are interchangeable, which can later be used for cross-border transactions. We are still developing this and we have a new standard QR code, known as the Quick Response Code Indonesian Standard (QRIS). In the future, we also want to improve fast payments like in Singapore, Thailand and Malaysia. It will allow the people to have instant peer-to-peer payments efficiently in real-time. That is our development plan.

In terms of cross-border transactions, we will have bilateral interoperability between the Indonesian retail payment system and other countries, such as Singapore, Thailand, China and another Asian countries. Here, money transactions are still "on us", which means that money using mobile apps is still not interchangeable or interoperable but this may change in the future.

Consequently, this development will affect noncash payment system growth and cash payment system growth. Cash as a means of payment will become scarcer if the people do not use cash anymore, implying slower cash payment growth and faster noncash payment growth. We have five years to develop this, so in 2025, all of the elements of the development will be accomplished. This is the future of the retail payment system in Indonesia.

We also have a program to boost the noncash payment system through electronification. The term is maybe related to Industry 3.0, but it is just a term to describe the changing trend from cash to noncash. Maybe later, if the technology improves, electrification will shift to digitalization. In this area, we expect electrification to have a positive economic impact because people will be using less cash, so more money is in the bank as loanable funds. Of course, the economy will also grow faster if people use less cash and more noncash payments because noncash transactions are faster with less friction, which improves the velocity of money. The velocity of money can also improve consumption and growth and reduce costs. People may think that using cash is cheap but actually it is not because there are many elements involved, like printing, cash processing and transportation costs. There is a cross-country study by the World Bank that compares four countries. They found that the cost is quite high but people just do not realize. If the cost could be reduced, that would be good for economic savings. The cost could be reallocated to more productive economic activities that boost growth. That is why we have conducted this program and will continue to enhance the program by accommodating new technologies into the payment system.

ELECTRIFICATION PROGRAM

This is the three areas of the electrification program. First, noncash social assistance disbursements. Bank Indonesia coordinates with the central and local governments. We promote noncash payments for social assistance disbursements to make government expenditure and other government transactions more efficient, including the income side. We also promote and build a coordination forum to increase noncash payments with local government and also in the transportation sector, including toll roads and integrated transportation modes in the central and regional areas. The aim is clear. In 2017, our Financial Inclusion Index reached 49% and this year our target is 75%. If we can achieve this, based on the research conducted by BIS, we may expect to see a continuous decline even if that decline is very small. We may see a faster decline in the share of currency in broad money.

FUTURE CASH CHALLENGES

This is the profile of the Indonesian population as it relates to digitalization. Amongst the younger generation, the mobile phone ratio to adult population is around 25% and the internet ratio to the adult population is also large. This represents potential for consumers to use a digitalized payment system. Penetration is also quite broad. On the supply and demand sides, we see rapid innovation and also changes in consumer behavior. Therefore, technology, consumer behavior and payment system policy are three salient aspects that are expected to accelerate noncash payment system growth. We can say that digitalization could change many aspects of our life, in each of these payment systems. Of course, there are transactions, which are dominated by noncash, so we see some of them in Indonesian products, Indonesian startups, or FinTech firms. Now, given that development and policies, what is Indonesia's position? There is research conducted by Lloyds. They have a measure index that tries to see the position of some countries in terms of transitioning to a cashless society. Indonesia is actually a transitioning country. For example, China is at the tipping point, or maybe we can say the boiling point, to transition to a more rapid phase of cashless society development. If there is something inhibiting the process and if it can be resolved, then it will boost growth. Indonesia is still here, so the room for more noncash payment growth is still large.

Noncash payments relate to money and payments using money, so we need to see what developments are occurring in the use of money. Of course, we are

dealing with currency here. This is the problem that Sweden faces because of the shift in currency towards this trend. Regarding electronic money in China, such as WeChat Pay or Alipay, there is an element here. We can see that social currency is a kind of currency used by the private sector, but it is limited to a certain community. Cryptocurrency has gained in popularity over the past several years. At the central bank, currency is actually a liability. Of course, it is not in digital form and cannot be an interest-bearing means of payments but the exchange rate to the sovereign currency denomination is unity. Bank account money is a liability of the central bank, it is the sovereign currency in digital form and universally accessible. Electronic money is a liability of the issuer: bank or nonbank. Of course, it is digital social currency, not universally accessible, it is limited to the ecosystem in the community. Cash is now improving to digital. The interesting thing in cryptocurrency is that this is actually not a liability of that currency and it is not using sovereign currency. It is digital and mostly does not bear interest. It can be centralized or decentralized. Bitcoin is decentralized. We know about Facebook currency. We are not very clear yet but it seems that they are centralized. It is not known if the liability is Facebook's or not. Then there is central bank digital currency. I think today no central banks are issuing digital currency, but most are researching about it.

In regard to Central Bank Digital Currency (CBDC), central banks have started to think in what way to respond to the emergence of cryptocurrencies. One possible response is to issue Central Bank Digital Currency. The development of private digital currency and also the technology have encouraged the central bank to monitor and analyze policy and its application. Many primary banks have researched the idea of CBDC, but they are still experimenting. One motivation to issue CBDC is in order to maintain central bank relevance because cryptocurrency obviates the use of sovereign currency, instead using a global or borderless currency. Other currency that is sovereign money is mostly used within national jurisdictions. That is the advantage of cryptocurrency, namely that a global currency is borderless. The central bank needs to think about how to maintain trust in sovereign currency. Cryptocurrency is disrupting not only sovereign currencies but also the payment system, financial system, and monetary system within a country. Research has shown that cryptocurrency is disrupting finance, so they are privatizing money and rendering the old style of central bank's banking system obsolete, which enables seamless and costless global transactions and also democratizes the financial system. Central banks have started to think about whether they have to adopt the technology that is used

by cryptocurrency or not. However, central banks are still considering the decision. Hence, cryptocurrency is a disruptive innovation to business models in the financial sector and also affecting the business of central banks. However, we have to be aware that by responding, we do not create a new problem that cannot resolve the issues. That is why most central banks are still considering the decision with caution. Cryptocurrency is acknowledged as a crypto asset, therefore the people who own the cryptocurrency cannot use it as a means of payment. The challenge for the central bank now is to maintain the trust of the people in sovereign currency.

