

# Fighting poverty, profitably

Transforming the economics of  
payments to build sustainable,  
inclusive financial systems

BILL & MELINDA  
GATES foundation



Special Report  
Financial Services for the Poor, September 2013



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# Table of Contents

About the Gates Foundation’s Financial Services for the Poor program.....	3
Preface .....	5
Summary of findings and recommendations .....	7
I. Payment systems: An overview .....	15
II. Accounts: Establishing secure and affordable payments .....	23
III. Cash-In-Cash-Out: Creating access to payment systems .....	40
IV. Transactions: Connecting payers and payees .....	61
V. Adjacencies: Generating revenues through relationships with users .....	83
Glossary .....	99
Reading list.....	104
Sources .....	108
About the authors.....	111



# About the Gates Foundation's Financial Services for the Poor program

Poor people do not live in a static state of poverty. Every year, many millions of people transition out of poverty by successfully adopting new farming technologies, investing in new business opportunities, or finding new jobs. At the same time, large numbers of people fall back into poverty due to health problems, financial setbacks, and other shocks. However, it is costly to serve poor people with financial services, in part because most of their transactions are conducted in cash. Storing, transporting, and processing cash is expensive for banks, insurance companies, utility companies, and other institutions, and they pass on those costs to customers.

The Bill & Melinda Gates Foundation's Financial Services for the Poor program aims to play a catalytic role in broadening the reach of digital payment systems, particularly in poor and rural areas, and expanding the range of services available on these systems. Until the infrastructure and customer base are well established, this might involve a combination of mobile money services that are accessible via cell phones and brick-and-mortar stores, where subscribers can convert cash they earn into digital money (and vice-versa).

Our approach has three mutually reinforcing objectives:

- Reducing the amount of time and money that poor people must spend to conduct financial transactions
- Increasing poor people's capacity to weather financial shocks and capture income-generating opportunities
- Generating economy-wide efficiencies by digitally connecting large numbers of poor people to one another, to other consumers, to financial services providers, to government services, and to businesses.

We are not focused on a particular product or distribution channel, but rather on innovative ways to expand access and encourage markets. At the same time, we are aware that interventions in this and other areas too often involve technologies that are made available to the intended users, but are not adopted. To address this demand-side challenge, we are supporting research and product design experiments to identify design features, price incentives, and marketing messages that will encourage poor people to adopt and actively use digital financial services. We are also supporting policymakers as they work to develop policies and regulations that facilitate these developments.

We believe that the combined effect of these interventions will accelerate the rate at which poor people transition out of poverty and decrease the rate at which they fall back into poverty. Our strategy also recognizes that countries are at different stages in developing an inclusive digital financial system, and that we must tailor our interventions accordingly.



# Preface

The Gates Foundation's Financial Services for the Poor program (FSP) believes that effective financial services are paramount in the fight against poverty. Nonetheless, today more than 2 billion people live outside the formal financial sector. Increasing their access to high quality, affordable financial services will accelerate the well-being of households, communities, and economies in the developing world. One of the most promising ways to deliver these financial services to the poor – profitably and at scale – is by using digital payment platforms.

These are the conclusions we have reached as the result of extensive research in pursuit of one of the Foundation's primary missions: to give the world's poorest people the chance to lift themselves out of hunger and extreme poverty.

FSP conducted this research because we believe that there is a gap in the fact base and understanding of how payment systems can extend digital services to low income consumers in developing markets. This is a complex topic, with fragmented information and a high degree of country-by-country variability. A complete view across the entire payment system has been missing, limiting how system providers, policy makers, and regulators (groups we refer to collectively as financial inclusion stakeholders) evaluate decisions and take actions. With a holistic view of the payment system, we believe that interventions can have higher impact, and stakeholders can better understand and address the ripple effects that changes to one part of the system can have. In this report, we focus on the economics of payment systems to understand how they can be transformed to serve poor people in a way that is profitable and sustainable in aggregate.

## Data, Analysis & Estimates

The data available to evaluate payment systems is limited. Even in highly advanced economies, complete and comparable information is difficult to obtain. In the developing world, much of this data simply does not exist. Given that there are limited examples showing how providers make money from providing financial services to the poor at scale, we looked at payment systems in both the developed and developing worlds, and tried to learn how to apply lessons from both to reach the poor.

In this report, we present a complete set of analyses and estimates based on the strongest collection of data that we could assemble. Readers should understand this base of data as a “best efforts” attempt to provide a full picture of payment system costs and revenues, rather than a definitive source. We have focused on evaluating formal payment flows that have available data and benchmarks. We recognize that there are large payment flows over informal channels, such as unlicensed money transmitters, that are outside the scope of our analysis. We drew insights from three primary activities. First, we conducted a thorough assessment of the payment systems in six significant economies – Nigeria, Kenya, India, China, the U.S., and the Netherlands – to understand their elements, changes over time, and the economics for providers. Next, we assembled detailed and comparable benchmark information on a peer set of developed markets rang-

ing from Poland and the Czech Republic to the U.K. and Switzerland. We anchored this benchmarking in data from central banks, think tanks, and other sources. In particular, McKinsey & Company's Global Payments Map – a structured and consistent dataset on payment systems – provided a critical pillar. This work provided us with a basis to make comparable analyses in major economies, and a platform to translate our findings into a developing market context. Finally, we interviewed more than 100 industry experts across more than a dozen countries. Together, this work provides an unparalleled foundation from which to draw conclusions.

We believe that this report offers a unique perspective on payment systems, and a powerful set of facts and tools for financial inclusion stakeholders seeking better answers to tough problems. In doing this work, our research team also uncovered as many new questions as they answered. Therefore, we will continue to improve our understanding of these issues, and acquire more insights into low-income consumer payments. We hope that you find this report thought-provoking, worthwhile, and useful.

## Acknowledgements

The analysis and conclusions in this report have been shaped and influenced by the generous contributions of colleagues and friends too numerous to fully acknowledge. Without these contributions, we could not have completed this work. There are, however, three groups of people we would like to acknowledge with special gratitude. First, our External Advisory Board, comprised of executives and thought leaders from a range of institutions. These advisors include Robert Annibale of Citigroup, Roar Bjaerum of Telenor Pakistan, Massimo Cirasino of the World Bank, Tilman Ehrbeck of the Consultative Group to Assist the Poor, Khalid Fellahi of Western Union, Doug Michaelman of Visa Inc., Hans Morris of General Atlantic, Wim Raymaekers of SWIFT, and Jerry Sung of Alipay. Each of these advisors provided special counsel and valued perspectives. They pushed our thinking, and gave us insights that will help stakeholders take action.

Next, we want to thank the many people we visited in China, India, Kenya, and Nigeria and those we interviewed from Holland. In these countries, we received invaluable insight and support from central bankers, banking executives, telecommunications leaders, start-up entrepreneurs, leading academics, and many more. Most importantly though, we want to thank the many poor individuals and families in these countries who shared their experiences, voiced their needs, and provided important perspectives on how digital payments can contribute to their local communities. We are grateful for all of their time and contributions.

Lastly, we want to acknowledge McKinsey & Company for providing a team of dedicated analysts and experts from their offices around the world. They partnered with the Gates Foundation to synthesize all of the information we gathered, to structure the findings, and to formulate our assessment.

Rodger Voorhies  
The Bill & Melinda Gates Foundation  
September 2013  
Seattle, WA



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# Summary of findings and recommendations

## Introduction

It is expensive to be poor. For most of the 2.5 billion people living on under \$2 per day, saving money is difficult, credit is available only at very high rates, if at all, and drought or illness can push people without savings or insurance deeper into poverty.

Access to financial services can be a key element in overcoming these stubborn realities. Not only does it help consumers accumulate, increase, and protect their money, it also allows them to weather financial shocks. A growing body of evidence indicates that people of limited income could see significant improvement in their lives if they had access to the kinds of financial services that many others take for granted, such as chequing and savings accounts, loans, and insurance.

Despite this potential, the marketplace still fails to serve the poor in this way. Only 16% of low income consumers globally have access to formal financial accounts. Access for women and rural consumers tends to be even lower.

Solutions to this marketplace failure are difficult, but possible. The Bill & Melinda Gates Foundation believes that the place to start in creating them is by transforming the economics of payment systems.

Poor people, even those without access to formal accounts, still need ways to send and receive money. Today, the payment systems available to them are generally inefficient, insecure, and expensive. If this could be changed, payments could serve as the connective tissue for bringing a broader array of financial services to poor users.

These realities prompted the Foundation's Financial Services for the Poor program to conduct extensive research on payment systems around the world to determine characteristics necessary to create successful payment systems for the poor. As we looked across numerous countries, one common issue arose: the economics of serving low income consumers simply does not work for many providers. The reasons are simple. Poor people usually conduct financial transactions frequently, and in small amounts. Their limited household income often leaves them with limited account balances. However, in current market structures, most banks and other providers make money on larger transactions and on sizable account balances. In many scenarios, the more the poor use the financial system, the bigger the losses for the providers of that system.

Developed markets can teach us lessons about efficiency and market construction that will help lower-income households obtain formal financial services. Such markets highlight the promise of digital payment systems, which are much cheaper than paper-based and manually intensive alternatives. (Exhibit 1 profiles one poor family that could use digital payments.) Digital systems also hold potential to supply payments providers with additional, non-payment sources of revenue, particularly from the digital information collected. Having additional revenue sources may allow providers to offer payment services at a lower price.

However, even developed markets are not designed to serve large numbers of very poor people, so these lessons cannot merely be transplanted into developing markets. We need a new

## EXHIBIT 1

### Digital payments can simplify the financial lives of the poor

#### Example Profile

Mangala and his family of four live in Ashapur, India. Their combined income is approximately US\$120 per month. The largest share of income is from Mangala's casual employment, as a road worker and plot digger. At the end of 2012 they took a US\$260 loan from Cashpor (MFI). They often take store credit and borrow or lend from and to family and friends. They prepare their budget about once per month, mentally.



March and April 2013				Potential cash flows digitized over time		
Inflows to the household (number in two months)	Total (US\$)	Outflows from the household (number in two months)	Total (US\$)		Number in two months	Total (US\$)
Regular employment (1)	\$10	Purchases (119)	\$130	Paying for public transportation	5	\$26
Casual employment (7)	\$120	Repay MFI loan (8)	\$48	Paying for prepaid phone credit	1	\$0.40
Government grant (1)	\$6	Repays store credit (2)	\$4	Paying for groceries, clothes, shoes, etc.	23	\$60
Receives informal loan repayment (1)	\$20			Paying MFI loan repayments	8	\$12
Borrows from family (1)	\$8			Receiving government grant	1	\$6
				Receiving wages for casual employment	8	\$106
<b>TOTAL</b>	<b>\$164</b>		<b>\$182</b>	<b>TOTAL</b>	<b>38</b>	<b>\$108.20</b>

SOURCE: Bankable Frontier Associates India Financial Diaries, 2012-2013

set of lessons to guide developing markets to greater financial inclusion.

Our experience indicates that, for a payment system to serve the poor successfully, it needs to meet three criteria:

- **Robust functionality.** Users need reliable access to the system and trusted providers. A broad assortment of users must accept the system, and it must offer them a suite of payment services.
- **Low cost and low price.** Providers need sufficiently low costs and a higher probability of attractive returns. Lower costs allow them to offer lower priced services. Higher returns will attract them to begin serving the poor, and to grow the system.
- **Effective coordination.** Market structures need effective coordination to ensure that providers achieve better outcomes, and the system evolves successfully over time. Effective coordination will include both cooperation and competition among providers.

In addition to these criteria, consumer demand must also be sufficiently high. Impediments to demand can include limited financial awareness, and challenges in satisfying documentation requirements for opening a financial account. Even with higher demand, however, the economics as they are currently will not work.

Today, we believe that an opportunity exists to create significantly more sustainable payment systems that will have greater incentives to meet these criteria and serve lower income groups. Our examination of payment system economics showed us three major indicators that this opportunity is real and achievable across countries.

- **Even in developed markets, providers have significant potential to reduce costs in existing structure by 20%-50%, using multiple methods from different payment systems.** Research shows that the drivers of cost vary widely across systems, and there are numerous approaches for reducing operating costs throughout the systems. Lower costs will expand consumer reach.
- **No system has reached its full potential; all can improve economic performance.** As a result, the potential to lower costs and broaden access are available to all markets from Austria to Zimbabwe.
- **Innovations offer increasing potential for payment system improvements.** Payment system innovations across markets are continuously developing, expanding the potential for improvements as new technology and business models emerge. Mobile money in East Africa and mobile phone-based card readers (both digital payment solutions) are two examples that have promising applications to further reduce provider cost barriers as well as extend reach to lower income consumers.

Together, these indicators show us that payment system providers have the ability to lower costs, expand margins, and broaden services. If they can do these things and generate more value for themselves, they will coordinate more with each other, increase their investments, and focus on growth. Together, these improved economics can give much larger portions of the population a first step to financial inclusion and the financial service support they can use to better their lives. The results would be a dual win for providers and consumers.

To find ways for systems to capitalize on these opportunities, we first focused on understanding the economic models of payment systems. Our work examined more than 30 countries. We incorporated extensive country and provider benchmarking data, and conducted more than 100 interviews with regulators and payments providers, including banks and telecommunications companies.

In this summary of our report, we offer a high-level view of our findings and recommendations for improving system economics. While we acknowledge that a successful system also requires perspectives on the user experience, this is not the focus of our research and analysis. Such user assessments are available in other bodies of work (e.g., Portfolios of the Poor).

We start this summary by describing a new framework for understanding payment systems, then use the framework as a foundation for laying out four major findings and four recommendations.

## Describing a new framework for understanding payment systems

Too often, analysts look at specific elements of a payment system without accounting for the behavior of the entire system and how it responds to change. To avoid this, we believe a new framework describing payment systems is needed. The framework must simplify the systems and their underlying market dynamics. It must keep a user-centered per-

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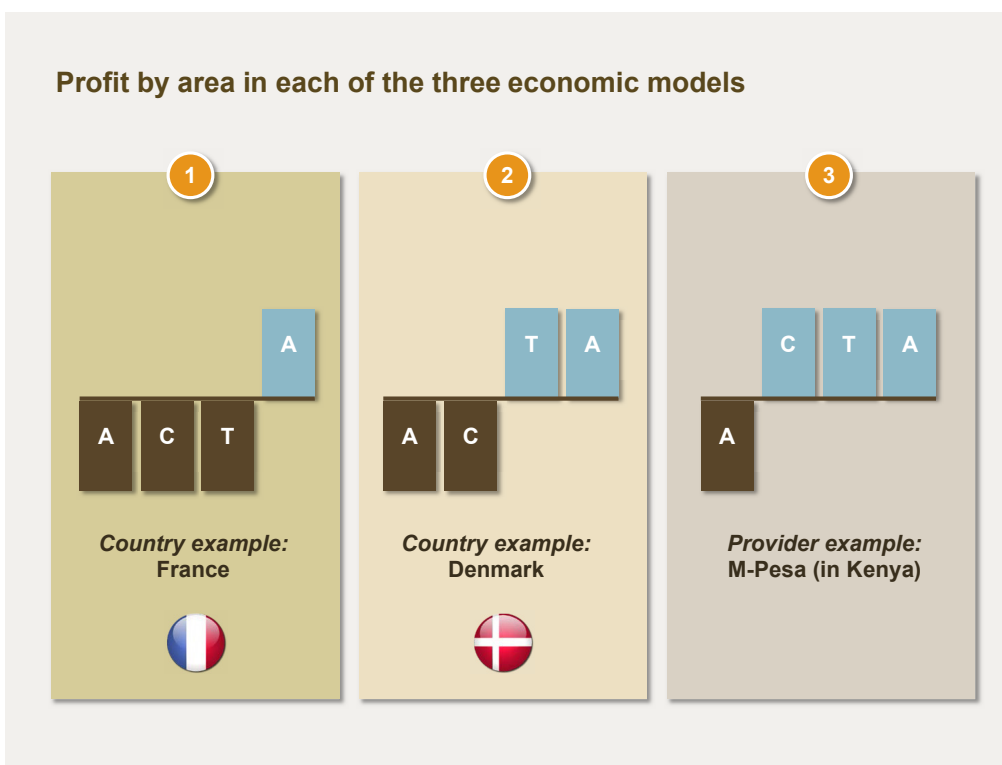
spective in examining the major payment activities. Finally, it must be flexible enough to allow us to evaluate the system as a whole, as well as specific payment instruments and players. To accomplish these goals we created a four-part framework we call ACTA, for Account, Cash-in-cash-out, Transactions, and Adjacencies.

- **Account** – Account activities cover the primary relationship that a user has with a provider, including opening new accounts and maintaining existing ones. Accounts must provide a secure, accessible store of value. Examples include current accounts (also known as chequing accounts) and mobile money accounts.
- **Cash-in-cash-out (CICO)** – To use the payment system, consumers must be able to deposit and withdraw cash to their payment accounts. CICO networks provide these services. Components include bank branches, ATMs, and individual money agents.
- **Transactions** – These are direct transfers of funds between accounts. They include debit and credit card payments, credit transfers, direct debits, and mobile money transfers.
- **Adjacencies** – These are activities, both financial and non-financial, that generate non-payments revenue for payment system providers. Financial adjacencies include interest earned on balances held, and the spread between the interest that the institution pays on savings accounts vs. what it charges for loans. Non-financial adjacencies include strategies to help companies acquire new customers, reduce customer attrition, cross-sell services, improve collections, or power other businesses with consumer insights. These revenue streams are vital for overall payment systems economics.

In different payment systems, different portions of the ACTA framework are profitable, break-even, or loss making. As a result, there are a large number of potential options for primary sources of profit to sustain the system. Our survey of country systems reveals that successful systems most commonly follow one of three economic models (Exhibit 2 illustrates the models).

1. **Account balance-driven profitability.** In this model, adjacencies account for all profits, while other payment elements – account, CICO, and transactions – lose money or break even. Profits from adjacencies are sufficient to cover the losses from other activities.
2. **Transaction and account balance-driven profitability.** In this model, the system reaches profitability through a combination of profit-generating and loss-making elements. Most commonly, adjacencies and transactions earn a profit, while accounts and CICO lose money.
3. **Usage-driven profitability.** In this model, CICO, transactions, and adjacencies all generate a profit, offering providers incentive to promote more frequent system use. Accounts often lose money or break even.

## EXHIBIT 2



## Applying the ACTA framework leads to four major findings

The four findings stemming from our work can significantly shape payment system performance, and the potential for more inclusive payment systems for the poor.

- 1. Usage-driven models create the strongest case for providers to serve the poor.** Because low income consumers have low balances, account-balance-driven adjacencies are less feasible. Models that thrive on profitable usage of the system have the strongest incentive to lower costs and drive volumes. That benefits the poor.
- 2. Three methods consistently offer opportunities for reducing operating costs across each element of the ACTA framework.** Many of these opportunities involve applying existing practices from developed markets to the developing world to improve existing systems. Combined, they could reduce the cost to serve across the system by up to 70%-to-80% in developing markets. On an individual basis, this could reduce the annual cost to serve a regular user of the system down to a low \$10-to-\$20 annually. Note, we believe that this is possible for regular users – those who use CICO services monthly and that transact once a week – and for the payment instruments with the best potential for low income consumers. When a system reaches these levels of average use, the share of transactions conducted digitally tends to accelerate, and this benefits the larger system as well as individual users. (Exhibit 3 illustrates the three methods)
- System design.** Payment systems can change their design to create an efficient foundation for payment activities and costs. This “rational design” approach to sys-

tems focuses on what is needed in the market, rather than what exists today. The good news is that developing countries often have the greatest freedom in system design as they have less entrenched infrastructure. For example, optimizing the locations of a network of CICO outlets (cash withdrawal points) can lower costs for participants in the system.

- **Minimum scale.** Scale efficiencies in the payment sector are significant particularly for transactions. With high fixed investment requirements, sub-scale systems struggle with high average costs. The benefit of driving volume is clear as marginal costs diminish quickly, and keep going down. Credit transfers, for example, keep providing scale efficiencies until a system reaches about 250 million to 500 million of these transactions annually. After that, we observe that scale benefits tail off.
- **Operational efficiency.** Major opportunities for cost savings are anchored in day-to-day operational improvements. Streamlining cumbersome procedures, automating manual processes, reducing unnecessary activities and other measures can make existing systems perform more efficiently with existing resources. Examples include digitizing account applications, eliminating paper statements, and streamlining customer support – all of which can reduce total cost to serve and allow providers to reach lower income consumers. In fact, this is the largest source of potential near-term improvement across many markets.

3. EXHIBIT 3

**Three main methods offer opportunities for reducing costs**

	ACCOUNTS	CICO	TRANSACTIONS
System design	✓	✓	✓
Minimum scale			✓
Operational efficiency	✓	✓	✓
Potential cost Reduction	65 – 75%	40 – 60%	95%
Potential annual cost	\$5-to-\$10	\$2.50-to-\$5.00	\$2.50-to-\$5.00

**Adjacency revenue beyond just interest on account balances will be vital for financial inclusion over the long run.** Because the economics of serving the poor often rest on thin margins for providers, any additional profitability from related services (adjacencies) can make a substantial difference. We believe that, even with all of the cost-cutting benefits described above, providers will still need to generate additional revenue and profit to give payment systems long-term sustainability. For serving the poor

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to be profitable, agencies will need to generate roughly \$5-to-\$10 in revenue per year, per user to cover account costs, of which we believe half will need to come from revenue sources beyond interest on account balances. If agency revenues cannot reach this level, providers may need to charge account fees to users (which could discourage use).

- 4. Market structures have a major impact on how providers reach the poor, but the most appropriate choice of structure depends on country-level payments economics.** Looking across dozens of countries, it is clear that the degree of government-led coordination and market consolidation matter in shaping payment system development (See sidebar in Chapter 1). Across the world, market structure is particularly important for transactions. For example, some markets have strong pricing programs or create collectively owned infrastructure at the center of the system where economies of scale are highest (e.g., clearing & settlement, processing). The balance of these drivers in a market will have a strong influence on near-term choices and long-term development. However, the most appropriate approach in a given country depends upon the full economics of its payments value chain.

## Applying the analysis and findings leads to four recommendations

Based on our payment system economics assessment and the major findings from this effort, the Gates Foundation has developed four main recommendations for private sector players, payment system providers, policy makers, and regulators. While each system presents a unique market landscape, dynamics, and priorities, we believe that these recommendations apply across markets, and will lead to better outcomes for poor consumers around the world.

- 1. Establish a solid economic baseline for the system, to improve oversight, and to better guide system development.** Given the complex dynamics, interdependencies, and incentives embedded in payment system behavior, financial inclusion stakeholders need to establish a robust baseline of their particular system's economics – revenues, costs, profits – to enable high-impact changes. Without this baseline, these stakeholders risk underachieving on their goals, and creating unintended ripple effects elsewhere in the system. The mandate, therefore, is to create this baseline to improve the impact of our work and others.
- 2. Incorporate “best of breed” providers into the system, to lower costs.** Financial inclusion stakeholders should give superior providers of services across the value chain broad access to participate in the payment system. We believe that these providers create a basis for change across the system because they bring high efficiencies, offer superior services, and spur competition. So, who are “best of breed” providers? They can include a diverse mix of domestic and international companies from inside or outside the financial services sector. They have skills, experience, and capabilities best suited for specific activities in the payment system. Allowing these providers to join the system in meaningful roles can raise the system's overall performance. New operating models, used in the developed world, provide an indication of the opportunity of coordination. For example, allowing mobile operators to manage cash-in agent networks for financial services often creates value because they have expertise in building and managing agent-based distribution networks at scale. Similarly, banks can benefit from shared service providers that streamline compliance activities by consolidating resources.
- 3. Actively apply innovations from other markets, to improve performance.** Payment systems are constantly evolving, and they always need innovations that expand

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capabilities. Happily, major innovations are continuously emerging in markets around the world. Payment service providers and regulators should actively monitor, evaluate, and apply innovations across the system as a means to ensure that it is continuously improving performance for the poor. For example, mobile point-of-sale solutions (e.g., Square, iZettle) hold tremendous promise for expanding acceptance and lowering costs for many markets. System leaders need to make purposeful assessments of these types of innovations and apply them when relevant.

- 4. Focus on the system as a whole instead of individual institutions, to improve regulation.** Regulators and policy makers should shift focus away from institutions, and toward the activities that occur within the system, a trend already in place in some countries. Regulating mobile money, for example, requires regulators to take a comprehensive view across mobile operators, financial services providers, retailers, and others, instead of simply confining their view to bank-only solutions. Policy makers and regulators in multiple areas (e.g., banking, telecoms, competition) will also need to work together to catalyze change, and foster collaboration. To manage all of this effectively, regulators need new tools to monitor, evaluate, and intervene in complex systems effectively. For example, mobile money regulations typically require significant coordination across regulatory bodies covering telecommunications and banking, and yet regulators often lack effective mechanisms for making coordinated decisions on important topics. The good news is that, as we looked at more progressive economies, a system-wide view is starting to take hold. Nigeria, for example, is expanding the role of banks and non-banks in developing a mobile money solution for the market, and focusing on key activities needed to drive adoption and usage.

