

Exercise 3

M-Payment

Mobile Business II (SS 2022)

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- Exercise 1:
 - The Secure Element can be found either embedded into the mobile phone's hardware, or in a SIM/UICC card or in an mSD card. In Lecture 5, we mentioned the advantages and disadvantages of the SIM-based Secure Element.
Briefly discuss the advantages and disadvantages of embedded Secure Element and mSD-based Secure Element.

	Advantages	Disadvantages
Embedded Secure Element (eSE)	<ul style="list-style-type: none"> + Security higher than for the other types of SE 	<ul style="list-style-type: none"> - Not transferable to other devices - Communication protocols between the NFC controller and the eSE are proprietary, not standardized.
mSD-based Secure Element (or NanoSD)	<ul style="list-style-type: none"> + Transferable: can be inserted in any device that supports NFC and has a memory capacity + Compatible with most standards and interfaces for smartcards +Trust 	<ul style="list-style-type: none"> - Not widespread, as the communication protocols are not standardized. - No single deal: Separate SIM- space rental rates need to be negotiated with each mobile operator.

- Exercise 2:
 - In Lecture 6, Slide no. 15, we list several mobile payment consortia. Choose five examples from the list and explain why did they fail or why did they become and/or remain successful, depending on your choices.

- **M-Pesa**, Kenia (Safaricom, Vodafone)
- **MobilMat**, Italy (Wind TLC, Banca Sella)
- **Mobipay**, Spain_(Telefonica, Vodafone, Amena, BBVA, BSCH, Sermepa, Sistema 4B, Euro 6000) - till 2009
- **Moxmo**, Netherlands (since beginning of 2002), Germany (since end of 2003), both till 2004
- **mpass**, Germany (Vodafone, O₂) [closed down 2016-10-01]
- **NFC Forum**, U.S. (NXP, Semiconductors, Sony, Nokia), Since 2004
- **Obopay**, U.S. and India (Nokia and other investors)
- **Omnipay**, Italy (Omnitel, Visa International, BankAmericard)
- **Orange Mobile Payment**, Denmark (Orange Denmark, PBS, Gemplus)
- **Paybox**, Europe (Deutsche Bank, Debitel – till 2002)
- **Simpay** (T-Mobile, Telefónica, Vodafone, Orange, O₂, TIM, Debitel), till 2005
- **Diem** (former Libra Association: Facebook, Uber, Temasek, Spotify, Coinbase, till 2022)

Different Drivers for M-Payment

	Banks/ card networks	Mobile operators	Online payment providers	Retailers
Cash replacement	✓		✓	✓
Speedier transactions				✓
Customer retention	✓	✓		✓
Promoting own payment service	✓	✓	✓	✓
Extending reach to physical world		✓	✓	
Reducing capex/opex	✓			✓
Seeking extra revenue stream(s)	✓	✓	✓	
P2P payments	✓	✓	✓	

Any mobile payment scheme involving an **exclusive link to the operator would face serious challenges** in attracting merchants, since the absence of a national (or multinational) standard could lead to a situation where each operator is pursuing an own solution.

Most commonly, such alliances will be **between operators and the financial services industry.**

- **Failure:**

- Consortia like Mobipay, EMPS, Omnipay, or Moxmo, which are not on the market anymore, might have failed because of the developing new technologies or because the solutions they proposed were 'ahead of their times'.
- The emergence of the smartphone market might have also influenced the decline in user acceptance or usage of the services provided by the above mentioned consortia
- Diem/Libra: Regulation, government intervention and consumer distrust

- **Success:**

- Consortia like Obopay or M-Pesa are very popular in societies largely based on cash, in countries such as Kenya, Tanzania, or Senegal.
- Services provided by these consortia offer people access to formal financial systems and allow them to perform financial transactions in locations where there are no bank branches.