The popular picture by CPMI. Last year, there were many publications about CBDC, trying to make the anatomy of money using what is called the "money flower". Money can be distinguished into several things based on four aspects. First, whether it is widely accessible, whether it is in digital form, whether it is issued by a central bank or whether it is token-based. Token-based means not on the account. There is a medium that money inputs into the medium. That is why cash is also considered token-based since it is on paper as a medium and there is a valuable input in there. There is a definition that central bank account and central bank digital token are both considered as retail CBDC. What about e-money and cryptocurrency? E-money and cryptocurrency are not issued by the central bank. E-money and cryptocurrency are digital and token-based but also widely accessible. People can acquire that means of payment. If the central bank finally issues CBDC, what will it look like? How will the central bank manage the currency? CBDC can take the form of account-based or token-based. Regarding account-based CBDC, there can be direct distribution, it can be distributed to the users, either directly or indirectly, so it is like the central bank administrates the account. People can open an account in the central bank directly, so the central bank handles all accounts. If conducted indirectly, there is a role for the commercial bank. We could open an account in a commercial bank but the account would be handled by the central bank. The account is still the liability of the central bank regardless of the distribution channel. In terms of token-based, we can convert our cash at the central bank and buy CBDC tokens using cash, or we can transfer from a commercial bank to the central bank in order to get a token. The central bank could also appoint several commercial banks or even agencies to sell CBDC tokens. Even though the customers are buying CBDC tokens at the commercial bank, the token will remain the liability of the central bank.

SHOULD THE CENTRAL BANK ISSUE CBDC?

What is actually the rationale behind issuing CBDC? Is the central bank issuing CBDC because of the challenges of cryptocurrency? We have to reassess the risks of issuing CBDC. A study from the national bank of Belgium explained that there are two aspects. Narrow banking; if people buy CBDC, bank deposits will decline along with commercial bank liabilities in terms of the deposits. Then CBDC increases. Therefore, there is a shift in assets from deposits to CBDC. As deposits decline, commercial banks may have to reduce loans, which would affect household and corporate liabilities, ultimately affecting credit growth. It is called impart lending because people withdraw their money and move it to the central bank from commercial banks in the form of central bank money. There is a risk associated with impart lending, but where there is a narrow banking phenomenon, namely that if people buy CBDC using deposits and central bank liabilities in the form of deposits also increase but they do not want to slow down or reduce lending, so commercial banks have other sources of funds or loans. Consequently, they have to borrow in the financial market so that they can keep the loan unaffected, but in this case it needs to be supported by financial market deepening so that a bank can secure a loan from the financial market but not from third-party funds because the money may go to the central bank. We can see another effect of this, the cost of loans will increase and then if they cannot rely more on the third-party funds, the banking system would actually change to what is called narrow banking. These are the things that have been considered by the central bank. This thing may pose a risk to financial system stability. That is why a non-central bank would be insufficient to implement central bank digital currency. Careful consideration is required before deciding to issue CBDC.

CONCLUSION

First, Bank Indonesia is actually interested in demand for currency to ensure the supply of banknotes and coins in the most efficient way. We talked with Indonesian printing works last year to discuss the future of cash and payment system development because we understand that there is an investment by the printing works. We updated the printing works about the prospect of noncash payments so that the investment is not useless. We also understand that cash payments need to be managed in a better way so that we can still fulfill the requirement to provide people with clean money and also distribute it in the most efficient way. Second, the most binding constraint to the advancement of a noncash payment system is the infrastructure, including

electricity and telecommunications. In terms of digital literacy, the people can be educated, but electricity needs investment and it takes time. If this basic problem can be resolved, we can expect more rapid advancement of the noncash payment system. If not, cash payments will still be reliable and dominant among the public. Third, the user preference of cash versus noncash payments will depend on the production cost in using these payments efficiently and effectively. This relates to the research conducted by the World Bank on retail payment costs. The payment cost is actually very important when comparing cash and noncash payments. Reducing the cost of noncash payments is also our priority. Our priority is to develop the retail payment system and we want to move to what is called real-time, more secure and more efficient, which is lower cost. Yesterday, for instance, we reduced the cost of clearing, which is part of reducing the cost of the noncash payment system. That way, we can expect to prompt a gradual rather than abrupt shift from cash to noncash payments. Fourth, Bank Indonesia shares the same views as other central banks, namely that we need to strike a balance between innovation and risk. Is it important to issue CBDC? That is the conclusion of today's presentation. Any questions?

Q&A SESSION 7

Q: Where did the initiative to build an automated cash center come from. Did Bank Indonesia give the mandate to BCA to build the cash center?

A: Akhis R. Hutabarat

Concerning the second point of the conclusion that basic infrastructure in Indonesia is one of the constraints to implementing digital payments and that is why cash is still king. The thing is you have already pointed out that we have more than 260 million people and maybe you can complete it with more than the 17,000 islands. I am concerned with the infrastructure as a hindrance, but that is why cash is still king, especially in remote areas. If we talk about the digital economy in the cities or big city like Jakarta, where infrastructure is supported by the availability of technology, the problem of cash and rupiah actually concerns inflation, which is why carrying rupiah is not easy because sometimes it is very risky and not practical. My question is about the planned redenomination of the Indonesian rupiah. I was informed that Bank Indonesia is preparing a draft bill to be completed hopefully in January 2020. Are there any barriers to implementing rupiah redenomination? What are the implications? Are there any other countries that have a redenomination success story?

Thank you for the question. We do have a plan for redenomination. There are requirements for countries that want to redenominate. First, the economy must be macroeconomically stable and sound in terms of growth, inflation and other macro indicators. Over the past five years, our economy has shown sound economic progress that may support the redenomination plan. We have also conducted a study into the prerequisites to ensure a successful program. If a country tries to redenominate when the economy is not healthy, it could result in problems, such as in Turkey. We are confident that macroeconomic conditions are currently good enough to support a redenomination plan in terms of currency management. The problem is how to socialize and educate the people because we are not allowed to initiate socialization efforts before the draft reaches parliament. Nonetheless, redenomination requires massive communication to ensure public understanding. We have already surveyed households to gauge their understanding of redenomination, and last year we

surveyed low-income households to understand if they were aware of the needs of redenomination and the implications. We found some issues. The effect of inflation, for example, there is a rounding up and a money illusion. If supported by the targeted people, however, so they understand the impact, it should be manageable, but the problem is the political process in parliament. We need the legalization first before a jump to educating the public.

Q: Thank you for your great presentation. I agree if you can control the cash and noncash currency or digital and non-digital currency, but I want to know about your approach when you want to create central bank digital currency. Instead of creating CBDC, why don't you monitor or supervise or even certify the existing digital currency? It seems quite difficult to create CBDC instead of supervising the existing digital currency, so which one is more practical: to create CBDC or just supervise the existing digital currency?