## Conclusion

These findings and recommendations – and the additional insights from our economic assessment of payment systems components – point to an important path forward to lower system costs so that they can reach lower income segments. We are encouraged. Everywhere we look, we see opportunities to make payment systems more efficient and more accessible to low income consumers. Nonetheless, it is difficult to offer specific prescriptions for specific systems. Financial inclusion stakeholders need to acknowledge and understand the unique characteristics of their system if they are to attack the root causes of its inefficiencies. And yet, we do not believe these differences should be a rationale for limiting change. The real work comes when the specifics of local market dynamics, regulations, and related providers are paired with user needs on a country-by-country basis to develop or improve an effective system.

Following this summary, the main body of our report describes our analysis, findings and recommendations in greater depth. To begin, we re-introduce the 4-part ACTA framework, and discuss how its components combine to define the broad contours of a payment system. Next, we take a detailed look at each element of the framework. For accounts, CICO, and transactions, we describe their activities, cost centers, methods for reducing those costs, their revenue and pricing models, and implications of all these findings for poor people in developing countries. Finally, we describe the wide diversity of adjacencies, their sources of revenue, and implications of these findings for the poor.

Our goal in this report is to provide financial inclusion stakeholders an objective foundation and a fact-base on which they can build, allowing them to develop actions to increase access to financial services for the poor, and help their systems continue evolving to serve more users with high quality services.



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# I. Payment systems: An overview

To focus us on ways to enable dialogue and drive impact in creating payment systems that will serve the poor, we need a simple but holistic approach to analyzing payment system economics. Here we introduce such an approach – the ACTA framework. This framework breaks the payment system into four core elements – (A)ccounts, (C)ash-in-cash-out, (T)ransactions, and (A)djacent opportunities for profit. We focus on the portion of the system involving individual consumers – consumer accounts, consumer cash-in-cash-out, transactions for which a consumer either pays (e.g., a purchase at a store), is paid (e.g., salary payment) or both, and adjacent opportunities for profit involving consumers. This breakdown enables us to analyze potentially profitable models for overall payment system economics, revealing several key findings. The framework also has natural extensions for analyzing the economics of the full payment system (including all business-to-business transactions), the economics of individual payment instruments or players in the value chain, as well as the economics of serving different customer segments. These extensions indicate avenues for further work.

To define payment systems and isolate their core elements, it is important to understand both what payment systems look like from a user’s perspective as well as to understand a full system view.

From the perspective of a user, a payment system provides ways to hold money in an account and then transfer it, to withdraw or deposit cash, and to receive funds from other accounts. Both a current account at a bank and mobile phone-based mobile money are examples of such accounts. Users with a current account, for example, can withdraw and deposit cash at bank branches or at ATMs and they can make or receive payments either with a cheque, a debit card or via an account-to-account transfer. Mobile phone-based mobile money – M-PESA in Kenya is a well-known example – has similarities, particularly from a user perspective. A consumer stores mobile money credit with a mobile money provider – often a mobile network operator. She can withdraw and deposit cash in return for this credit with an agent or possibly at an ATM. She can also transfer money to or from a different account using an interface on her phone.

From the full system view, a payment system is a set of instruments, banking procedures, and, typically, interbank funds transfer systems that ensure the circulation of money. The full payment system in a country is the collection of all ways these things can happen. This full picture is complex, involving many players (e.g., banks, mobile-money operators, processors), channels for accessing cash or making transactions (e.g., ATMs, point-of-sale terminals, on-line interfaces, mobile phones) and payment instruments that can be used to make transactions (e.g., credit transfers, debit cards, credit cards).

## Financial characteristics of the payment system elements

Despite the complexity, all payment system activities fall under the four core elements: accounts, cash-in-cash-out, transactions, and adjacencies. Providers make money by

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<sup>1</sup> Some costs will be caused by regulatory or other requirements not directly associated with revenue generating activities (e.g., banks have processes to detect money laundering)

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charging users – payers, payees, or both – for some combination of the activities under these elements. The elements are profitable overall as long as total revenues from the underlying activities exceed total associated costs<sup>1</sup>.

Here is a brief financial profile of the four elements:

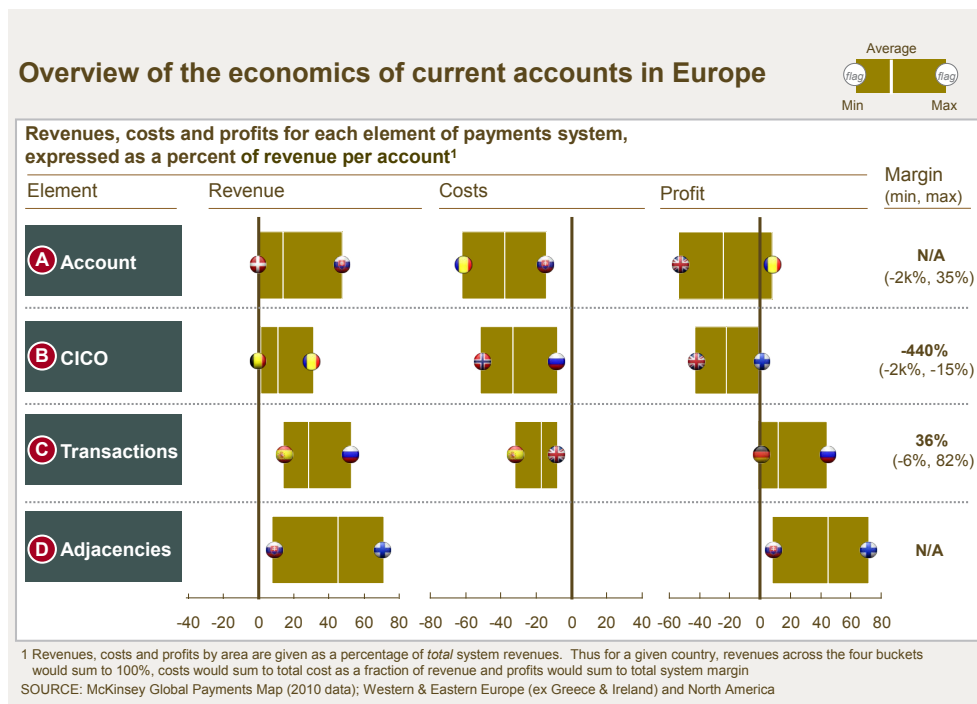
- 1. Account** activities include opening new accounts and maintaining existing ones. As mentioned, common examples of accounts include current accounts with banks and mobile money accounts with mobile phone-based mobile money providers. Accounts need to provide users a secure but accessible store of value. Maintaining an account costs providers money, but they generally charge users nothing or very little directly. Instead, revenues earned in other areas justify this necessary investment. In Europe, consumer current accounts cost providers about \$50-to-\$150 annually per user, and generate revenues from \$0 to \$80.
- 2. Cash-in-cash-out (CICO)** activities support a user's ability to move cash into or out of her own account. This occurs at access points such as bank branches, ATMs and mobile money agents – and is supported by cash distribution, which makes sure access points maintain the right amount of cash. CICO must be convenient for users, enabling them to convert cash to digital funds and back. These activities tend to lose money, but this varies somewhat by country and by type of system. Banks generally lose money while mobile money operators focused on remittance usually make a slight profit. In Europe, providers spend about \$30-to-\$170 annually on CICO per consumer, and receive related revenues of anywhere from \$2-to-\$40.
- 3. Transaction** activities support a user's ability to transfer funds directly between accounts. Debit and credit card transactions, credit transfers, and direct debits, as well as SMS mobile money transfers are all types of transactions. Both the payer and the person being paid need to be able to participate in the transaction, trust that funds will be transferred, and receive some benefit over using cash (e.g., in the U.S. many merchants pay to accept credit cards to increase sales volumes). Costs vary by transaction type and country. While pricing models also vary, users usually pay something (users can be either consumers or merchants) and in many markets, pricing for accounts and transactions are closely tied. In developed systems today, providers spend about \$10-to-\$70 on transactions per consumer<sup>1</sup> and receive related revenues of about \$20-to-\$130.
- 4. Adjacencies** refer to activities that support revenue-earning products that link to the basic payment system. Adjacencies are of three types. First, some adjacencies tie to direct use of the payment system. For example, banks earn interest on money that users deposit in current accounts. These adjacencies provide revenue at little additional cost. In developed countries, current account balance revenues range from \$100-to-\$300 per consumer annually. Second, adjacencies stem from use of financial services linked to payments. These can come from additional financial products (e.g., savings, insurance, lending). Third, non-financial adjacencies accrue from services unrelated to payments or financial services (e.g., the sale of transaction data to advertisers or rating agencies). In the case of mobile money, mobile operators may benefit from a reduction in customer churn (i.e., mobile phone customers will forgo a tempting offer to switch providers so they can retain their mobile money account). For these types of adjacencies, providers would count as revenue the incremental profit that comes from their link to payment systems. We do not consider costs and revenues explicitly since the activities needed to support them fall outside of the realm of payment system activities.

In each of the four payment system elements, provider margins vary widely. However, in general, accounts are the most unprofitable, followed by CICO. Across countries, transactions range from slightly unprofitable to highly profitable. While agencies always provide a source of additional revenue, their size varies widely across countries. Note, in this ACTA framework, we include only direct payment adjacency revenues and profits. We have not quantified or incorporated the profitability of indirect financial and non-financial agencies. Exhibit 4 shows revenue, cost, profit, and associated margins across the four payment system elements associated with consumer current accounts in countries across Europe<sup>2</sup>.

## How the four elements combine into different economic models

Most profitable payment systems follow one of three economic models. (Exhibit 5 illustrates examples of each model.) Each of these models can be economically sustain-

EXHIBIT 4

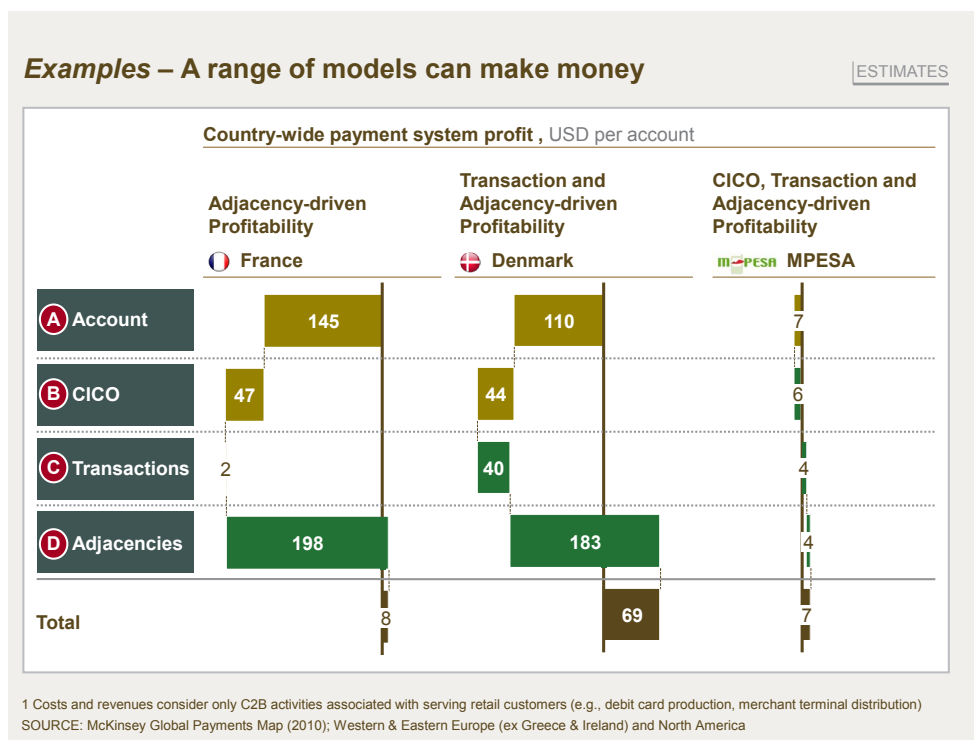


able and effective, and yet each provides users with very different experiences:

- 1. Agency-driven Profitability.** In this model, agencies account for all profits, while other payment elements – account, CICO, and transactions – lose money or break even. Profits from agencies are sufficient to cover the losses from other elements<sup>2</sup>. This model appears in current accounts in some parts of the developed world (e.g., the Netherlands, Belgium, Germany, and France) and is followed by banks in some developing countries (e.g., China). Providers typically choose this model when account balances are sufficiently large to generate meaningful interest revenue. For example, a provider may decide that charging customers a maintenance fee for a current account will decrease the number of accounts, and hence the institution’s earnings from interest spread are greater than from fees. From a user per-

1 Including all transactions in which a consumer is involved in at least one end of the payment, including C2C, C2B, and B2C payments.  
2 Note that the same breakdown is possible for the economics of business current accounts and payments involving at least one business, as well as for the economics of all current accounts and payments. In each of these views, the qualitative features of the economics remain similar. However, the relative contribution of retail and commercial payments can vary across countries.

## EXHIBIT 5



spective, payments often appear to be free as long as the user maintains sufficient balances to provide profits for the provider.

2. **Transaction and Agency-driven Profitability.** In this model, providers typically earn a profit from transactions and adjacencies, while accounts and CICO usually lose money. A wide range of developed payment systems follow this model (e.g., U.S., Spain, Austria, and Denmark) as do some developing country systems (e.g., current accounts in Kenya). This model makes sense for providers when user willingness to pay for transactions is high enough so that there is more to gain from charging for transactions than to lose from decreasing adjacent revenues based on balances. From a user perspective, payments appear to be low cost, and consumers and merchants expect to pay fees for some activities (e.g., wire transfers, debit cards).
3. **CICO, Transaction and Agency-driven Profitability.** In this model, providers earn a profit from increased usage, specifically on CICO and transactions, due to fees they assess on users. In general, only accounts fail to make money. This is the model of successful mobile money deployments (e.g., M-PESA). This model makes sense for providers when users place a high premium on the ability to withdraw cash, and are willing to pay for at least some transactions. In general, it is more likely to be successful when there is less adjacent revenue at stake. From a user perspective, this model provides a la carte options for transactions and CICO, all of which come with fees attached.

## Observations on payment system economic models

With these models as reference, several observations are important to note:

- **The choice of model alone does not determine the level of system profitability.** There are systems following each of the three models that actually lose money. Germany provides an example of a money-losing Adjacency-driven Profitability model. In Germany, fees are low for account, CICO, and transactions, and the country fails to earn enough money through adjacencies to be profitable. The German system has encountered particular problems over the past several years when interest rates have been very low, reducing adjacency profits from interest on account balances. Even among systems that are profitable using a given model, that profitability can vary widely. For example, current account linked payments in Denmark and Poland both follow the Transaction and Adjacency-driven Profitability model, but annual profit per account in Denmark is \$69 compared to only \$23 in Poland.
- **The Adjacency-driven Profitability and Transaction and Adjacency-driven Profitability models are rarely profitable for serving poor people, because the poor carry low account balances.** The Adjacency-driven Profitability model depends heavily on adjacency revenue such as interest, and poor people rarely have balances big enough to generate much interest. For example, a user with a \$100 average annual balance may generate between \$3 and \$6 in interest revenue. If annual account maintenance costs the bank \$10, then the user would need to generate an additional \$4 to \$7 in revenue from other sources for the bank to break even on that user. The Transaction and Adjacency-driven Profitability model also has difficulty generating a profit serving a poor user base because transactions need to fill the gap created by a lack of adjacency revenue. In the CICO, Transaction and Adjacency-driven Profitability model, however both CICO and transactions have the potential to generate revenue, and hence it has a better chance of generating profits serving poor people.
- **The usage-driven model (CICO, Transaction and Adjacency-driven Profitability) creates the strongest case for providers to encourage their poorest customers to use the system.** In this model, providers earn additional income every time a consumer withdraws cash or transacts. Thus, providers gain by encouraging people to use the system, which is good for financial inclusion.
- **Within the CICO, Transaction and Adjacency-driven Profitability model, digital payment systems offer the highest potential for financial inclusion.** Digital payment systems include mobile money, direct electronic account deposits, and online money transfer as means to complete transactions. They tend to have lower costs than heavily paper-based and manual systems, and they also offer greater potential for generating adjacent revenues not tied to user balances (e.g., through capturing data that can then be sold). However, even digital payment systems must include non-digital activities, such as cash deposits and withdrawals. Making digital payment systems more accessible, more robust, and higher volume helps to broaden financial inclusion.
- **The roles of players in the payment system value chain map closely to the four core elements.** For each element, players are involved at various points of interaction with customers, ranging from actual distribution points to designing and maintaining gateways or portals through which customers interact. At the front end in accounts, both account activation and customer service involve direct interaction by a financial institution with the user. At the back end, there are players responsible for holding the customer's money and associated processing activities (e.g., calculating interest, updating balances, and creating statements – either electronic or paper).

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While the building blocks of a payment system profit are consistent across countries, there are significant variances in the level of value chain integration, the range of participating players, and the balance between competition and cooperation. When the value chain is integrated, a small set of players absorbs all costs and reaps all the benefits from providing payment services to users, so player profitability closely reflects total system profitability. The types of players involved tend to be limited, and innovation generally occurs in-house since new entrants rarely germinate. In a more disaggregated value chain, specialized players provide services within a payment system element. In this case, the way that overall system profits divide among players is critical in how each behaves, and in the service and prices seen by the end user.

- **In areas of the value chain where players benefit from reaching scale or taking collective action, there is potential for cooperation among them.** Prime examples include switches connecting institutions for different types of transactions, and networks for cash handling and distribution points. In each case, it is possible for players to generate large cost savings and improve their effectiveness through cooperation. However, in all cases there is also concern that a single provider with no competition may hamper efficiency and innovation, and gain from monopolistic pricing. Furthermore, cooperative structures can be difficult to activate and administer, particularly when some players involved stand to lose individually. Countries that cooperate tend to regulate prices and/or establish governance structures in which players with competing interests have a voice (See sidebar). They also tend to have relatively consolidated banking systems and culturally established traditions of cooperating to increase collective benefits. For example, in the Netherlands, transactions linked to current accounts are considered a utility. Thanks to a collaborative system, transaction processing costs are very low, but prices are limited, so that overall transaction profits are near break-even (about \$0.70 loss per account per year).
- **The ACTA framework can be applied to any part of the payment system.** We rely on the four core elements of payment systems to structure our analysis of overall system economics. However, these elements can also be used to break down payment system economics in various ways. For example, we can compare the economics of various payment instruments (e.g., debit card vs. mobile money), the economics seen by various players in the value chain (e.g., bank vs. processor), or the economics of serving different customer segments (e.g., mass-affluent vs. living on under \$2 per day). We believe this is a new and useful framing for system evaluations.

## Implications for poor people in developing countries

The ACTA framework is a useful tool for understanding the performance of the payment system. For financial inclusion, the drivers of better performance remain difficult to isolate. We find little direct causality between profitability across the ACTA framework and access of financial services for the poor. Highly profitable systems can achieve important outcomes for financial inclusion, as well as systems that mostly break even. While we see no “silver bullet” that would reveal a combination of financial levers in the ACTA framework, there are important lessons to draw. Understanding the financial performance for low income users is vital for designing and managing a more inclusive payment system. In addition, the overall commitment of a system to serving the poor is key. While impossible to pinpoint, we clearly see markets that outperform their peers through an apparent focus on low income segments across government and payment system providers.

## Government coordination and market consolidation influence consumer prices in payment systems

The cost of operating a payment system alone rarely determines the price consumers pay to participate in it. The degree of government coordination and market consolidation can have a large impact. Therefore, they also influence the system's affordability for both poor users and small transactions.

**Government coordination.** Governments play an important role in establishing the regulatory environment for payments, and sometimes set a philosophy for pricing. The degree to which the government of a country views payment infrastructure as a public good or a "utility" may influence its willingness to intervene in the market to shape the delivery of payment services, to keep pricing low and to facilitate market coordination. These types of government interventions generally seek the following:

- Serve the broader good
- Capture economies of scale in production and delivery
- Set prices, often based on the cost of providing services.

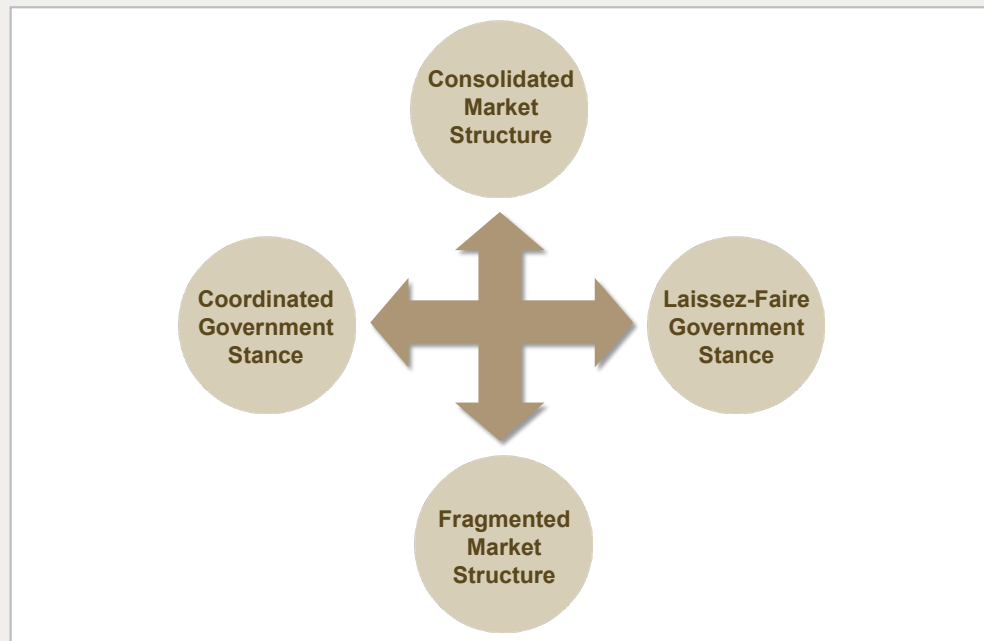
An example of this type of government intervention is the Netherlands. After WWII, the government provided citizens free chequing accounts through the government owned Post Office. This intervention led banks to offer free chequing and focus on cost containment. Part of this cost focus saw banks forming vehicles to manage payments as a public good, most recently in cooperation with merchants. Government authorities oversee such efforts to ensure there is no evidence of anti-trust. One result is that merchants pay a low price of just \$0.01 per \$10 debit card transaction. Also, 98% of the poorest 40% of adults hold a formal bank account.

A different example can be found in the United States. Until recently, the U.S. government took a more laissez-faire approach to coordinating market players and setting payment system pricing. Interchange fees on debit and credit card payments, for example, were established by the main payment service providers and then passed onto merchants, who in turn often passed them on to consumers through higher prices. With the advent of the Dodd-Frank financial reforms, the U.S. government capped debit interchange.

Often, a country's decision to establish a central payment system creates conditions for providers to collectively own payment infrastructure. For instance, such countries often have bank-owned payment providers, including Equens in the Netherlands, Interac in Canada, and NIBSS in Nigeria. This can lower the cost for banks to provide payments because they do not need to pay a margin to private owners of payment infrastructure. If the market is sufficiently competitive, banks will pass this savings along to consumers in the form of lower prices.

**Market consolidation.** The structure of competition in the market also has an important impact on a payment system's reach to poor consumers. Limited competition can keep prices for consumers overly high. This kind of behavior is happening with mobile money payment in Kenya (which is a consolidated market) where the money transfer price to consumers for sending \$1.50 is \$0.30, or ten times higher than the same provider charges in a more competitive market in Tanzania.

## Market Behavior: Cost alone does not determine price to transact



On the other hand, an extremely fragmented market can make establishing common business rules, standards, and protocols for interacting with the payment system overly burdensome.

As a result, institutions are likely to abandon the system and forge bilateral agreements that neither promote system efficiency nor build scale. The exhibit above demonstrates these concepts.

While we cannot propose the best solution for a given country, we highlight these issues because they have a profound impact on the development of the payment system, and its ability to reach the poor.