- Exercise 3:

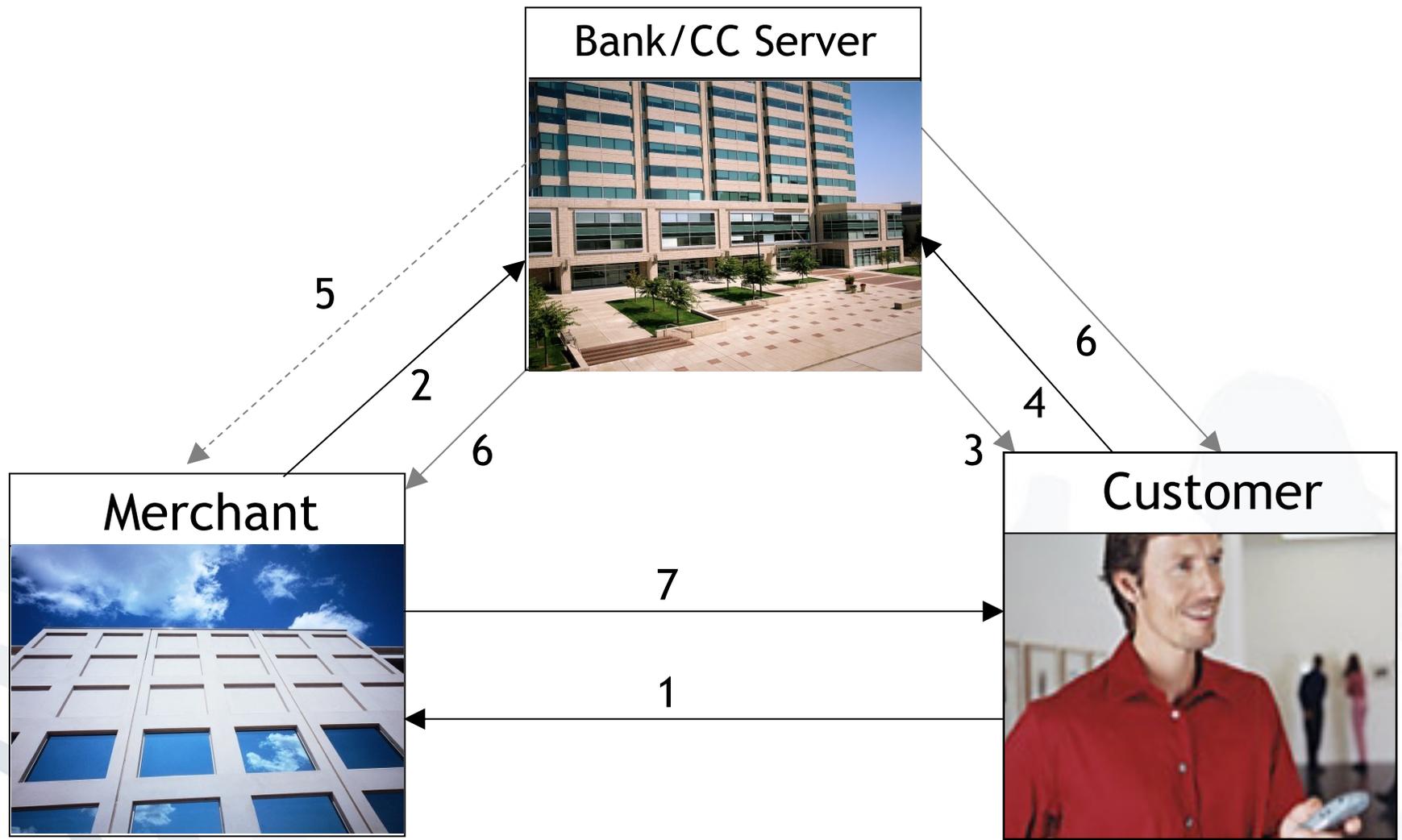
We saw in Lecture 7 that there are several types of mobile payment infrastructures, depending on the party that processes the transaction.

- a) In your opinion, in which infrastructure does the party, which processes the transaction, collect more data and in which infrastructure does it make more profit?
- b) Mention some advantages and disadvantages of each of the infrastructures (for the individual).

