WORLD CASH REPORT 2018

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Foreword

G4S is delighted to present the first World Cash Report.

The 2018 World Cash Report brings together data from 47 countries across six continents. The report includes relevant data on cash and non-cash payments from the past five years. It has been analysed to look at the past, present, and future of cash in our society and the way we organise its distribution throughout the cash cycle.

Cash makes the world go around

Cash is the most established and widely used payment instrument in the world.

At the same time, electronic payment methods are becoming more widely available and their transaction volumes are increasing rapidly. These electronic payment instruments are compatible with our increasingly digital society, where electronic and mobile commerce are becoming more relevant.

People trust cash; it's free to use and readily available for consumers, it's confidential, it can't be hacked and it doesn't run out of battery power – these unique qualities continue to hold significant value to people living on all continents.

So the question then becomes: what makes cash so persistent and popular in our society today? Why is it important for the future? What is its place in a modern digital society? How can we continue making cash efficient and accessible to all in society?

In this report, we address these questions by looking at the development of cash in recent years and its current status across the six continents.

In addition to the global and continental perspective, we'll also look at individual countries, acknowledging the fact that cash usage and cash cycle organisation differ greatly between countries. This is largely because cash is, in most cases, a domestic affair, driven by country-specific legislation, domestic non-cash payment initiatives, and, in many countries, a unique sovereign currency.

This country-level view allows us to draw comparisons and analyse why the status of cash differs so greatly from country to country, sometimes even between neighbours.

With this global report, we aim to stimulate an informed debate on the subject of cash and cash cycle organisation in various regions around the world.

We believe that this report represents the most comprehensive overview of relevant data and insights into the status of cash in our global society that is available in our market today. We hope you enjoy reading this report and we look forward to discussing it with you.

Jesus Rosano
Divisional CEO
G4S Global Cash Solutions


NEW YORK STOCK EXCHANGE

Introduction

1.1 Introduction

As the saying goes 'Money makes the world go 'round'. This has been true for a very long time. But what constitutes money, or rather the shape and form of money, has changed over time.

In the early days, money was a physical representation of value like a lump of gold. This evolved into banknotes and coins as a medium of exchange that we still use today. This is what we now call cash. Notes and coins have been around for centuries. The first man-made coins were invented separately in India, China, and in cities around the Aegean Sea between 700 and 500 BC. Paper money was introduced during the Song Dynasty in China in the 11th century. The first European banknotes were issued by Stockholm's Banco, a predecessor of the Bank of Sweden, in 1661[1].

On this timeline, only recently have electronic forms of money been introduced as a means of exchange alongside cash. At first, there were the 'hybrid' form of cheques (paper-based giro payments), but card payments and interbank payments, such as credit transfers and direct debits, evolved shortly thereafter. Today, innovations in electronic payments are rapidly developing thanks to increasing availability of internet and mobile communication technology. The most recent innovations are the introduction of blockchain/distributed ledger technology and cryptocurrencies.

In this report, we focus on what was the main payment method for centuries and still is today: cash. Given the enormous growth in electronic payments today, it begs the question: what is the position of cash, as a payment method, around the world, today and in the future?

1.2 Objectives of the World Cash Report

The key objectives of the World Cash Report are:

- Answering or gaining insight into key questions regarding the use of cash and the organisation of cash cycle organization throughout the world.
- Analysing the findings (similarities/differences) across countries/continents to understand and potentially explain differences/similarities.
- Providing an objective overview of cash and cash cycle organization across the world to stimulate an open discussion about cash, its future use, and organisation.

1.3 Background

G4S is a global provider in cash management and cash technology. In addition to its day-to-day services and client interactions, the company has also performed market research since 2011, when the first Cash Report (for the Netherlands) was released. In subsequent years, more publications followed: Belgium in 2013,

1 Source: https://en.wikipedia.org/wiki/History_of_money

Scenario Analysis on the Future of Cash in the Netherlands in 2014, and the European Cash Report in 2016.

1.4 Reading guide

Chapter 1 includes Introduction to the report, its objective and background, the reading guide, a description of the generic themes and topics and, finally, the management summary.

Chapter 2 presents an overview of the use of cash and cash cycle organisation at a global and inter-continental level. It also discusses generic themes, trends, and drivers relevant to the central questions in this report.

Chapter 3 discusses the central topics of the report per continent.

Chapter 4 looks at the future of cash and cash cycle organization across the world.

Chapter 5 contains final observations and closing remarks.

Chapter 6 contains the single-page country reference sheets, including the most relevant statistics and characteristics of cash usage and organisation.

Chapter 7 includes methodology, acknowledgements, and a list of sources.

1.5 Introduction to generic themes and topics

Generally, the following key functions are attributed to cash:

- Medium of exchange: money allows goods and services to be traded without the need for a barter system.
- Store of value: this can refer to any asset whose "value" can be used now or used in the future, i.e. its value can be retrieved later. This means that people can save cash now to fund spending at a later date.
- Unit of account: this refers to anything that allows the value of something to be expressed in an understandable way and in a way, that allows the value of items to be compared.
- Standard of deferred payment: this refers to expressing the value of a debt. So, if people borrow today, they can pay back their loan in the future in a way that is acceptable to the person who provided the loan.

In addition to the generic use of money, cash has other features that are valued from a societal perspective, including its universal use and low-tech availability in everyday life. Therefore, cash is a public good and ensures competition with other electronic payment methods which are more commercial in nature. Cash also acts as a symbol of national sovereignty, history, and culture. Cash is also widely used for educational purposes. Last, but not least, cash is regarded as the first stage in financial inclusion.

1.5.1. The Use of Cash

When discussing the use of cash, we primarily refer to the function of cash as a medium of exchange. The Use of Cash in any geography or

community in terms of actual number of transactions remains very difficult to establish, as cash transactions are largely anonymous in nature. Not every cash transaction is recorded, so the number of cash transactions can only be measured through specific, focused research[2].

These types of research are only occasionally available for individual countries, let alone on a consistent basis or a continental or even global scale. When specific research is available for individual countries or a group of countries or a continent, the outcome of that research will be mentioned in this report.

To establish a common, consistent, and comparable indication of the Use of Cash based on objective and publicly available statistics, this report bases the use of cash and development of that use on the value of:

- Cash in Circulation
- ATM withdrawals
- Bank withdrawals
- Cash-out at Points of Sale (POS), if applicable

These objective indicators do not translate into a specific number of transactions; however, they do provide insight into the development of the use of cash (decline/increase).

Other key statistics directly related to cash, discussed here, are the number of:

- ATMs
- Bank branches
- ATM withdrawals

2 for instance, via questionnaires, or so-called diary research

Obviously, the use of cash is also related to the availability of alternatives. This leads to the inclusion of the following statistics in this report:

- Electronic payment transaction volumes (Credit Transfer, Direct Debit, Debit & Credit Cards, eMoney, Other)
- Number of debit and credit cards issued
- Number of POS terminals

To establish a sense of a country's development in digitalising its financial services, the following statistics are presented:

- Internet usage - percentage of population with access to Internet
- Financial inclusion - percentage of population with a bank account
- Mobile usage - number of mobile phone subscriptions per 100 inhabitants

Finally, to allow further analysis and specific cross-country comparisons, the following country demographics are included:

- Population
- GDP

1.5.2 Cost of Cash

The cost of the payment method compared to electronic alternatives is an argument often made to promote phasing out cash.

Worldwide, there are many studies on the costs of retail payment instruments, including cash. These studies usually distinguish between social and private costs. The social cost of a payment instrument is the sum of the resource costs incurred by all parties in transactions using that instrument. This cost is separate from the private

cost of using a payment instrument for a payment to an individual party.

The latter costs include not only the resource costs incurred by an individual party to a payment transaction, but also the fees paid by that party to other parties as part of the transaction. These fees are excluded from social costs because, from a societal point of view, the fees received by one party offset the fees paid by another party to complete a transaction.

Obviously, providing cash to the market and maintaining the cash infrastructure isn't free. However, the costs vary significantly per cash cycle stakeholder.

For consumers

Using cash for transactions is mostly free worldwide. Merchants usually don't charge extra for payments in cash. Access to cash, through ATMs (the primary distribution channel for cash to consumers), bank offices (secondary), or otherwise, might be subject to a fee.

Whether ATM withdrawals are free differs per country or per bank. Using debit/credit cards (with withdrawal capabilities) is increasingly subject to a fee.

For Merchants

Merchants are not subject to a fee when accepting cash. They do, however, pay other payment chain participants to process their total cash payments. For instance, a bank or CIT company may charge for "Cash Conversion" (either depositing or withdrawing cash at a branch office).

For Commercial Banks

Banks buy the cash they need from their respective NCB. Costs of storing the money include rental of storage space, insurance, security, machines, staff, and IT systems. Professionals in valuables transport (including money) also need to be paid for things like the necessary staff, logistics, and security.

One of the bank's tasks is processing the ready cash that is deposited and withdrawn. These transactions involve costs for renting premises and employing staff. These costs are relatively constant, irrespective of the number of withdrawals or deposits.

Cash machines also involve relatively high fixed costs. But there are also substantial variable costs such as filling the machines and interbank settlement fees. Other costs may include uncollected interest, administration costs, and the transportation of ready cash between banks and money storage units. Adjusting the infrastructure of ready cash to comply with changing legislation is also costly.

National Central Banks (NCB)

The main costs for the NCB are related to the production and acceptance of banknotes and coins (including printing costs, storage costs, etc.). NCBs must incur resource costs to maintain an adequate supply of currency and coin and to distribute cash to depository institutions as needed.

Seigniorage

These central bank costs are balanced by income derived from what is called seigniorage. Simply put, seigniorage is the difference between the

face value of money (paid by commercial banks to the central banks) and the cost to produce and distribute it (paid by the central banks to manufacturers and distributors).

Cost economics in maintaining the cash infrastructure

Studies on the cost economics of cash infrastructures indicate that these costs are largely fixed. They are mostly independent of fluctuations in cash transaction volumes. Cash can therefore be a very cost-efficient payment product, provided there are sufficient cash transactions to offset the fixed costs. Conversely, cash becomes an increasingly inefficient payment instrument when volumes drop.

This dynamic stimulates many countries to continuously increase the efficiency of their cash cycle organisations.

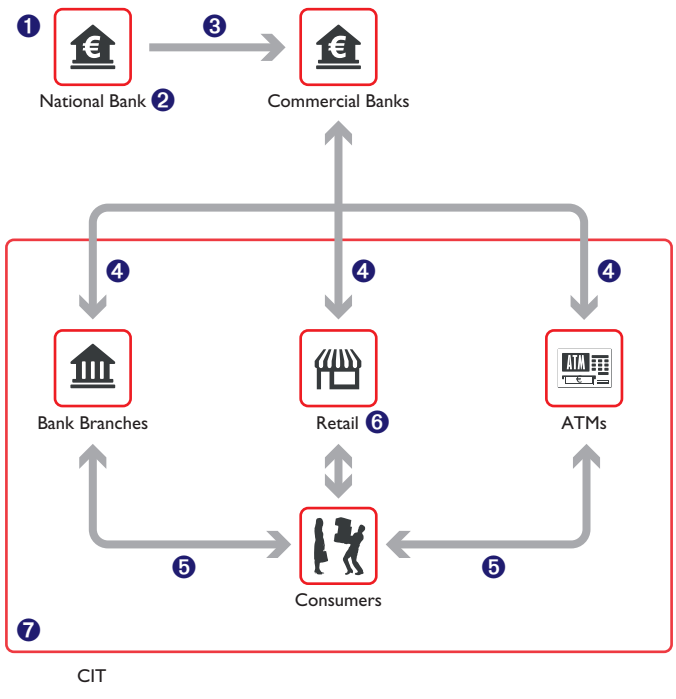
1.5.3 Cash Cycle Organisation

Cash still has a very prominent place in our society. That means that the industry is continuously looking for ways to optimise the cash process, in both efficiency and reliability. This process is also called the Cash Cycle.

The basic activities in the Cash Cycle are:

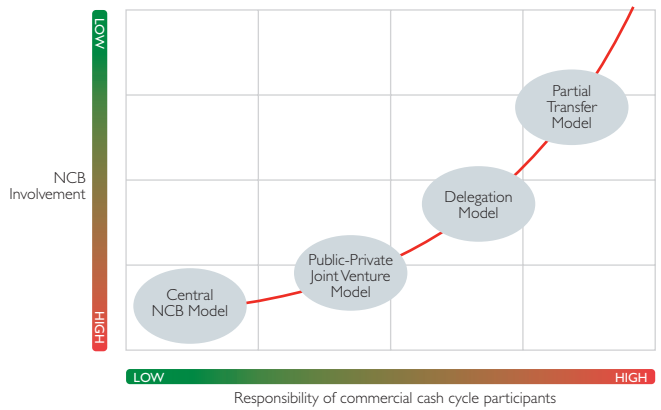
1 NCBs determine annually how many banknotes are needed to meet public demand and replace unfit banknotes.
2 NCBs produce these banknotes under strict quality regulations.
3 The notes are transported to the commercial banks that ordered the banknotes.
4 The banks issue the banknotes into the public domain through cash distribution points (ATMs and/or branches).
5 Consumers use banknotes to buy goods or services.
6 Merchants receive payment and check if the banknotes are genuine and fit for recirculation.
7 The banknotes now circulate between consumers, retailers, and banks.
8 Unfit banknotes are returned to the NCB and destroyed and replaced if deemed unfit by NCBs
9 Fit banknotes are re-circulated.

Figure 1 The Cash Cycle



Source: G4S

Figure 2 Cash Cycle Models



Source EPC 037-2013, Improving the efficiency of the handling of cash - Cash Cycle Models

Key stakeholders performing these activities are:

- National Central Bank (NCBs)
- Commercial Banks
- (Independent) ATM Deployers (IADs)
- Merchants
- Consumers
- Cash-in-Transit (CIT) companies

Even though cash cycles are similar around the world, there are subtle differences per country in things like roles in the cash cycle and how the cash cycle is organised.

There are four basic generic cash cycle models. They are identified by NCB involvement in operational activities and the responsibilities of commercial cash cycle partners.

Centralized Model

The NCB plays a pivotal role in the cash distribution cycle at national level, acting - through its branch network - as the primary warehouse, distribution centre, and cash processor.

Joint-Venture Model

A joint venture between the NCB and PSPs is established, with both acting as financial shareholders. This joint venture deals with all aspects of wholesale cash activities on a lower operational cost basis compared to the Centralised Model. These joint ventures have to comply with regulations set by national competition authorities.

Delegation Model

The NCB delegates some cash-handling activities, such as authentication checks, fitness sorting, and bundling, to the commercial sector (PSPs and/or CIT companies).

Transfer Model

PSPs assume the responsibility and cost for all wholesale cash functions. The NCB is no longer present within the cash supply cycle (except for issuing).

The main objective for each cash cycle is to be as (cost) efficient as possible, while maintaining high reliability and availability of cash service to the general public.

1.6 Management summary

This report discusses the use of cash throughout the world by studying relevant qualitative and quantitative data from 50 countries across six continents over the last five reporting years.

Related topics, like the availability and use of non-cash payment infrastructure and products, the cost of cash, and the organisation of the cash cycle are also analysed.

The main conclusions of the World Cash Report 2018 are:

Cash usage

- Cash remains the most widely used payment instrument in the world and on all continents.
- Africa appears most reliant on cash, whereas Oceania seems to have the lowest cash dependency.
- Demand for cash is increasing globally, based on the rising value of ATM withdrawals and currency in circulation, both in absolute value and relative to GDP.
- Available diary surveys (from 24 countries) show that in 18 countries (75%) cash represents more than 50% of all payment transactions.
- Cash has unique valued attributes, such as: 100% availability and reliability, anonymity, and direct settlement without the need for a technical infrastructure, explaining the continued popularity of cash even if provided with an alternative.
- Cash is fundamental to financial inclusion, as it allows everyone, including the more than 2 billion global citizens without access

to a bank account, to participate in our day-to-day society.
- Cross-continental and cross-country differences in the use of cash and non-cash instruments are abundant and should be explained by each country's unique history, culture, demographic set up, financial sector organization, availability of non-cash infrastructure and laws and regulations.

Developments and Trends

- Developments and trends impacting the use of cash include: digitalization, a changing retail environment (towards online), increasing adoption of mobile phone and internet.
- In addition technologies such as NFC (enabling contactless payments), QR codes and integration of electronic payment functionality directly from social media platforms enhance the ease of use of card and mobile payments.
- Furthermore, the introduction in many countries of real-time or immediate payments (infrastructural improvement) allow electronic payments to be settled directly as well, increasingly covering key attributes which were previously uniquely covered by cash.

Non-cash

- The availability of non-cash payment infrastructure is increasing significantly in almost all countries translating in consistently growing non-cash transaction volumes.
- While cash transaction volumes on a global level seem to be increasing in absolute terms, electronic payment transaction volumes are increasing faster. This results in a diminished share of cash in the total payment mix.

Cash Cycle Organisation

- Cash cycle organisation is driven within national boundaries based on globally shared objectives like cost efficiency, reliability, and availability.
- National banks and increasingly also commercial banks are withdrawing from operational participation in the cash cycle, leaving these activities more and more to specialized 3rd parties.
- Consolidation of activities takes place and Shared Service Centers are introduced as new entities in the cash cycle.
- Through their expertise these Shared Service Centers and 3rd parties are able to increase cost efficiency by recirculating cash in smaller cycles at the retailer-consumer level of the cash cycle.

2 Global view on Cash and Cash Cycle organisation

2.1 Introduction - What is money?

Money is defined as a general metal, paper, or non-cash exchange medium. In specific terms, money is regarded as a generally accepted means of making payments for purchasing goods and services and for the repayment of debts. Money, therefore, has a function that we can distinguish: exchange medium, unit of account, share of value, and, more occasionally, a standard of deferred payments (see paragraph 1.5).

Money is Trust!

For decades, money, issued by the National Central Banks (NCBs) in notes or coins, could be freely converted into precious metals (gold standard). The direct convertibility ensured that cash could be trusted. After leaving the gold standard, all notes and coins became entirely fiduciary. Financial transactions are based on the fiduciary system, whereby the main characteristic of cash is not having intrinsic practical value as a physical good. This means that cash draws its value from the fact that domestic governments designate it as legal tender. The general acceptance of money as a means of payment for goods and services is fundamentally connected to trust in the money-creating government.

In contrast to cash, non-cash money is not tangible. Given that non-cash money is also accepted as a general form of payment, it can also be used to perform the basic functions of money. As soon as trust in money is tainted in some way, the consumer will seek salvation in an alternative form that is trusted.

In this cash report, cash is understood to mean 'ready money'. As an extension of this, the cash area is defined as the total area within which ready cash is broken down physically and circulated. Furthermore, in this report, the cash area is placed in the context of the whole payment system in each region, including non-cash payment transactions.

Cash payment transactions consist of banknotes and coins. Both are legal tender.

In total, there are 164 official national currencies circulating around the world[3]. Some of the 197 countries share the same currency (most notably the 19 countries in the Euro area), while others have more than one currency within their country (such as Panama and Bhutan[4]).

3 Source: https://www.countries-ofthe-world.com/world-currencies.html

4 Sources: https://en.wikipedia.org/wiki/Panama and https://en.wikipedia.org/wiki/Bhutan

2.1.1 Key themes in Financial Services, Payments, and Cash

There are several key themes to define in Financial Services, payments and cash in particular like efficiency, availability, reliability and safety.

Efficiency

Efficiency is defined in terms of cost effectiveness, typically measured in the total cost to support the end-to-end processing of a payment instrument and then defined in unit cost or cost per transaction. Again, this is not a straightforward exercise, as both the cost and the number of transactions for cash are difficult to establish.

Availability

This speaks to the availability of payment methods to the general public. For instance, for card payment methods to be available to the public, infrastructure needs to be in place consisting of cards issuance/acquisition, POS terminals, connections to processing, and clearing and settlement mechanisms. For cash, this infrastructure is less complicated.

Reliability

Reliability is closely related to availability, yet it is defined in terms of performance or uptime of the end-to-end infrastructure supporting completion of the payment transaction. In general, cash transactions are much more reliable than non-cash payments. Even though the uptime of electronic payment systems is increasing, the uptime of cash is 100%. This speaks to another key characteristic of cash: fall back in case of crisis.

Even though cash as a means of payment between consumers and retailers is always available, Business Continuity throughout the cash cycle is an issue raised by central banks and discussed with other stakeholders in the cash cycle, such as CIT companies.

Safety

Safety is always an important aspect of financial transactions. Elements such as authorisation, authentication, and integrity are paramount to every transaction. In case of cash, the safety aspect gets another dimension, as cash represents direct value and therefore attracts criminals. This poses a challenge for banks, CIT companies, retailers, and consumers.

However, it should be clear that themes and issues such as safety and security are prevalent in both the cash and the non-cash domain, and they cannot be attributed to any payment product alone.

Consumers have a choice between cash and various non-cash payment instruments when they complete a purchase or a transaction. In addition to the key themes described above, there are a number of attributes of cash that are valued by consumers when making this choice. These key attributes are listed in the following paragraph.

2.1.2 Key Attributes of Cash

Cash is Legal Tender

The legal status of cash is that it is legal tender. Legal tender is a medium of payment recognised by a legal system to be valid for meeting a financial obligation. Paper currency and coins are common forms of legal tender in many countries.

Thus, personal cheques, credit cards, debit cards, and similar non-cash methods of payment are not usually legal tender.

Cash is easy to use: Convenience
Everyone can use cash, because it is a very simple, straightforward type of payment. It is low-tech, as it does not require a bank account or a device by either party to complete a transaction.

Cash is immediate transfer of value: Direct
A big advantage of cash payments is that no third party needs to be involved; the debt is actually settled directly. A transaction completed with cash allows the recipient to re-use that cash immediately for other purposes. A cash payment is also easy to reverse: no good, money back.

Cash is anonymous - Anonymity
Unlike electronic money, cash does not leave a digital trace. Even though banks and governments favour this traceability, the aspect of anonymity is highly valued by consumers when making ordinary day-to-day purchases.

Cash is contingency and fall-back solution: Safe Haven
Building on the aspects of availability and reliability, another attribute of cash is its ability to function as a Contingency or Safe Haven in case of a crisis. Not only national banks and governments but also consumers on an individual level rely on cash in case of crises. This could vary from a banking crisis or a power outage at a convenience store to the uncertainty of being able to pay electronically. In these situations, consumers resort to cash payments to finalise their purchase.

Cash is tangible and helps with budgeting
Cash simplifies budgeting and allows a large group of consumers to handle money more responsibly. Cash gives consumers better control of their budgets as they can actually see how much money they have.

Cash is insecure
For cash, this is a two-sided topic:
Cash can be counterfeited, even though security features are increasingly sophisticated and the number and value of counterfeit notes across the world is negligible.
Ready cash is also fairly easy to steal. Even though the losses are limited to the amount seized (monetary impact is relatively small), such an event will have a more significant impact on a personal and emotional level.

The question is whether ready cash would be considered so great a risk if all retailers were to make optimum use of the opportunities offered by the market players in order to protect the cash cycle or if the law were to manage to achieve a more successful tracing policy.

The insecurity of cash cannot be regarded as a standalone issue. Both consumers and retailers can fall victim to cash and non-cash related crimes, with differing material and personal impact. From this point of view, the insecurity of cash is relative and dependent on the security offered by paying electronically.

As stated before, these key themes and attributes are important factors for consumers when deciding which payment instrument to select. It

Figure 3 Scoring of payment instruments on key attributes of payments

	Legal Tender	Convenience	Direct Settlement	Anonymity	Availability	Reliability	Safe Haven/Fallback	Tangible/Budgeting	Secure	Efficient	Remote payment	'Higher' value payment >5000 EUR
Cash	✓	✓	✓	✓	✓	✓	✓	✓	±	±	✗	✗
Cards	✗	✓	✗	✗	±	±	✗	✗	±	✓	✓	✓
Debit card	✗	✓	✗	✗	±	±	✗	✗	±	✓	±	±
Credit card	✗	✓	✗	✗	±	±	✗	✗	±	±	✓	✓
Prepaid card	✗	✓	✗	✓	±	±	✗	✗	±	±	±	✗
Credit transfer	✗	✓	✗	✗	±	✓	✗	✗	±	✓	✓	✓
Direct debit	✗	±	✗	✗	±	±	✗	✗	±	✓	✓	✓
Cheques	✗	✗	✗	±	±	±	✗	✗	✗	✗	✗	✗
Mobile	✗	✓	✗	✗	✗	±	✗	✗	±	±	✓	✗
Internet	✗	✓	✗	✗	✗	✓	✗	✗	±	±	✓	✓
Crypto currency	✗	±	✓	±	✗	✗	✗	✗	✗	±	✓	✗
Instant payments	✗	✓	✓	✗	✗	✓	✗	✗	±	±	✓	✓

Source: G4S and Payments Advisory Group analysis, 2018
Comment: it is understood that listed payment instruments are not mutually exclusive.

would therefore be interesting to see how the various payment instruments score on these selection criteria.

2.1.3 Payment method analysis

Consumers have a range of options to choose from when selecting a payment method to complete a transaction. They make this selection based on the value they attribute to a payment method in a certain situation. A number of conclusions can be drawn from this analysis:

- Each payment instrument seems to have its own value
- Both cash and non-cash payment instruments fulfil unique needs, and as long as these needs do not change, both types of payment instruments are required to meet the full spectrum of user's needs.

- Cash covers many of the features that consumers most value in a payment instrument.
- Moreover, cash uniquely covers many of the features that consumers most value in a payment instrument, such as:
  - Cash is trusted as legal tender
  - Cash has near 100% availability and reliability
  - Cash retains anonymity
  - Cash offers direct settlement
  - Cash offers a safe haven and fall-back
  - Cash is tangible and helps with budgeting
- Non-cash payment methods seem to overlap more, with some attributes covered by multiple non-cash payment instruments. This suggests that competition exists mostly within non-cash payment instruments (potentially leading to cannibalisation or fragmentation), while cash payments remain largely unaffected.
- Therefore, it can be expected that as long as these attributes (valued assets) are only fulfilled by cash and not by any other alternative, cash will fulfil a need and therefore will continue to be a widely used payment instrument.
- It will be some time before non-cash payment mechanisms adopt the same valued attributes, but we do see certain new developments making inroads into "cash-territory", e.g. Instant Payments possibly in combination with mobile peer-to-peer functionality on Direct Settlement.

From a user's perspective, one could argue there shouldn't be any competition between cash versus non-cash, nor should it be an either/or proposition. There is simply a need to make payments in all circumstances and this need is fully fulfilled by both cash and non-cash payment instruments.

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2.2. The use of cash throughout the world

Given the anonymity of cash transactions, it is very difficult to establish the exact volumes of transactions conducted in cash. In order to make a credible estimation of the status of cash throughout a geography, this report looks at two key indicators:

- The value of Currency in Circulation vs. GDP
- The value of ATM withdrawals

In Chapter 3, similar information is presented on a continental level, including a country breakdown, supplemented by individual country insights and any available payment usage reports.

Figure 4 CIC/GDP

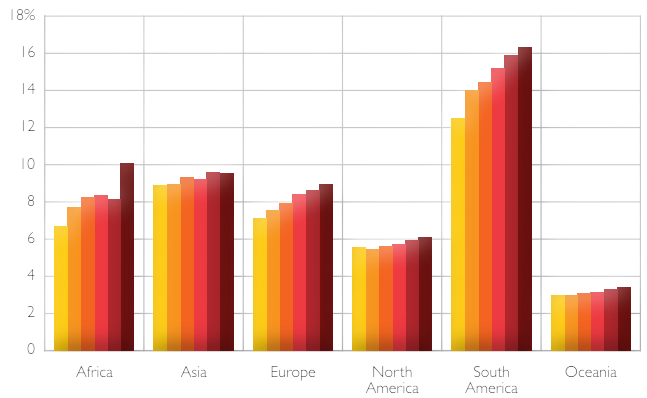
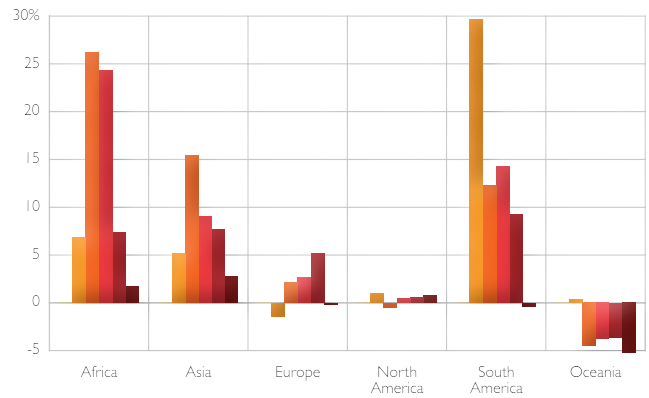


Figure 5 Growth ATM withdrawals (value in local currency)



Legend

2011
2012
2013
2014
2015
2016

- The world average ratio in Currency in Circulation vs. GDP is 9.6%.
- Africa, Asia, and Europe are level with the global average, while North America and especially Oceania are below the world average.
- Based on this indicator, South America has by far the highest cash dependency relative to its GDP
- Currency in Circulation vs. GDP is increasing on all continents, indicating a consistent, growing demand for cash across the world.

- Globally, the value of ATM withdrawals experienced a positive (average weighted) growth rate of 4.6% in 2015[5].
- The value of ATM withdrawals shows positive (average weighted) growth rates in most continents, except Oceania.
- In North America, the value of ATM withdrawals has largely stabilised, growing only marginally.
- Positive growth rates seem to be declining over the past years across most continents except Europe, where the growth rate almost doubled between 2014 and 2015.

Based on these two key indicators, cash demand is growing consistently across the world.

5 2016 was excluded, as the number of countries providing this data was insufficient for a representative assessment at continent level.

Figure 6 ATMs per 100,000 capita

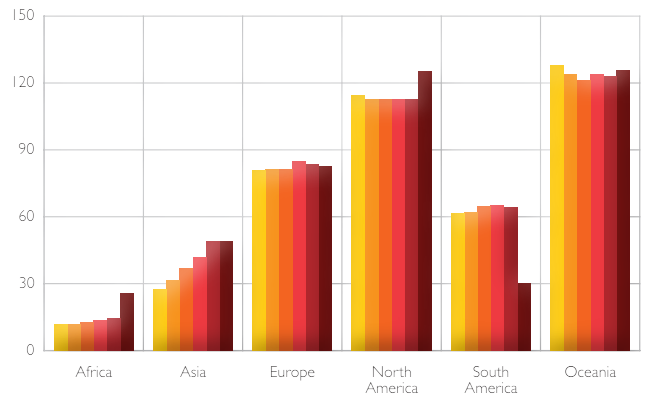
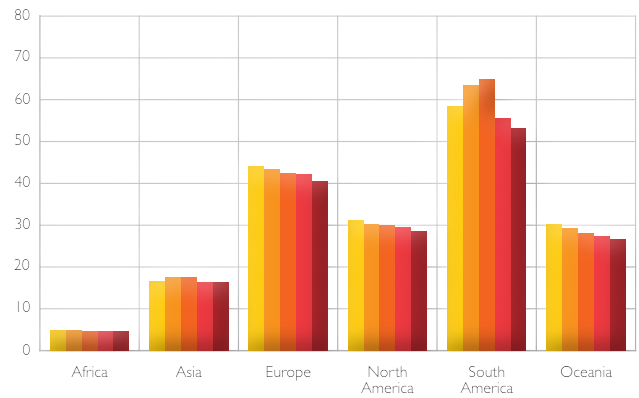


Figure 7 Bank branches per 100,000 capita



Access to Cash

Primary sources for obtaining cash are ATMs and bank branches.

- The world average was 56.8 ATMs per 100,000 capita in 2015[6].
- The availability of ATMs has grown consistently across the world by an average of 11.2% per annum.
- Africa is clearly the continent with the lowest level of ATM availability.
- Asia is also still below the world average but has shown strong and consistent growth in the past five years (+16.3% on average per annum).
- The total number of ATMs on other continents is largely stable.

Additionally, research shows that the share of non-bank ATMs is increasing. Independent ATM deployers (IADs) accounted for one in six ATMs worldwide at the end of 2016[7].

- Overall, the number of bank branches per capita[8] is decreasing across all continents.
- South America and Europe still have most bank branches available to the general public, while Africa and Asia are well below the world average.

6 2016 was excluded as the number of countries providing this data was insufficient for a representative assessment at continent level.

7 Source: RBR's Global ATM Market and Forecasts to 2022

8 2016 was excluded as the number of countries providing this data was insufficient for a representative assessment at continent level.

Figure 8 Cards per capita

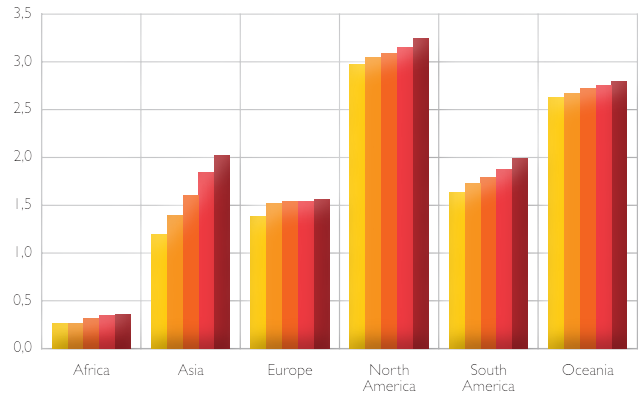
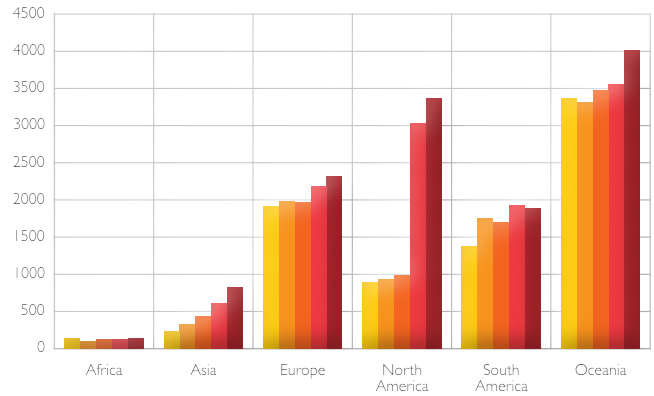


Figure 9 POS terminals per 100,000 capita



Legend

2011
2012
2013
2014
2015
2016

Electronic Payments Infrastructure

When it comes to the availability of non-cash payments, the following data was examined: the number cards issued and acceptance points or POS terminals.

Card issuance

- The world average number of cards per capita is 2.0 (2015[9]).
- Availability of payment cards is growing on all continents around the world.
- Strongest growth is observed in Asia, followed by South and North America.
- These continents and Oceania are all on or above the global average.
- Europe is below the 2.0 average and has seemingly failed to convincingly grow that number in recent years.
- Africa is increasing its card base, but availability per capita is still relatively low.

POS terminals

- The world average number of POS terminals per 100,000 capita[10] comes to 1.235 (2015).
- All continents have shown consistent positive growth in the availability of POS terminals.
- Europe, South America, and especially North America[11] and Oceania are above the global average.
- Asia is growing its POS numbers, while Africa has not in recent years.

The growth rate in the availability and the use of electronic payments infrastructure and methods such as cards clearly reflects the growing relevance and popularity of electronic payments throughout the world. This is one of the drivers for change when it comes to the use of cash.

9 2016 was excluded as the number of countries providing this data was insufficient for a representative assessment at continent level.

10 2016 was excluded as the number of countries providing this data was insufficient for a representative assessment at continent level.

11 The USA only provided data for 2014 and 2015, which is the reason for the strong increase in the continent's weighted average.

2.2.1 Payment Diary Surveys from around the world

As previously mentioned, it is very difficult to establish the exact number of cash transactions. Instead, we've used the parameters described above to make an educated assessment of the position of cash for transactional purposes. Another source of information is diary surveys, which are conducted throughout the world. Even though these surveys are not done consistently and vary widely (e.g. in scope and researched population), making it scientifically incorrect to simply compare the results, it is insightful to present an overview of the outcomes of the most recent Payment Usage Surveys from around the world.

It is clear from the above overview that:

- In 17 out of 24 studied countries, cash represents more than 50% of all payment transactions.
- In Europe (ECB Diary Study), cash represents 78.8% of all transactions in volume and 53.8% in value.

Given the importance of cash, it is interesting to take a look at how these volumes are transported through the cash cycle across the various regions.

2.3 Cash cycle organisation throughout the world

As already introduced in 1.5.3 Cash Cycle Organisation, the logistical process of providing cash to the market is a generic one across the globe. By and large, they all share the same objectives, process, and stakeholders. However, they differ in the distribution of activities across stakeholders,

Figure 10

Country	Continent	% Cash	Source
South Korea	Asia	14%	BOK study
Finland	Europe	54%	ECB Diary Study
Estonia	Europe	48%	ECB Diary Study
Latvia	Europe	71%	ECB Diary Study
Lithuania	Europe	75%	ECB Diary Study
Slovakia	Europe	78%	ECB Diary Study
Austria	Europe	85%	ECB Diary Study
Slovenia	Europe	80%	ECB Diary Study
Greece	Europe	88%	ECB Diary Study
Cyprus	Europe	88%	ECB Diary Study
Malta	Europe	92%	ECB Diary Study
Italy	Europe	86%	ECB Diary Study
Germany	Europe	80%	ECB Diary Study
The Netherlands	Europe	45%	ECB Diary Study
Belgium	Europe	63%	ECB Diary Study
Luxembourg	Europe	64%	ECB Diary Study
France	Europe	68%	ECB Diary Study
Spain	Europe	87%	ECB Diary Study
Portugal	Europe	81%	ECB Diary Study
Ireland	Europe	79%	ECB Diary Study
Sweden	Europe	20%	ECB Diary Study
United Kingdom	Europe	42%	Payments UK Diary Study
Australia	Oceania	37%	RBA Diary Study
United States of America	North America	32%	FedResSys Diary Study

i.e. the level of operational involvement of the NCB and, consequently, the level of outsourcing to other banks and/or third parties, such as CIT companies.

As cash cycles are solely organised within country borders, it is impossible to qualify the cash-cycle model at a continental, let alone a global level. It is, however, a clear trend that NCBs

around the world are working towards becoming less involved in the operational aspects of the cash cycle[12].

A related observation concerns the governance supporting the various cash cycle models; please see paragraph 5.2.2 Cash Cycle Governance for more on this.

2.4 Key trends and drivers for change

When it comes to the way we pay and the use of cash, there are a number of key trends and drivers for change influencing our collective payment behaviour.

2.4.1 Digitalisation

Digitalisation is an undeniable trend and an important topic on the global agenda. The United Nations addresses this topic in their Information Economy Report 2017: Digitalisation, Trade & Development[13], while other central governments, such as the European Union[14], have their own digitalisation agendas in place.

These agendas focus on advanced robotics, artificial intelligence, and the Internet of Things, but also on topics more directly related to payments, such as the importance of interoperability and digital payment systems. On a more social level, these agendas focus on bridging the so-called digital divide.

12 See Chapter 3 for cash cycle assessments on a country level

13 Source: http://unctad.org/en/PublicationsLibrary/ier2017_en.pdf

14 https://ec.europa.eu/digital-single-market

2.4.2 Social and financial inclusion

Social inclusion is the process of improving the terms on which individuals and groups take part in society—improving the ability, opportunity, and dignity of those who are disadvantaged because of their identity[15].

Even though social inclusion doesn't have a direct relationship to the use of cash or electronic payments, there is a clear relationship between social and financial inclusion.

Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit, and insurance – delivered in a responsible and sustainable way. Access to a transaction account is a first step towards broader financial inclusion, since it allows people to store money and send and receive payments[16].

Financial inclusion, then, does have a clear relationship to the use of cash and access to electronic banking infrastructure. This, in turn, has a clear social inclusion component, as it allows everyone to participate in our day-to-day economic society. The Worldbank, in their Global Findex Database - Measuring Financial Inclusion around the World, has monitored financial inclusion consistently since 2011.

Key indicators for financial inclusion are listed

15 Source: http://www.worldbank.org/en/topic/socialdevelopment/brief/social-inclusion

16 Source: http://www.worldbank.org/en/topic/financialinclusion/overview

on the website of the Global Partnership for Financial Inclusion (GPFI), a platform for all G20 countries, interested non-G20 countries, and relevant stakeholders to carry forward work on financial inclusion. These indicators include[17]:

- Adults with a bank account
- Number of bank accounts
- Number of cashless payment transactions
- Adults with internet access
- Number of mobile phone subscriptions

Key conclusions from the Worldbank report:

The number of people with an account worldwide grew by 700 million between 2011 and 2014. 62% of the world's adult population has an account, up from 51% in 2011. Three years ago, 2.5 billion adults were unbanked. Today, 2 billion adults remain without an account. This represents a 20% decrease.

Global distribution is depicted below. For a more detailed view, please see the continent paragraphs in the next chapter.

17 For a full list of the key indicators of financial inclusion, please visit http://www.gpfi.org/sites/default/files/sites/default/files/Indicators%20note_formatted.pdf

Figure 11 Access to a Bank Account (% of population > age 15)

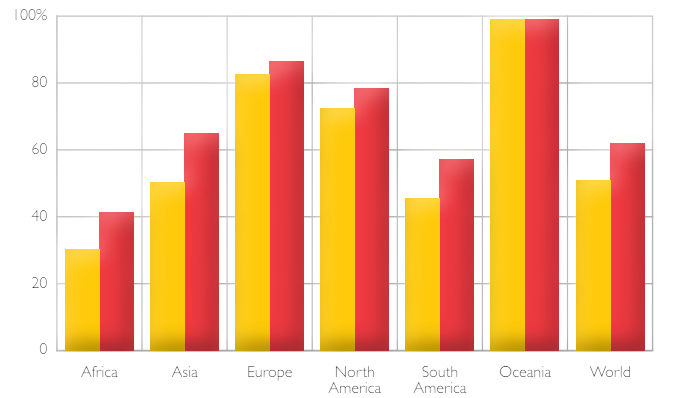
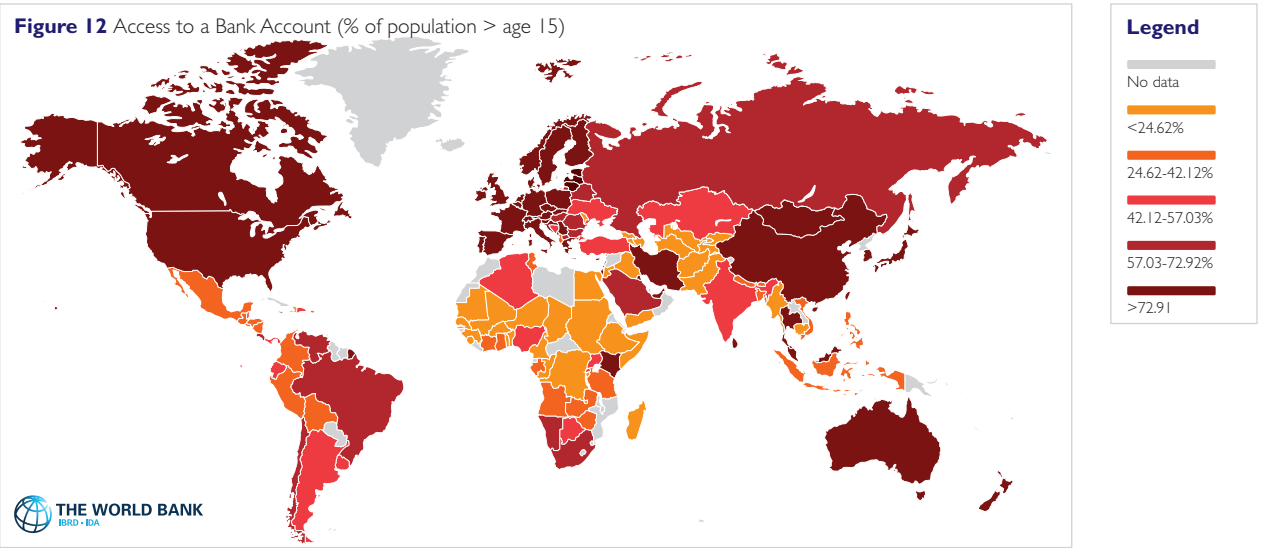


Figure 12 Access to a Bank Account (% of population > age 15)



Source: The World Bank IBRD IDA

Figure 13 Internet Access (% of population > age 15)

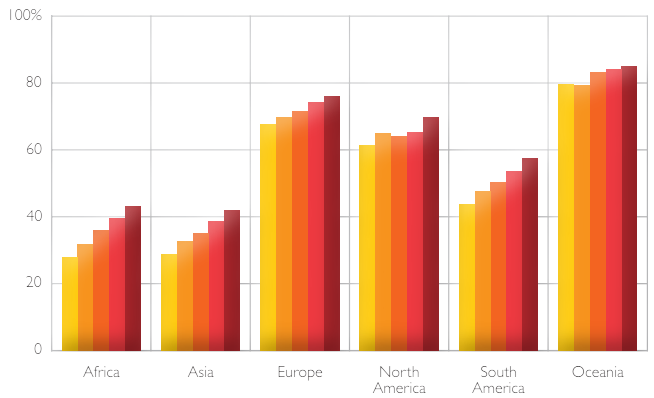
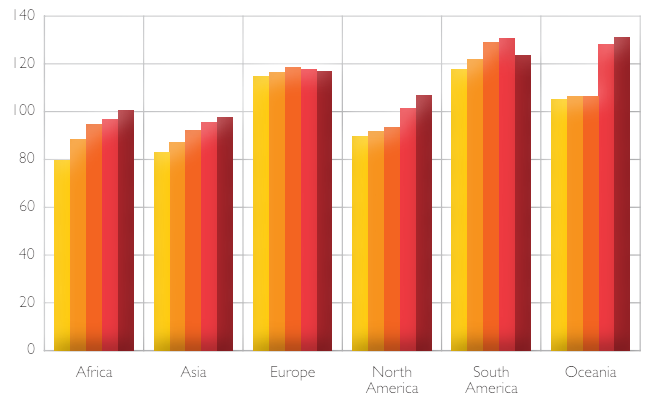


Figure 14 Number of Mobile Phone subscriptions per 100 capita



Legend

2011
2012
2013
2014
2015
2016

Other relevant indicators regarding social and financial inclusion related to payments:

Access to mobile phone or internet at home

Internet access, measured as the percentage of the population who has access to the internet, is growing across the world, yet not all continents are at the same level, as the following graph shows:

The world average is 102.7 mobile phone subscriptions per 100 people (age 15+), and it is interesting to note that the differences between continents observed in other social and financial inclusion categories are not as prevalent when it comes to the number of mobile phone subscriptions.

Overall, the results show that the numbers for access to electronic payment facilities are increasing, which could, in turn, lead to a reduction in the use of cash.

At the same time, cash is still indispensable to the full inclusion all citizens in the day-to-day payment infrastructure.

2.4.3 The changing retail environment

The way we transact is increasingly changing from an offline, face-to-face environment to an online, longer distance environment, from retail to e-tail. This impacts the way we pay.
The global ecommerce market is growing significantly throughout the world and is projected to grow to well over 4 trillion USD by 2021. On top of that, the relevance of ecommerce in overall retail is also expected to increase year on year from 7.4% in 2015 to 15.5% in 2021[18] (see figure 16).

The fastest growing online retail markets are Indonesia and India, followed by Mexico and China. Digital retail development in these countries is strongly connected to the constantly improving online access, especially in mobile-first online communities.

18 Source: www.statista.com

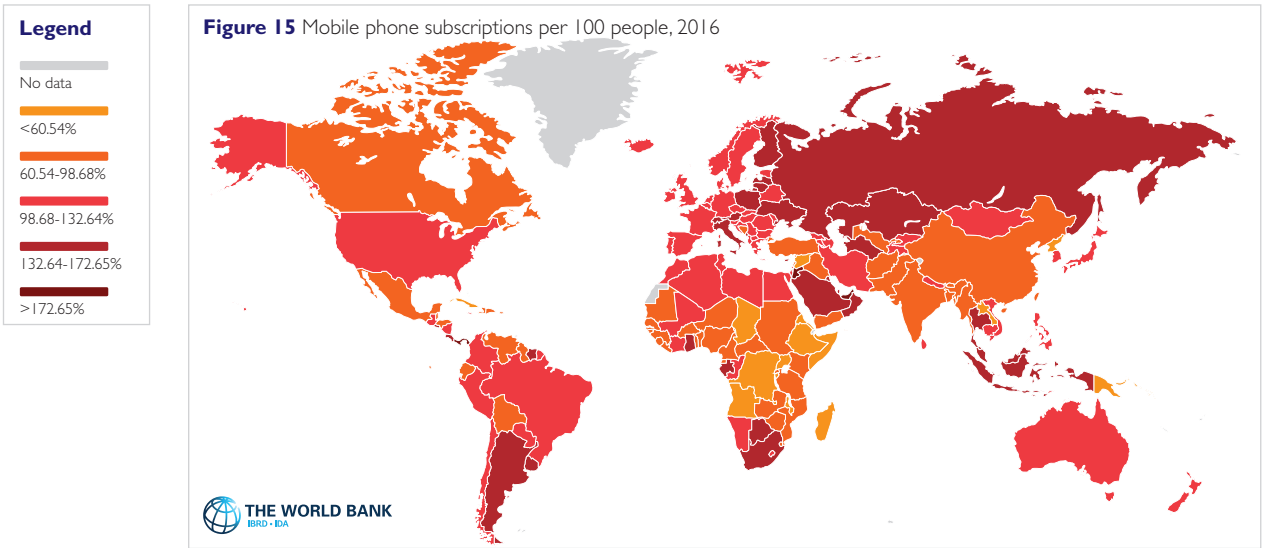


Figure 15 Mobile phone subscriptions per 100 people, 2016

Source: The World Bank IBRD IDA

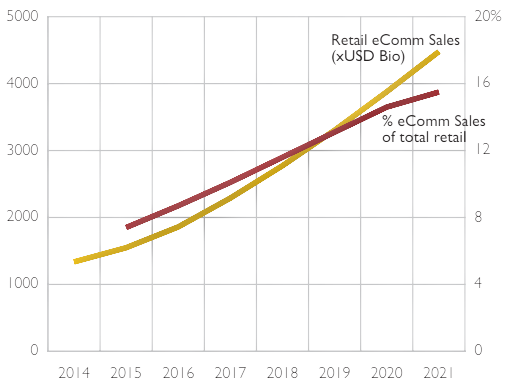


Figure 16 ECommerce Sales 2014-2021

2.4.4 Mobile-first online communities

Another interesting development is the leapfrogging of countries that have long struggled with traditional fixed broadband connections due to financial or infrastructure restrictions. With the adoption of cheaper mobile broadband connections, and without the 'hindrance' of an existing infrastructure, they are now experiencing the full benefits of mobile commerce. This directly affects the way we pay, as the mobile phone enables both online (customer not present) and offline (customer present, or face-to-face) transactions. Transactions conducted via mobile phones therefore directly compete with both traditional electronic payment methods (e.g. plastic cards) and cash.

2.4.5 Paying in an online environment

Changing the way we transact from face-to-face to remote also impacts the way we pay for these services. In many instances, the common assumption is that cash is not the ideal payment instrument for these remote purchases. Even though this holds true for some countries and regions across the world, this is not the case in all countries.

Cash on Delivery is still a dominant payment method in many countries around the world. In the Arab world for instance, Cash on Delivery continues to be the most popular payment option in the region, with 50% of shoppers preferring this method of payment. This preference is most prevalent in Egypt, where 70% of the shopping population prefers Cash on Delivery[19]. Privacy and security remain major concerns for shoppers across the region. While there have been dramatic improvements over the last five years, confidence in online shopping is still lower than in more mature markets[20].

2.4.6 Innovation and new entrants

Innovation is one of the cornerstones for our future society. For cash payments this can be translated into innovation in payment products and innovation in the way the cash payment market is organized.

Innovation in payment products

Even though innovation in payment products predominantly takes place in the electronic payment domain, this does have a potential impact on the use of cash as more and more alternatives become available to the general public. Examples of such product innovations are: internet payments, mobile payments, the increased use of Near-Field Communication (NFC) and QR (Quick Response) code technology, virtual currencies, and instant payments.

When it comes to cash as a payment instrument, continuous innovation is also paramount, for instance, when it comes to:

- Production of cash (notes and coins): banknotes are printed on various materials, such as paper, cotton, polymer, or a mixture.
- Increasingly innovative security features to prevent counterfeiting, such as: cylinder-mould watermarks, security threads, security foils, secure windows, printed and covert security features, 3D imaging, holograms, and fluorescent ink.
- Withdrawing from ATMs using mobile banking apps. Mobile banking is a new trend is mobile banking. Mobile banks work via a mobile app and enable their users to retrieve money at many ATMs worldwide without a surcharge. For instance, the Maltese mobile bank Ferratum Bank can be used to withdraw cash at all ATMs in Spain, while German mobile bank N26 and Spanish app Imaginbank are available at all ATMs across Europe[21].

Additionally, continuous effort and investment is required in cash cycle organisation to maintain or even improve the current cost-efficiency level.

19 Source: www.stateofpayments.com; Payfort, 2017

20 Source: State of Payments, Payfort, 2016. Countries included in this report are: United Arab Emirates, Saudi Arabia, Lebanon, Egypt, Kuwait, Jordan and Qatar.

21 Source: https://vulcanpost.com/573674/uber-malaysia-cash-payment-system-kl/

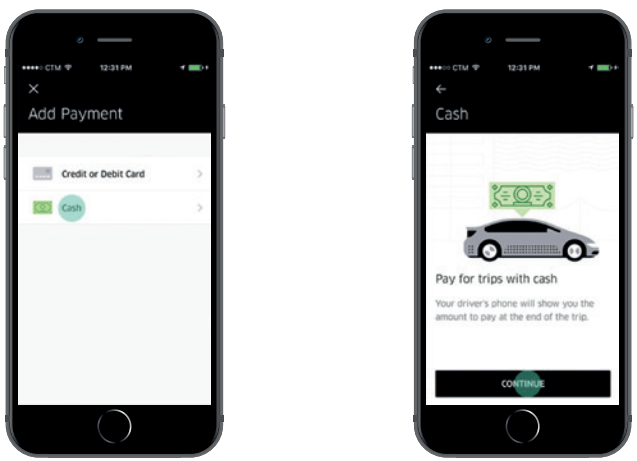
Showcase

Uber and Cash

Uber is regarded by many as an industry disruptor and the poster child of revolutionary new business models. Moreover, it has been praised for its easy payment method. Simply approving the fare will automatically deduct the fee from your credit card that is linked to the Uber system. However, Uber did find itself wanting in certain countries and has recognized the importance of cash to its clients. After intensive testing, Uber has started offering the cash payment option in India[22]. More countries soon followed. Uber now offers the cash payment function in many countries around the world, primarily in Asia, Africa, and South America. These countries include South Africa, Vietnam, Thailand, Colombia, Kenya, Singapore, Malaysia, China, Nigeria, and Brazil.

22 Source: https://medium.com/uber-design/designing-the-uber-cash-experience-649a2749b324

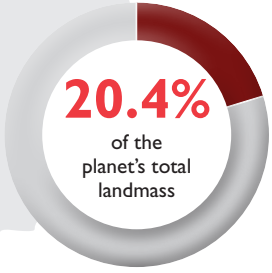
"Uber's biggest selling point is their seamless payment system, but when they introduced cash, they saw exponential growth in sign-ups."