Government officials, institutions, and investors should establish the starting point of a given country, assess the degree to which each stakeholder will be involved in building up the payment infrastructure, and then lay out an approach for achieving success. If governments and institutions have financial inclusion as a goal, they will need to foster market coordination to build the infrastructure, create scalable solutions, and drive efficiency across the value chain. Only then will providers be able to contain costs enough to make a profit while charging prices low enough to serve poor users and support small transactions.



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## II. Accounts: Establishing secure and affordable payments

### Chapter summary

Accounts are the first element in the four-part ACTA framework of payment system economics<sup>1</sup>. This element – allowing users to create accounts that they control and that can hold money – is foundational for payment system activities. Account activities include opening new accounts and maintaining existing ones. Common examples of accounts include current accounts with banks<sup>2</sup> and mobile money accounts.

**A successful payment system that fosters financial inclusion requires** access, trust, and sufficiently low price. A user needs to be able to access his account easily, trust its security enough that he is willing to hold money there, and know how to use it. In order for prices to be low enough for low-income users, providers must push their costs down to a minimum.

**Our economic analysis of accounts across a broad set of markets yields several major insights:**

- **Account providers generally charge users less than the costs of creating and maintaining accounts.** Therefore, nearly without exception, accounts themselves lose money. Annual costs range from about \$50 to \$150, and annual account fees paid by users range from zero to about \$80.
- **In most developing countries, mobile money providers can provide accounts at roughly 60% lower costs than banks.** Average annual costs for current accounts in developing countries range from \$20-to-\$30, while mobile money accounts (not available in most developed countries) can cost as little as \$6-to-\$15. The bulk of the costs are driven by manual processes, user-driven support, account security measures and IT system maintenance.
- **Improvements to system design and operations together can help lower costs by as much as 70%.** Eliminating paper for statements and in the back office may reduce current account costs by as much as 30% -to-40%. Shifting to lower-cost channels, increasing process automation and improving process efficiency will be the highest-impact methods for lowering current account costs by an additional 30% or more. Moreover, process automation and efficiency can both contribute to lowering costs for mobile money accounts.
- **Costs for both current accounts, held by banks, and mobile money accounts could be cut to as low as \$5 per year. Banks have potential to lower their account costs to \$5-to-\$10 per year.** Providers of mobile money (often telcos) could cut their annual account costs to slightly below \$5, but this reduction potential will be limited by requirements for fraud and system reliability.

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1 ACTA stands for: Accounts, Cash-in-cash-out, Transactions, and Adjacent opportunities for profit

2 Known as chequing or cheque accounts in some countries

- **Providers typically set account fees in conjunction with transaction fees.** Though there are multiple approaches for doing so, at the country level, payment systems typically strike a balance between higher account fees or higher fees for transactions.
- **Countries with lower account fees have higher levels of financial inclusion,** however low fees alone will not create inclusion. Some countries with low account fees still have low inclusion. However, the combination of low account fees and high digital payments can help make a system inclusive. Digital payments help lower costs overall (beyond just accounts), and increase the possibilities for adjacent revenues – thereby increasing the chances for making even poor customers profitable. Countries that we examined that have average annual account fees less than \$25 and at least 45% digital payments enjoy over 85% financial inclusion.

**To elaborate on these insights, we have divided this chapter into five parts:**

- Activities involved in opening and maintaining accounts
- Components of account costs
- Methods to lower account costs
- Account revenue and pricing models
- Implications for poor people in developing countries

## Activities involved in opening and maintaining accounts

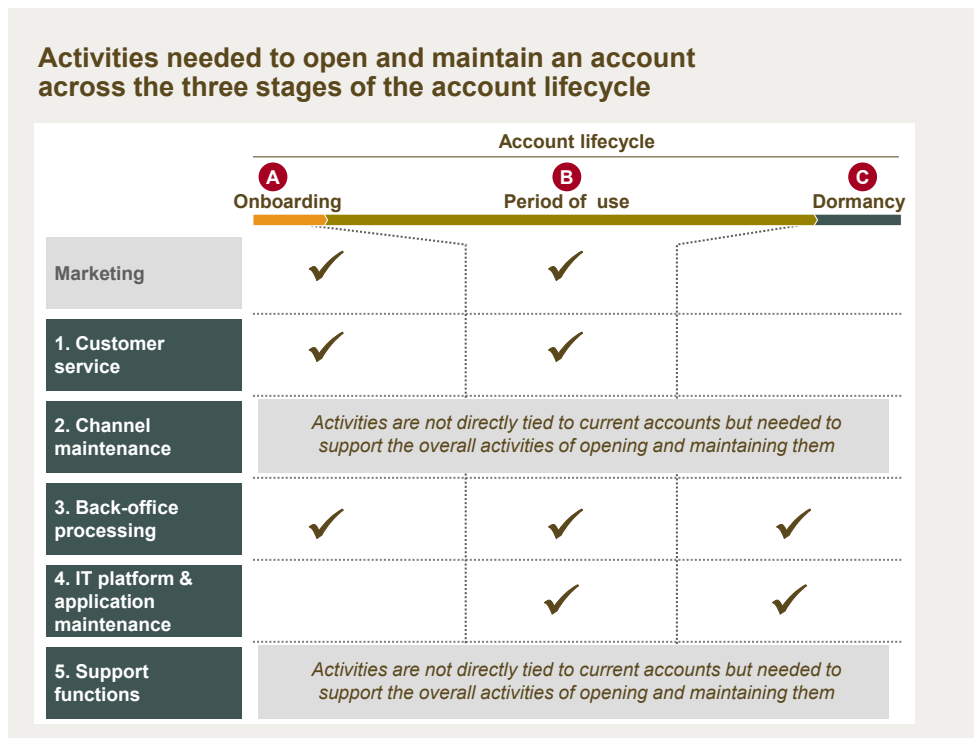
While current accounts held by banks, mobile money accounts, and accounts with other payment service providers have some important differences, they all move through the same stages of life, and require the same broad activities to open and maintain them.

Accounts move through three stages of life:

- A. Onboarding** – Account providers attract consumers to obtain an account, work with her to get that account opened, and establish it for her use.
- B. Period of use** – Once her account is open, a customer typically uses it for a period of time. For example, the average current account in Europe is active for 11 years, with country level averages ranging from 7 years in Slovakia to 23 years in Finland. Across countries we examined, average lifetimes are shorter in lower income countries. Thus, we expect that account lifetimes in developing countries, particularly among poor users, typically will be significantly shorter than 7 years. Consistent with this expectation, the average customer lifetime of telco users in developing countries is roughly 4 years (e.g., Safaricom, the parent company of the Kenyan mobile money system M-PESA, reports annual churn of 28%, coinciding with a customer lifetime of just under 4 years).
- C. Dormancy** – Even after customers stop using accounts, they often lie dormant for one or more years. In Europe, levels of account dormancy indicate that a typical account is dormant for 1 year before closing or reactivating. Analogous data does not exist for developing countries. Dormant accounts still incur costs.

Activities needed to open and maintain an account across these three stages of life fall into five categories. Exhibit 6 shows where these activities support stages in the account lifecycle.

EXHIBIT 6



- 1. Customer service.** This includes all client facing, or front office, activities at a branch, agent, or through other channels (e.g., call center). During onboarding, an employee or commissioned agent may help a prospective customer understand options and fill out application forms, and often will enter data into the system while doing so. During the time a customer uses his account, customer service will include answering customer questions at the branch, through call centers, online, via email or through the mail<sup>3</sup>.
- 2. Channel maintenance.** This category includes activities needed to maintain the channels used to reach the customer. In the case of banks, this includes all activities needed to maintain both branches and Internet banking. A portion of the cost to maintain ATMs that provide account-linked services is also included (e.g., printing a mini-statement of past transactions). Since all channels have uses beyond account establishment and maintenance, institutions charge only a percentage of the costs for operating a given channel against accounts. This percentage will vary significantly, depending upon institution-specific details of channel use and accounting practices.

<sup>3</sup> Customer service here refers only to that directly related to use of the account itself (e.g., chequing an account balance or asking questions about rules or fees). Customer services associated with particular cash deposits or withdrawals (CICO) or transactions is accounted for in the CICO and “Transaction” portions of the ACTA framework.

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3. **Back-office processing.** This includes product-related processing activities. At onboarding, back-office activities include processing a prospective customer's application (entering information into the bank IT system) and verifying identity and suitability as a customer. Processing activities supporting account use include calculating interest and transferring money between a customer account and the bank (e.g., for an interest payment to the customer or the deduction of a fee from his account). Processing also includes statementing, which typically occurs both for active and dormant accounts. Providers may also need to undertake processing activities to close down accounts that have been dormant for sufficient time. In many cases, regulations set a minimum time that an account must be dormant before it can be closed.
  4. **IT platform and application maintenance.** This includes establishing and maintaining the IT software and hardware to support accounts once they are established. It also enables the interface between accounts and customers, as well as back-office and front office employees. This IT must be sufficiently reliable to support business needs (e.g., have limited downtime and capacity to recover quickly from a disaster). It must provide security against fraud, and comply with all regulatory standards. IT systems must house and provide the same functionality for both active and dormant accounts.
  5. **Support functions.** These functions, including risk, finance and HR also perform activities needed to support account opening and maintenance. As with channel maintenance, support functions have uses beyond account, so institutions charge only a percentage of their cost against accounts themselves.

Providers must also spend money on product development and marketing. Marketing plays a particularly central role in generating new customer accounts and also plays a role in influencing existing customers to stay. Since marketing activities are broad and generally not directed toward current accounts alone, we do not consider them in detail here.

## Components of account costs

Account costs can be broken down either by stage in the account lifetime, or by the activities needed to open and maintain an account across its life. The lifetime breakdown illustrates how average customer lifetime determines the relative contribution of onboarding costs to overall account costs. The cost breakdown by type of activity illustrates some of the differences in the cost structures of current accounts compared to mobile money accounts<sup>4</sup>.

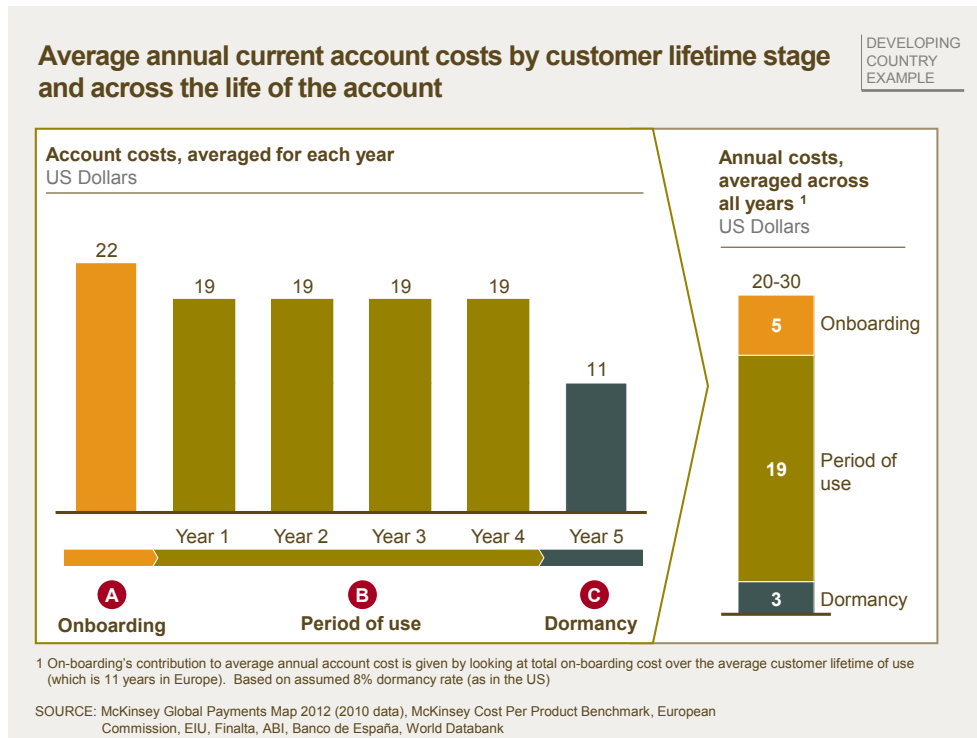
### Cost breakdown by stage in the account lifetime

An account generates costs unevenly across its lifetime. Exhibit 7 illustrates cost estimates for a typical current account in a developing country.

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<sup>4</sup> Current accounts held by banks, mobile money accounts, and accounts with other payment service providers generally have important differences in terms of functionality, which we do not discuss in detail in this work. For example, a current account at a bank typically offers a small interest rate to the account holder, generally gives access to multiple types of payment options, sometimes with additional fees (e.g., including debit card, credit transfers, cheques), and often can be linked to savings accounts, overdraft lines of credit, and other banking products. Mobile money account functionality typically is more limited, though it differs across providers and countries, and providers are exploring ways of linking these accounts to other banking products, often in partnership with banks.

EXHIBIT 7



The relative contribution of onboarding costs to annual costs depends on the number of years that a customer remains active. In the example in Exhibit 7, the \$22 in onboarding costs is slightly more than the typical annual costs of \$19 during the period of use. When onboarding costs are spread out over the entire lifetime of the account, they contribute only \$5 to average annual costs of \$20-\$30. Cutting onboarding costs by half or doubling customer lifetime lead to roughly the same decrease in average annual account costs (e.g., decreasing onboarding costs from \$20 to \$10 has the same effect as increasing customer lifetime from 4 to 8 years).<sup>5</sup>

It costs money to maintain an account even after it goes dormant (in this developing country example, this happens after Year 4). These costs are roughly \$11 per year. When averaged out over all the years the account exists, this maintenance contributes \$3 per year.



<sup>5</sup> Note that for the model of CICO, Transaction and Adjacency-driven Profitability, in which providers earn a profit on CICO and transactions, due to per-use fees they assess on users, account cost per use may be more relevant than account cost per year. For current account-based models in which most revenue comes from interest on account balances, account cost per year is the most relevant quantity. We give annual cost numbers to allow for an apples-to-apples comparison.

## Onboarding activities

Onboarding costs comprise under 20% of total annual account costs in developing countries, and account for an even smaller fraction in developed countries where customer lifetimes are longer (e.g., average onboarding cost contribution in Europe is under 10%). While this cost is small overall, it is useful to understand the process by which onboarding occurs because better onboarding may increase access and adoption.

Onboarding requires a significant amount of human labor over a series of five steps, whether at a bank, mobile money operator, or other payment service provider.

- 1. Application** – The customer fills in an application, sometimes with the help of an employee or commissioned agent.
- 2. Processing** – The account provider will then process the application. In general, an employee will do this manually, both keying information from the application into the bank IT system and checking the potential customer's ID. However, new technologies that scan IDs for information can automate this process. ID requirements vary by country. In some countries, all applications for a transaction account must show a government-issued ID. This step generally is significantly easier in countries with universal IDs. In other countries, people opening low-balance accounts do not need to show formal identification.
- 3. Verification** – Next the account provider verifies the applicant. It will use ID information to check that the applicant is not on any watch lists (e.g., for terrorist activity), and perform any other checks in accordance with country-level regulation. If the potential customer is applying for an overdraft line or other form of credit, the bank will also check his credit worthiness, based on the application and ID information. In countries that have a credit bureau, the bureau will generally perform this job. In some cases, the bank will ask the customer for more information, in which case it will need to repeat at least a portion of processing and verification steps. Providers can automate verification, but it still tends to involve a final manual decision.
- 4. Notification** – Following verification, the account provider notifies the potential customer that his application has been approved (or denied). In case of denial, the provider will often ask the customer for more information. In case of approval, the provider will sometimes need to wait for the customer to accept the account.
- 5. Initiation** – Once the customer has accepted the account, the provider initiates processes needed to open and maintain it. This includes data entry into the system, and the initial deposit. This process may also require additional customer service, since the customer may not yet know how the system works.

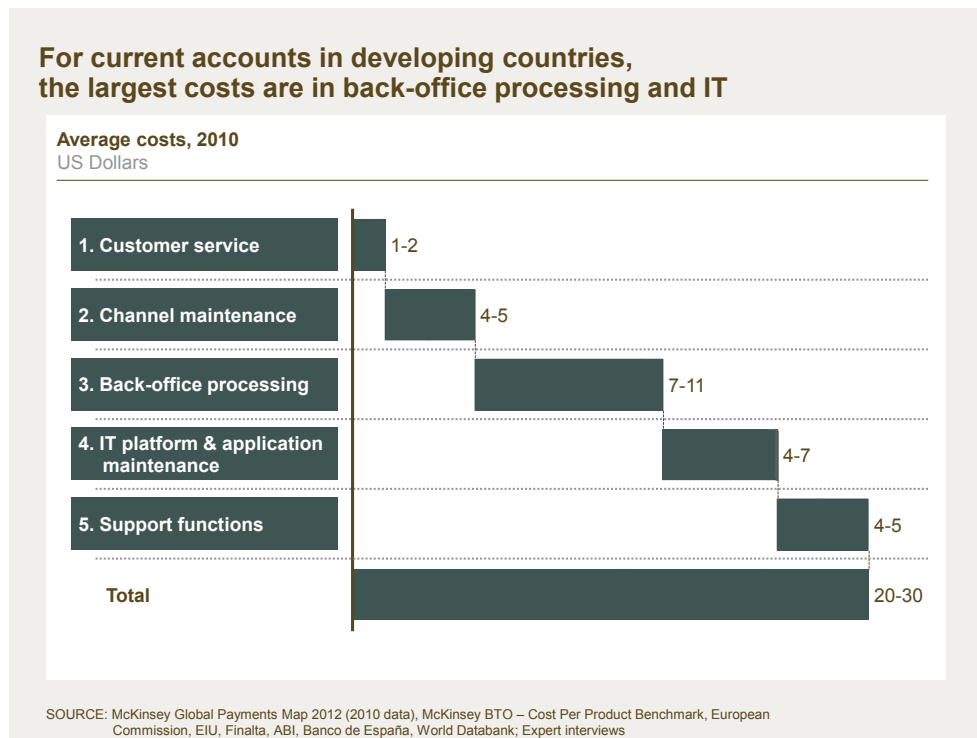
When a customer applies for a current account at a bank branch, the above steps often occur while he waits. However, the process can be significantly less efficient when initiated at an agent. In most countries, agents do not have authority to verify new customers, and often do not have the technology needed to process the application. Hence, agents or another person responsible for delivery will need to transport applications to a bank branch for processing and verification. When some needed information is missing, the agent may need to go back and forth between the bank and the customer (often at his storefront) multiple times. This increases turn-around times significantly and can increase cost, through additional labor time.

## Cost breakdown by account activity

Today, the cost breakdown among the five activities needed to open and maintain an account varies significantly between current accounts and mobile money accounts, with annual mobile money account costing roughly 25%-to-50% of traditional current accounts.

**Current account cost breakdown.** Exhibit 8 shows an estimated breakdown, by activity, of the \$20-to-\$30 in annual costs for a current account held by a bank in a developing country.

EXHIBIT 8

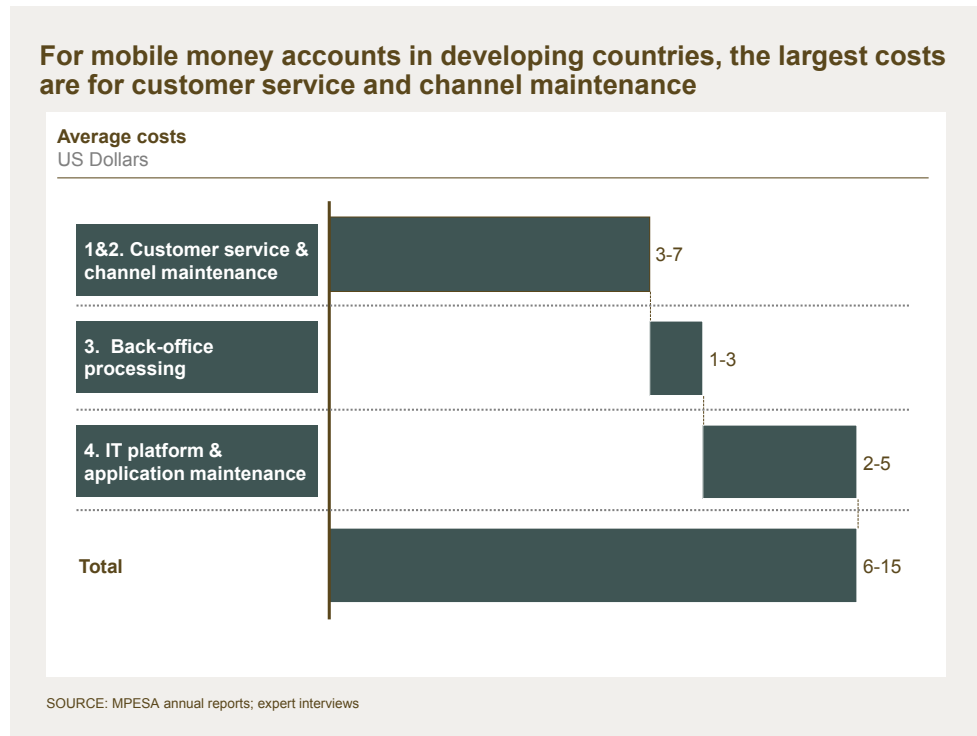


- 1. Customer service** costs are \$1-to-\$2 and come from front-office labor. This corresponds to roughly 1 hour of employee time.
- 2. Channel maintenance** costs are \$4-to-\$5 annually and are split between on-boarding and account maintenance. The appropriate split will vary by bank, depending upon the combination of channels that customers use.
- 3. Back-office processing** costs are \$7-to-\$11. Of this, up to \$9 comes from printing and distributing paper statements. By contrast, for on-line or SMS-based statement access, costs of generating and distributing statements is only about \$1 annually. This cost is equivalent to a customer looking up her account balance once a week via SMS. The remaining back-office cost comes from labor, corresponding to slightly less than 1 hour in employee time.
- 4. IT platform & application maintenance** costs are \$4-to-\$7. These come from both IT hardware and software costs.

- Support function** costs allocated to accounts are about \$4-to-\$5. These include allocations for risk, finance and HR. As with channel maintenance, support functions have uses beyond account so institutions only charge a percentage of their cost against accounts themselves.

**Mobile money account cost breakdown.** Exhibit 9 shows an approximate cost breakdown, by activity, of the \$6-to-\$15 in annual costs of a mobile money account in a developing country<sup>6</sup>.

EXHIBIT 9



- 1, 2. Customer service & channel maintenance.** Combined customer service and channel maintenance costs are \$3-to-\$7 per year. Approximately \$1 of this comes from call center labor, with the remainder primarily from agent management. Associated activities include evaluation and training of prospective agents as well as periodic on-site supervision of stores.
- 3. Back-office processing** costs are \$1-to-\$3 per year, not including balance inquiries. Many mobile money providers charge customers for each such inquiry. A typical charge is about \$0.01 per inquiry, which roughly covers costs.
- 4. IT platform and application maintenance** costs are \$2-to-\$5 per year. These can come either from running the platform directly or from a licensing fee. MPESA, for instance, pays a licensing fee to its Safaricom parent company, which houses and maintains the account and payment platform.

<sup>6</sup> Based on expert interviews and cost structure extrapolated from annual reports of several telcos that provide mobile money services.



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**Comparison between mobile money and current account costs<sup>7</sup>.** As mentioned, annual costs for mobile money accounts are generally 25%-50% of the costs of bank-held current accounts, or \$6-to-\$15 vs. \$20-to-\$30. All categories of activity cost less for a mobile money provider, with the largest difference in back office processing.

- 1, 2. Combined customer service and channel management** costs are about 40% lower – \$4 compared to \$7.
- 3. Back-office processing** costs are about 95% lower – as low as \$1.00 compared to roughly \$10. Paper statements, which cost banks roughly \$9 annually, provide the primary source of difference.
- 4. IT platform and application maintenance** costs are about 65% lower – an estimated \$2 compared to \$6.
- 5. Support functions** also differ in cost. Banks generally have higher support function costs than do providers of mobile money services (e.g., telcos), in part because they carry significant risk management costs that telcos do not. Banks will allocate some of these costs to the current account, according to allocation rules that vary by bank.

### **Comparison of current account costs in developed and developing countries**

As mentioned, average annual costs for current accounts in Europe are \$83, vs. \$20-\$30 in developing countries. A comparison between developed and developing country cost structures illustrates how country-specific factors that providers cannot control influence account cost: labor costs and overhead from real estate and capital equipment play a particularly large role. Other factors that providers can influence, but that vary by country, also matter – account churn and labor productivity are important examples.

In order to estimate annual costs of current accounts in developing countries, we extrapolated them from the costs for similar activities in Europe. Exhibit 10 illustrates how we did this.

The difference in costs has four primary causes: developing countries have higher churn, lower productivity, lower overhead, and much cheaper labor.