- Different infrastructures exist:
 - Network operator
 - Payment provider
 - Bank-Server Wallet
 - Bank-Handset Wallet
 - Payment Intermediary

M-Payment Infrastructures

Transactions processed by Banks-Server Wallet



1. Customer asks for transaction on merchant's web page and selects whether he wants to pay with credit card or bank card.
2. Merchant sends order details to the bank or credit card server.
3. Bank or credit card server sends order details to the customer and asks for confirmation.
4. Customer enters PIN and confirms the transaction.
5. Bank or credit card server verifies PIN, checks details of the customer account and authorizes the transaction. Then the server transfers the money to the merchant deducting service charge.
6. Bank or credit card server informs merchant and customer that the transaction was authorized.
7. Merchant confirms transaction & customer receives an "m-bill".

- The more steps and entities, the more data might be gathered.
- The more entities, the less money for one individual entity.
- Banks and payment providers are the parties considered to collect most user data. However, merchants are also able to build exhaustive dossiers detailing users' buying behavior.
- Banks and the payment providers could also be considered as the parties that make more profit, as their customer base is in general larger than that of the other parties. However, both the merchants and the payment providers (can) sell their user data to other third parties, data aggregators.

- Data Gathering:**
 Extensive list of third parties and type of data shared available under: https://www.paypal.com/de/webapps/mpp/ua/third-parties-list?locale.x=en_DE

Category	Party Name and Jurisdiction (in brackets)	Purpose	Data Disclosed
1. Payment Processors			
	Soft Space Sdn. Bhd. (Malaysia)	To allow payment processing using the Zettle Services	Details of payment transactions.
	Ratepay GmbH, Germany	Processing of open invoice transactions	Buyer name, DOB, email, phone, address, transaction details, merchant details, proof of shipment, case details for disputes handling
	Barclays Bank Plc (UK), HSBC Bank Plc (UK, Ireland), HSBC Merchant Services LLP (UK), Bank of America N.A. (EMEA, USA), Discover Financial Services (USA), JPMorgan Chase Bank (UK, USA), BNP Paribas (France), Netgiro (Sweden), Wells Fargo (Ireland, USA), American Express (USA), National Westminster Bank PLC (UK), OmniPay Limited (Ireland), Australia and New Zealand Banking Group Limited (Australia), ANZ National Bank Limited (New Zealand), Transaction Network Services UK Limited (UK)	To allow payment processing settlement services, and fraud checking.	Name, address, email address, phone number, details of user funding instruments, and details of payment transactions, document identification number.

- Profitability**



	Advantages	Disadvantages
Network operator	+ The merchant does not learn the user identity.	- The network operator learns the user location.
Payment provider	+ Convenience and ease of payment process, from the user perspective.	- The payment provider learns as much data as the bank. - High bandwidth communication
Bank-Server Wallet	+ Convenience and ease of payment process, from the user's perspective	- The merchant learns almost the same amount of information about the user as the bank.
Bank-Handset Wallet	+ Convenience and ease of payment process, from the user's perspective + Low bandwidth communication	- The merchant learns almost the same amount of information about the user as the bank.

- Exercise 4:
 - Facebook was in the process of developing a new payment solution, the cryptocurrency Diem (Libra). At the same time, central banks and countries like China are in the process of researching, and piloting, Central Bank Digital Currencies (CBDC). Such currencies may be seen as the next step in (mobile) payment.
 - What stakeholders might be affected by this new, digital form of money, provided by a central bank?
 - Describe possible advantages and disadvantages for the stakeholders involved. Who are these stakeholders?

What is money?

Medium of Exchange



Unit of Account



Store of Value



Store of Information



Transaction privacy: product, price
 Identity privacy: buyer, seller
 Allen et al. (2020)

Conventional money types



Cash (legal tender)



Bank money (book money)