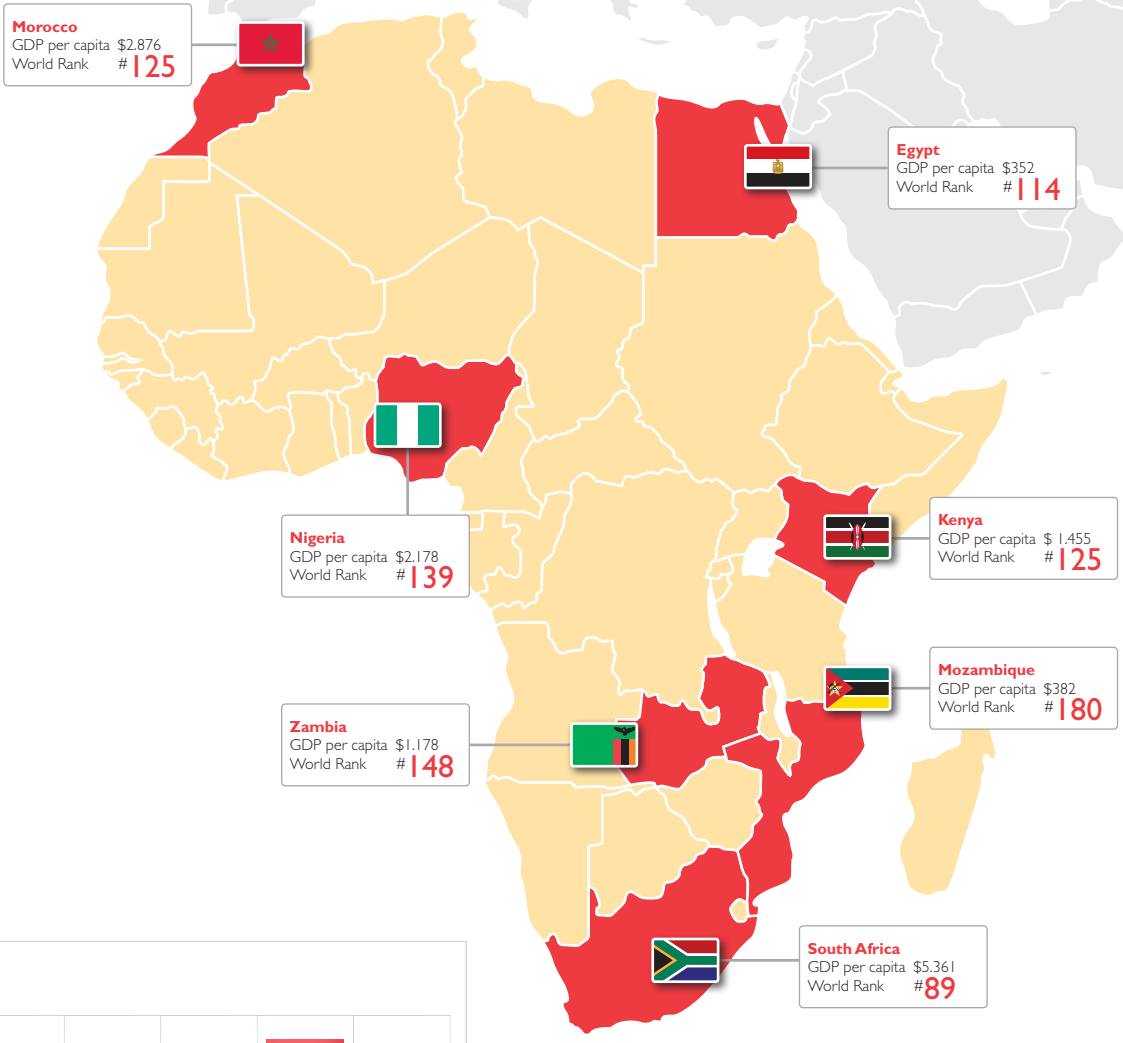


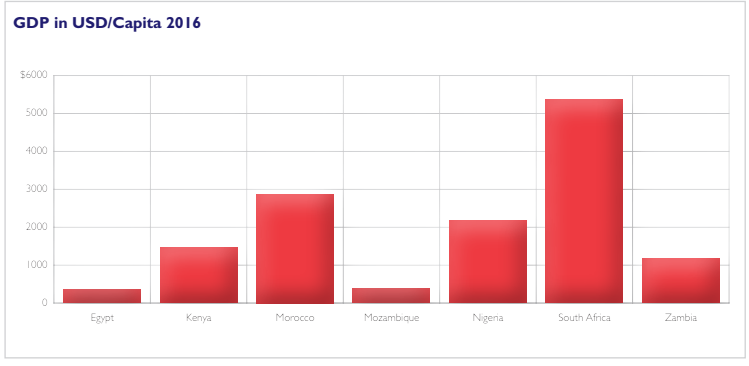
According to Uber, the company has seen exponential growth in sign-ups in cities where it accepts cash. Previous experiments in other Uber cities have shown an increased adoption rate of new passengers outside of core service areas by an average of 45%[23].

23 Source: https://vulcanpost.com/573674/uber-malaysia-cash-payment-system-kl/

AFRICA







	GDP	Population
Afrika	2,115,124,929,728	1,197,739,371
Afrika CR18	1,238,760,219,188	466,746,405
Percentage	59%	39%

Legend

2011

2012

2013

2014

2015

2016

#114
Rank in world GDP (USD)/Capita

3.1. Africa

Africa is the world's second largest and second most populous continent (the first being Asia in both categories). At about 30.3 million km^2 (11.7 million square miles), it covers 20,4% of the earth's total land area. With 1.2 billion people as of 2016, it accounts for 16.6% of the world's human population. It contains 54 fully recognized sovereign states (countries), and 41 different currencies. The CFA Franc is used in 14 countries throughout West and Central Africa[24].

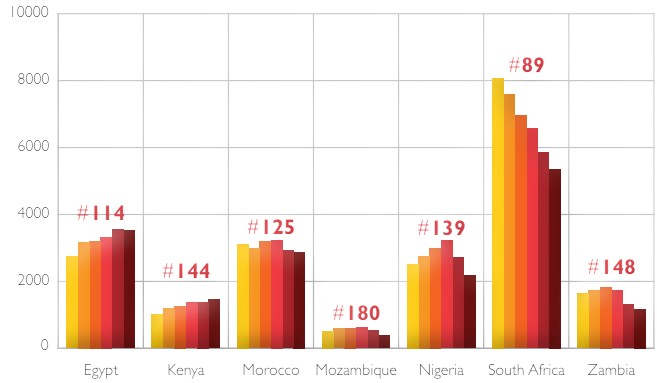
Countries included in this report, in alphabetical order[25]:

- Egypt
- Kenya
- Morocco
- Mozambique
- Nigeria
- South Africa
- Zambia

3.1.1 The Use of Cash

Currency in Circulation rose an average 39.8% in local currency across the reported countries during 2011-2016. This is in line with global growth rates. One notable exception is South Africa where the absolute value of Currency in Circulation (local currency) dropped by 37.6% over the 2012-2016 period. However, this decline is not consistent, as some years (2012, 2014, and to a lesser extent 2016) showed increases. This is also reflected when looking at the ratio of Currency in Circulation versus GDP (local currency).

Figure 17 GDP in USD per capita



- Egypt and Morocco both have relatively high ratios, compared to the 7.8% average in Africa (2015) and 9.6% in the world.
- Egypt, Morocco, South Africa, and Mozambique (up until 2016) showed an upward trend
- Kenya, Nigeria and Zambia showed a decrease in the cash in circulation when pitched against GDP.
- Nigeria (2.0% in 2015) and Zambia (3.0% in 2016) are among the lowest ratios in the world (Sweden and New Zealand score 1.4% and 2.1% respectively).

When looking at the growth in value of ATM withdrawals, the data shows:

- All but one countries report positive growth in the value of ATM withdrawals, with values ranging from 8% (South Africa) to 21% (Egypt).
- Positive growth numbers indicate an increasing need throughout the African continent to obtain cash for transactional purposes.
- Only Mozambique showed a decline in the latest reporting year of 2015.

24 CFA, in this context, stands for Communauté Financière Africaine (African Financial Community) https://en.wikipedia.org/wiki/CFA_franc

25 See Methodology for country selection criteria

Figure 18 Currency in Circulation/GDP (value in local currency)

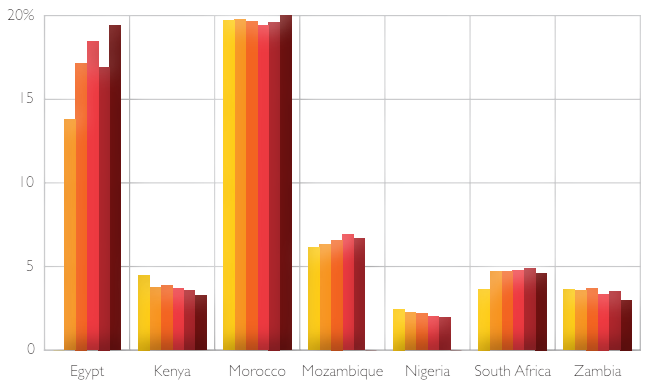


Figure 19 Growth ATM Withdrawals (value in local currency)

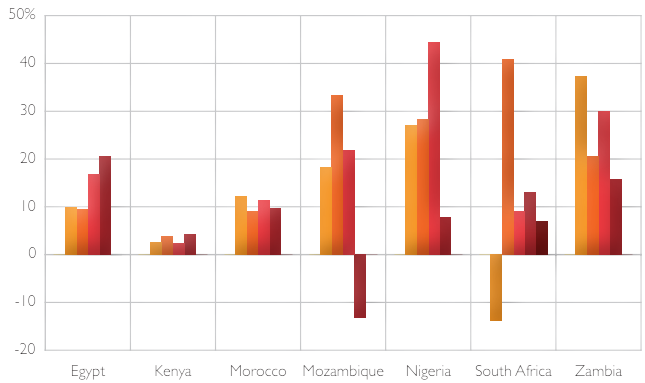


Figure 20 ATMs per 100.000 capita

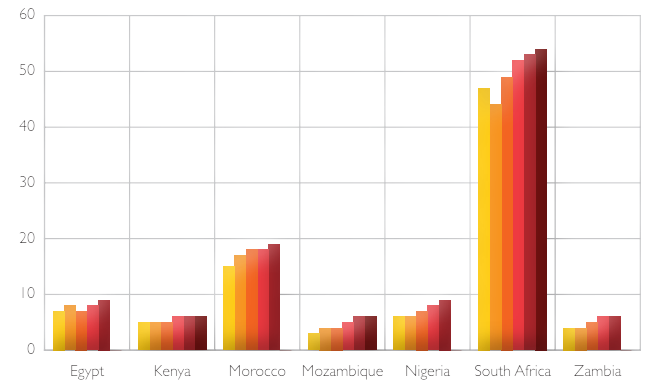
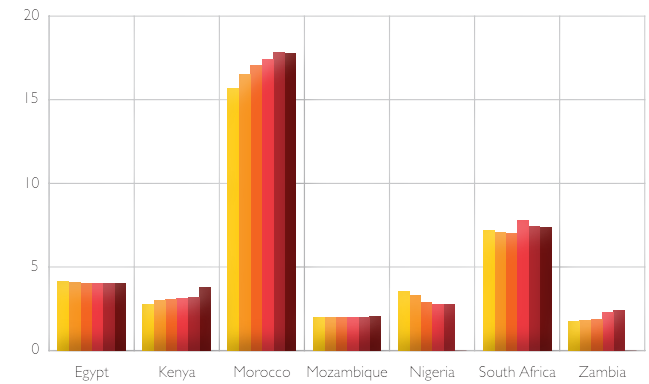


Figure 21 Bank branches per 100.000 capita



Even though Access to Cash via ATMs and bank branches is improving, it is still limited, with most African nations scoring well below global average on both criteria.

- Only South Africa (54) scores above the global average of 40.53 ATMs per 100,000 capita.
- All other countries are well below 10 ATMs per 100,000 inhabitants, with only Morocco (19) exceeding the African average of 16.5 (2015).
- All countries report positive growth with regards to the number of ATMs in their countries.

A similar picture emerges when looking at bank branches, with Morocco and South Africa now switching the top 2 spots.

- Only South Africa (18) scores above the global average of 12.6 bank branches per 100,000 capita.

- All other countries are well below 5 ATMs per 100,000 inhabitants, with only South Africa (7) exceeding the African average of 6.0 (2015).
- Zambia shows strongest relative growth in reporting years (+37.3%), with Kenya (+14.9%) and Morocco (13.6%) also reporting double-digit growth.
- Nigeria (-22.5%) is the only African reporting country that has significantly reduced the number of bank branches available to the general public.

Conclusions on the Use of Cash in Africa

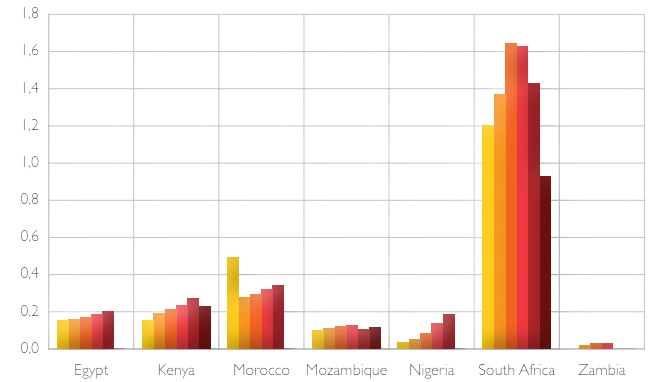
Based on the indicators above, a mixed picture emerges when it comes to the use of cash throughout the studied countries in Africa. Cash in circulation has risen in most countries in absolute values, yet the GDP's of half of the studied countries has risen faster, resulting in a diminished share of cash in circulation in the country's economy.

The value of ATM withdrawals, the most direct measure of the use of cash in day-to-day transactions, is rising in all African countries, while access to cash through bank branches and ATMs is rising with sufficient room for further growth towards global averages.

Electronic payments infrastructure

The traditional electronic payments infrastructure in a retail environment consists of cards and POS terminals. Throughout the world, card transactions are quickly becoming the most common form of electronic payments. In Africa, however a different picture emerges.

Figure 22 Cards per capita



Cards issued

- Cards per capita fall short of the global average of 1.8 card per capita for all African countries reporting on this indicator.
- Most countries showed a positive trend (only Mozambique reported a decline in 2015, against its positive trend from previous years) with significant growth percentages.
- In absolute terms, cards are not in widespread use across the African continent.

POS terminals

The card infrastructure also lags behind at the receiving end, with 40-70 POS terminals for every 100,000 inhabitants in most African countries.

- South Africa is the notable exception, with well over 700 POS terminals in 2016, which is still far below the global average of around 1,500 terminals per 100,000 capita.
- Most countries have reported positive growth over the past five years, with the exception of Nigeria.

Figure 23 POS terminals per 100.000 capita

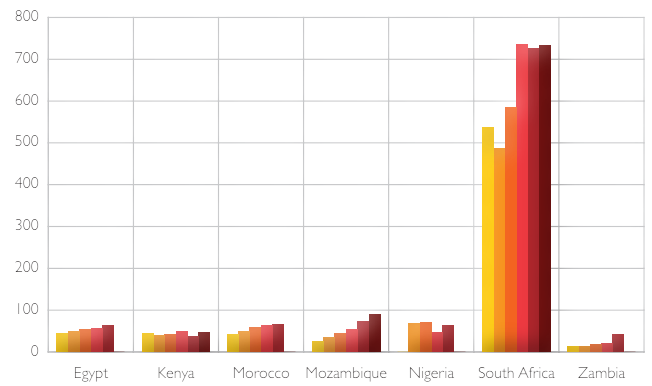
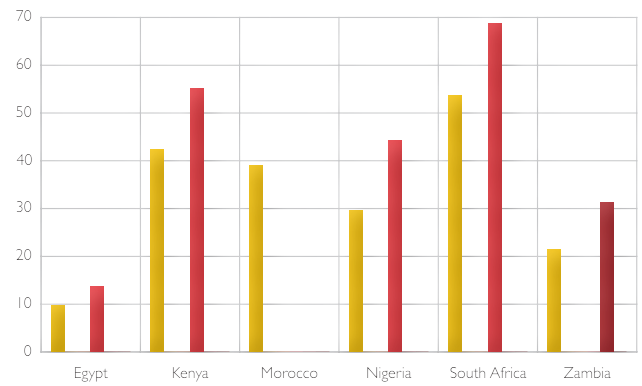


Figure 25 Access to a Bank Account (% of population > age 15)



Legend

2011
2012
2013
2014
2015
2016

Figure 24 Cards transactions per year per capita

Country	Cards per capita
Egypt	0.5
Kenya	4.4
Morocco	0.9
Mozambique	0.7
Nigeria	0.3
South Africa	50.3
Zambia	0.0

The low availability of cards on the one hand and POS terminals on the other translates into very low number of debit and credit card transactions per capita, as the overview below shows[26]:
The world average is 103 card transactions per capita per annum.

Access to a bank account

When looking at the latest data for overall access to the (electronic) banking environment:

Africa[27] is improving but, except for South Africa, still has some ground to cover to reach the average global level of 60.7%.

Internet Access

Another important indicator of social and financial inclusion is the percentage of the population with access to the internet.

- All African countries have shown strong and consistent positive growth rates in recent years.
- Morocco is leading the continent (57%) and, along with South Africa, it is the only country that exceeds the global mark of 50%.
- Mozambique (9%) and Zambia (21%) are trailing this category.

Mobile Phone subscriptions

In stark contrast with the previous comparative data points, the number of mobile phone subscriptions (per 100 capita) in Africa is at the global average.

26 Morocco, South Africa, and Zambia reported only debit card volumes

27 No data for Mozambique, Morocco, and Zambia (2014)

Figure 26 Internet Access (% of population > age 15)

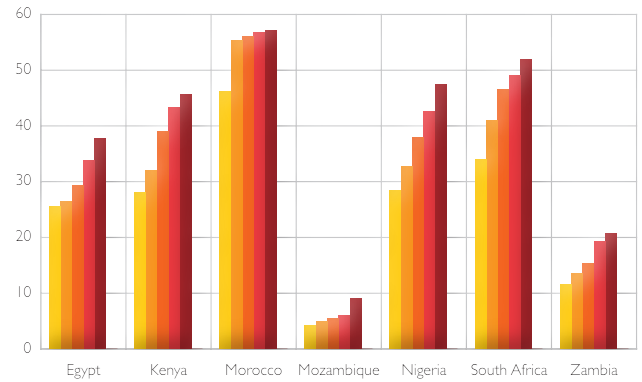
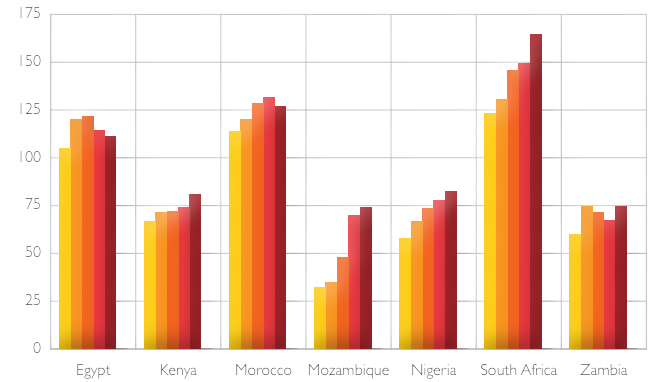


Figure 27 Number of Mobile Phone subscriptions per 100 capita



Legend

2011
2012
2013
2014
2015
2016

- The African average of 102 matches the global average score, indicating that:
  - the gap between African countries and the rest of the world we see in most other categories is not present when it comes to mobile phone subscriptions.
  - Africans have far better access to mobile phones than to 'classic' electronic payment infrastructures such as payment cards, POS terminals, or even bank accounts.
- All countries have shown positive growth in these numbers over the past five reported years.
- Egypt has shown a decline since 2013 (-10%), but with 111 subscriptions per 100 inhabitants (2015), is still above global average and above its 2011 score of 105.
- Morocco saw a slight decline in 2015, breaking with its positive trend from the years before.
- South Africa is leading (165 subscriptions) in Africa and comes in 4th in the world only after Hong Kong (229), the United Arab Emirates (203), and Saudi Arabia (177).

Conclusion on electronic payments and social and financial inclusion in Africa

In general, the conclusion here is that Africa scores below the world averages in the studied categories. The number of cards and the number of POS terminals, as well as access to a bank account, fall far short of other continents around the world. Internet access also leaves much room for improvement throughout Africa. The number of electronic payments conducted by Africans is negligible in African countries reporting these numbers, especially when viewed through the lends of number of card transactions per capita.

The single exception to this general trend is the number of mobile phone subscriptions, which is on par with the rest of the world.

3.1.2 Cost of Cash

To a consumer, the cost of using or getting access to cash differs per country. In most reporting countries, getting money out of an ATM at your own bank or network is free of charge, however

both in South Africa and Zambia, a fee is charged even for withdrawal at your own bank. Egypt does not charge a fee even for a withdrawal outside of one's own network, while Kenya and Nigeria do charge for this service.

3.1.3 Cash Cycle Organisation

As on all other continents, the cash cycle is organized on a domestic level. As the table below shows, most countries in Africa can be classified as centralized, where the NCB plays a significant role in the operational activity of the cash cycle.

3.1.4 Future developments

Cash can be expected to remain a very important means of payment for years to come in Africa. The lack of substantial electronic infrastructure and the high number of 'unbanked' residents in many African countries are the main reasons for this.

At the same time, key stakeholders (primarily the banking community and central governments) are likely to continue attempting to persuade the population to start using bank accounts, thereby increasing the number of 'banked' people throughout Africa. At the same time, investments will continue to further develop the electronic infrastructure and introduce electronic payment methods. As a result, transaction volumes for electronic payments are expected to increase significantly in years to come.

The main driver behind the adoption of electronic payments in Africa is likely to be the mobile phone, as opposed to the more traditional card infrastructures that are more common in other parts of the world.

Figure 28 ATM withdrawals subject to fees

Country	Own Bank/ Network	Other Bank/ATM Network	Number of ATM networks	Market share of largest network
Egypt	No fee	no fee	1	100% 123 shared
Kenya	No fee	Fee, Sh150 - Sh250 (reduced fee)	1	100%, Kenswitch
Morocco	No data	No data	1	100%, CMI (Centre Monétique Interbancaire)
Mozambique	No data	No data	2	80%, Ponto24
Nigeria	No fee	Fee, 65 NGN	1	100%, Interswitch
South Africa	Fee	Fee, 8 - 30 ZAR	1	100%, Bankserv Africa
Zambia	Fee 3,50 - 5ZMV	Fee 9 - 20 ZMV	1	27%, Zamlink

Figure 29 Key cash-cycle components per country

Country	Population	Central Bank Offices	Cash Centers	Bank Branches	ATMs	POSs	CIT Companies	Cash Cycle Model
Egypt	95.688.680	N/A		4,091	8,898	59,200		
Kenya	48.461.570	7		1,829	2,733	22,596		
Morocco	35.276.790	19		6,265	6,700	22,413		
Mozambique	28.829.480	2		568	1,678	25,815	7	Centralised Model
Nigeria	185.989.640	37		5,570	16,186	116,868		
South Africa	55.021.250	7		4,051	29,643	402,670		
Zambia	16.591.390	17	2	458	1,047	6,915	5	Centralised Model

Showcase Africa

Mobile Money Accounts in Africa

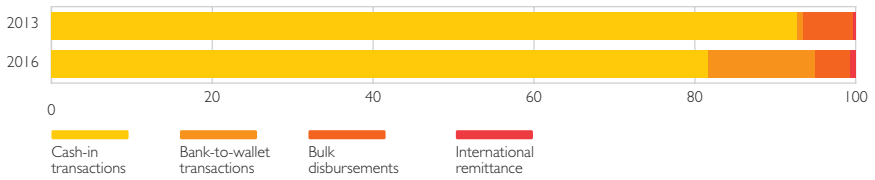
Given the relatively high mobile phone penetration in Africa perhaps it should not come as a surprise that Africa is focusing on the mobile phone as the driver for electronic payment expansion. The following overview from the Worldbank report on financial inclusion points to the high relevance of mobile phones and mobile money accounts throughout the African continent.

Mobile Money is a service whereby customers use their mobile phone to send and receive monetary value – or, more simply put, to transfer money electronically from one person to another using a mobile phone as Mobile Wallet.

Typically, a person with a mobile money account can perform the following functions:

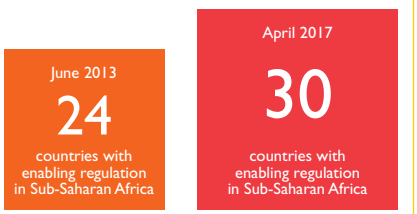
- Cash in: Exchange of physical cash into electronic cash (e-value or e-money). Purchase e-money/e-value by offering cash to the seller.
- Transfer: Movement of the e-value available in one's Mobile Money Account to another Mobile Wallet. In another word, sending e-money to others by SMS.
- Cash out:
  - Exchange of e-value into physical cash.
  - The sales of e-money in exchange for physical cash. It is the withdrawal of physical cash in exchange for e-value.
- Pay bills: Use of the e-money to pay for day-to day services and products e.g. cable TV, utility bills, airline tickets, among others.

Figure 30 Evolution of incoming transactions in Sub-Saharan Africa, 2013 vs. 2016



Source: GSMA

Figure 31



Source: GSMA

One of the main benefits for using these services is that it does not require a bank account and allows users to perform daily financial transactions without the need to carry around cash.

A recent report[28] shows that more than 40% of the adult population is using mobile money on an active basis in seven sub-Saharan countries (Gabon, Ghana, Kenya, Namibia, Tanzania, Uganda, Zimbabwe).

The same report also shows that the value of incoming transactions (Cash in)

28 Source: GSMA report: "The State of Mobile Money in Sub-Saharan Africa 2016" https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/2016-The-State-of-Mobile-Money-in-Sub-Saharan-Africa.pdf The GSMA represents the interests of mobile operators worldwide

has doubled between 2013 and 2016, and that, even though its share has fallen, cash is still the primary means of payment.

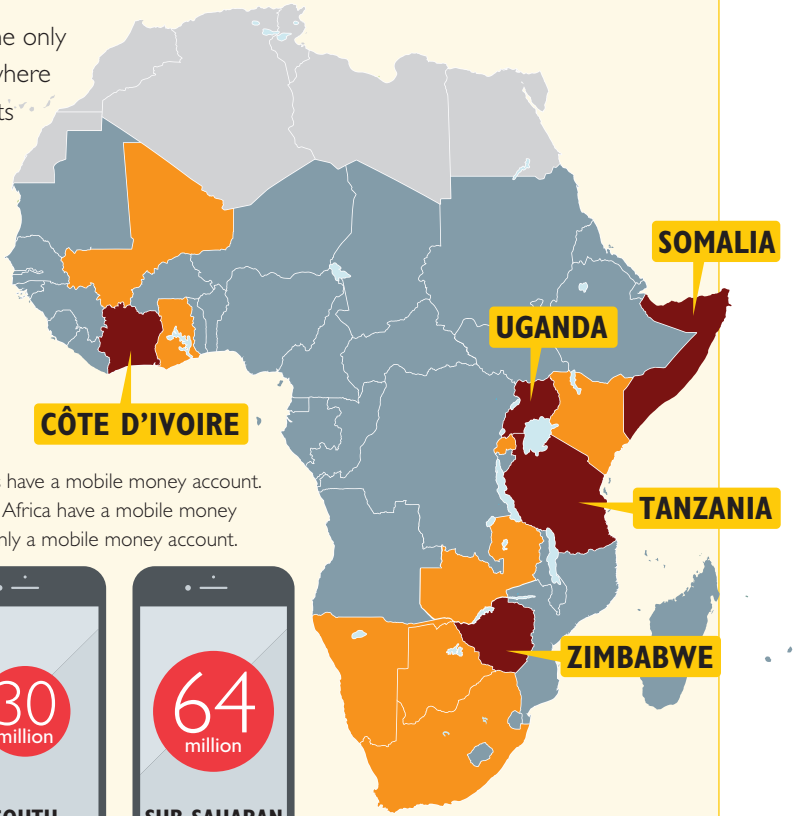
The most well-known and one of the first major mobile money initiatives is M-Pesa in Kenya (launched in 2007), but many more countries have followed since then. Africa is now leading the world when it comes to Mobile Money, as the statistics below demonstrate:

Figure 32

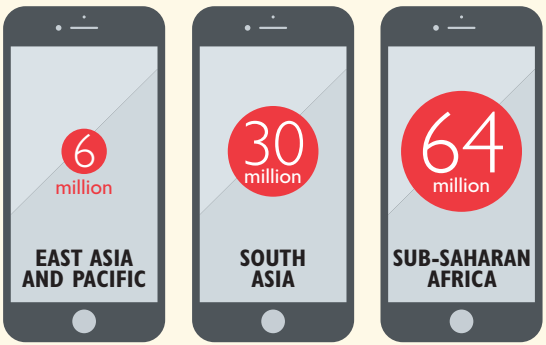
In Sub-Saharan Africa, mobile money account ownership is driving a huge expansion of financial inclusion

Sub-Saharan Africa is the only region with countries where more than 10% of adults have a mobile money account.

In 5 of these 13 countries more adults have a mobile money account than an account at a financial institution.



Worldwide, only 2% of adults have a mobile money account. 12% of adults in Sub-Saharan Africa have a mobile money account. 45% of them have only a mobile money account.



Source: Worldbank - Financial Inclusion Report 2016

ASIA

36%
GDP Share in the World

60%
Population share in the World

30%
of the planet's total landmass

Russian Federation
GDP per capita $8.748
World Rank #64

XXL SIZE 17.1 million km²

Kazakhstan
2.7 million km²

China
GDP per capita $8.123
World Rank #69

9.6 million km²
1.4 billion people

Japan
GDP per capita $38.894
World Rank #23

South Korea
GDP per capita $27.214
World Rank #28

Hong Kong SAR, China
GDP per capita $43.681
World Rank #16

Philippines
GDP per capita $2.951
World Rank #121

Pakistan
193 million people

1.3 billion people

Saudi Arabia
GDP per capita $20.029
World Rank #36

India
GDP per capita $1.709
World Rank #138

United Arab Emirates
GDP per capita $37.622
World Rank #24

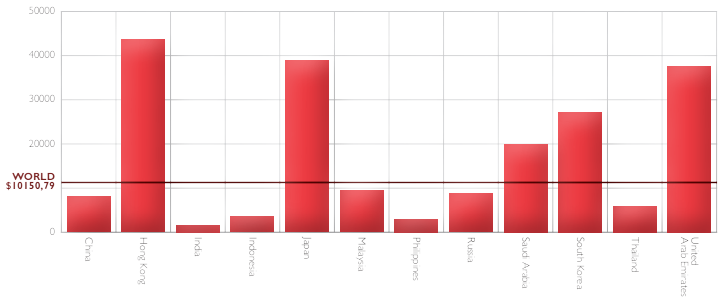
Thailand
GDP per capita $5.908
World Rank #85

9.6 million km²
259 million people

Indonesia
GDP per capita $3.570
World Rank #113

Malaysia
GDP per capita $9.503
World Rank #61

GDP in USD/Capita 2016



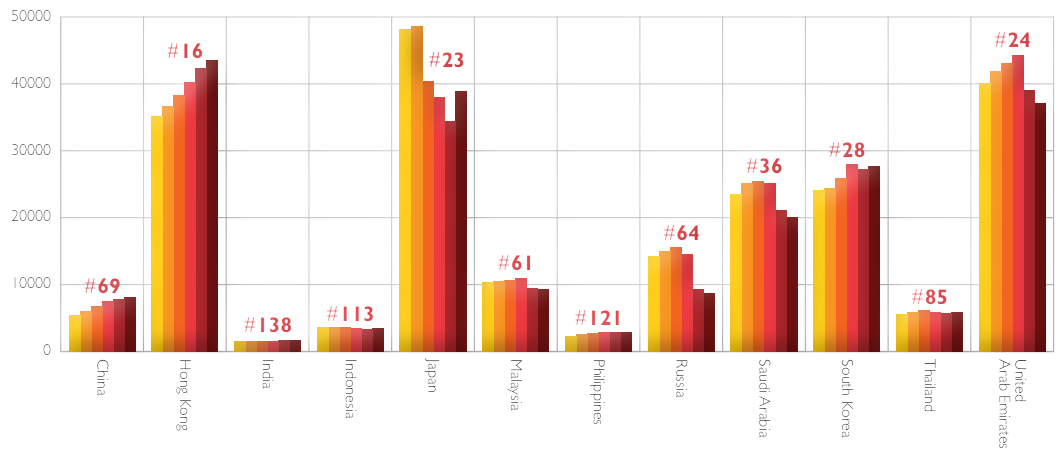
	GDP	Population
Azië	26.774.369.244.291	4.330.679.695
Azië CR18	24.352.916.788.208	3.538.797.424
Percentage	91%	82%

Legend

2011
2012
2013
2014
2015
2016

#114
Rank in world GDP (USD)/Capita

Figure 33 GDP in USD per capita



3.2 Asia

Asia is the world's largest and most populous continent.

Asia's total size is well over 44.5 million square kilometres, equalling 30% of the planet's total landmass. The largest countries in Asia include Russia (17.1 million square kilometres), China (9.6 million square kilometres), India (3.3 million square kilometres), and Kazakhstan (2.7 million square kilometres).

With a population of roughly 4.4 billion, i.e. 62% of the global population, Asia is also by far the most populous continent on the planet. The most populous countries in Asia are China (1.4 billion people), India (1.3 billion people), Indonesia (259 million people), and Pakistan (193 million people).

Though most of its continental borders are clearly defined, there are grey areas. Russia and Turkey[29] are sometimes referred to as part of Europe, whereas Indonesia and parts of the Philippines are sometimes categorized as part of Oceania.

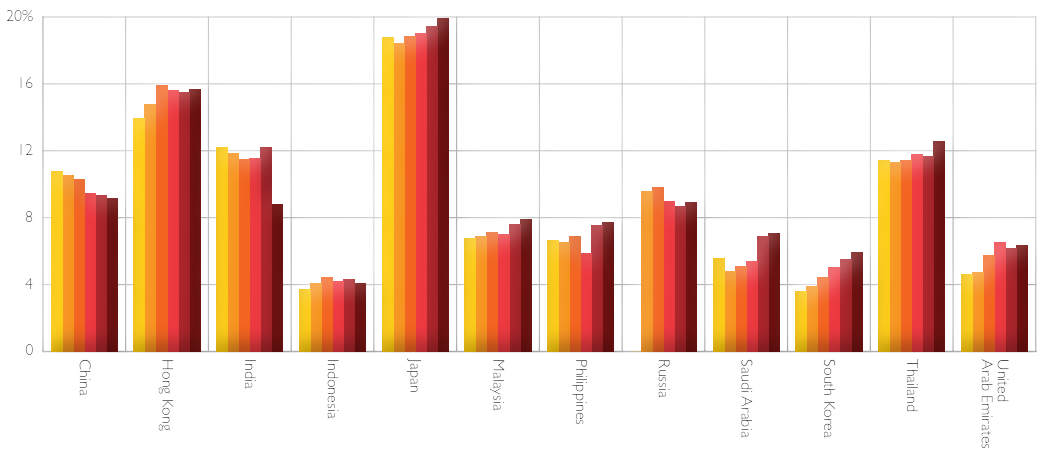
The following countries have been included to represent Asia[30] in this report, in alphabetical order:

- China
- Hong Kong
- India
- Indonesia
- Japan
- Republic of Korea
- Malaysia
- Philippines
- Russian Federation
- Saudi Arabia
- Thailand
- United Arab Emirates

29 For the purpose of this report, Russia has been included in Asia and Turkey has been included in Europe

30 See Methodology for country selection criteria

Figure 34 Currency in Circulation/GDP (value in local currency)



3.2.1 Cash Usage

The amount of Currency in Circulation (CiC, local currencies) is on the rise in all countries in Asia in absolute terms, with an increase of 45.6% over the past 5 years, or 9.1% on average per annum.

However, when measured against local GDP, a different picture emerges, as figure 34 demonstrates.

Main observations are:

For most larger countries in Asia (in terms of population and GDP) the ratios show a declining trend, these countries are:

- China
- Hong Kong (since 2014)
- India (in 2016[31])
- Indonesia (since 2016)
- Russia (since 2014, yet in 2016 the ratio increased again)

Overall, the ratios are like other regions in the world, mostly ranging between 5 and 10%.

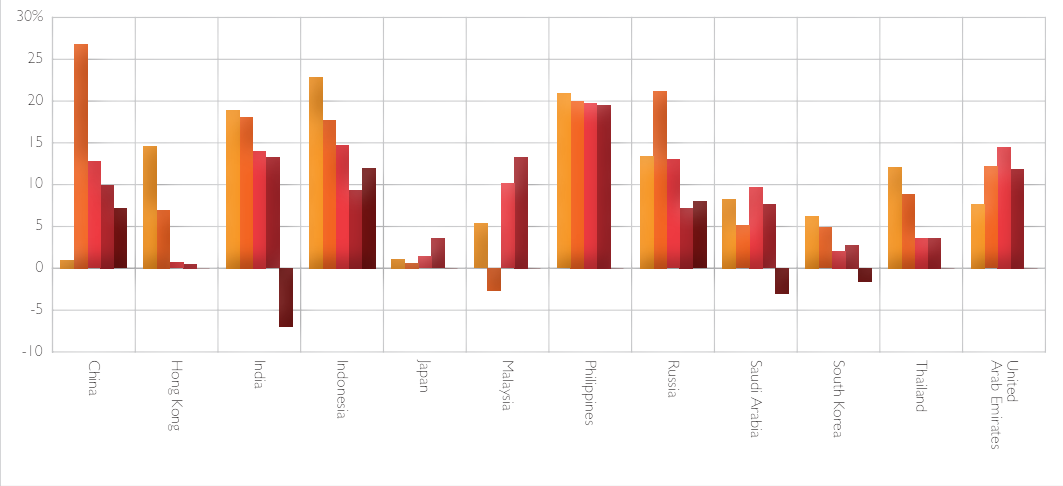
Hong Kong (>15%), Japan (>20%) and Thailand (>10%) show somewhat higher ratios.

These figures indicate a substantial demand for cash in Asia, even though this demand seems to be decreasing in key Asian markets. This initial assessment is underpinned, when looking at the value of ATM withdrawals, as the second important indicator of cash usage in a country. This has grown significantly in most countries, as shown in figure 35.

- Most countries in Asia have shown moderate (0-10%) to strong (>10%) growth in the value of ATM withdrawals over the past 5 years.

31 most likely primarily due to the demonetisation of 86% of Indian cash notes in Q4-2016, see Showcase India on page 54|55)

Figure 35 Growth ATM Withdrawals (value in local currency)



- Only India, Saudi Arabia, and South Korea have shown a decline, and only in the final reporting year, 2016.
- Overall in Asia, these growth percentages indicate a clear demand for cash as a means of transaction throughout the continent.
- While these growth numbers are still positive, the growth is slowing down almost in all reporting countries in Asia.

Access to cash is defined by the number of ATMs and the number of Bank Branches available to the public. In line with global trends, the number of ATMs is on the rise while the number of bank branches is falling throughout Asia.

Number of ATMs – main conclusions

- The number of ATMs in Asia is increasing, with the highest growth in China, Indonesia, and Thailand.
- Most countries have experienced growth over the past 5 years, with only South Korea (and Russia since 2015) consistently reducing the number of ATMs. Both Russia and South Korea have a very high number of ATMs per capita, which may explain the need for reduction of ATMs.

Number of Bank Branches – main conclusions

Data for the number of bank branches throughout Asia is insufficient to allow for a validated overall assessment of growth for the continent. However, when considering countries, a number of conclusions can be drawn:

- Russia, South Korea, and Saudi Arabia have a relatively high number of bank branches. Most countries have shown a decline in the number of bank branches per capita (2012-2016), with strongest declines in Russia (-11.1%), Japan (-8.4%), and South Korea (-7,6%).

Figure 36 ATMs per 100.000 capita

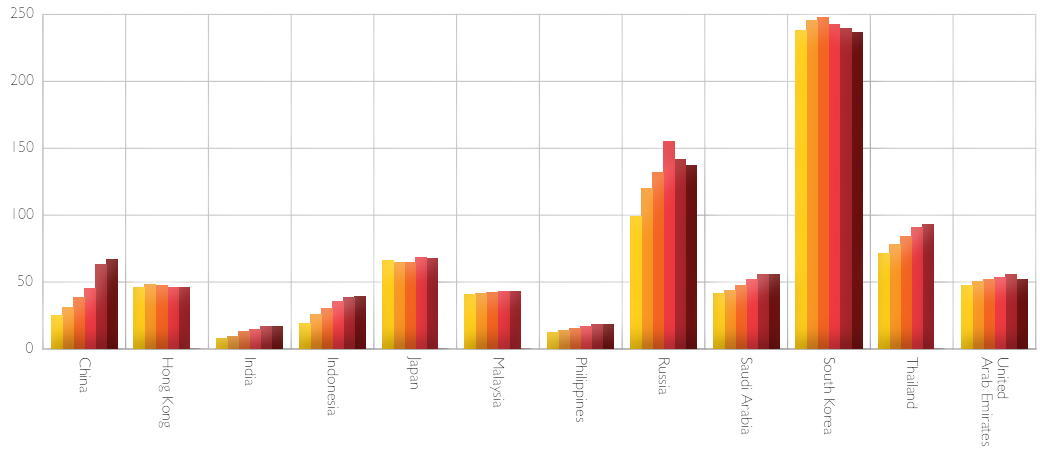
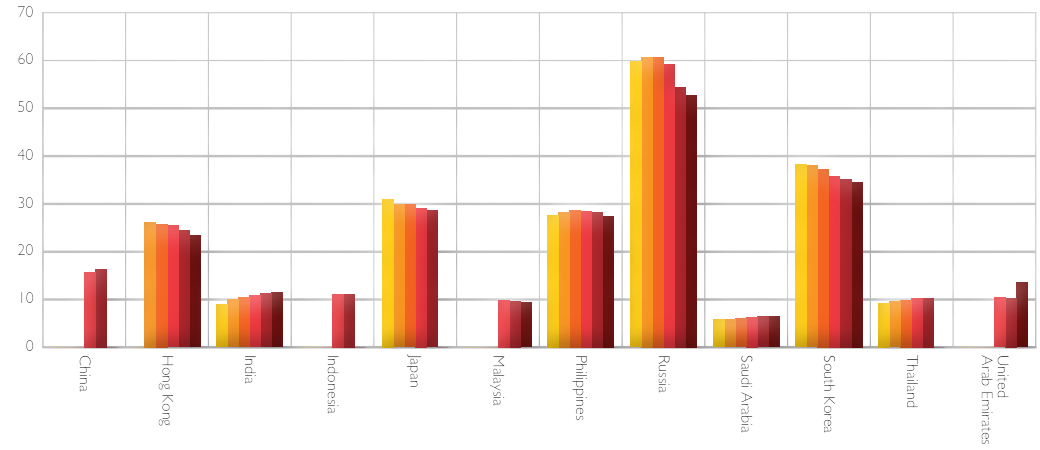


Figure 37 Bank branches per 100.000 capita



- India (+21.7%) shows the strongest increase in the number of bank branches per capita, yet 11.4 branches per 100,000 capita in 2016 is still relatively low.
- Saudi Arabia significantly increased its number of bank branches per capita in 2016 (+35.1% compared to 2015, to a total of 1,273 branches per 100,000 capita).

Even though cash transaction volumes are unavailable for most countries, the high use of cash in the region is further evidenced by research conducted by a number of payment service providers in the ecommerce industry, such as Adyen[32] and Payfort[33], which cite remarkably high percentages of online purchases being paid with Cash on Delivery.

Payfort compares cash with credit card usage for online purchases (State of Payments in the Arab world, 2014).

Given that these already high percentages occur in an ecommerce (remote) environment, it is most likely these percentages would be even higher in an offline (face-to-face) environment, where cash payments are generally regarded as more suitable.

32 Source: https://www.adyen.com/knowledge-hub/country-guides/southeast-asia-payments-guide

33 Source: State of Payments in the Arab world 2016, https://www.payfort.com/stateofpayments2016/

Figure 38 Cash usage for online purchases

Country	Cash on Delivery	Credit Card
United Arab Emirates	78%	22%
Saudi Arabia	76%	24%
Egypt	80%	20%
Kuwait	79%	21%

Adyen concludes:
"Even as ecommerce is on a growth path in Southeast Asia, the payments market is hardly homogeneous, as the vast majority of payments are still conducted offline and in cash.
In developing markets such as Indonesia and Thailand, shoppers still mainly pay by cash, and due to a perceived lack of security online, even shoppers who have cards are more reluctant to give out their card information when compared to the global average."

Looking at the alternatives for cash

Cards Issuance

Conclusions can be drawn from these statistics:

- With only a few exceptions, card issuance in Asia lags behind when compared to the global average of 1.6 cards per inhabitant.
- The exceptions are China with 4.4, South Korea with 5.1 and, to a lesser extent, the United Arab Emirates, with 2.0 cards per inhabitant.
- Cards per inhabitant have been increasing in almost Asian countries at double-digit growth rates over the past 5 years. China (+69.3%), India (136.3%) and Indonesia (56.7%) experienced the strongest growth.

POS-terminals

Main observations are:

- With an average of 750 POS terminals per 100,000 inhabitants, Asia is trailing the global average of 1,500.
- China (1,774 in 2016) and UAE (1,548) are the only two countries that exceed the global average.

Legend

2011
2012
2013
2014
2015
2016

Figure 39 Cards per capita

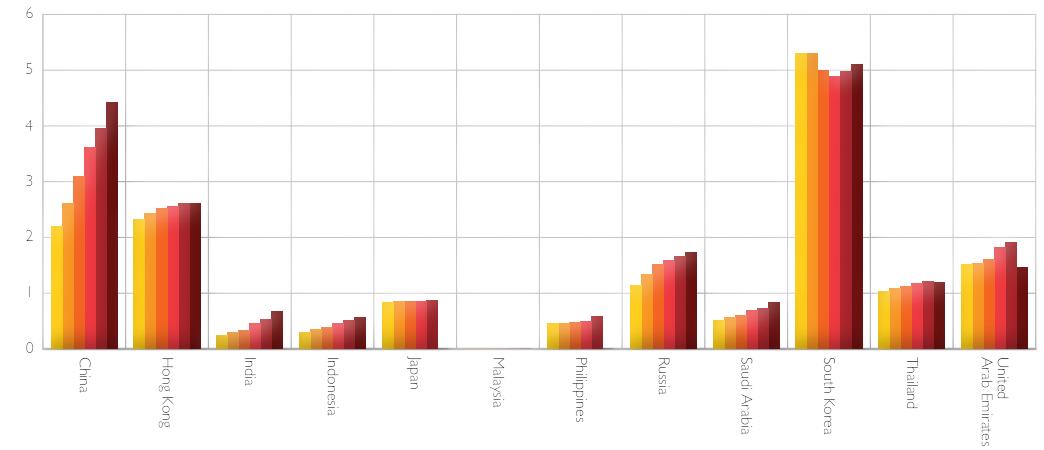


Figure 40 POS terminals per 100.000 capita

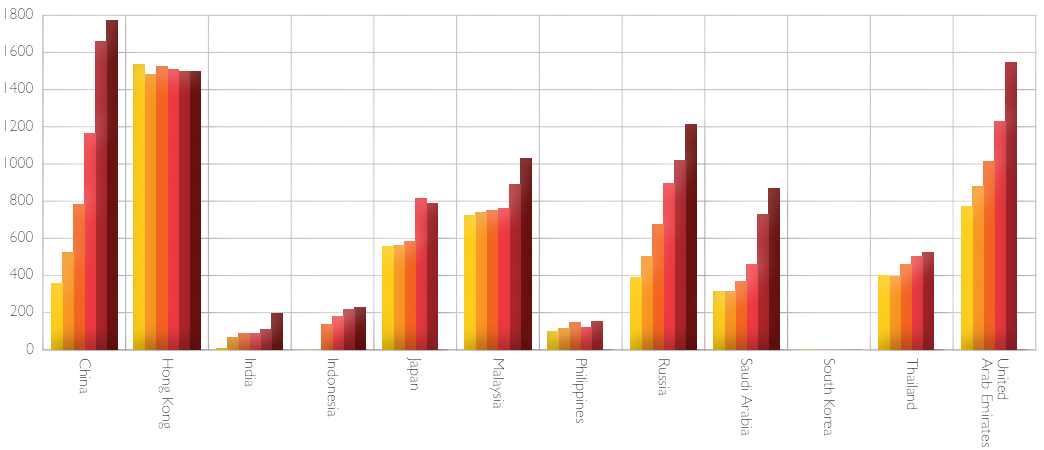
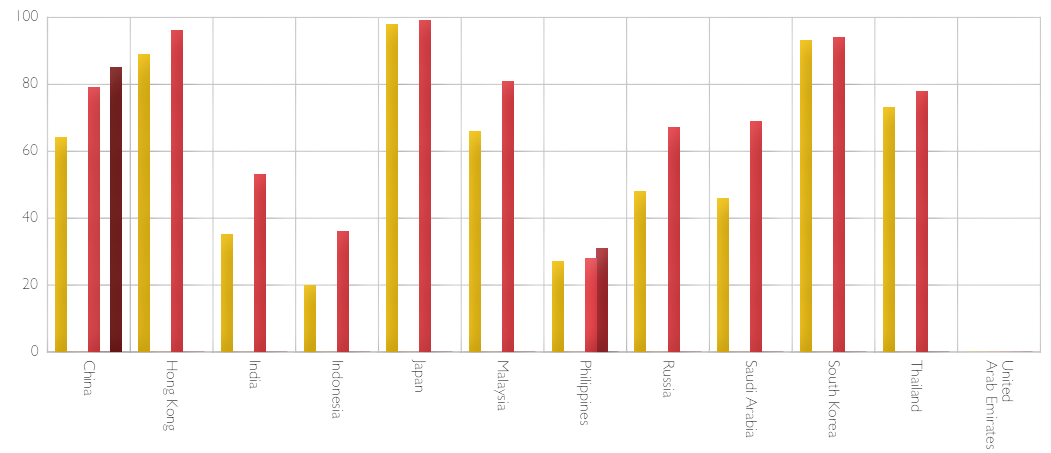


Figure 41 Access to bankaccount



- All reporting countries in Asia have shown strong growth in the availability of POS terminals over the past 5 years, with 4 countries more than doubling their POS total: China (+236.7%), India (+180.2%), Russia (+141.8%), Saudi Arabia (+174.1%).

Access to bankaccount

- The most recent data (2014) shows that Asia (with 72%) is just above the global average of 69% when it comes to inhabitants (>age 15) having access to a bank account.
- Leading countries in Asia are Japan (99%), Hong Kong (96%), and South Korea (94%)
- All countries have shown growth in this category.

Internet Access

- With 62% Asia matches the global average (61%) for internet access.
- UAE (91%), South Korea (90%), and Japan (88%) are the leading countries, with India (26%) and Indonesia (22%) at the tail end of the continent.
- These two countries do show the strongest 5-year growth, with 158% and 79% respectively.

Mobile phone subscriptions

- With 143 mobile phone subscriptions per 100 inhabitants, Asia scores well above the global average of 117.
- Hong Kong (229), the United Arab Emirates (203), and Saudi Arabia (177) are the leading countries in Asia and the world.
- Almost all countries have shown strong growth, with Thailand (+31.3%), Indonesia (+29.2%), and China (+27.9%) as the fastest growers over the past 5 years.
- Only in Saudi Arabia the number of phone subscriptions has been consistently declining, yet their total remains among the highest in the region and the world.

Figure 42 Internet Access (% of population >15yr, Asia)

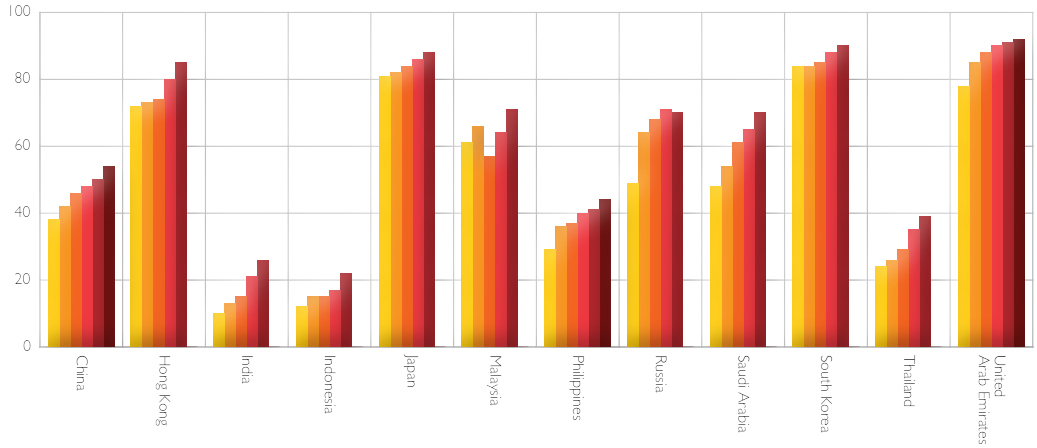
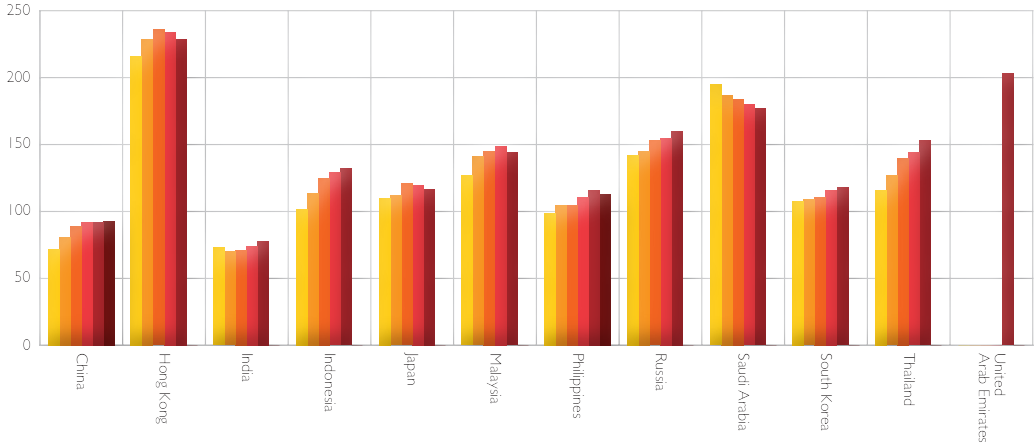


Figure 43 Number of Mobile Phone subscriptions per 100 capita (Asia)



3.2.2 Cost of Cash

In addition to the overarching discussion of infrastructure cost of cash on an economy or society, the cost of cash to consumers largely follows a similar pattern throughout Asia. This cost is mostly related to obtaining cash (through an ATM withdrawal), rather than a transaction fee when a payment with cash is made. Also some banks do not charge a withdrawal fee, yet include this service in the overall fee for 'basic banking services'.

ATM usage fees are the fees that many banks and interbank networks charge for the use of their automated teller machines (ATMs). In some cases, these fees are assessed solely for non-members of the bank; in other cases, they apply to all users. Two types of consumer charges exist: the surcharge and the foreign fee.

The surcharge fee may be imposed by the ATM owner and will be charged to the consumer using the machine. The foreign fee or transaction fee is a fee charged by the card issuer (financial institution, stored value provider) to the consumer for conducting a transaction outside of their network of machines in the case of a financial institution.

ATM withdrawal at own bank or ATM-network

In almost all countries ATM withdrawals are free for all customers when withdrawing funds from their own banks' ATMs.

ATM withdrawals at another bank or ATM-network

Depending on network-sharing and commercial arrangements between banks within countries, withdrawing cash from ATMs from another (not your own) bank, can be subject to a fee.

Figure 44 ATM withdrawals subject to fees

Country	Own Bank/Network	Other Bank/ATM Network
China	No fee	No fee
Hong Kong	No fee	Fee between HKD$ 15-30
India	Fee, after 3 withdrawals p/mth; INR20	No data
Indonesia	No fee	Fee
Japan	No fee	No data
Malaysia	Fee, after 8 withdrawals p/mth RM 0,53-1,06	Fee, RM 1,06
Philippines	No fee	No data
Russia	No fee	No data
Saudi Arabia	No fee	Fee, ranging SAR 10-30
South Korea	No fee	No data
Thailand	Fee, after 4 withdrawals p/mth	Fee, up to THB10-20
United Arab Emirates	No fee	Fee, up to AED 2

The following overview shows whether or not ATM withdrawals are subject to fees across Asian countries. If specific information regarding the amount or percentage of the fee is available, this figure is included.

3.2.3 Cash Cycle Organization

Cash cycles can be characterized as country by country organizations with most countries in Asia following a centralized model, in which the Central Bank plays a significant role. The NCB plays a pivotal role in the cash distribution cycle at national level, acting - through its branch network - as the primary warehouse, distribution center and processor of cash.

A number of countries have identified the potential for further optimizing the cash cycle by actively developing towards a delegated model.

The overview in figure 45 gives insight into the key cash-cycle components of each of the Asian countries included in this report.