- 1. Higher churn and account dormancy.** Churn in the developing world is roughly 150% higher than it is in Europe (i.e., corresponding to an average account lifetime of 4 years of use vs. 11 years in Europe). The difference in the rate of account dormancy is similar (i.e., corresponding to roughly 20% of all accounts lying dormant versus only 8% in Europe). Thus, all else equal, both on-boarding and account maintenance make a larger relative contribution to costs per year of use in developing countries than they do in Europe.
- 2. Lower productivity.** Employee productivity in the developing world tends to be lower than in Europe, particularly compared to the most efficient European banks. We estimate that developed country productivity is 50% of the European average. This increases labor costs in the developing world, assuming equalized wages, increasing the contribution of both on-boarding and use-maintenance costs.

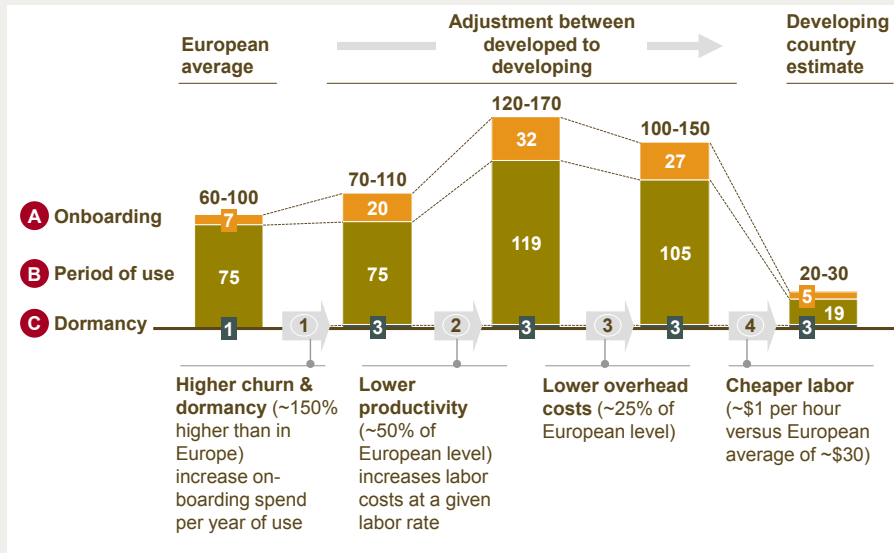
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<sup>7</sup> Since current accounts and mobile money do not have equivalent functionality, their costs are not fully comparable. However, since each may be a way of providing payment services to poor users, it is nevertheless instructive to compare costs.

## EXHIBIT 10

### In developing countries, annual account cost per year of use is \$20-30, based on data from developed countries

US Dollars



SOURCE: McKinsey Global Payments Map 2012 (2010 data), McKinsey BTO – Cost Per Product Benchmark, European Commission, EIU, Finalta, ABI, Banco de España, World Databank

- 3. Lower overhead costs.** Benchmarks indicate that overhead costs in the developing world are roughly 25% of those in Europe. We apply this cost differential to both onboarding and use-dependent maintenance components of cost.
- 4. Lower cost of labor.** Here is where the difference between developed and developing worlds becomes huge. The cost of labor in the developing world is only about 3% of that in Europe (as little as \$1 per hour compared to \$30 in many European countries). This decreases labor costs drastically, decreasing the relative contribution of both on-boarding and maintenance costs.

## Methods to lower account costs

Improving system design and operations are the most important methods for lowering account cost. There are five primary ways to reduce costs at a bank (Exhibit 11 has an overview). Applying all of these could lower total current account costs in developing countries by 65%-to-75% to \$5-to-\$10 annually, roughly to the level of current costs for mobile money accounts.

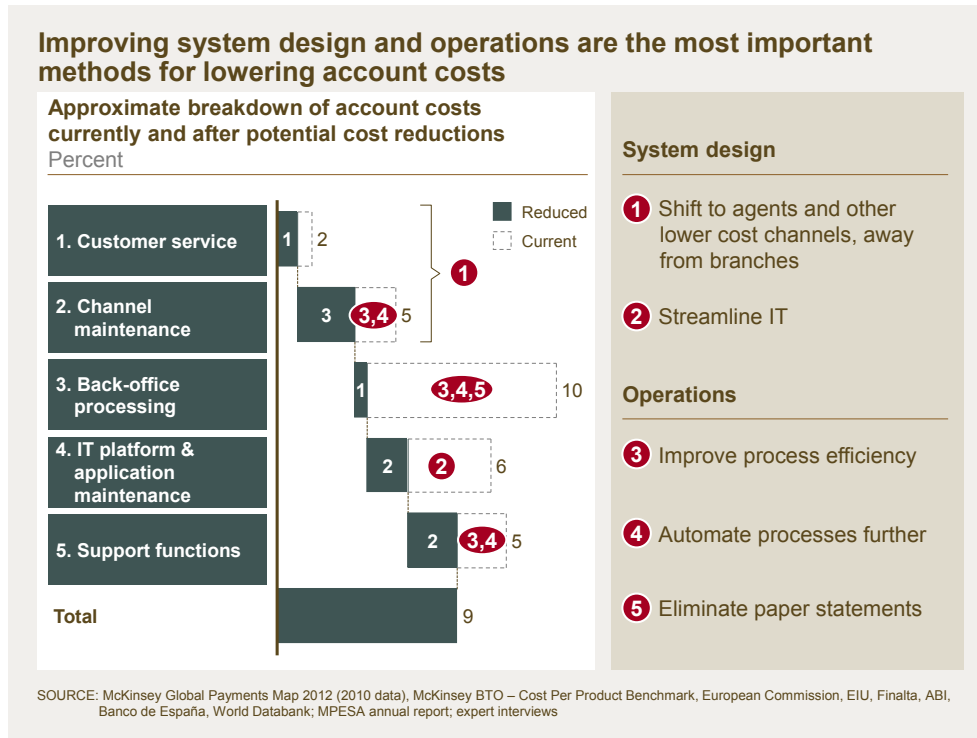
### Improving system design

- 1. Shift to bank agents and other lower cost channels.** Shifting to agents and other lower cost channels, and away from branches, can lower the contribution of customer service and channel maintenance costs to total account costs by more than 40% (or \$3), primarily by avoiding costs of managing branches, and shifting some labor costs into agent commissions away from salaries for higher-wage employees.<sup>8</sup>

<sup>8</sup> Shifting from branch to agent also reduces the costs of CICO by over 80% (see page 50). Cost reductions due to this channel shift are larger for CICO than for account. For account, back-office, IT-related, and support function costs are typically more than half of the total, but do not depend upon channel. However for CICO, the bulk of costs are channel-dependent.

2. **Streamline IT.** This can lower costs by roughly 15%, at least to the level of IT costs to maintain a mobile money account. IT costs might fall to \$2 from the roughly \$6 we estimate at many institutions today. However risk and security considerations will inhibit further decreases.

EXHIBIT 11



## Improving operations

- 3, 4. **Improve process efficiency and Automate processes.** Improving process efficiency in call centers and in back-office processing can lower account costs, particularly in conjunction with automating processes. Combined, they can lower costs by more than 10%.

Even in relatively developed markets, process automation offers large potential for productivity improvements. Cross-European benchmarking studies suggest that spending an additional \$15,000 to \$25,000 annually per back-office banking employee can double his productivity (e.g., in terms of current accounts per employee). Hence, increasing automation for back office tasks is worthwhile as soon as employees earn more than about \$15,000 to \$25,000 annually.

Providers can decrease costs from roughly \$5 to under \$2 by achieving levels of automation and process efficiency at a par with best-of-class institutions in the developed world. Note that limiting account options provides potential to reduce costs further. However, since the overall labor costs are low, the absolute potential for improvement from decreased labor time is limited; developing countries already reap the benefit of low labor rates compared to developed countries.

- Eliminate paper statements.** Moving from paper to electronic statements presents a significant and straightforward opportunity to cut costs from roughly \$10 to \$1 or less annually. Nearly all licensed banks in the developing world have this capacity in place. Some smaller institutions, particularly cooperatives and savings unions may not be able to offer such options currently. However, low-cost cloud-based solutions that exist now, or are under development, appear to be extending this option even to institutions with little to no IT infrastructure.

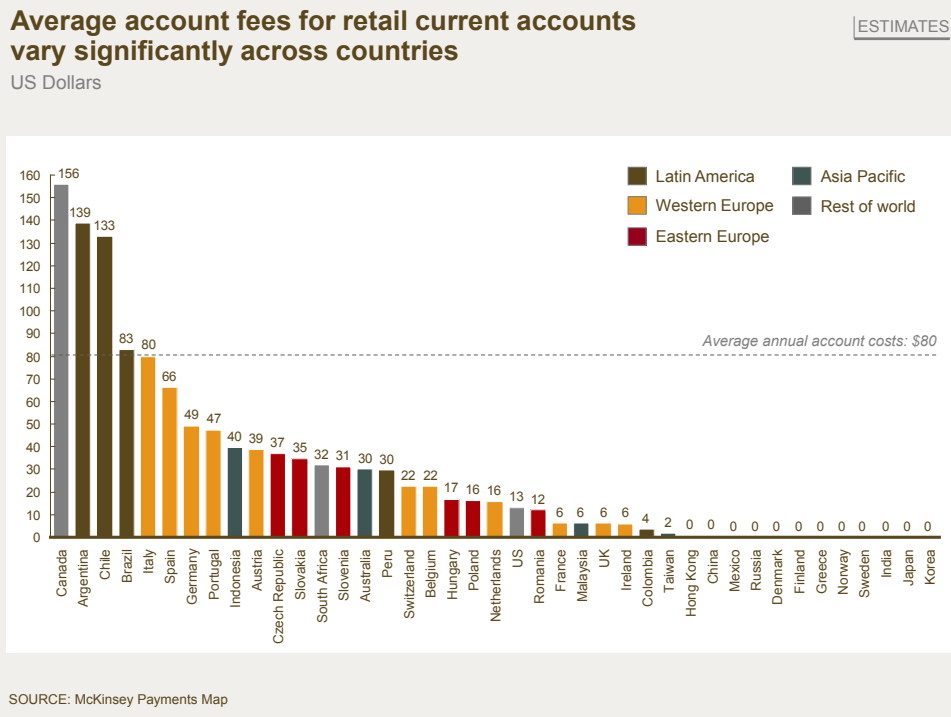
## Account revenue and pricing models

As mentioned, accounts themselves usually lose money for providers. However, revenue from accounts varies significantly across the world. Providers rarely link the account fees they charge users to the actual cost of those accounts. Instead, differences appear to arise due to different revenue model choices. Banks typically set account fee structure in coordination with the fee structure they set for transactions.

### Revenue from accounts across the world and relationship to cost

Average revenue varies substantially across the world. Exhibit 12 shows average annual current account maintenance fees for 41 countries, ranging from a high of \$156 in Canada, down to zero in several countries.

EXHIBIT 12



In all but four of the countries in Exhibit 12 (Canada, Argentina, Chile, and Brazil) revenues are smaller than the average annual account costs in Europe (roughly \$80). In all but eight of the countries shown, revenues are smaller than the minimum annual account cost in Western Europe. Of the 41 countries, only Spain and Romania make a profit on accounts, and it is small.

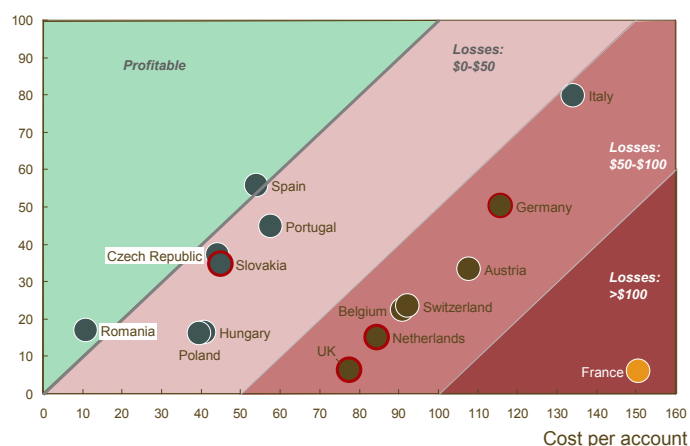
Exhibit 13 illustrates the disconnect between revenues per account and account costs, showing annual account costs and revenues for countries in Europe<sup>9</sup>. For example, annual account costs are \$75 in the UK but only \$55 in Portugal while revenues per account in the UK are \$10 vs. roughly \$45, in Portugal.

## EXHIBIT 13

### A comparison of European countries shows revenues per account typically have no link to cost per account

US Dollars

#### Revenues per account, 2010<sup>1</sup>



#### Share of digital payments (by volume) Percent

- >45%
- 25%-45%
- <25%
- Payment system not profitable in 2010

<sup>1</sup> Excludes Sweden, Norway, Finland, and Denmark since in all of these countries base account fees are zero. In each over 45% of payments are electronic (by volume). Estimated account costs are roughly \$56, \$85, \$85, and \$110, respectively

SOURCE: McKinsey Global Payments Map

## Fee models for current accounts

Multiple fee models for current accounts and related services exist across the world, sometimes even in the same country or at the same bank<sup>10</sup>. However, there are four primary models.

1. **Free, but with penalties for breaking rules.** Such accounts have no annual maintenance fees but come with high penalty and overdraft fees. Many banks in the UK take this approach, particularly for the most basic current accounts that they offer.
2. **Free, but with conditions.** These accounts are free when customers meet minimum conditions, but otherwise carry maintenance fees. Potential conditions

<sup>9</sup> Nordic countries, which have no per account fees are not included in Exhibit 13.

<sup>10</sup> Note that this is distinct from any fees assessed for CICO (i.e., cash deposits, withdrawals) or for transactions.

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include a minimum balance, minimum number of other products held at the same bank, or limits on branch access (e.g., additional fee for teller-assisted cash withdrawals). This approach is typical for banks in Australia.

- 3. Pay for account access.** Some current accounts come with an annual fee. In some instances, the bank will reduce this fee if customers meet certain conditions. This is the typical approach taken in Belgium. As another example, in Italy, some banks offer lower-fee accounts for “heavily online users.”
- 4. Pay for value-added services.** Some current accounts come with value-added services, all for a higher annual fee. This value can come either in the form of banking services or as other, non-banking services. Potential banking services include improved deposit interest rates, lower overdraft fees, or privileged access to financial professionals. Examples of non-banking services include travel insurance, airport lounge access, or shopping discounts. Many banks in the UK have begun to take this approach for current accounts geared toward higher-end customers.

### Coordination between account fees and transaction fees

Banks typically set their account fees in combination with transaction fees. There are two approaches to pricing transactions and other basic uses of the current account, which can be applied in different combinations with the approaches to pricing for the account itself.

- 1. Free to transact.** These accounts come with free transactions. This can be the case with any of the four types of account.
- 2. Pay to transact.** These accounts require users to pay fees for most types of activities (e.g., an annual debit card fee, online banking fee, fees to use cheques).







Individual banks typically adopt some combination of these account and transaction fee models to offer a range of services for different types of consumers. In general, most banks in given country take the same approach. There are three typical combinations (Exhibit 14 has an overview).

- 1.** In some markets, the dominant model for holding the account is **free but with penalties** (e.g., 88% in the UK in 2009). However, many banks will also offer accounts where users **pay for value added services**. In both cases, the accounts are generally **free to transact**. UK banks are increasingly taking this approach.
- 2.** Banks in markets such as Australia have traditionally kept their accounts **free, but with conditions**, while requiring customers to **pay to transact**. Some of these are now beginning to offer accounts that are **free to transact** as part of a package, but with a stronger set of conditions, or higher fees for violating the conditions.
- 3.** In markets such as Belgium, banks have traditionally used **pay for account access and pay to transact**. These are now beginning to offer accounts that are **free to transact** as part of a package that charges a higher annual access fee.

In the case of combinations 2 and 3, the banks may increase the number of products included in the account package, such as credit cards or a safety deposit box. Or they may offer new benefits, such as preferential interest rates for overdraft protection.

EXHIBIT 14

**Examples of fee models for current accounts**

<b>Transactions</b>	<b>Pay to transact</b>	<ul style="list-style-type: none"> <li>Free if at least \$2,000 direct deposit monthly, otherwise \$50 annual fee</li> <li>Fee for check payment &amp; branch withdrawals</li> </ul> <p> e.g., basic account in Australia</p>	<ul style="list-style-type: none"> <li>\$12 annual fee</li> <li>Annual fees for debit card and credit card</li> <li>Fee for paper payment &amp; branch withdrawals</li> </ul> <p> e.g., basic account in Belgium</p>		
	<b>Free to transact</b>	<ul style="list-style-type: none"> <li>No annual fee</li> <li>\$40 fee if account has insufficient funds for a payment; \$10 per day for unarranged overdraft</li> </ul> <p> e.g., basic account in the UK</p>	<ul style="list-style-type: none"> <li>Free if at least \$2,000 direct deposit monthly, otherwise \$70 annual fee</li> <li>No use fees</li> </ul> <p> e.g., higher access account in Australia</p>	<ul style="list-style-type: none"> <li>\$50 annual fee</li> <li>Free debit and credit cards</li> <li>Free paper payment &amp; branch withdrawals</li> </ul> <p> e.g., higher service account in Belgium</p>	<ul style="list-style-type: none"> <li>\$270 annual fee</li> <li>No overdraft fees</li> <li>Insurance for worldwide travel and mobile phone; legal advice and will-writing service</li> </ul> <p> e.g., value added account in the UK</p>
		<b>Free with penalties</b>	<b>Free under conditions</b>	<b>Pay for access</b>	<b>Pay for value-added services</b>
<b>Account</b>					

At the country level, payment systems typically strike a balance between higher account fees and higher fees for transactions. Exhibit 15 compares these revenue sources for European countries with similar levels of financial inclusion and digital payments.

In Belgium, where many accounts come bundled with free transaction options, fee revenue for access to the account is relatively high compared to transaction fee revenue. By contrast, in the UK, the majority of customers pay little for access to their account. Instead, providers seek higher revenues from transaction fees to merchants or other businesses receiving payments from the account holders. The situation is similar in the Nordic countries, in which banks typically do not charge annual account fees.

### Implications for poor people in developing countries

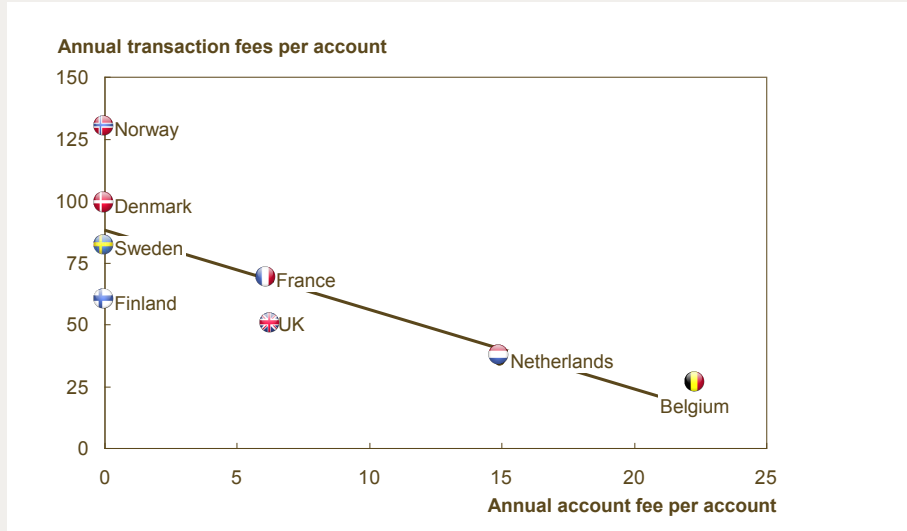
Our work indicates that significant levels of financial inclusion require low account fees, but low fees alone will not do the trick. Countries also require higher volumes of digital payments. Exhibit 16 illustrates this phenomenon. Low account fees exist in countries with all ranges of financial inclusion, including some in countries with under 50% inclusion. However countries that have low fees combined with high volumes of digital payments have higher levels of financial inclusion (see the upper right portion of the exhibit).

Higher volumes of digital payments can help offset the lower account fees because they can increase adjacent revenue possibilities and help reduce provider costs for both CICO and transactions. However, merely increasing the volume of digital payments may not be enough to ensure providers earn a profit in a financially inclusive system.

EXHIBIT 15

**European countries with high financial inclusion and digital payments typically choose between higher transaction fees or higher account fees**

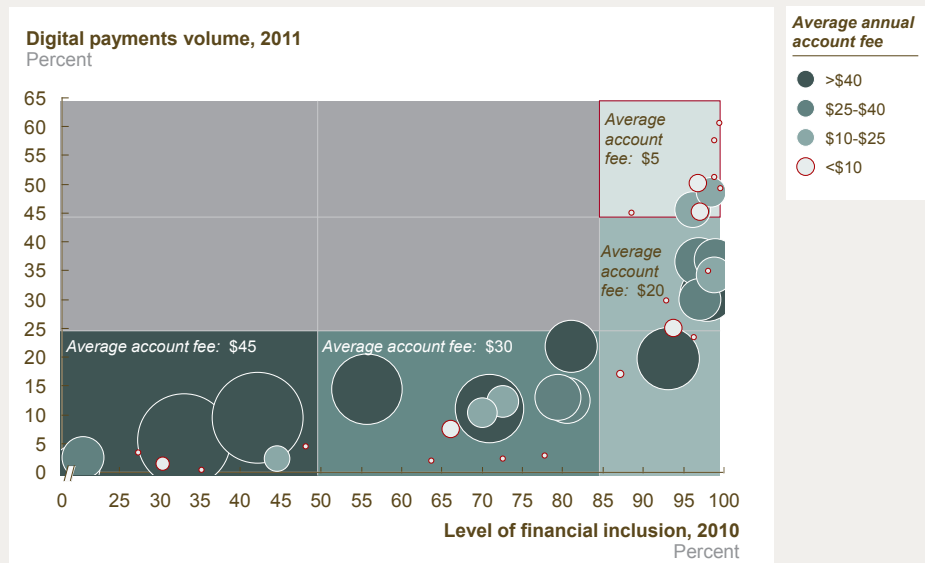
US Dollars, 2012



<sup>1</sup> All European countries with financial inclusion greater than 85% of population over 15 years, and more than 45% of payments done digitally (by volume)  
 SOURCE: McKinsey Global Payments Map 2012 (2010 data), Findex

EXHIBIT 16

**Countries with higher volumes of digital payments and lower account fees have higher financial inclusion<sup>1</sup>**



<sup>1</sup> Data from 40 countries across Europe, Latin America and Asia Pacific  
 SOURCE: McKinsey Global Payments Map 2012 (2010 data), Findex



For one thing, higher digital payments are often accompanied by higher losses on accounts. Exhibit 13 illustrates this phenomenon<sup>11</sup>. It shows that countries in which digital payments account for 25% to 45% of all payments have account pricing schemes where accounts lose between \$50 and \$100 annually. France, where 50% of transactions are digital, has priced accounts to lose over \$100. On the other hand, in European countries where digital payments account for fewer than 25% of payments by volume, accounts are priced to lose less than \$50 per account (with the exception of Italy, which loses just over \$50).

So, beyond increasing digital payments, providers will also need to lower their account costs to a minimum to have a chance at profitability. They will need to improve account system design and operations in ways that reduce costs while maintaining accounts that customers want to use. The easier the account creation process, the more likely users are to establish accounts. Efforts to streamline account opening processes, approval times, and information requirements will all provide major benefits for users. Therefore, providers will have to make purposeful design trade-offs between account costs and quality and security. Stripping customer support removes cost, but could harm the customer experience. It is essential that providers get this balance right for low income users.



<sup>11</sup> Note that country-level retail payment systems were not profitable in Germany, Slovakia, UK and the Netherlands in 2010. This is almost certainly attributable to the low interest rate environment in 2010, in which usually profitable systems lost money due to decreased revenue from payment adjacencies – interest income on deposits. As an indication, average net interest margin across Europe on retail current accounts was an estimated 2.3% in 2010, compared to the 2004-2009 average of 3.4%.

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# III. Cash-In-Cash-Out: Creating access to payment systems

## Chapter summary

Cash-in-cash-out (CICO) is the second element in the four-part ACTA framework of payment system economics<sup>1</sup>. It enables consumers to move cash into or out of a payment system by depositing and withdrawing it to and from their accounts. CICO distribution outlets include bank branches, ATMs, and individual money agents. Cash handling networks support distribution outlets by making sure that each of them maintains the right amount of cash. These features are particularly important for those who are not accustomed to transacting electronically. Historical evidence from across the world indicates that reliable and accessible CICO systems are necessary for growth of digital payment systems, which often grow alongside the CICO systems.