A: Akhis R. Hutabarat

Thank you for your question. Digital money issued by private sector consists of e-money and cryptocurrency. For e-money, we have regulated the commercial banks issuing e-money. When we buy e-money, like GoPay or OVO for example, it just shifts the money in the bank and transfers to the e-money issuer. Bank Indonesia ensures that all the processes are done in the bank. Hence, it requires an interlink between the banks and FinTech. The money is in the bank and then the issuer puts the money in the issuer account. There is a regulation that a minimum 30% of the money should be put in a bank and a maximum of 70% can be put to other things. This ensures that the money can be claimed. The security of money is ensured by the regulations and by ensuring that the money is within the banking system. The central bank also wants to make sure the policies are effective, so we do not want to see an escalation of shadow banking risk. This is why we have the regulations. For e-money issued by a bank or nonbank in Indonesia, we have strict regulations that the money should be put in the banking system. That is also the objective. We do not want to see e-money issuers create money or have the ability to create money because the money is still part of money supply or broad money. In the Statistics Department of Bank Indonesia, all the money issued by e-money issuers is still in the bank and calculated as M1 and M2. That is important for the central bank.

Regarding crypto tokens, we have a clear stance. We do not allow it as a means of payment. The legal basis is that "all transactions within the national jurisdiction must use the rupiah as a sovereign currency", which is stated in the Currency Act. We have already regulated digital money but CBDC is different, it is digital money issued by the central bank. That is why it is still under consideration.

Q: At the beginning, you explained that low-income countries tend to grow faster in terms of noncash payments because there is more space to grow. However, at the end, you stated that for a country to be a cashless society, it needs infrastructure, such as electricity and public awareness about using digital payments. I imagine that all low-income countries are also associated with low infrastructure and low awareness concerning digital payments, so how can low-income countries grow faster than high-income countries? Also, you described Indonesia's position as in transition. What is your opinion about how long that will take for us to become a cashless society?

A: Akhis R. Hutabarat

Thank you. Several aspects need to be resolved, such as infrastructure and electricity. That remains on the supply side but for the demand side, it is actually the profile of youth in terms of high mobile phone and internet penetration, especially in Indonesia. Indonesia has one of the largest internets userbases. Even in rural areas, people use mobile phones. There is a survey by the World Bank that shows mobile phone ownership in rural areas is also high. The problem is again the acceleration of electrification, like social assistance disbursements. There is a problem with blank spots or no signal, which requires assistance by people dedicated to the poor. Actually, the interest in or preference for using noncash payment transactions is actually high in rural areas. Probably, this is one factor that affects less developed economies. Growth is high but the value is low. If there is a small increase in a small population, it will matter to the growth. Therefore, we do not pursue a cashless society, rather a less-cash society. Pursuing a cashless society would be impossible in Indonesia due to geographical diversity and the frequency of natural disasters in Indonesia. We still need room for cash supply if an emergency situation happens. It would be impossible to pursue an entirely cashless society at this point in time. There is also the ageing population, people who are now old are coming from a previous generation who are not aware about digital payments. All we can expect

is that digital payments, or noncash payments, are maintained in a large number. It takes time to become a less-cash society.

Q: I just want to know about your experience. What department in Bank Indonesia is responsible for overseeing the digital currency? What is the currency management department's role in regulating the digital currency?

A: Akhis R. Hutabarat

We have a payment system department within the central bank consisting of the payment system policy department, noncash payment operations, and other departments dealing with electrification and currency management. We are in the process of streamlining the business process within those departments. We are still under the reorganization process. We have set up the first phase of the reorganization, which will be continued later this year.

Q: Do you plan for the currency management department to respond to the trend of digital currency later on?

A: Akhis R. Hutabarat

Thus far, digital currency issues are dealt with by the payment system policy department. We might think it should be handled by the currency management system department, but the possibility to adopt a new system should come from the policy department.

Q: My concern is relevant to the previous question regarding how to safeguard digital cash for the future, especially the role of Bank Indonesia as the central bank. The one important aspect that has also been taken care of by the central bank is fraud. Whether the central bank has an input in future advancements of cybercrime in the way that their utilization of digital cash could be disruptive, how does Bank Indonesia ensure the security of this type of transaction? Second, how to prevent criminal acts such as money laundering? By using the new technology, the tracking could be blurrier, so what is the central bank's consideration about this phenomenon?

A: Akhis R. Hutabarat

Thank you. On the first topic of cybersecurity, this is also one of the biggest issues that we have been facing. Last month, the chairman of the Federal Reserve System was interviewed by CBS News, he was asked what the biggest risk is that the central bank is now facing and he said cyber risk. Other risks are predictable, except cyber risk. This may involve a country initiating a cyberattack. At Bank Indonesia, we have a payment system vision underlying the payment system initiatives. First, we need to ensure the payment system for the sake of digital economic and financial integration. To that end, the central bank's function is still working properly. Second, we need to promote banking system digitalization, including the role of payment system providers. Therefore, the payment system provided by the banking sector can be interlinked with FinTech and then we underscore the importance of striking an optimal balance between embracing innovation and also mitigating the risks. The risks include cyber risk and money laundering. Data integrity is also crucial. Digitalization may cause risks in terms of payment system stability and security as a whole. That is why we also develop regulatory and supervisory initiatives involving technology. There is regulatory technology. We have developed a new data ecosystem that can support anti-money laundering. We also plan to have a data structure so we can develop the retail system configuration over the next five years, connected to the data ecosystem. In that landscape, we have prioritized cyber risk and anti-money laundering. The design of CBDC can take two forms. People like to use cash because of the anonymity but CBDC could be designed to include that feature. If we create CBDC, we have to ensure the transactions are traceable. But if we allowed that, it might increase demand. We may issue a means of transaction that people do not want because there is an eagerness to use cash for illegal transactions.

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- SESSION 8 -
THE NEW TREND OF COUNTERFEITING

Speaker: Rasul Atmaca, Bank of Turkey

INTRODUCTION

Good morning everybody, ladies and gentlemen. The last day of the seminar but first session of the day, it is about counterfeiting. During the first two days, you mentioned about currency, cash circulation and genuine notes. This morning, we will talk about counterfeiting. If there is something valuable, there will be a counterfeit for it. Banknotes are valuable things, so they also have counterfeits. I have prepared a presentation about our case of counterfeiting in Turkey. Let me first introduce myself, my name is Rasul Atmaca. I am from the Central Bank of Turkey. I deal with counterfeiting in banknote printing. About 26 years ago, I started in banknote printing in Milan. I am a mechanical engineer. I started first in the Maintenance and Engineering Department and then I work in the R&D Department and now, for about 7 years, I have been Director of the Counterfeit Monitoring & Analysis Division. The subject of this presentation is banknote counterfeiting and overview. In my presentation, there will be three main subjects, namely Fight Against Banknote Counterfeiting, Turkey Facts about Banknote Counterfeiting, and Conclusion.