3.2.4 Future developments

Overall the Asian Market is rapidly developing its electronic payment capabilities and, as a consequence, is strongly reducing its dependency on cash. It is expected that this trend will continue with some countries:

1. Expanding their electronic payments infrastructure, through increased roll out of cards, POS terminals and other electronic payment methods
2. Optimizing their electronic payments infrastructure
3. Improving social & financial inclusion rates, including the number of bank accounts, internet access, electronic (internet and or mobile) banking, mobile phone subscriptions
4. Optimizing their cash infrastructure to improve cost efficiency
5. Starting projects to reduce the use of cash (such as the Coinless project in South Korea, or the Cashless project in India)

Furthermore, it is expected that the development of e- and m-commerce in combination with increased relevance of social media and e-tail platforms (such as WeChat, Alibaba, Sooq, etc), will strongly influence the way Asians will pay in future years.

Figure 45 Key cash-cycle components per country

Country	Population	Central Bank Offices	Cash Centers	Bank Branches	ATMs	POSs	CIT Companies	Cash Cycle Model
China	1.382.710.000	2.099	1 central (100+ distributed)	224.600	924.176	24.535.000	>30	Centralised Model
Hong Kong	7.374.900	-	8	1.484	3.348		5	Centralised Model
India	1.299.000.000	20		148.649	222.318	2.529.141		
Indonesia	261.115.456	37	161	28.808	103.419	602.460	98	Centralised Model
Japan	127.000.000	33		53.845	199.564	998.800		
Malaysia	31.700.000	5	6	2.980	13.340	326.507	12	Delegation Model
Philippines	103.320.222	22	no data	28.392	18.165	1.898	5	Transfer Model
Russia	146.675.000	239		77.350	201.396	1.777.996		
Saudi Arabia	31.787.850	10	134	20.380	17.800	276.167	7	Centralised Model
South Korea	50.801.410	17		17.572	122.610			
Thailand	68.414.135	5		9.903	62.691	357.986		
United Arab Emirates	9.404.500	5	9	1.273	4.870	141.792	5; with 2 covering 98%	Delegation Model

Showcase India

Demonetization of 500- and 1000-rupee notes

On 8 November 2016, as part of the Indian government's larger digitalisation program[34], the Reserve Bank of India announced the withdrawal of Legal Tender Character for existing 500- and 1000-rupee (INR) bank notes per November 9, 2016 (also known as demonetisation)[35]. The objectives behind this drastic and unprecedented move were:

- Reducing the number, and amount, of counterfeit notes in the country.
- Reducing the amount of "black-market money" in the country.
- A push towards the use of electronic payments.

With restrictions in volume and value, these notes could be exchanged for new series of Bank Notes (Mahatma Ghandi series) or deposited into a bank account (no restrictions in volume or value) until December 31, 2016. This money could later be withdrawn, though there were restrictions on the amount of money that could be withdrawn immediately.

This represented roughly 86% of the value of notes circulating in India's economy. Needless to say, this caused quite a shock throughout India, with people standing in line for hours to get their cash from ATMs or bank branches.

As a result, during this short span, the Reserve Bank pumped in 23.8 billion bank notes into circulation, aggregating 5.540 billion INR in value[36].

The pace of re-monetisation continued ceaselessly thereafter. The notes in circulation (NiC) as of 31 March 2017 increased by nearly 74% of the prevailing NiC on 4 November 2016. The value of bank notes in circulation declined by 20.2 % over the year to 13.102 billion INR as of late March 2017. The volume of banknotes, however, increased by 11.1 %, mainly due to higher infusion of bank notes in lower denominations in circulation following the demonetisation.

The key question is, of course, was this drastic move a success or not? The jury is still out on that, and opinions vary widely. One year later, the first, more formal observations are:

- The number of counterfeit notes detected has increased significantly in the last year, especially for the 500 and 1,000 INR notes, shown in figure 14. Given the enormous number of notes (23.8 billion) being demonetised, this increase is negligible.
- Reducing the amount of "black money" in circulation. India's central bank reported that almost 99% of

34 For more information, visit: http://digitalindia.gov.in and http://cashlessindia.gov.in

35 https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=10684&Mode=0

36 Source: RBI Annual Report 2016-2017; VIII. Currency Management, p124 https://rbi.org.in/SCRIPTS/AnnualReportPublications.aspx?Id=1208

Figure 46 Denomination-wise counterfeit notes

Denomination	2014-2015	2015-2016	2016-2017
1	2	3	4
2 and 5	0	2	80
10	268	134	523
20	106	96	324
50	7,160	6,453	9,222
100	181,799	221,447	177,195
500 (MG Series)	273,923	261,695	317,567
500 (New Design)	0	0	199
1,000	131,190	143,099	256,324
2,000	0	0	638
Total	594,446	632,926	762,072

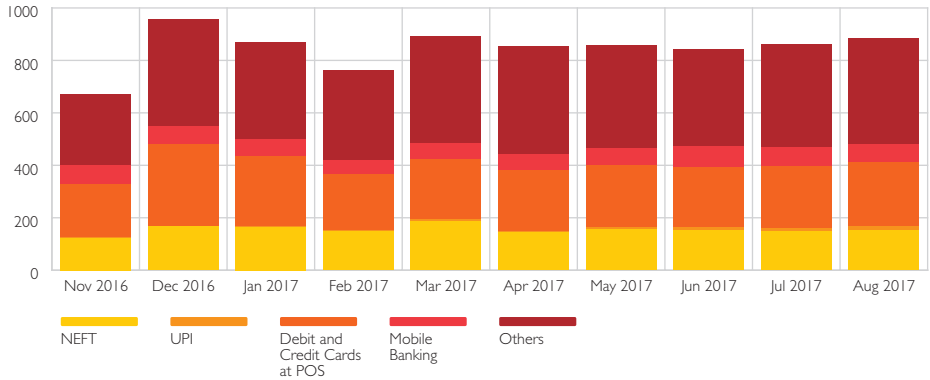
Source: RBI Annual Report 2016-2017

the estimated 15.28 trillion rupees ($239 billion) taken out of circulation by demonetisation, had been returned to the banking system. Hence, almost all the "black-market money" made it back into the banks and wasn't really destroyed as desired.

- Stimulating electronic payments.

According to data from the RBI, while digital transactions did spike post-demonetisation (when consumers had few alternatives), they have dropped below peak levels in both volume and value since. Growth in digital transactions has slowed further in the months since demonetisation. The number of transactions declined 8% from the peak in December 2016. There has only been a marginal rise of 2.2% compared to July 2016, the Reserve Bank of India's data showed. Except for the Unified Payments Interface[37], all other digital payment forms have declined[38].

Figure 47 Electronic retail payment volumes Nov 2016 – Aug 2017, RBI Data

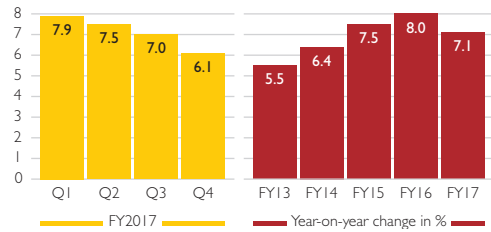


Source: RBI Data

Arguably most importantly, India was one of the fastest growing economies in the world. It witnessed a dramatic drop in its GDP growth rate, falling to 6.1% annualized in January–March 2017, after three quarters with the annualized growth rate staying in the range of 7% to 7.9%. Its most recent GDP growth figure has fallen to 5.7. This can be partly attributed to the policy move from last November.

Additionally, key sectors of India's large cash economy were badly hit by the policy[39]. Important sectors such as real estate and agriculture have taken the biggest hits. The real long-term effects of this unprecedented event are only just starting to show.

Figure 48 GDP growth rate



37 A payment system that facilitates instant fund transfers between bank accounts on mobile platforms

38 Source: https://hbr.org/2017/11/one-year-after-india-killed-off-cash-heres-what-other-countries-should-learn-from-it

39 Source: RBI annual report 2016-2017

Showcase China

WeChat Pay, AliPay, QR-codes & Mobile Wallets

China is still very much reliant on cash. Nevertheless, in the payments industry, the country is mostly known for its innovations in electronic and mobile commerce, social media, and accompanying digital payment methods. Examples are AliPay (the spinoff company of ecommerce giant Alibaba) and Tencent company WeChat Pay, a spinoff of the tremendously popular social media platform WeChat. Both companies have expanded their market outside of China in recent years. Alipay opened in Europe in 2015 and WeChat Pay followed in 2016, initially only targeting and servicing Chinese users abroad.

QR codes (short for "quick response") are at the heart of the country's digital payments boom. In the U.S. and Europe, QR codes never really took off[40]. But in China, QR codes are everywhere, used by major retailers, street markets and even beggars and buskers[41].

People can use them to pay in a store by scanning a product's QR-code or showing their personal code to the cashier. The money is deducted from mobile wallets that are usually linked to regular bank accounts.

If headlines are to be believed, this calls for a quick response of our own, concluding that China is getting rid of all cash and is quickly becoming a cashless society.

What is the impact of these payment methodologies on the use of cash as a means of transaction?

Since 2012, Cash in Circulation in China has increased by 7% per annum.

Figure 49 Number of monthly active Facebook users worldwide as of 4th quarter 2017 (in millions)

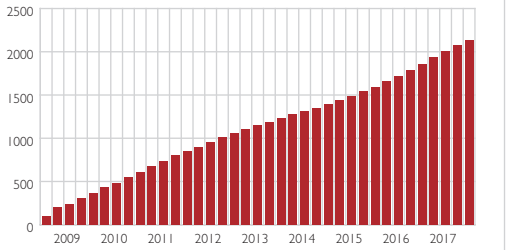


Figure 50 Number of monthly active WeChat users from 2nd quarter 2010 to 2nd quarter 2017 (in millions)

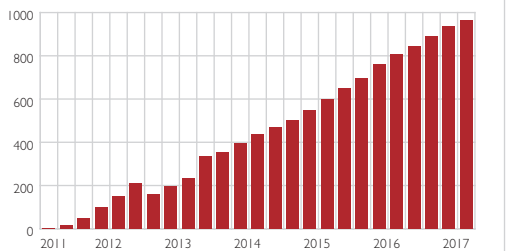
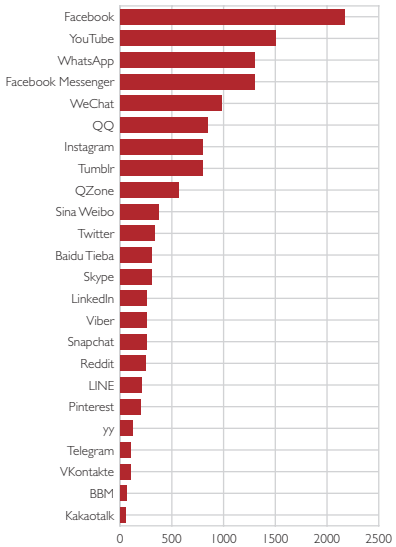


Figure 51 Most popular social networks worldwide as of January 2018, ranked by number of active users (in millions)



40 There are a variety of reasons for this, the most important being that major Western mobile and social media companies (e.g. Apple, Facebook) have not embraced QR codes from the start. Responding to the codes' popularity in China, Apple has updated the camera app in iOS 11, the latest version of its mobile operating system.

41 Source: http://money.cnn.com/2017/09/08/technology/china-qr-codes/index.html

Furthermore, the value of ATM withdrawals increased by almost 69% between 2012 and 2016. Both indicate a demand for cash in the country.

Cash in Circulation per the country's GDP decreased by 13% over the same period. Growth rates in the value of ATM withdrawals are declining rapidly (from 26.8% in peak year 2013 to 7.2% in 2016). Simultaneously, electronic payment volumes have skyrocketed. Credit transfers (+460%) and POS-transactions (+325%) in particular experienced tremendous growth in 2012-2016.

Key conclusion: Cash is still important and growing in absolute numbers, but its relevance is diminishing quickly, given the enormous boom in electronic payments driven by mobile wallet solutions such as AliPay and WeChat Pay.

China's Cashless society

Even though representatives of both companies are quick to acknowledge that a totally cashless China is unlikely soon, they are promoting the concept through "Cashless week" (first week of August, AliPay), "Cashless Day" (August 8th, WeChat Pay) and "Cashless Month" (August, WeChat Pay). Furthermore, recent research shows (among other key findings) that:

- 52% of Chinese use cash for only 20% or less of their monthly consumption.
- 74% of people stated that they could live for more than a month with only 100 RMB in cash.
- 84% people reported that they could accept a totally cashless life.

Figure 52 How long can you survive with less than 100 RMB in cash?

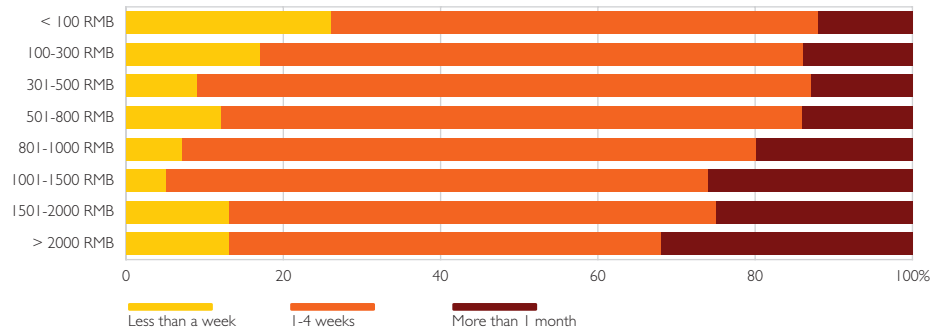


Figure 53 52% of Chinese use cash for only 20% or less of their monthly consumption

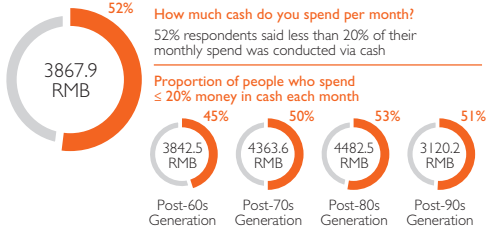
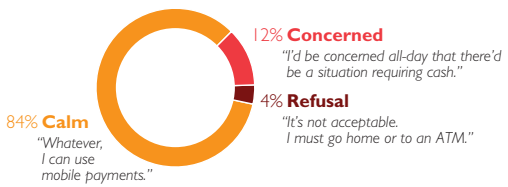


Figure 54 How do you feel if you don't carry any cash?

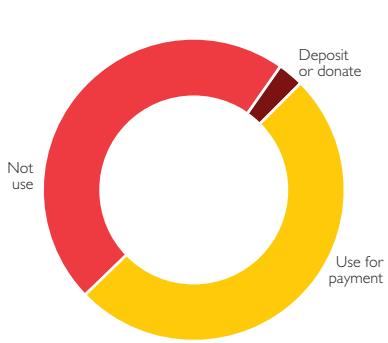


Source: Images from 2017 Mobile Payment Usage in China Report
https://www.slideshare.net/ChinaTechInsights/2017-mobile-payment-usage-in-china

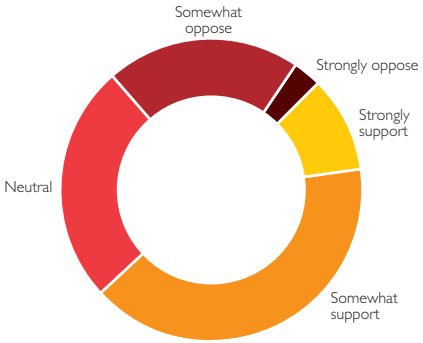
Showcase South Korea

Coinless society

Figure 55



Use of coins received after cash payment



Opinions on coinless society policy

As part of its 'Payment System Policy Roadmap - Vision 2020'[42] and after public consultation, the Bank of Korea (BOK) started a project to decrease the circulation of coins and pursue a "Coinless Society".

The key rationale behind the project is to ease the inconvenience of using and carrying coins and to reduce the social costs incurred in their circulation and management.

The plan will be carried forward in a way that decreases the circulation of coins by effectively utilizing existing digital payment infrastructure. However, it does not aim to eliminate coins completely, the goal is instead a less-coin society.

In April 2017, a pilot program was started, and based on the results, the project will expand its service territory during 2018-2020 by both attracting more service providers and diversifying the mechanisms for returning change. Four companies were added to the pilot program in September 2017 alone. The four new companies include GS25, a South Korean convenience store chain, and three other prepaid card operators. Existing partners in the project include CU, a major South Korean convenience store chain, Seven Eleven, E-Mart, the country's largest discount store outlet by sales, Lotte Mart, and Lotte Department Store[43].

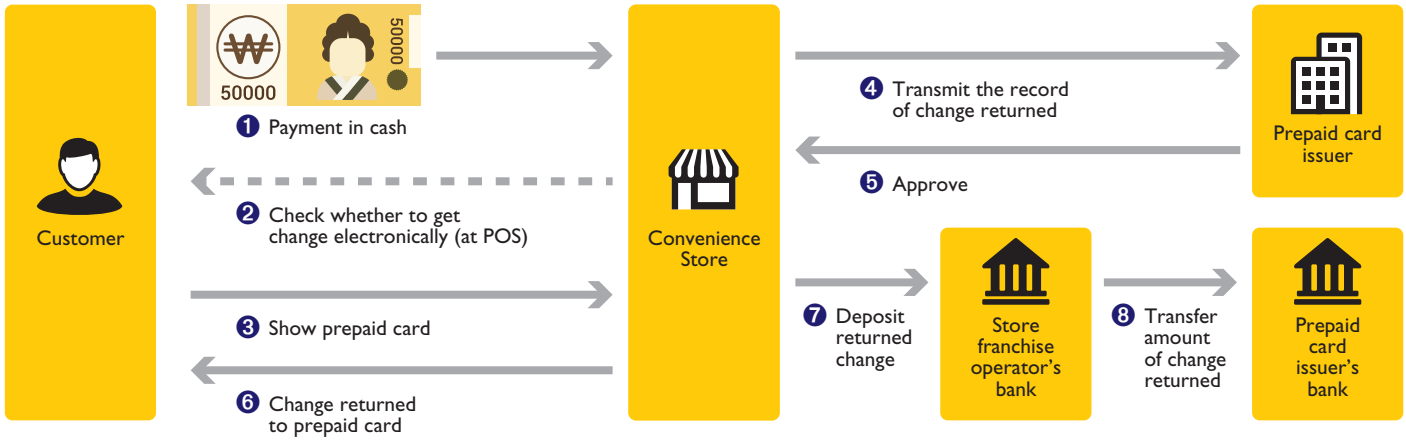
By promoting the pilot program, the BOK will raise consumer awareness of its benefits, thereby encouraging them to ask their change value to be deposited to prepaid cards instead of physical coins. In parallel, a business environment will be pursued in collaboration with relevant industries so as to create an incentive for them to develop and provide new types of services for returning change to consumers electronically (such as direct deposit of change to consumers' bank accounts or accrual their mobile or reward points etc.).

Schematically, it could look like this (from BOK, December 2016, Action Plan for Coinless Society, p3):

42 Source: http://www.bok.or.kr/contents/total/eng/boardView.action?menuNavId=654&boardBean.brdid=18543&boardBean.menuid=654

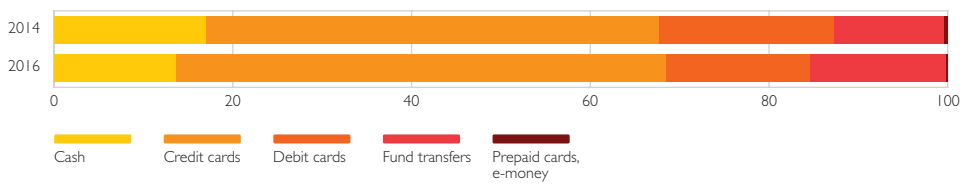
43 Source: http://english.yonhapnews.co.kr/business/2017/09/01/0502000000AEN20170901008400320.html

Figure 56 Chart of returning change electronically to prepaid cards (example)



In 2016, the bank reportedly spent the equivalent of ₩53.7 billion or 47 million US dollars minting coins. They also report that "13.6% of transactions [within the country] are being settled with cash" [44]. The smallest coin (the ₩1) is valued at around 0.0009 USD while the largest coin (the ₩500) is valued at around 0.45 USD.

Figure 57 Payment instruments usages




ARS EROTICA
RUPERT
EXPELLED
Beneath the Cross
HAYSEEDS 2
NORMAN DAVIES
THE ISLES
PURITANS
PETER TAIT
RED NEMESIS
IVAN THE TERRIBLE
Fantastic voyage

EUROPE

Germany
GDP per capita $42.026
World Rank #19

Sweden
GDP per capita $51.497
World Rank #12

Netherlands
GDP per capita $46.917
World Rank #14

United Kingdom
GDP per capita $39.939
World Rank #21

Poland
GDP per capita $12.218
World Rank #56

Ireland
GDP per capita $62.792
World Rank #5

Czech Republic
GDP per capita $18.261
World Rank #38

Belgium
GDP per capita $41.377
World Rank #20

Hungary
GDP per capita $12.669
World Rank #54

France
GDP per capita $36.876
World Rank #26

Romania
GDP per capita $9.448
World Rank #62

Spain
GDP per capita $26.515
World Rank #30

Italy
GDP per capita $30.516
World Rank #27

Greece
GDP per capita $18.098
World Rank #39

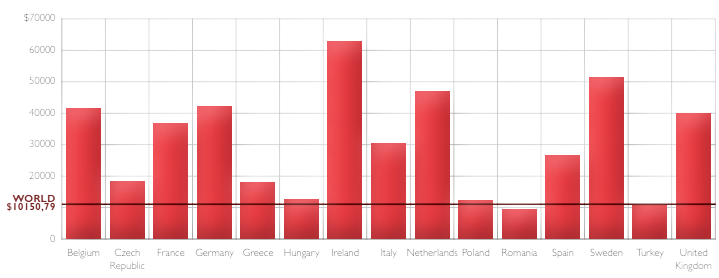
Turkey
GDP per capita $10.744
World Rank #59

25%
GDP Share in the World

11%
Population share in the World

6.8%
of the planet's total landmass

GDP in USD/Capita 2016



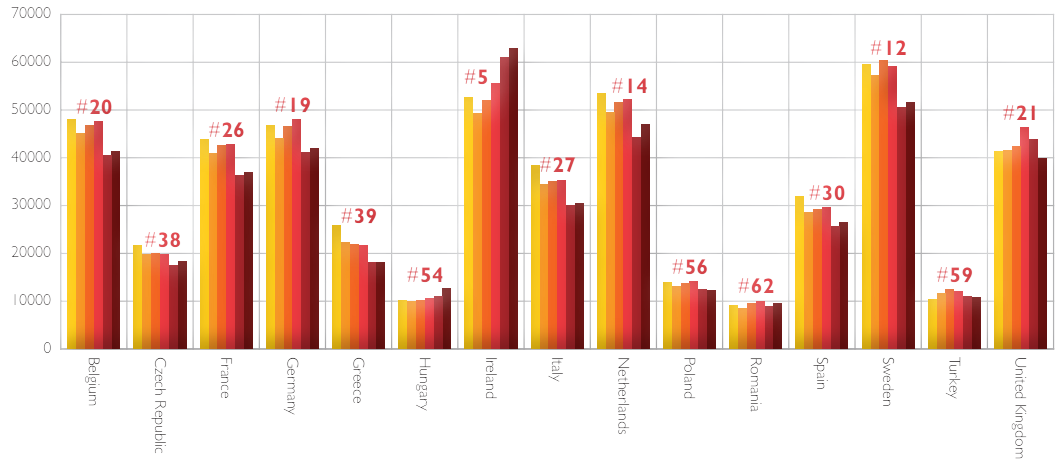
	GDP	Population
Europe	18,604,295,915,578	697,389,791
Europe CR18	15,701,193,813,281	533,580,440
Percentage	84%	77%

Legend

2011
2012
2013
2014
2015
2016

#114
Rank in world GDP (USD)/Capita

Figure 58 GDP in USD per capita



3.3 Europe

Europe covers about 10.2 million km^2 (3,930,000 square miles), or 2% of the earth's surface (6.8% of land area). Politically, Europe is divided into about fifty sovereign states, of which the Russian Federation is the largest and most populous, spanning 39% of the continent and comprising 15% of its population. Europe has a total population of about 741 million (around 11% of the 2017 world population), equalling close to 10% of the world's population.

There are 28 currencies across Europe, with the Euro being the most commonly used in 19 countries called the Euro area or Eurozone.

Countries included in this report, in alphabetical order[45]:

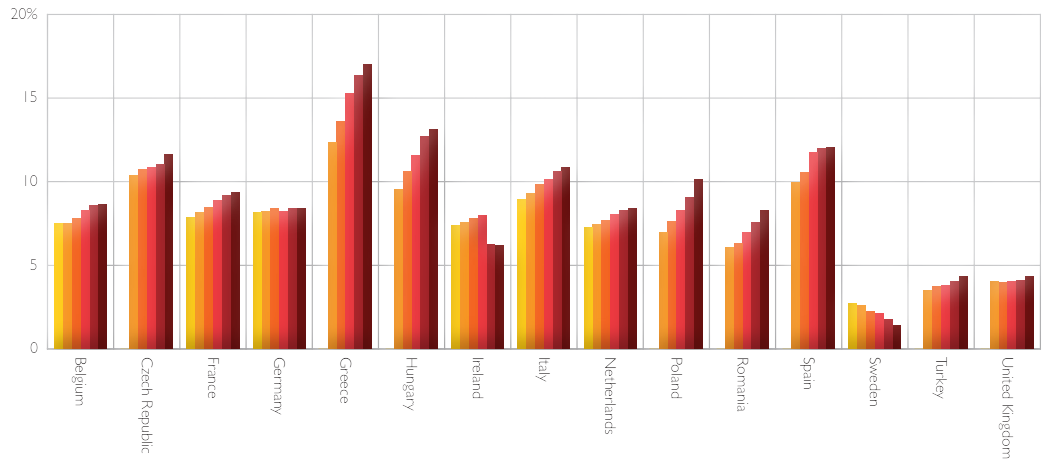
- Belgium
- Czech Republic
- France
- Germany
- Greece
- Hungary
- Ireland
- Italy
- Netherlands
- Poland
- Romania
- Spain
- Sweden
- Turkey
- United Kingdom

3.3.1 The Use of Cash

Currency in Circulation (CiC) has increased by an average of 39.5% in local currency value across selected European countries in recent years (7.9% per annum). One notable exception is Sweden, which reported a decline in the absolute value of Currency in Circulation (local currency) of 34.9% over the past five years.

45 See Methodology for country selection criteria

Figure 59 Currency in Circulation/GDP (value in local currency)



Of all countries included in this report, Sweden is the only country to show a consistent five-year annual decline in the value of currency in circulation. For more information, see Showcase Sweden.

When looking at Currency in Circulation against GDP (all local currency) a similar picture emerges.

Again, most countries show an increase, with Sweden the most consistent exception. Ireland has also shown a decline since 2015. This, however, is largely due to the country's significant growth in GDP in recent years[46]. In absolute terms, its value of Currency in Circulation has increased by 28.2% over the past five years and by 10.1% since 2015.

Not only is Sweden's ratio declining, it is also the lowest of all the countries in the world (1.4%), comparing only New Zealand (2.1%) in 2016.

Other ratios are mostly between 5% and 10%, Hungary and Greece being the exceptions at the higher end, with 12% and 16%, respectively.

46 This growth can be attributed largely to multinationals (Google, Microsoft, Amazon, Google, Twitter, Johnson &Johnson, etc.) domiciling their assets in Ireland.

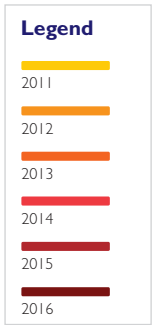
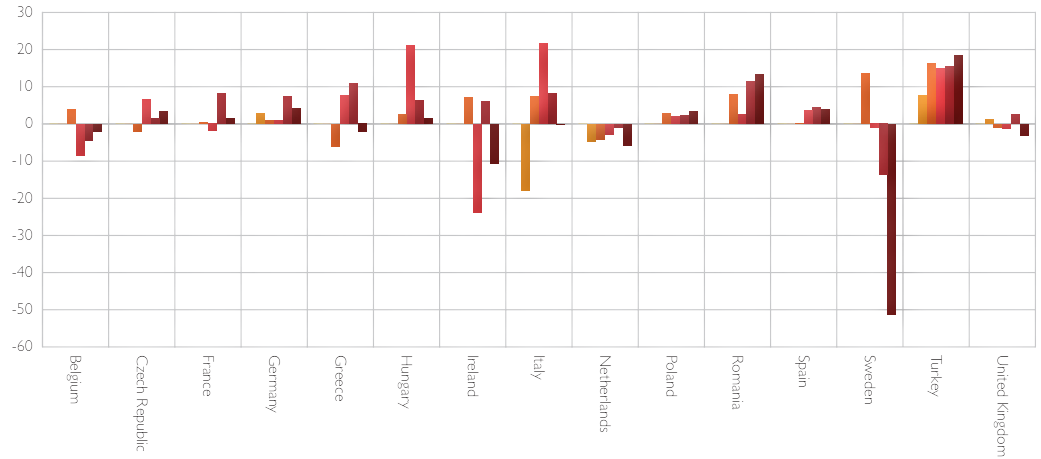


Figure 60 Growth ATM Withdrawals (value in local currency)



When looking at the growth of value of Cash Withdrawals at ATMs, figure 60 emerges.

Most notable conclusions:

- Overall, growth rates are positive and range between 5% and 21%, indicating an increasing need for cash for transaction purposes in most European countries.
- Exceptions are Belgium, The Netherlands and the UK, with Ireland and Greece painting a somewhat inconsistent picture.
- Sweden has shown a very strong decline in the value of ATM withdrawals, especially in 2016.

Access to cash via ATMs and bank branches is largely consistent throughout Europe, with significant differences between countries. Across Europe, there are 84 ATMs and 34 bank branches on average per 100,000 people.

- Most countries have shown a slight increase or remained constant when it comes to the number of ATMs.
- Belgium is leading Europe when it comes to ATMs per capita, with 154.8 ATMs per 100,000 capita in 2016.
- Other countries with high availability of ATMs in 2016 were: Germany (103.5), Spain (107.5) and the UK (106.8).
- Sweden (-20.0%), Greece (-24.1%), the Netherlands (-12.3%), and Spain (-10.6%) have been consistently and significantly decreasing their ATM fleets in recent years.

- Bank branches are being reduced in most countries throughout Europe.
- Italy and Belgium (both 71 per 100,000 capita) had the highest bank branch availability in Europe in 2016.

Figure 61 ATMs per 100.000 capita

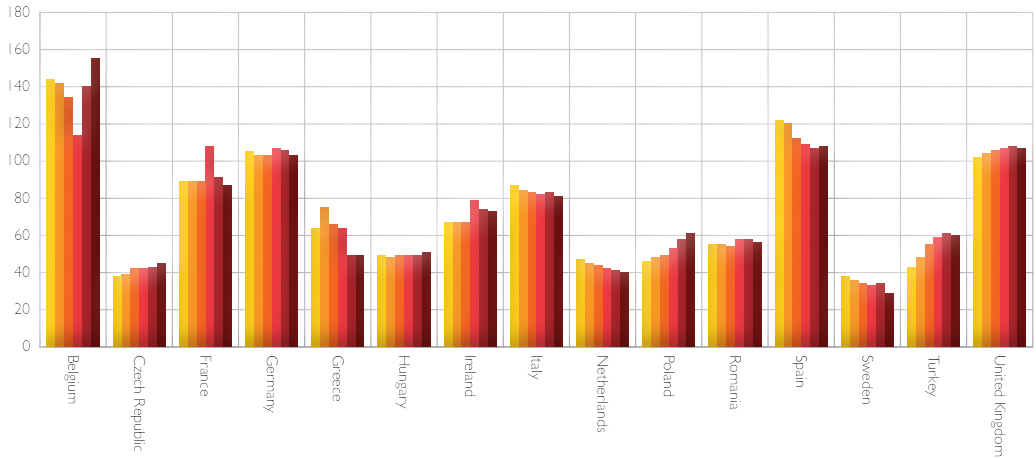
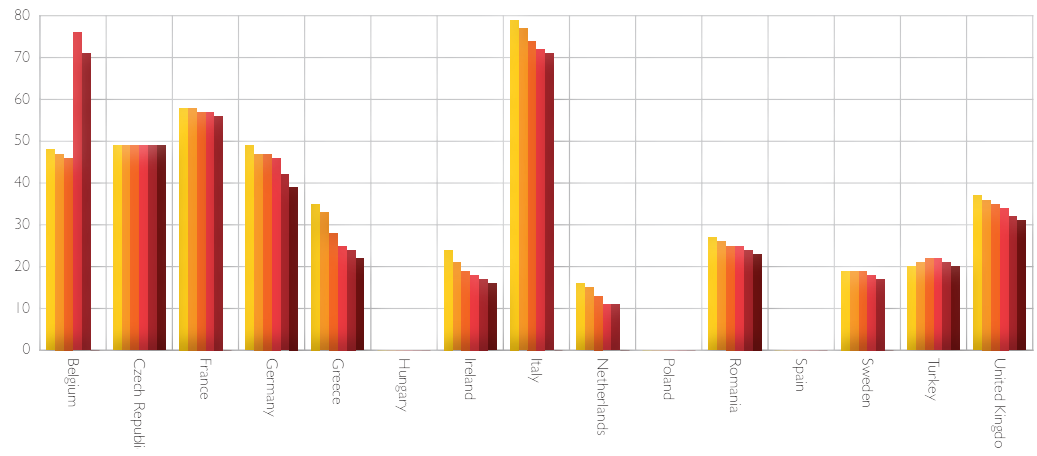


Figure 62 Bank branches per 100.000 capita



- The Netherlands (11) and Sweden (17) have the lowest number of bank branches per capita.
- Most countries were above the world average of 12.6 bank branches per 100,000 global inhabitants in 2015.

Conclusions on the Use of Cash in Europe

Based on the indicators, we can't conclude that cash volumes are declining across Europe. It therefore continues to be an important payment instrument, even in a well-developed market such as Europe. A recent study[47], carried out by the European Central Bank, underlines this conclusion.

"Even in this digital age, cash remains essential in our economy," Mario Draghi, President of the ECB said. "A survey on cash use, carried out on behalf of the ECB, shows that over three-quarters of all payments at points-of-sale in the euro area are made in cash. In terms of transaction values, that's slightly more than half."[48]

47 ECB Occasional Paper Series 201 "The use of cash by households in the euro area" November 2017, https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op201.en.pdf

48 Source: https://www.ecb.europa.eu/press/pr/date/2017/html/pr170404.en.html

The survey results show that, in 2016, cash was the dominant payment instrument at POS. In terms of number, 79% of all transactions were carried out using cash, amounting to 54% of the total value of all payments. Cards were the second most frequently used payment instrument at POS; 19% of all transactions were settled using a payment card. In terms of value, this amounts to 39% of the total value paid at POS.

The use of cash and cards differs per country, place of purchase, transaction value and consumers' demographic characteristics. In terms of number of transactions, cash was most used in the southern euro area countries, as well as in Germany, Austria and Slovenia, where 80% or more of POS transactions were conducted with cash. Cash was least used in the Netherlands, Estonia, and Finland, where its share in the number of transactions ranged from 45% to 54%, see also figures 64 and 65.

Other interesting findings:

- Cash is mainly used for low-value payments, while cards are used for larger-value payments. Cash was the instrument of choice for purchases under €45. These purchases accounted for 91% of all POS payments.

Figure 63 Share of transaction number by payment instrument

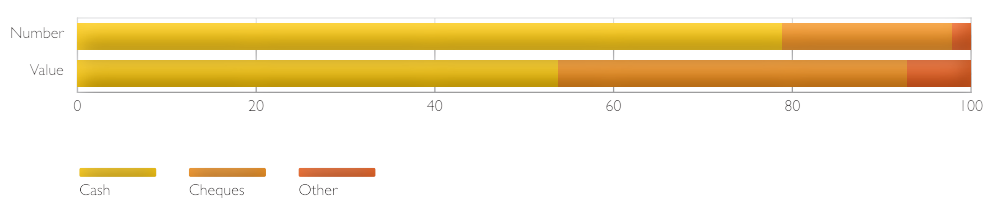


Figure 64 Share of cash transactions per country at points of sale (number of transactions)

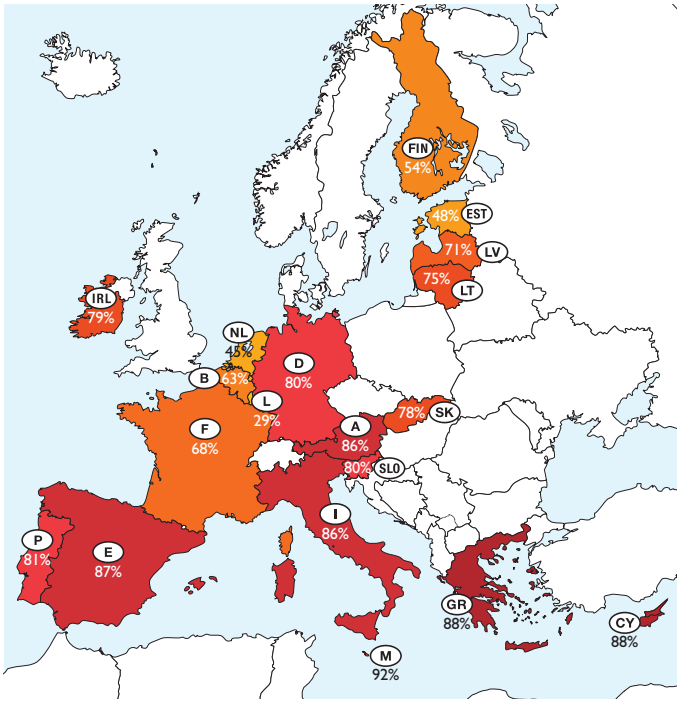
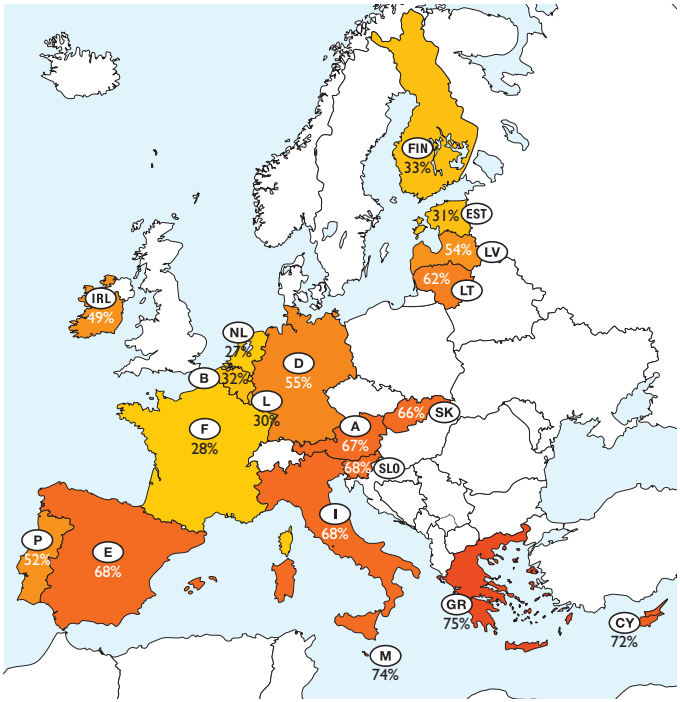


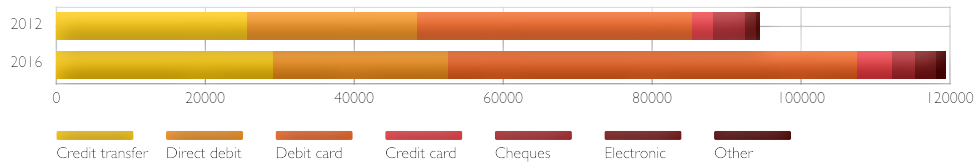
Figure 65 Share of cash transactions per country at points of sale (value of transactions)



Source: ECB, Deutsche Bundesbank and De Nederlandsche Bank

- When consumers are asked what means of payment they prefer, a larger share report a preference for cards rather than cash – even though they use cash more often. This contradiction may be explained by the fact that people, when asked about their payment behaviour, mostly seem to remember their infrequent, larger-value payments, and tend to forget how frequently they make low-value cash payments daily.
- Access to payment cards does not seem to fully explain differences in payment behaviour, because on average, access to cards is high in all Euro-area countries.
- However, there seems to be a relationship between card acceptance (i.e. the perceived availability of card payment terminals) and cash usage. In countries and market sectors where card acceptance is still low, it is to be expected that cash usage may decrease once infrastructure for making card payments becomes more widely available.

Figure 66 Share of transaction number by payment instrument



The last two points are related to the key role of cash as a fall-back at the consumer level. As long as consumers cannot fully rely on being able to complete a purchase or transaction via electronic means, they will continue to carry cash.

The ECB report indicates that the increasing acceptance of contactless payments throughout Europe is likely to have an impact on the use of cash, as both respondents who prefer cash and those who prefer cards both appear to place importance on the transaction speed of their preferred means of payment.

Electronic payments

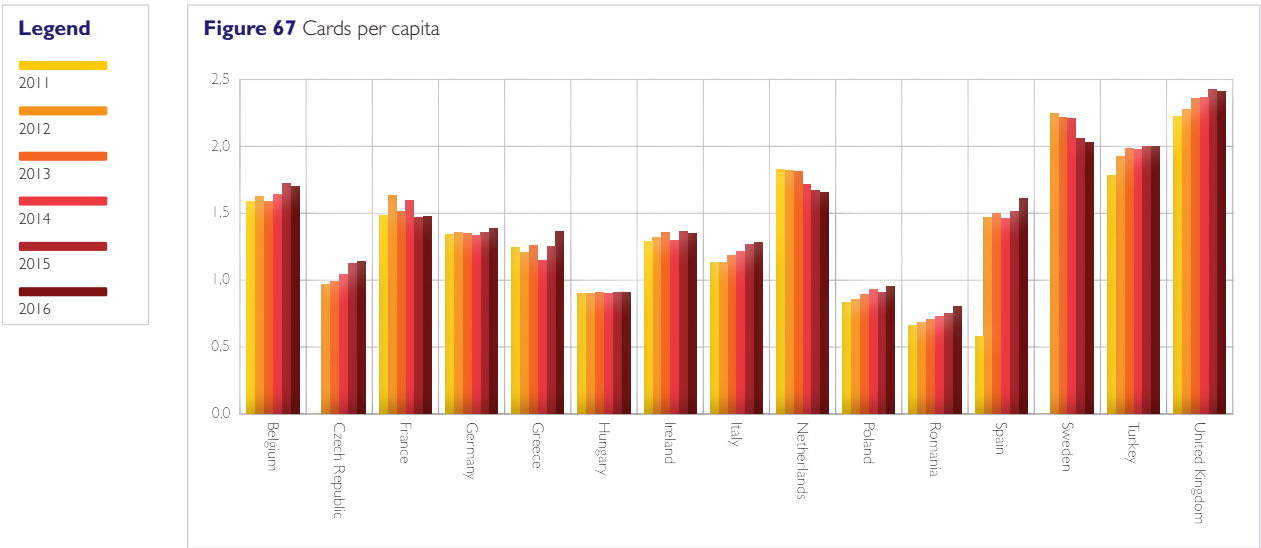
The total number of electronic payments has increased significantly in Europe, with the EU28 reporting a total number of 122 billion transactions (up from 94.4 billion in 2012).

Most products have shown double-digit growth over the reported period, except for direct debits (+3.69%) and cheques (-29.24%).

Credit Transfers increased by 13.24% to 29 billion transactions, debit cards by 48.6% to 54.8 billion, and credit cards by 67.6% to 4.8 billion.

Since 2016, card transactions have accounted for more than 50% of all electronic payments in Europe and have overtaken credit transfers and direct debits combined.

Figure 67 Cards per capita



Strongest relative growth came from:

- eMoney: +87.6% to 2.8 billion - largely following growth in PayPal transactions located in and reported out of Luxembourg.
- Other payments services[49]: +177.6% to 1.2 billion.

Electronic payments infrastructure

Despite the importance of cash throughout Europe, electronic payment volumes and the underlying infrastructure are experiencing tremendous growth, as well.

When examining the availability of payment cards (debit and credit) and POS terminals to the general public, the following pictures emerge:

- Cards per capita are growing in all countries except for France, the Netherlands and Sweden
- For the Netherlands, this is largely due to a considerable drop in the number of credit cards. The vast majority of cards in the Netherlands are debit cards, and this total number has increased by 7% over the past five years.
- Cards per capita average 1.6 card per person in Europe, against a global average of 1.8
- Only the UK, Turkey and Sweden averaged above two cards per inhabitant in most recent numbers.

49 Note by ECB: Payment services existing in some countries that cannot be included in any of the other payment service categories – e.g. bills of exchange

Legend

2011
2012
2013
2014
2015
2016

Figure 68 POS terminals per 100.000 capita

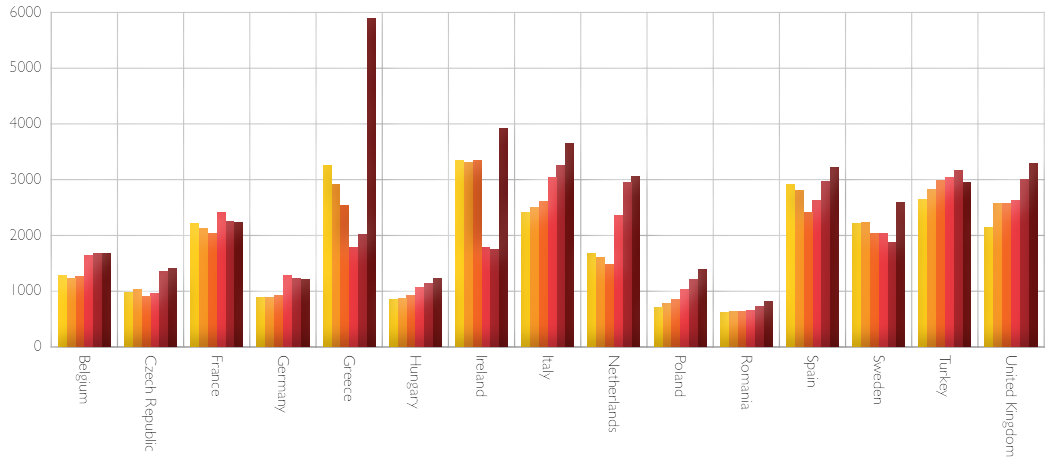
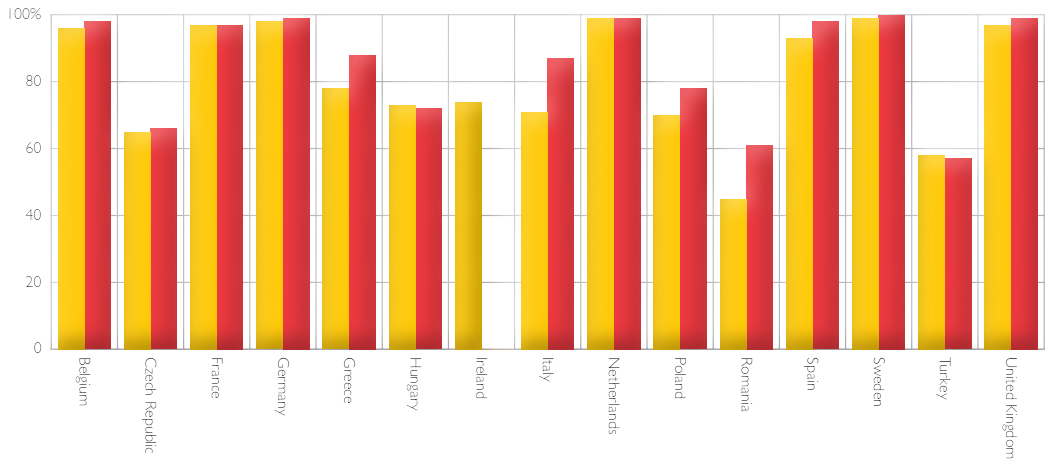


Figure 69 Access to a Bank Account (% of population >15yr, Europe)



- Overall, the growth numbers for POS terminals in European countries are impressive, with most countries experiencing double-digit growth over the past years.
- The European average of POS terminals per capita (2,570 for 2016) far outstrips the global average of 1500 terminals per 100,000 capita
- The spike in Greece's 2016 number (5,891) can be explained largely by a change in Greek tax policy in 2016, effectively telling taxpayers to spend up to a certain amount of their incomes via bank and card transactions in order to qualify for an annual tax-free exemption[50]. This, in turn, caused merchants to install POS terminals en masse in 2016.
- Greece became the European leader in this category and is second in the world only after Paraguay (with 6,701 POS terminals reported per 100,000 capita).
- The dip in Ireland's POS terminals in 2014 and 2015 is largely due to different statistical reporting, rather than an actual change in the number of terminals.

Access to a bank account

- Throughout Europe, the average number of inhabitants (age 15 and above) who have access to a bank account has reached 84%, which is well above the global average of 60.7%.
- Within the Eurozone, the percentage rose to 94.8% in 2014 (most recent data).

50 Law 4446/2016 on "Bankruptcy Code, Administrative Justice, Duties - Fees, Voluntary disclosure of undeclared income, Electronic transactions, Amendments of Law 4270/2014 and other provisions.

- North-western European countries (Belgium, France, Germany, the Netherlands, Spain, Sweden, the UK) are approaching 100% coverage, while Eastern European countries are lagging behind (e.g. Romania and Turkey).
- Greece, Italy, Romania, Poland, and Spain showed the strongest growth between 2011 and 2014.

Legend

2011
2012
2013
2014
2015
2016

Figure 70 Internet Access (% of population > age15)

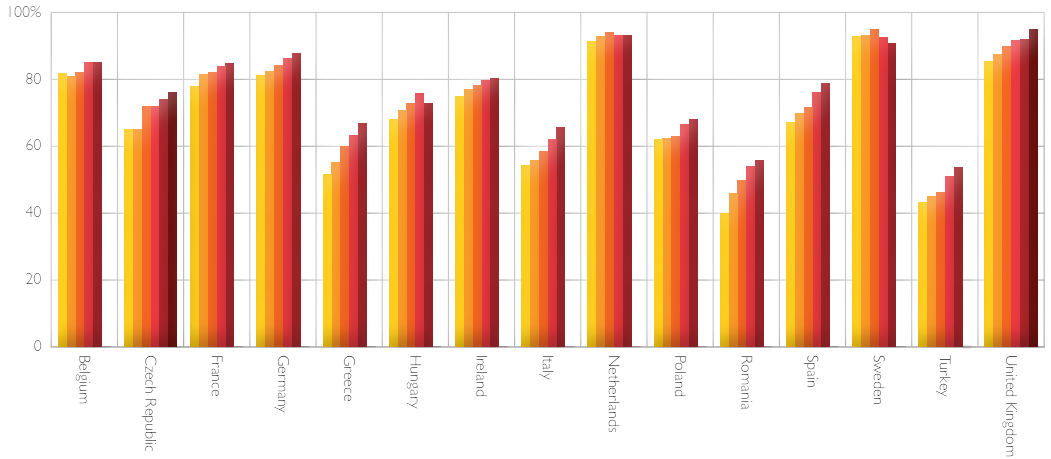
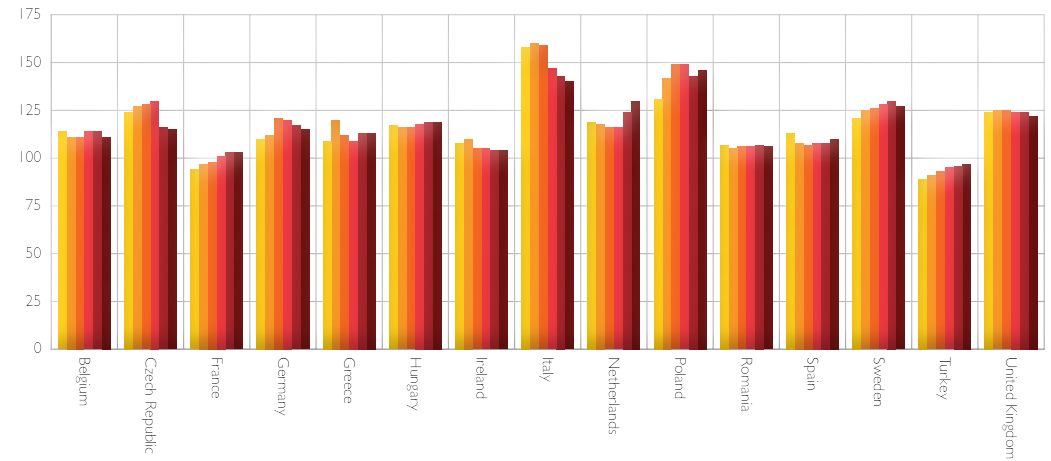


Figure 71 Number of Mobile Phone subscriptions per 100 capita



Internet Access

- Internet access has improved across Europe in recent years.
- Overall coverage (average 77%) is well above the world percentage of around 50%.

Mobile phone subscriptions

- Mobile phone subscriptions per 100 capita averages 121 in Europe, against the global number of 102.
- The number of subscriptions is rising in most countries, except in the leading countries of Italy, UK, the Czech Republic (since 2015), and Sweden (since 2016).

Overall, these demographics show that Europeans are doing well when it comes to social and financial inclusion, scoring well above global averages in the listed categories.

3.3.2 Cost of Cash

The cost of maintaining the cash infrastructure is discussed in paragraph 1.5.2 Cost of Cash. In this paragraph, we focus on the cost of cash for the direct users, i.e. the consumer and the merchant.

Consumers

The overview below provides insight into the fees that are charged to consumers for using cash. In Europe, there are no national policies in place to charge a transaction fee to a consumer when they choose cash to complete a transaction. Individual retailers may differ. Consumers are charged for accessing cash primarily through charges for ATM withdrawals, especially when using an ATM at a bank outside of your network.

Figure 72 ATM withdrawals subject to fees

Country	Own Bank/ Network	Other Bank/ ATM Network	Number of ATM networks	Market share of largest network
Austria	No fee	No fee	4	
Belgium	No fee	Disloyalty Fee	1	almost 100%, Worldline
Czech Republic	No fee	No fee	2	
Finland	No fee	Fee	3	Otto is the largest ATM network in the country
France	No fee	Fee	1	Cartes Bancaires
Germany	No fee	Fee , ranging from 1.95 - 5 euro	1	Girocard
Greece	No Fee	No Fee	1	94%, DIAS
Hungary	Fee, differs per bank	Fee	1	SIA Central Europe
Ireland	Fee, 0,12 euro per withdrawal p/a max 2,50 (ATM only) - 5,00 euro (ATM & POS)	No data	1	100%, Irish Banks Network
Italy	No fee	Fee, € 0,50	2	83%, Bancomat
Netherlands	No fee	No fee	1	100%, Equens
Norway	Fee, cash advance	No data	2	80&, EVRY
Poland	No fee	Fee, 3-4%		
Portugal	No fee	No data	2	Multibanco
United Kingdom	97% of withdrawals is free	97% of withdrawals is free	1	99%, LINK Network,

Of the European countries providing information on this topic:

- Only Austria, the Czech Republic, Greece, and the Netherlands have no charge at all for Cash Withdrawals.
- Most other countries charge only for ATM withdrawals at another bank or ATM network.
- Hungary and Ireland also charge for ATM withdrawals at your own bank.

The following overview from the ECB study[51] in the Eurozone underlines this view:

Figure 73 ATM withdrawals subject to fees
Question: Which of the following applies for a cash withdrawal from a cash dispenser (ATM) when using a debit card in your country?

Country	You always pay a fee per withdrawal	You sometimes pay a fee at ATMs	You never pay a fee for withdrawing cash at ATMs	You do not know what fees you pay for withdrawals	Don't know
Euro area	6%	26%	60%	7%	0%
Austria	10%	11%	59%	21%	0%
Belgium	7%	16%	57%	20%	0%
Cyprus	8%	7%	70%	11%	5%
Estonia	5%	18%	61%	16%	1%
France	3%	29%	62%	6%	0%
Finland	4%	17%	58%	19%	1%
Greece	4%	26%	60%	9%	1%
Italy	10%	35%	53%	3%	0%
Ireland	27%	19%	38%	14%	1%
Latvia	2%	31%	55%	12%	1%
Lithuania	15%	25%	37%	23%	0%
Luxembourg	5%	48%	36%	10%	1%
Malta	3%	9%	81%	3%	4%
Portugal	2%	4%	75%	17%	2%
Slovakia	20%	43%	27%	9%	0%
Slovenia	13%	44%	31%	12%	1%
Spain	3%	21%	74%	2%	0%

Source: ECB. Notes: Dutch residents do not pay any withdrawal fees irrespective of the ATM bank network they use. For this reason, this question was not included in the Dutch questionnaire. German resits excluded given lack of data availability.