**A successful payment system that fosters financial inclusion requires CICO services** that consumers can access easily, trust, and use at a low price. CICO distribution outlets must be located in local communities, even in rural areas. More distribution outlets expand access to more users. Furthermore, users must have confidence that CICO distribution outlets will be open and have cash when they need it. They also need to trust their accounts will be credited properly when they deposit cash, and that they will be charged published rates when they withdraw or deposit money. Pricing must be affordable for very poor consumers since our research shows that all consumers still want access to cash, even as their use of digital payments grows. Low price, in turn, requires low-cost systems.

**Our economic analysis of CICO activities** across a broad set of markets yields several major insights:

- **Payment system providers generally lose money on their CICO activities**, but the amount varies widely by country and type of system. Banks typically lose money, while individual money agents, who handle deposits and withdrawals for consumers and businesses, can find it profitable. In developed payments systems, the margin of loss for CICO can range from minus 15% to more than minus 100%. This stems from costs for each withdrawal or deposit ranging from 50 cents to over \$5, and cash withdrawal fees from zero to \$1.40. This translates to annual costs of \$6-to-\$60 and revenues of \$0-to-\$17 for a user withdrawing 12 times annually<sup>2</sup>.
- **Using agents to provide CICO services is universally important to ensuring reach to poor customers at costs that can be as much as 90% lower than alternatives such as branches.** In all developing markets we examined, agents play an indispensable role for quickly expanding reach and building scale. It is vital for payment systems to be able to scale up their agent networks by providing them sufficient incentives.

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<sup>1</sup> ACTA stands for: Accounts, Cash-in-cash-out, Transactions, and Adjacent opportunities for profit.

<sup>2</sup> This is the level of CICO use typical in countries where digital payments use has taken root.

- **Improving system design and operations together can lower CICO costs in developing countries by as much as 40%-to-60%**, with each of these actions contributing about half the impact.
  - Improvements to system design can account for a 25% cost reduction and include optimization of CICO distribution outlets and cash centers (up to 20% cost reduction) and optimization of route planning for moving cash (up to 5% cost reduction). Effective CICO systems rely on complex and interconnected supply systems that offer potential for increased cost effectiveness through improved design that incorporates optimized locations for a network of agents or ATMs, and coordinated routes for mobile agents or refilling ATMs.
  - Better cash forecasting, recycling of cash and process improvements can each improve system efficiency, together lowering CICO costs by up to 35%. Forecasting reduces the stock of cash stored in the system that is not earning interest, and can reduce the number of cash deliveries needed. Forgone interest is known as a funding cost. Better forecasting can reduce funding costs to branches and ATMs by up to 50%, or 10% of total costs. Optimizing inefficient systems of money agents has the potential to bring similar improvements. Recycling – taking cash deposited by users and then dispensing it directly to other users – also can reduce overall costs by roughly 10% as can improving process efficiency.
- **Costs for a cash withdrawal could be as low as \$0.20-to-\$0.50 (or \$2.50-to-\$6 annually for a user transacting 12 times).** This requires optimized system design as well as high operational efficiency.
- **Providers typically price CICO either to lower operating costs or to maximize revenues, often through adjacent services.** Strategies to lower operating costs involve pricing that encourages customers to use the lowest cost CICO outlets. In revenue maximizing strategies, providers seek to generate as much value out of CICO outlets as they can -- either by offering additional revenue generating features (e.g., sales of tickets or mobile phone minutes) or by recovering costs directly from cash withdrawal fees.
- **Reliable and accessible CICO networks are necessary for growth of digital payments.** Evidence from across the globe suggests that cash access will remain important long after digital payments take root. As a result, successful digital platforms that encourage financial inclusion require complementary traditional solutions for both collecting and dispensing cash.

**To offer a more detailed analysis of the role of CICO in payment systems, we have divided this section into five parts.**

- Activities involved in CICO
- Components of CICO costs
- Methods to lower CICO costs
- CICO revenue and pricing models
- Implications for poor people in developing countries.

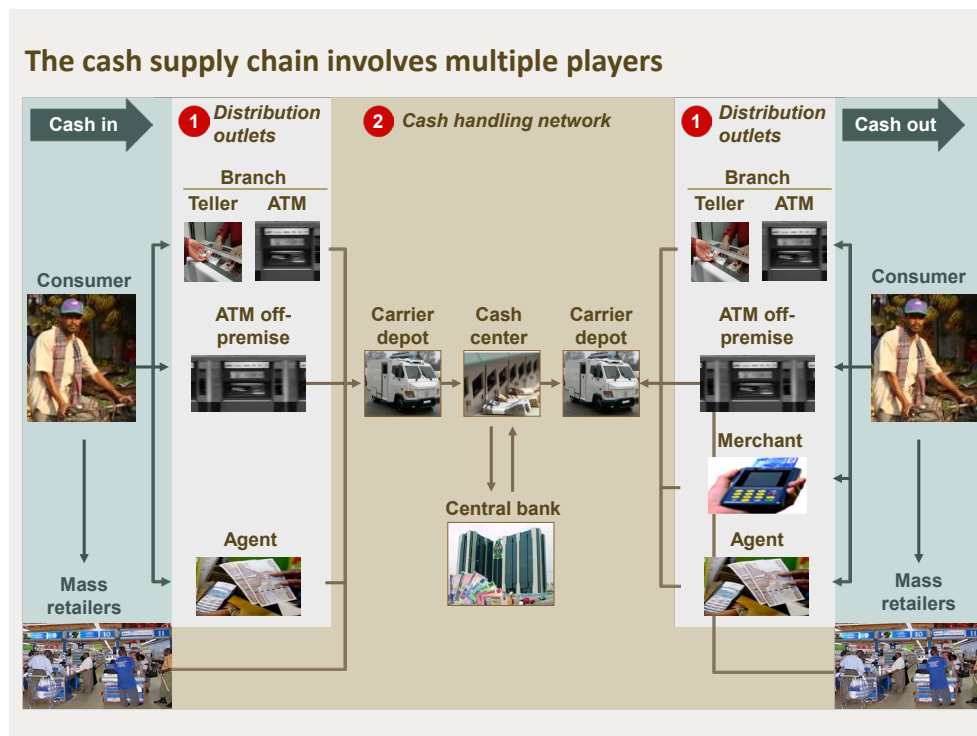
## Activities involved in CICO

CICO networks have three interacting components:

1. **Distribution outlets** where people can deposit or withdraw cash and, in some cases, obtain additional financial services. Some outlets also perform cash handling, such as sorting, counting, and detecting counterfeit and damaged bills.
2. **Cash handling network** for moving cash between distribution outlets. The network connects to different types of distribution outlets in slightly different ways (e.g., in some cases armored trucks make pick-ups, in other cases outlet operators transport money).
3. **Processing platforms** that credit or debit accounts when cash is deposited or withdrawn. With an *open platform*, distribution outlets can dispense and collect cash from users who hold accounts with institutions different from the one operating the outlet. Outlets attached to *closed platforms* can only dispense and collect cash from accounts with the single institution operating that outlet

Exhibit 17 illustrates how distribution outlets and the cash handling network interact to make up the cash supply chain, enabling cash in and cash out.

EXHIBIT 17



## Distribution outlets

Consumers use four primary types of cash distribution outlets, which exist in varying combinations in different countries – bank branches, remote ATMs, merchants, and agents. Agents rarely exist in developed systems but are increasingly common in developing ones.

- **Bank branches** provide withdrawals to, and accept cash deposits from, consumers and small businesses. Consumers interact either with a human teller or an automatic teller machine (ATM). Some banks give consumers the choice, while others only have tellers or else require that people use ATMs (e.g., as in Belgium).
- **Remote ATMs** are located away from bank branches and allow consumers or small business to withdraw cash. More advanced machines also accept deposits, but these are less common in some developing countries<sup>3</sup>. Some remote ATMs are owned by banks, while third parties own others. Restrictions around third party ownership vary by country.
- **Merchants** can allow consumers to withdraw cash when making an in-person purchase. In general, the transaction is processed using a card point-of-sale terminal, which routes through a traditional card payment network or a proprietary payment system that is set up with the system provider. In some countries this option is common while elsewhere it does not exist or is rare.
- **Agents** are individuals designated by a payment system provider to distribute and accept cash on its behalf, operating on a commission. Depending on the system, agents either operate from a fixed location or are “roaming,” traversing a pre-determined route and schedule. Generally agents are responsible for making sure that they have sufficient cash, travelling to a bank or a “super agent” when they need to deposit or withdraw cash to support their business. In other instances, the payment system provider picks up and drops off cash at the agent. To authenticate and record transactions, agents often use a mobile device. However, other devices are also possible (e.g., a point-of-sale machine where users swipe a card<sup>4</sup>.)



<sup>3</sup> The most advanced ATMs also offer multiple non-CICO functions including transferring money between linked accounts (e.g., savings and chequing accounts) paying bills, or initiating other transactions (e.g., credit transfers), buying pre-paid minutes for mobile phones, loading credit onto stored value cards, cheque processing, as well as sales of items (e.g., stamps, movie or event tickets)

<sup>4</sup> Procedures vary. In some cases (e.g., Kenya's M-PESA) consumers enter a PIN on their mobile phone. In others (e.g., India's Banking Correspondents) consumers identify themselves with a card and/or biometric information on an agent's mobile device.

## Defining characteristics of distribution outlets

Five characteristics help distinguish types of distribution outlets. The exhibit gives an overview of these characteristics for the four primary types of outlets.

1. **Function.** Whether outlets allow deposits as well as withdrawals and whether they provide additional financial services (e.g., remittances, options for paying bills) or other services (e.g., ticket sales or sales of pre-paid minutes for a mobile phone).
2. **User interface.** Whether the user interaction is with a human, is automated, or is with a human supplemented by a computing device (e.g., a mobile phone).
3. **Cash handling responsibilities.** The degree and nature of cash handling that occurs at the distribution outlet itself, and whether the outlet can recycle bills, taking cash deposited, and then dispensing it to other users.
4. **Connection to cash handling network.** Whether armored cars pick up and drop off cash at the outlet, or the agent operators are responsible for transporting cash themselves.
5. **Openness of the processing platform.** Whether users deposit and withdraw through closed or open platforms. Outlets using closed platforms are affiliated with a single provider, with whom customers must hold an account to withdraw or deposit cash (e.g., branch tellers or agents connected to a single telco, as are M-PE-SA agents). A distribution outlet in an open platform can provide CICO services to users with accounts at any institution that belongs to the platform. For example, most ATMs connect to interbank platforms, enabling people to withdraw and deposit cash from machines not held by the bank holding their account.

### Overview of CICO distribution outlets

	Branch	Remote ATM	Merchant	Agent
Function	<ul style="list-style-type: none"> <li>▪ Withdrawals</li> <li>▪ Deposits</li> <li>▪ Full banking functions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Withdrawals</li> <li>▪ Deposits at some locations</li> <li>▪ Other peripheral services</li> </ul>	<ul style="list-style-type: none"> <li>▪ Withdrawals</li> </ul>	<ul style="list-style-type: none"> <li>▪ Withdrawals</li> <li>▪ Deposits</li> <li>▪ Other limited banking functions</li> </ul>
User interface	<ul style="list-style-type: none"> <li>▪ Teller (human)</li> <li>▪ ATM</li> </ul>	<ul style="list-style-type: none"> <li>▪ ATM</li> </ul>	<ul style="list-style-type: none"> <li>▪ POS terminal or</li> <li>▪ Mobile phone</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mobile phone or</li> <li>▪ POS terminal</li> </ul>
Cash handling responsibilities	<ul style="list-style-type: none"> <li>▪ Recycle cash</li> </ul>	<ul style="list-style-type: none"> <li>▪ Non-recycling machines are most common</li> </ul>	<ul style="list-style-type: none"> <li>▪ Recycle cash</li> </ul>	<ul style="list-style-type: none"> <li>▪ Recycle cash</li> </ul>
Connection to cash handling network	<ul style="list-style-type: none"> <li>▪ Cash in transit vehicles when rebalancing is needed</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cash in transit vehicles</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cash transported as part of standard merchant procedure</li> </ul>	<ul style="list-style-type: none"> <li>▪ Agent transports cash to bank or other larger distribution outlet</li> </ul>
Openness of the processing platform	<ul style="list-style-type: none"> <li>▪ Internal bank systems</li> <li>▪ Interbank network at ATMs &amp; some tellers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Interbank network</li> <li>▪ ATMs dedicated to a single bank exist but are rare</li> </ul>	<ul style="list-style-type: none"> <li>▪ Interbank networks</li> </ul>	<ul style="list-style-type: none"> <li>▪ Internal networks (e.g., of a mobile money network) and/or</li> <li>▪ Some interbank networks</li> </ul>

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## Cash handling network

The cash handling network enables the flow and transport of cash between distribution outlets, businesses, and the central bank. This network continuously balances the distribution of cash in the market, ensuring that it does not pool unused where it is not needed, nor go missing where it is. Cash handling logistics become increasingly complex as CICO networks grow.

- **Cash in transport (CIT) companies** transport cash to and from distribution outlets and among other points in the cash handling network. CIT is responsible for ensuring that cash goes to the correct destinations and is not stolen on the way. To mitigate risk of theft, cash is moved in armored cars, often in custom-designed containers that will indelibly stain bills when stolen.

Distribution outlets interact with CIT in one of two broad ways. First, for branches, remote ATMs and some merchants, CIT armored cars drop off fresh cash and pick up cash that needs to be collected. Pick-ups are least frequent at large branches that have significant cash in-flow and out-flow that balance each other out. Second, agents and smaller merchants transport cash themselves to larger CICO distribution points.

- **Cash centers** sort and pack cash for branches, ATMs and other cash distribution outlets, while also withdrawing counterfeit or damaged notes. In some countries, cash centers may destroy damaged notes, while in others they must direct them to the central bank for destruction. Collecting, disbursing and counting can be either manual (e.g., as with most branch transactions), or automated to varying degrees (e.g., as at ATMs).
- **Central banks** provide new banknotes to place into circulation and are responsible for destroying old notes. Furthermore, the central bank will often pay banks or other financial institutions interest on their cash in the cash center so that they do not lose money from participating in the full cash supply chain.

## Processing platform

For every cash deposit or withdrawal, an account is debited or credited. CICO processing platforms are the electronic transfer systems that do this. Open platforms coincide with or resemble card payment networks and function in roughly the same way regardless of type of CICO outlet used. For closed platforms, transfers occur in roughly the same way money is transferred between accounts in a bank.

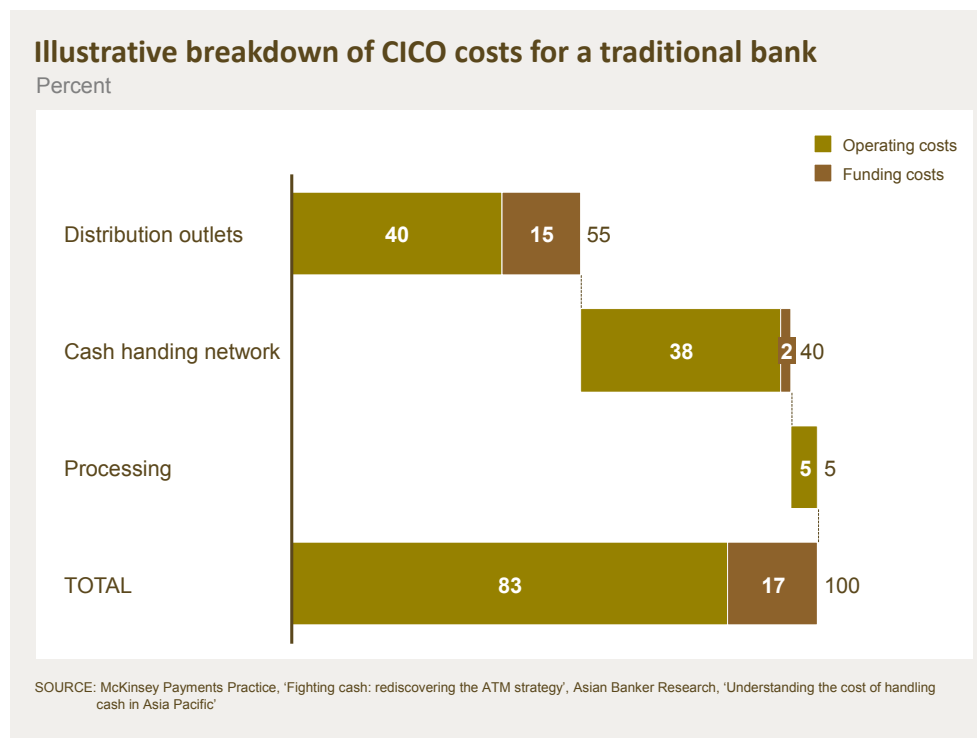
## Components of cash-in-cash-out costs

Each component of CICO networks contributes to overall costs, which are of two types.

- **Operating costs.** These include costs for labor, real estate, overhead, and capital equipment (e.g., armored vehicles, cash sorting machinery).
- **Funding costs.** These are the opportunity cost associated with the foregone interest on cash that sits in branches or ATMs rather than in an interest bearing account.

The breakdown of costs across CICO components and between operating and funding costs varies by country and institution. However, Exhibit 18 shows an illustrative breakdown based on costs across European institutions and in select developed Asian markets.

EXHIBIT 18



## Operating costs

Operating costs are responsible for roughly 80% of overall CICO costs. The main drivers of operating costs are distribution outlets and the cash handing network, with processing platforms a distant third.

**Distribution outlets.** Distribution outlets account for 40% to 50% of total operating costs. These costs come primarily from labor, equipment and maintenance. Details and magnitude depend on the type of outlet.

- **Bank branches.** Operating costs in branches come from labor – both tellers and back-office staff – and on-site ATMs. Allocation for physical branch costs can also contribute.

Cash deposits and withdrawals at the cash window require teller time. Associated costs can account for over 50% of CICO operating costs in branches. The exact contribution depends on the fraction of cash withdrawals and deposits at the teller window. At some branches, tellers spend more than 10% of their time on cash transactions. At others, people must withdraw and deposit cash at on-site ATMs. For example, some banks in Belgium run cashless branches where all withdrawals and



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deposits under about \$3,000 are at machines and all larger deposits are pre-booked.

Cash handling activities that occur at the branch also require back-office labor. Associated costs can be 30%-to-40% of CICO operating costs in branches. Back office employees, often aided by machines, sort and count bills and check for counterfeit or damaged notes. At most branches, bills in good quality will be disbursed to new customers. The degree of in-branch cash handling varies by country.

Finally, on-site ATM costs come from equipment depreciation and maintenance. These can account for 10%-to-20% of CICO-related branch operating costs, split roughly evenly between depreciation and maintenance. Back-office employees must also spend time loading and unloading cash from the on-site ATMs.

Finally, branches may allocate a portion of their overhead costs toward CICO. The size of the allocation will depend upon how many people are devoted to cash.

- **Remote ATMs.** These operating costs typically total \$15,000-\$25,000 or more annually. ATMs that can perform cash handling tasks tend to cost more and require more maintenance<sup>5</sup>. An approximate cost breakdown is 40%-to-50% maintenance, 25%-to-35% depreciation, 15%-to-25% occupancy fees, and 5% insurance. Occupancy fees are paid by the ATM owner to the party that owns the site where the ATM sits.

ATM costs can be higher in developing countries. In very unsafe locations, ATM owners will also hire armed guards to oversee machines. In such places, machine insurance is also expensive, and can rise to 10%-to-15% of total machine operating costs. Furthermore, in countries or locations where electricity is not stable, each ATM will come with its own generator.

- **Merchants.** Operating costs from merchants are typically close to zero. When a merchant gives a customer extra cash back during a debit or credit card purchase, this involves activities that the merchant would be doing anyway as part of its standard business – taking cashier time to ring up customers, buying and maintaining point-of-sale devices to authenticate and record transactions, and maintaining the store.
- **Agents.** Operating costs come from agent labor and the cost of the agent's storefront, or transportation if he is "roaming." Providers see agent costs as a per transaction commission they pay to the agent. To ensure a stable agent network, this must at least cover the agent's basic costs. Particularly in places with low informal labor rates, agents are much cheaper than branches; lower-wage agents replace bank branch employee labor, and low-cost agent storefronts replace high-cost branch infrastructure and real estate.

**Cash handling network.** The cash handling network accounts for roughly 50% of total operating costs. These come from moving cash between outlets and distribution points, as well as from the operating costs of running cash centers themselves.

- **Cash in transport (CIT).** This involves labor, maintaining a fleet of armored ve-

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<sup>5</sup> Standard ATM machines have separate cassettes, or storage compartments, for withdrawals and deposits; one set of cassettes holds cash to be dispensed and a second holds cash that has been collected. However, more sophisticated and expensive machines can recycle deposited cash. They accurately count deposited bills and inspect them for damage and counterfeits, recycling good notes and segregating others for pick-up. Recycling machines can require substantial maintenance, particularly in places where bills tend to be dirty or torn. While they cost more to operate, ATMs that can recycle can reduce transportation costs in the cash handling network.

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hicles, as well as the overhead to run the logistics. The costs associated with moving cash between distribution outlets will depend on number and type of outlet, placement and number of cash centers, the routes used to move cash between points in this network, as well as the amount of cash that flows through the system.

Type of outlet influences transport costs, because different outlets have varying capacities both to hold and to recycle cash. For example, ATMs hold less cash than branches, so require more frequent cash transport. The cost of moving cash is lower in systems with larger numbers of agents. Agents can recycle cash and assume much of the burden of the last-mile cash transportation cost of getting to a bank or distribution hub to deposit or receive large cash supplies.

- **Cash centers.** Operating costs come from labor, equipment maintenance and depreciation, as well as from security and general overhead. Once cash centers are established, labor is the most important component of ongoing costs. Cash flows through the system in five steps, each of which requires human labor, often supplemented by automation.
  - Cash bags are received from couriers and fed into the system.
  - Bags are processed – bags are opened, cash and coins are removed and placed into trays and customer details and accounting is recorded.
  - Notes are sorted, counted, and cleaned.
  - Any needed reconciliation with customer accounting is performed.
  - Notes are prepared and packaged for distribution.

The efficiency of each process step, smoothness of hand-offs between steps, and staffing matched to cash flowing through the center all influence labor costs.

**Processing platforms.** Processing each CICO transaction costs money, though overall processing costs account for less than 10% of total operating costs. Often this includes electronic processing of the transaction and subsequent account rebalancing, as well as telecom costs in some cases. Most of the base infrastructure required for processing is a fixed cost allocated to the payment system as a whole. However, this infrastructure must grow with the number of CICO points. Moreover, processing has some true variable costs associated with a transaction, including fraud, exceptions processing, and customer service. Though the interfaces may change, processing is similar between the types of CICO outlets and is not a major driver of cost.

## Funding costs

Funding costs are responsible for roughly 20% of overall CICO costs. They come primarily from cash sitting at distribution outlets and, to a lesser extent, from cash in the cash handling network. Therefore, funding costs grow with the amount of cash sitting idle, as well as with the interest rate that the party holding it could be earning.

Approximately 90% of funding costs come from cash stocks at distribution outlets. Cash sits both after deposit by users, waiting for pick-up by CIT, and before withdrawal. Even in relatively efficient systems, cash can sit waiting for pick-up for 1-to-2 days. Once it returns from cash centers, it can wait for more than 10 days before customers withdraw it, particularly in ATM machines.

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The remaining 10% of funding costs come from cash moving through the cash handling network. This cost arises from the day or so that cash sits at depots, after pick-up from distribution outlets, but before being sent to cash centers. Once cash arrives at cash centers, central banks generally provide funding so that financial institutions do not lose money while cash is there<sup>6</sup>.

The interest rate determining funding costs depends on who holds the un-invested cash. For cash held by banks – at bank branches, in ATMs or in cash depots – the rate at which the bank could lend the money risk free (i.e., the inter-bank lending rate) sets funding cost. When a merchant holds cash, the rate he would earn in his deposit account sets funding cost<sup>7</sup>. This is typically lower than the analogous opportunity cost for a bank. Finally, for cash held by agents, funding cost is typically set by the rate that the entity for whom the agent works could earn. For example, money held by bank agents has the same funding cost as money held by a bank. On the other hand, mobile money operator agents may have funding costs set by the trust account where the operator holds money.

### Cost by type of CICO distribution outlet

To enhance our understanding of the drivers of CICO costs and how to minimize them, it is helpful to break them down by the cost of an individual transaction at different distribution outlets – branches, remote ATMs, agents and point-of-sale merchants. Contributors to per-transaction costs include the operating costs of the distribution outlet itself, plus a portion of the operating costs for the cash handling network, and the processing platform, along with funding costs. Exhibit 19 offers a broad comparison of these per-transaction costs for a cash withdrawal.