The first subject is the Fight Against Banknote Counterfeiting. There are three subtitles: 1) Design of Banknotes; 2) Public Information; and 3) Judicial and Law Enforcement Measures. Dealing with counterfeiting, we start at the beginning with the design of banknotes. If you have state-of-the-art banknote security features, that is a good starting point against counterfeiting. Public information is also important. You may have good banknotes but if the public does not know about those features, then counterfeit banknotes will still exist. The third is judicial and law enforcement measures. There must be some judicial calls in all the countries that are related to counterfeiting. Actually, in 1929, there was a General Commission about cooperation against banknote counterfeiting. Many countries are cooperating against counterfeiting. The next subject, Turkey Facts, is about our banknote production,

our fight against counterfeiting, and our statistics relating to counterfeiting. As a conclusion, there are some counterfeiting trends and final words of my presentation.

DESIGN OF BANKNOTES

The first part is the design of banknotes. Some parameters are important. The first parameter is the substrate. The substrate may be cotton, polymer, hybrid, etc. The printing tools are offset, intaglio, numbering, silk screen, etc. Then, the security features have some levels. Level 1 includes features for the public, level 2 are features for cashier etc. Level three are features for measure may say. Sometimes 2 and 3 are calls in others. And level + is for central banks. Of course, the banknote design must be good. All the features must be in good positions. The banknote's subject is important, dimensions, placement of security features, format, colors and so on in the graphical design of banknotes. There are also control devices for security features of banknotes at the inspection of ATMs, vending machines, etc. These are all parameters of banknote designs.

PUBLIC INFORMATION

As I said, you have to give information about those features to the public. In the circles, in newspapers, in some ways, you have to give information to the public about the security features of banknotes. If you cannot give enough information to the public, they will not understand those features or determine genuine from fake banknotes.

JUDICIAL AND LAW ENFORCEMENT MEASURES

There is a need for legislation related to banknote counterfeiting called criminal procedure code, bylaws, circulars, rules, etc. In law, you must define banknote counterfeiting. There must be some description about the production, importation, transportation and storage as well as custodial sentences. There is also the analysis methods relating to Counterfeit Currencies and Securities. They must be defined in those rules.

BANKNOTE PRODUCTION

Our banknotes, Turkish lira (TL), are printed in Ankara, the capital city of Turkey. The design and all plate production processes are made in the same place. Our Banknote

Printing Plant (BPP) was established in 1955 and it is an in-house printing group. BPP started to print in 1957. It covers an indoor area of 25,000m^2. We have three printing lines and 300 employees. Production capacity is more than 1 billion notes per year. Last year, we produced 1.2 billion banknotes.

The Counterfeit Monitoring & Analysis Division (CMAD) is working as the National Analysis Center (NAC). In Europe, there is the Cash Analysis and Counterfeit Analysis Center of the European Central Bank. The NAC is located in the member countries. We are a candidate country for the European zone, so we established our structure with respect to NAC.

The Banknote Printing Plant (BPP) is one of 20 departments in the Central Bank of Turkey. BPP has six divisions as follows:

1. Banknote & Other Securities Production;
2. Maintenance & Repair;
3. Research & Development;
4. Counterfeit Monitoring & Analysis;
5. Technical Support; and
6. Quality Control.

These are our banknotes, the E-9 series banknotes. We issued them into circulation in 2009. For about 11 years, we have used those banknotes. In the series, there are older portraits of the founder of Turkey on the front and some Turkish people on the back. If you see, the smallest denomination, 5 TL, has the same format as the largest (100 TL). For the public, it is important to know about this series of banknotes.

SECURITY FEATURES ON TURKISH LIRA BANKNOTES

We have security threads and watermarks because we use paper banknotes. As we know, there are polymer or hybrid notes also but only the structure of paper banknotes can include security threads and a watermark. Other security features that we have on TL banknotes include holographic stripes, intaglio printing, latent images, see-through images, size differences, features for the visually impaired, microlettering, Ultraviolet/ Infrared/ Magnetic (UV/IR/MG) properties, iridescent stripes and tinted paper. Those security features are known to the public. We can see them on the

notes. This is a watermark. This is intaglio printing. As we know, intaglio printing is an important feature for banknotes. As it is see-through, we can look at them through the light and see the complete view. The security thread is here and there are some numbers on the security features. This is holographic foil. It is also an important feature for banknotes. This is the latent view of the 200 TL. There is security thread on the back of our banknotes and the notes are see-through. There are two serial numbers on the reverse side of our banknotes. In terms of the watermark, there are multitone and electrotype watermarks. This is a UV view of our banknotes. Regarding the paper type, we use a substrate. It does not shine under the UV light. We have on it a security thread, shining, and three different colors for six denominations. All the banknotes have values under the UV light. You can see security features, security thread, and serial numbers on the reverse side. As you see, it shines in yellowish colors on the top and red colors on the bottom.

Just before our E-9 series, we issued these notes. This was after the six zeros were dropped from the banknotes. At the end of this year, the redemption period will have been completed for those. Just before those banknotes, we used denominations with more zeros. The 20 million lira was the largest denomination banknote in the world. Then, we dropped those zeros. By dropping six zeros, the graphical design was the same but only zeros went out. There are also new denominations, 50 and 100 lira banknotes were added to the E-8 series.

At the beginning of my work in the central bank, I started with the production of 500,000 Turkish lira, which we produced every two years and other large-value denominations due to high inflation, namely 70%-80% inflation. After the 20 million Turkish lira banknote, our inflation decreased to about 10% and we decided to drop the zeros. Therefore, we left these series first and after 2009 we produced our new series.

BANKNOTE COUNTERFEITING FACTS IN TURKEY

Our main series was first circulated in 2009. There were about 30,000 counterfeit banknotes in circulation. This subsequently decreased but then increased to 45,000. In 2018, there were around 25,000 counterfeit banknotes.

FIGHT AGAINST BANKNOTE COUNTERFEITING IN TURKEY

We prepare expertise reports in coordination with 21 CBRT branches. As you see on the map of Turkey, there are 21 branches distributed all over the country, all of which can prepare expertise reports. We are in banknote printing as a central unit. We and our 21 branches, 22 places, prepare expertise reports about counterfeiting. We also have a role in the destruction of counterfeit banknotes and the Counterfeit Banknote Monitoring System in Turkey. We prepare annual reports about banknote counterfeiting in Turkey and we coordinate with related institutions in Turkey, including law enforcement units, public prosecution services, the Ministry of Justice, and banking sector.