51 ECB Occasional Paper Series 201 "The use of cash by households in the euro area" November 2017, https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op201.en.pdf

Merchants

In all countries, it is common practice that merchants incur a cost for handling cash, i.e. transporting and depositing cash into their bank accounts. Most research on this topic focuses on the difference, if any, in costs associated with handling cash transactions versus the costs associated with being able to accept and process non-cash payments.

An independent and the most recent example of such a study is the "Survey on merchants' costs of processing cash and card payments", published by the European Central Bank in March 2015[52]. The first result of their analysis showed that the cost for accepting a card transaction exceeds the cost for accepting a cash transaction for the same amount. Further analysis indicated that the Merchant Interchange Fee (MIF) largely explained the difference, with most other cost components being equal.

The report then concludes: "the merchants in the sample would be better off, on average, if the transactions currently executed with cards were carried out by cash."

3.3.3 Cash Cycle Organisation

Cash cycles in Europe are organised within country borders, even though 19, largely bordering, countries use the same currency, the Euro. Apparently, using a single currency is not the only factor needed to create a multinational/ cross border cash cycle organization.

52 Source: http://ec.europa.eu/competition/sectors/financial_services/dgcomp_final_report_en.pdf

Following the logic of creating cost-efficiency through economies of scale, the European Payments Council advocates cross-border CIT as one of the main potential drivers for further cost-efficiency. The concept is put forward as the SECA framework[53] (Single Euro Cash Area, in spirit of its digital predecessor SEPA, the Single Euro Payments Area).

Other stakeholder groups do not share the same view[54], pointing to other, more effective, measures for achieving cost-efficiencies in the cash cycle:

Reduction of NCB involvement in operational activities – outsourcing

Outsourcing cash management functions can be done for a variety of reasons, the main one being that NCBs may no longer consider these functions to be part of their core business. Substantial cost reduction in cash management can be achieved through outsourcing, as cash management becomes more efficient with supply and demand based on the free market.

Improve recirculation of cash outside the central/ commercial banking domain

ECB decisions have resulted in increased responsibility for commercial cash cycle operators in authenticating and fitness checking bank notes in accordance with ECB standards. As the ECB pointed out[55], around 39% of cash recirculation is conducted through commercial operators, both banks and CMC, while 61% remains with NCBs. Some NCBs have set explicit targets in terms of recirculation (e.g. BuBa's 90%).

Restructuring of cash cycle governance

Restructuring the cash cycle organisation in each country, including its governance, also provides ample opportunities to implement cost-efficiency measures. This is described in more detail in paragraph 4.2 Future developments in Cash Cycle Organization and governance.

The overview below shows the set-up and participants in each stakeholder group, per country. It concludes with an assessment of the current cash cycle organisation and a categorisation into one of the four cash cycle models, varying based on the level of NCB participation in operational activities (see 1.5.3 Cash Cycle Organization for more detail on these generic models):

1. Centralised model
2. Joint Venture model
3. Delegation model
4. Transfer model

53 SECA Framework v4.0, May 2016: Framework to develop a common set of rules and best practices for the distribution and recirculation of wholesale and retail euro cash in the eurozone. https://www.europeanpaymentscouncil.eu/sites/default/files/KB/files/Cash%20021-05%20v4%200%20-%20SECA%20Framework%202016.pdf

54 Source: Cash Report Europe 2016, G4S, based on interviews with all key stakeholders: EC, ECB, BEUC, EuroCommerce, ESTA and EPC.

55 ECB Presentation, ESTA Conference 2015

Figure 74 Key cash-cycle components per country

Country	Population	Central Bank Offices	Cash Centers	Bank Branches	ATMs	POSs	CIT Companies	Cash Cycle Model
Austria	8,747,360	2		4,540	12,217	130,208		Joint Venture Model
Belgium	11,271,000	3	5	8,131	17,450	187,018	2 (but 3 other companies also have a license)	Centralised Model
Czech Republic	10,565,000	7	16	5,498	4,704	148,394	4	Centralised model
Finland	5,495,100	4		1,137	1,923	153,373		Delegation Model
France	66,858,000	98		36,673	58,480	1,487,272	12	Centralised Model
Germany	82,491,000	35		32,215	85,352	1,002,340		Centralised Model
Greece	10,746,740	17	38	2,348	5,310	633,279	4	Centralised Model
Hungary	9,815,000		5	5,934	4,995	121,095	5	Delegation Model
Ireland	4,683,000	2	8	1,321	3,400	183,769	5	Delegation Model
Italy	60,623,000	52		41,667	49,281	2,226,131		Centralised Model
Netherlands	17,030,000	1	10	1,750	6,750	521,464	3	Delegation Model
Poland	38,427,000	17		59,924	23,451	530,865		Centralised Model
Portugal	10,324,610			7,072				Centralised Model
Romania	19,760,000	4 regional branches 16 agencies	21	5,042	11,127	161,905	2	Centralised Model
Spain	46,468,000	16		29,190	49,963	1,496,018		Delegation Model
Sweden	9,923,000	1		1,514	2,850	257,874	2	Transfer Model
Turkey	79,814,871	21	133	16,090	48,241	2,349,541	4	Centralised Model
United Kingdom	65,572,000	1	31	22,001	70,021	2,157,053	3	Delegation Model

Main conclusions:

- Cash Cycles are organised per country.
- In most countries, the NCB still plays a significant role in the operational activities of the cash cycle (Centralised). The most notable exceptions are Sweden (Transfer), Hungary, Ireland, the Netherlands, Spain (Delegation), and Austria (Joint Venture).
- There is significant room for further optimisation within country borders, especially in the reduction of the number of Central Bank offices and Cash Centres in certain countries.

3.3.4 Future developments

The use of cash is developing at two different speeds across Europe. Certain countries are clearly reducing their use of cash in favour of non-cash (e.g. Sweden/Nordics, the Netherlands, the UK). Others still or increasingly rely on cash, mostly in South-eastern Europe.

As pointed out in the ECB report, it is expected that the adoption of contactless card payments will impact the use of cash, as it increases the speed at which the transaction is completed, significantly improving ease of use.

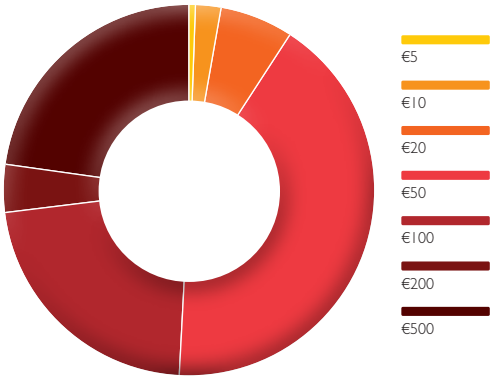
The further roll-out of electronic infrastructure, especially the number of accepting devices (POS terminals), will most likely also impact the use of cash, as more people can rely on being able to transact electronically.

Other relevant developments in the electronic domain are the introduction of the 2nd Payment Services Directive (PSD2), which will allow licensed third parties to access consumers' bank accounts (Access to the Account, or XS2A) for informational purposes (AISP; Account Information Service Provider) or to initiate transactions initiation (PISP; Payment Initiation Service Provider). The PSD2 came into force in January 2018[56]. This is a relevant development, as it is expected to have an impact on the retail payment experience and thus, at least potentially, on the use of cash.

The introduction/further roll-out of Instant Payments across Europe may very well impact the use of cash, especially if combined with mobile, peer-to-peer solutions and/or in combination with opportunities arising from PSD2 regulation. Instant Payment enables electronic payments to be carried out 24/7/365, with the recipient actually receiving – and able to re-use – the funds within seconds, thereby directly competing with cash on one of its unique attributes, direct settlement.

In 2016, the ECB announced that it would stop issuing new 500-euro notes around the end of 2018 . The existing 500-euro notes will continue to be legal tender and, as such, can still be used for transactional purposes and as a store of value. It will be interesting to see what this discontinuation will do to the total value of Cash in Circulation in Europe.

Figure 75 Euro denominations % of total value, currency in circulation Sept 2017



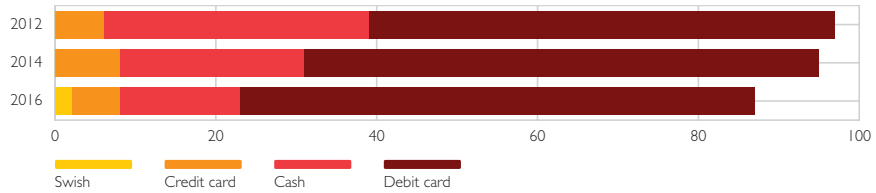
The 500-euro note currently represents 22.5% of the total value of Euro notes in circulation, and 2.5% of the total volume (ECB, September 2017).

56 For more information: https://ec.europa.eu/info/law/payment-services-psd-2-directive-eu-2015-2366_en

Showcase Sweden

On the way to the world's first cashless society?

Figure 76 How did you pay the last time you made a payment?



Sweden is regarded by many as the world's leading country in adopting electronic payments over cash. And for good reason, as both the statistics and a recent consumer survey show a declining use of cash in recent years.

Currency in Circulation is decreasing both in absolute value and as a percentage of GDP, which is already very low. ATM withdrawals are consistently decreasing in volume and value. At the other end, electronic payment volumes are high and increasing, as are the numbers for the availability of electronic payment infrastructure. The average Swedish citizen made 319 card payments in 2016. The average for the European Union is 116 card payments per year.

Furthermore, Swedish research shows that between 2010 and 2015, the number of cash payments in shops dropped by almost half, from 39% to 20%[57].

When asked "How did you pay the last time you made a payment?", only 16% answered cash in 2016. In 2012, this figure was 33%[58].

These observations raise a number of questions:

1. What are the main drivers behind Sweden's current position when it comes to the use of cash?

There are several factors at play here:

- First of all: Sweden has very low population density. This negatively affects the cost of cash distribution across the vast country and drives the push towards more cost-effective electronic payments.
- Secondly, the number of (larger) banks is limited, facilitating cooperation between banks. For instance: Swedish banks are cooperating in the joint single ATM network, Bankomat AB, which operates all of the 2,850 remaining ATMs in the country. Other examples are Bankgirot (a central clearinghouse for electronic payment processing) and the newly launched real-time electronic payments methodology, Swish[59].
- Thirdly, Swedes are inquisitive and technology friendly by nature. Recently introduced "innovations" are Klarna, which supplies eCommerce payment solutions, and iZettle, which has developed a small card-reader that can easily be connected to a mobile phone. iZettle is even being used by homeless people to accept payment for the magazine Situation Stockholm.

57 Source: http://www.riksbank.se/en/Press-and-published/Notices/2016/IT-friendly-Swedes-like-to-pay-digitally/

58 Source: Riksbank survey to better understand Swedish payment habits, 2016. http://www.riksbank.se/en/Statistics/Payment-statistics/

59 Swish; mobile-phone-based realtime payment service introduced in 2012 (pilots) and 2016 (full operation)

- A fourth factor may be the high level of trust the Swedes historically have in the government and the financial sector. This trust has been 'earned' by the Swedish government and the financial sector by their performance and stability over a long period of time.
- Intertwined with and perhaps following on from the previous point, Swedes have historically been rather trusting and transparent when it comes to sharing personal information between population and government. Privacy issues are less of a concern, given the established relationship of trust. Consequently, Swedes place less value on the uniquely anonymous character of cash, and subsequently seem to have less difficulty abandoning cash for less anonymous non-cash alternatives.

2. What can other countries learn from Sweden?

Some key elements of Sweden's leading position are difficult to copy. Geographical factors, such as population density, are obviously different for each country and are hard to influence. To a certain extent, the same goes for the third point: a population's interest in and willingness to adopt new technologies and innovations. However, the level of cooperation within a country's financial sector is something that can be influenced. Even if the number of larger players in a country is higher than in Sweden, cooperation may be more complex, but not impossible. Participants just need to be willing to forego short-term individual gain for longer-term collective gain. This obviously requires trust.

In turn, the population will reciprocate this trust over time when collaboration within the financial sector starts to pay off for the community at large, positively affecting factors 3 and 4.

3. (When) will Sweden actually become cashless?

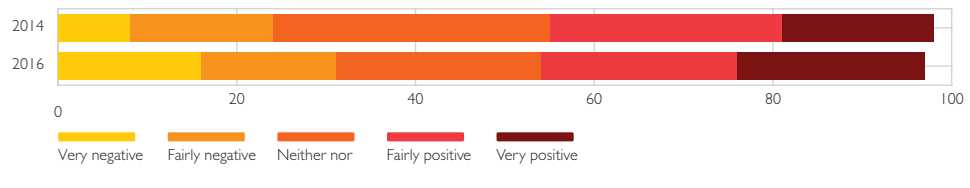
If a Cashless Society is not just a theoretical concept, Sweden seems to be on its way to becoming the first in the world. At present, it is already the 'least-cash' society in the world. It seems clear that cash is used less and less in Sweden, but not every Swede is fully supportive of this development, as the results of a recent Riksbank survey show:

Positive or negative attitude to decline in cash?

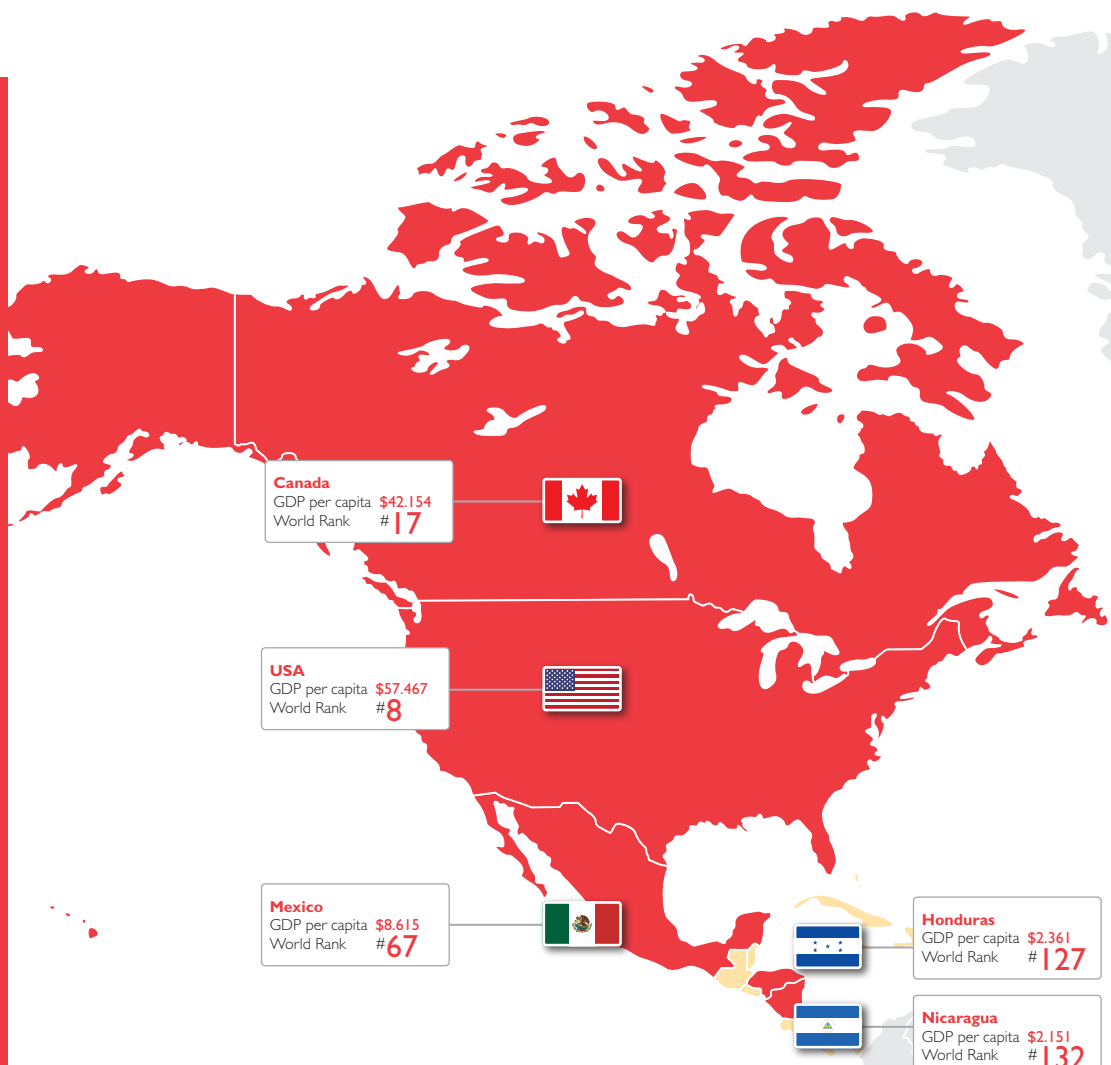
Three out of ten Swedes have a negative attitude towards the increasing decline of cash usage, which is an increase compared with 2014. Four out of ten feel that this development is positive (stable since 2014). The attitude towards the decline in cash seems to be polarising in Sweden, with a larger, previously ambiguous group now ticking the (very) negative box.

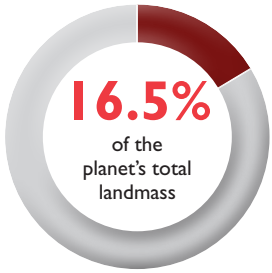
The same survey also showed that cash is still used to great extent, with eight out of ten Swedes indicating that they have used cash in the past month. The Riksbank states: "Digital payment services are growing, and cash is on its way out. But an entirely cashless society is still a long way off. We still need to facilitate cash withdrawals and deposits all over the country, which also means that we need to come up with creative ideas and possible new forms of cooperation to provide these services in the most cost-efficient way."

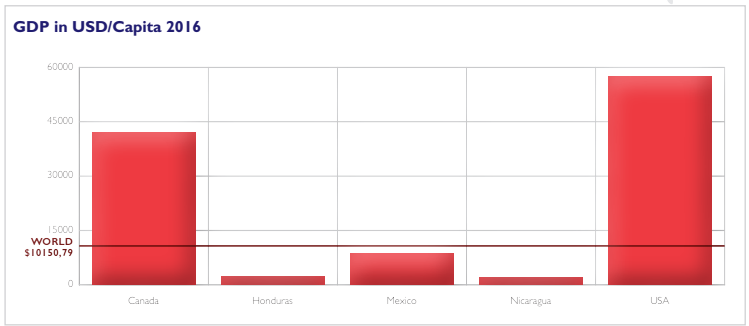
Figure 77 Attitude to decline in cash



NORTH AMERICA







	GDP	Population
North America	21.602.004.131.711	570.620.597
North America CR18	21.179.606.320.886	502.217.156
Percentage	98%	88%

Legend

2011

2012

2013

2014

2015

2016

#114
Rank in world GDP (USD)/Capita

3.4 North America

North America covers an area of about 24,709,000 square kilometres (9,540,000 square miles), around 16.5% of the earth's land area and 4.8% of its total surface. North America is the third largest continent by area, after Asia and Africa, and the fourth by population after Asia, Africa, and Europe. In 2016, its population was estimated at nearly 571 million people in 24 independent states, or about 7.9% of the world's population.

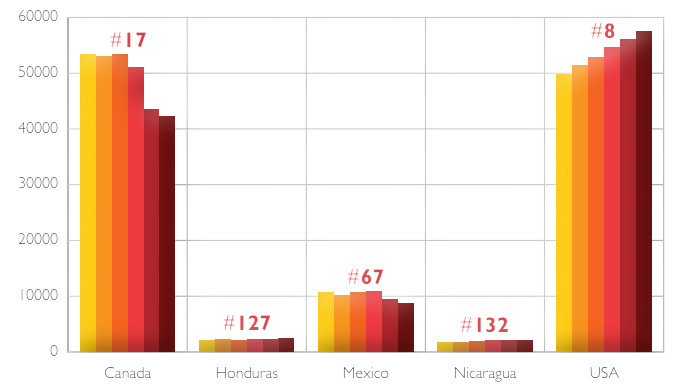
There are 25 different currencies in official use throughout North America. The US Dollar is the most common and the world's largest reserve currency[60]. Countries included in this report, in alphabetical order[61]:

- Canada
- Honduras
- Mexico
- Nicaragua
- United States of America

The United States and Canada are the most prominent countries, and combined they represent 93% of total GDP.

- Both Canada and the USA are among the highest-ranking countries when it comes to GDP/capita.
- However, this ratio is declining in Canada[62], whereas in the US there's an upward trend.

Figure 78 GDP in USD per capita



- A sharp drop in prices for oils and minerals affected Canada's economy.
- Honduras, Mexico and Nicaragua are much lower, yet their cost-of-living index[63] is also much lower (US 73.21; Canada 69.09; Honduras 47.19; Mexico 33.07).
- The global average is 10,151 USD per capita (2016).

3.4.1 The Use of Cash

- The value of Cash in Circulation is increasing throughout North America, both in absolute numbers and relative to the country's GDP.
- Ratios in 2016 were between 4% (Canada) and 8% (USA), which is slightly lower than most other countries around the world.
- The world average is 9.6%, while the average for North America was 6.13% in 2016.

60 Source: https://en.wikipedia.org/wiki/List_of_currencies_in_North_America

61 See Methodology for country selection criteria

62 Canada's economy relies largely on mining and oil exports. The sharp drop in market prices in this sector negatively affected performance and the Canadian economy.

63 Cost of Living Index: these indices are relative to New York City (NYC). Which means that for New York City, each index should be 100(%). No data available for Nicaragua.

Figure 79 Currency in Circulation/GDP (value in local currency)

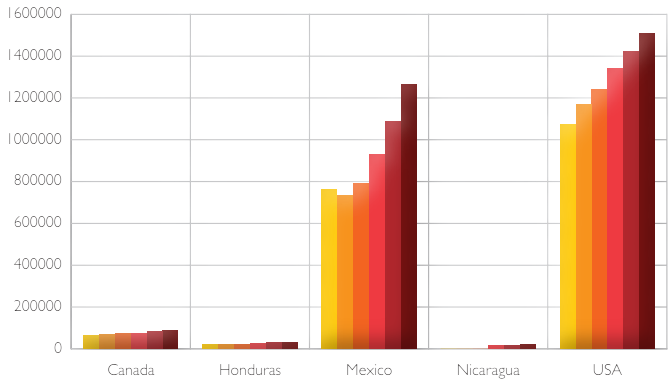
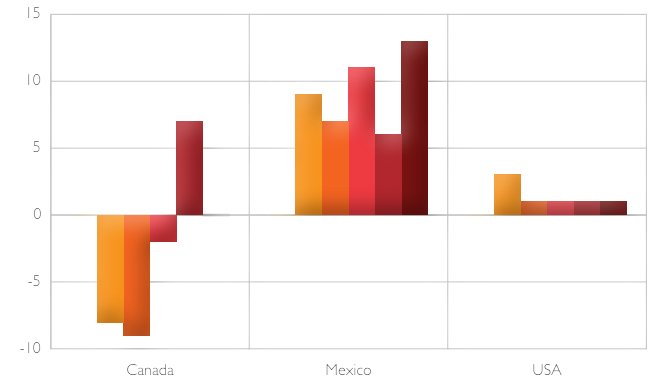


Figure 80 Growth ATM Withdrawals (value in local currency)



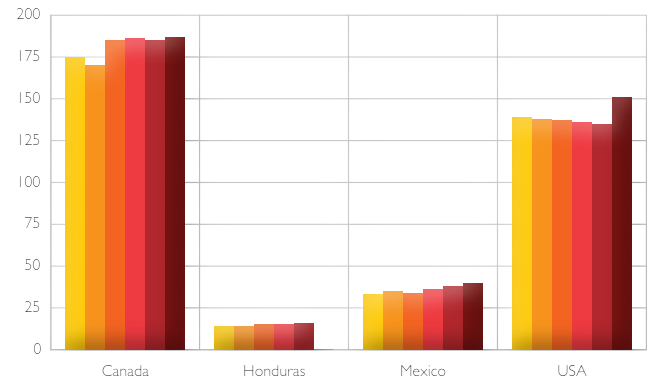
Growth ATM Withdrawals

When looking at the value of cash withdrawn from ATMs in these countries[64]:

- All countries reported positive figures for the value of ATM withdrawals in 2016.
- Canada consistently showed a decline, yet in the last reporting year (2015), witnessed a significant increase in the value of ATM withdrawals.

Judging by these two key indicators, there is a clear need for cash throughout North America.

Figure 81 ATMs per 100.000 capita



Access to Cash

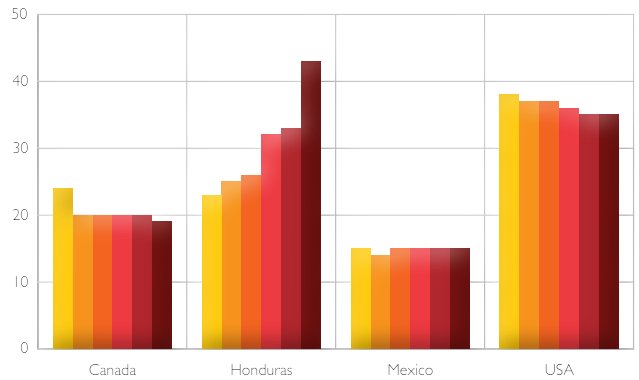
When looking at access to cash, primarily through ATMs and bank branches, the data[65] shows:

- Both Canada and the USA are well above the world average of 56.8 ATMs per 100,000 people.
- Canada is the global leader in this category (187 ATMs) and its total is stabilising.
- The USA witnessed a significant increase in ATMs in 2016, after years of stagnation (-2.9% for 2011-2015).
- Honduras and Mexico are still increasing their total number of ATMs.

64 No data available for Honduras and Nicaragua

65 No data available for Nicaragua

Figure 82 Bank branches per 100.000 capita



Legend

2011
2012
2013
2014
2015
2016

- Overall, the number of bank branches in North America stabilised in absolute numbers in recent years.
- The USA (-4.1%) and Canada (-0.8%) decreased access to bank branches in the reported period, while Honduras (+ 80.9%) has increased its bank branch network significantly over the past few years.
- Canada, with 19 bank branches per 100,000 capita, lies well below the continental average of 27.82.
- The North American average is 27.82, which is just below the global average of 29.06 bank branches per 100,000 capita.

Conclusions on the use of cash in North America

North Americans still have a clear demand for cash, based on Currency in Circulation (in absolute numbers and relative to GDP). Also, the value of ATM withdrawals is increasing. Growth percentages in the US are only marginally, yet consistently, positive. Direct demand for cash in Canada showed growth for the first time in years in 2015, so it will be interesting to see how this develops in the future.

These results are complemented by the conclusions from a diary survey conducted among US citizens[66] that was conducted by the US FED and published in 2016. Their main findings are:

- When first conducted in 2012, the Diary showed that cash was the most frequently used payment instrument and that cash use was prevalent across all demographic groups. The key findings of the 2015 Diary of Consumer Payment Choice are similar.
- Cash continues to be the most frequently used consumer payment instrument, however its share is decreasing.

Share of transaction number by payment instrument

- Cash is widely used in a variety of circumstances, even when other payment options are available. Figure 84 outlines the different payment instruments used for various spending categories and shows that cash is the most prevalent payment instrument in six of nine merchant categories.

Payment instrument use by spending categorie

- Cash dominates small-value transactions, with cash being used for more than 50% of transactions under $25. As shown in figure 85, cash was used for more than 60% of purchases under $10. For purchases between $10 and $24.99, cash was used 42% of the time.

66 Source: The State of Cash, Preliminary Findings from the 2015 Diary of Consumer Payment Choice, Cash Product Office Federal Reserve System, November 2016

Figure 83 Share of transaction number by payment instrument

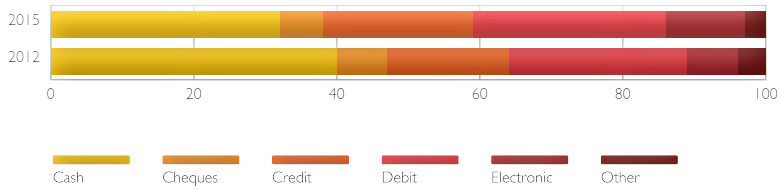


Figure 84 Payment instrument use by spending categorie

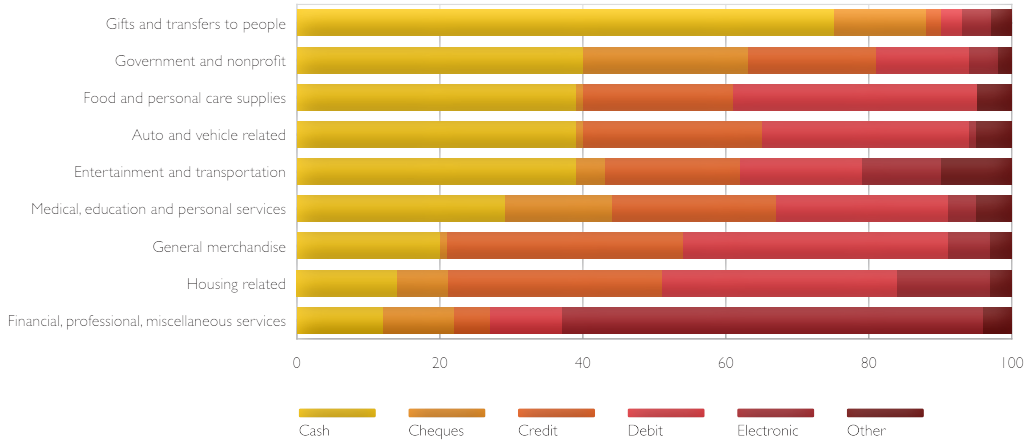


Figure 85 Payment instrument by amount, in-store 2015

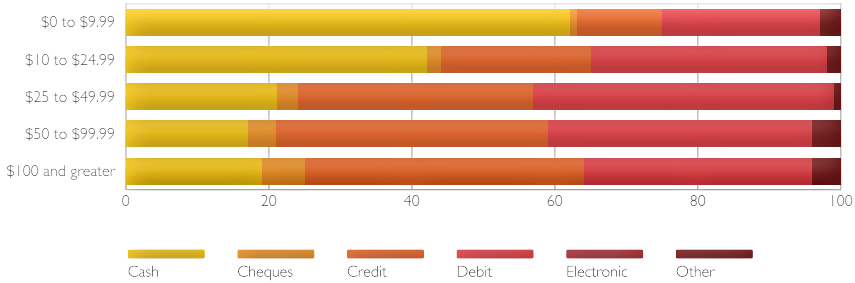
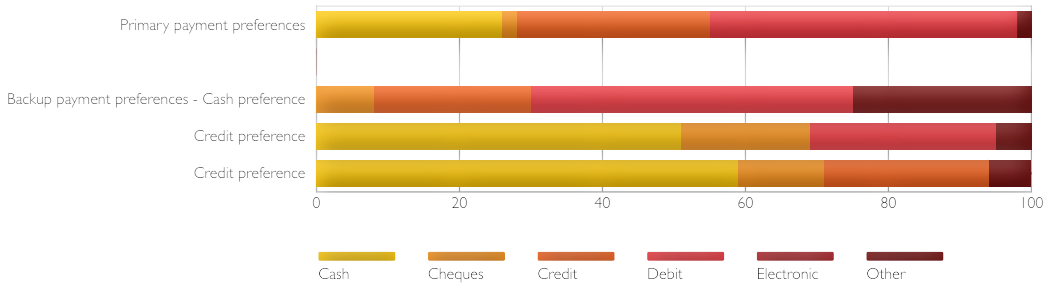


Figure 86 Payment preferences



Payment instrument by amount, in-store 2015

- The average value of cash holdings has grown
  Most U.S. consumers continue to carry cash. Nearly 83% of diarists kept cash at the end of at least one day of the Diary reporting period, and 69% kept cash at the end of all three days. The average amount of cash that diarists kept daily increased from $55 to $59 between 2012 and 2015.
- Consumers prefer to pay electronically with cash as primary backup
  For non-bill purchases, 43% of diarists cited debit cards as their preferred payment instrument. Credit cards and cash were roughly even, at 27% and 26%, respectively (figure 86).

  Compared to 2012, debit cards remained the most popular payment instrument. The preference for credit cards increased five percentage points, while cash's share declined by four percentage points from 2012.

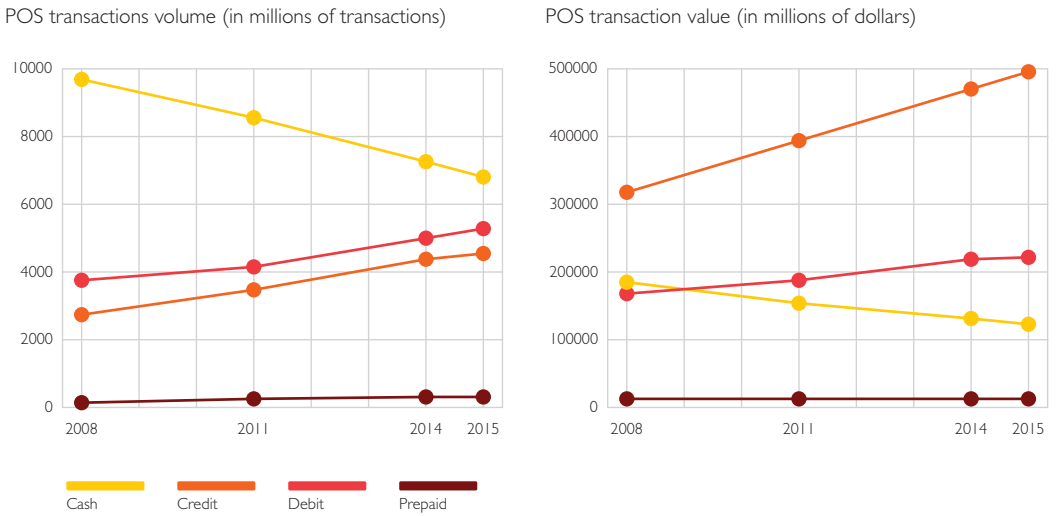
  While most consumers prefer cards, cash remains the most preferred backup payment instrument. When asked what payment instrument they preferred if their primary option was unavailable, 55% of people who prefer cheques, debit cards, or credit cards chose cash.

Trends reported from Canada are similar when it comes to using cash for transactional purposes. The Canadian Payments Methods and Trend report (2016)[67] concludes:

- The composition of POS transaction volume has been profoundly altered by a seven-year decline in cash use.
- Since 2011, cash use has been declining by around 5% on average every year.
- Cash decline can be attributed to the wider use of prepaid, credit and debit cards, and more recently to the growing use of contactless and e-commerce payment channels.
- In terms of value, cash makes up a lower proportion of POS transactions.
- Cash is being used for fewer transactions and for smaller transaction amounts.

67 Source: https://www.payments.ca/sites/default/files/cpmt_report_english_0.pdf

Figure 87 POS transactions volume and value



- In Canada (2015), cash accounted for 6.8 million transactions[68] or 41% of all POS transactions.

Electronic Payments

In line with the global trend, electronic payment volumes increased significantly in North America, as well.

Growth in card volumes was particularly significant, with Mexico reporting 69.7% growth over the past 5 years, and US and Canada also reporting double-digit growth, with 33.3% (2011-2015) and 32.7% (2012-2016), respectively.

Mexico's card volumes are still relatively low, which suggests there is even further room for growth in this domain. This is underlined by the following overview of annual card transactions per capita:

- Mexico: 21
- Canada: 274
- USA: 304 (2015)

Electronic Payments Infrastructure

Payment infrastructures show great diversity across the North American continent, specifically between US/Canada on the one hand, and Mexico/Honduras/Nicaragua on the other.

68 From the Payments Canada report: "Total cash was estimated based upon data from Bank of Canada survey research data […]. We used these numbers to extrapolate to the larger Canadian population to formulate cash payment estimates and adjusted based on the market research suggestion of cash decline in 2014 and 2015."

Figure 88 Cards per capita

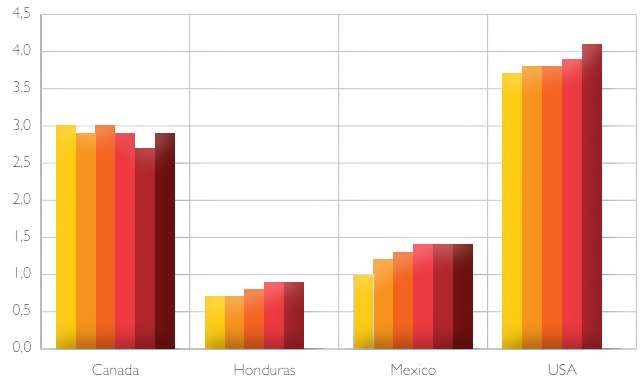
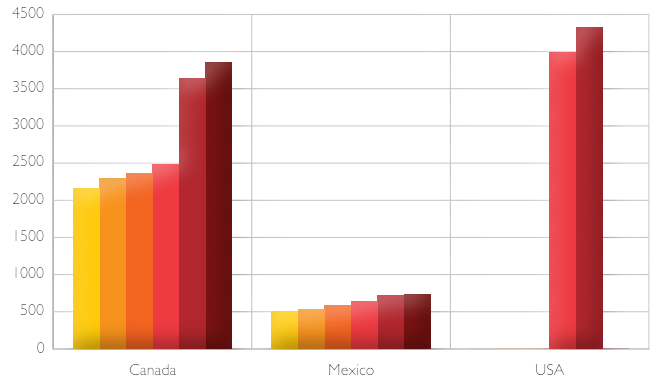


Figure 89 POS terminals per 100,000 capita



Legend

2011
2012
2013
2014
2015
2016

When looking at cards issued to the population, the following conclusions can be drawn[69]:

- Cards per capita increased in almost all countries in North America except Canada over the reported period (2011-2016).
- With 4.1 cards per capita, the USA is number four in the world, after South Korea (5.1), China (4.4) and Paraguay (4.4).
- With 2.9 cards per capita, Canada is still well above the world average of 1.8 cards per capita.

The following points are relevant for primary acceptance points (POS terminals)[70]:

- All reporting countries show an upward trend.
- Canada showed a strong increase in the number of POS terminals in 2015, which reflects a change in the estimation methodology.
- Both the USA and Canada far outscore the world average of 1500 terminals per 100,000 capita.
- Mexico is consistently increasing its POS coverage (+10.4% per annum since 2011) yet is still well below the world average.

Access to a Bank account

- All reporting countries show a positive trend for the number of people (aged > 15) with access to a bank account.
- Canada is nearing 100%, while the US reported 94% coverage in 2014 (latest available data).
- Both countries are well above the global average of 60.7% and above the North American average of 56%.
- Mexico showed strongest development, with +41.1% between 2011 and 2014.

69 No data available for Nicaragua

70 No data available for Honduras and Nicaragua, US numbers based on public information https://letstalkpayments.com/comprehensive-2015-u-s-market-analysis-of-pos-terminals-and-emv-nfc-status-review/

Figure 90 Access to a Bank Account (% of population >15yr)

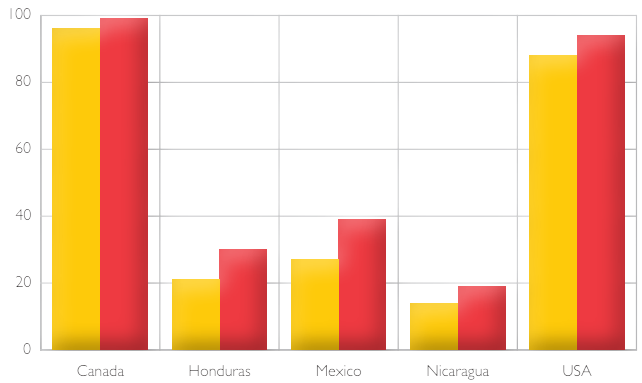
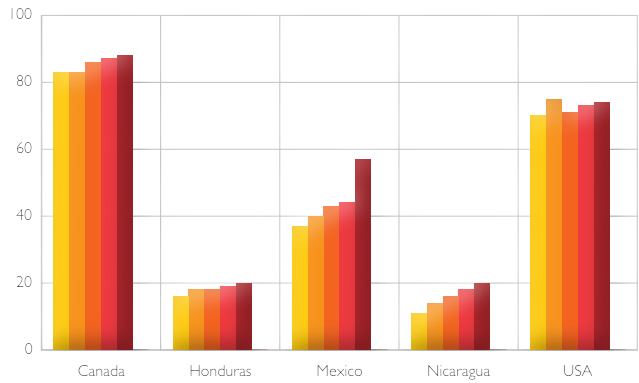


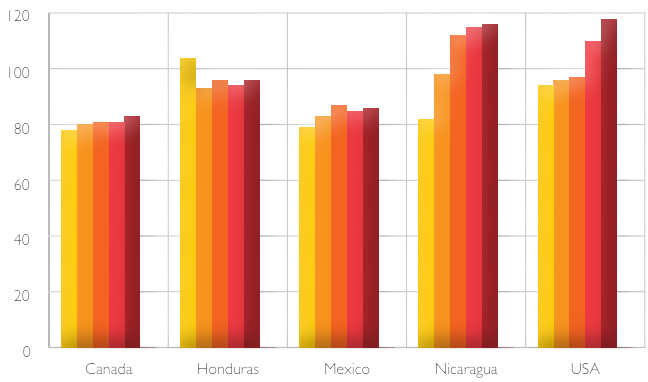
Figure 91 Internet Access (% of population >15yr)



Internet access

- Internet access has improved in all reported countries in North America.
- Canada and the USA rank the highest, with 88% and 74% respectively.
- Honduras (+28%) and Nicaragua (+85.9%) are clearly catching up, however are still below the global average of 50%.
- Mexico showed particularly strong growth in 2015, the most recent reporting year: +29.4%. 57% of Mexico's adult population now has access to the internet.

Figure 92 Mobile phone subscriptions per 100 capita

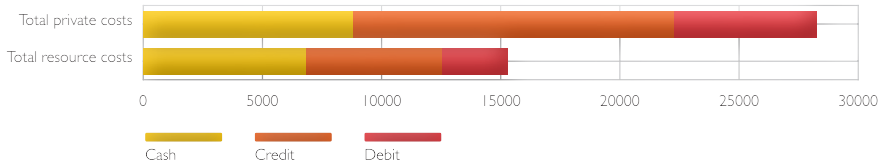


Regarding the number of mobile phone subscriptions per 100 capita:

- Most countries show growth, except Honduras.
- The divide between the USA/Canada and the other countries is less significant; moreover, Canada seems to be trailing with 'only' 83 subscriptions.
- Nicaragua and the US are leading in this category, with 116 and 118 subscriptions respectively, both well above the global average of 102.

Overall, when it comes to social and financial inclusion for North America, there is a clear divide between Canada and the USA on the one hand, and Honduras, Mexico and Nicaragua on the other.

Figure 93 Total private and resource costs (in millions)



3.4.2 Cost of Cash

The cost of maintaining the cash infrastructure is discussed in paragraph 1.5.2 Cost of Cash. In this paragraph, we focus on the cost of cash for direct users, i.e. the consumers and the merchants.

Consumers

The overview shows the fees charged to consumers for using cash. Throughout North America, there are no nationwide policies in place for charging transaction fees to consumers when they choose cash to complete a transaction. Individual retailers may differ. Consumers are generally not charged for accessing cash from an ATM at their own bank(network). In most countries except Mexico, fees are charged for using an ATM outside of this network.

Figure 94 ATM withdrawals subject to fees

Country	Own Bank/ Network	Other Bank/ ATM Network	Number of ATM networks	Market share of largest network
Canada	No fee	Fee, ranging from 1-4 CAD	1	100%, Interac
Honduras			7	18%, Banet
Mexico	No fee	Fee	2	61%, RED
Nicaragua				
United States of America	No fee	Fee, ranging from 3 - 6 USD	17	Most ATMs belong to most networks

Merchants

Merchants do incur costs for accepting payments, both cash and non-cash. Studies on the topic usually focus on the difference in cost between acceptance of cash versus non-cash payments.

A recent study was conducted in Canada, "The Costs of Point-of-Sale Payments in Canada, 2017"[71]. The key findings of this study are:

- The costs of cash and card payments at the POS in Canada are non-negligible. Total resource costs amounted to $15.3 billion, which corresponds to 0.78% of GDP.
- Stakeholders incur costs when providing, accepting and using payments at the POS and their shares vary by payment method.
- Debit cards are the least costly in terms of absolute resource costs, followed by credit cards, whereas cash is the most expensive.
- On average, debit cards are the least expensive in terms of resource costs per transaction (volume), followed by cash. Credit cards carry the highest resource cost per transaction.

71 Source: http://www.bankofcanada.ca/wp-content/uploads/2017/03/sdp2017-4.pdf Study uses 2014 retail payments data.

Figure 95 Total costs by stakeholder (in millions)

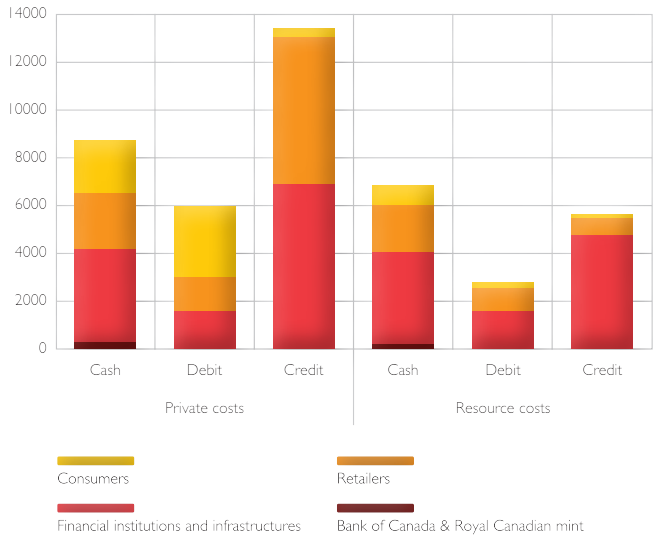
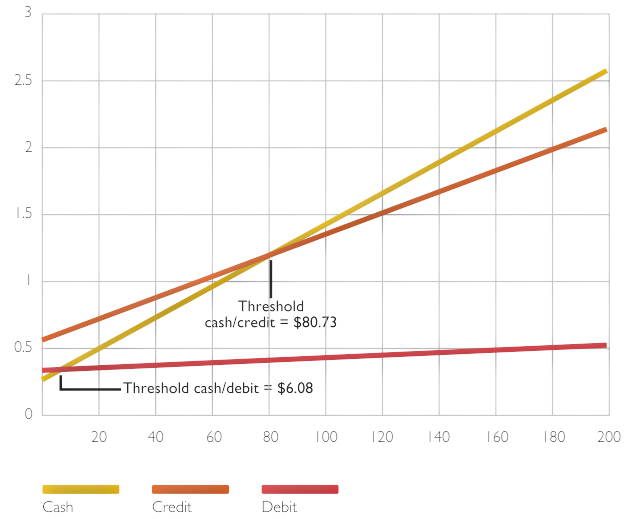
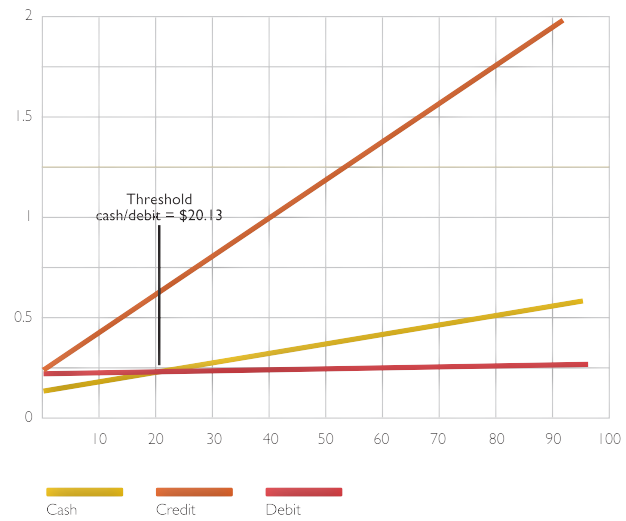


Figure 96 Variable resource costs per transaction by transaction value (Can$)



- Considering variable resource costs per transaction, cash is cheapest for transactions up to $6, while debit cards are the least expensive for transactions above $6.
- Strictly from a merchant perspective, accepting cash for all transactions under Can$ 20.13 is the most cost-effective.

Figure 97 Variable private cost per transaction by transaction value (Can$)



3.4.3 Cash Cycle Organization

In North America, cash cycles are organized within country borders, or even, especially in the case of the US, per state. A recent trend in cash cycle organisation in the US has been for large banks to outsource all bank cash vault activities to armoured carriers, while cash recycling is mostly done at bank branches. Retailers are starting to use cash recycling technologies, thereby increasing the recirculation of cash in the market and consequently improving the cost-efficiency of the entire cash cycle.

3.4.4 Future developments

When it comes to the use of payment methods, it is expected that the trends shown for cash and non-cash will continue in years to come. Cash volumes are expected to continue their steady decline, especially in US and Canada, yet cash will remain a very relevant payment product for the foreseeable future.

Most countries, especially those that have not yet reached market maturity for their electronic payments infrastructure, are expected to

Figure 98 Key cash-cycle components per country

Country	Population	Central Bank Offices	Cash Centers	Bank Branches	ATMs	POSs	CIT Companies	Cash Cycle Model
Canada	36.286.430	1		16.704	66.433	1.301.400		
Honduras	9.112.867	5		864	1.404	N/A		
Mexico	121.567.000	1		17.940	48.118	895.400	5+	
Nicaragua	6.149.928	2		N/A	N/A	N/A		
United States of America	323.127.500	36	300+	112.244	434.000	13.900.000	4 big 50+ small (54 total)	Delegation Model

grow regarding the number of cards and POS terminals in their respective countries, enabling the transition to electronic means of payment.

Given their current status and the high relevance of cash as a transaction medium within those countries, cash is likely to remain the most dominant payment method for years to come.

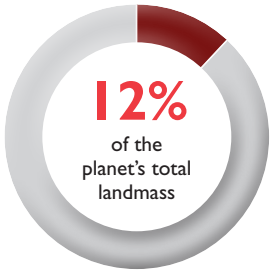
Both the US and Canada have announced plans to introduce instant or real-time payment solutions in the coming years. The US FED (Federal Reserve) is not planning to operate their own real-time payments scheme or choose a single preferred solution. However, the FED is acting as a catalyst and looking to the private sector to meet market needs. The FED Taskforce has established key effectiveness criteria against which 16 faster payment solutions have been assessed.

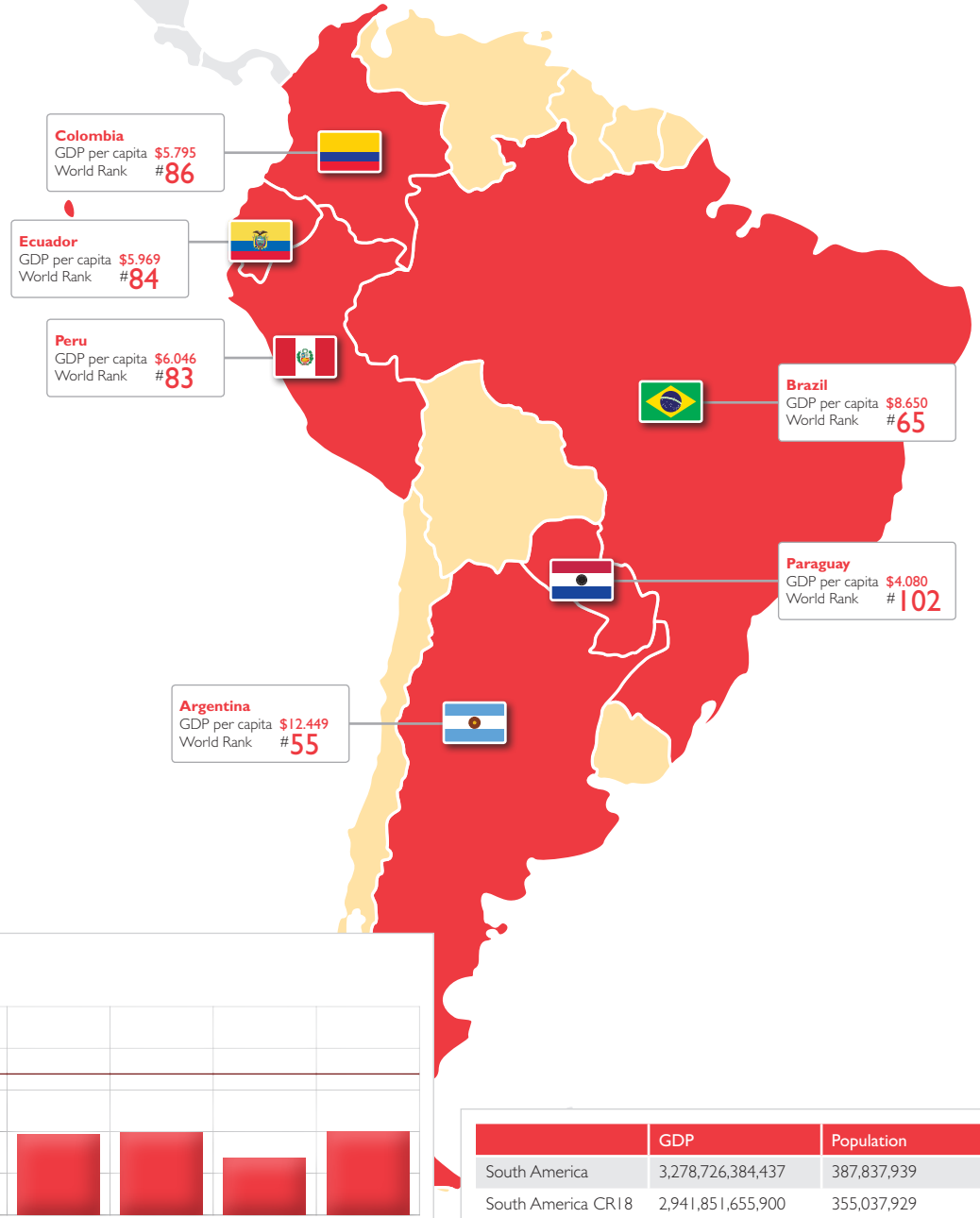
A similar initiative is ongoing in Canada where potential solutions have been explored and a final decision on next steps and implementation (timeline) is planned for 2018. The ambition to implement instant payments in Canada is part of a larger programme to modernise the country's payments infrastructure[72].

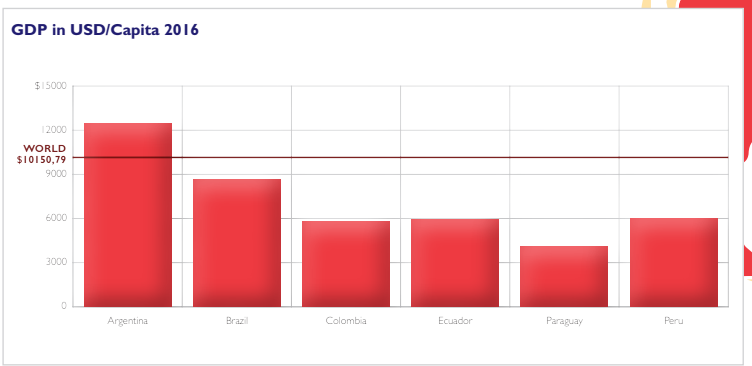
Simultaneously, the Canadian Central Bank is one of the Central Banks around the world actively looking at Central Bank Digital Currency as a potential replacement for physical cash. For more on the development of (Central Bank) Digital Currency see 4.3.

72 Source: https://www.payments.ca/sites/default/files/vision-canadian-payments-ecosystem-reader.pdf

SOUTH AMERICA







	GDP	Population
South America	3,278,726,384,437	387,837,939
South America CR18	2,941,851,655,900	355,037,929
Percentage	90%	92%

Legend

2011
2012
2013
2014
2015
2016

#114
Rank in world GDP (USD)/Capita

3.5 South America

South America covers an area of 17,840,000 km^2 (6,890,000 square miles) and ranks fourth in size after Asia, Africa, and North America. With just over 250 million inhabitants, the continent ranks fifth in population (after Asia, Africa, Europe, and North America). Brazil is by far the most populous of the 15 South American countries, with more than half of the continent's population, followed by Colombia, Argentina, Venezuela, and Peru. In recent decades, Brazil has also accounted for half of the region's GDP (1.8 billion USD).

Each country in South America uses a different currency and most use their own sovereign currency. Ecuador (US dollar) and French Guiana (Euro) are the exceptions.