**Branches.** These are the most costly CICO distribution outlet. In Europe, in-branch cash withdrawals cost \$5.30 per transaction on average, ranging from \$1.20 in Finland to \$8.50 in Switzerland. In developing countries, labor components of branch costs may be 80% to 90% lower than in developed countries due to lower wages. However, transport and other cash handling can cost much more, particularly in places with poor roads, low physical security and less efficient processes. All told, we estimate CICO costs in branches are similar in developing countries to those in developed countries, albeit with high variation depending on country and branch location. Branch costs can also include rent or depreciation on an owned building, along with maintenance. We do not include these factors in the estimates in Exhibit 19 because they are not directly related to CICO.

**Remote ATMs.** These transactions are significantly less expensive than branch transactions, as long as they have a sufficiently large number of transactions per machine. In Europe, an average ATM cash withdrawal costs the system \$1.50, ranging from a minimum of \$0.70 in Finland to \$2.10 in Switzerland. These costs will be the same or higher in developing countries, where ATMs in some locations may require dedicated security guards or back-up generators in case of power outage.

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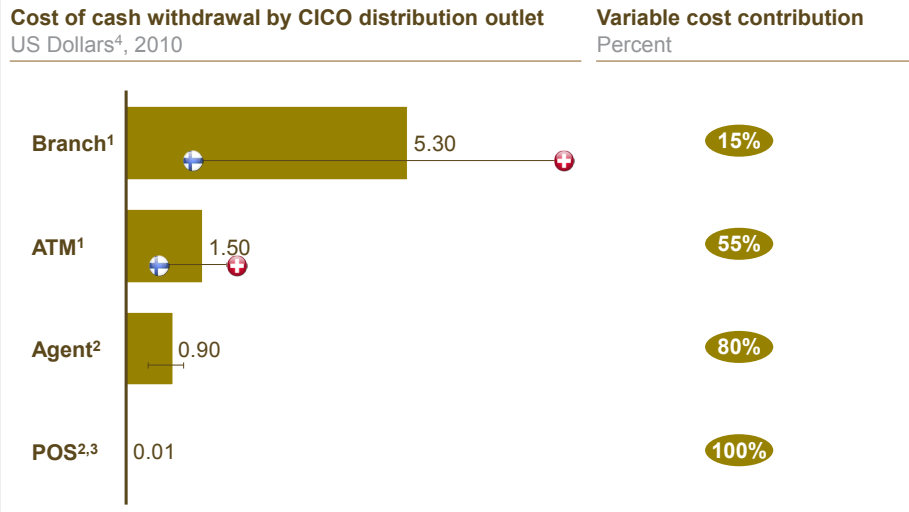
6 The model for how this is done varies by country. Models include: (1) central bank will fund all cash held in cash centers, (2) central bank funds cash held in cash centers above a stipulated threshold, (3) central bank funds all cash above a stipulated threshold, regardless of whether it is held at cash centers or at distribution outlets. In approach 3, the incentive to reduce inventory at outlets is smallest.

7 Relevant deposit rates can vary depending upon the nature and sophistication of the merchant's cash management. For a merchant who moves most money into a demand deposit account, funding cost typically will be roughly 1% or less. For merchants with more sophisticated cash management, moving money into higher yield savings accounts whenever possible, funding costs can be larger.

EXHIBIT 19

**Branch cash withdrawals are most expensive while POS cashback is nearly cost free**

ESTIMATES



<sup>1</sup> Based on European data; <sup>2</sup> Lower range assumes developing country labour rates of \$10K annually for employees paid to recruit, train and inspect agents; Upper range assumes annual labour rates of \$50K annually corresponding to mid-range wage developed country labour to allow even comparison with branch and ATM cost estimates.. All calculations are made by adjusting ATM cost categories with expert input; <sup>3</sup> Incremental cost is near zero; <sup>4</sup> Exchange rate: 1 EUR = 1.36 USD

SOURCE: McKinsey Payments Map 2012 (2010 data), ESTA, ATM Life Cycle Costs and Currency, 'Fighting cash: rediscovering the ATM strategy'

Exhibit 20 shows an example of the cost breakdown of a cash withdrawal. Distribution outlet costs are roughly 55% of total costs. Funding costs make up 20% of distribution outlet costs, and 11% of total costs. Cash handling network costs are roughly 21%. Processing costs are approximately 24%, accounting both for the cost of processing the transaction itself as well as for telecom connection costs.

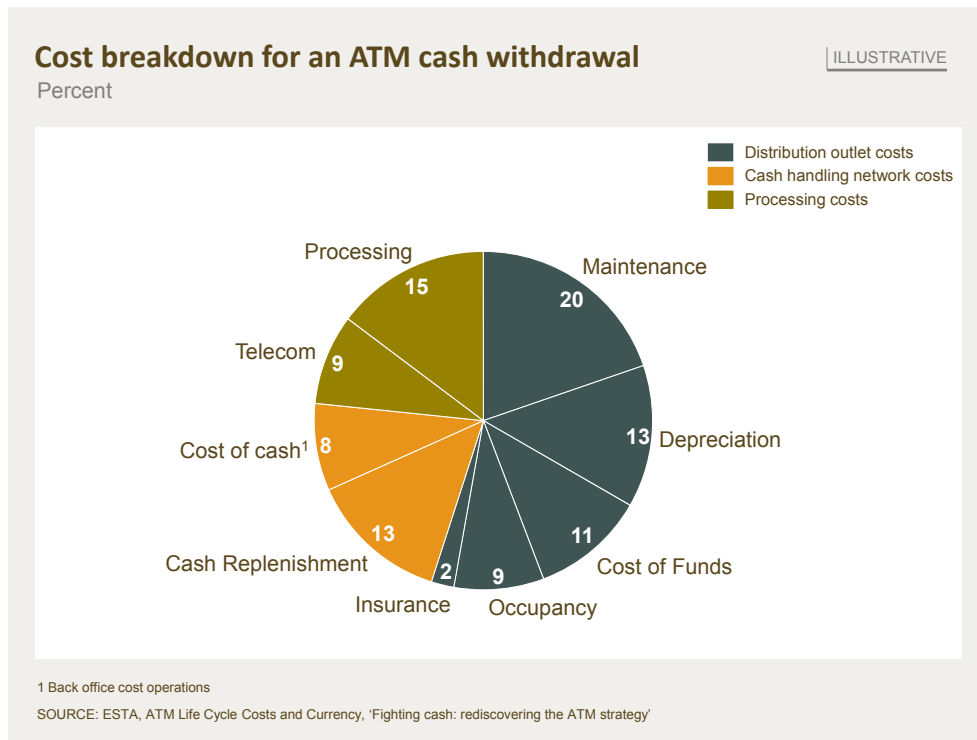
**Agents.** CICO at agents is less expensive than that at branches, but exact per transaction cost depends critically on labor rates. At European-level labor rates, we estimate that the cost of a cash withdrawal at an agent is \$0.90. At developing country labor rates, the cost is under \$0.50 and may reach as low as roughly \$0.10<sup>8</sup>.

As mentioned, agent-based models replace the labor cost of a bank branch employee with commissions to agents for carrying out similar CICO tasks. Costs for infrastructure and real- estate are virtually nonexistent. Instead, payment system providers pay agent management costs, the costs associated with training agents and monitoring their performance. Particularly in lower-wage countries, these can be much less expensive than the cost of brick-and-mortar.

**Merchants (POS).** Getting cash back at merchants is the cheapest way to disburse cash. We estimate that each transaction costs just \$0.01. These transactions use retail point-of-sale systems, cash drawers and existing transaction messaging at established retailers. In Europe, this cost is separate from the \$0.10-\$0.30 that a debit card transaction itself costs, and the roughly \$0.04-\$0.11 that terminal cost contributes to each transaction (see Chapter 4 on transactions). Although transactions can be significantly more expensive in developing systems, the incremental cost of cash-back will remain small at any merchant with sufficient cash turnover.

<sup>8</sup> Cost depends on labor costs associated with recruiting, training and inspecting agents. The high-end of the cost estimate range corresponds to when such tasks are performed regularly by relatively low-wage but formal sector employees in developing countries (assumes an annual salary of \$10,000). The low-end of the cost estimate range corresponds to lower-touch recruitment and management of agents. Note that agent training and inspection costs also play a marketing and account maintenance role and thus arguably might be allocated to those cost buckets instead.

## EXHIBIT 20



## Methods to lower CICO costs

Improving system design and operations are the most important methods for lowering CICO costs. There are five primary ways to do this (Exhibit 21 has an overview). Applying all of these could lower total CICO costs in developing countries by as much as 40%-to-60%, with the reduction potential roughly equally split between improvements to system design and operations.

### 1. Optimize locations of distribution outlets and cash centers

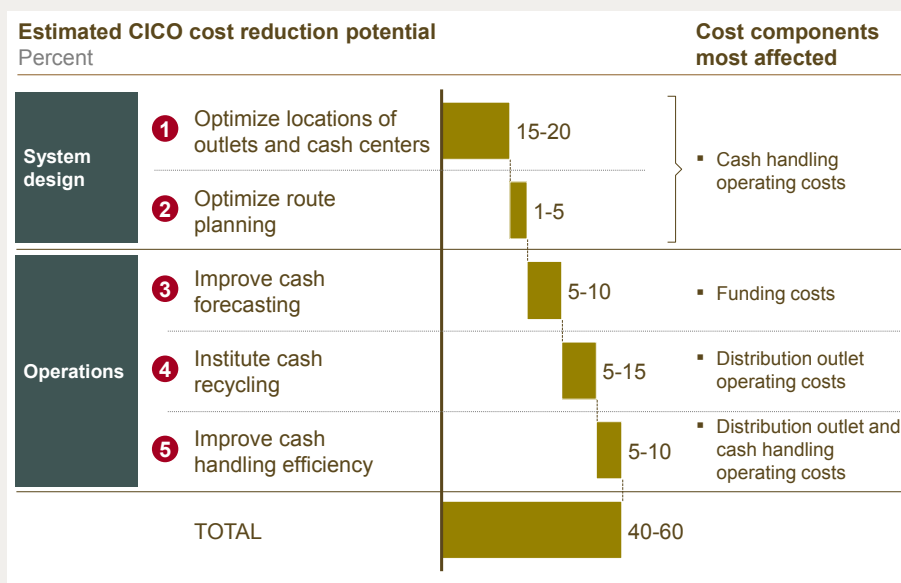
System operators can lower CICO costs by 15%-to-20% by optimizing the location of distribution outlets and cash centers. However this requires cooperation among all payment system providers.

Location optimization involves identifying highest utilization locations for CICO outlets based on user demand, selecting the right type of outlet by location, and taking into account the other types of outlets nearby. To ensure low cost, operators should then place cash distribution centers so that they can service CICO outlets efficiently (e.g., not co-located, but distributed in accordance with CICO outlet placement).

Any particular bank or other payment system provider can optimize its CICO network, given its customers and its competitors. However, the overall system may remain full of inefficiency. For example, ATMs of competing banks often stand side by side, replicating the number of outlets as well as the labor needed to service and replenish them.

EXHIBIT 21

There are five primary methods for reducing CICO costs



SOURCE: McKinsey Payments Practice, 'Fighting cash: rediscovering the ATM strategy', Asian Banker Research, 'Understanding the cost of handling cash in Asia Pacific'

Therefore, payment system operators in a country should work together to optimize their systems as a whole, rather than separately. Faced with an economic crisis in 1994, Finland took this collective approach to CICO optimization. The three leading banks established Automatia – a centralized cash handling company that owns and manages all ATMs (roughly 1,600) and provides all cash handling. Thus, Automatia can optimize location of distribution outlets from the standpoint of the full system. Originally intended to reduce costs by roughly \$0.11 per transaction, Automatia exceeded this goal by a factor of two, reducing costs by nearly \$0.22 per transaction<sup>9</sup>. Today each ATM withdrawal in Finland costs \$0.70, roughly 20% cheaper than costs before Automatia.

## 2. Optimize route planning between distribution outlets

Optimized route planning between distribution outlets can reduce CICO costs by up to 5% by lowering cash-in-transit costs. The people who plan the travel routes between distribution centers for cash pick-up and drop-off can make these routes more efficient, ensuring that they minimize travel distance, while giving highest priority to the most important centers. To accomplish this, they need to understand the patterns of use at each outlet within a given geography, and they need real-time feedback on the operational status of their outlets. They need to know which outlets need to be serviced, and when. Many banks may have room for improvement in route planning. For example, they may be servicing nearby ATMs at different times of the day instead of together. Or, they may

<sup>9</sup> One challenge to establishing a utility-like system to support CICO is to guard against both non-competitive pricing and reduction of system access for people who live in more remote areas. When banks use ATMs as a way to compete with one another for customers they have incentive to keep prices low and to offer services to people who live in the country; they will lose money on CICO in order to gain customers through whom they earn money in other ways. When only a subset of banks cooperate to provide CICO services, a second challenge is to make sure that other, often smaller, banks are not forced out reducing competition too far. To guard against this in Finland, the competition watchdog requires Automatia to offer all banks, including non-shareholder, the same tariffs.

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not take the shortest routes between ATMs. However, if they have real-time information about ATM status (e.g., level of function and need for cash), they may be able to use dynamic dispatch algorithms to adjust routes in real time.

### **3. Improve cash forecasting**

Improved cash forecasting can lower CICO costs by 5%-to-10% primarily by lowering the cost of funding, but also by reducing cash transportation costs. An important way to accomplish these cost reductions is to realign the incentives of line managers so they make decisions consistent with the cash forecast, and not just because they want to make sure no location runs out of cash.

Traditionally an experienced manager, perhaps using a limited amount of data, decides how much cash to hold at branches and in ATMs, and when to refill them. Automated forecasting models can help managers make much more efficient decisions, calculating the frequency at which to replenish each site, and the amount of cash to deliver at each time. A good forecasting model can lower funding costs significantly by enabling institutions to reduce cash levels in the supply chain without causing distribution outlets to run out of cash. Evidence across multiple developing countries indicates that they can reduce overall funding costs by up to 50%, equivalent to a nearly 10% decrease in overall CICO costs<sup>10</sup>. The bulk of this reduction comes from a decrease in funding costs, along with decreased operating costs, thanks to fewer trips.

Predictive models to improve cash forecasting also incorporate bill denominations. Even ATMs that require refilling can have high residual stores of some bills. For example, even if \$20s and \$50s run short, large numbers of \$10s and \$100s may remain. Smart forecasting algorithms will incorporate demand by denomination and adjust in real-time. Similar principles will hold for agents. The denominations that an agent holds could, in principle, be based upon both his historical and his recent inflow and outflow by bill denomination.

In many cases, the people making decisions for distribution outlets do not have incentives to reduce stocks, even if the forecast indicates that they should. For example, branch managers may fear consequences of a branch or an ATM they supervise running out of cash, but will not be rewarded for managing funding costs down. In addition, transportation costs may be more visible to managers than are funding costs. They may avoid outbound cash transfers to cash centers, building large stocks of cash. In the case of agents, many will have no incentive at all to manage cash in a way to reduce funding costs. Thus aligning incentives of line managers or of agents with actions consistent with lowering funding costs will also help promote lower CICO costs.

### **4. Institute cash recycling**

Cash recycling can lower provider CICO costs by 5-to-15%, primarily by reducing back-office labor at distribution outlets (5-to-10%). Recycling can also reduce cash transportation (1-to-5%), lowering operating cost for the cash handling network.

As mentioned, cash recycling allows cash deposited by one user to be withdrawn by a different user, without first being transported away, processed at a cash distribution center, and transported back. It typically occurs at branches, agents, and merchants, and offers

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<sup>10</sup> For example, see Simutis, Dilijonas, and Bastina (2008), Cash demand forecasting for ATM using neural networks and support vector regression algorithms, and Toro-Dias and Osurio-Muriel (2012), Stochastic Optimization of a Cash Supply Chain.

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opportunities to reduce back-office labor costs at branches, and lower transportation needs.

For instance, some payment system providers in the developed world have used recycling to lower their operating costs by roughly 40% (e.g., by shrinking labor hours spent packing and remitting bags of cash).

Cash recycling at industrial cash handling centers allows sorters to remove poor quality banknotes from circulation. This saves the cost of transporting these notes to a central bank facility. However, some countries require removal of banknotes to be performed only by central banks, in order to reduce the potential for fraud.

Recycling is more difficult at ATMs, particularly in rural areas, where money gets dirty quickly. While providers can lower their ATM funding costs by as much as 20% through recycling, this can require them to buy more expensive cash recycling ATMs. Therefore, it is worthwhile only in locations with high use, and where maintenance does not require undue expense in terms of time or money.

## **5. Improve efficiency of cash handling by branches and cash centers**

Improved efficiency of in-branch and cash center cash handling together can lower CICO costs by an additional 5-to-10%, by reducing back office labor at distribution outlets as well as the labor needed to run the cash handling network.

Branches have a number of cash handling processes that they can make more efficient. These include processes for replenishing their in-branch ATMs, and for preparing cash for transport to cash centers.

The process for replenishing in-branch ATMs includes preparing cash, filling ATM cartridges and loading cartridges into ATMs. Even in developed countries, branches can streamline these processes significantly, simplifying many steps and eliminating some altogether. For example, on the table for recounting cash, process efficiency is much higher if only the necessary tools are out, arrayed visibly and in an organized way. An organized bank vault also increases efficiency. For example, the bank can pre-define shelves for cash wads of specified quality and use (e.g., fit for ATM, fit for compensation with other branches, unfit for cash transportation).

Cash centers also have multiple opportunities for process improvements that meaningfully reduce costs. For one thing, they can make the flow of cash through the center more efficient by getting workers to minimize the number of times they hand cash from one person to another, and the number of times they count it. Second, through process improvements, they can speed up banknote counting machines by more than 50%. The more notes a machine can count, the more cash that the cash center can process.

## **CICO revenue and pricing models**

As mentioned, CICO usually loses money for payment system providers. Providers generally are willing to lose money since, by providing affordable cash deposit and withdrawal services, they foster more use of the payment system. Higher usage helps generate other forms of revenues. For example, in many developed world systems, higher usage corresponds to higher average account balances, and hence greater revenue from interest



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income.

The measures we have outlined above can lower these losses substantially. However, providers also have pricing and revenue strategies to improve CICO margins. There are two broad models.

- 1. Pricing strategies to lower operating costs.** In many developed payment systems, providers price to encourage customers to use the lowest-cost CICO outlets (e.g., ATMs). The cost differential can be over 50%. In such systems, deposits tend to be free and withdrawal fees lower at ATMs than at branches. Any fees at ATMs tend to be fixed.
- 2. Revenue maximizing strategies.** In some markets, providers seek to generate as much value out of CICO distribution outlets as they can. In well-developed markets, they will provide ATMs that offer additional revenue generating features, such as ticket sales or sales of pre-paid minutes for a mobile phone<sup>11</sup>. In other markets, CICO networks themselves may be independently profitable. Such is the case for M-PESA, which charges cash withdrawal fees that are higher than CICO costs. These withdrawal fees are tiered, depending on withdrawal value. Deposits are free, as providers benefit from greater inflows.

### ATM example

ATMs across countries illustrate these two broad strategies. As shown in Exhibit 22, most countries lose money on ATMs. Most are willing to do so to ensure lower branch costs. However, in several countries – most prominently South Africa – the system earns money on ATMs.

While Exhibit 22 shows system-wide revenue for each country, revenue to individual players within a country can vary substantially. Here is why. Revenue to banks comes from two separate streams, each of which can have significant variation. First, banks charge customers for withdrawals and deposits. Some are more effective than others in generating revenue, even on low per-transaction fees. Approaches include managing the ATM network location (e.g., selecting high-traffic off-site locations) and applying smart pricing. For example, several years ago in Norway, ATM withdrawals were free of charge during the day – to push people to withdraw money at ATMs rather than through branches – but charged at night once bank branches were closed, and people had no other substitutes.

Second, banks that have ATMs charge other banks with no or limited ATM networks for withdrawals made by their customers. This results in intra-bank transfer of value and a net win for banks with an ATM network. Thus, some banks can be profitable from ATMs even in countries where, system-wide, ATMs lose money.

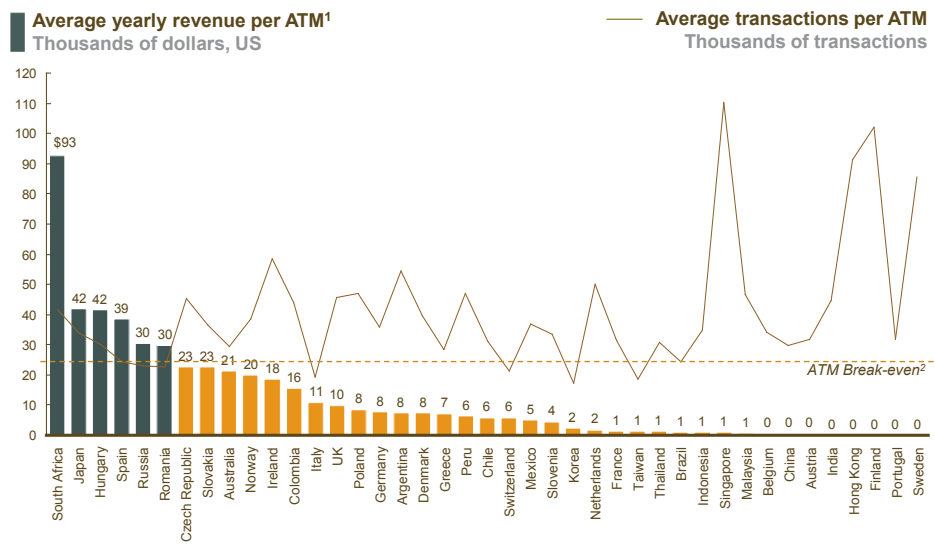
Even for a given bank, some ATMs will be much more profitable than others, depending upon their location. For example, off-site ATMs in the high-traffic center of a city with few other substitutes to withdraw cash can be profitable due to high use. However, ATMs in rural areas may lose money because of low use due to factors including lower population densities, poor communications infrastructure, power outages, and low quality paper notes causing jams.

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<sup>11</sup> Note that within the ACTA framework, such additional revenue generating features are sources of Adjacent revenue.

EXHIBIT 22

Most countries lose money on ATMs; South Africa is a strong exception



<sup>1</sup> Revenue comes from fees for cash withdrawals and deposits, charged to retail and corporate customers  
<sup>2</sup> Assuming average total annual maintenance cost per ATM at \$25,000

SOURCE: McKinsey Payments Map 2012 (2010 data)



## ATM profitability in South Africa is due to several factors

From a full system perspective, several complementary factors help ATMs in South Africa generate significant profits.

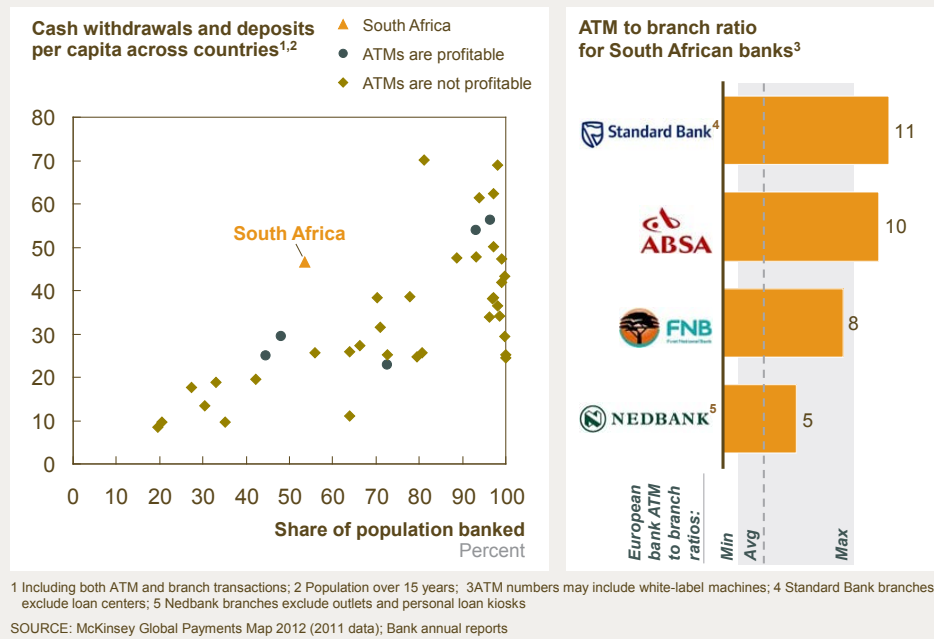
First, South Africa sees high volumes of cash withdrawals and deposits for a country with its level of financial inclusion (as seen on the left side of the exhibit). In other words, there is significant demand for CICO services.