STATISTICAL VALUES RELATED WITH COUNTERFEIT BANKNOTES IN TURKEY

This blue chart is currency in circulation and the yellowish one is the total. Just before releasing into circulation, the banknotes are checked before circulation and in circulation. It is more important in circulation because it acquires some value for the public. It is also important before circulation for the operational cases relating to law enforcement. This seems effective. The yellowish one shows big numbers, more than 100.000 etc. These are just the total reduction. For example, in 2018, 116,000 in total value but only 25,000 in circulation. These are the denominations most counterfeited. As you can see, the 100 Turkish Lira (TL) banknote is the most counterfeited one. Second is the 50, followed by the 200.

PRODUCTION TECHNIQUES USED IN REPORTED E-9 SERIES COUNTERFEIT BANKNOTES

We prepare expertise reports and then input this information into our monitoring system. These numbers are different from the suspicious banknotes because 99.9% of suspicious banknotes turn out to be counterfeits. The amount of genuine banknotes found in the suspicious category is negligible, so we classify them as counterfeits. But here, only the reported ones are related. Based on our expertise report, we analyze them in terms of the production techniques, such as offset, inkjet and LaserJet. There are three main production techniques used. Two are digital, namely inkjet and LaserJet. Offset techniques require large machines. In Turkey, we have not detected offset counterfeits. Some are used for TV, films, etc. There is a note in a wallet but it is very small, so they are used in counterfeiting cases

sometimes. The offset counterfeits come from there and are not really produced for counterfeiting. Therefore, in Turkey, our counterfeit banknotes are produced using digital printing, inkjet and LaserJet. Inkjet is mostly commonly used. I think other countries have a similar inkjet situation. Offset production is used more for banknotes like dollars, euros, etc.

Also, I could use counterfeit euros and US dollars in Turkey. These are euro values and the quantity detected in Turkey is much less. For the euro, only 400 banknotes were detected in circulation last year. As you see, the offset is here a little bit more but decreasing. Regarding US dollars, last year we detected about 70,000 banknotes in total with only 2,000 in circulation. For US dollars, offset production is dominant.

A COMPARISON OF COUNTERFEITING IN TURKEY AND THE EURO AREA

In Turkey there are 13 counterfeit notes per million genuine in circulation. In the Euro area, the number is 25. It is similar. In our agenda, there was a description about how to calculate the ratio of counterfeit banknotes to genuine banknotes in circulation. Our number of counterfeit banknotes seized in circulation is 24,959 and the number of genuine banknotes in circulation is about 1,914,266,032. If we do a comparison, we get 13 counterfeit banknotes per million genuine banknotes in circulation. For the Euro zone the ratio is 25. We can say both numbers are acceptable.

BANKNOTE COUNTERFEITING TRENDS

I will share some pictures of counterfeit banknotes in Turkey. This is the 100 TL denomination counterfeit banknote. As you see, it is a good counterfeit note from the ultraviolet view. On the reverse side, the security features, colors, and other security fibers are fine. The numbers are not shiny, actually they must be, but this is a counterfeit note. LaserJet and inkjet together are used here in two counterfeiting phases. The first tone is just inkjet like this. Then, the intaglio print is imitated here by LaserJet. Perhaps you know about LaserJet. If a counterfeit note is made with LaserJet, it receives a bitmap code. We can know that bitmap code and find the serial number of the machine used. It is important, if LaserJet is used, the police or law enforcement can trace the machine used for that counterfeit note. The professionals know about that and they prefer to avoid LaserJet. Consequently, there are not many LaserJet counterfeits, inkjet is more common. Actually, the LaserJet process is very rapid, but more expensive than inkjet devices.

Another counterfeiting method is double layered. These are the most common in Turkey. As you see, there are two layers. The inside layer depicts the portrait and numbers relating to the watermark. Then there is a layer as a security thread. After getting together those two layers, the note is counterfeited and produced just using digital printing. Next is another example of double layering.

Triple layering is also used. For the sounding as currency, it's both here. It is a good sample of course. Other counterfeits imitate the foil application. As you see, here are some letters or numbers in print. This is made first by printing these figures on the paper and then some foils are used on the second layer. This is an imitation method. Another example is where some genuine and some fake notes are combined. They are put together as a counterfeit note.

CONCLUSION

1. Banknote counterfeiting is a fact and will likely continue in the future.
2. We have to take precautions against banknote counterfeiting.
3. Banknotes must be produced with state-of-the-art security features because we have to do more than one step to stop counterfeiters.
4. The public should be informed about security features on banknotes.
5. Every citizen should bear the responsibility of notification.
6. Legal arrangements should be made.
7. The fight against counterfeiting should be made by the central bank and national banks in cooperation with law enforcement.

Thank you.

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Q&A SESSION 8

Q: When counterfeit banknotes are found on somebody in bulk, suppose 5, 6 or 10 banknotes, what are the legal and police procedures? When counterfeit notes are found, in any denomination, what is the process?

A: Rasul Atmaca

I will explain just now. At the beginning, counterfeit notes are suspicious notes found by a central bank branch or directly by the public prosecutors or law enforcement agencies. In Turkey, there are four law enforcement agencies: Police, Gendarmerie, Customs and Coast Guard. Only they may seize and detect counterfeit banknotes.

This is the procedures in Turkey related to counterfeiting. If a suspicious note is detected, it can be moved to the public persecutor or law enforcement agencies. If the stression is important then a delay is disadvantageous, so they may be taken by preliminary report about counterfeit banknotes. Any related agencies, maybe commercial banks, cashier, the police, Gendarmerie, or law enforcement agencies, may take the preliminary report and the suspected banknote is then sent to the public prosecution services.

Q: When you inform the police authorities, even if a single banknote is found to be counterfeited, do you report immediately or is there a threshold limit of 5 notes or 10 notes? How long will that complaint be?

A: Rasul Atmaca

Every banknote, if 1 million or 1 billion, it does not matter, you have to submit information to the public prosecution services.

Q: Is there any threshold that immediately in such cases you will be giving immediate information to the police? I mean, is there some threshold limit? Will you wait for some time? In India, for example, up to four banknotes we

do not report to the police immediately but if the number of notes is five and more, we report the complaint to the police. That's what I'm asking, what is the limit when you go to the police? What is the process?