Countries included in this report are[73]:

- Argentina
- Brazil
- Colombia
- Ecuador
- Paraguay
- Peru

3.5.1 The Use of Cash

Over the course of the past 5 years, currency in circulation (local currency) has increased by an impressive average of 61.9% in absolute value in studied South American countries. All countries reported double-digit growth of close to or well over 30%, with Argentina reporting 150% growth over this period. In relation to each country's GDP, the growth is less significant, as most countries also report strong growth in GDP. However, the growth in the Currency in Circulation ratio versus GDP is positive for most countries.

73 See Methodology for country selection criteria

Figure 99 GDP in USD per capita

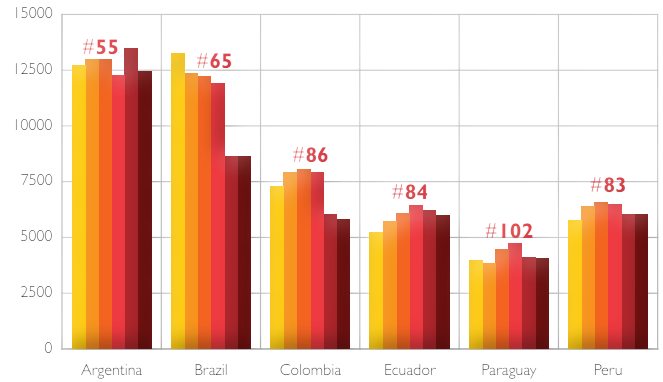
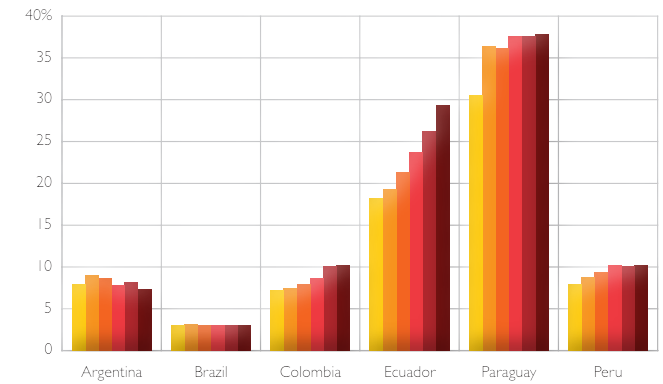


Figure 100 Currency in Circulation/GDP (value in local currency)



- Most countries show ratios between 3% and 10%, which is in line with most other countries in the world.
- Ecuador and Paraguay scored significantly higher with 29% and 38% in 2016, while Brazil is at the low end with 3%.
- Brazil is also very consistent with little or no change in this ratio over the past 5 years. Most

Figure 101 Growth ATM Withdrawals (value in local currency)

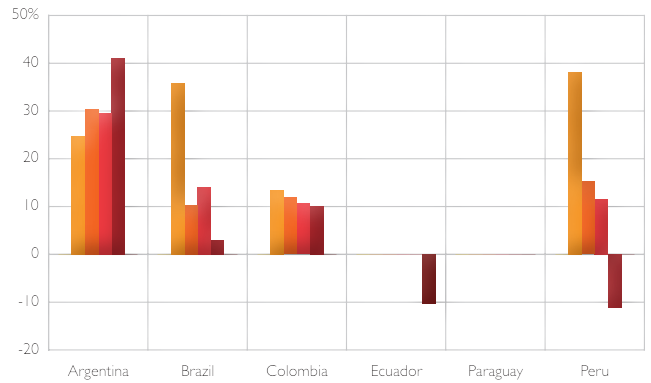
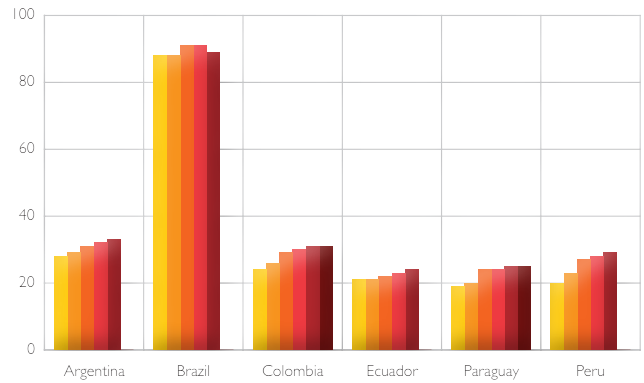


Figure 102 ATMs per 100.000 capita



other countries also show growth, indicating an increasing relevance of cash in their GDP.

- Argentina is the only country in South America with a declining trend.

- The value of ATM withdrawals is increasing in most South American countries[74], as this graph clearly shows.
- Growth percentages are strongest in Argentina (+41% in 2016) and close to 200% in total over the last 5 reporting years.
- Peru has shown a declining trend in growth percentages ending with a decline in the last reporting year of 2015. Yet over the period of 2011-2015, the compound growth rate was still +58%.

All of this indicates a clear and growing need for cash throughout the continent of South America for transactional purposes.

74 No data available for Paraguay; only 2015 and 2016 data available for Ecuador

Access to Cash

- The public availability of ATMs has improved in all countries in South America.
- Peru shows the strongest relative growth (+41.6%), resulting in 28.8 ATMs for every 100,000 inhabitants.
- Most countries have between 24 and 33 ATMs, which is somewhat below the global average of 40.5 ATMs.
- Only Brazil (89) clearly exceeds the global score, but at the same time is also the country with the lowest growth rate (+1.3%).

Figure 103 Bank branches per 100.000 capita

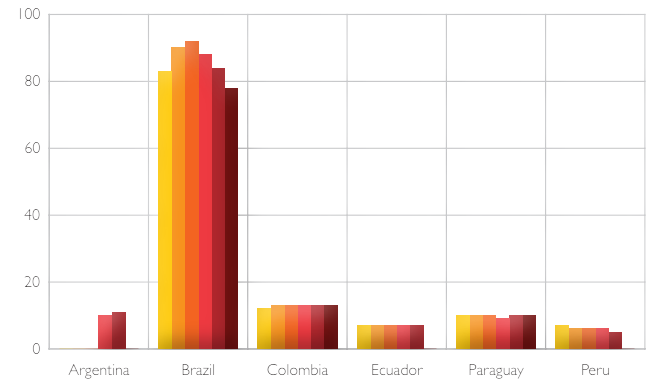
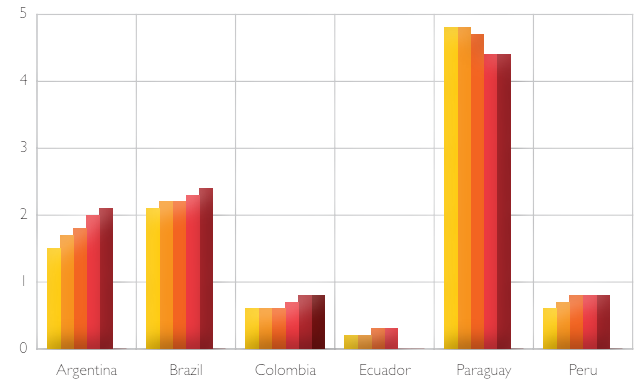


Figure 104 Cards per capita



Legend

2011
2012
2013
2014
2015
2016

- Availability of bank branches is largely in line with the global average of 12.6 bank branches for every 100,000 inhabitants.
- Brazil is once again the only notable exception, with a very high availability of bank branches (78), even though this number has been declining consistently from its peak of 92 in 2013.
- Most countries have (slightly) increased the number of bank branches to the public, except for Brazil and Peru (-30% to 'only' 5 bank branches for every 100,000 inhabitants).

Conclusions on the Use of Cash in South America

All in all, the main conclusions for the use of cash in South America are:

- Currency in Circulation in absolute value and as a percentage of GDP is increasing in most countries in South America.
- This is supported by the growth observed in the value of ATM withdrawals in most of the studied countries.
- These observations clearly indicate an increasing need for cash in the continent.
- Access to cash, via bank branches or ATMs, is fairly in line with global averages and is slightly improving, suggesting that the public's need for cash is recognised and facilitated.

Electronic Payments Infrastructure

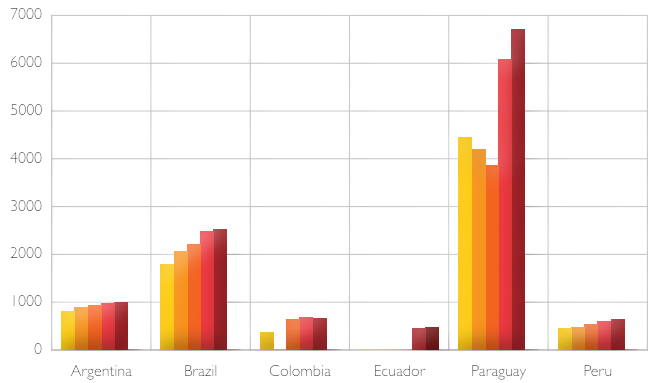
The electronic payments infrastructure in South America shows significant differences between countries, but growth in all countries. The two countries contributing most to the continent's total GDP, Brazil and Argentina, report higher numbers when it comes to cards and POS terminals.

Cards Issued

Looking at the number of cards available to South Americans:

- Argentina (2.1) and Brazil (2.4) exceed the global average of 1.8 cards per inhabitant, bringing the continent's average to 1.5.
- Colombia and Peru both counted 0.8 cards per inhabitant in their last reporting year.
- All countries have shown consistent growth numbers, resulting in an average growth

Figure 105 POS terminals per 100.000 capita



percentage of +29% over the past 5 years.

- Especially in Argentina, the number of cards issued increased by +48%.

POS Terminals

The picture is similar for merchants accepting cards in South America via POS terminals[75]:

- Argentina (998 POS terminals for every 100,000 inhabitants) and especially Brazil (just over 2,500 terminals or 1 terminal for every 4,000 inhabitants) score highest.
- While Colombia (658), Peru (636) and Ecuador (9,465) report significantly lower POS terminal availability.
- Resulting in a continental average of 1,055 POS terminals for every 100,000 inhabitants, which is well below the global average of 1500.
- All countries reported strong growth over the reporting period, indicating an improving availability of retail electronic payments infrastructure.

Even though the infrastructure is improving, the use of cards as a means of payment is still very limited in South America. Included South American countries[76] report significantly lower use of cards for transaction purposes than the global average of 103 card transactions per inhabitant per annum:

Figure 106 Card transactions per inhabitant per annum

Country	Card transactions
Argentina	13.5
Brazil	31.6
Colombia	18.0
Ecuador	1.9
Peru	4.5

75 Only 2015 and 2016 data were available for Ecuador

76 No data available for Paraguay

Figure 107 Access to a Bank Account (% of population >15yr)

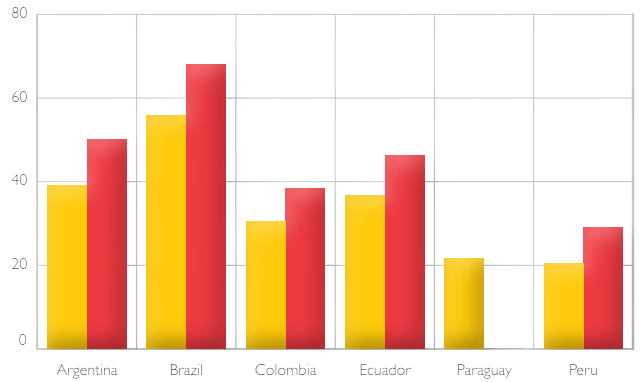
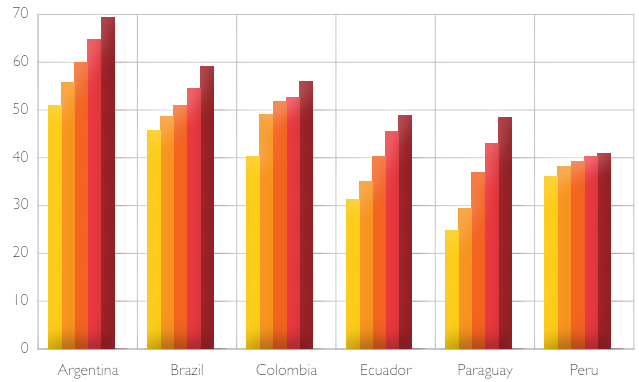


Figure 108 Internet Access (% of population >15yr)



Access to a bank account

Another factor in the adoption of electronic payments is the percentage of the population with access to a bank account. In South America:

- All countries are improving between the latest available reporting years of 2011 and 2014[77]
- However, only Brazil (with 68%) exceeds the global average of 60.7%

Internet Access

When looking at internet access:

- All countries have shown consistent growth over the past 5 years.
- All countries are at or above the global average of 50%.
- Resulting in a South American average of 54%.

Mobile Phone subscriptions

- With a score of 115 mobile phone subscriptions per 100 inhabitants in South America, the continent scores significantly above the global average of 102.
- All countries, except Ecuador (84), score higher than the global benchmark, with Argentina being the continent's leader at 151.
- Growth has not been consistent, with Argentina (-3.8%), Brazil (-4.9%), and Ecuador (-20.9%) reporting negative growth over the past 5 years, and even more significantly in the past 2 to 3 years.

Conclusion on electronic payments and social and financial inclusion in South America

- The card infrastructure is reasonably well developed in South America, with more than the global average of POS terminals per inhabitant and only slightly below the number of cards available to the public.
- However, that does not translate into frequent use of cards for transactional purposes, as all

77 No 2014 data available for Paraguay

Figure 109 Mobile phone subscriptions per 100 capita

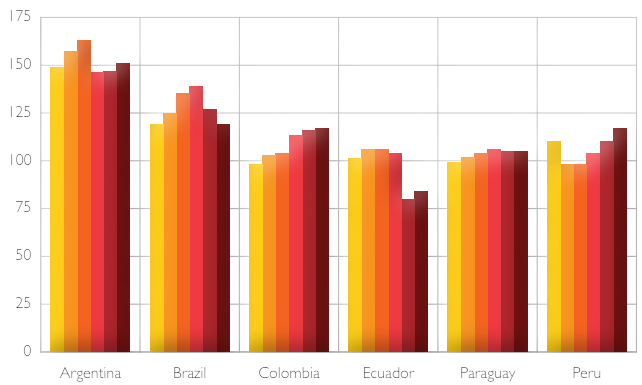


Figure 110 ATM withdrawals subject to fees

Country	Own Bank/ Network	Other Bank/ATM Network	Number of ATM networks	Market share of largest network
Argentina	No fee	Fee	2	53%, Red Link
Brazil	No fee	Fee, more withdrawals made than allowed	2	29%, Banco24Horas Rede Compartilhada
Colombia	No data	Fee	4	34% Servibanca
Ecuador	No fee	Fee, max. $0,50	2	90%, Banred
Paraguay	No data	No data	2	86%, BDI
Peru	No fee	Fee	1	7%

reporting countries remain below the global benchmark (102) in annual card transactions per person.

- Financial inclusion, measured in the percentage of the population with a bank account, is improving but is still behind the global average.
- Social inclusion, measured by internet and mobile phone access, is better developed, as the continent and most of the individual countries included here outperform the global benchmark.

3.5.2 Cost of Cash

The cost for obtaining cash for South American consumers is largely dictated by a familiar fee model that we have seen on all the other continents. Consumers can withdraw cash free of charge at their own bank or within their own banking ATM network. However, they are subject to a fee (disloyalty, not-on-us) when using an ATM outside of that network.

The overview below shows the specific fees for each of the South American countries included in this report. It also includes insight into the number of ATM networks and the market share of the largest network in the country, as an indicator of market consolidation/fragmentation.

- In Ecuador and Paraguay, we see a highly consolidated ATM network, with 90% of all ATMs connected to the Banred network in Ecuador, and 86% of all ATMs in Paraguay are connected to the BDI network.
- Peru, on the other hand, is highly fragmented. Even though the country only has one multiparty ATM network, only 7% of all ATMs are connected to it. All other ATMs are connected to proprietary networks.

Figure 111 Key cash-cycle components per country

Country	Population	Central Bank Offices	Cash Centers	Bank Branches	ATMs	POSs	CIT Companies	Cash Cycle Model
Argentina	43,847,430			4,585	14,244	433,283	21	
Brazil	207,652,860	9		161,526	182,378	5,160,948		
Colombia	48,747,708	29	101	6,462	15,227	317,204	8	Delegation Model
Ecuador	16,385,068	3	27	1,720	3,954	76,245	N/A	Centralised Model
Paraguay	6,725,308	17	10	1,826	7,004	444,859	5	Centralised Model
Peru	31,773,840	2		3,790	9,050	199,687		

21 CIT companies registered at Argentina National Bank; source: http://www.bcra.gov.ar/SistemasFinancierosYdePagos/Transportadoras_de_caudales_i.asp

3.5.3 Cash Cycle Organization

As in all other countries around the world, cash cycles in South America are organised separately by country. For most countries, the organisation of the cash cycle can be classified as centralized. In this model, the national central bank still plays a significant role in the operational activities of the cash cycle.

The overview below provides insight into key aspects of the cash cycle for each of the studied countries:

3.5.4 Future developments

Cash will remain an important method of payment throughout South America as the main building blocks to replace cash are not yet fully in place. At the same time, improvements to this end will be achieved as most countries actively pursue the development of their electronic payment infrastructure. The number of cards available to the public is increasing and, with room to grow towards the global benchmark in most countries, will continue to do so. The same goes for the number of people who have access to a bank account to begin with.

However, these developments will not materialise overnight, making cash indispensable across the continent in coming years.

Showcase

The catalytic role of cash in LatAm e-commerce

It might almost seem a contradiction in terms when talking about e-commerce and the important role of cash. Most view the centuries-old payment method of notes and coins incompatible with the modern way of transacting online, as cash banknotes can't just be fed into a laptop to complete a purchase.

Most would then be surprised to see that cash represents a significant portion (up to 40%) of e-commerce sales throughout South America[78].

In South America, on average, only 45% of the population has access to a bank account and even fewer people have a credit card[79]. On top of that, many are unwilling to put their credit card information online. Recognising this and looking for ways to stimulate their online business, e-commerce sites began accepting cash for online purchases.

They found solutions by accepting coded vouchers paid for with cash in banks or affiliated agents. Numerous initiatives have sprung up across the continent, initiated by single payment service providers or sometimes by a community of banks. Among the cash payment market leaders are Boleto bancário in Brazil, Oxxo in Mexico, Efecty in Colombia, and PagoEfectivo in Peru.

Since then, cash has claimed an astounding share of Latin American e-commerce, reaching up to 40% of sales in some markets. Below, you'll find a quick look at key LatAm markets where cash is an important e-commerce payment method and the major payment service providers (PSP) in each one.

These payment methods have not only claimed a significant position in e-commerce but also in offline business and day-to-day life. Boleto bancário, for example, is an official Brazilian payment method regulated by the Central Bank of Brazil. Launched in 1993, it now generates 3.7 billion transactions per year and accounts for around 25% of all online payment transactions. Boleto bancário is popular with enterprises as well as with consumers who don't have a credit card or just prefer the security of offline or cash payments. For 55 million unbanked adults in Brazil, Boleto bancário is the only way to pay for goods or services purchased online[80].

Figure 112

Country	Cash payment penetration of all e-commerce sites	Cash payment providers
Brazil	25%	safetypay, Boleto Bancário
Mexico	30%	safetypay, OXXO, 7 ELEVEN
Colombia	34%	safetypay, efecty, VIA, Baloto
Peru	33%	safetypay, Pagoefectivo
Argentina	40%	Pago Fácil, rapipago, Cobro Express

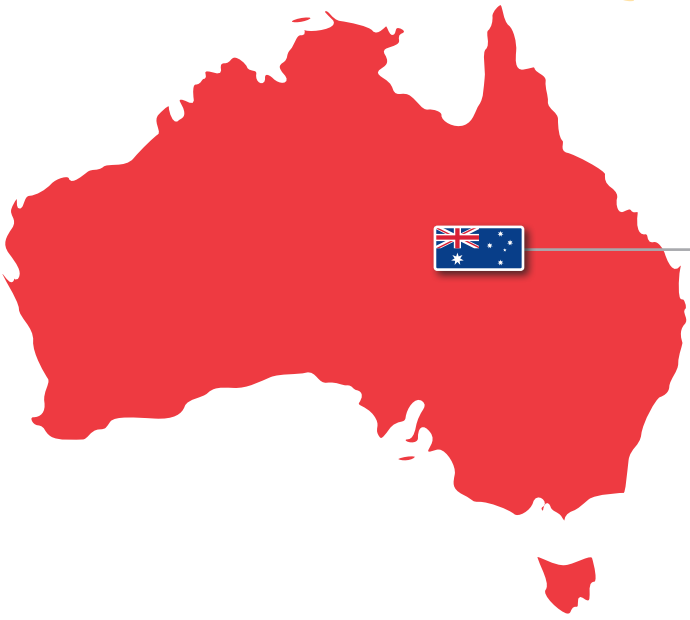
Given the way these cash based payment methods have already established themselves into South American retail business, it is unlikely that they will be replaced by purely electronic payment methods any time soon.

78 Source: http://amiperspectiva.americasmi.com/e-commerce-cash-payments-keep-growing-in-latin-america/

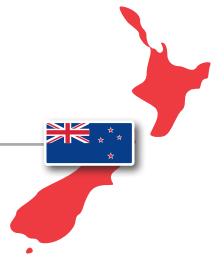
79 Even though more people have debit cards, they are only marginally used for e-commerce purposes, as most banks apply additional security measures for debit cards that decimate conversion rates.

80 Source: https://www.pagbrasil.com/payment-methods/boleto-bancario/

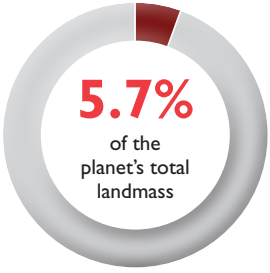
OCEANIA



Australia
GDP per capita $49,928
World Rank #12



New Zealand
GDP per capita $39,427
World Rank #21



3.6 Oceania

Oceania is the world's smallest continent and encompasses all of Australia, New Zealand, Papua New Guinea, as well as the thousands of coral atolls and volcanic islands in the South Pacific Ocean, including the Melanesia and Polynesia groups. With a combined population of just under 36 million, it is the least populous continent[81].

For the purpose of this report, we have selected the two countries with the highest GDP (in total and per capita) on the continent: Australia and New Zealand[82].

3.6.1 Cash Usage

Cash continues to play an important role in economies throughout Oceania. However, in recent years, consumers have increasingly started using electronic payment methods over cash for their transactions. Still, the overall demand for cash in Oceania remains strong. There is ongoing demand for cash, for both transactional and non-transactional purposes, particularly as a store of wealth.

Currency in circulation has increased steadily across Oceania in recent years, both in Australia and New Zealand, with an average year-on-year growth in value of 6% in Australia and 7% in New Zealand. When looking at the denominational breakdown, it is clear that this growth can largely be attributed to the larger denominations, e.g. the 50 and 100 (Australian and New Zealand) Dollar notes in both countries underlining the use of cash more as store of wealth than to be used for transactional purposes.

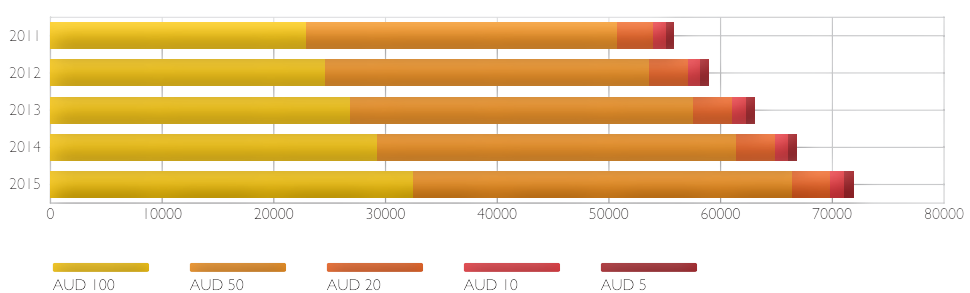
When offset against the growth in GDP, in both countries the ratio shows an increase, with Australia reporting that the value of currency in circulation has increased at a faster rate than nominal GDP in recent years, and the 'Currency-to-GDP' ratio has risen to its highest level in several decades[83], per the 2015 percentage. The ratio in New Zealand is substantially lower than in Australia, yet both ratios are low compared to most other countries around the world.

81 Source: http://www.worldatlas.com

82 Source: https://data.worldbank.org

83 Source: RBA Bulletin, December 2016, The Future of Cash, Cassie Davies, Mary-Alice Doyle, Chay Fisher and Samual Nightingale www.rba.gov.au/publications/bulletin/2016/dec/pdf/rba-bulletin-2016-12-the-future-of-cash.pdf

Figure 113 Banknotes in circulation, Australia 2011-2015, Value in AUD Mio



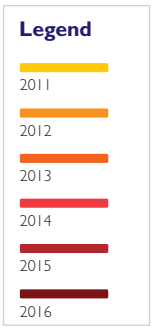


Figure 114 Currency in Circulation/GDP (Local Currency)

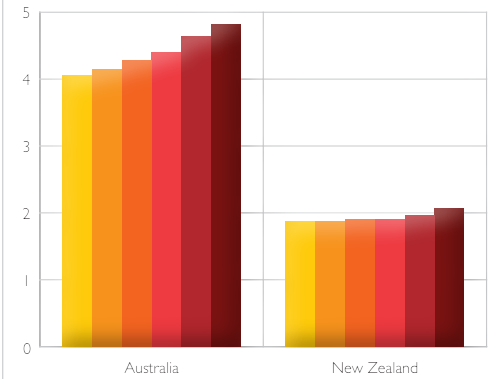
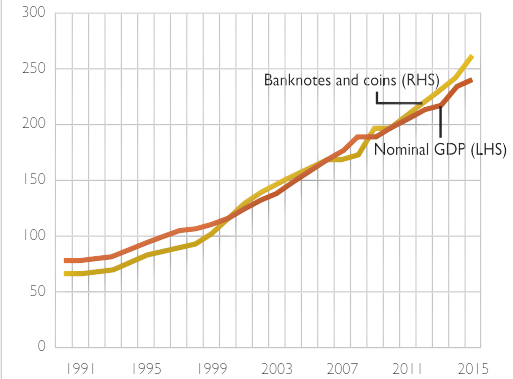


Figure 115 Value of notes in circulation in New Zealand 1991-2015



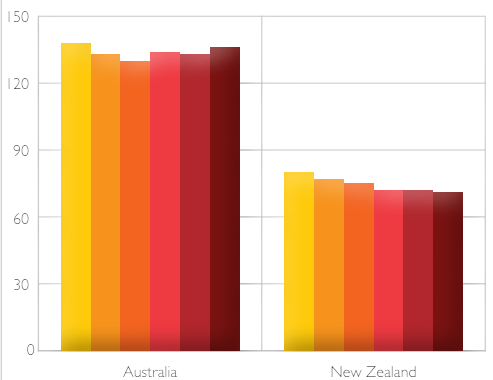
Source: Annual Report NZNB 2016 – chart 6.

The upward trend for both Australia and New Zealand is common for most economies across the globe, with only a few notable exceptions.

Australia's currency-to-GDP ratio is currently broadly similar to that of the United Kingdom and Canada, but noticeably lower than equivalent ratios of economies in the major global reserve currencies, namely the United States, the Euro area and Japan.

New Zealand's ratio is remarkably low, comparable to South Africa and Nigeria, which also have ratios of around 2%.

Figure 116 ATMs per 100.000 capita



Access to Cash

Access to cash in Oceania is increasingly limited, as the number of ATMs and the bank branches per capita are declining in both countries.

The number of ATMs per 100,000 adults declined by 1.2% in Australia and by 10% in New Zealand between 2011 and 2016. The number of ATMs available in New Zealand is significantly lower than in Australia: 71 to 136 in 2016 for every 100,000 adults. Australia ranks among the highest in the world (#7), whereas New Zealand compares to the EU average of 70 ATMs per 100,000 adults, but is significantly higher than the average number in the region (East-Asia Pacific), which stands at 52.

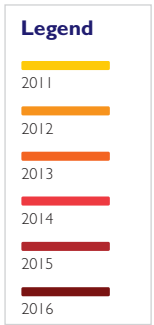
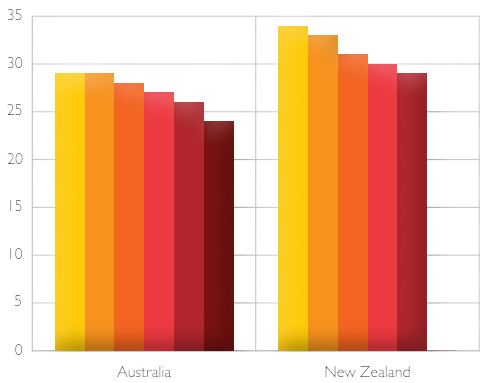


Figure 117 Bank branches per 100.000 capita



No data was available for New Zealand in 2016.

Where the number of ATMs has only marginally declined in Australia, the number of bank branches has shown a steeper decline: -12.9%. It's a trend followed in New Zealand, as well, where the number of bank branches has fallen consistently from a 2012 peak of 1,232 branches to 1,134 in 2015. Banks have been rationalising their branch footprints in response to their clients' increased preference for using digital channels to interact with their banks.

The number and value of ATM withdrawals

The use of cash has gradually declined over a number of years. This is reflected in reductions in the number and value of ATM cash withdrawals (the main method used to obtain cash), which fell by 14.8% and 30.2%, respectively, in the 2011-2015 period. The continuing decline in ATM withdrawals reflects a number of factors, including the adoption of new technologies such as contactless card payments and mobile payments.

Cash-Out at Point of Sales/EFT POS

In Australia, a third way to access cash is through 'cash-out' function at EFTPOS. Consistent with the effect of reduced cash use, EFTPOS cash-outs have also been declining since 2012.

Use of Cash – Consumer User Studies

A study published in 2017 on consumer payments behaviour In Australia[84] clearly shows that the trends mentioned above translate into a diminished use of cash as a means of transaction. Between 2007 and 2016, the share of cash fell from 67% in 2007 to 37% in 2015. This decline is mainly attributed to an increasing share of consumer payments being made via 'remote' payment channels – e.g. online card payments. Between 2013 and 2016, the decline in cash usage was almost entirely due to consumers using cards more frequently, even for in-person payments. Credit and debit cards combined were the most frequently used means of payment in 2016, overtaking cash for the first time.

For New Zealand, a similar study was conducted in the second half of 2017. The results of that study were not yet published when this report went to print.

84 Source: RBA Research Discussion Paper 2017-04; How Australians Pay: Evidence from the 2016 Consumer Payments Survey, Mary-Alice Doyle, Chay Fisher, Ed Tellez and Anirudh Yadav https://www.rba.gov.au/publications/rdp/2017/pdf/rdp2017-04.pdf

Figure 118 Total number of ATM withdrawals x Mio

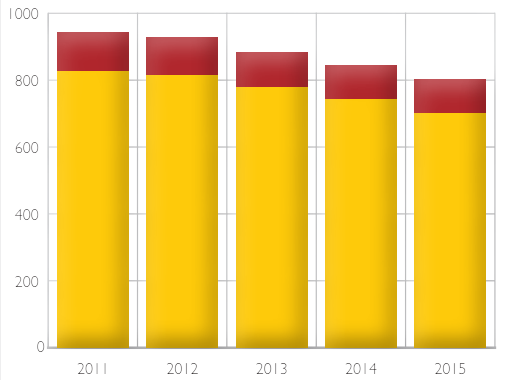
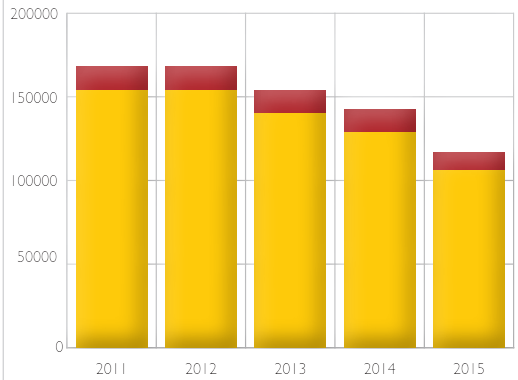


Figure 119 Total value of ATM withdrawals x Mio USD



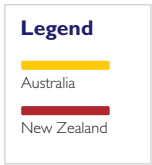


Figure 120 Consumer payment methods

	Number of payments				Value of payments			
	2007	2010	2013	2016	2007	2010	2013	2016
Cash	69	62	47	37	38	29	18	18
Cards	26	31	43	52	43	43	53	54
Debitcards	15	22	24	30	21	27	22	26
Credit and charge cards	11	9	19	22	23	16	31	28
BPAY	2	3	3	2	10	10	11	8
Internet/phone banking [a]	na	2	2	1	na	12	10	10
PayPal	na	1	3	3	na	1	2	4
Cheque	1	1	0.4	0.2	6	3	2	2
Other [b]	1	1	2	4	3	3	5	3

Notes:
Excludes payments over $9,999, transfers (payments to family and friends) and automatic payments
[a] Payments made using banks' internet or telephone facilities; does not include other payments made using the internet
[b] 'Other' methods would include prepaid, gift and welfare cards, bank cheques, money order, Cabcharge, and other online payment methods apart from PayPal (e.g. POLI)

Source: Table 1 from RBA Research Discussion Paper 2017-04; How Australians Pay: Evidence from the 2016 Consumer Payments Survey

Alternatives to cash

Alternatives to cash are already widely available throughout Oceania, and more and improved alternative payment methods are being developed. Payment cards and POS terminals available to the public show strong growth, in both Australia and New Zealand, and are among the highest in availability in the world. At the same time, other forms of electronic payments like credit transfer and direct debits have also shown positive growth, even though these payments are outperformed by cards in terms of transaction volume.
Card payments represent 65.6% and 76.8% of all electronic payment transactions for Australia and New Zealand, respectively (2016).

Innovations in these domains include contactless ('Tap & Go') payments with debit cards, the use of mobile phones for making (online or P2P) payments and the planned launch of the New Payments Platform (NPP) in Australia at the end of 2017. This will introduce a convenient, fast, secure option for person-to-person payments once it becomes operational. When in full operation, the NPP will offer some of the characteristics of cash that are valued for person-to-person payments, including immediate payment[85].

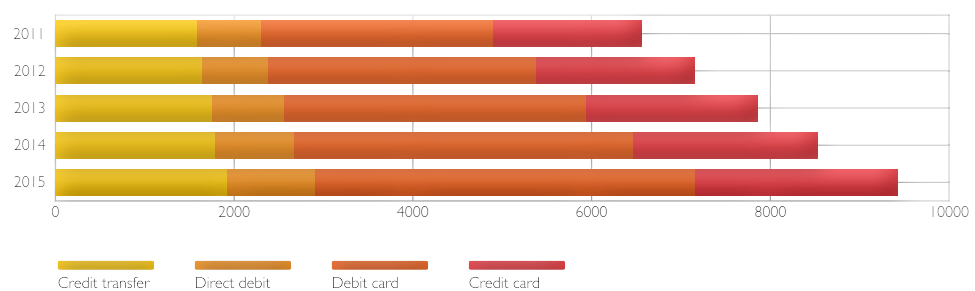
Development of non-cash payment methods over time

Electronic payment volumes are consistently increasing throughout Oceania, with the strongest growth in card transactions.

With an average annual growth rate of 9.8% in recent years, the growth in electronic payments exceeds the growth in 'currency in circulation' in Australia. Moreover, looking at growth in card transactions, the difference is even more significant; the number of debit card transactions in Australia grew by 63.4% in total and 12.7% per annum since 2011.

85 The NPP will allow individuals and businesses to make account-to-account fund transfers in real time, at any time of the day or night, seven days a week.

Figure 121 Electronic payments 2011-2016 Australia



The consumer study in Australia also shows a sharp increase in the use of automatic bill payments (using direct debit for recurring payments), from 23% in 2013 to 40% in 2016. This increase in direct debits for these types of payments comes mostly at the expense of BPAY[86] and card usage.

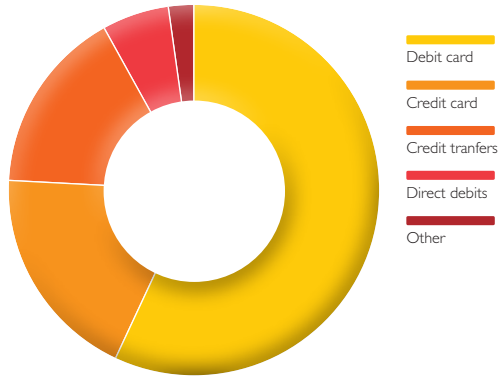
In New Zealand, card transactions also represent the largest share of electronic payments, with debit cards alone already accounting for more than half of all electronic payments in 2016 (1.1 billion). At the same time, credit cards have shown the sharpest growth in recent years, from 257 million transactions in 2011 to over 430 million transactions reported in 2016, a 41.4% increase over the period and 18.5% growth from 2015 to 2016.

Cards and POS terminals[87]

Australia and New Zealand have very similar numbers of cards issued per capita. New Zealand has a combined total of 2.88 debit and credit cards per capita and Australia has 2.75 cards per capita.

Australia and New Zealand are the world's number one and two when it comes to Point of Sale terminals per capita. In 2014, New Zealand had 151,700 POS terminals in service, equal to one POS terminal for every 28.8 inhabitants. Australia had 967,167 POS terminals in 2015, or one POS per 24.9 inhabitants.

Figure 122 Electronic Payment Mix New Zealand 2016



86 BPAY is an electronic bill payment system in Australia which enables payments to be made through a financial institution's online, mobile, or telephone banking facility to organisations which are registered BPAY billers. BPAY covers over 95% of the consumer banking market in Australia and has been operational since 1997.

87 Source: PaymentsNZ Research Paper - Benchmarking New Zealand's payment systems, May 2016

Figure 123 Digitalisation and Financial Inclusion in Oceania

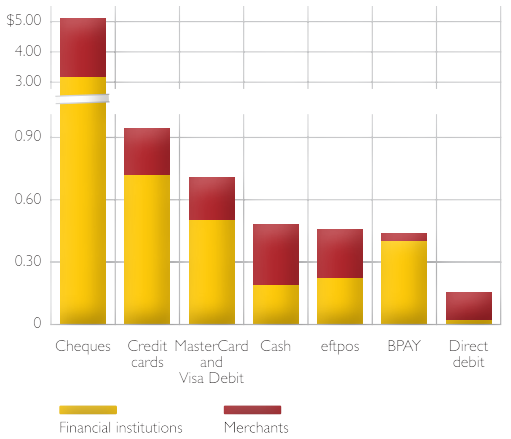
	Australia	New Zealand
% of population with access to Internet (2015)	84.56%	88.22%
% of population with a bank account (2014)	98.86%	99.53%
% of population with access to electronic banking (2014)	68.23%	71.66%
number of mobile phone subscriptions per 100 capita (2015)	132.80	121.83

Source: Source: Worldbank data

Digitalisation and financial inclusion

Internet penetration, access to a bank account, mobile phone subscriptions, and electronic banking usage are all high in both Australia and New Zealand. This indicates that the region is very mature when it comes to digitalisation and access to electronic payments infrastructure. Even though some individuals continue to rely extensively on paper-based payment methods, this means that, overall, the continent's dependency on cash for social and financial inclusion is limited. This is a clear indicator that the use of cash for transactional purposes is likely to decrease further, as more and more people become used to an increasing number of electronic alternatives and will use them more frequently in years to come.

Figure 124 Direct Resource Cost per average-sized transaction for each payment method



Source: RBA, Research Discussion Paper 2014-14, figure 1
Note: Payment function only

3.6.2 Cost of Cash

For consumers, using or getting cash is generally free in Oceania. When using an ATM that belongs to your bank, or a bank in its network, you will not be charged an ATM fee to withdraw cash. Using an ATM outside of your network could be subject to an ATM convenience fee. Until September 2017, this fee averaged 2 AUD per transaction in Australia[88], and according to the Australian Consumer Payments Survey, an 8% fee was charged on all ATM withdrawals. However, in September 2017, Australia's "big four banks" (CBA, Westpac, ANZ, and NAB) dropped ATM fees, with CBA being the first to abolish the charges[89]. In New Zealand, this 'disloyalty fee' averages 1 NZD. Surcharging is also allowed, with IADs charging between 2 and 3 NZD per withdrawal.

As stated earlier, cash-out at point of sale is another increasingly popular way to access cash. While some stores offer this service for free, others do charge a fee.

For merchants, the cost of accepting and handling cash has been studied in Australia, as well[90]. The main findings of this study, relevant to cash, were:

- The direct resource costs incurred by financial institutions and merchants in accepting an average-sized payment in cash from households were relatively low compared with some other payment methods.
- Financial institutions incur the majority of these costs. Around one-third of costs are incurred by merchants, with tender time (the time taken at the till to process the payment) being the most significant component.
- The study estimated that, in 2013, cash would have been the lowest-cost payment method for just under half of consumer payments (based on transaction size), although this share had fallen from around three-quarters when estimated at the time of the previous costs study in 2006.
- The aggregate and relative costs associated with card payments are changing considerably with the advent of contactless payments. Contactless card payments are estimated to

88 Source: https://www.finder.com.au/australian-bank-atm-fees-charges

89 Source: http://www.abc.net.au/news/2017-09-24/commonwealth-bank-and-westpac-axe-atm-fees-for-non-customers/8979250

90 Source: RBA, Research Discussion Paper 2014-14; The Evolution of Payment Costs in Australia, Chris Stewart, Iris Chan, Crystal Ossolinski, David Halperin and Paul Ryan

incur 10% to 20% lower resource costs than a comparable contact-based card transaction.

A number of conclusions can be drawn from these findings when it comes to the development of the cost of cash:

- Cash in itself is not more or less expensive than electronic alternatives, as long as the transaction volumes are there to balance the largely fixed cost base.
- Consumers do not incur direct financial cost for making a cash transaction, however they do incur cost in terms of time at the till to process the payment.
- Innovations in electronic payments will further reduce the time at the till for making electronic payments (for example, Tap&Go technology through cards and the use of mobile phones, introduction of real-time payments), facilitating a further shift away from cash towards electronic alternatives.
- This, in turn, leads to a further deterioration of the cost per transaction for cash and an intensified debate on the future of cash and maintaining a cost-efficient cash infrastructure.

Cost to community for maintaining the cash infrastructure

Oceania also has to deal with the dynamic of a potentially increasingly cost-inefficient cash cycle where the fixed costs associated with storing, transporting, and distributing cash would be spread across fewer transactions over time. Central banks in both Australia and New Zealand are fully aware of this. At the same time, they recognise their obligation to ensure that cash is accessible to all those who need and wish to use it, including segments of society that are particularly reliant on cash.

The '2016 Consumer Use Survey' showed little change from 2013 in the share of consumers that use cash very intensively – one-fifth of respondents continue to use cash for more than 80% of their transactions, compared with one-quarter in 2013. Within this group, around 12% of respondents in both 2013 and 2016 reported paying cash for all of their in-person transactions in the survey week.

While the Reserve Bank's current cash distribution arrangements – which, as noted above, are undertaken by the private sector – are working well, the Reserve Bank will continue to monitor cash distribution throughout the economy to ensure that it continues to meet the needs of the community.

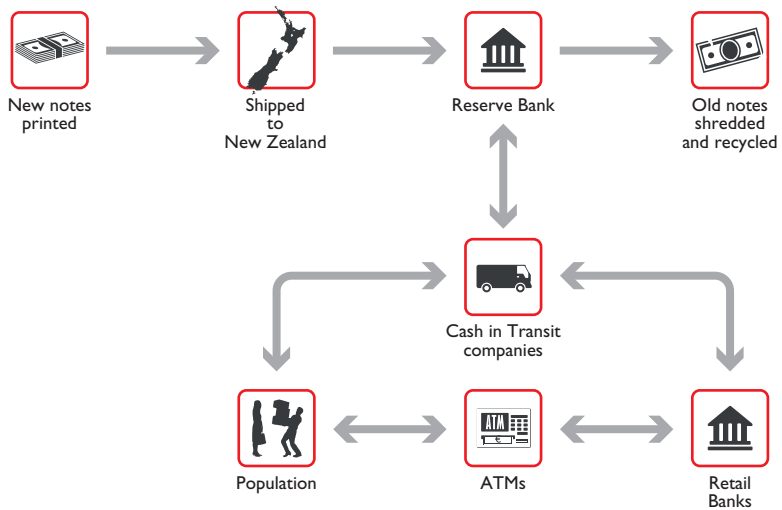
3.6.3 Cash Cycle Organization

As we have seen in other continents, cross-border integration is very limited when it comes to organising and operating the cash cycle in Oceania. In other words, cash cycle organization and optimization is largely pursued within national borders. The main reasons for this are differences in culture, laws, and regulations between individual countries. For Oceania, the particular geography of the continent is another reason. Borders between countries in Oceania are mostly oceans, actually separating each country physically from its neighbour. This obviously limits the potential for efficiency gains from cross-border cash cycle organisation following economies of scale.

Figure 125 Digitalisation and Financial Inclusion in Oceania

	Australia	New Zealand
Central Bank	1	1
Central Bank Offices	2	1
Banks / MFI's	155	24
Bank Branches	6220	1,134
ATMs	31,661	3,31
POSs	956,167	151,7
Population	23,832,520	4,692,700
CIT Companies	3	2
Cash Replenishment	Armaguard, Prosegur, Cash Services Australia	ACM, Armourguard
FLM	Prosegur, Armaguard + Integrated Technology Services, NCR, Toll	ACM, Armourguard
SLM	NCR, ITS, Armaguard, Diebold	NCR, Gilbarco, ITS

Figure 126 The Cash Cycle in New Zealand



Source: https://www.rbnz.govt.nz/notes-and-coins/notes/banknote-life-cycle

Another challenging factor for optimal cash cycle organisation is the density of the population in many countries in Oceania. First of all, it is the least populous continent in the world in absolute numbers, and the continent with the lowest density, as well (population per square kilometre).

Having said that, cash cycle organisation in Oceania largely follows the traditional cycle we see across the world.

Central Bank/Reserve Bank

In both Australia and New Zealand, the Reserve Bank manages the issuance and distribution of banknotes to commercial banks. The Reserve Bank also maintains a contingency holding of bank-notes to meet seasonal and other fluctuations in demand. From time to time, the Reserve Bank Australia also arranges for the return of circulating banknotes to the National Note Processing and Distribution Centre (NNPDC). These banknotes are processed through high-speed automated machines to check for quality and authenticity. Banknotes that are not fit for further circulation are shredded for polymer recycling; authentic fit banknotes are reissued to commercial banks[91].

Commercial Banks

Commercial banks purchase banknotes directly from the Reserve Bank. Those banknotes are transported and stored by the banks at approved cash centres located throughout Australia. Bank-notes which are identified as no longer fit for circulation are returned to the NNPDC.

91 Source: https://banknotes.rba.gov.au/production-and-distribution/distribution/

ATM replenishment and servicing

Cash Replenishment is outsourced for just over 80% of all ATMs in Australia and New Zealand, at a rate of around 50% for branch ATMs and nearly 100% for off-site ATMs. First-Line Maintenance follows a similar pattern, with third parties performing FLM for two thirds of all ATMs in New Zealand. This percentage increases for Second-Line Maintenance to 70% in Australia and nearly 100% in New Zealand.

In Australia, an efficiency initiative was started in 2013 called eftpos-Hub, or eHub, which initially focused on efficiency gains in the card-acquisition infrastructure. Thanks to this initiative, the industry is now also taking steps towards a more streamlined and efficient ATM acquisition infrastructure. In October 2015, two major banks in Australia connected their ATM fleets to the eHub and more industry participants are expected to follow suit.

3.6.4. Future developments

The trend of increased cooperation between banks to improve the cost-efficiency of the cash cycle is likely to continue in coming years. In Australia, it started back in 2001, when Cash Services Australia (CSA) was established by the four major commercial banks – ANZ, CBA, NAB, and Westpac – as a shared cash outsourcing provider. CSA was acquired by private CIT company Prosegur in March 2017.

For non-cash payments, several innovative initiatives are ongoing across Oceania. In the card domain, these initiatives include the use of NFC technology to allow for more speedy transactions

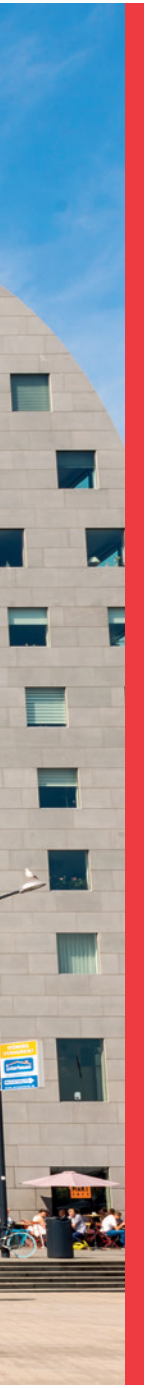
at the till (Tap & Go) and the integration of similar payment functionality on mobile phones. In bank payments, the introduction of real-time payments (e.g. through the New Payments Platform in Australia) is expected to take off in coming years. All these innovations in electronic payments are likely to have a negative impact on the use of cash.

Consumer studies already show that cash is used less and less for transactional purposes, with its use being limited to certain age groups and lower transaction amounts. However, some people continue to rely heavily on cash for their transactions and it will be important to consider the needs of these members of the community in the transition towards digital payments.

Even though its relative importance as a payment instrument is declining, cash will remain an important part of the economy and the payments system for the foreseeable future. It will also continue to be valued as a store of wealth.

Central Banks are reconfirming their obligation to meet the demand for banknotes to ensure that cash is readily available to those who wish to use it. At the same time, they do recognise the increasing tension between meeting this obligation and doing so at a reasonable cost. That is why national banks and their communities are expected to look to:

- Increase the efficiency of the current cash infrastructure.
- Look for alternatives to cash with a particular focus on new technologies to influence the way in which central banks meet society's demand for currency.



4 Future developments

Having analysed the use of cash and relevant related aspects on a global, continental, and country level over the years, the main question remains: what will the future bring for cash? Will the long-proclaimed cashless society become a reality, or will cash maintain the cornerstone position it has held for day-to-day transactions for decades, if not centuries?

4.1 The future of cash as a payment instrument

On a global and continental level, Cash in Circulation continues to rise consistently and has done so for almost as long as this statistic has been reported. In absolute terms as well as measured against GDP, the relevance of cash is continuously increasing in our economy. From that point of view, cash will remain of significant importance across society.

At the same time, an increasing number of individual countries have shown a decreasing Currency in Circulation vs. GDP ratio in recent years (Kenya, Nigeria, South Africa, Zambia, China, India, Indonesia, Russia, Ireland, Sweden, Argentina, and Brazil), indicating faster GDP growth than CIC. Moreover, two countries, South Africa and Sweden, actually showed a CIC decrease in absolute terms.
A similar pattern can be observed with the 2nd key indicator for the use and relevance of cash: growth in the value of ATM withdrawals. On a global level and on all continents except Oceania, that value is increasing, indicating a growing need for cash in day-to-day transactions. However, a small number of countries are also showing negative growth here, indicating the decreasing relevance of cash. These countries are mainly in Europe and Oceania: Belgium, Ireland, Sweden, United Kingdom, Australia, and New Zealand. Outside of these continents, only Canada has shown the same negative trend when it comes to the value of ATM withdrawals.

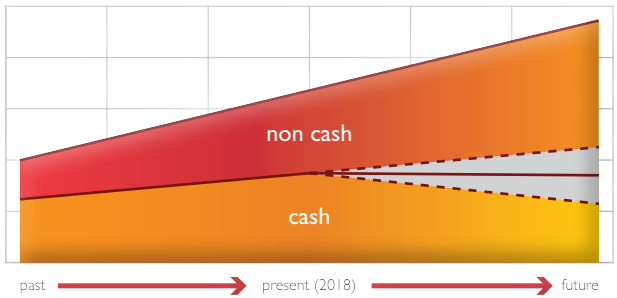
The key question is whether these countries will remain the exception to the rule (which they are at present), or if they are the first exemplars of a new rule.

Non-cash payments

On the other hand, non-cash payments have shown impressive growth rates in most studied countries. Card transaction volumes in particular have grown significantly in all countries except Kenya, overtaking cash as the most widely used payment instrument at the point of sale in some countries. Other forms of electronic payment have also shown positive growth, as has the availability of required infrastructure (cards, POS terminals, electronic banking, access to bank account).

All of this leads to the conclusion that, globally on average, payment transaction volumes are increasing in absolute terms, yet electronic payment volumes seem to be increasing at a faster

Figure 127 Development of payment volumes, cash and non cash



Source: Analysis G4S and Payments Advisory Group, 2018

rate. This then results in a reducing share of cash in the overall transaction volume, as shown in the below figure.

Even though it holds true for most countries that cash volumes seem to be increasing in absolute terms, it should be noted that this is clearly not the case in all countries. Most notably, the key indicators for Sweden clearly show an absolute reduction in cash transaction volumes. Other countries report a relative decline in the use of cash (vs. electronic payments).

From that point of view, each country has a different position on the horizontal 'timeline', creating a different outlook and a different dynamic in each country's cash cycle organisation.

4.1.1 Innovation & Technology

The trend towards electronic payments seems to be fostered by innovations geared towards facilitating the use of electronic payments methods. Examples of these new technologies are NFC (Near Field Communication) and QR codes, which enable contactless payments by card or mobile phone. A primary example of an innovation at the infrastructure level is the introduction of immediate payments in many countries around the world.

The increased use of mobile phones and wallets (especially in Asia) is also propelling the use of electronic payments over cash.

The combination of these technologies, features, and devices is allowing more and more people to quickly complete transactions in a consumer-to-consumer or retail environment face to face, electronically, and instantly. These forms of electronic payments are increasingly taking over the valued features of payment instruments that were previously exclusively the domain of cash, such as direct settlement, availability, and convenience/ease of use.

4.2 The future of cash cycle organization

The objective of cash cycle organisation is always clear: improving cost efficiency, regardless of positive or negative volume growth, while maintaining the reliability and availability of the cash infrastructure.

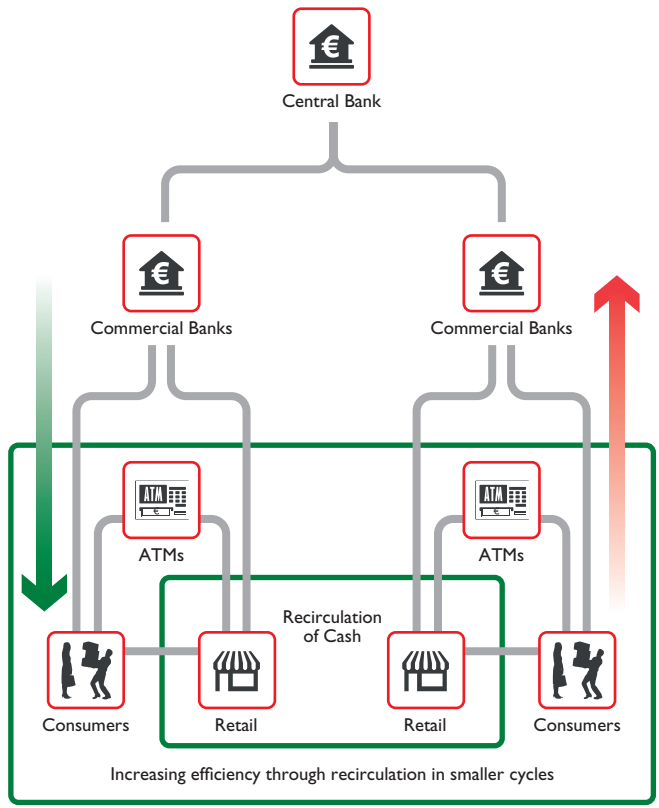
4.2.1 Trends in cash cycle organisation

A number of general trends have emerged towards that end:

- Banking sector retracts from operational activity. The banking sector is pulling back from operational participation in the cash cycle, starting with Central Banks but followed by retail banks in a number of countries. These activities are then executed by specialized third parties such as independent ATM deployers (IADs), Cash In Transit (CIT) companies and other Payment Service Providers (PSPs).
- From CIT to CMC. CIT companies anticipate future developments by transforming from classic Cash in Transit Companies to Cash Management Companies (CMCs). These companies signal an ambition to not only take on more activities in the cash cycle, but to become more actively involved in the liquidity and cash management on behalf of their clients, as well.
- Recirculation of cash in smaller cycles.

Another general trend seems to be that the recirculation of cash is increasingly handled at the retailer/consumer level, as shown in figure 128. This obviously varies per country and depends largely on each country's cash cycle organisation.