Second, South Africa has developed a dense ATM network relative to its branch network (as seen on the right side of the exhibit). As a result, a large percentage of CICO demand is most suited to flow through ATMs.

Finally South African banks charge more for CICO services than do banks in any other country. In South Africa, the weighted average fee on cash withdrawals and deposits charged by banks to retail and corporate customers is \$2.20.

Among 40 major payment systems we examined, Spain has the second highest such fee, at \$1.60. The average is \$0.40. Demand for ATM use in South Africa likely allows for its high fee structure.

### In South Africa, consumers withdraw and deposit cash frequently, and ATMs are common relative to bank branches



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## Implications for poor people in developing countries

Reliable and accessible CICO networks are necessary for the growth of digital payments – a key ingredient for financial inclusion. Moreover, evidence from across the globe suggests that cash access will remain important long after digital payments take root. As a result, for payment platforms to adequately serve the poor, they need both a viable digital payment system, complemented with traditional solutions for both collecting and dispensing cash.

### The role of CICO as digital payments are introduced

To start to use digital payment systems, people must have any easy way to convert cash into digital money. But they aren't going to want digital money unless they are certain they will be able to use it. Particularly for people in cash-dominant societies considering adopting digital payments, this means being certain that they will be able to convert their digital money back to cash.

India's experience with its government-sponsored guaranteed employment program, National Rural Employment Guarantee Act (NREGA), demonstrates that people will not use new digital payment options unless CICO is available and reliable. NREGA makes digital payments to savings accounts established for beneficiaries, who have the option to withdraw the money through a network of business correspondents (BCs). This program has not succeeded in increasing savings or digital transactions among beneficiaries. Unreliable CICO networks seem to be at fault. In many places, agents visit villages once or twice a week at best. Consumers often withdraw 100% of their funds at the first opportunity.

### The role of CICO once digital payments take root

We find that demand for traditional systems for accepting and dispensing cash continues even as use of digital payment systems grow. Therefore, successful digital payment systems require complementary CICO services.

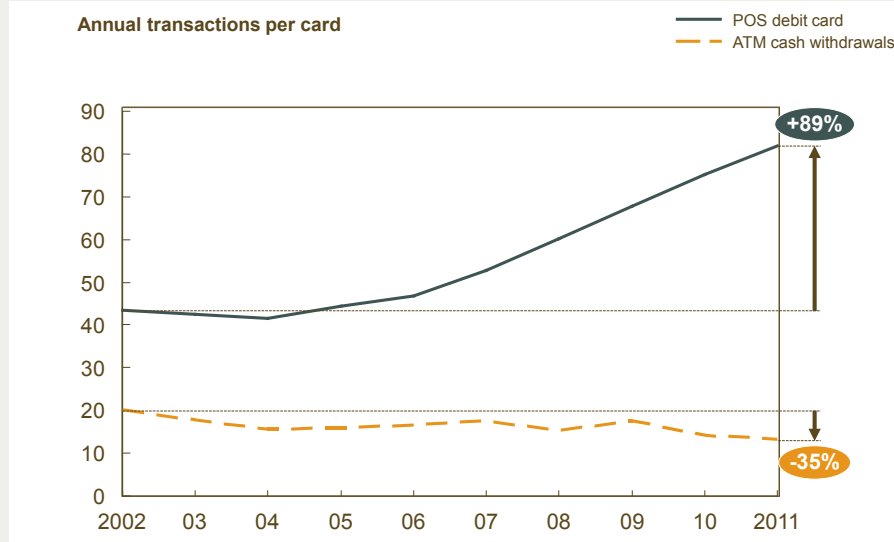
Cross-country data suggests that CICO transactions linked to a digital payment system may not decrease until both digital transactions and withdrawals occur regularly. For example, between 2006 and 2011 ATM withdrawals increased in over 60% of 42 countries in which people made fewer than one debit card POS transaction a week. However ATM use decreased in over 90% of countries where consumers used debit cards at the POS more than weekly. ATM withdrawals per person only decrease in countries where they have first grown to occur at least once a month.

Even in developed economies with heavy digital payments use, demand for CICO transactions does not decrease significantly. The Netherlands – a developed economy with one of the highest digital payments use per capita – provides a useful example. While the number of annual POS transactions per debit card grew by 89% between 2002 and 2011, the number of ATM withdrawals per card decreased by only 35%. (See Exhibit 23).

As the volume of digital transactions grows, consumers may withdraw smaller amounts of money each time they visit a CICO point. In the case of the Netherlands, average transaction size dropped more quickly than did transaction frequency – shrinking by 34% (versus 22%) and beginning to fall by 2005 (versus 2008).

EXHIBIT 23

**In the Netherlands, debit card point-of-sale transactions have grown more quickly than ATM cash withdrawals have decreased**

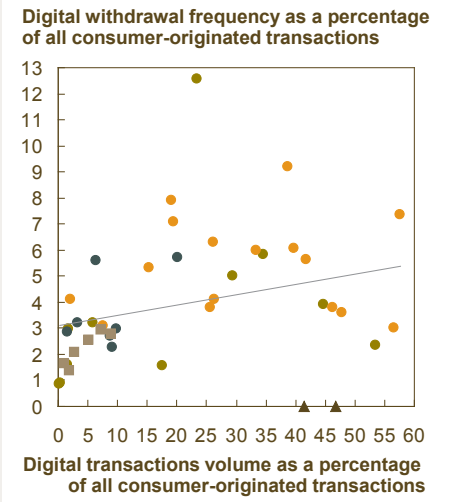
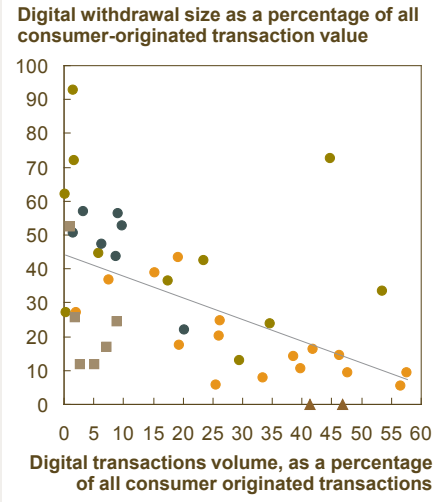


SOURCE: McKinsey Global Payments Map

EXHIBIT 24

**As the volume of digital transactions grows, people tend to withdraw smaller amounts of cash more frequently**

- Asia Pacific
- Western Europe
- Eastern Europe
- ▲ North America
- Latin America



SOURCE: McKinsey Global Payments Map 2012 (2011 data)

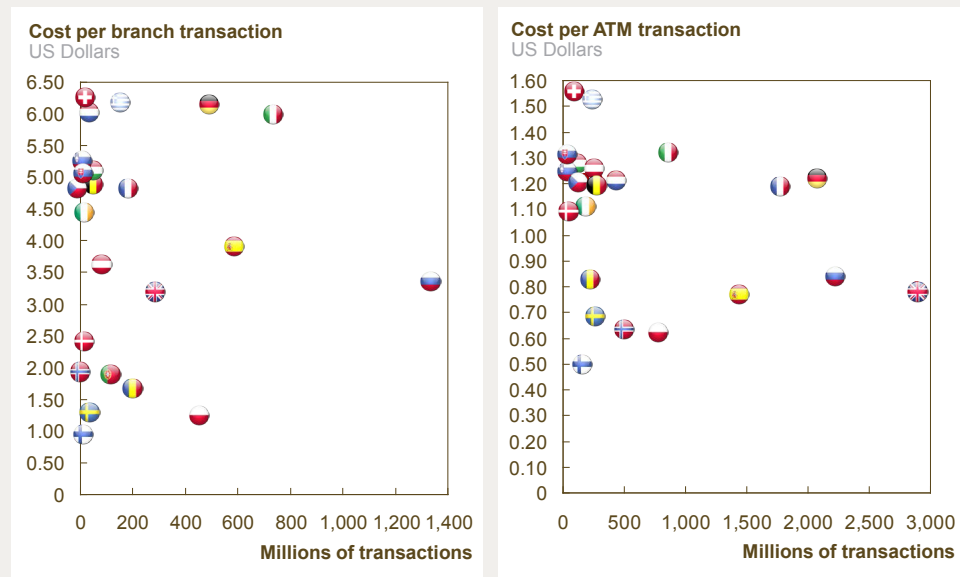
Transaction patterns across countries suggest a similar pattern, as illustrated by Exhibit 24. A potential explanation is that users maintain their cash withdrawal habit (e.g., weekly trip to the ATM), but withdraw less and less per trip since they are spending less cash overall.

### Building CICO networks for the future

Overall scale is not an important factor influencing CICO costs. Costs for cash withdrawals and deposits are not, in general, lower in countries with greater scale (see Exhibit 25). In particular, Finland demonstrates that low costs are possible even with very low country-wide volumes. Thus, even as countries strive to reduce cash use in favor of digital transactions, they can seek to improve CICO efficiency.

EXHIBIT 25

#### Large country-wide scale is not required to achieve low CICO costs



SOURCE: McKinsey Payments Map 2012 (2010 data)

For many developing countries focused on serving low income consumers, CICO networks are a critical component to scaling affordable services. Flexible agent-based networks hold high potential, and yet, require substantial incentives and logistics to implement at scale. The analysis of CICO networks in this chapter sheds light on the key drivers for efficient services.

Looking across our four-part payment system model, CICO is the most important for scaling digital payment services – bringing new users and new funds into the system. Next, we will look at the dynamics of transactions to evaluate the importance of reaching economies of scale and how to make important design choices of what transaction instruments (e.g., debit cards) the system provides to users.

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## IV. Transactions: Connecting payers and payees

### Chapter summary

Transactions are the third element of our four-part ACTA framework of payment system economics<sup>1</sup>. Once customers can establish and maintain accounts and have easy and reliable methods of withdrawing and depositing money, transactions let them move money to other users. Transactions serve as the connective tissue between payers and payees. Instruments for transactions include debit and credit card payments, cheques, credit transfers, direct debits, and mobile money transfers. Transaction channels are the method by which the user initiates payment. They range from the Internet or a mobile phone at the fully digital end, to branch- or agent-based channels at the least automated end. Other channel options include point-of-sale terminals, ATMs, call centers, and mail-in-forms.

**A successful payment system that fosters financial inclusion requires** ways of transacting that give users some benefit over cash (e.g., in the US, many merchants pay to accept credit cards to increase sales volumes), allows them to transact with whomever they wish - including providers of a variety of financial services - and charges prices affordable to very poor consumers.

To use a system at all, users require clear payment terms, high levels of certainty that money disbursed from their accounts will be directed to the recipient, and confirmation of completion. For many, this includes mechanisms to resolve disputed transactions or errors.

The dynamics of transaction platforms can have major implications for how easily users can transact among one another. This includes whether countries have centralized clearing and settlement systems and “openness” – meaning that providers can gain access to the system. Users gain access to the system through their account and the means enabled by the transaction instrument (e.g., card-enabled payment, mobile phone initiated transfers).

Different payment instruments offer different perceived benefits, influencing user willingness to pay. For users to pick digital transaction instruments over cash or other vehicles, they must see them as cheaper or perceive that any higher cost is offset by other advantages (e.g., convenience, security, or for merchants, increased data on customers). Country and user-specific considerations will determine how people assess the relative importance of such benefits, and what this means for the types of instruments available. For example, in Nigeria, most small merchants today accept only cash because they perceive it as having no cost and customers often “round up” prices.

**Our economic analysis of transactions across a broad set of markets yields several major insights:**

- **Both transaction costs and fees vary significantly by transaction type and country**, and though pricing models vary, users usually pay something. In developed systems, provider margins on transactions range from losses of minus 6% to profits of

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<sup>1</sup> ACTA stands for: Accounts, Cash-in-cash-out, Transactions, and Adjacent opportunities for profit

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80%. Cost per transaction ranges from \$0.04 to more than \$4, and fees paid by users range from less than \$0.01 to \$20, depending on the type and size of the transaction. This translates to annual costs of \$2-to-\$200 per user, and revenues of \$0.50 to well over \$200 for a user transacting 50 times annually<sup>2</sup>.

- **“Push” payments initiated through digital transaction channels (such as online or through mobile devices) can be up to 90% cheaper than non-digital channels.** In push payments, the payer pushes money to the payee without giving any financial information, (e.g., direct deposit of a paycheck). Beyond their lower cost, digital channels also have lower cost variability when compared to non-digital channels.
- **To lower transaction costs in a meaningful way, it is necessary for systems to achieve minimum scale and improve operational efficiency.** Together, these steps can lower costs by as much as 85% for a given transaction instrument and channel.
  - **Transaction costs can decrease by as much as 50% when scale doubles.** However, while minimum scale is essential to reach low costs, cost efficiencies from scale diminish at higher volumes. For credit transfers, a transaction system reaches adequate scale at about 250-to-500 million transactions per year.
  - **Improving operational efficiency can reduce the costs of similarly sized transaction systems by nearly 70%.** Scale does much more to lower costs in operationally efficient systems. Furthermore, even systems that are not at scale can see significant benefits from operational improvements.
- **Efficient clearing and settlement infrastructure is critical for reaching lower overall transaction costs.** This lowers costs for clearing and settlement themselves (a very small cost component in an efficient system) as well as costs for some bank processes influenced by the particular rules dictating clearing and settlement.
- **Per transaction costs could be as low as \$0.04 (or \$2.00 annually for a user transacting 50 times).** This requires optimized system design (promoting digital “push” payments), sufficient scale, and high operational efficiency.
- **Transaction cost does not determine the price charged to users.** At a given cost for transactions, price can vary across countries by a factor of 3 or more. Prices can be low in systems where they are set by the marketplace, or controlled by regulators, but prices are more predictably linked to costs when someone controls them.
- **Only countries with relatively widespread access to digital transactions (through either a bank or a mobile money provider), achieve high levels of financial inclusion.** For example, in countries where more than 70% of people can pay digitally, financial inclusion is over 85%. However, high digital transaction access does not alone ensure financial access for poor people (e.g., in Kenya, nearly 70% of adults can pay by mobile phone while formal financial inclusion is less than 50%). Other efforts are needed to reduce costs and prices to levels that can earn providers a profit while serving poor consumers.

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<sup>2</sup> CICO services declines, based on current and historical data on frequency of card-based transactions and cash withdrawals across 42 countries



To elaborate on these insights, we have divided this chapter into five parts:

- Activities involved in transacting
- Transaction instruments and drivers of their cost
- Methods of lowering transaction costs
- The range of transaction revenue models
- Implications for poor people in developing countries

## Activities involved in transacting

Across the world, there are a myriad of ways to conduct digital transactions. Four fundamental features help us to classify the transaction types:

- 1. What type of institution holds the accounts?** Some transactions occur only between bank accounts, while others involve customer accounts held by a non-bank (e.g., mobile phone operator, money transfer operators, or other payment service providers).
- 2. Do the payee and payer need to have accounts at the same institution?** Some systems allow transactions only between accounts held by the same entity (e.g., transactions via M-PESA). These are known as “closed loop” systems. Others, known as “open-loop” systems, allow transactions between accounts held by multiple institutions<sup>3</sup>.

### EXHIBIT 26

#### Payment instruments are either “push” or “pull”

##### Push payment: Payer pays payee, sometimes through intermediaries

- One-way flow of information
- Payer initiates payment without sharing financial information
- Examples:
  - Cash payment
  - M-PESA
  - Credit transfer

Payer — Intermediaries —> Payee

##### Pull payment: Payer gives payee consent to ask payer bank to pay<sup>1</sup>

- Two-way flow of information
- Payer shares financial information so that payee can initiate transaction
- Examples:
  - Debit & credit card
  - Direct debit
  - Check

Payer —> Payee  
Payer bank — Intermediaries —> Payee

NOTE: Credit cards are slightly more complicated, requiring two fund exchanges. PayPal & pre-paid cards combine elements of both push & pull payments  
1 May also be a non-bank payments service provider in countries where regulation allows (e.g., M-PESA in Kenya)

<sup>3</sup> “Open-loop” systems allow multiple providers to come together for payment services (e.g., any bank can potentially join the Visa network to perform account issuing or acquiring services). Managing “open-loop” systems can be complex due to multiple participants. In contrast, “closed-loop” systems involve a single organization performing all core functions (e.g., American Express issues accounts, acquires merchants, settles payments). Closed-loop systems typically operate at lower cost but can have difficulty scaling.

3. **What rules determine how money is transferred; in particular is it “pushed” or “pulled”?** Transaction instruments either allow a payer to push funds to a payee or give payee consent to pull funds from the payer’s account (Exhibit 26). Credit transfers are examples of push transactions. Direct debits and debit cards payments are pull transactions<sup>4</sup>.
4. **How does the user initiate payment (i.e., which channel)?** Channel options vary by payment instrument. They range from the Internet or a mobile phone at the fully digital end, to branch- or agent-based channels at the least automated end. Other channel options include point-of-sale terminals, ATMs, call centers, and mail-in-forms. Payees have choices about subsequent actions (e.g., taking cash out through an agent, or transacting again with the just-received funds).

In this chapter, we will focus on transactions on “open-loop” systems. Users make non-cash transactions of this sort via five primary transaction instruments, variants of which exist in nearly every country in the world: credit transfers, direct debits, debit cards, credit cards, cheques (see sidebar for descriptions of instruments and channels)<sup>5</sup>.

Each transaction instrument requires the same five activities: capture, processing, clearing & settlement, exceptions, and reporting. Three primary factors control cost across all instruments – system design (including shift to least costly channels), scale, and operational efficiency – and each factor effects a different combination of activities. (Exhibit 27 explains the activities and their link to costs)

#### EXHIBIT 27

##### Each type of transaction instrument requires five activities; with three factors controlling costs

Activities <sup>1</sup>	Factors strongly controlling costs		
	System design <sup>2</sup>	Scale	Operational efficiency
<b>Capture &amp; authorization</b> <ul style="list-style-type: none"> <li>▪ Validating payer’s identity at payment</li> <li>▪ Capturing, transmitting &amp; authorizing financial and transaction information</li> </ul>	✓	✓	
<b>Processing &amp; adjustment</b> <ul style="list-style-type: none"> <li>▪ Communicating between parties</li> <li>▪ Processing transaction information</li> <li>▪ Data control &amp; error identification</li> <li>▪ Debiting or crediting payer &amp; payee accounts</li> </ul>	✓	✓	✓
<b>Clearing &amp; settlement</b> <ul style="list-style-type: none"> <li>▪ Authorizing payment across counterparties</li> <li>▪ Transferring funds between payer’s &amp; payee’s financial institutions</li> </ul>		✓	
<b>Exceptions &amp; fraud</b> <ul style="list-style-type: none"> <li>▪ Resolving errors or changes to standard transactions</li> <li>▪ Monitoring fraud, handling fraud &amp; covering fraud losses</li> </ul>	✓		✓
<b>Invoicing &amp; reporting</b> <ul style="list-style-type: none"> <li>▪ Tracking, reporting &amp; notifying users (consumers &amp; businesses)</li> <li>▪ Archiving required records</li> </ul>			✓

<sup>1</sup> Includes only customer service costs directly associated with transactions. Such costs sit in either capture & authorization (e.g., processing a credit transfer at the counter) or exceptions & fraud (e.g., processing fraud complaint)  
<sup>2</sup> Includes optimizing for least costly channel

<sup>4</sup> In the United States, “paying by ACH” is sometimes used loosely to denote either a credit transfer or a direct debit.  
<sup>5</sup> Some payments are combinations of these five instruments. PayPal is an example: An account can be funded in advance via credit transfer, debit card or credit card or through direct debit at the moment of transaction. The PayPal payment itself is within the system, but is closest in form to a credit transfer. The payee can then perform a direct debit-like payment to move money from PayPal into an accessible format.

## Description of instruments and channels

### Five primary payment instruments

1. **Credit transfers** allow for account-to-account payments, initiated by the person or institution paying, and are common in both developed and developing markets, particularly for paying salaries and for business-to-business payments (e.g., 23% of flows by value in Nigeria, 32% in the US, 37% in China, and 90% in the Netherlands).
2. **Direct debits** are also account-to-account payments, in which the payee “pulls” money from a payer’s account. They are common for paying bills in developed economies (e.g., 15% of consumer-to-business payments in the Netherlands). They are favored by many businesses because they ensure timely payment, but are rare to non-existent in developing markets where trust is lower and infrastructure less sophisticated (e.g., under 0.1% of all payments in Nigeria).
3. **Debit cards** are common for point-of-sale consumer purchases across developed markets, but tend to be used only by the wealthy in developing markets (e.g., they are used for 19% of all payments transactions in the Netherlands but 0.7% in Kenya and less than 0.04% in Nigeria).
4. **Credit cards** are prevalent in a selection of developed markets but are eschewed in others where credit for personal purchases is less common (e.g., they are used for 23% of transactions in the U.S. but 1% in the Netherlands). In developing markets, they are used primarily by international travelers and the wealthy.
5. **Cheques** are a common payment instrument, but are being phased out in most countries. They have been eliminated in some developed countries (e.g., the Netherlands) but are still common in others (e.g., France and the US, where they are used for 43% of payment flows by value). Multiple developing world countries also see cheque flows (e.g., 23% by annual transaction value in Nigeria and 10% in Kenya) and they continue to invest in improving infrastructure.\*

### Payment channels

Digital channels make payment via the Internet or mobile devices, or else use batch processing (e.g., corporations, for salary payments). Consumer Internet credit transfers are common in most of Europe and available in countries such as Nigeria and China (though in the U.S. they are generally not available). Digital channels are also available for direct debit, debit card and credit card instruments. In general, the digital channel is cheapest since it requires minimal human labor, no paper processing expenses, and no maintenance of physical infrastructure.

Branch transactions are most expensive because they require overhead costs and a meaningful amount of human labor. In countries with an expensive labor force, such costs can be more than \$6.00 per transaction. In developing countries, where labor is much less expensive, the incremental cost of the branch channel compared to digital may be less than \$1.00 but will remain meaningful. Branch transactions generally do not exist for direct debits and are not possible for debit and credit cards.

There are a range of other channels with some degree of physical maintenance or labor component. For example, in many European countries, consumers can initiate credit transfers at the ATM. When done efficiently, this has a cost very close to digital, but physical maintenance costs remain. Point-of-sale (POS) terminals facilitate use of debit and credit cards. Credit transfers initiated through a call center may require human labor and introduce potentially costly errors, in cases when people staffing the phones mis-transcribe information. Finally, mail-initiated transactions require employees to process paper remittance slips in a back office.

\* While paper instruments such as cheques are generally significantly more expensive than digital alternatives, cheque-initiated systems that are quickly digitized can be nearly as efficient and are maintained in countries where they are attractive to consumers.

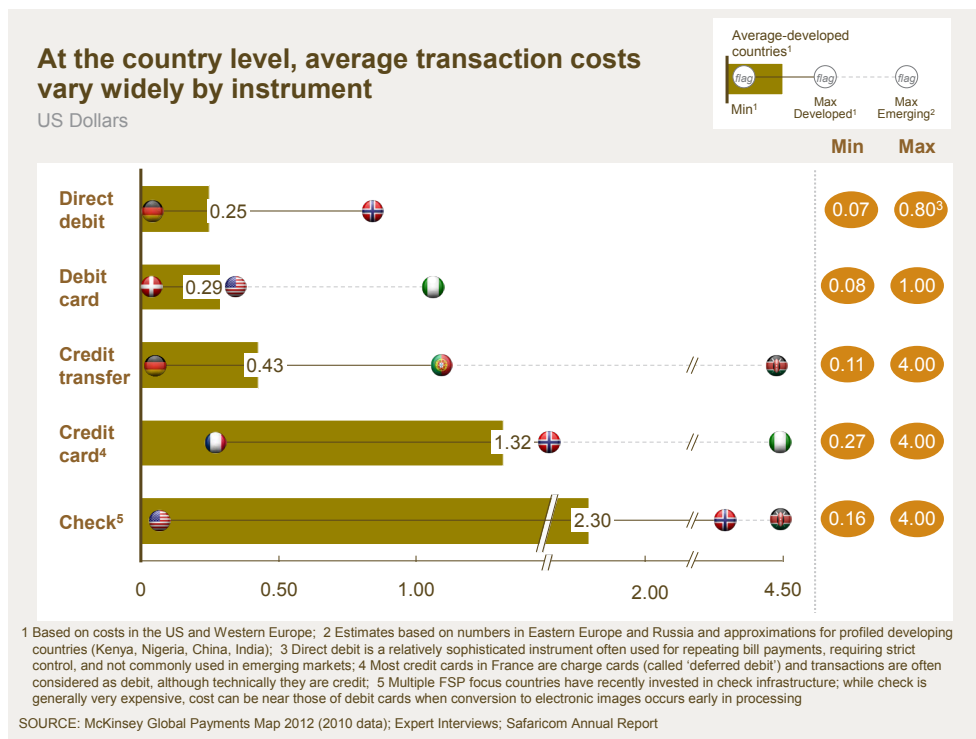
## Components of transaction costs

Transaction cost depends on both payment instrument and payment channel. Digital “push” payments are cheapest. How effectively a system encourages these sorts of payments is an aspect of the system design. For a given choice of instrument and channel, costs break down across the five activities.