Central bank reserves

New money types



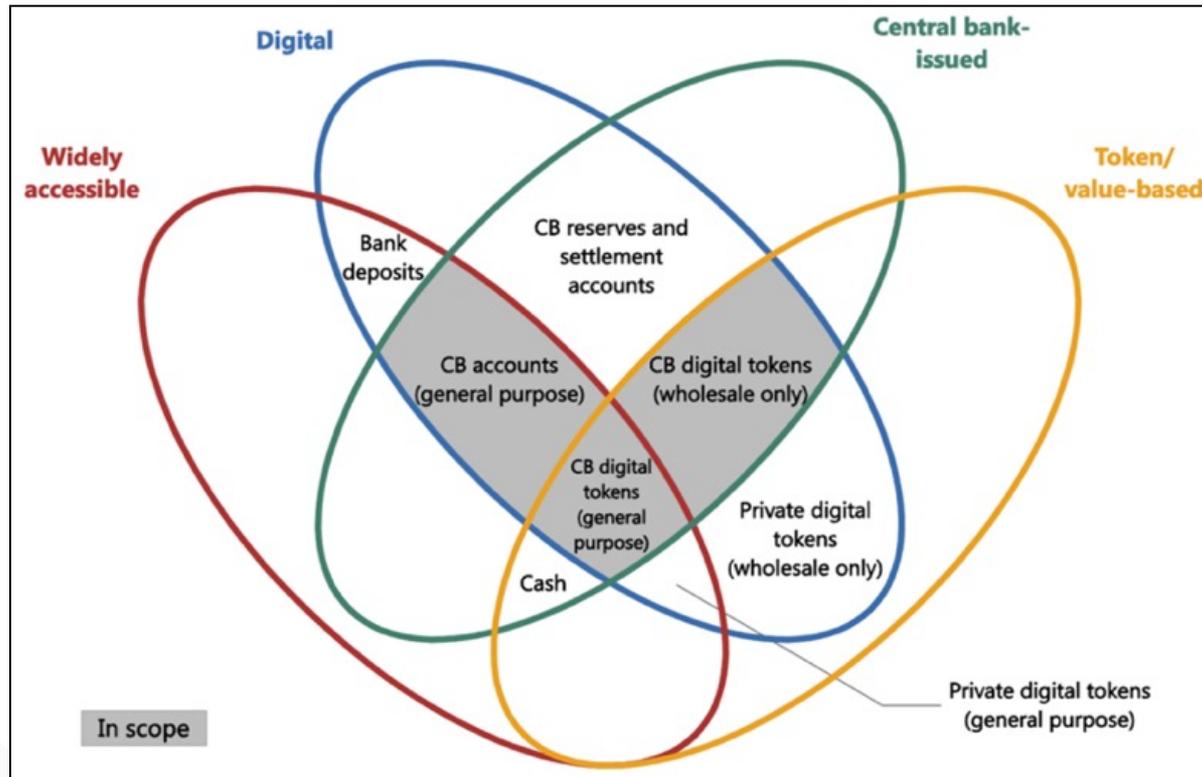
Crypto assets (e.g. Bitcoin)



Stablecoins? (e.g. Tether, Diem)