Figure 128 The Cash Cycle



The green arrow on the left indicates that operational services are pushed "down" into the cycle. There is more and more cash recirculation at that lower end, through increasingly sophisticated practices and services in cash cycle organisation. Furthermore, this recirculation is happening in increasingly smaller cycles (sometimes even within the premises of a single store). These both increase the efficiency in the cash cycle. Consequently, less cash is then transported back "up" into the cycle, as depicted by the smaller red arrow on the right.

4.2.2 Cash Cycle Governance

Following the trends signalled above, the governance of cash cycles is also subject to change. As already discussed in paragraph 2.3 Cash cycle organisation throughout the world, we've observed both similarities and differences between the various cash cycle organisations throughout the world.

Cash cycle models in the various countries can be regarded as generic, as they all share, by and large, the same:

- Objectives: cost efficiency, reliability, safety, and availability
- Process:
  - Issuing of notes and coins
  - Distribution via bank/ATM network to retailers and the general public
  - Fitness and counterfeit checking
  - Destruction
- Stakeholders:
  - Central Bank
  - Commercial Banks and (Independent) ATM Deployers
  - Retailers and consumers
  - CIT companies

However, they differ in the distribution of activities across stakeholders, i.e. the NCB's level of operational involvement and, consequently, the level of outsourcing to the other banks and/or third parties such as CIT companies. The four models associated with this are, in decreasing order of NCB involvement: Centralized, Joint-Venture, Delegation, Transfer.

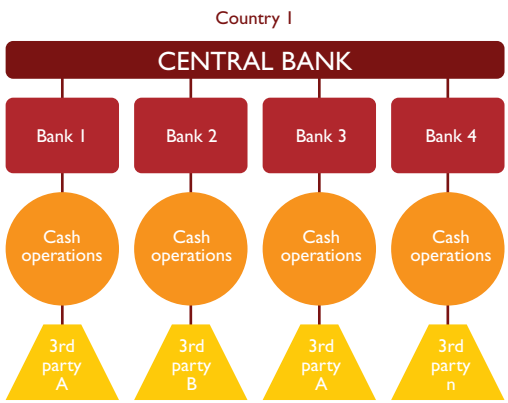
The observed trends of reduced involvement in cash operations by the (central) banking sector and recirculation of cash in smaller cycles between retailers and consumers both have an impact on the governance of domestic cash cycles.

Cash Cycle Governance

The most common governance model observed throughout the world is related to the Centralized/Delegation model, in which the NCB still has a large role in the operational aspects of the cash cycle but is transferring operational responsibility to banks and third parties.

Schematically it looks like this:

Figure 129 Cash cycle governance



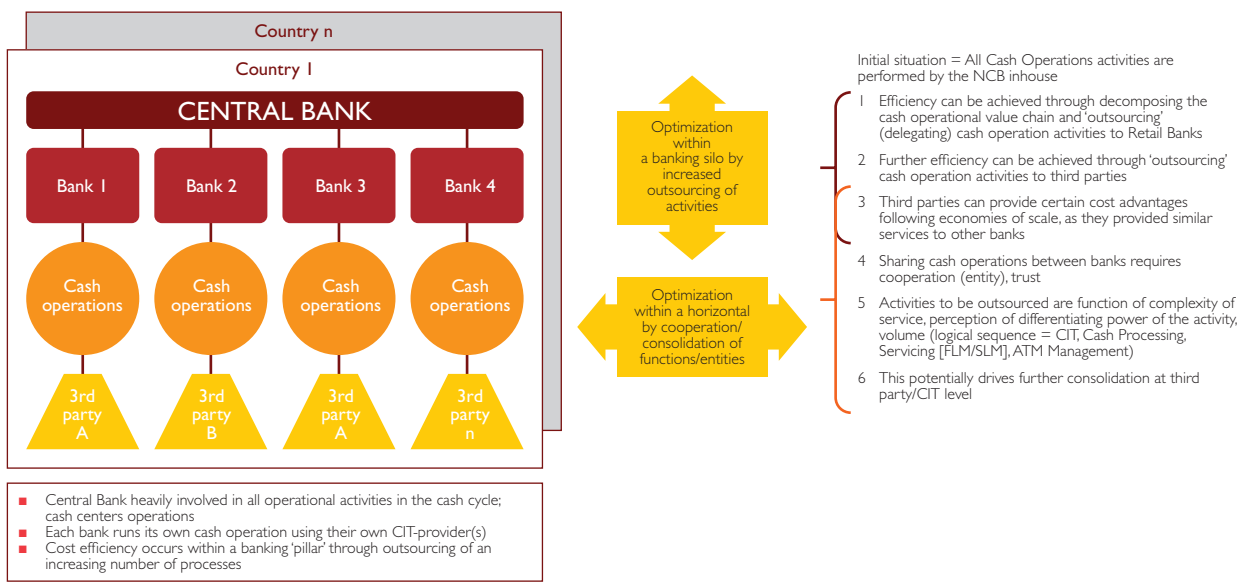
In the initial situation, all cash operations activities are performed by the NCB.

- Efficiency can be achieved through decomposing the cash operational value chain and "outsourcing" (delegating) cash operation activities to Retail Banks.
- Further efficiency can be achieved through "outsourcing" cash operation activities to third parties.
- Third parties can provide certain cost advantages following economies of scale, as they provided similar services to other banks.
- Sharing cash operations between banks requires cooperation (entity), trust.
- Activities to be outsourced are function of complexity of service, perception of differentiating power of the activity, volume (logical sequence = CIT, Cash Processing, Servicing [FLM/SLM], ATM Management).
- This potentially drives further consolidation at third party/CIT level.

Within this model, cost efficiencies come in two waves:

- Vertical: Optimisation within a banking silo by increased outsourcing of activities.
- Horizontal: Optimisation horizontally by cooperation/consolidation of functions/entities; this typically occurs 'bottom-up', starting with consolidation at third-party level and growing towards cooperation (rather than consolidation) at the cash operation/banking level.

Figure 130 Cash cycle governance - Overview and dynamics



This then leads to the next governance model (see figure 131) in which this consolidation has already taken place and further cooperation is undertaken to improve cost efficiencies.

In this model, associated with the cash cycle Joint-Venture model, commercial banks are responsible for cash operations (except issuing & destruction of notes, which remains the unique role of the NCB).

Through interbank cooperation, a shared and consolidated utility service is created to perform (generic) cash operations.

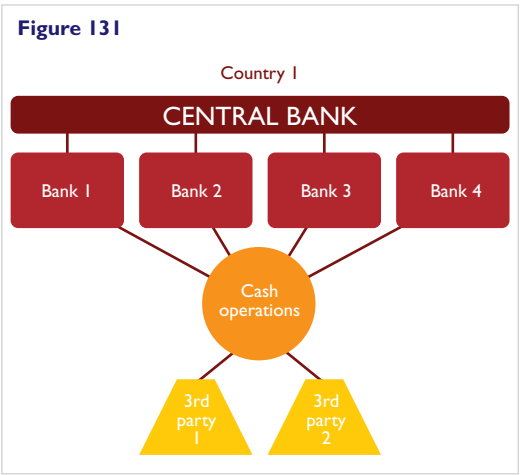
Retail banks are usually both shareholders and clients of this shared utility, while the actual operational activities are performed by the "Shared Utility".

This underpins another trend observed in cash cycle organization: in addition to NCBs, retail banks also are pulling back from operational involvement in the cash cycle. Examples of this model are countries such as the Netherlands, Austria, Sweden, and Australia.

This is potentially analogous to the developments we've seen in the electronic payments space: shared utilities for payment processing, such as Automated Clearing Houses (ACHs), owned solely by banks were established and gradually developed into more commercial Clearing & Settlement Mechanisms (CSMs), with non-bank shareholders.

Simultaneously, these companies have joined to discuss shared rules, regulations, and standards

Figure 131



in order to further increase operational (cost) efficiency. Examples are associations such as EACHA (European Automated Clearing House Association) in Europe and NACHA (National Automated Clearing House Association) in the US. Analogous to this development, it is expected that these shared utilities will become a central voice in the cash domain, as well, and as such, a new stakeholder in cash cycle organisation governance.

The shared utility works with select third parties to develop optimal cash cycle processes, coverage, and services in order to reduce cost. This means facilitating circulation of cash in the market (on the consumer and retailer level) as much as possible, avoiding unnecessary (and costly) transports of cash to banks, ATMs, or cash centres.

Looking further ahead, future models can be identified that are driven by reduced volumes in cash transactions at the level of (central) banks

Figure 132 Option Third Party Ownership

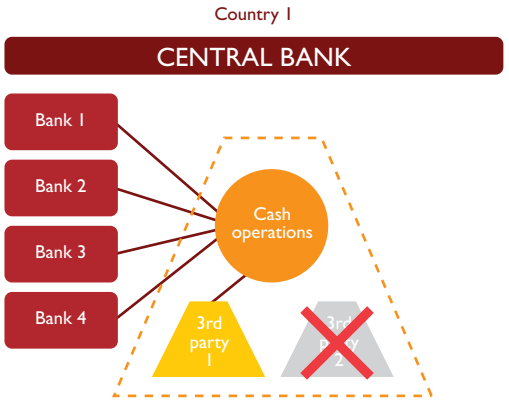
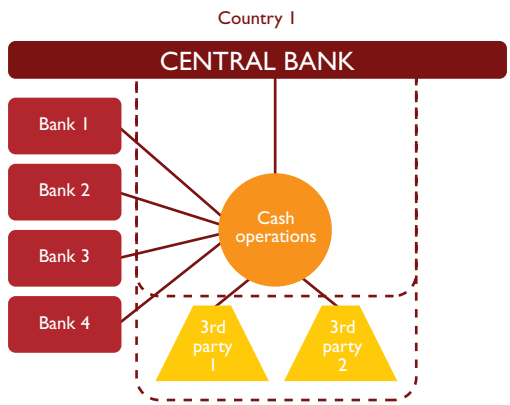


Figure 133 Option NCB Ownership



and cash centres. These models typically occur in countries with an already low dependency on cash. Driven by low cash transaction volumes and at the same time a need (obligation?) to provide continuity in the country, these communities (such as Sweden and Australia) are forced to find alternative and sustainable cash cycle models. These potential future models are depicted in figures 132 and 133.

In both models, cost efficiency occurs through re-integration in the vertical and retail banks are no longer shareholders but remain clients of the utility company. Ownership of the company is taken over either by a third party (figure 132) or an NCB (figure 133):

Option Third Party Ownership

- Third party acquires a centralized Cash Operation Entity.
- Banks are no longer shareholders, but users of cash "utility services".
- Cost efficiency comes from economies of scope and scale following the international expertise of the third party.
- Example is Australia, where CSA (Cash Services Australia) was acquired by Prosegur, 2017.

Option NCB Ownership

- NCB re-enters the cash operations domain
- Banks are no longer shareholders, but users of cash "utility services".
- Cost efficiency comes from further centralising the utility function.
- Main driver: low transaction volumes result in unsustainable business model for commercial parties, leading to continuity concerns.
- Business continuity is 'guaranteed' by central bank, even at low volumes.

4.3 Is Central Bank Digital Currency the future of cash?

Cryptocurrencies are emerging almost daily, with Bitcoin as the most well-known example. These currencies attract the general public's attention not necessarily because of their use as a means of payment, but more so as a potentially rewarding investment. The value of Bitcoin has increased (and decreased!) significantly in a very short period of time.

It is exactly this volatility and unpredictability that makes it very unlikely that these cryptocurrencies will replace the sovereign currencies we know today. Even though they can be regarded as a medium of exchange, they do not meet any of the other key functions attributed to money: store of value, unit of account, and standard of deferred payment.

At the same time, they have demonstrated the viability of the underlying blockchain or distributed ledger technology (DLT).

In many countries, especially in countries where cash usage has declined significantly, central banks have been looking for an alternative to physical cash. In those countries, questions such as "Will the payment system continue to be safe and efficient without cash?" are becoming an increasingly realistic concern.

In an effort to combine the best of both worlds, central banks have been studying the potential of and are experimenting with Central Bank Digital Currency (CBDC).

CBDC is defined as[92] an electronic form of central bank money that can be exchanged in a decentralised manner known as peer-to-peer, meaning that transactions occur directly between the payer and the payee without the need for a central intermediary[93].

Examples are the eKrona project in Sweden (see below) and the Fedcoin concept in the USA, but other countries, such as China, Russia, Canada, and the Netherlands, have been investigating the possibilities of DLT and CBDC, as well.

The Riksbank currently has a so-called eKrona project under way to determine whether it should supply digital central bank money to the general public. The project is considering different technical solutions and is looking at a register-based and a value-based solution, or a combination of these two. With a register-based e-krona, the balance would be stored in accounts in a central database, while a value-based solution would be more like cash is at present, as the value would be stored locally in an app or on a card[94]. The Riksbank has not yet made any decisions about issuing an e-krona and has identified a number of areas which need to be addressed before being able to make that decision. One of these areas is central bank legis-

92 Source: BIS Quarterly Review, September 2017. Central bank cryptocurrencies, Morten Bech and Rodney Garrett.

93 The purest form of peer-to-peer transaction is a cash exchange. On a computer network, the peer-to-peer concept means that transactions can be processed without the need for a central server.

94 Source: Riksbank, The Riksbank's e-krona project 1st interim report, September 2017 http://www.riksbank.se/en/Financial-stability/Payments/Does-Sweden-need-the-e-krona/Reports/

lation ('Sveriges Riksbank Act'), as the Riksbank's mandate to issue an e-krona and the question of whether or not the e-krona should be legal tender are ultimately matters for legislators to decide.

Given the investigative phase that all of these projects are in and the significant obstacles they have already identified, it seems safe to say that we're some time away from replacing actual physical cash with e-cash in the shape of a CBDC. At the same time, obstacles can be overcome and the potential of the DLT is undeniable. However, there is currently still doubt as to whether the DLT-based application of CBDC will actually be able to replace physical cash.

4.4 Cashless society: anytime soon?

Many advocates of electronic payments have long predicted a cashless society. But is that a realistic future and, if so, when? Or is it nothing but an academic concept that will never actually materialise?

In many discussions, it appears to come down to a matter of definition, or better yet: re-definition.

A society without any form of cash

In its purest form (no cash at all), the cashless society seems a far off, if not purely theoretical, future. Even Sweden, the country with the lowest dependency on cash in the world, acknowledges that that are many reasons to maintain (a certain amount of) cash and many obstacles to fully getting rid of or replacing cash.

A society with less cash

An of-heard alternative is a "less-cash society", which is a reality in an increasing number of countries, even though in many countries, as we've seen, cash usage is still rising. However, a less-cash society is oftentimes the objective of many policy-makers and stakeholders, especially from central governments and the banking community.

A society in which one could participate without using cash

A third way of defining a cashless society is a society in which one could participate without using cash and simultaneously still be able to use cash if preferred. This seems to be the more realistic future, especially for countries with already relatively low cash usage. It is also the option that leaves the choice of desired payment instrument open for consumers. Cash and non-cash payment instruments existing alongside each other, because, as stated before, there shouldn't be any competition between cash versus non-cash, nor should it be an either/or proposition. There is simply a need to make payments in all circumstances, and this need is fully fulfilled by both cash and non-cash payment instruments.

A society in which cash remains essential

Finally, one could imagine a future in which cash maintains its current leading and crucial position in day-to-day transactions. As we've seen, paying with cash is still the norm in the vast majority of countries around the world. And with more than 2 billion people unconnected to the electronic banking infrastructure, cash is, by and large, the only option available to them for participating in the day-to-day economy. For many people around the world, cash provides the lifeline to social and especially financial inclusion.

5 Key Findings and Closing Remarks

After having analysed the available data, research, trends, and developments in cash over a 5-year period, across 6 continents and close to 50 countries, it can safely be concluded that cash is still an essential payment instrument throughout the world. As such, cash plays a crucial role in our economy and in the day-to-day lives of many of the world's citizens.

In this closing chapter of the 2018 World Cash Report, we would like to present the key findings that have arisen from the analyses and observations we've made throughout this report. We do so in the absolute understanding that by drawing generic conclusions on a continental, let alone global level, we cannot do justice to the particular status and dynamics of each individual country.

5.1 Key findings

5.1.1 Use of Cash

Cash is by far the most commonly used payment instrument throughout the world. Cash demand is growing consistently, based on increasing ratio of Currency in Circulation vs. GDP and positive growth in the value of ATM withdrawals (+4.6% in 2015). The world average Currency in Circulation vs. GDP ratio is 9.6% in 2016 (up from 8.1% in 2011).

Access to cash is shifting more and more to ATMs as the number of bank branches is declining, while the number of ATMs is increasing (+11.2% per year to 56.8 ATMs per 100,000 capita in 2015).

Available diary surveys from 24 countries show that in 17 countries (71%), cash represents more than 50% of all payment transactions. Additionally, in Europe (ECB study covering 20 countries) the percentage of transactions conducted with cash is 78.8%. In countries that have conducted similar research before (the USA, Australia, the Netherlands, and Sweden), the percentage of cash transactions seems to be declining.

The following observations can be made about non-cash payments:

The availability of non-cash payment infrastructure is increasing significantly in almost all countries, translating into consistent growth non-cash transaction volumes. These growth rates, primarily in card infrastructure and transactions, but also in other forms such as mobile and e-money solutions, clearly reflect the increasing relevance and popularity of electronic payments throughout the world.

Given these observations, a logical conclusion could be that cash transaction volumes on a global level seem to be increasing in absolute terms, while at the same time, electronic payment transaction volumes are increasing even

faster. This results in a diminished share of cash in the total payment mix.

The attractiveness of cash and the reason consumers often select cash as their preferred method of payment (if they have a choice in payment method in the first place), could be because cash uniquely covers many of the features that consumers most value in a payment instrument, such as 100% availability and reliability, anonymity, and direct settlement without the need for a technical infrastructure.

Based on the payment attribute analysis, one could conclude that, at least from a user perspective, there shouldn't be any competition between cash versus non-cash, nor should it be an either/or proposition. There is simply a need to make payments in all circumstances, and both cash and non-cash payment instruments adequately fulfil this need.

Developments and trends impacting the use of cash and/or the shift towards electronic payments include digitalisation, a changing retail environment (towards online), and increasing adoption of mobile phones and internet. In addition, technologies such as NFC (enabling contactless payments), QR codes (Asia) and integration of electronic payment functionality directly from social media platforms enhance ease of use for card and mobile payments. Furthermore, the introduction of real-time or immediate payments (infrastructural improvement) in many countries allows electronic payments to be settled directly as well, increasingly covering key attributes which were previously uniquely covered by cash.

With regards to the cost of cash, like electronic payments, cash incurs a high fixed-cost component, which means that cost per transaction is highly dependent on transaction volumes.

Cash, in and of itself, is not an inefficient payment instrument. However, cash requires sufficient transaction volumes to offset the total cost for maintaining the cash infrastructure and keep the cost efficiency of cash transactions at an acceptable level. As the payment attribute analysis shows, the cost of a payment instrument is not the main driver for consumers to choose that payment instrument. For a consumer, using cash is free, whereas the use of a debit card isn't (fees for banking services including a debit card). Yet consumers increasingly seem to favour electronic payments over cash payments.

Some cash cycle participants are offering expert services and developing new technologies to optimise cost efficiency throughout the cycle. Decreasing volumes would only increase the urgency to do so.

5.1.2 Cash Cycle Organisation

When it comes to cash cycle development throughout the world, a number of overall observations and trends stand out:

Cash cycle organisation is a mostly domestic affair, with optimisation efforts limited to country borders. Each country's specific history, language, laws, regulations, and customs explain and contribute to these differences in cash cycle organisation. Despite this individuality, there are a number of generic trends:

- NCBs and increasingly also commercial banks are withdrawing from operational participation in the cash cycle, leaving these activities more and more to specialised third parties.
- Consolidation of activities takes place and Shared Service Centres are introduced as new entities in the cash cycle. Examples are Cash Services Australia (CSA in Australia), Geld Service Nederland (GSN in the Netherlands), Geld Service Austria (GSA in Austria), Bankomat (in Sweden).
- CIT (Cash in Transit) companies also benefit from the increased outsourcing trend and transform into Cash Management Companies, or CMCs.
- Repositioning of these CMCs in cash cycle value chain by offering additional services and acquiring central positions (e.g. CIT/CMC Prosegur acquired CSA, March 2017).
- Through their expertise, these Shared Service Centres and the CIT/CMCs are able to increase cost efficiency by re-circulating cash in smaller cycles in the lower part of the cash cycle (retailers, consumers).

Cash Usage per continent

As stated, cash is dominant on all continents, but there are differences between continents and certainly between individual countries. Overall, the following can be said about the usage of cash on a continental level:

Cash Characteristics per continent:

Africa

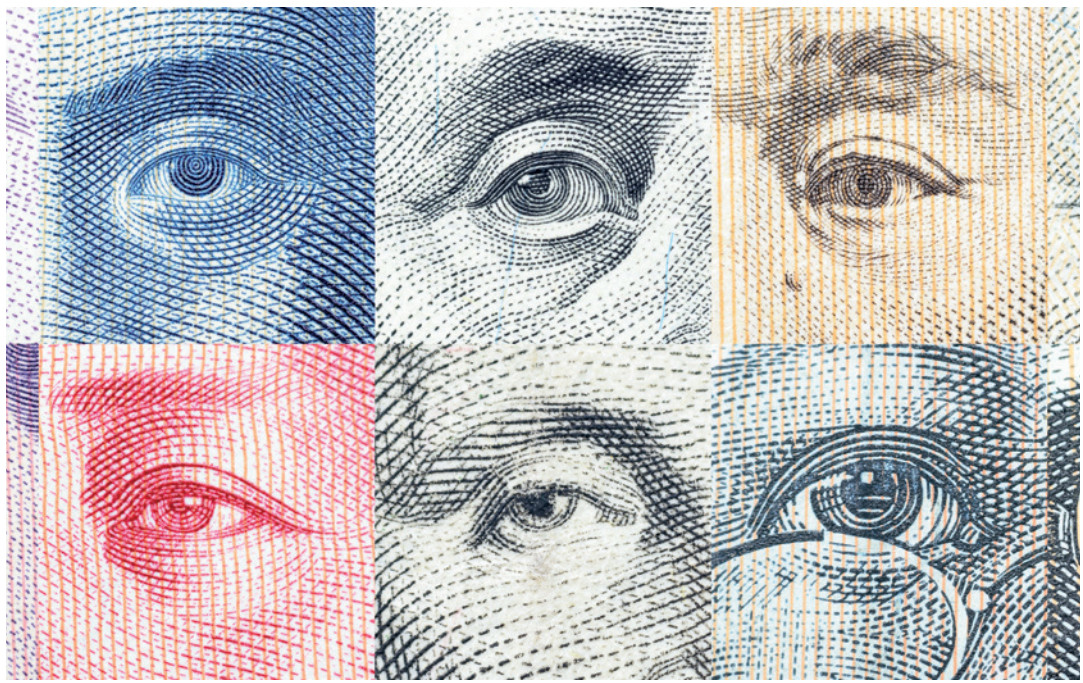
Africa is largely dependent on cash. Card infrastructure is limited and there are a large number of unbanked citizens. Mobile phone adoption, on the other hand, is high. In Africa, we see so called mobile-first communities leapfrogging the more traditional (and expensive) card infrastructure towards a more electronic payments future.

Asia

Even though cash is still paramount across Asia, growth rates for electronic payments, both in infrastructure and transaction volumes, are impressive. Card transaction volumes are soaring, as are mobile (wallet) payment solutions such as WeChat and AliPay. Asia is very diverse, with some countries depending almost solely on cash while others, like South Korea, are leading the way in becoming more and more cash-independent.

Europe

The use of cash is developing at two different speeds across Europe. Certain countries are clearly reducing their cash usage in favour of non-cash (e.g. Sweden/Nordics, the Netherlands, UK).



Others are still increasingly reliant on cash, mostly in South Eastern Europe. The continued adoption of contactless card payments will impact the use of cash, as will further roll out of instant payments across Europe. At present, however, according to ECB research, 4 out 5 retail transactions in Europe are still conducted in cash.

North America

There is a significant difference between cash usage and electronic payment adoption between the USA and Canada on the one hand and Mexico, Nicaragua, and Honduras on the other. With well-established and widely used electronic payment, largely card-based, infrastructures in the USA and Canada, these countries are less dependent on cash than other North American countries.

South America

South America is largely dependent on cash. Even though card infrastructures are improving, and electronic volumes are increasing, cash remains crucial to participation in economic society. Also, due to the relatively large group of unbanked citizens in South America, e-voucher solutions have become increasingly popular in many South American countries.

Oceania

Based on Australia and New Zealand, Oceania seems to be the least cash dependent continent, with a well-developed and highly adopted card infrastructure. Developments in mobile and immediate payments are likely to further drive electronic payment usage and transaction volumes.

5.2 Closing remarks

As we have seen throughout this World Cash Report, cash remains the cornerstone for conducting day-to-day transactions. For many people around the world, cash is the only payment method available to them that allows them to actively participate in our economic society. In that sense, cash is the starting point for financial inclusion. And even if they have a choice, many people still prefer to use cash to complete transactions.

At the same time, many initiatives are being undertaken to further extend and improve non-cash payment infrastructures, for instance via cards or mobile networks. This trend is clearly present in most if not all countries around the world and will have an impact on the use of cash and its share in the total payment mix.

This, in turn, impacts the way cash cycles are organised. Different models have been identified, all pursuing the shared objective of optimal cost efficiency, availability, and reliability. The various models are related to a country's level of cash dependency, and can, at the same time, be used as an inspiration for future development.

As we've also seen, there are clear differences between countries in terms of their cash dependency. This means each individual country needs to look at its own current situation and assess how it should organise its cash cycle, because even in the least cash-dependent countries around the world, the understanding is that a fully cashless society will not be a reality anytime soon.

Simply put, the world cannot do without cash.

Showcase

Ranking countries on their cash dependency

A popular question is how each country ranks in terms of its use of cash.

Even though it was not an objective of this World Cash Report, analysing all the data and drafting the report sparked our curiosity. As stated before, it is very difficult to calculate exactly how many cash transactions take place in a certain country. A number of key indicators have been identified in this World Cash Report that allow us to make an educated guess about the development of the share of cash in the total payment mix.

The following primary variables were used in order to help us present this 'educated guess':

- The ratio of Currency in Circulation vs. GDP in local currency, ranked low to high
- The ratio of the value of ATM withdrawals vs. GDP in local currency, ranked low to high
- The number of card transactions per capita, ranked high to low

Furthermore, the following secondary variables were used:

- Number of cards issued per capita; ranked high to low
- Number of POS terminals per 100,000 capita; ranked high to low
- The percentage of inhabitants with access to a bank account; ranked high to low

Finally, the ranking based on these primary and secondary variables was cross-referenced with the self-reported percentages of cash usage in the country. These diary survey results, which were not available for all countries, led to minor changes in the top 10.

So, without claiming scientific accuracy, and based on the scores of each individual country on these variables, the following top 10 list of countries[95] was compiled in ascending order of their dependency on cash:

1. Sweden

Sweden has the lowest ratio in CIC/GDP and one of the lowest ATM value/GDP in the world. Combined with very high availability and usage of electronic payments and a self-reported percentage of cash usage of just 20%, Sweden can rightfully be regarded as the least cash-dependent country in the world.

95 Comment: Countries "missing" (not included in our report) that would be expected to score high on this list are Norway, Denmark, Finland, Estonia, and Singapore.

2. New Zealand

New Zealand comes in 2nd just after Sweden, primarily because of the country's slightly higher ratios of CIC and ATM value against GDP. On the other hand, New Zealand's card transactions per capita are slightly higher than Sweden's.

3. South Korea

South Korea 'completes the podium' with the highest number of card payments per capita in the top 10 and the lowest self-proclaimed cash usage at just 14%. However, its CIC/GDP ratio is higher while its Financial Inclusion rate is lower than in Sweden and New Zealand.

Figure 134 Ranking the countries

	Country	CIC/GDP (LCY)	ATM withdrawals/ GDP (LCY)	Total card payments per capita	Cards per capita	POS terminals per 100,0000 capita	Population (age >15) with access to bank account (2014)	Self reported Share of Cash in total pos transactions
1	Sweden	1,4%	5,5%	299	2,1	2.599	99.7%	20%
2	New Zealand	2,0%	6,4%	323	-	-	99.5%	-
3	South Korea	5,9%	4,0%	334	5,0	-	94.4%	14%
4	Australia	4,8%	8,6%	274	2,8	3.955	98.9%	37%
5	Canada	4,1%	5,9%	274	2,9	3.860	99.1%	-
6	United States of America	8,1%	3,9%	304	4,1	4.325	93.6%	32%
7	United Kingdom	4,3%	10,4%	244	2,4	3.290	98.9%	42%
8	Netherlands	8,4%	6,5%	229	1,7	3.062	99.3%	45%
9	Belgium	8,7%	11,3%	151	1,7	1.683	98.1%	63%
10	France	9,4%	6,9%	118	1,5	2.225	96.6%	68%

The remainder of the top 10:

4. Australia
5. Canada
6. United States
7. United Kingdom
8. The Netherlands
9. Belgium
10. France

Quick Observations

A few quick observations can be made when examining this list:

- All top 8 countries, except New Zealand and Canada, reported cash usage below 50% in their latest diary surveys. Self-reported cash usage exceeds 63% starting at number 9 (Belgium).
- Another striking shared characteristic is the negative growth rate of the value of ATM withdrawals in most of these countries. This is unusual since, as stated in chapter 2, the value of ATM withdrawals globally showed a positive (average weighted) growth rate of 4.6% in 2015. The development of the growth rate in the value of ATM withdrawals could perhaps be considered an early indicator of cash usage in a country.
- By measure of their scores, only the top 8 countries could be considered "less cash-dependent" countries. Beyond that, the countries on this list (and all the countries that are not on this list) should be considered cash-dependent countries.


DÉB AMS
LONDON UNITED
94
Hammersmith 10
next
AXI
Y256 HGJ

6 Country Pages

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate GDP Per Capita in local currency 2012-2016
Population	Absolute number		
GDP (USD)	Billions of US Dollars	Per capita US Dollars	
Currency	Local Currency		
Currency in Circulation (x Mio LCY)	Millions in local currency	Per capita	
Value of ATM withdrawals (x Mio LCY) 2015	Millions in local currency	Per capita	
Number of ATMs 2015	Absolute number	Per 100,000 capita	
Number of Bank Branches	Absolute number	Per 100,000 capita	
Number of Cards Issued (x million) 2015	Absolute number in Millions	Per capita	
Number of POS Terminals 2015	Absolute number	Per 100,000 capita	
Total number of electronic transactions (x Mio)	Absolute number in Millions	Per capita	
Total number of card transactions (x Mio) 2015	Absolute number in Millions	Per capita	
Share of cash transactions at points of sale	Percentage		

The numbers shown in the value column will portray the latest data of 2016, unless the description of the statistic says 2015. The same goes for the column Growth Rate per Capita, it will portray the growth rate of 2012 – 2016, unless the description of the statistics says 2015.

Africa

- Egypt
- Kenya
- Morocco
- Mozambique
- Nigeria
- South Africa
- Zambia

Asia

- China
- Hong Kong
- India
- Indonesia
- Japan
- Malaysia
- Philippines
- Russian Federation
- Saudi Arabia
- South Korea
- Thailand
- United Arab Emirates

Europe

- Belgium
- Czech Republic
- France
- Germany
- Greece
- Hungary
- Ireland
- Italy
- Netherlands
- Poland
- Romania
- Spain
- Sweden
- Turkey
- United Kingdom

North America

- Canada
- Honduras
- Mexico
- United States of America

South America

- Argentina
- Brazil
- Colombia
- Ecuador
- Paraguay
- Peru

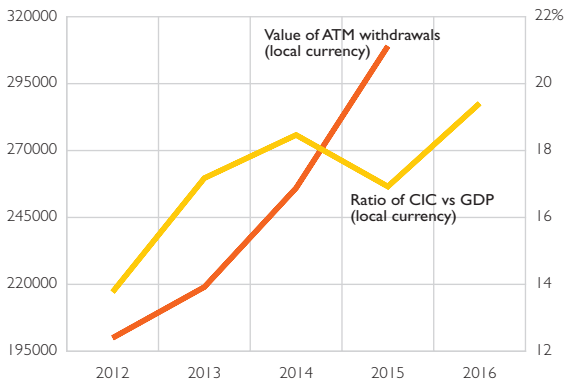
Oceania

- Australia
- New Zealand

Africa Egypt

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	95,668,680		
GDP (Bio USD)	34	351	15.9%
Currency	Egyptian Pound		
Currency in Circulation (x Mio LCY)	369,757	3,864	60.3%
Value of ATM withdrawals (x Mio LCY) 2015	309,000	3,295	55.5%
Number of ATMs 2015	8,898	9	33.1%
Number of Bank Branches	3,882	4	-1.3%
Number of Cards Issued (x million) 2015	18.98	0.20	30.7%
Number of POS Terminals 2015	59,200	63	46.6%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio) 2015	47	0.50	62.1% (2014-2016)
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Egypt seems to be growing. The value of ATM withdrawals shows a continuous growth and has experienced growth of +56% between 2011 and 2015. Furthermore, the growth seems to be accelerating. The currency in circulation vs. GDP ratio has also shown a positive trend during these years. At 19% (2016), this ratio is very high compared to other countries and twice the global average of 9.6%. Overall, the use of cash seems to be growing in Egypt.

The number of POS terminals increased by 47% and the number of cards issued has grown with 31% over the years 2011 – 2015. Yet despite these positive growth numbers, the absolute availability of card infrastructure is very low in Egypt. With only 0.5 card transactions per inhabitant per year, card usage is extremely low in Egypt. Conversely, Egypt is very dependent on cash for retail payments.

Cash cycle organisation

The Central Bank of Egypt plays an important role in the country's cash cycle. Besides its responsibilities as issuer of cash, the central bank also enforces rules and regulations on the cash cycle market in order to protect customers and minimize crime[96] [97].

Developments

Egypt is still considered a cash-based society, with only around 15% of its inhabitants having a bank account. However, the Central Bank of Egypt and the government are investing in alternative payment methods besides cash. One of these initiatives is the introduction of a mobile money transfer service, which has become increasingly popular in recent years, judging from its growing number of users. Other initiatives to grow Egypt's financial inclusion are to be expected, e.g. making simple banking services available for disadvantaged segments of the population[98].

96 Central Bank of Egypt, Annual Report 2015/2016

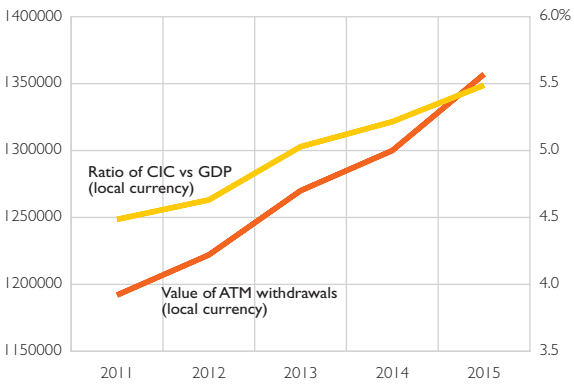
97 Central Bank of Egypt, Payment Systems Oversight Framework & Principal for financial Market Infrastructures (http://www.cbe.org.eg/en/PaymentSystems/Pages/Oversight.aspx)

98 Central Bank of Egypt, Annual Report 2015/2016

Africa Kenya

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	48.461.570		
GDP (Bio USD)	71	1.455	47,5%
Currency	Kenyan Shilling		
Currency in Circulation (x Mio LCY)	234.960	4.848	29,3%
Value of ATM withdrawals (x Mio LCY) 2015	1.357.000	29.468	13,8%
Number of ATMs	2.733	6	7,9%
Number of Bank Branches	1.829	4	26,2%
Number of Cards Issued (x million)	11,09	0,23	21,3%
Number of POS Terminals	22.596	47	18,7%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	214	4,41	-13,63%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Kenya seems to be growing. The value of ATM withdrawals has grown consistently from 2011 to 2015 (+14%). The currency in circulation vs. GDP ratio has taken a different path, with a small decrease from 4.4% in 2011 to 3.6% in 2015.

While the growth numbers for traditional non-cash infrastructure, such as cards issued (+21%) and POS terminals (+19%), are positive, the absolute availability of this infrastructure is still limited.

Kenya is looking beyond the traditional card infrastructure towards mobile payments to reduce its dependency on cash as the most important payment instrument in the country.

Cash cycle organisation

The Central Bank of Kenya is the only institution in the country that issues currency. The central bank is also responsible for processing and sorting deposited banknotes and coins. Central Bank of Kenya's role as sole issuer means it also has the task of distributing the currency throughout the country to local financial institutions. Distribution is done through the central bank's local branches. This shows that the cash cycle in Kenya follows a centralised model, where the Central Bank of Kenya plays a pivotal role in the overall cash distribution and processing.

Developments

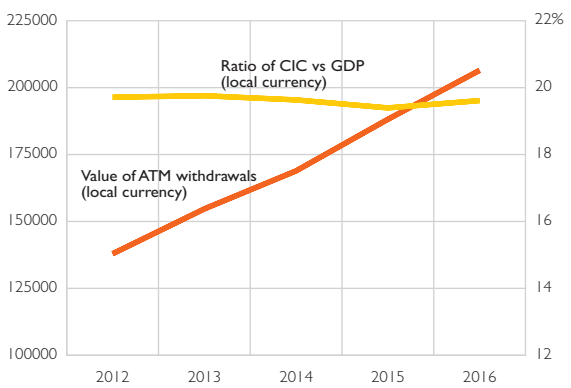
As indicated, cash still holds a strong position in the Kenyan payment market. Kenya has witnessed strong growth in the adoption of mobile payments service M-Pesa in recent years. The mobile-phone-based money transfer service is already accepted by many Africans and is likely to continue on this growth trajectory in the next few years. Cash, however, will remain crucial in Kenya's economy, as a majority of Kenyans still rely most on notes and coins to participate in day-to-day society and receive their primary income in cash[99].

99 https://www.centralbank.go.ke/uploads/financial_inclusion/736331048_FinAccess%20%20Household%202016%20Key%20Results%20Report.pdf

Africa Morocco

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	35,276,790		
GDP (Bio USD)	101	2,876	14.7%
Currency	Moroccan Dirham		
Currency in Circulation (x Mio LCY)	203,200	5,760	16.1%
Value of ATM withdrawals (x Mio LCY) 2015	206,458	6,006	41.6%
Number of ATMs 2015	6,529	19	23.0%
Number of Bank Branches	6,283	18	7.9%
Number of Cards Issued (x million) only debit cards 2015	11.82	0.34	39.4%
Number of POS Terminals 2015	22,413	65	53.5%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	-	-	-
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

Morocco seems to depend heavily on cash, judging by the two key indicators in this graph. The value of ATM withdrawals shows constant growth from 2011 to 2015. While the currency in circulation vs. GDP ratio was largely stable throughout these years, 20% is relatively high and more than twice the global average of 9.6%. In addition, the absolute value of currency in circulation also increased during from 2011 to 2015.

When it comes to electronic payment infrastructure, the available numbers show significant growth. The number of cards issued grew by almost 40% and the number of POS terminals increased by 53%. In absolute terms, however, those numbers are not yet near the global average, indicating that Moroccans have to rely mostly on cash to complete their day-to-day transactions.

Cash cycle organisation

The central bank of Morocco is the sole issuer of currency in Morocco. The bank is also responsible for preserving the quality of currency in circulation and is done by processing at the bank, as well as by delegating it to specialized institutions. This is all done under strict conditions set by the central bank. The distribution of currency is done through local branches of the central bank, these branches provide the currency to financial institutions. Which is then made available through ATMs and direct withdrawal from bank counters[100].

Developments

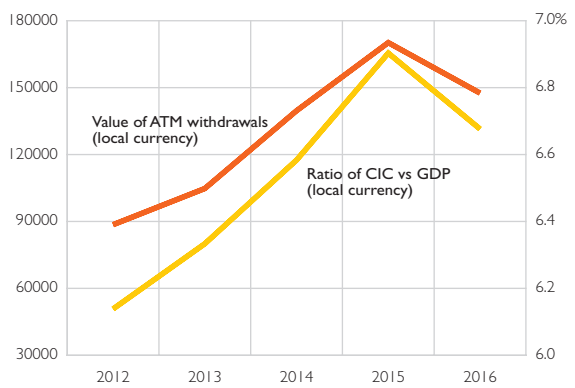
The growth of cash in Morocco seems evident. The value of currency in circulation is growing and the currency in circulation / GDP ratio shows growth in 2015, which continues in 2016. The value of ATM withdrawals show a constant growth over the years and the number of ATM withdrawals is also growing. Although there is growth in the infrastructure for non-cash payment methods, we cannot depict the growth rates for a lack of data. However, steps are made with the use of electronic payment methods.

100 http://www.bkam.ma/en/content/view/full/15786

Africa Mozambique

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	28,829,480		
GDP (Bio USD)	11	382	48.5%
Currency	Mozambique Metical		
Currency in Circulation (x Mio LCY) 2015	39,334	1,406	60.6%
Value of ATM withdrawals (x Mio LCY) 2015	147,553	5,274	49.0%
Number of ATMs	1,678	6	57.7%
Number of Bank Branches	587	2	1.7%
Number of Cards Issued (x million)	3,40	0.12	9.4%
Number of POS Terminals	25,815	90	151.9%
Total number of electronic transactions (x Mio) 2015	51	1.81	144.1%
Total number of card transactions (x Mio) 2015	20	0.72	132.8%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

Cash is an important payment instrument in Mozambique. The value of ATM withdrawals increased steadily up until 2015, when a decline was reported for the first time. A similar pattern emerges when looking at the currency in circulation vs. GDP ratio. A consistent increase with a slight decline followed a stronger growth in GDP than in the value of currency in circulation, which also witnessed positive growth. It will be interesting to see whether this is a one-off occurrence or the start of a new trend in Mozambique.

Mozambique has made investments in expanding the infrastructure to support conventional electronic transactions. The number of cards issued grew by nearly 10% and the number of POS terminals grew by more than 150%. These investments benefit the growth of the total number of card transactions (133%). However, the absolute numbers are far from the global average, indicating that card payments have not been embraced by the people of Mozambique.

Cash cycle organisation

The cash cycle in Mozambique is follows a centralised model. In this model, the central bank plays a pivotal role in cash distribution at a national level. Through its branch network, the central bank acts as a warehouse, distribution centre, and cash processor. There are seven CIT companies active in the cash cycle in Mozambique, none of which have a cash centre. That means that counting, sorting, and fitness checks are all done by the Central Bank of Mozambique[101].

Developments

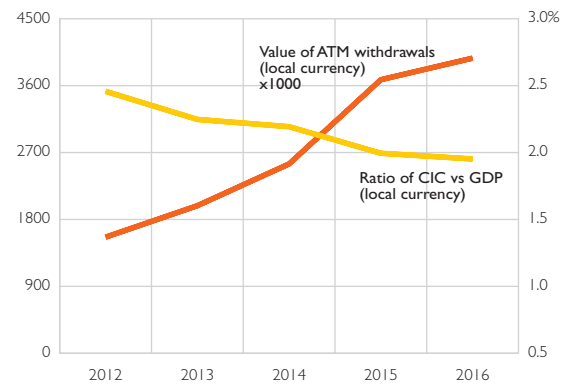
The key figures show that cash is the dominant factor in the payment market in Mozambique. The central bank is carefully looking at further developing the cash cycle and is developing new rules and regulations regarding cash cycle organisation in the country. Much effort will be geared towards improving the country's financial inclusion rate, as currently about two-thirds of its people do not have access to a bank account.

101 Central bank of Mozambique; Annual Report 2015

Africa Nigeria

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	185,989,640		
GDP (Bio USD)	405	2,178	27.1%
Currency	Nigerian Naira		
Currency in Circulation (x Mio LCY)	1,857,940	10,255	6.7%
Value of ATM withdrawals (x Mio LCY) 2015	3,970,000	21,912	128.5%
Number of ATMs 2015	16,186	9	50.9%
Number of Bank Branches	5,031	3	-22.5%
Number of Cards Issued (x million) 2015	33.86	0.19	475.3%
Number of POS Terminals 2015	116,868	65	-
Total number of electronic transactions (x Mio) 2015	222	1.23	388.8% (2012-2015)
Total number of card transactions (x Mio) 2015	53	0.29	1450.0%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

Cash is in high demand in Nigeria, especially given the value of ATM withdrawals. That volume has more than doubled in the past five years (+129%). At the same time, the already low ration of currency in circulation vs. GDP ratio has decreased over the 2011 to 2015 period to just below 2% in 2015.

This is mainly due to strong growth in GDP, which outperformed the absolute growth in currency in circulation in the country.

The infrastructure for non-cash payment methods has shown very impressive percentage growth in cards issued (+475%) and the number of electronic transactions (+389%). The number of electronic payments increased by 1450%. However, absolute numbers for these key indicators are still very low compared to regional and global averages.

Cash cycle organisation

The Central Bank of Nigeria is the sole issuer of Nigerian Naira. The Central Bank of Nigeria then uses its branches to deposit the currency into circulation with the deposit money banks. The old and unfit notes are collected via the same channel. The central bank of Nigeria is therefore responsible for the distribution and processing of currency in Nigeria[102]. The cash cycle can be characterised as a centralised model.

Developments

Cash is still the main payment instrument in Nigeria, but given the low availability of non-cash payment infrastructure and the strong growth rates already realised in the past few years, this growth can be expected to continue. This would then most likely lead to a shift from cash to non-cash. However, given the current status, cash is likely to retain its leading position in Nigeria for years to come.

The payment market in Nigeria is growing overall, with cash as the dominant payment factor, while electronic transactions have just started to settle in[103].

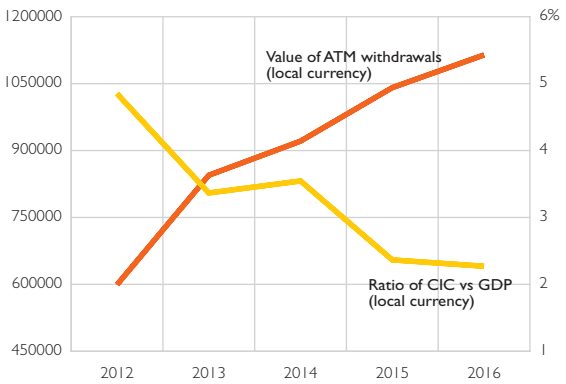
102 https://www.cbn.gov.ng/#_

103 Central Bank of Nigeria; Annual Report 2015

Africa South Africa

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	55,021,250		
GDP (Bio USD)	295	13,467	26.6%
Currency	South African Rand		
Currency in Circulation (x Mio LCY)	98,525	13,561	+30.9%
Value of ATM withdrawals (x Mio LCY)	1,114,367	27,432	76.5%
Number of ATMs	29,643	33	22.9%
Number of Bank Branches	4,051	11	3.6%
Number of Cards Issued (x million) (only debit cards)	50.94	0.93	18.5%
Number of POS Terminals	402,670	732	50.3%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	-	-	-
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

Demand for cash in South Africa is growing, primarily based on the growing value of ATM withdrawals from 2012 to 2016 (+86%). The value of currency in circulation has also grown in absolute terms (+31%), in line with the growth in reported GDP (+27%). This results in a rather stable ratio of between 4.6% and 4.9%.

The infrastructure for electronic payment methods has expanded in South Africa. The number of cards issued increased by +19% and the number of POS terminals increased by +50%. These are substantial growth numbers, but both cards issued and POS terminals per capita are not yet near the global average, so there is still growth to be expected.

Cash cycle organisation

The South African Reserve Bank has the sole right to issue banknotes and coins in South Africa. The bank's branches handle cash distribution and processing. The South African Reserve Bank also carries out fitness checks for banknotes. Therefore, the cash cycle in South Africa can be characterised as a centralised model[104].

Developments

While cash remains vital in the South African economy, many initiatives designed to modernise the non-cash payments infrastructure are ongoing and planned. The so-called Modernisation of Payments Programme focuses on four main project areas: strategic research and prioritisation, high-value credits, low-value credits, and debit payment systems[105]. Increased competition for cash is to be expected, which could potentially impact the share of cash in the South African economy.

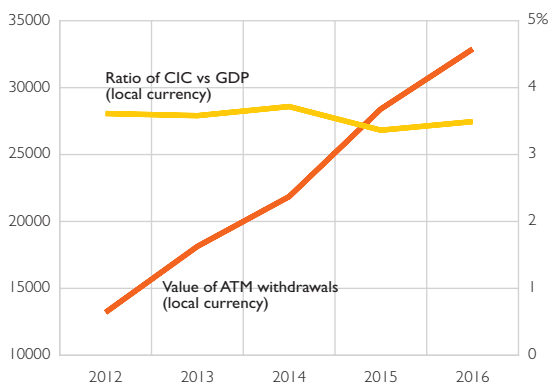
104 https://www.resbank.co.za/BanknotesandCoin/CurrencyManagement/Pages/Currencymanagement-Home.aspx

105 PASA Annual report 2016 - http://www.pasa.org.za/docs/default-source/default-document-library/pasa-2016-annual-report.pdf?sfvrsn=0

Africa Zambia

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	16,591,390		
GDP (Bio USD)	20	1,178	78.6%
Currency	Zambian Kwacha		
Currency in Circulation (x Mio LCY)	6,400	386	50.1%
Value of ATM withdrawals (x Mio LCY) 2015	32,880	2,028	120.2%
Number of ATMs 2015	1,000	6	64.8%
Number of Bank Branches 2015	391	2	37.3%
Number of Cards Issued (x million)	-	-	-
Number of POS Terminals 2015	6,915	43	242.9%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	-	-	-
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

Based on the growth in the value of ATM withdrawals, the use of cash in Zambia seems to be growing. This value more than doubled between 2011 and 2015 (+120%), with consistent year-on year-growth. The value of currency in circulation has also increased significantly (+50%), yet this growth is in line with the growth in GDP in local currency, resulting in a stable ratio of 3.5%, which is very low compared to most other countries in the world and far below the global average of 9.6%.

Cash remains a very important payment instrument, if judging only by the availability of non-cash alternatives. Despite high growth numbers, the absolute availability of traditional electronic payment infrastructure is still very low. The number of POS terminals has grown by +243%, but at 'only' 43 POS terminals per 100,000 inhabitants, access is still very limited. Also, the financial inclusion rate is rather low in Zambia, with 31% of the population over 15 years having access to a bank account (2014).

Cash cycle organisation

The cash cycle in Zambia follows a centralised model. The central bank of Zambia plays an important role in cash distribution. They act as a primary warehouse, distribution centre, and processing centre through their network of local branches[106].

Developments

All key indicators point to a high and growing relevance of cash in Zambia. At the same time, non cash infrastructure shows growth as well, with room for further improvement.

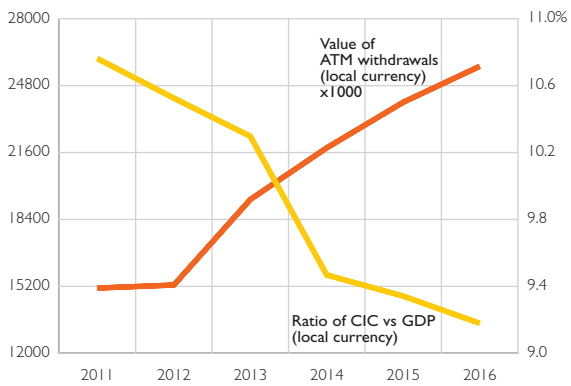
The Bank of Zambia is working towards increased usage of electronic payment mechanisms by the general public. To this end, the BoZ is cooperating with government and other private and public stakeholders to increase financial inclusion by increasing access to formal financial services and expanding and improving its electronic payments infrastructure.

106 http://www.boz.zm/banking-and-currency.htm

Asia China

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	1,382,710,000		
GDP (Bio USD)	11,203	8,102	40.0%
Currency	Chinese Yuan		
Currency in Circulation (x Mio LCY)	6,830,390	4,940	22.1%
Value of ATM withdrawals (x Mio LCY)	25,723,670	18,604	64.6%
Number of ATMs	924,176	67	117.2%
Number of Bank Branches 2015	224,600	16	-
Number of Cards Issued (x million)	6,124,64	4.43	69.3%
Number of POS Terminals	24,535,000	1,774	236.7%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	-	-	-
Total number of cash transactions	nav	-	-

Use of cash



Use of Cash

Cash still holds an important position in everyday life in China. This is substantiated by the growth rates of currency in circulation (22.1%), the value of ATM withdrawals (64.6%), and number of ATMs (117.2%).

Following strong growth in China's GDP (+40% in 2012-2016), the ratio of CIC vs. GDP is declining (despite the growth in CIC in absolute terms).

The infrastructure for non-cash payments in China has also improved, both in the 'more conventional' cards infrastructure and in the mobile domain in combination with social media. China reports +360% growth in number of POS terminals and 80% growth in cards issued. Adoption rates for WeChat and Alipay are even more impressive, as the Chinese show case clearly illustrates, see page 56|57.

Cash cycle organisation

The People's Bank of China (PBC) plays a very important role in the cash distribution cycle on national level. The cash cycle organisation is follows a centralised model where the PBC acts as the primary warehouse, distribution centre, and cash processor. There are more than 30 CIT companies active in China. The PBC uses one central cash centre and more than 100 supporting centres spread out across the country.

Developments

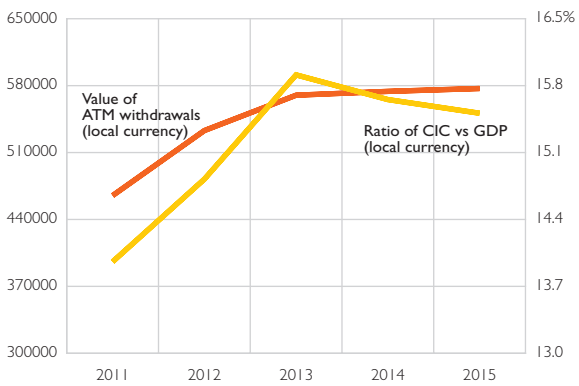
The PBC is encouraging the use of digital cash and electronic payments, but it also acknowledges the value of cash as a payment method[107]. The increasing popularity of non-cash payments is most clearly examplified in the enormous growth in adoption rates for payment methods such as WeChat Pay and AliPay.

107 Source: People's Bank of China Annual Report 2016; Payment System, p69-74

Asia Hong Kong

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	7,374,900		
GDP (Bio USD)	321	43,512	18.6%
Currency	Hong Kong Dollar		
Currency in Circulation (x Mio LCY)	390,470	52,945	25.5%
Value of ATM withdrawals (x Mio LCY) 2015	577,000	78,979	20.1%
Number of ATMs 2015	3,348	46	-1.1%
Number of Bank Branches	1,725	23	-10.9%
Number of Cards Issued (x million)	19.18	2.60	6.7%
Number of POS Terminals	110,320	1,495	0.8%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	690	93.51	23.0%
Total number of cash transactions	-	-	-

Use of cash



Use of Cash

In Hong Kong, the use of cash seems to hold a crucial position in everyday life. Currency in circulation has shown a growth rate of 25,5% (2012-2016) over a five-year period from 2011 to 2015. The value of ATM withdrawals has also grown, levelling off over the same period. Currency in circulation compared to GDP has followed a similar path, where the value of currency in circulation compared to GDP rose until 2013, and from then through 2015 it dropped 0.4%. However, the absolute value of currency in circulation has grown from 2011 to 2016, and the reported ratio (±15,6%) is relatively high compared to most other countries in the world (global average ratio is 9.6%).

The infrastructure for electronic payments in Hong Kong is stabilising, with the number of POS terminals levelling out with 0.8% growth, while cards issued grew by 6.7%. However, its usage has increased, as indicated by a 23% growth (2012-2016) in the number of card-based payments.

Cash cycle organisation

Cash cycle organisation in Hong Kong can be described as a centralised model, where the central bank (The Hong Kong Monetary Authority) plays an important in the distribution and processing of cash[108]. The Hong Kong Monetary Authority uses this role to optimise the cash cycle carried out by Hong Kong's five CIT companies and five cash centres. The Government, through the HKMA, has authorised three commercial banks to issue banknotes in Hong Kong. Authorisation is accompanied by a set of terms and conditions agreed between the government and these three note-issuing banks[109].

Developments

Financial institutions in Hong Kong are incentivising the use of e-wallets and card payments in order to reduce the use of cash. However, the use of cash is still prominent, as both the currency in circulation and the value of ATM withdrawals experienced growth over the 2011 – 2015 period.