A: Rasul Atmaca

There is no limit for us. If one or more, it does not matter. The compliant is taken to the public persecution first, just before reporting. At the public persecution office, they have to take an expertise report from the central bank or the central bank can prepare the expertise report for counterfeit banknotes. After our expertise report, it is taken to a criminal court for prosecution if accepted. The complaint is sent to the criminal court. After judgment, all the counterfeit banknotes are taken to the central bank to be destroyed. We can destroy them or make a collection. As you see here, the central part of Banknote Printing or our 21 branches can prepare an expertise report on counterfeit banknotes. It does not matter the limit because just the printing time if they are detected. It may be a big number or maybe in the printing offices.

This is our procedure in Turkey for counterfeit banknotes. I said counterfeit banknotes because coins and notes are treated differently in Turkey. We deal with banknotes not coins. Coins are deal with Turkish meet. We have a monitoring system in Turkey, operated by us. When the law enforcement agencies or the central bank are suspicious of counterfeit notes, we give information to the system. The information is inputted into the system at the beginning as suspicious. After the expertise report from the central bank, we give more information to the system about the banknotes. Every note is informed to the system. All law enforcement agencies and the central bank also receive information about counterfeit banknotes in Turkey from this system. A similar system is used in European countries also. It is controlled by the European Central Bank, through its Counterfeit Analysis Center. In Turkey, we implement a monitoring system.

Our 21 branches use this monitoring system, including the Head of Anti-Smuggling and Organized Crime and related units located in 81 provincial centers of the Directorate General of Turkish National Police and other Anti-Smuggling and Organized Crime-Financial Branch Directorate of Operations Presidency and related units located in 81 provincial centers of General Command of Gendarmerie. Coast Guard and Customs, these two have a comparatively small number. The police account for about 60%-70%, with 20% in the Gendarmerie and 10% at the central bank.

In Turkey, the legal aspects of banknote counterfeiting are as follows:

1. Turkish Penal Code no. 5237, entitled Counterfeiting Money. This includes the production, importation, transportation, storage or issuances of counterfeit money, punishable by imprisonment for 2-12 years.
2. Criminal Procedure Code no. 5271, relating to the analyses made on Counterfeit Moneys and Securities.
3. Law no. 5320 relating to gathering information about counterfeit money. Our monitoring system is structured based on this code.
4. Central bank regulation concerning Procedures and Principles for the Analysis and Evaluation of Counterfeit Banknotes.

Q: In your presentation, you mentioned that the majority of counterfeit banknotes are produce using a laser printer, which is a normal printer. If I am not mistaken, Turkey is a member of the Central Bank Counterfeit Deterrence Group (CBCDG), are you implementing any of those Counterfeit Deterrence System (CDS)? Malaysia is also exploring whether we can obtain any advantages by joining the CBCDG because most of the systems that are implemented or used to deter counterfeiting need to be embedded into the printing system, which maybe you can control with the supply of those machines. For the machines that are already in market, however, is quite difficult to implement. What measures have been taken by Turkey?

A: Rasul Atmaca

Yes, we use some security features related with the central bank. These are also for the central bank features used. Counterfeit Deterrence System (CDS) and Banknote Detection System (BDS), as you know, are against digital counterfeiting. We use them but they are not going to stop the digital printing. Again, there are some methods and some professional counterfeiters to them with printing. They do not use CDS and BDS features. They are used in all copying machines, printers, etc. Therefore, they are printed again in digital devices. We use the CDS and BDS but some digitals may be produced.

Q: You said that the detection of counterfeit banknotes is the central bank's responsibility, does this include all of the counterfeits or only the previously circulated ones? How about the counterfeits that have not been circulated or come from the police? Is it detacted by you or kept by the police? Regarding my second question, in your calculation you do not include the counterfeit notes that have not been circulated, only the past ones in circulation. The most counterfeited denomination is not the biggest, why not?

A: Rasul Atmaca

Yes, detected in circulation is calculated as the counterfeiting ratio. Counterfeit notes that have not been circulated are not included because they do not have any value to the public. Counterfeits that have not been circulated are kept by the central bank. In court, they may deposit sometimes, but not to destroy. For destroying purposes, all the institutions send the banknotes to us as the central bank. The second and third biggest denomination are mid values. We can say the mid values are counterfeited more.

Q: Could you please explain, do your regulations stipulate different punishments for higher denomination counterfeits?

A: Rasul Atmaca

Not like that, it relates to professionality. If you take money knowing it is counterfeit and you pay, you will get a light sentenced. Professionally, however, if you take professionally produced counterfeit banknotes and there are some people for them, they take them to some marketing etc. and put into circulation, they would receive a harsher sentence.

Q: I am just wondering why the counterfeiters do not replicate the highest denomination? Maybe because the effort is the same but they can produce bigger denomination than the second or the third denomination. The data showed that the biggest number of counterfeited banknotes are the second and the third biggest denominations.

A: Rasul Atmaca

Yes, just see in the figure. Our biggest value is 200 Turkish lira but it is less counterfeited than the 100 or 50 TL. The mid values are most counterfeited. The public would pay more attention if the largest value (200 TL) was counterfeited.

Q: How does the Turkish Central Bank educate the public? Is there a national campaign or advertisements?

A: Rasul Atmaca

The education about banknote counterfeiting in Turkey is delivered through: (1) school books, especially educational materials for preparatory schools (9-11 years old); (2) written media, such as booklets, brochures, newspapers; and (3) audio-visual materials, such as radio, television, billboards, public institutions, and so on. Those are the main methods used to educate the public about banknote counterfeiting in Turkey.

Q: When did you announce the new series? When did you inform the public? Do you inform about all the security features that are going to be introduced?

A: Rasul Atmaca

Almost nine months ago. The central bank needs about 2-3 years to make a new series from design to circulation. From the designing step, the Turkish Central Bank informed the public about the new series. Not all the security features in the new series were informed to the public. The central bank only supplied depictions of the new notes.

Q: Some counterfeited euro and USD banknotes were found in Turkey. How do you detect counterfeit foreign currencies? Do you collaborate and coordinate with European countries or the US to detect foreign counterfeits?

A: Rasul Atmaca

We analyze the foreign notes and prepare an expertise report for them. There is information about almost all denominations used in the world. We also use some

samples that we have. There is no collaboration or coordination about foreign counterfeits with any countries.

Q: Referring to page 18, I would like to know why in 2013 the counterfeit banknote claim was so high? And then, what did you do to make it drop so significantly?

A: Rasul Atmaca

There was no particular reason why in 2013 the seized counterfeit TL was quite high, it changes sometimes. Sometimes, the operational cases are minimized. No specific action was taken to make the counterfeiting drop so significantly. Monitoring from law enforcement increased the operation.

Q: The figure on page 18 shows the quantity of seized counterfeit TL in circulation. What is the meaning of seized counterfeit? Is it suspicious counterfeit that comes from the banking system and public? Who can input that into the system? Do the values on this graph include the counterfeit in circulation or not?