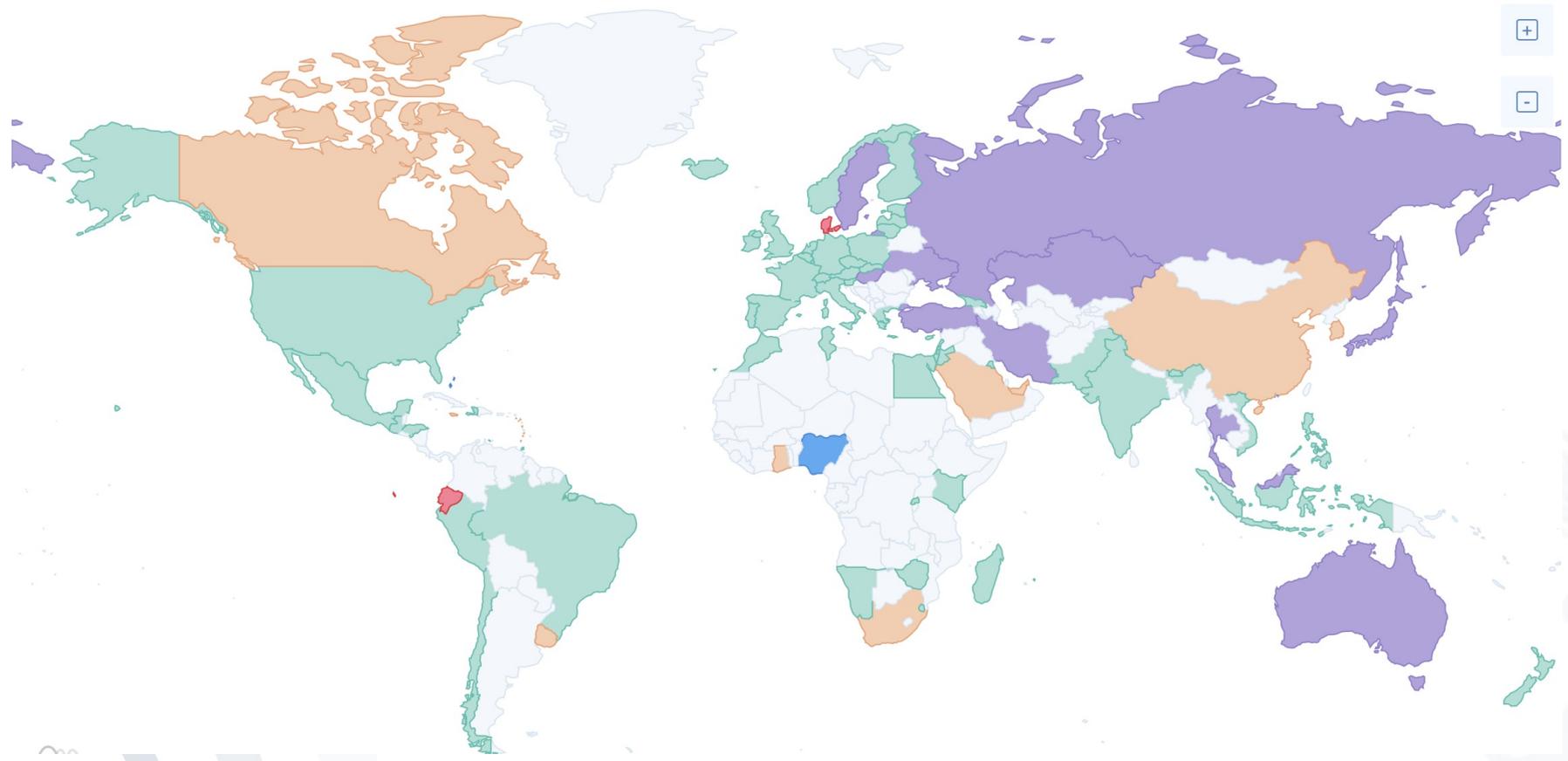


Central Bank Digital Currency



Taxonomy of Money (Money Flower) by Barontini and Holden (2019, p.2)

Digital and central bank-issued programmable money excluding central bank reserves and settlement accounts



Advantages of CBDC

1. Payment efficiency
 2. Convenience
 3. Financial integrity
 4. Financial inclusion
 5. Opportunities for monetary policy
 6. Automation
 - Privacy / Trust / Programmability (DLT-based CBDC)
- (Frankfurt School Blockchain Center, 2020)

Motivation and Status quo

- Changes in the payment landscape:
 - Decrease in cash payments
 - Emergence of Cryptocurrencies and stablecoin projects like Diem
- Research in academia and by central banks
- First existing solutions worldwide

- Central Bank Digital Currencies (CBDC) and their possible pros and cons

	Advantages	Disadvantages
Governments	<ul style="list-style-type: none"> + Greater control over monetary policy helps general planning + Financial inclusion 	<ul style="list-style-type: none"> - Negative reactions from individuals. - Power imbalance towards central banks - Cyber risks might create chaos
Central Banks	<ul style="list-style-type: none"> + Greater control over monetary policy (inflation + interest rate) 	<ul style="list-style-type: none"> - More responsibility - May need to provide commercial banks with additional liquidity → credit risk - Unknown monetary effects?
Commercial Banks	<ul style="list-style-type: none"> + Increase in digitalization may decrease cost + CBDC could hinder global tech players from entering the banking sector 	<ul style="list-style-type: none"> - Central banks gain power that belonged to commercial banks. - Decrease in customers - Entry point for new competitors
Individuals (User)	<ul style="list-style-type: none"> + New access to secure money, directly from the central bank + New service might lead to lower cost + Digitalization leads to better, quicker services 	<ul style="list-style-type: none"> - Decrease in privacy - Decrease in physical cash - Unknown human errors or cyber attacks may lead to loss of money/savings