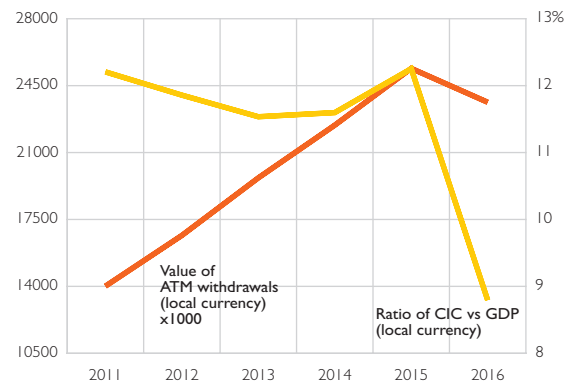
108 Source: Hong Kong Monetary Authority; Annual Report 2016

109 http://www.hkma.gov.hk/eng/key-functions/monetary-stability/notes-coins-hong-kong/notes.shtml

Asia India

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	1,299,000,000		
GDP (Bio USD)	2,259	1,739	42.9%
Currency			
Currency in Circulation (x Mio LCY)	13,352,340	10,279	6.0%
Value of ATM withdrawals (x Mio LCY)	23,631,117	18,192	32.9%
Number of ATMs	222,318	17	82.7%
Number of Bank Branches	148,629	11	14.0%
Number of Cards Issued (x million)	884.72	0.68	136.3%
Number of POS Terminals	2,529,141	195	180.2%
Total number of electronic transactions (x Mio)	19,032	14.65	208.8%
Total number of card transactions (x Mio)	12,056	9.28	76.5%
Total number of cash transactions	nav	-	-

Use of cash



Use of Cash

All growth rates related to payments are impressive in India. As part of the Indian government's larger digitalisation programme, the Reserve Bank of India (RBI) is driving for a cashless India. The decision to withdraw existing 500 and 1000-rupee (INR) banknotes from circulation as of 9 November 2016[110] was part of this endeavour[111]. This is reflected in the 2016 numbers, as indicated in the graph.

The Indian cash and non-cash payment landscape is expanding rapidly, especially the use of electronic payments: +209% (2012 - 2016). This is a direct result of tremendous growth rates in cards issued (+136%) and POS terminals (+180%). However, the per-capita numbers of cards issued, POS terminals, electronic and card transactions, are still considered low when compared to world averages, indicating ample room for growth.

110 https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=10684&Mode=0

111 http://digitalindia.gov.in and http://cashlessindia.gov.in

Cash cycle organisation

The RBI has only recently started setting up clear guidelines and business and policy standards for cash logistics[112]. The RBI is the proclaimed distribution centre and processor of cash and is working with banks and CIT companies to further improve business and policy standards[113].

Developments

The RBI has an initiative in place called "Cashless India". This is a taskforce set up to push the Indian economy towards electronic, card, and mobile payments and away from cash. Judging from the percentage growth, this taskforce has been very successful. However, in absolute terms, India is not yet near the global averages for electronic payment infrastructure and use. Cash is therefore likely to remain the most important payment method in India for the foreseeable future. See also Show Case India on page 54|55.

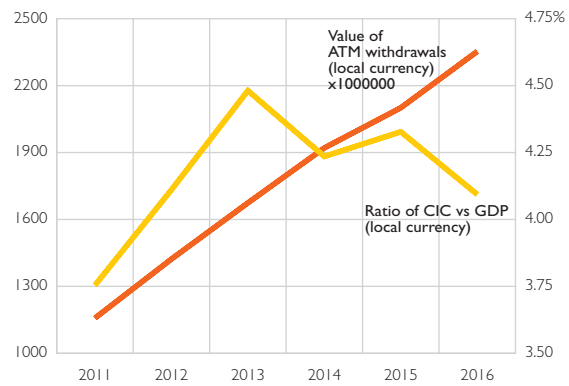
112 https://timesofindia.indiatimes.com/business/india-business/Stricter-norms-for-ATM-cash-handling-companies-likely/articleshow/44456188.cms

113 Source: Proposed Guidelines for Cash Logistics companies in India, Federation of Indian Chambers of Commerce and Industry.

Asia Indonesia

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	261,115,456		
GDP (Bio USD)	932	3,570	46,0%
Currency	Indonesian Rupiah		
Currency in Circulation (x Mio LCY)	528,533,908	2,024,139	45,4%
Value of ATM withdrawals (x Mio LCY)	2,353,443,247	9,013,037	57,2%
Number of ATMs	103,419	40	54,3%
Number of Bank Branches	28,808	11	-
Number of Cards Issued (x million)	145.19	0.56	56,7%
Number of POS Terminals	602,460	231	75,5% (2013-2016)
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	5,502	2107	71,6%
Total number of cash transactions	nav	-	-

Use of cash



Use of Cash

The use of cash in Indonesia looks substantial given the growth rates of both currency in circulation (53.1%) and the value of ATM withdrawals (65.5%), where the total value of ATM withdrawals shows an almost linear increase throughout the years 2012 – 2016. This is different when looking at the currency in circulation/GDP ratio, which seems to balance just above 4.0%.

Despite cash being an important payment instrument in Indonesia, alternative payment methods are growing rapidly. The growth rates of debit card transactions (+84%), credit card transactions (+37.7%), and eMoney transactions (+578.9%) illustrate this trend. eMoney transactions in particular are quickly gaining market share, even overtaking credit card volumes in absolute terms.

Cash cycle organisation

Cash cycle organisation in Indonesia follows centralised model. The Indonesian Central Bank plays a pivotal role in cash distribution on a national level as distributor and processor of cash. Indonesia has 98 different CIT companies, which have a combined total of 161 Cash Centres throughout the country. The high numbers of both CITs and cash centres is largely due to the island structure of the country.

Developments

Cash payment volumes in Indonesia are stable. A little over 50% (between 50% and 55%) of all transactions in Indonesia are completed with cash[114]. However, the Central Bank of Indonesia has ambitions and policies for becoming a less cash-dependent country. One of these is the launch of the National Non-Cash Movement. "The launch intends to build public awareness of non-cash payment instruments, thereby gradually fostering a less-cash society."[115]

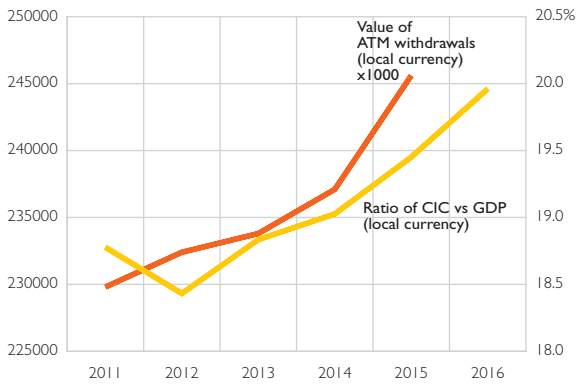
114 http://www.bi.go.id/en/statistik/sistem-pembayaran/rtgs/Default.aspx

115 http://www.bi.go.id/en/ruang-media/siaran-pers/Pages/sp_165814.aspx

Asia Japan

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	127,000,000		
GDP (Bio USD)	4,939	38,893	9.0%
Currency	Japanese Yen		
Currency in Circulation (x Mio LCY)	107,203,482	844,122	18.1%
Value of ATM withdrawals (x Mio LCY) 2015	245,600,000	1,932,337	7.5%
Number of ATMs 2015	85,900	68	2.7%
Number of Bank Branches 2015	36,326	29	-7.9%
Number of Cards Issued (x million) 2015	110.71	0.87	3.6%
Number of POS Terminals 2015	998,800	786	41.3%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio) 2015	2,783	21.89	14.66%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

Japan is considered a cash-oriented country[116]. This is underpinned by the already-high and growing ratio of currency in circulation vs. GDP and the increasing value of ATM withdrawals in the last five years.

Looking at the growth rates in electronic transactions, it shows that all types of electronic transactions are only moderately increasing, especially compared to other countries in the region. Japan invested in its POS terminal infrastructure, resulting in an increase in card transactions of nearly 15%. However, the number of cards per capita is still relatively low. According to the Retail Banking Research, Japan remains a predominantly cash-based society, where cash is the main method of retail payment[117].

116 https://www.bloomberg.com/news/articles/2016-11-08/cash-is-still-king-in-japan-and-that-could-be-a-problem-for-the-boj and https://www.ft.com/content/a7dc2cfc-9fa0-11e3-94f3-00144feab7de

117 Source: Retail Banking Research, Global ATM Market and Forecasts, 2016.

Cash cycle organisation

The cash cycle in Japan can follows a centralized model. The Bank of Japan acts as a primary warehouse, distributor, and processor of cash. The Bank of Japan issues currency into circulation through their branch network. Financial institutions in Japan bring their excess banknotes back to the Bank of Japan's branch offices and these are put back into circulation by the Bank of Japan or taken out of circulation when unfit[118].

Developments

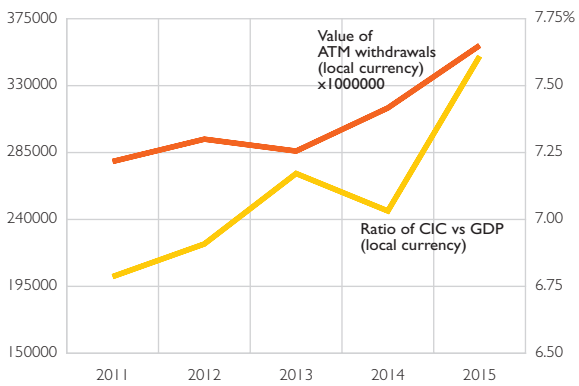
As indicated, cash is still very important in Japan and key indicators do not predict any decline in the near future. Even though cashless alternative payment methods are growing in Japan, they are not yet comparable to world averages. However, the Japanese Central Bank is looking for change and innovation ahead of the 2020 Olympics. They aim to use this event to upgrade the Japanese payment system and instruments.

118 https://www.boj.or.jp/en/note_tfjgs/note/outline/index.htm/

Asia Malaysia

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	31,700,000		
GDP (Bio USD)	296	9,348	19.0%
Currency	Malaysian Ringgit		
Currency in Circulation (x Mio LCY)	97,751	3,084	36.9%
Value of ATM withdrawals (x Mio LCY) 2015	357,000	11,442	17.2%
Number of ATMs 2015	13,340	43	4.2%
Number of Bank Branches	2,980	9	-
Number of Cards Issued (x million)	51.7	1.65	24.1%
Number of POS Terminals	326,507	1,030	39.7%
Total number of electronic transactions (x Mio) 2015	2,668	85.51	52.8%
Total number of card transactions (x Mio) 2015	452	14.50	22.9%
Total number of cash transactions	nav		

Use of cash



Use of Cash

The use of cash in Malaysia looks to be increasing. The percentage of currency in circulation vs. GDP and the value of ATM withdrawals increased in the 2011 – 2015 period. Not only did these numbers grow over a five-year period, they keep growing faster year on year. This is a good indication that cash plays and will likely continue to play an important role in the Malaysian payment landscape.

Even though cash is an important payment method, electronic payment methods are growing in availability and popularity, as well. While card infrastructure and debit card use (+250%) have grown over the past years, the most relevant non-cash payment instrument in Malaysia is eMoney, which constitutes 52% of total electronic payment volumes and has reported a +76% growth over the past five years. However, the total number of electronic transactions per capita is still low compared to the global average, indicating further room for growth.

Cash cycle organisation

The Indonesian cash cycle can be classified as a delegation model. In this model the Central Bank of Indonesia delegates some cash handling activities such as authentication checks, fitness sorting, and bundling to the commercial sector (PSPs and CIT companies). Throughout Malaysia, there are 12 CIT companies and six cash centres.

Developments

The Central Bank of Malaysia has a strong drive towards electronic payments[119]. The number of card payments is rising and more and more retailers are now accepting card payments. It is anticipated that the number of card/electronic payments will continue to rise[120]. However, as stated, the use of cash is also expected to rise. The future of payments in Malaysia is likely to be an and/and instead of an and/or proposition when it comes to non-cash vs. cash.

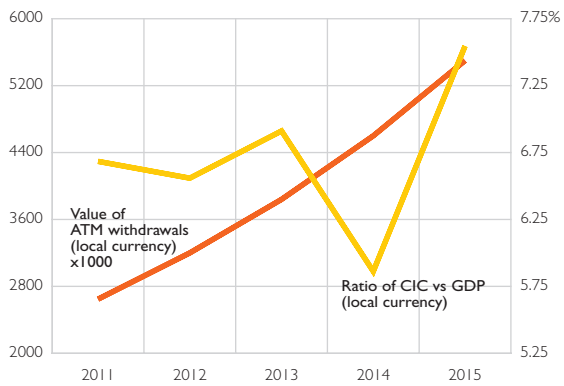
119 http://www.bnm.gov.my/index.php?ch=en_announcement&pg=en_announcement&ac=472&lang=en

120 http://www.bnm.gov.my/index.php?ch=ps&pg=ps_mep_drv_toward&ac=193&lang=en

Asia Philippines

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	103,320,222		
GDP (Bio USD)	305	2,951	27.4%
Currency	Philippine Peso		
Currency in Circulation (x Mio LCY)	1,124,192	10,881	50.8%
Value of ATM withdrawals (x Mio LCY) 2015	5,500,000	54,618	95.0%
Number of ATMs	19,205	19	37.0%
Number of Bank Branches	28,392	27	-3.0%
Number of Cards Issued (x million) 2015	59,21	0.59	29.0%
Number of POS Terminals	152,203	151	53.9%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	32,549	315.03	-
Total number of cash transactions	-	-	33.4% (2015-2016)

Use of cash



Use of Cash

The use of cash in the Philippines looks to be growing. This is best illustrated by the value of ATM withdrawals, which almost doubled between 2011 and 2015. The number of ATM withdrawals has experienced a similar trend, with close to 60% growth. The ratio of currency in circulation vs. GDP shows a slightly different pattern, but still an upward trend.

Signs of cash still holding a valuable position in the payment landscape is evident, however the electronic payment infrastructure is growing, as well, with almost 30% growth in cards issued in the country and an almost 54% growth in POS terminals. Besides that, eMoney has witnessed spectacular growth rates in the Philippines, especially in recent years, even though absolute numbers are relatively low. This is mainly driven by the increased availability of mobile banking, which has picked up momentum since its launch in 2011.

Cash cycle organisation

The cash cycle in the Philippines is follows a transfer model, where payment service providers (PSPs) assume responsibility and costs for all wholesale cash functions. The Central Bank of the Philippines is only responsible for issuing and demonetising currency. In the Philippines, five CIT companies cover the logistical process for cash.

Developments

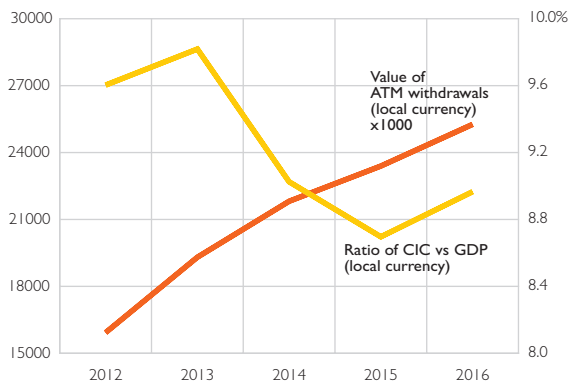
In the Philippines, cash is the number one payment method. The currency in circulation continues to grow and the value and number of ATM withdrawals has also grown over the 2012 – 2016 period. This shows that cash has a strong foothold in the payment market in the Philippines. However, the Central Bank of the Philippines is also actively involved in redesigning and improving the payment landscape[121].

121 Read more: http://www.bsp.gov.ph/publications/media.asp?id=4332

Asia Russian Federation

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	146,675,000		
GDP (Bio USD)	1,286	8,769	25.5%
Currency	Russian Ruble		
Currency in Circulation (x Mio LCY)	7,714,597	52,597	17.2%
Value of ATM withdrawals (x Mio LCY)	25,263,763	172,243	54.9%
Number of ATMs	201,396	137	14.4%
Number of Bank Branches	77,350	53	-13.2%
Number of Cards Issued (x million)	254.74	1.74	29.9%
Number of POS Terminals	1,777,996	1,212	141.8%
Total number of electronic transactions (x Mio)	20,292	138.35	271.0%
Total number of card transactions (x Mio)	14,414	98.27	393.09%
Total number of cash transactions	-	-	-

Use of cash



Use of Cash

The use of cash is still evident in Russia, which is illustrated by some interesting findings. The value of ATM withdrawals rose consistently in the 2012 – 2016 period. When looking at the ratio of currency in circulation vs. GDP, a mixed pattern emerges. But looking at the limited spread (between 8.8% and 10.0%), the ratio remains largely stable. In absolute terms, the currency in circulation in Russia has grown by over 17% over the 2012 – 2016 period. At the other end of the payment landscape, the infrastructure is changing rapidly, with an increase of POS terminals of 141.8% and an almost 30% rise in number of cards issued. These changes in infrastructure will have contributed to the enormous growth in electronic payments (271%) in total and in particular card payments, with a growth of almost 400% over the years 2012 – 2016.

Cash cycle organisation

The Bank of Russia has the following tasks regarding cash cycle organisation nationwide: they ensure the continuous supply of banknotes and coins and they are actively involved in the increase in efficiency of cash in circulation management through re-engineering business processes and mitigating risks. The Bank of Russia, therefore, plays a pivotal role in the current cash cycle in Russia as it is actively involved in determining the standards and procedures for all parties involved in the cycle[122]. This means that the cash cycle organisation in Russia can be described as a centralised model.

Developments

As shown by the Use of Cash graph, cash is still very much an important payment method in Russia. The number of withdrawals from ATMs continues to grow and the Bank of Russia is bringing more currency into circulation. However, alternative payment methods are growing fast and the Bank of Russia continues to stimulate the development of these cashless payment methods[123].

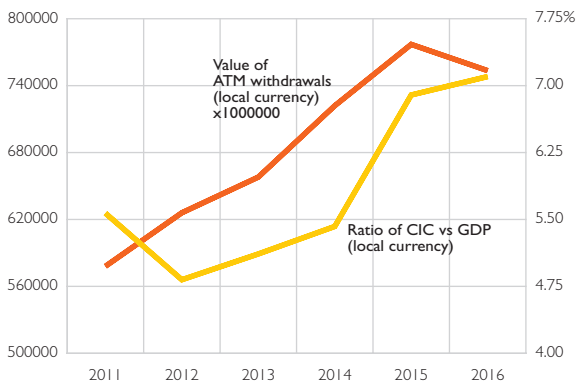
122 Source: Bank of Russia Annual Report 2016; II.5 Development of the National Payment System, p. 122

123 Source: Bank of Russia Annual Report 2016; II.5 Development of the National Payment System, p. 124

Asia Saudi Arabia

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	31,787,580		
GDP (Bio USD)	640	20,121	-20.2%
Currency	Saudi Riyal		
Currency in Circulation (x Mio LCY)	170,341	5,359	17.5%
Value of ATM withdrawals (x Mio LCY)	753,449	23,703	10.5%
Number of ATMs	17,800	56	28.6%
Number of Bank Branches	2,038	6	10.4%
Number of Cards Issued (x million)	26.54	0.83	48.3%
Number of POS Terminals	276,167	869	174.1%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	2,559	80.5	44.7%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of Cash seems to be increasing slightly in Saudi Arabia. The value of ATM withdrawals has risen each year since 2011, with only a slight decline in the last reporting year. The ratio of currency in circulation vs. GDP has been increasing steadily from 2012 onwards (from 4.8% to 7.1%), driven by a growing amount of currency in circulation and a declining GDP over the 2012 – 2016 period.

Other means of payment are growing within Saudi Arabia, as the infrastructure for electronic and especially card payments evolves. Both the number of cards (+48%) and, especially, accepting devices (+174.1%) have increased, translating into more card transactions per person (up by 415% to 74).

Cash cycle organisation

The cash cycle organisation in Saudi Arabia can be characterised as a centralized model, where the central bank plays an important part in cash distribution. The central bank acts as a distribution centre and cash processor. Besides the central bank, there are seven CIT companies and a total of 134 cash centres in Saudi Arabia that are part of the cash cycle.

Developments

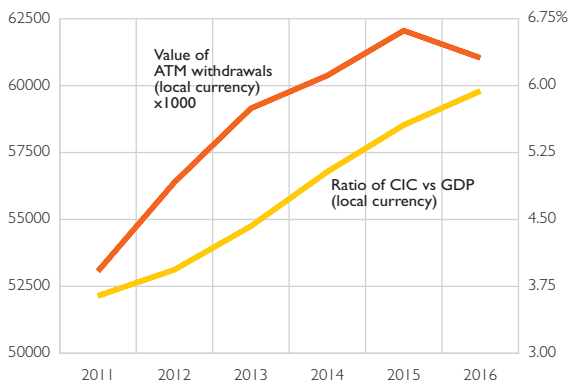
Saudi Arabia has recently introduced a multi-bank, outsourced cash centre as an innovation to further optimise cost effectiveness in the Saudi cash cycle. Another development in Saudi Arabia for cash management is safety measures for handling cash in transport. Ink dye techniques are now compulsory, as are minimum five-man crews for ATM replenishment. Besides investing in cash management, Saudi Arabia is also improving the infrastructure for non-cash payments, as shown by the key figures above. So, it seems like Saudi Arabia is developing its payment infrastructure as a whole[124].

124 https://www.abana.com.sa/

Asia South Korea

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	50,801,410		
GDP (Bio USD)	1,411	27,774	17.0%
Currency	South Korean Won		
Currency in Circulation (x Mio LCY)	97,254,300	1,914,402	76.5%
Value of ATM withdrawals (x Mio LCY)	61,040,451	1,201,550	6.6%
Number of ATMs	120,306	237	-3.7%
Number of Bank Branches	17,572	35	-9.1%
Number of Cards Issued (x million)	259.66	5.11	-3.4%
Number of POS Terminals	-	-	-
Total number of electronic transactions (x Mio)	23,215	456.98	149.9%
Total number of card transactions (x Mio)	16,970	334.05	68.84%
Total number of cash transactions	-	-	-

Use of cash



Use of Cash

The use of Cash in South Korea seems to be rising in absolute terms. The value of ATM withdrawals was on the rise until 2015, then dropped slightly in 2016. The currency in circulation vs. GDP ratio shows a rising trend, as the value of currency in circulation compared to GDP increased significantly over the last five years with an increase to almost 5.9% from a starting point of around 3.6%.

South Korea has shown consistent and strong growth in electronic payments (+150%) with cards contributing the most to that growth (+70%). It seems that the infrastructure for electronic payments in South Korea is well established, as 5.1 cards per capita is the highest number globally. Absolute numbers for electronic and card payment volumes are also very high in South Korea, making it one of the least cash dependent countries in the world.

Cash cycle organisation

The Bank of Korea is very involved in the organization of the cash cycle in Korea. They act as the prime solicitor, distributor, and processor of cash in Korea. They are continuously improving the Korean cash cycle and play a central role in this[125]. The cash cycle in Korea can therefore be characterised as a centralised model.

Developments

The South Korean Central Bank keeps track of trends in the amount of payments and settlements. For the last couple of years, non-cash payment instrument use has shown a continuous upward trend[126]. South Korea is actively pushing towards non-cash payments, as the country wants to go coinless by 2020 (see Show Case South Korea: coinless society). It will be interesting to see what the effect will be on the use of cash following this unique project in South Korea.

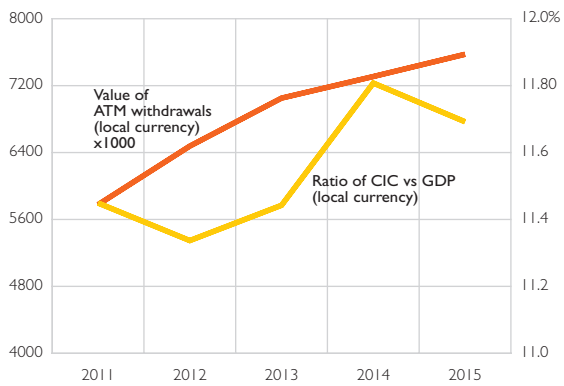
125 http://eng.bok.or.kr/broadcast.action?menuNaviId=649

126 South Korea Central Bank, Payment and Settlement Trends in 2016.

Asia Thailand

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	68,414,135		
GDP (Bio USD)	407	5,946	7.0%
Currency	Thai Baht		
Currency in Circulation (x Mio LCY)	1,690,869	24,715	18.5%
Value of ATM withdrawals (x Mio LCY) 2015	7,575,000	111,464	29.1%
Number of ATMs 2015	63,432	93	30.8%
Number of Bank Branches	7,039	10	12.1%
Number of Cards Issued (x million)	81,13	1.19	9.5%
Number of POS Terminals 2015	357,986	527	31.9%
Total number of electronic transactions (x Mio)	5,823	85.7	70.4%
Total number of card transactions (x Mio)	2,229	32.8	44.4%
Total number of cash transactions	-	-	-

Use of cash



Use of Cash

In Thailand, cash is still widely used. The value of ATM withdrawals rose in the 2011 – 2015 period, however, the growth rates, while positive, are diminishing year on year. The actual number of ATM withdrawals is growing steadily, with an annual growth rate between 4% and 8%. The currency in circulation vs. GDP ratio increases slightly from 11.4 to 12.6% in 2016, which is just above the global average of 9.6%.

Non-cash payment methods have shown positive growth in recent years, as well. Thailand has invested in the non-cash payment infrastructure, as indicated by the growth in POS terminals (+32%) and cards issued (+10%). This investment led to an almost 45% increase in card payments in Thailand. Overall, non-cash payment volumes increased by just over 70%.

Cash cycle organisation

At the end of 2015 99% of all ATMs in Thailand were connected to the ITMX network (Interbank Transactions Management Exchange), which is owned by the Thai banks. Cash replenishment was outsourced for 53% of all ATMs, which is comparable to the percentage for outsourcing of First Line Maintenance. Second Line Maintenance is always outsourced for all ATMs and has been for several years. There are 5 main outsourcing parties active in Thailand, performing these services. The Bank of Thailand currently runs 10 banknote operation centres[127].

Developments

The Bank of Thailand has been executing their Payment Systems Roadmap 2012 – 2016, but has not yet released a future outlook. The current roadmap pushed the development of innovative payment services and infrastructure, mostly linked to e-payments. The Bank of Thailand also supported mobile wallets and the payment through QR-codes, and envisioned real-time interbank payments, or at least an increase in the speed and availability of electronic transfers[128].

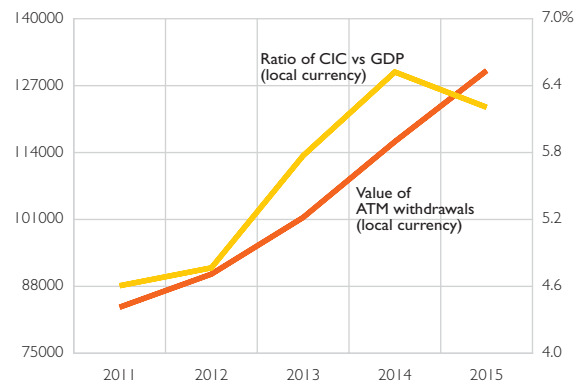
127 Source: https://www.bot.or.th/English/Banknotes/BMD/Pages/Map_BOC.aspx

128 Source: Bank of Thailand, Payment Systems Report 2015.

Asia United Arab Emirates

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	9,404,500		
GDP (Bio USD)	349	37,082	9.4%
Currency	United Arab Emirates Dirham		
Currency in Circulation (x Mio LCY)	77,551	8,246	46.5%
Value of ATM withdrawals (x Mio LCY) 2015	129,916	14,187	47.6%
Number of ATMs	4,870	52	3.2%
Number of Bank Branches	1,273	13	
Number of Cards Issued (x million)	13.76	1,46	-4.2%
Number of POS Terminals 2015	141,565	1,546	100.7%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	302	33.0	196.1%
Total number of cash transactions			

Use of cash



Use of Cash

In the United Arab Emirates, the use of cash seems to be rising. The value of ATM withdrawals is rising by a seemingly greater percentage each year. The same trend can be seen in the number of ATM withdrawals. Currency in circulation vs. GDP ratio showed an upward trend between 2011 and 2016. The drop in 2015 was caused by an isolated reduction in the value of currency in circulation in 2015.

The United Arab Emirates have invested in their electronic payments infrastructure. The number of cards issued (+10%) and number of POS terminals (+101%) have grown. This led to the increase in number of card transactions (+196%). Even though the growth numbers are quite positive, the absolute numbers for availability and use are relatively low compared to other countries.

Cash cycle organisation

The Cash cycle organization in the United Arab Emirates can be classified as a delegation model. In this model, the central bank delegates some cash-handling activities like authentication checks, fitness sorting, and bundling to the commercial sector. In the case of the United Arab Emirates, these activities are carried out by five CIT companies, with four cash centres. Two of these CIT companies have more than 90% market share combined.

Developments

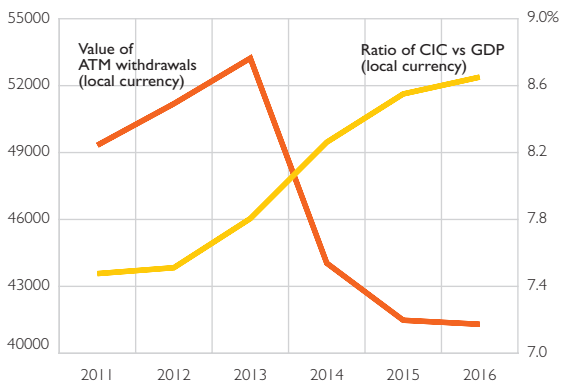
At the beginning of January 2017, the Central Bank of the United Arab Emirates issued a Regulatory Framework for Stored Values and Electronic Payment Systems. This framework basically requires all parties involved with electronic payments to maintain necessary licensing and standards in order to provide consumer protection and to ensure the integrity of the payments system. This framework can be seen as a huge leap forward in shaping and cultivating an online payment landscape in the United Arab Emirates[129]. It will be interesting to see what the impact will be on the use of cash throughout the UAE.

129 Source: United Arab Emirates – the New Digital Payments Regulatory Landscape, Latham & Watkins, January 26, 2017.

Europe Belgium

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	11,271,000		
GDP (Bio USD)	466	41,377	6.7%
Currency	Euro		
Currency in Circulation (x Mio LCY)	36,473	3,236	22.9%
Value of ATM withdrawals (x Mio LCY)	45,500	4,037	-12.8%
Number of ATMs	17,450	155	9.3%
Number of Bank Branches (2015)	7,985	71	48.7%
Number of Cards Issued (x million)	19.18	1.70	4.5%
Number of POS Terminals	189,661	1,683	36.5%
Total number of electronic transactions (x Mio)	3,438	305.07	134.3%
Total number of card transactions (x Mio)	1,696	150.49	35.6%
Share of cash transactions at points of sale	63%	-	-

Use of cash



Use of Cash

The share of cash transactions at points of sale in Belgium is 63%. Clearly, cash holds a dominant position in the Belgian payments market. However, its position is changing. The value of ATM withdrawals grew in the years leading up to 2013, but has shown a decline since then. On the other hand, the currency in circulation vs. GDP ratio has shown moderate but consistent growth over the past six years.

Non-cash payment instruments have experienced growth in Belgium. The total number of electronic transactions has more than doubled (+134%) to a total of 305 transactions per person per annum, which is relatively high compared to most other countries. Card usage (150 transactions per person) also clearly exceeds the global average of 102.

Cash cycle organisation

The cash cycle in Belgium follows a centralised model in which Belgium's central bank plays an important part in the cash distribution cycle at a national level. Within this network, there are five operational cash centres, of which three are owned by the central bank and two by commercial CIT companies, which are also the two foremost CIT companies in Belgium.

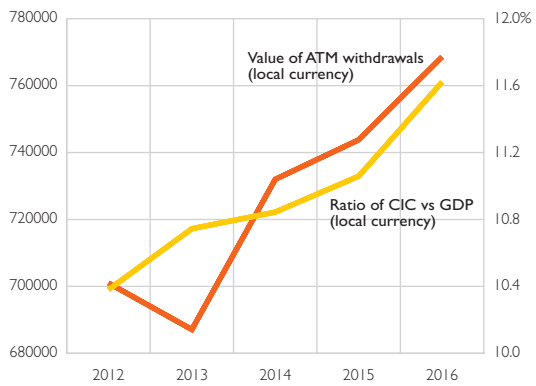
Developments

The Belgian National Bank and banking federation are continuously looking to optimise the country's cash cycle. In recent years, the number of cash centres has been reduced from 14 (1999) to 4 in 2015. Two additional centres have recently been closed down, leaving only the centres in Kortrijk and Luik to support the country's cash handling needs. Further cost-efficiency measures throughout the cash cycle are to be expected in coming years. At 155, Belgium has one of the highest ATM per capita ratios in the world.

Europe Czech Republic

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	10,565,000		
GDP (Bio USD)	193	18,261	16.9%
Currency	Czech Koruna		
Currency in Circulation (x Mio LCY)	554,688	52,502	30.9%
Value of ATM withdrawals (x Mio LCY)	768,600	72,750	9.1%
Number of ATMs	4,704	45	14.0%
Number of Bank Branches	5,200	49	-0.05%
Number of Cards Issued (x million)	12.02	1.14	17.7%
Number of POS Terminals	148,394	1,405	35.8%
Total number of electronic transactions (x Mio)	2,425	229.57	227.7%
Total number of card transactions (x Mio)	745	70.53	131.5%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in the Czech Republic looks as though it is growing. Both the value of ATM withdrawals (+9%) and the ratio of currency in circulation vs. GDP rose steadily from 2012 to 2016. With a ratio of 11.6%, the Czech Republic scores just above the global average of 9.6%.

Parallel to this development, the electronic payment infrastructure in the Czech Republic has grown, as well. The number of POS terminals grew by 35.8% and the number of cards issued by 17.7%. In absolute terms, this is only slightly below the European average. Electronic payment usage has more than tripled in recent years (+228%), with card volumes also experiencing significant growth (+132%).

When looking at cash and non-cash developments combined, it looks like the payment market as a whole is growing in the Czech Republic.

Cash cycle organisation

The cash cycle in the Czech Republic is a centralised model, where the central bank plays an important role as distribution centre and processor for cash. There are a total of 16 cash centres in the Czech Republic operated by four commercial CIT companies and the central bank. The central bank organises the cash circulation and the CIT companies handle distribution.

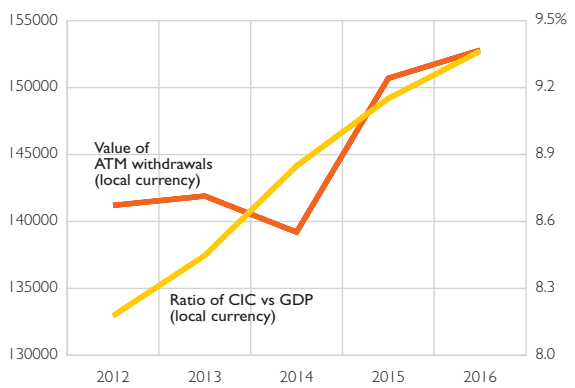
Developments

The use of cash in the Czech Republic seems to be on the rise. Both the currency in circulation and the value of ATM withdrawals grew over the 2012 – 2016 period. These numbers demonstrate the dominant position of cash. However, as in many other countries, electronic payments are developing strongly in the Czech Republic, as well, with banks and other service providers looking especially to cards and mobile payments to accelerate growth further.

Europe France

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	66,858,000		
GDP (Bio USD)	2,465	36,876	4.8%
Currency	Euro		
Currency in Circulation (x Mio LCY)	208,710	3,122	20.0%
Value of ATM withdrawals (x Mio LCY)	152,800	2,285	6.2%
Number of ATMs	58,480	87	-2.0%
Number of Bank Branches 2015	37,182	56	-4.5%
Number of Cards Issued (x million)	98.56	147	-9.6%
Number of POS Terminals	1,487,272	2,225	4.3%
Total number of electronic transactions (x Mio)	17,800	266.23	22.5% (2014-2016)
Total number of card transactions (x Mio)	7,889	11799	57.5% (2014-2016)
Share of cash transactions at points of sale	68%	-	-

Use of cash



Use of Cash

In France, 68% of all transactions at points of sale are paid for in cash[130]. Combined with the growing ATM withdrawal value (+6%) and the increasing currency in circulation vs. GDP ratio, it is safe to conclude that cash still holds a dominant position in the French payment market.

In the last three reporting years (2014 to 2016), electronic payment instruments have been growing in France. Credit transfer and direct debits both grew well over 20%, and card payment volumes (debit + credit) increased by 57,5%. The French have only recently embraced the use of the (debit) card, as the number of card transactions per capita in France (118) exceeded the global average (102) for the first time in 2016.

Cash cycle organisation

The Banque de France is changing its cash activities. They are planning to construct fully automated cash management centres and ensure that they optimise logistics and standardise data exchanges[131]. The Banque de France intends to do this jointly with banks, CIT companies, and retailers in order to fully modernise and streamline the cash supply chain.

Developments

The Banque the France recognises the importance of cash in France and will continue modernising its cash cycle operations, in an effort to improve service and cost-efficiency.

On the other hand, the recent introduction of contactless payments and the increased use of digital wallets will drive the use of electronic payments, as these innovations have not yet reached their full potential[132].

130 Source: ECB – Occasional Paper Series, the use of cash by households in the euro area, no 201, 2017

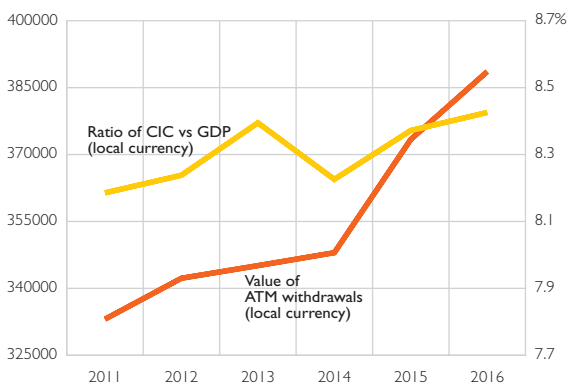
131 Source: https://www.banque-france.fr/en/banknotes/modernising-and-managing-cash-cycle-two-key-challenges/modernisation-cash-cycle

132 https://www.banque-france.fr/en/financial-stability/monitoring-cashless-payments/overview-cashless-payment-instruments-france

Europe Germany

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	82.491.000		
GDP (Bio USD)	3.467	42.026	11,1%
Currency	Euro		
Currency in Circulation (x Mio LCY)	264,907	3,211	13.7%
Value of ATM withdrawals (x Mio LCY)	388,600	4,711	10.7%
Number of ATMs	85,352	103	0.7%
Number of Bank Branches	32,215	39	-17.7%
Number of Cards Issued (x million)	114.30	1.39	2.0%
Number of POS Terminals	1,002,340	1,215	35.7%
Total number of electronic transactions (x Mio)	20,457	247.99	113.0%
Total number of card transactions (x Mio)	3,108	37.68	15.55%
Share of cash transactions at points of sale	80%	-	-

Use of cash



Use of Cash

Cash is the preferred method of payment at points of sale in Germany, with a share of 80%[133]. The use of cash in Germany, given the rise in value of ATM withdrawals, seems to be increasing, as values have increased year on year since 2011. The currency in circulation vs. GDP ratio is largely stable at around 8.3%, with both the currency in circulation and GDP (in local currency) growing at similar pace in absolute terms.

Electronic payment volumes more than doubled (+113%) in the studied period (2012-2016), but with 80% at the POS, cash remains king in the retail environment. This is further illustrated by the relatively low growth in the number of card transactions over the past five years (+16%). In addition, the number of annual card transactions per person comes to only 38, which is well below the world average of 102.

133 Source: ECB – Occasional Paper Series, the use of cash by households in the euro area, no 201, 2017

Cash cycle organisation

The German cash cycle organisation is highly fragmented, with many CIT companies providing regional services and only a few players offering nationwide services. Together with other stakeholders, the Bundesbank is working towards a more efficient cash cycle.

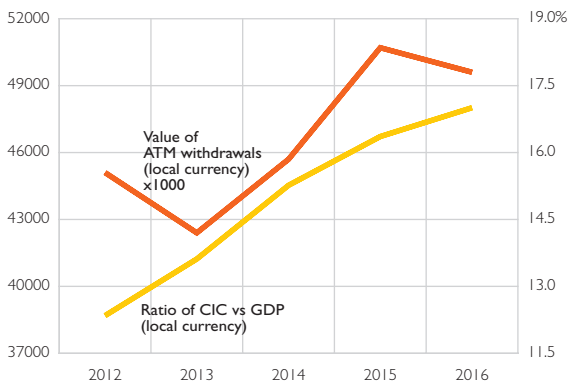
Developments

Cash is the preferred payment method in Germany, with an 80% share of transactions paid at points of sale. Currency in circulation and the value of ATM withdrawals also grew over the 2012 to 2016 period. However, alternative payment solutions are gaining market share in Germany. Digital wallets in particular are rapidly gaining among consumers. However, given the apparent reluctance of Germans to use the widely available card infrastructure, it is expected that cash will maintain its dominant position in Germany for some time to come.

Europe Greece

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	10,750,000		
GDP (Bio USD)	195	18,098	-5.3%
Currency	Euro		
Currency in Circulation (x Mio LCY)	29,929	2,784	30.4%
Value of ATM withdrawals (x Mio LCY)	49,600	4,614	13.0%
Number of ATMs	5,310	49	-34.5%
Number of Bank Branches	2,348	22	-33.8%
Number of Cards Issued (x million)	14.62	1.36	12.7%
Number of POS Terminals	633,279	5,891	102.6%
Total number of electronic transactions (x Mio)	640	59.57	266.8%
Total number of card transactions (x Mio)	300	27.90	324.95%
Share of cash transactions at points of sale	88%	-	-

Use of cash



Use of Cash

With a reported share of 88% of point-of-sale transactions[134], Greece is clearly very dependent on cash. Both the value of ATM withdrawals and the ratio of currency in circulation vs. GDP showed positive growth in 2012 to 2016 period. The CIC/GDP ratio is rather high compared to the global average of 9.6%.

At the same time, non-cash payment infrastructure has grown, with POS terminals doubling (+103%) and a minor increase in cards issued (+12.7%). This has led to enormous growth in the number of electronic payments (+267%), whereas the number of card payments has seen the highest growth at nearly 325% from 2012 to 2016. However, the absolute numbers per capita are still low compared to the global average.

Cash cycle organisation

The cash cycle organisation in Greece follows a centralised model. In this model, the central bank plays a pivotal role in the cash cycle. They act through their branch network as a warehouse, distribution centre, and cash processor. Within Greece, the cash cycle is served and executed by four CIT companies that operate 38 cash centres in combination with the central bank of Greece.

Developments

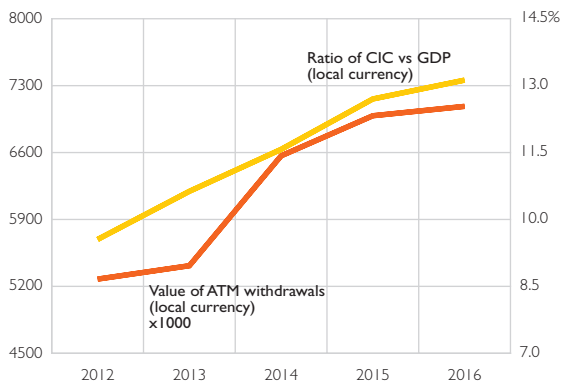
Greece has weathered a major financial crisis in which the government was forced to limit capital transfers and cash withdrawals. These restrictions led to a gradual increase in the acceptance of electronic payment methods. In 2016 mandatory card acceptance was imposed on firms, and consumers were given incentives to start using electronic payments. The number (142%) and value (82%) of mobile banking transactions have risen in particular. However, at present, cash still remains the preferred payment method and is still essential to the Greek economy.

134 Source: ECB – Occasional Paper Series, the use of cash by households in the euro area, no 201, 2017

Europe Hungary

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	9,815,000		
GDP (Bio USD)	124	12,669	23.4%
Currency	Hungarian Forint		
Currency in Circulation (x Mio LCY)	4,594,002	468,059	69.6%
Value of ATM withdrawals (x Mio LCY)	7,083,300	721,681	35.7%
Number of ATMs	4,995	51	5.5%
Number of Bank Branches	5,934	60	-7.8%
Number of Cards Issued (x million)	8.95	0.91	1.2%
Number of POS Terminals	121,095	1,234	43.1%
Total number of electronic transactions (x Mio)	1,180	120.17	132.8%
Total number of card transactions (x Mio)	531	54.08	98.82%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Hungary seems to be rising. The value of ATM withdrawals grew from 2012 to 2016 (+36%). Growth has seemed to slow slightly in more recent years. The ratio of currency in circulation vs. GDP, however, has steadily increased each year to 13.1% in 2016.

The number of electronic payments doubled from 2012 to 2016, as did the number of card transactions (99%), which now make up for almost half of total electronic payment volumes. However, the per capita numbers for electronic and card transactions are not yet at the global average level, but it looks like the payment market in Hungary is developing and electronic payments are gaining in popularity.

Cash cycle organisation

The cash cycle in Hungary is a delegation model. In a delegation model, the central bank delegates some cash-handling activities to the commercial sector. Currently, the Central Bank of Hungary only acts as a wholesaler in the circulation of notes and coins, the rest of the cash-handling activities are left to the commercial sector. The commercial sector in Hungary consists of five CIT companies with five cash centres[135].

Developments

Cash seems to play an important role in the Hungarian payment market. The growth in currency in circulation (+70%) and value of ATM withdrawals (+36%) illustrate this point. Developments in non-cash payments and the further roll-out of electronic payments infrastructure are increasing the availability of non-cash payments to the Hungarian people. "There has been a big increase in contactless purchases as the number of contactless cards grew and the number of compatible terminals grew significantly as well." [136] Whether this will have a significant impact on the use of cash remains to be seen.

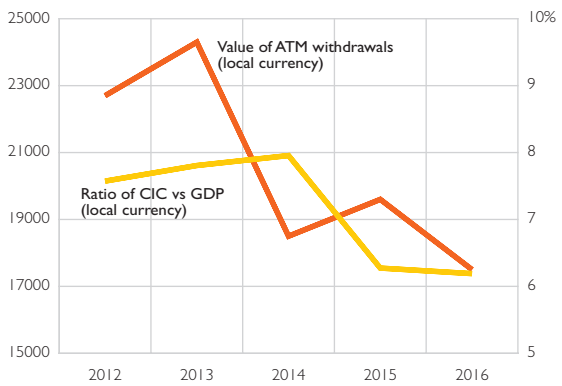
135 Central Bank Hungary – Annual Report 2016

136 Magyar Nemzeti Bank – Payment Systems Report, 2017

Europe Ireland

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	4,683,000		
GDP (Bio USD)	294	62,791	53.6%
Currency	Euro		
Currency in Circulation (x Mio LCY)	17,085	3,648	25.6%
Value of ATM withdrawals (x Mio LCY)	17,500	3,737	-24.5%
Number of ATMs	3,400	73	8.8%
Number of Bank Branches	743	16	-26.1%
Number of Cards Issued (x million)	6.32	1.35	2.5%
Number of POS Terminals	183,769	3,924	18.3%
Total number of electronic transactions (x Mio)	1,125	240.29	147.4%
Total number of card transactions (x Mio)	670	143.09	60.28%
Share of cash transactions at points of sale	79%	-	-

Use of cash



Use of Cash

In Ireland, 79% of all transactions at points of sale are paid with cash[137]. According to this statistic, cash is still very dominant. However, the graph paints a different picture, with both key indicators declining. The value of ATM withdrawals has decreased in recent years. The same can be said for the ratio of currency in circulation vs. GDP[138]. This is primarily due to stronger growth in GDP , as the absolute value of currency in circulation also grew from 2012 to 2016.

Although cash holds a firm position, other payment instruments are growing quickly. The total number of electronic transactions more than doubled from 2012 to 2016, which shows that the payment market in Ireland is growing and changing.

Cash cycle organisation

Ireland's cash cycle is a delegation model in which the operational activities are increasingly outsourced to banks and third-party providers. The Irish Central Bank (ICB) continues to drive efficiencies in the Irish cash cycle through the National Cash Cycle Contingency Group. The current focus is the introduction of Service Level Agreements with customers and a reduction in the number of unnecessary movements of cash within the cash cycle, in an effort to improve its overall efficiency.

Developments

Ireland will continue to have a substantial need for cash, but banks have increased cash lodgement and processing charges and are moving to cashless branches across the market. At the same time, social welfare payments continue to be paid in cash in Ireland and will continue to be for the next three to five years.

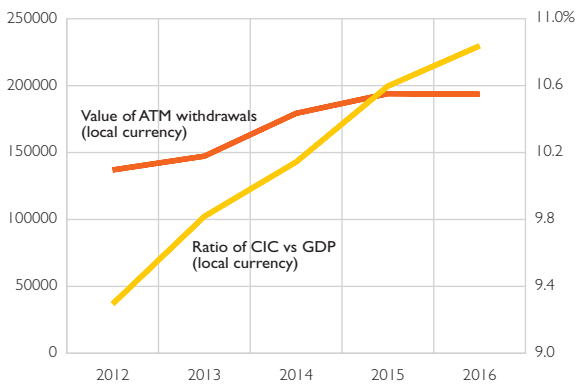
137 Source: ECB – Occasional Paper Series, the use of cash by households in the euro area, no 201, 2017

138 This growth can be attributed largely to multinationals (Google, Microsoft, Amazon, Google, Twitter, Johnson &Johnson, etc.) domiciling their assets in Ireland.

Europe Italy

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	60,623,000		
GDP (Bio USD)	1,850	30,516	3.2%
Currency	Euro		
Currency in Circulation (x Mio LCY)	181,208	2,989	20.3%
Value of ATM withdrawals (x Mio LCY)	193,600	3,194	40.7%
Number of ATMs	49,281	81	-3.3%
Number of Bank Branches	41,667	69	-11.0%
Number of Cards Issued (x million)	77.76	1.28	13.5%
Number of POS Terminals	2,210,311	3,646	45.6%
Total number of electronic transactions (x Mio)	5,746	94.79	134.2%
Total number of card transactions (x Mio)	2,613	43.1	59.7%
Share of cash transactions at points of sale	86%	-	-

Use of cash



Use of Cash

Cash usage is still very high in Italy. The reported share of cash transactions at points of sale in Italy is 86%[139]. The value of ATM withdrawals has been increasing steadily since 2012, while the currency in circulation vs. GDP ratio has shown even stronger growth over the past five years. These numbers show that cash has a dominant position as means of payment in Italy.

Although cash is the preferred manner of settling debts at points of sale in Italy, the number of electronic transactions experienced enormous growth for the 2012 – 2016 period, increasing by +134%. This increase can largely be attributed to the increased availability of the necessary infrastructure, POS terminals (+46%), and cards issued (+14%), even though in absolute terms, the infrastructure and number of electronic payments have not yet reached the global average.

139 Source: ECB; The use of cash by households in the euro area; November 2017

Cash cycle organisation

The cash cycle in Italy follows a centralised model. The Bank of Italy plays a pivotal role in the cash distribution cycle at national level. Through their branch network, the Bank of Italy acts as the primary warehouse, distribution centre, and processor of cash.

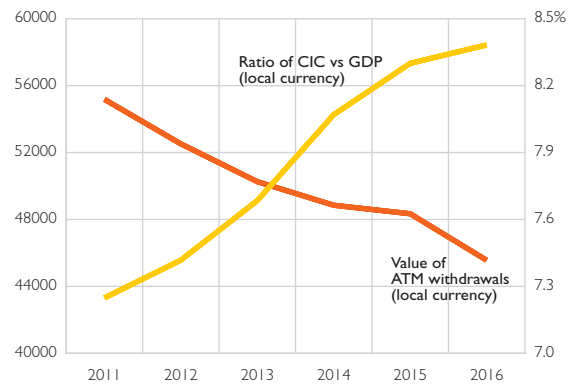
Developments

There are many developments happening within the payment landscape in Italy. One of these developments is an initiative called Jiffy, which allows its users to send and receive money through an app on their smartphone in real-time. Another development is the mobile POS initiative, which allows business owners to accept card payments through their smartphone or tablet. However, given the current relevance of cash and the reported growth numbers in key cash usage indicators, it seems likely that cash will retain its dominance in the Italian market for the foreseeable future.

Europe Netherlands

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	17,030,000		
GDP (Bio USD)	799	46,917	7.2%
Currency	Euro		
Currency in Circulation (x Mio LCY)	58,929	3,460	21.1%
Value of ATM withdrawals (x Mio LCY)	45,560	2,675	-13.60%
Number of ATMs	6,750	40	-12.3%
Number of Bank Branches	2,169	13	-15.2%
Number of Cards Issued (x million)	28,15	1.65	-9.2%
Number of POS Terminals	521,464	3,062	91.7%
Total number of electronic transactions (x Mio)	7,174	421.25	122.0%
Total number of card transactions (x Mio)	3,902	229.12	45.2%
Share of cash transactions at points of sale	45%	-	-

Use of cash



Use of Cash

With a reported 45% in 2016, the Netherlands has the lowest share of cash for point of sale transactions in the Euro zone. This number is down from 53% in 2014 , indicating a reduced use of cash in the country. The 50/50 tipping point was reached in 2015.

This is also reflected in the consistent decline in the value of ATM withdrawals since 2011. The currency in circulation vs. GDP ratio shows a constant growth, suggesting an increased relevance of cash in the country's economy. The combination of these two contrary indicators could indicate an increased use of cash for non-transactional purposes, such as fall-back currency or hoarding.

The decline in cash share should also be explained by the stronger growth in electronic payment usage. The non-cash payments infrastructure is already well established and still growing, particularly in the availability of POS terminals (+92%). This translates in high electronic payment volumes and growth rates.

Cash cycle organisation

The cash cycle in the Netherlands can be described as a joined-venture/delegation model, where the Dutch national bank delegates most cash-handling activities to the commercial sector. In the Netherlands, the three largest banks joined forces to create a company called Geld Service Nederland. GSN ensures that all cash-management activities are done at the highest level of efficiency, availability, and reliability on behalf of the banking shareholders.

Developments

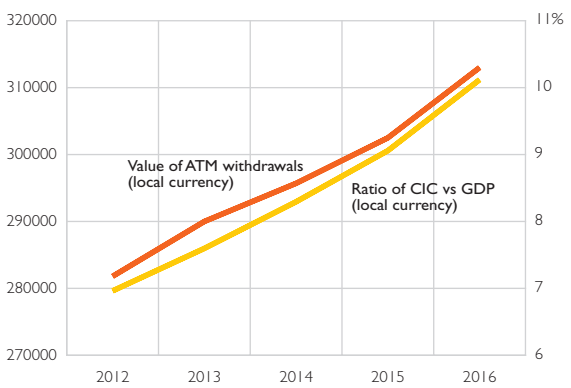
There are many developments in the Dutch payments market, both in the cash and non-cash domains (e.g. Instant Payments are to become the new normal in The Netherlands as of mid-2019; planned launch).

Furthermore, the three largest banks decided to pool their ATMs into one shared, GSN operated network. By 2020, all of the now bank owned and branded ATMs should be centrally managed and neutrally branded by GSN, in an effort to further optimise the ATM network across the country.

Europe Poland

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	38,427,000		
GDP (Bio USD)	470	12,218	13.9%
Currency	Polish Zloty		
Currency in Circulation (x Mio LCY)	187,295	4,874	65.6%
Value of ATM withdrawals (x Mio LCY)	313,000	8,145	11.4%
Number of ATMs	23,451	61	26.0%
Number of Bank Branches	59,924	156	76.8%
Number of Cards Issued (x million)	36.62	0.95	11.3%
Number of POS Terminals	530,865	1,381	78.4%
Total number of electronic transactions (x Mio)	5,655	147.16	191.3%
Total number of card transactions (x Mio)	3,192	83.06	165.9%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Poland seems to be rising. Both the value of ATM withdrawals and the currency in circulation vs. GDP ratio showed clear positive growth from 2012 to 2016, and neither trends show any sign of diminished growth going forward.

Simultaneously, Poland has clearly invested in its electronic payments infrastructure, which is perhaps best indicated by growth in POS terminals (+78%). Cards per capita have also improved, but to a lesser extent (+11%) and the absolute number of close to 1 card per capita is well below the global average of 2.0. All of this translates to significant growth in electronic (+191%) and card (+166%) payment volumes.