A: Rasul Atmaca

It means the suspicious counterfeit, but more than 99.99% of suspicious counterfeits are counterfeit. In the beginning, our counterfeit monitoring system was controlled by the police and central bank and these values were inputted to the monitoring system as suspicious counterfeits. After expertizing, however, almost 99.99% of those were counterfeits. The police, Gendarmerie, law enforcement agencies and central bank/branches can input counterfeit banknote data into the system. These values are the circulated counterfeits.

Q: I just wanted to know how you destroy the counterfeit euros and US dollars? Do you destroy them?

A: Rasul Atmaca

Yes, we destroy them because they are counterfeit, not genuine.

Q: From my experience at Bank Indonesia, during certain periods, such as during an election, the circulation of counterfeit money is higher. Is that the case in Turkey?

A: Rasul Atmaca

There is no such thing in Turkey.

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- SESSION 9 -
INDONESIA'S CASE OF COUNTERFEITING

Speaker: Hasiholan Siahaan, Deputy Director at Currency Management Department, Bank Indonesia

INTRODUCTION

My name is Hasiholan Siahaan, I am head of the Counterfeit Money Deterrence Division of Bank Indonesia. As asked by the BI Institute, this morning I will present and share about the Counterfeit Deterrence Strategy in Indonesia. This is our outline for today. First, I will talk about the definition and second about counterfeit rupiah in circulation. Third is the challenges of counterfeit rupiah eradication. Fourth is the counterfeit deterrence strategy and last is the invention of counterfeit.

LEGAL ASPECTS

In Indonesia, there are three legal aspects pertaining to counterfeit deterrence. First, the Law of Criminal Procedure Act No. 8/1981 and second is Bank Indonesia Act No. 23/1999, last amended by Act No.6/2009. Then, there is the Currency Act No. 7/2011. Finally, Presidential Regulation No. 123 of 2012 concerning the Coordination Board for the Eradication of Counterfeit Rupiah. According to our penal code, counterfeit rupiah shall be an object whose material, size, color, images, and/or design resembles rupiah that is made, shaped, printed, duplicated, distributed, and used as an illegal payment instrument" (Currency Act No. 7/2011). Pursuant to our laws, the penalty for counterfeiters is imprisonment ranging from 10 years to life, plus a fine. Life in jail could be handed down to counterfeiters connected with terrorist activities.

RUPIAH COUNTERFEITS IN CIRCULATION

The ratio of counterfeits is the number of counterfeits found in 1 million circulated banknotes. This is one of the methods used to measure the number of counterfeits in circulation within a certain area. This is the ratio of counterfeits in Indonesia. We

compare from 2016 until May 2019. The ratio in 2016 was 13, meaning that there were 13 counterfeits per 1 million banknotes in circulation. The ratio in 2017 was 9, 12 in 2018 and just 4 in May 2019. High denomination Rp100,000 or Rp50,000 banknotes dominate the counterfeits found in Indonesia. Since the Currency Act of 2011 does not differentiate between low and high-denomination counterfeits in terms of the custodial sentence, counterfeiters tend to counterfeit the high-denomination banknotes because the risk is the same as for the lower denomination.

This is the circulation area of counterfeit money in Indonesia. As we see, México has the highest amount of counterfeit money in circulation but that is because most money circulates in Java. This is the ratio of counterfeit money in several countries. In the United Kingdom, based on the Annual Report in 2018, the ratio is 127 per 1 million. The ratio of counterfeit money in México is 66.8, the euro area is about 25, Australia is 16, Canada is 50, Indonesia is 12 and the lowest is New Zealand with a ratio of 0.8 per 1 million. We cannot, however, directly compare the ratio of rupiah counterfeits with pound sterling or euro counterfeits because of the different nature of the money in circulation. The rupiah is circulated mainly in Indonesia, with a little in Malaysia, Singapore, and Saudi Arabia, while the pound sterling and euro are circulated in many countries. Consequently, the pound sterling and euro are more at risk to counterfeiting than the rupiah.

CHALLENGES IN COUNTERFEIT RUPIAH ERADICATION

The first issue is the leniency of sentences for counterfeiting cases. Our currency law only stipulates the maximum sentence for counterfeiting, there is no minimum. Consequently, there are unequal and relatively mild punishments for counterfeiting cases. Therefore, we have implemented several efforts. We have coordination amongst institutions, such as Bank Indonesia, National Police and Attorney General's Office. Even though the law has specified harsh penalties for counterfeiters, numerous court verdicts have imposed low penalties on counterfeiters. Therefore, we collaborate with the police and the attorney general's office to build synergy and common understanding concerning counterfeits, such as the definition of counterfeits, which we agree is a serious and organized crime. Counterfeit money is economically detrimental and reduces public trust in transacting with the rupiah, while simultaneously threatening rupiah sovereignty as a national symbol. In Indonesia, besides the flag and national anthem, the rupiah is also a national symbol.

Second, we have to increase public understanding of rupiah authenticity. Since 2005, Bank Indonesia has organized a massive program introducing rupiah authenticity to the public. We campaign on how to quickly recognize authentic rupiah, specially identifying the security features that can be detected without any tools. We introduced the tagline 3D (*Dilihat, Diraba, Diterawang* in Indonesian) or see, feel, and tilt. Those are effective methods to detect rupiah authenticity. For example, we have made several short films as public service announcements. We showcase the security features and broadcast them through various channels such as television, cinema, YouTube and other social media. Let me show you two of our public service announcements.

We designed the videos to be very simple in order to inform the public on how to detect the security features, level one in particular. We have collaborated with one of the most famous rappers in Indonesia and we made the song very easy to memorize. The impact has been very big. Every time we issue a new denomination, we also make a new video to introduce the security features, level one especially. We think that method is the most effective way to introduce the security features and make the public understand how to easily detect the level-one security features of the currency. Let us see the second video from when we issued new banknotes in 2016. In the last part of the video, we introduce the 3D tagline. This method has been effective.

The next issue is increasing public understanding of counterfeits. The public must understand that counterfeiters can be sentenced to lengthy jail terms. In some case of counterfeit money within organized crime, we collaborate with the national police and attorney general's office. We publish the court proceedings to the public, including the court's verdict. In 2015, for example, police caught counterfeiters with 120,000 counterfeit Rp100,000 banknotes as evidence. We collaborated with the police and attorney general and also invited the media to publish every stage of the court proceedings. The judge handed down a 13-year custodial sentence, which is comparatively high for counterfeiters in Indonesia. Since the court's decision was announced to the public, other courts have sentenced counterfeiters to more than five years in jail. Of course, the public is now more aware about the counterfeiters and that is the impact of collaboration between Bank Indonesia, law enforcement, the police, attorney general and media. That is how we have built public awareness. If you get caught counterfeiting, you will go to jail for multiple years.