Cash cycle organisation

The Polish national bank is the authority that holds the exclusive rights to issue currency into circulation in Poland. In addition to issuing currency, the Polish national bank is also the authority that writes rules and regulations for the cash management market. The Polish bank holds a key position in the issuance and cash distribution cycle[140].

Developments

Cash is a very important method of payment in Poland and the data suggests this to continue in future years, as both currency in circulation and value of ATM withdrawals have shown consistent year on year growth since 2012. However, most of the efforts in Poland are geared towards further developing the electronic payments infrastructure and promoting the use of electronic payments[141]. Poland has introduced contactless card payments (through NFC technology) and introduced immediate payments already in 2012. It is expected that these developments will gain further traction in years to come which may have an effect on the use of cash.

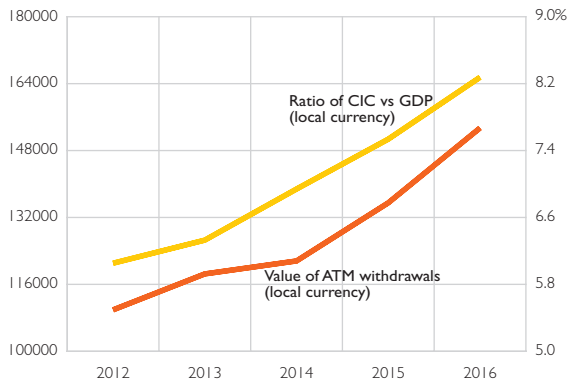
140 Narodowy Bank Polski – Annual Report 2015, chapter 4 & 7.

141 Narodowy Bank Polski – Annual Report 2015, chapter 4 & 7.

Europe Romania

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	19,760,000		
GDP (Bio USD)	187	9,448	29.8%
Currency	Romanian Leu		
Currency in Circulation (x Mio LCY)	63,020	3,189	77.5%
Value of ATM withdrawals (x Mio LCY)	153,400	7,763	41.7%
Number of ATMs	11,127	56	2.8%
Number of Bank Branches	4,608	23	-10.5%
Number of Cards Issued (x million)	15.89	0.80	17.8%
Number of POS Terminals	161,905	819	30.2%
Total number of electronic transactions (x Mio)	599	30.31	117.6% (2015-2016)
Total number of card transactions (x Mio)	350	17.70	125.30%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

Use of cash in Romania grew over the 2012 – 2016 period. The value of ATM withdrawals increased consistently during that period(+42%). The same can be said for the currency in circulation vs. GDP ratio, largely due to the strong growth in value of currency in circulation: +78% from 2012 to 2016.

Judging by the growth in non-cash payments infrastructure and use, Romania is clearly working to reduce its dependency on cash. Electronic payment volumes have more than doubled (+117.6), with card transactions (+125%) contributing most to this growth. However, in absolute numbers, the number of cards, POS terminals, and electronic transactions per capita or still far from the global average level.

Cash cycle organisation

The cash cycle in Romania is a delegation model. In this model, the central bank delegates cash handling activities like authentication checks and fitness sorting to the commercial sector. In Romania, there are two companies that offer both cash transport and handling, or so-called full cash management. These two companies have a combined 21 cash centres. There are also a few small companies that only offer cash transport.

Developments

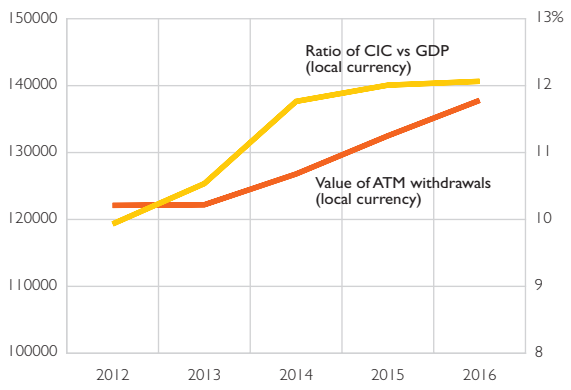
The use of cash in Romania is already high and seems to be growing, based on the key indicators described above. However, investments in electronic payment infrastructure are beginning to bear fruit, both in the more traditional card environment as well as in mobile payments for e & m-commerce. With increasing usage of mobile phones for ecommerce and the introduction of mobile wallets, Romania has sufficient room for growth in the digital payments space[142].

142 https://ecommercenews.eu/ecommerce-romania-e1-8-billion-2016/

Europe Spain

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	46,468,000		
GDP (Bio USD)	1,232	26,515	7.8%
Currency	Euro		
Currency in Circulation (x Mio LCY)	134,400	2,892	30.9%
Value of ATM withdrawals (x Mio LCY)	137,800	2,965	13.6%
Number of ATMs	49,963	108	-10.6%
Number of Bank Branches	29,190	63	-23.3%
Number of Cards Issued (x million)	74.85	1.61	9.5%
Number of POS Terminals	1,496,018	3,219	14.4%
Total number of electronic transactions (x Mio)	6,864	147.71	119.2%
Total number of card transactions (x Mio)	3,464	74.54	45.28%
Share of cash transactions at points of sale	87%	-	-

Use of cash



Use of Cash

Spain is very dependent on cash, with the reported share of cash transactions at the point of sale at 87%[143]. Cash usage also seems to be growing, judging by the increasing value of ATM withdrawals. The currency in circulation vs. GDP ratio also increased over the same period; from 10% to just over 12%, which is above the global average of 9.6%.

At the same time, electronic payments have shown impressive growth. Their volumes more than doubled. This illustrates that the payment market in Spain is growing.

Cash cycle organisation

The Central Bank of Spain is responsible for the distribution and release of currency in Spain. The central bank has cash depots, created to improve efficiency in the issuing flow. These are the storage centres for banknotes and are spread throughout Spain. Credit institutions use CIT companies to withdraw banknotes and coins from the central bank. This cash cycle is organized according to the centralised model, as the central bank plays a pivotal role in cash distribution and processing[144].

Developments

The payment landscape in Spain is evolving. Spain is among the first countries to introduce instant and person-to-person mobile payments. 27 Spanish banks have teamed up to launch a new mobile payment platform called Bizum[145]. This platform is designed to further develop the electronic payments market in Spain. However, the numbers show that Spain is very much a cash-dominated market, given the growth in of currency in circulation (+31%), value of ATM withdrawals (+14%), and the share of cash transactions at point of sale (87%).

143 Source: ECB; The use of cash by households in the euro area; November 2017

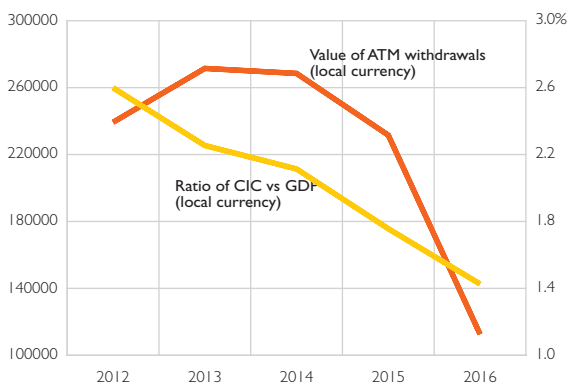
144 https://www.bde.es/bde/en/areas/billemone/Publico_general/El_ciclo_del_efe/El_ciclo_del_efectivo.html

145 https://www.europeanpaymentscouncil.eu/news-insights/insight/spanish-payment-landscape-innovation-gains-tradition

Europe Sweden

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	9,923,000		
GDP (Bio USD)	511	51,497	13.9%
Currency	Swedish Krona		
Currency in Circulation (x Mio LCY)	62,393	6,288	-37.5%
Value of ATM withdrawals (x Mio LCY)	112,600	11,347	-54.9%
Number of ATMs	2,850	29	-20.0%
Number of Bank Branches	1,735	17	-11.9%
Number of Cards Issued (x million)	20.15	2.03	-9.6%
Number of POS Terminals	257,874	2,599	15.9%
Total number of electronic transactions (x Mio)	4,577	461,21	142.1%
Total number of card transactions (x Mio)	2,966	298.90	47.2%
Share of cash transactions at points of sale	15%	-	-

Use of cash



Use of Cash

A recent survey by the Central Bank of Sweden found that only 15% of the most recent payments were made using cash[146]. The use of cash in Sweden is declining, illustrated by negative trends in both the value of annual ATM withdrawals and the currency in circulation vs. GDP ratio. Also, the value of currency in circulation has declined in absolute terms (-38%). The declines in these three figures are unique among the countries discussed in this report.

At the other end of the spectrum, the number of electronic transactions has experienced tremendous growth in the reported years, +142%. Also, in absolute terms, Sweden's electronic payments usage is among the highest in the world. Based on the above, Sweden can be considered the least cash-dependent country in the world.

Cash cycle organisation

The Central Bank of Sweden plays an important role in this market, as cash is being used less and less. However, the central bank does want to maintain cash as a means of payment, as not everyone is ready for going cashless. Therefore, the central bank plays a directive role in the cash cycle in Sweden[147]. Swedish banks are also cooperating in the joint single ATM network, Bankomat AB, which operates all of the 2,850 remaining ATMs in Sweden.

Developments

Despite the popularity of non-cash payments and the reduced share of cash, the Swedish central bank says that they need to facilitate the availability of cash, as becoming a fully cashless society is still a long way off[148]. Still, Sweden seems to be the best example of a less-cash society and, as such, it will be very interesting to see how the country balances the availability of cash with maintaining its cost effectiveness.

See also showcase Sweden, page 78|79.

146 Source: Riksbank survey to better understand Swedish payment habits, 2016. http://www.riksbank.se/en/Statistics/Payment-statistics/

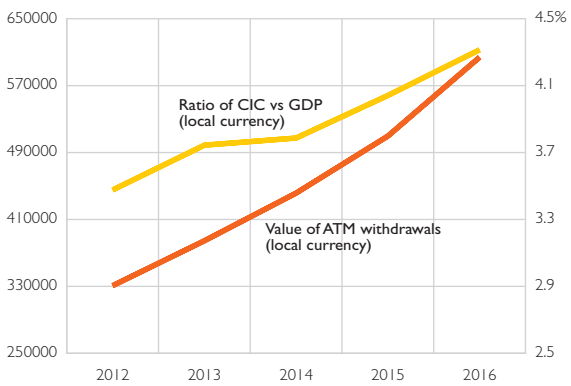
147 Riksbank – annual report 2016

148 Riksbank – annual report 2016

Europe Turkey

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	79,814,871		
GDP (Bio USD)	858	10,744	56.4%
Currency	Turkish Lira		
Currency in Circulation (x Mio LCY)	111,762	1,400	94.1%
Value of ATM withdrawals (x Mio LCY)	603,990	7,567	73.0%
Number of ATMs	48,241	60	25.8%
Number of Bank Branches	16,090	20	-2.2%
Number of Cards Issued (x million)	159.45	2.00	3.8%
Number of POS Terminals	2,349,541	2,944	4.3%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	4,166	52.20	37.80%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Turkey seems to be increasing. The value of ATM withdrawals grew by 73% from 2012 to 2016. And even though the currency in circulation vs. GDP ratio is still relatively low, it is growing. This is primarily because the value of currency in circulation almost doubled in the past five years (+94%).

Other payment instruments have also experienced growth, but these numbers are not as high as the cash numbers. The total number of card transactions increased by 38% over the five-year period and the growth in both cards issued and POS terminals was relatively low. In absolute terms, the number of POS terminals per capita is high, while the number of cards per capita is low compared to world and continental averages. Use of cards (52 transactions per year per person) is still well below the global average of 102.

Based on these insights, it seems fair to conclude that cash is still the most dominant payment instrument in Turkey.

Cash cycle organisation

The cash cycle in Turkey follows a centralised model, where the central bank plays a pivotal role in the cash distribution cycle. The central bank acts as a warehouse, distribution centre, and distributor of cash. Together with the central bank, there are four CIT companies in Turkey. These companies, along with the central bank, operate 133 cash centres throughout the country.

Developments

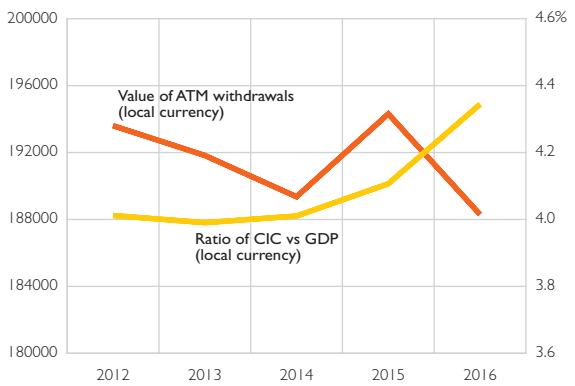
Given the current status and growth in key indicators of cash in Turkey, it will likely remain the preferred payment method in the near future. At the same time, the non-cash domain is also developing. The establishment of a centralised card payment system called Troy, is particularly interesting. It has started its operations in early 2016, in accordance with applicable laws. Troy provides the sole infrastructure for non-cash payments, serving both consumers and merchants in Turkey[149].

149 https://troyodeme.com/en/hakkimizda/ne-yapiyoruz/

Europe United Kingdom

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	65,572,000		
GDP (Bio USD)	2,619	39,939	12.5%
Currency	British pound		
Currency in Circulation (x Mio LCY)	84,280	1,285	21.8%
Value of ATM withdrawals (x Mio LCY)	188,300	2,872	-5.5%
Number of ATMs	70,020	107	2.9%
Number of Bank Branches	20,481	31	-13.8%
Number of Cards Issued (x million)	158.19	2.41	6.0%
Number of POS Terminals	2,157,053	3,290	27.8%
Total number of electronic transactions (x Mio)	24,788	378.03	132.8%
Total number of card transactions (x Mio)	16,016	244.25	52.9%
Share of cash in all payment transactions	42%	-	-

Use of cash



Use of Cash

The United Kingdom reports a 42% share of cash in all payment transactions. The value of ATM withdrawals varies per year, but over a five-year timeframe, suggests a slight decline (-6%). The currency in circulation vs. GDP ratio is largely stable at a relatively low 4.2%, with both components growing in absolute terms. These numbers indicate that even though cash is a major payment instrument in the UK, the country doesn't rely on cash as much as most other countries do.

This is also reflected in the availability and use of electronic payment instruments. The number of electronic transactions more than doubled from 2012 to 2016 (+133%) to close to 380 electronic payments per person. With 244 card transactions per person, the UK is one of the leading countries in the world when it comes to the adoption of electronic payments.

Cash cycle organisation

The United Kingdom operates a highly delegated cash cycle model, in which the central bank only issues and destroys currency. The central bank also provides the Note Circulation Scheme (NCS), which is a balance sheet mechanism. The NCS is a regulated membership scheme operated by the Bank of England for wholesale cash recirculation[150].

Developments

There are several developments regarding cash and payments in the United Kingdom. A number of banks have sold their remote ATM estates to independent ATM deployers (IADs). The electronic payments market also continues to develop. As an example, in 2014, Paym was introduced, allowing immediate payments (Faster Payments was already introduced to the UK market in 2008) to be done via mobile phones. Contactless technology is also expected to push the use of card payments forward. Payments UK expects the number of card transactions to exceed the number of cash transactions by 2020[151].

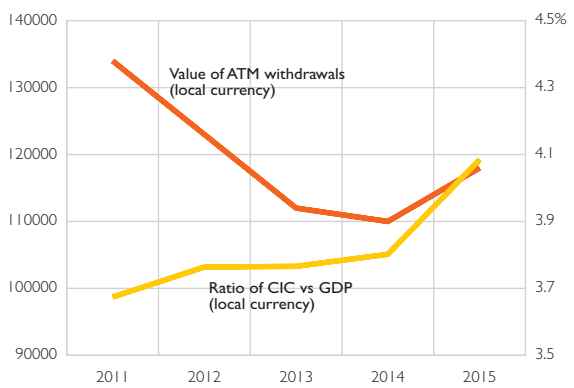
150 https://www.bankofengland.co.uk/banknotes/lifecycle-of-a-banknote

151 Payments UK; Changing Payment Landscape – How 2017 will change the way we pay for good, 2017.

North America Canada

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	36,290,000		
GDP (Bio USD)	1,530	42,154	7.7%
Currency	Canadian Dollar		
Currency in Circulation (x Mio LCY)	86,472	2,383	19.4%
Value of ATM withdrawals (x Mio LCY) 2015	118,000	3,294	-15.7%
Number of ATMs	67,992	187	10.0%
Number of Bank Branches 2015	6,928	19	-5.2%
Number of Cards Issued (x million)	104,00	2.87	-2.5%
Number of POS Terminals	1,400,800	3,860	68.7%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	9,931	273.65	26.9%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

Canada is regarded as one of the least cash-dependent countries in the world. The value of ATM withdrawals has been declining year on year between 2011 and 2014, yet the last reporting year (2015) showed a small increase. The overall growth rate is negative at -16%.

The value of currency in circulation vs. GDP ratio is relatively low compared to other countries at 4.1% in 2015. This ratio has been increasing marginally but consistently year on year from 3.7% in 2011.

The infrastructure for electronic payments is well established in Canada. Both cards issued (2.87 per capita) and POS terminals (3,860) are well above global averages. Canadians also use this infrastructure frequently, as card payment volumes have increased significantly and consistently over past years (+27%) to 274 annual card transactions per inhabitant.

Cash cycle organisation

The Bank of Canada is responsible for supplying and distributing currency in circulation throughout Canada. The bank supplies financial institutions with the notes they need to satisfy public demand through the country's Bank Note Distribution System. The same distribution system is used to return banknotes that are considered unfit[152].

Developments

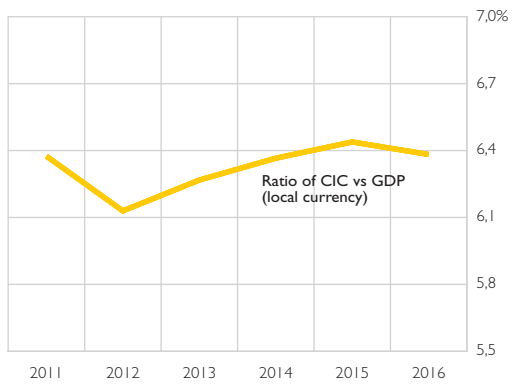
Canada is still investing in its cash infrastructure, as the country has recently transitioned from paper notes to polymer notes. Based on the trends highlighted in the Canadian cost of retail payments study , it is to be expected that cash will remain an important payment instrument, but for increasingly lower amounts. At the same time, the Bank of Canada is experimenting with blockchain (Distributed Ledger Technology) and Central Bank Crypto Currency ("CADcoin") through a proof of concept in Project Jasper as they look for ways to further innovate the Canadian payments landscape.

152 https://www.bankofcanada.ca/core-functions/currency/

North America Honduras

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	9,112,867		
GDP (Bio USD)	22	2,361	26.9%
Currency	Honduran Lempira		
Currency in Circulation (x Mio LCY)	31,359	3,441	32.1%
Value of ATM withdrawals (x Mio LCY)	-	-	-
Number of ATMs 2015	1,404	16	14.4%
Number of Bank Branches 2015	3,892	42	68.9%
Number of Cards Issued (x million) 2015	8.13	0.91	33.0%
Number of POS Terminals	-	-	-
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	-	-	-
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Honduras is difficult to determine, as not all relevant data is available. The relevance of cash in the Honduran economy remained largely stable over the past five years at around 6.4%, which is well below the global average of 9.6%. Overall, currency in circulation grew by +32%, compared to +27% for GDP. The value of ATM withdrawals is not publically available.

Statistics for electronic methods of payment are not available for Honduras.

Cash cycle organisation

The Central Bank of Honduras has the obligation to ensure maintenance of the internal and external value of the national currency. They are also the sole issuer of currency in circulation and tasked with distributing currency throughout the country via their branch network[153]. As such, the cash cycle in Honduras can be classified as a centralised model.

Developments

The percentage of people without access to a bank account in Honduras sits at 69% (2014, Worldbank). The Honduran government and central bank are working together with the banking community to increase the financial inclusion ratio and make electronic payments infrastructure more widely available to the general public.
At the same time, the objective is to improve its reliability and extending its functionality, e.g. by introducing "Pay-Expedite" in April 2016, allowing the BCH to process transactions immediately, transferring funds in real time[154].

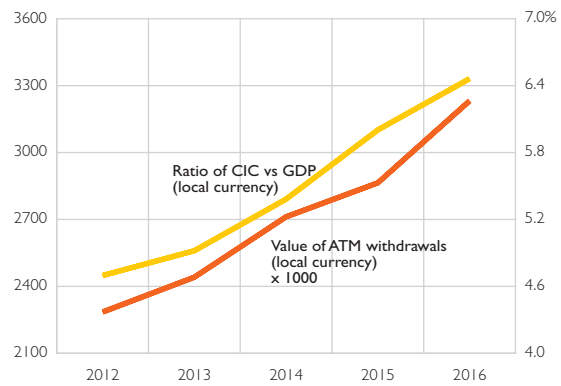
153 http://www.bch.hn/eng/funciones_eng.php

154 Source: Banco Central Honduras, annual report 2016

North America Mexico

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	121,567,000		
GDP (Bio USD)	1,047	8,615	19.6%
Currency	Mexican Peso		
Currency in Circulation (x Mio LCY)	1,262,735	10,387	64.6%
Value of ATM withdrawals (x Mio LCY)	3,231,839	26,585	35.3%
Number of ATMs	48,118	40	13.5%
Number of Bank Branches	17,940	15	2.6%
Number of Cards Issued (x million)	168,35	1.38	16.6%
Number of POS Terminals	895,400	737	37.8%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	2,572	21.16	62.3%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Mexico seems to be growing. The value of ATM withdrawals grew consistently from 2012 to 2016 (+35%). The currency in circulation vs. GDP ratio has also been increasing consistently since 2012. The 2016 ratio is now 6.5%, which is still well below the global average ratio of 9.6%.

The infrastructure for electronic payments grew over the 2012 to 2016 period. Cards issued experienced growth (+17%) as did the number of POS terminals (+38%). This increase in infrastructure contributed to the increase in number of card transactions, which grew by +62%. However, the values of cards and POS terminals, as well as number of card transactions are still low compared to global averages.

Cash cycle organisation

The Central Bank of Mexico has a constitutional mandate for issuing currency to the economy. The bank is also responsible for the distribution of currency to financial institutions. These financial institutions then make sure that the currency is available to the public[155]. The same network is used to return unfit and counterfeit banknotes and coins back to the central bank.

Developments

Despite the growth in electronic payment methods, Mexico is still seen as a cash-based country[156]. The use of cash will remain dominant because of low financial inclusion (39%) and electronic banking use rates (6%)[157]. However, the rise in alternative payment methods is evident, and if this growth continues, it is likely to have an impact on the use of cash in Mexico[158].

155 Central Bank of Mexico; Executive Report of the Life Cycle Analysis of the Mexican Banknotes

156 Mazzota B, Chakravorti B. The Cost of Cash in Mexico. The Fletcher School, Tufts University. December 2014. http://fletcher.tufts.edu/~/media/Fletcher/ Microsites/Cost%20of%20Cash/CCMEX-final-web.pdf. Accessed April 3, 2017.

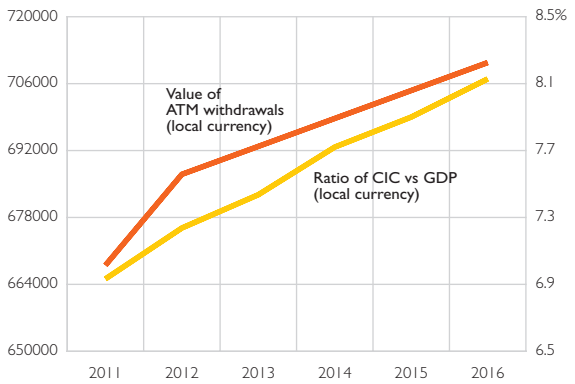
157 Worldbank Development Indicators: https://data.worldbank.org/

158 PYMNTS.com; Global Cash Index – Mexico Analysis, April 2017

North America United States of America

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	323,127,500		
GDP (Bio USD)	18,569	57,467	11.6%
Currency	US Dollar		
Currency in Circulation (x Mio LCY)	1,509,337	4,671	25.4%
Value of ATM withdrawals (x Mio LCY)	710,410	2,199	3.4%
Number of ATMs 2015	487,500	151	9.5%
Number of Bank Branches	112,244	35	-6.8%
Number of Cards Issued (x million) 2015	1,305,40	4.06	9.0%
Number of POS Terminals 2015	13,900,000	4,325	9.4% (2014-2015)
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio) 2015	97,666	303.86	29.2%
Share of cash transactions at points of sale	32%		

Use of cash



Use of Cash

The 32% cash share reported[159] for all POS transactions in the Unied States is relatively low compared to most other countries. When looking at cash in isolation, its relevance seems to be increasing as the value of currency in circulation vs. GDP ratio grew from 6.9% to 8.1%. The value of ATM withdrawals also showed a consistent upward trend. The relatively low reported share of cash at POS could be explained by the relatively high usage and growth in card transactions. The number of cards issued and the number of POS terminals grew by 9%. These increases enabled growth in the number of card transactions by +29% to one of the highest annual card transaction figures per capita in the world: 304.

Cash cycle organisation

The Federal Reserve Bank is the issuing authority for currency in the US. Within the United States, the cash cycle is a delegation model.

Within this model, the Federal Reserve Bank delegates some cash-handling activities like authentication checks, fitness sorting, and bundling to the commercial sector. The Federal Reserve distributes, receives, and processes currency, then redistributes it via depository institutions. The commercial sector consists of four large CIT companies and more than 50 minor CIT companies. These CIT companies have more than 300 cash centres combined[160].

Developments

The use of cash in the US is projected to continue growing from 2016/2017 onwards[161]. Cash is still the preferred method when it comes to making payments in the United States. However, the alternative payment methods are growing in numbers and in percentage of transactions. Despite this growth in alternative payments, cash is used for more transactions than any other payment method in the US.

159 Cash Product Office Federal Reserve System, November 2016. The State of Cash: Preliminary Findings from the 2015 Diary of Consumer Payment Choice, Matheny, O'Brien and Wang.

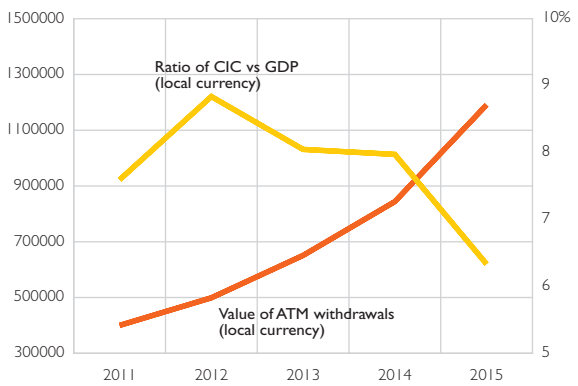
160 https://www.federalreserve.gov/paymentsystems/coin_about.htm

161 Source: Global Cash Index - United States Analysis, March 2017, PYMNTS.COM.

South America Argentina

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	43,847,430		
GDP (Bio USD)	546	12,449	193.2%
Currency	Argentine Peso		
Currency in Circulation (x Mio LCY)	594,616	13,561	140.9%
Value of ATM withdrawals (x Mio LCY) 2015	1,191,000	27,432	185.7%
Number of ATMs 2015	14,244	33	18.3%
Number of Bank Branches 2015	4,585	11	3.6%
Number of Cards Issued (x million) 2015	92.81	2.14	42.2%
Number of POS Terminals 2015	433,283	998	22.7%
Total number of electronic transactions (x Mio) 2015	5,614	129.30	240.6%
Total number of card transactions (x Mio) 2015	1,269	29.24	51.0%
Total number of cash transactions	-	-	-

Use of cash



Use of Cash

When judged by the increasingly upward trend in the value of ATM withdrawals, it would seem that cash is growing in popularity in Argentina. In fact, the value of ATM withdrawals has almost tripled in the past five years (+186%). The value of currency in circulation is also growing strongly (+141%). However, combined with the even stronger growth in the country's GDP in the same period, the share of cash in the Argentinian economy seems to be declining.

On the other hand, the non-cash infrastructure in Argentina has grown over the 2012 to 2016 period. The number of cards issued (+42%) and the number of POS terminals (+23%) have grown in absolute numbers comparable to global averages and well above the continental averages in South America. Having said that, even though these growth numbers have contributed to a growth in card transactions (+51%), the absolute number of card transactions per capita (29) is still far short of the global benchmark of 102.

Cash cycle organisation

The central bank of Argentina plays an important role in the cash cycle in Argentina. They regulate all payment systems and cash-in-transit companies. They are responsible for the distribution and processing of cash. This is distinguished as a centralized model of the cash cycle. There are a total of 21 registered CIT companies in Argentina[162].

Developments

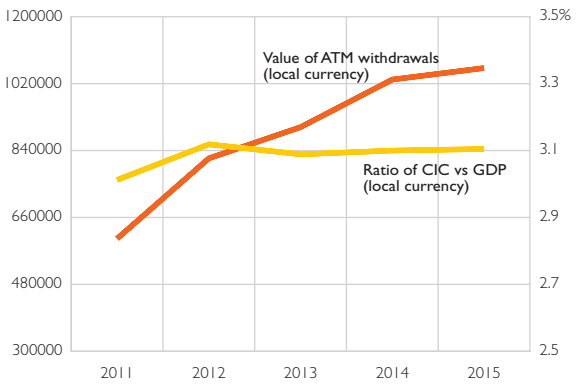
Current growth is expected to continue in the Argentinian electronic payments market. Even though the use of cash seems largely unaffected at present, it remains to be seen if cash can maintain its current position. Argentina is in the process of introducing the new banknote series, Argentina's Fauna, which depicts images of some of Argentina's native animals. The notes for AR$ 20, 200, 500 and 1,000 have already been introduced. The introduction of the new notes for AR$ 50 and 100 is planned for 2018.

162 source: http://www.bcra.gov.ar/SistemasFinancierosYdePagos/Transportadoras_de_caudales_i.asp

South America Brazil

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	207,652,860		
GDP (Bio USD)	1,796	8,649	24.9%
Currency	Brazil real		
Currency in Circulation (x Mio LCY)	193,022	930	23.3%
Value of ATM withdrawals (x Mio LCY) 2015	1,062,000	5,194	70.0%
Number of ATMs 2015	182,378	89	1.3%
Number of Bank Branches	161,526	78	-13.6%
Number of Cards Issued (x million) 2015	482.58	2.36	14.0%
Number of POS Terminals 2015	5,160,948	2,524	41.7%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio) 2015	12,121	59.28	57.5%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Brazil seems to be growing, especially in view of the value of ATM withdrawals, which grew by +70% over the 2011 – 2015 period. The currency in circulation vs. GDP ratio remains very stable at the relatively low percentage of 3.1%. Both components grew by close to 30% in the past five years.

The market for non-cash payment methods also expanded in Brazil. The infrastructure, number of cards issued, and POS terminals increased by +14% and +42%, respectively. These growth rates contributed to the +58% increase in number of card transactions. It is notable that, despite the relatively high absolute numbers in cards issued (2.4 per capita) and POS terminals (2.524 per 100,000 capita), the number of card payments per capita is relatively low (59) compared to the global average of 102 transactions.

Cash cycle organisation

The cash cycle in Brazil is a very complex chain of different operators and actors. The Central Bank of Brazil plays a pivotal part in this cycle, as they have to manage all the different parties involved in the supply chain. The currency in circulation is distributed by the central bank and the commercial banks. Financial institutions, advanced service points, and retail companies are responsible for making this currency available for the public.

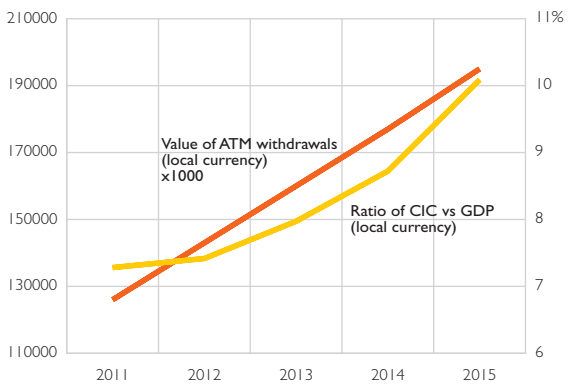
Developments

The developments in Brazil are clear. It looks like the payment market in Brazil is growing, as all the different payment methods experienced growth over the 2012 to 2016 period. The value of ATM withdrawals has grown consistently, which demonstrates the continued importance of cash in society in Brazil. At the same time, cash vouchers and mobile payment (wallet) solutions are becomingly increasingly popular in Brazil.

South America Colombia

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	48,747,708		
GDP (Bio USD)	283	5,795	10.8%
Currency	Colombian peso		
Currency in Circulation (x Mio LCY)	55,426,541	1,137,008	52.6%
Value of ATM withdrawals (x Mio LCY) 2015	195,000,000	4,045,357	47.8%
Number of ATMs	15,227	31	18.5%
Number of Bank Branches	6,462	13	-13.6%
Number of Cards Issued (x million)	40.11	0.82	33.9%
Number of POS Terminals 2015	317,204	658	81.7%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	1,148	23.56	31.4%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Colombia is rising. The value of ATM withdrawals showed a constant growth from 2011 to 2015 (+48%). Currency in circulation vs. GDP ratio also showed consistent, even accelerating, growth to 10% in 2015. The value of currency in circulation has shown steady growth, with a growth rate of +53% over the reporting period.

Non-cash payment methods have also experienced growth. The infrastructure grew in the number of cards issued (+34%) and number of POS terminals (+82%). This growth has contributed to a growth in number of card transactions of +32%. In absolute terms, these volumes are still relatively low compared to many other countries.

Cash cycle organisation

The cash cycle in Colombia is a delegation model. In this model, the Central Bank of Colombia delegates cash handling activities such as authentication checks, fitness sorting, and bundling to the commercial sector. The commercial sector in Colombia consists of 8 CIT companies, which have a combined 101 cash centres spread across the country.

Developments

Use of cash has been rising in Colombia and is likely to remain a very important means of payment for many Colombians. More so because many of Colombians (over 60% as of 2014[163]) do not have access to a bank account. That may be why so-called cash vouchers have become increasingly popular throughout South America and in Colombia in particular[164].

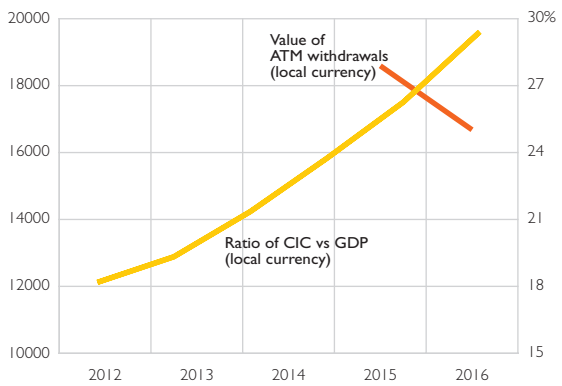
163 Worldbank data

164 Source: https://www.pagbrasil.com/payment-methods/boleto-bancario/

South America Ecuador

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	16,385,068		
GDP (Bio USD)	98	5,969	1.5%
Currency	US Dollar		
Currency in Circulation (x Mio LCY)	20,293	1,239	54.4%
Value of ATM withdrawals (x Mio LCY) 2015	16,681	1,018	-
Number of ATMs 2015	3,954	24	17.6%
Number of Bank Branches	1,120	7	2.7%
Number of Cards Issued (x million) 2015	-	-	-
Number of POS Terminals 2015	76,245	465	-
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio) 2015	166	10.14	-
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Ecuador seems to be rising. The share of currency in circulation in the country's GDP has consistently increased since 2011 to 29.4% in 2016. This is higher than the global average of 9.6%, indicating high cash dependency in Ecuador. As only limited data is available for the value of ATM withdrawals, firm conclusions cannot be drawn. However, the value of ATM withdrawals showed a small decrease from 2015 to 2016.

No data was found for the 2011 to 2016 period for non-cash payments, only some snapshots from individual years, displayed in the table above.

Cash cycle organisation

The Central Bank of Ecuador plays a pivotal role in the cash distribution cycle at a national level. They act through their branch network as the primary warehouse, distribution centre, and processor for cash. This cash cycle model is known as the centralised model.

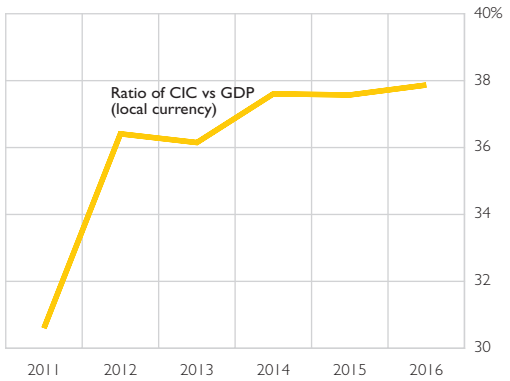
Developments

Ecuador is very much a country in development. With the percentage of unbanked inhabitants still over 50%, the country has some ground to cover before catching up to their global and regional peers. In the coming years, cash is likely to remain the key payment instrument that allows many Ecuadorians to be financially included in day-to-day society.

South America Paraguay

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	6,725,308		
GDP (Bio USD)	27	4,080	21.4%
Currency	Paraguayan Guarani		
Currency in Circulation (x Mio LCY)	11,456,785	1,703,533	26.3%
Value of ATM withdrawals (x Mio LCY) 2015	27,500,000	4,142,116	-
Number of ATMs 2015	1,683	25	22.7%
Number of Bank Branches	682	10	0.9%
Number of Cards Issued (x million)	-	-	-
Number of POS Terminals 2015	444,859	6,701	50.8%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	3,459	521,04	34.2%
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

The use of cash in Paraguay seems high, as the ratio for currency in circulation vs. GDP is one of the highest in the world at 37.9% in 2016. No data was available for the value of ATM withdrawals.

At the same time, the number of POS terminals and the reported volume of card transactions (per capita) are very high and growing, as well.

Cash cycle organisation

The Central Bank of Paraguay plays a pivotal role in the cash cycle. The central bank is the primary distributor and processor of cash. Through their branch network, currency is spread throughout the country. The market is served by five CIT companies operating ten cash centres. These, together with the Central Bank of Paraguay, handle the country's cash logistics.

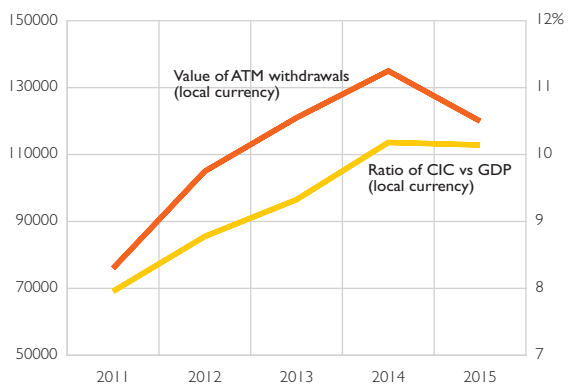
Developments

Growth in the demand for cash through ATMs or the banking network will be driven by an increase in financial inclusion, not least because the government is backing a campaign to reduce the size of the unbanked population (currently 71%). However, increased access to electronic payments infrastructure and the growing popularity of mobile payments may put a brake on the demand for cash.

South America Peru

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	31,773,840		
GDP (Bio USD)	192	6,046	10.3%
Currency	Peruvian Sol		
Currency in Circulation (x Mio LCY)	51,056	1,607	28.1%
Value of ATM withdrawals (x Mio LCY) 2015	120,000	3,824	49.8%
Number of ATMs 2015	9,050	29	41.6%
Number of Bank Branches	1,583	5	-30.0%
Number of Cards Issued (x million) 2015	24,65	0.79	26.8%
Number of POS Terminals 2015	199,687	636	42.9%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio) 2015	270	8.61	28.6% (2013-2015)
Share of cash transactions at points of sale	-	-	-

Use of cash



Use of Cash

Cash is the main instrument used by the public for payments and savings in Peru, according to the results of the cash survey developed by the central bank in 2012. In that year, cash represented about 84% of the household and small business payments and nearly 95% of their savings[165].

This is reflected in an increasing value of ATM withdrawals (+50%) and ratio of currency in circulation vs. GDP, which rose to 10.2% in 2016.

The infrastructure for electronic payments also saw an increase in the 2011 to 2015 period. Cards issued (+27%) and the number of POS terminals (+43%) grew considerably. However, the absolute numbers indicate that availability and use is relatively low in Peru.

Cash cycle organisation

The Central Bank of Peru plays an important part in the cash cycle. It is not only the issuer of currency in circulation, but also acts as a distribution centre for cash. It is then the responsibility of banks and other financial institutions to make the currency available to the public.

Developments

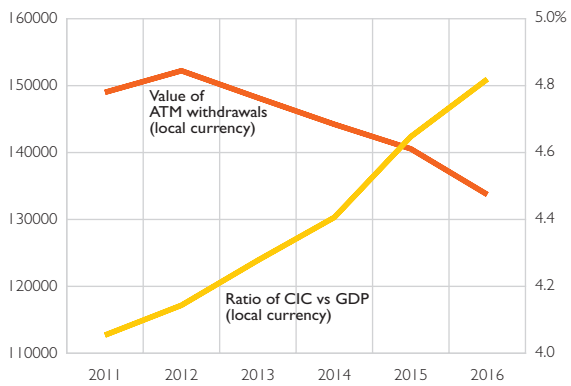
In Peru, the importance of cash remains high, although it is diminishing as the use of alternative payment instruments, such as debit cards, credit cards, interbank transferences, m-banking, and capital market instruments, grow1. This is possibly illustrated by the decline in the value of ATM withdrawals reported in 2015. It will be interesting to see whether this is the beginning of a new trend or if it was just an isolated event in an otherwise continuing growth.

165 Source: http://www.bcrp.gob.pe/docs/Publicaciones/Documentos-de-Trabajo/2015/documento-de-trabajo-06-2015.pdf

Oceania Australia

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	24,127,159		
GDP (Bio USD)	1,205	49,927	3.8%
Currency	Australian Dollar		
Currency in Circulation (x Mio LCY)	79,752	3,305	20.7%
Value of ATM withdrawals (x Mio LCY)	133,728	5,543	-17.1%
Number of ATMs	32,879	136	2.4%
Number of Bank Branches	5,903	24	-14.3%
Number of Cards Issued (x million)	69.09	2.80	6.0%
Number of POS Terminals	954,174	3,955	19.2%
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	6,522	27374	43.6%
Total number of cash transactions	37%	-	-

Use of cash



Use of Cash

The use of cash graph for Australia shows a mixed pattern. The ratio of currency in circulation vs. GDP is increasing, while the total value of ATM withdrawals has been decreasing since 2012. According to the Consumer Payments Survey, the share of cash payments has been decreasing since 2007 to 37% against 62% non-cash in 2016[166]. The 50-50 tipping point was reached in 2014.

The RBA notes that they will continue to look at the role of cash in society, but that they will also take a longer perspective where new technologies will become more influential in the payments landscape.

Cash cycle organisation

The cash cycle in Australia is primarilly run by Cash Services Australia (CSA), a joint venture between Australia's four largest banks. In Q2-2017, CSA was acquired by CIT company Prosegur. This unique transfer led to a new situation, as the banks have completely outsourced their cash logistics to a non-proprietary company. The RBA continues to monitor cash distribution, as they want to ensure that cash is readily available to meet the needs of society.

Developments

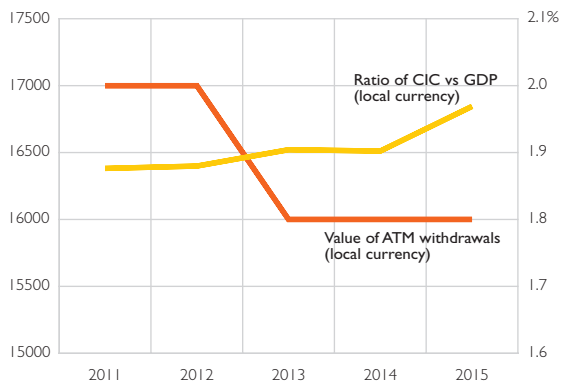
Developments in non-cash payments that are expected to have a continued effect on the use of cash include contactless (Tap & Go) payments with credit cards, the use of mobile phones for making online or P2P payments and the planned launch of the New Payments Platform. This platform will allow customers to move money between accounts in a 'real-time', 24/7/365.

166 Source: RBA Research Discussion Paper 2017-04; How Australians Pay: Evidence from the 2016 Consumer Payments Survey, Mary-Alice Doyle, Chay Fisher, Ed Tellez and Anirudh Yadav. https://www.rba.gov.au/publications/rdp/2017/pdf/rdp2017-04.pdf

Oceania New Zealand

Key Figures 2016	Value	Per Capita/ Per Capita 100.000	Growth Rate Per Capita 2012-2016
Population	4,692,700		
GDP (Bio USD)	185	39,426	14.8%
Currency	New Zealand Dollar		
Currency in Circulation (x Mio LCY)	5,491	1,170	26.2%
Value of ATM withdrawals (x Mio LCY) 2015	16,000	3,482	-10.2%
Number of ATMs 2015	3,318	71	-8.0%
Number of Bank Branches 2015	1,335	29	-14.4%
Number of Cards Issued (x million)	-	-	-
Number of POS Terminals	-	-	-
Total number of electronic transactions (x Mio)	-	-	-
Total number of card transactions (x Mio)	1,514	322.63	17.0%
Total number of cash transactions	-	-	-

Use of cash



Use of Cash

As the graph shows, cash in circulation vs. GDP has increased only marginally (+0,2%) in recent years to 2.1%, which is among the lowest ratios in the world. At the same time, the value of ATM withdrawals has declined.

While the New Zealand National Bank (NZNB) acknowledges the importance of cash in its society, it is also looking into new and improved methods of payment, such as Real Time Payments (RTP). This indicates that New Zealand is looking to further improve their electronic payment infrastructure, which will probably have an effect on the use of cash. New Zealand's annual number of card transactions per capita (322) is already among the highest in the world.

Cash cycle organisation

The NZNB is responsible for the issuance and distribution of banknotes and coins to commercial banks. These commercial banks use the banknotes to supply their ATMs, these ATMs are used by the public to access cash, and this cash is used for day-to-day transactions. Cash is collected by the cash in transit (CIT) companies and these companies are tasked with redirecting fit money back to the commercial banks and returning unfit money to the NZNB for destruction and recycling.

Developments

Payments New Zealand has several strategic objectives for the next 10 years. The most important of these strategic objectives are enabling fast payment systems, enabling an intelligent messaging ecosystem, and working towards and introducing Real Time Payments. Although these objectives are cashless initiatives, the NZNB views cash as an important part of society and will ensure that cash continues to be readily available for society.

7 Methodology and Sources

7.1 Methodology

The primary methodology used for this report is desk research of available public sources (see 7.2 Sources for a full list). Furthermore, a questionnaire was developed and sent to G4S Country Directors from those countries in the report for which G4S provides cash management services. The local insights resulting from the questionnaire feedback were used to enrich the publically available data.

Country Selection Criteria

The ± 200 countries in the world were scored against the following criteria to help us select the countries included in this report:

- Global/regional economic relevance
- Specific development in cash
- G4S (cash management) country presence (67 countries)
- The availability of data/research (pragmatic approach)

The objective was to:

- have a fair representation of countries for all six continents
- limit the total number of countries to ~ 50, for practical reasons

7.2 Sources

- Americas Market Intelligence, Payments in Latin America: Under Digital Transformation – A payments industry whitepaper, October 2016.
- Australia - RBA Research Discussion Paper 2017-04; How Australians Pay: Evidence from the 2016 Consumer Payments Survey, Mary-Alice Doyle, Chay Fisher, Ed Tellez and Anirudh Yadav. https://www.rba.gov.au/publications/rdp/2017/pdf/rdp2017-04.pdf
- Bank of Canada, The Costs of Point-of-Sale Payments in Canada, March 2017. http://www.bankofcanada.ca/wp-content/uploads/2017/03/sdp2017-4.pdf
- Bank for International Settlements – www.bis.org
- Bank for International Settlements, Statistics on payment clearing and settlement systems in the CPMI countries, December 2017. https://www.bis.org/cpmi/publ/d172.pdf
- Bank of Korea, Presentation CBPC, June 2017.
- BIS Quarterly Review, Central bank cryptocurrencies, September 2017.
- Cash Product Office Federal Reserve System, The State of Cash, Preliminary Findings from the 2015 Diary of Consumer Payment Choice, November 2016.
- Cash Report Europe 2016, G4S, based on interviews with all key stakeholders: EC, ECB, BEUC, EuroCommerce, ESTA and EPC.
- China Tech Insights, 2017 Mobile Payment Usage in China Report - https://www.slideshare.net/ChinaTechInsights/2017-mobile-payment-usage-in-china
- ECB Presentation, ESTA Conference 2015
- ECB, Occasional Paper Series 201: the use of cash by households in the euro area, November 2017. https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op201.en.pdf
- European Central Bank – www.ecb.europe.eu
- European Commission – www.ec.europe.eu
- European Commission, Survey on merchants' costs of processing cash and card payments, March 2015. http://ec.europa.eu/competition/sectors/financial_services/dgcomp_final_report_en.pdf
- European Payments Council, Single Euro Cash Area framework, March 2016. https://www.europeanpaymentscouncil.eu/sites/default/files/KB/files/Cash 021-05 v4 0 - SECA Framework 2016.pdf
- Germany - GS1 – Use GS1 Standards to Organize Cash Handling and ATM Processes; strategies for Implementation in Banking and Retail, 2017
- Law 4446/2016 on "Bankruptcy Code, Administrative Justice, Duties - Fees, Voluntary disclosure of undeclared income, Electronic transactions, Amendments of Law 4270/2014 and other provisions.
- The Organisation for Economic Co-operation and Development – www.oecd.org
- Payment New Zealand, Research Paper: Benchmarking New Zealand's Payment Systems, May 2016.
- Payments Canada, A Vision for the Canadian Payments Ecosystem, April 2016. https://www.payments.ca/sites/default/files/vision-canadian-payments-ecosystem-reader.pdf
- Payments Canada, Canadian Payment Methods and Trends, November 2016. https://www.payments.ca/sites/default/files/cpmt_report_english_0.pdf
- Payments UK, Diary study, 2017.
- Payments UK; Changing Payment Landscape – How 2017 will change the way we pay for good, 2017.
- PYMNTS.COM, Global Cash Index – United States Analysis, March 2017,
- PYMNTS.com; Global Cash Index – Mexico Analysis, April 2017
- RBA Bulletin, The Future of Cash, December 2016. https://www.rba.gov.au/publications/bulletin/2016/dec/pdf/rba-bulletin-2016-12-the-future-of-cash.pdf
- RBA, Research Discussion Paper 2014-14, The Evolution of Payment Costs in Australia, 2014.
- RBI Annual Report 2016/2017 - https://rbi.org.in/SCRIPTS/AnnualReportPublications.aspx?Id=1208
- Retail Banking Research, Global ATM Market and Forecasts, 2016.
- Riksbank, The Riksbank e-krona project 1st interim report, September 2017. http://www.riksbank.se/en/Financial-stability/Payments/Does-Sweden-need-the-e-krona/Reports/
- State of Payments, Payfort 2016.
- United Arab Emirates, The New Digital Payments Regulatory Landscape, Latham & Watkins, January 2017. https://www.lw.com/thoughtLeadership/LW-UAE-new-digital-payments-regulatory-landscape
- Wikipedia – en.wikipedia.org
- World Atlas – www.worldatlas.com
- Worldbank – www.worldbank.org

Other sources used:
- All central banking websites of all countries included in the report
- All central banking annual reports (latest available versions)
- Press releases (URL listed as footnotes in report)

Acknowledgements

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G4S Cash Solutions provides and develops new security concepts that enable market players such as retailers and banks to manage cash easily. The business is part of G4S, the leading global, integrated security company, specialising in the provision of security services and solutions to customers. Our mission is to create material, sustainable value for our customers and shareholders by being the supply partner of choice in all of our markets. G4S is quoted on the London Stock Exchange and has a secondary stock exchange listing in Copenhagen. G4S is active in over 100 countries and has 611,000 employees. For more information on G4S, visit www.g4s.com

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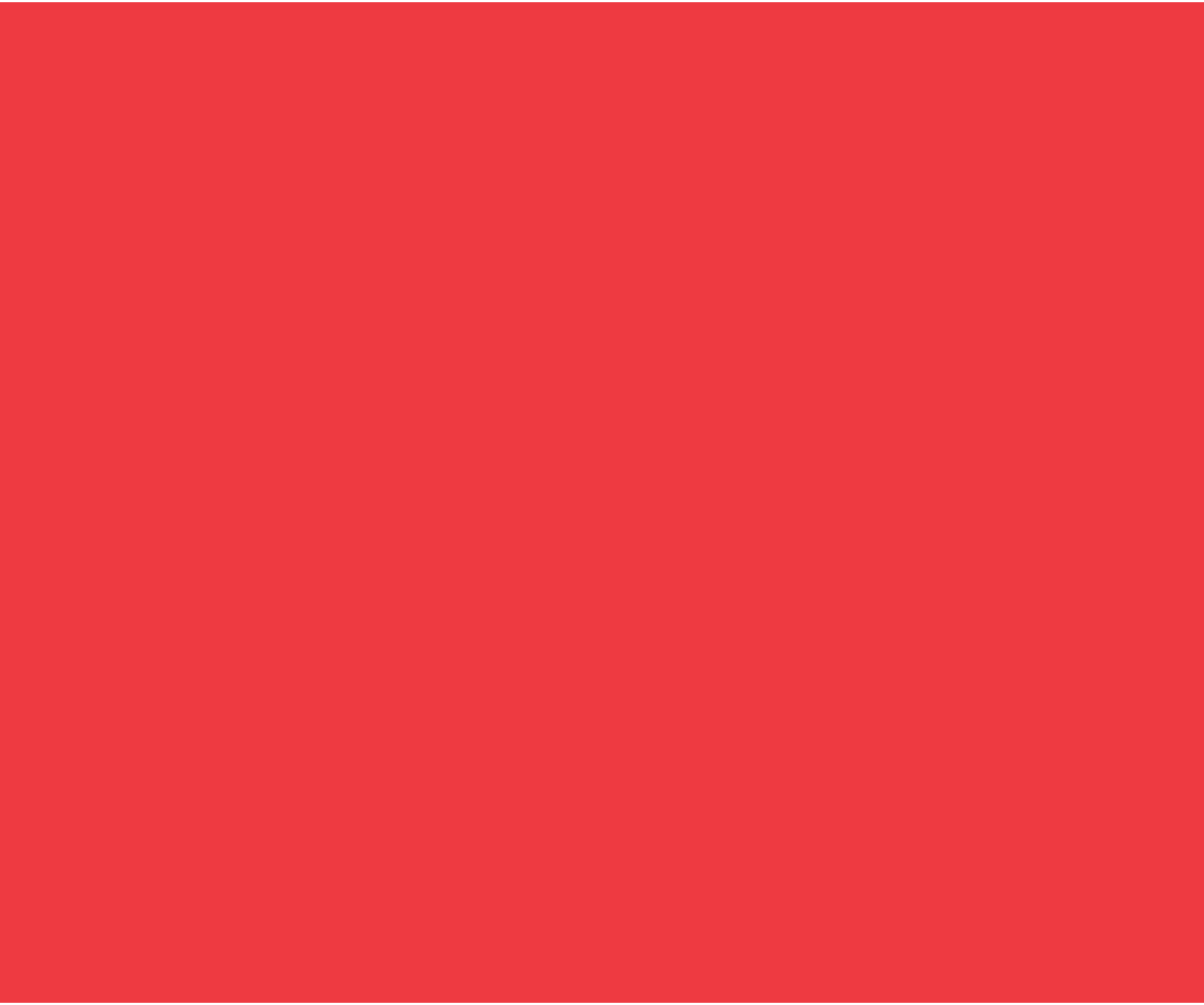

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Building on the G4S European Cash Report issued in 2016, the 2018 World Cash Report brings together data from almost 50 countries across all six continents to analyze and discuss the role of cash throughout the world. Cash is the oldest and, based on extensive quantitative and qualitative data research, it is also safe to say that cash is still the most widely used payment instrument in the world. Yet its position is subject to change.

There are many factors influencing the use of cash as there also are many reasons why cash still remains the favored payment instrument for many people across the world.

This World Cash Report addresses the following key questions: What is the current status of cash throughout the world? What will the future of cash look like? What are the key developments in≈current and future cash logistics and cycle organization?

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