BANK INDONESIA COUNTERFEIT ANALYSIS CENTER

We have the Bank Indonesia Counterfeit Analysis Center (BI-CAC). There is a laboratory in Bank Indonesia with equipment to detect and analyze counterfeit money. We set up our first BI-CAC with technical assistance from our colleges in Deutsche Bundesbank in 2007. BI-CAC is a counterfeit analysis center that records and analyzes counterfeit money found in circulation. Every single counterfeit note is reported to BI-CAC, either by the police, banks or money processing in Bank Indonesia. BI-CAC categorizes the counterfeits based on an analysis. The BI-CAC analyses are used by law enforcement in counterfeit money cases and also by our Research & Development Division to develop a new currency designs. In addition to Jakarta, we have a BI-CAC in three other cities, namely Bandung, Semarang, and Surabaya.

COUNTERFEIT DETERRENCE STRATEGY

Bank Indonesia has a strategy map for counterfeit deterrence. As we see, there are three pillars in our strategy to fight against counterfeiting. The first pillar is how to make good quality currency. The second pillar is regarding the public communication and education strategy. And the third pillar deals with optimizing the criminal punishment for the counterfeiters.

First Pillar: Reliable, Secure and Trusted Rupiah Supply

In order to reach the goal of prevention and countermeasures to money counterfeiting, one of Bank Indonesia's main objectives is to make trusted, reliable and secure rupiah currency that is more difficult to counterfeit. We also need rupiah standardization, encompassing the materials and type of high-security features, while considering the operational costs to manufacture every denomination.

Through BI-CAC, we analyze and research the counterfeiting rate as a reference when choosing the security materials that will be used on rupiah banknotes. At BI-CAC, we analyze every single note and then that information is disseminated to our planning division. For example, when we analyzed banknotes prior to 2016, there were some high-quality counterfeits because we only employed a single color of UV light, which was easy to counterfeit. The counterfeiters knew the materials, which were easy to procure from the black market. Informed of the situation, we decided to improve the quality of our new banknotes. For example, we increased the

UV light filter from single to multicolor, which is more difficult to counterfeit. That is an example of how BI-CAC has collaborated with our design division.

Second Pillar: Knowledge and Understanding of Public about the Characteristic of Authenticity Money

With more of the public familiar with the characteristics of counterfeit money, the space for counterfeit money in circulation can be narrowed. There was an issue, however, the first time we proposed a budget to make a public service announcement. Our finance department asked me at the time if a budget for such a program could reduce the ratio of counterfeits. It is not that simple, however, because when we introduce the public to genuine rupiah and how to detect the security features, the number of counterfeit banknotes found in circulation could increase rather than decrease. Before we introduced the massive campaigns, the public was unaware of the security features of the banknotes and how to detect them. After the huge campaigns, the public acquired greater understanding about the security features. In fact, the ratio of counterfeit money increased significantly at that time in 2005, when we introduced a huge 3D tagline campaign for the first time. In 2004, the ratio of counterfeit money was about 4 or 5. After we introduced the public campaign in 2005, the ratio increased to 15 counterfeit notes per one million in 2006. Therefore, we could not connect the budget to a decreasing counterfeit ratio. Actually, the opposite was true. When we introduced a public campaign about the security features of our money, the people were better equipped to detect the authentic money.

Third Pillar: Optimization of Criminal Punishment Towards the Counterfeiters of Money Counterfeiting to Create Deterrent

As I said before, Indonesia has a special board to eradicate counterfeit money, established in 1971. In 2012, it was re-regulated under a presidential regulation. We call it BOTASUPAL (*Badan Koordinasi Pemberantasan Rupiah Palsu*) or Coordination Board for the Eradication of Counterfeit Rupiah. There are five member institutions of BOTASUPAL, namely the National Intelligence Agency, National Police, Attorney General's Office, Bank Indonesia and the Customs Office. The National Intelligence Agency has a role as coordinator of BOTASUPAL. The National Police and Attorney General's Office have roles in law enforcement efforts, while Bank Indonesia designs rupiah banknotes that are difficult to counterfeit. The Customs Office makes

the regulations and monitors the importation and the threat of various types of printing machines and multicolor printing, such as color copiers, multicolor printers, etc. BOTASUPAL meets regularly to share information and sometimes conduct a joint operation to eradicate counterfeit money. That is the super body institution to fight against counterfeiting in Indonesia.

In some cases, where the counterfeit money points to organized crime, we collaborate with the National Police and Attorney General's Office to push for the maximum punishment. For example, in 2015, counterfeiters with 120,000 counterfeit Rp100,000 banknotes as evidence were charged and sentenced to 13 years in jail. After we collaborated with the police and publicly announced details of the case, another court also sentenced counterfeiters more stringently to more than five years in jail. Now in Indonesia, counterfeiters can be put in jail for more than five years. We focus on the criminal group that is caught. For example, for the investors, counterfeiters and big distributors, we push for the maximum sentence.

INVENTION OF COUNTERFEITING

Since we issued the new banknotes in 2016, we have made the banknotes more difficult to counterfeit. We have implemented multicolor UV features. We strengthened the level 1, level 2, and level 3 features. However, there are some very low-quality counterfeits of the new banknotes using color shifting. The color shifting counterfeiting technique is achieved through a printing process, printer and screen printing. They produce a color change effect, but different from genuine banknotes. The quality is still very low. Another counterfeiting technique uses cut, paint, vanish. In Indonesia, when large amounts of counterfeit banknotes are found, they are usually low quality using regular printing.

There is a technique unique to currency counterfeiting in Indonesia, in which the counterfeiters try to make intaglio. Some counterfeiters try to make intaglio using the sanding technique. A certain area of the paper will have a role effect to be felt in the sand area. This is different from the intaglio effect. The role effect will be felt in the printed image. Some countries have a serial number with authentic look, like font and glow using screen printing techniques and inkjet printing. People can buy UV ink freely online through e-commerce platforms. That is why our new banknotes use multicolored UV light features.

Thank you.

Q&A SESSION 9

Q: When we talk about the currency education program, especially for the younger generation, do you formalize such programs in the curriculum itself?

A: Hasiholan Siahaan

We tried to formalize the program in the elementary and high school curricula but bureaucracy stood in the way. We have some tools like a coloring book for kindergarten and elementary schools and we have some online games. Our games target elementary to high school students. We design our campaigns based on the participants.

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