### Costs by transaction instrument

At the country level, transaction costs vary widely for any particular instrument (See Exhibit 28). For example, the average cost for a credit transfer in developed countries is \$0.43, with country averages ranging from \$0.11 in Germany to \$1.16<sup>6</sup> in Portugal. In a developing country such as Kenya, costs are much higher: roughly \$4.00. Other instruments show similar variation across countries.

EXHIBIT 28



Mobile money systems such as M-PESA that use SMS, encrypted SMS, or USSD (another digital messaging technology), provide alternative non-cash ways to transact. Because these systems are currently outside the national clearing and settlement process and typically are “closed-loop,” we do not include them in this analysis. Mobile money systems have to perform the same functions as any other payment transaction (e.g., processing, exception handling, fraud handling) but they typically manage these at lower cost because their closed-loop system integrates all major activities within one provider. Many mobile money systems work essentially like credit transfers, whereby the account holder pushes funds from the account. Although data is not publicly available, we estimate SMS mobile money transactions cost about \$0.03-to-\$0.04 – close to that of a digitally initiated electronic credit transfers.

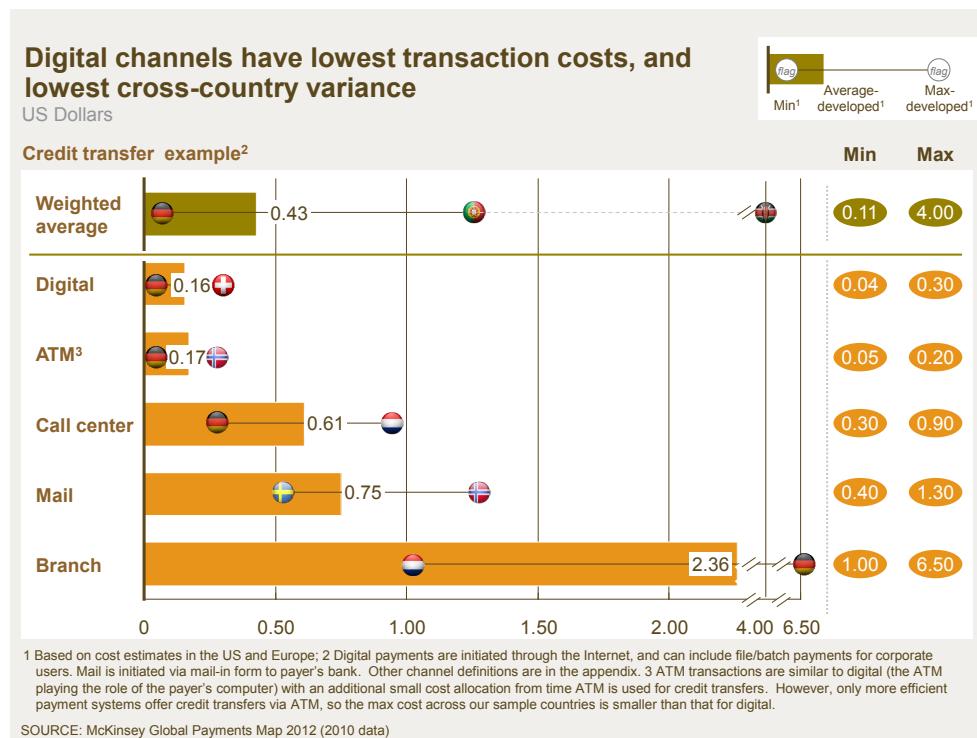
<sup>6</sup> Based on costs in the US and Western Europe. Costs in other developed markets are in-line with these. Note that about ~35% of credit transfers in Portugal are initiated in a bank branch, driving this relatively high cost.

## Costs by transaction channel

Digital channels – mobile device, online – are cheapest, and costs vary the least across countries. The point-of-sale card channel is more expensive due to the costly card and terminal infrastructure needed. However, in developing countries, providers who shift users to mobile payments can also shift infrastructure costs to them (since users buy the mobile phones), while capturing the low-cost benefits of a digital channel.

**The cost benefits of digital transaction channels.** Initiating transactions through digital channels can decrease transaction costs by as much as 90% (or over \$1.50). Exhibit 29 shows the example of credit transfers, which users can initiate through five channels – digital, ATM, call center, mail, and branch. However, not all channels are available in all countries. Digitally initiated credit transfers are cheapest. For instance, they can cost as little as \$0.04 (in Germany) and average \$0.16 across Western Europe. Branch-initiated credit transfers are most expensive, costing \$2.36 on average in Western Europe, and \$6.50 at the high-end (in Germany).

EXHIBIT 29



Lower variance in costs is also a major benefit from digital transactions. We observe a tighter range of costs across markets with high use of feature phones<sup>7</sup>, which suggest that it is easier to reach an efficient standard in such markets than others. As such, there may be hope that lower income countries could more easily reach efficiency with smaller investments that seek to employ cheaper instruments. We see feature phones as the most promising option to provide access to cheaper digital channels in most developing countries. Mobile penetration is high in many of these countries (e.g., 55% in Nigeria, 70% in Kenya, 75% in India), and feature phones are increasingly affordable (about \$20-to-\$30).

<sup>7</sup> Phones with some features beyond voice calling and text messaging but without the full functionality of a smart phone (e.g., feature phones may offer Web browsing and e-mail, but generally cannot download apps from an online market place)

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While the data shows that the digital channel is the cheapest; other channels may also be sufficiently cost-efficient to exist in the medium- to long-term. For example, credit transfers initiated at ATMs cost roughly \$0.05 in Germany. All low-cost channels are worth exploiting, particularly in countries with an installed base for delivery.

**Shifting point-of-sale card payments to mobile.** Traditional point-of-sale (POS) card payments require the provider to bear the cost of manufacturing and distributing cards and terminals. A debit card transaction at the point-of-sale requires the consumer to have a card and the merchant to have a POS terminal. This infrastructure contributes significantly to card transaction costs, especially if payment volumes are low. This can increase cost per transaction by 30% over channel options in which one or both of consumer and merchant uses his own mobile phone or computer to initiate payment.

Manufacturing and distributing debit cards costs \$1-to-\$3 annually per card. Costs in emerging markets are near the high end because limited scale raises manufacturing costs, and transport can cost more. Annual costs come from total per-card costs of \$2-to-\$6 per card, amortized over the average card lifetime of 2 years.

Manufacturing and distributing POS terminals can range from about \$60 to over \$500 per year. The cost of a POS terminal ranges from roughly \$100 for a basic device to well over \$500, depending upon terminal features (e.g., whether it has multiple SIM cards for different mobile communications systems, or whether the user interface includes a touch screen)<sup>8</sup>. Distribution costs add additional expense. Terminal lifetimes are roughly 5 years, though replacement rates can vary significantly by country and over time as technology and security compliance rules change<sup>9</sup>.

As more transactions are completed using the same infrastructure, the cost allocated to any one transaction falls. Given average card and terminal usage levels in Europe for example, the average per transaction cost for debit POS transactions is roughly \$0.05-to-\$0.10 from the terminal and an additional \$0.01-to \$0.04 from the debit card. However, variation across countries is significant. For example in Norway an average debit card is used roughly 200 times annually (190 times at POS and 10 times at the ATM) so its cost contribution is a small \$0.01 per transaction. An average POS terminal in Norway sees nearly 9,500 card transactions, and its cost contribution is \$0.05 per transaction. By contrast in Germany, an average debit card is used only about 50 times annually (30 times at POS and 20 times at the ATM), and its cost contribution is higher at \$0.04 per transaction. An average German POS terminal sees only 3,800 card transactions and its cost contribution is \$0.07 per transaction.

POS costs in other emerging markets can be much higher (e.g., an estimated \$0.23 in Kenya and \$0.42 in Nigeria). Exhibit 30 shows these costs for a selection of countries.

These high costs have important implications for emerging markets seeking to increase digital payments. Most of these countries are heavily cash-based and POS infrastructure

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8 Terminal distribution models differ significantly across countries. In some countries, acquirers provide the terminal as part of card acceptance (e.g., Spain, Turkey Greece, Brazil). On other countries, merchants pay fees (one-time or monthly) for the use of a POS terminal, on the promise of sales lifts that will result from cards (e.g., UK, Portugal, China). Such fees typically are set in conjunction with per transaction fees that merchants pay. In a third category of countries, specialized 'terminal players' provide the terminal outside of the acquiring relation, either through lease or sale (e.g., Nordics, Netherlands). As a general rule, merchants pay more for terminal use in countries in which per-transaction fees are lower.

9 In general, cycle time is set by changes in technology products (e.g., broadband terminals, WiFi terminals, 3G, contactless) and in security compliance rules, rather than the useful life of the hardware itself (roughly 20 million transactions). Changes tend to trigger acceleration of replacement cycles, which is then often followed by a slow-down. In Western Europe average cycle time is roughly 5 years. In the US, where mag stripe logic still predominates cycle time has been closer to 6-7 years but this is likely to decrease as contactless becomes more common. Note also that in some countries (e.g., Brazil), it is common practice to move old terminals (past cycle) from premium locations to 'sub prime' locations. Note that whenever a 'free' terminal or a lease is involved, the acquirer decides on the replacement cycle.

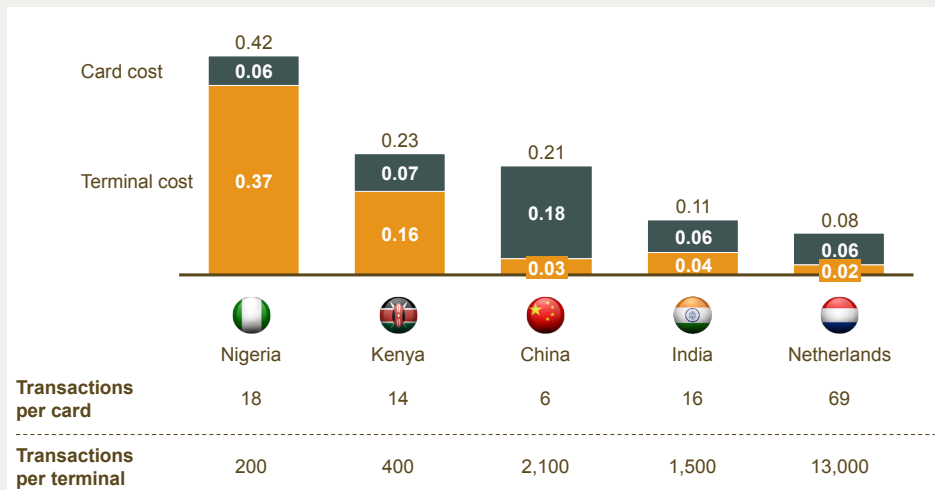
sees limited volumes, translating to high per-transaction costs. Attempts to grow card-based POS infrastructure can increase per transaction costs substantially if they are not matched by increased transaction volumes. For example, in Nigeria, the number of POS terminals grew by over 10 times (from 12,000 to 150,000) from 2011 to 2012, encouraged by the Cashless Lagos initiative. However, the total number of debit card transactions has mostly remained flat. Unsupported by increased payment flow on the new terminals, terminal contribution to per-transaction costs doubled from about \$0.37 in 2011 to nearly \$0.80 in 2012.

Mobile payments provide an opportunity to shift the cost of the POS payment infrastructure to users, while capturing the low-cost benefits of a digital channel<sup>10</sup>. Consumers'

**EXHIBIT 30**

**POS card transaction costs in some countries are more than 80% cheaper than in others, driven by transaction volumes<sup>1</sup>**

US Dollars, 2011



<sup>1</sup> Excludes costs of distributing to consumers and merchants (e.g., shipping). Assumes \$320 cost amortized over a 5 year lifetime for terminals and \$2 cost amortized over a 2 year lifetime for cards. Card costs are based on aggregate stock of debit and credit cards and total transactions through POS and ATMs. Terminal costs are based on debit and credit card transactions at POS. Number of POS terminals come from the McKinsey Global Payments Map except for Nigeria (12,000 – a pre *Cashless Lagos* number based on interviews) and the US (Global Findex)

SOURCE: McKinsey Global Payments Map (2012 release), Global Findex, Retail Banking Research, CBN, CBK, Expert Interviews

and sometimes merchants' phones can take the place of cards and POS terminals; and ongoing account management costs are lower (e.g., for replacement cards). Other ways to have users pay for transaction infrastructure (e.g., through on-line purchases at a PC) have a similar effect. For providers, the tradeoff is reduced control over equipment standards (e.g., customer adoption of mobile devices) and, potentially, the users' inability to keep their devices ready for use (e.g., mobile phones may not always be charged).

**Summary of transaction costs by payment instrument and channel**

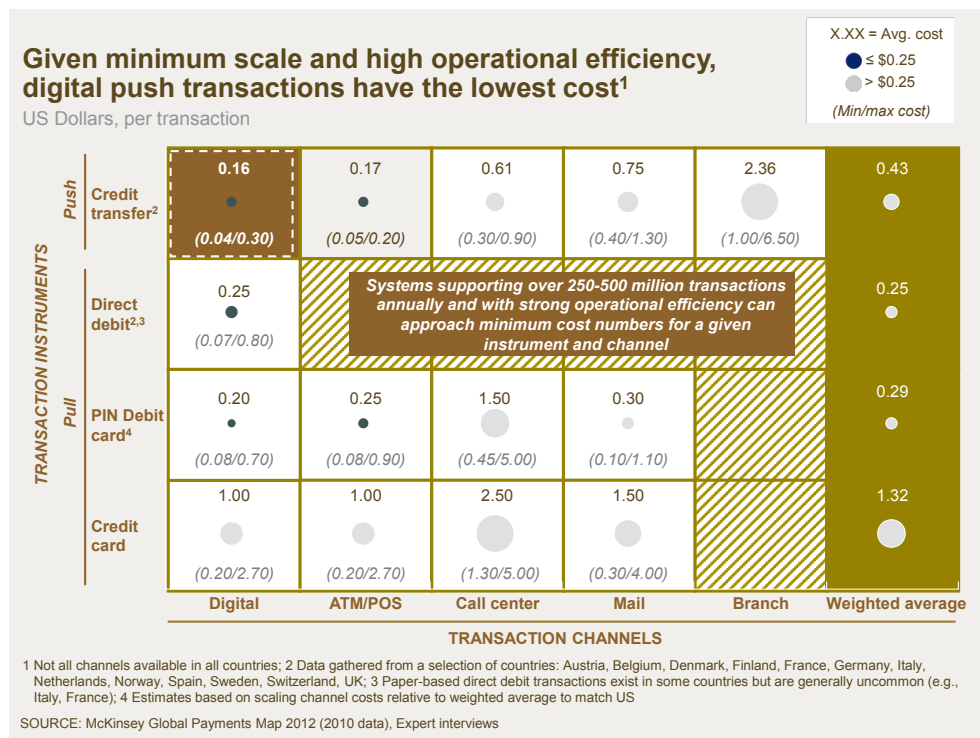
Exhibit 31 pulls together the elements of the above discussion on costs by presenting transaction costs for each instrument depending on the channel used to initiate the transaction.

<sup>10</sup> Some payment instrument and channel combinations allow us to virtually eliminate the infrastructure cost altogether. One such option is online credit transfers, where the user typically uses an online form to initiate the transaction. Though there is a cost associated with that entry-point, it is negligible when allocated to a single transaction. The tradeoff here can be access (i.e., requires access to the internet) and portability (e.g., where a computer is necessary mobile data coverage is scarce).

“Push instruments” – such as credit transfers – initiated through a digital channel are least costly (as indicated by the dotted line). Push transactions, carried out via a one-way flow of information, have a more streamlined process than pull transactions, which require two-way information flow. Push transactions can be as cheap as \$0.04, assuming large scale and high operational efficiency. Indeed, mobile money operators and PayPal both use a “push-like” mechanism within their closed systems to transfer money, due to its lower cost, among other considerations.

## Costs by component activity

EXHIBIT 31



Looking at transaction costs across instruments and activities, we see that activities carried out by banks or processors (particularly processing & adjustment), contribute the majority of transaction costs (see Exhibit 32). Clearing & settlement, undertaken by a payment network, represents a relatively small portion of total costs (7%-to-20%).

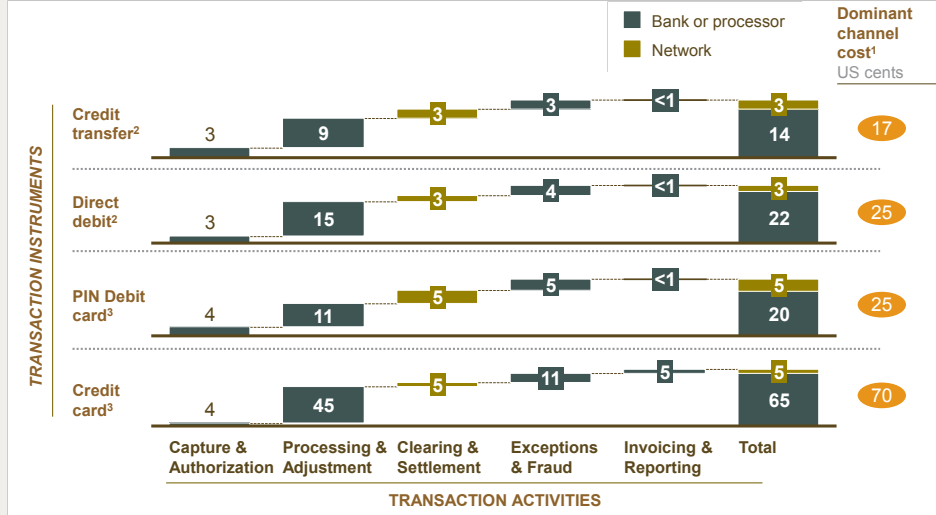
Cost breakdown by activity helps highlight where push transactions cost less than pull transactions. Their one-way information flow generally leads to fewer process steps and hand-offs, leading to relatively lower processing & adjustment costs. Furthermore, the payer initiation of payment in push transactions can reduce fraud, and tends to offer fewer options for recourse. Since the payer has direct control over push payments, there is less reason or demand to allow people to contest or reverse transactions, which drive substantial operating costs. Exhibit 33 shows a comparison of costs for a credit transfer (push) and direct debit (pull) transactions. The big cost differences among activities are in processing and exceptions.



EXHIBIT 32

**Banks and processors account for the largest share of transaction costs, across instruments and activities**

US cents



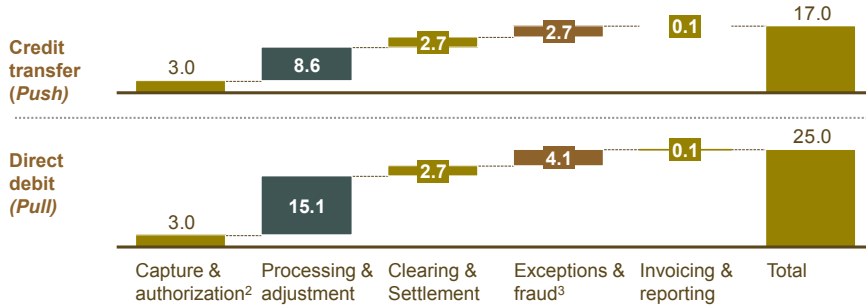
1 Avg. cost of dominant channel (electronic for CT & DD, POS for cards) by payment instrument in Western Europe. Card cost is adjusted to \$0.70 from the European average of \$1.00 at POS, to adjust for higher cost due to sub-scale credit card volumes in many European countries. This preserves the ratio of debit card cost to credit card cost that occurs in the US (36%), where both are at scale. Note that overall average cross-channel costs are 37¢ for CT, 25¢ for DD, 29¢ for PD & 132¢ for CC; 2 Estimates based on US breakout w/ adjustments: CT Clearing & Settlement equal to DD and Capture & Authorization capped at 3¢; 3 Estimates based on US breakouts, with exceptions & fraud adjusted for PIN based on European credit card benchmarking. SOURCE: McKinsey US Payments Map 2012 (2010 data), McKinsey US Payments Operations Benchmarking Studies, Federal Reserve, Expert analysis

EXHIBIT 33

**Processing and exceptions-related activities are less costly in push transactions than pull**

Cost per transaction via digital channel<sup>1</sup> (Western Europe)

US cents



One-way flow of information in push payments generally leads to fewer process steps and handoffs than in pull payments

Payer initiation of payment in push payments means

- Fewer recourse options generally offered, since payer has more control
- The financial information needed to initiate payment is not shared, reducing fraud potential

1 Estimates based on US cost breakout scaled up to European average w/ following adjustments: Clearing & settling for credit transfer assumed to be equal to direct debit; Capture & authorization capped at 3¢, remaining cost allocated to processing & adjustment; 2 For card payments, the two-way flow of information in pull payments raises capture & authorization costs (two-way-flow happens during authorization); 3 Efficient processes can substantially contain the differential in exceptions & fraud costs between push and pull payments. However, such processes require some sophistication to implement. SOURCE: McKinsey Global Payments Map 2012 (2010 data), Expert interviews

## Methods of lowering costs for a given transaction type

To achieve the lowest possible transaction costs, providers will need to optimize system design – promoting digital “push” payments, as we have discussed above. They will also need to grow enough to achieve sufficient scale, and significantly improve operational efficiency.

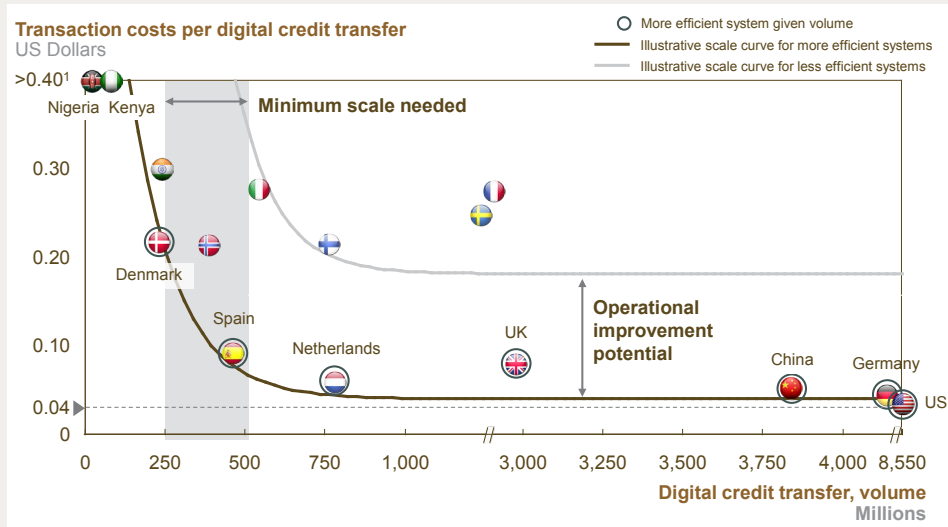
### Achieving sufficient scale

Systems need a minimum number of transactions to reach low transaction costs, though these scale benefits diminish at higher volumes. Transaction costs can decrease by as much as 50 percent when scale doubles, particularly at relatively low transaction volumes.

As an example, Exhibit 34 illustrates the role of scale in digital credit transfers. Comparing Denmark and Spain shows that doubling scale at low volumes can cut costs by more than 50 percent. Transaction volumes in Spain are roughly 2 times those in Denmark (458 million annually vs. 233 million) and costs are roughly half (\$0.10 per transaction vs. \$0.22). However, the Netherlands and Germany show how this effect lessens at higher transaction volumes. Volumes in Germany are more than four times higher than those in the Netherlands (4,143 million annually vs. 788 million) while costs are only 30 percent lower (\$0.04 vs. \$0.06). Based on the fit scale curve, a system requires 250 million-to-500 million credit transfer transactions to reap scale benefits. These systems hit the point of diminishing returns when volumes surpass about 1 billion annual transactions. Note this evaluation does not include mobile money account transfers since these are not credit transfers that are part of an “open-loop” system.

EXHIBIT 34

### Digital credit transfer example shows that both minimum scale and operational efficiency are essential to reach low costs



1 Kenya has 16 million annual credit transfers and Nigeria 37 million. Of these an approximate 50-60% are electronic, rather than branch initiated (based on electronic volumes of 55 in China and 60% in India)

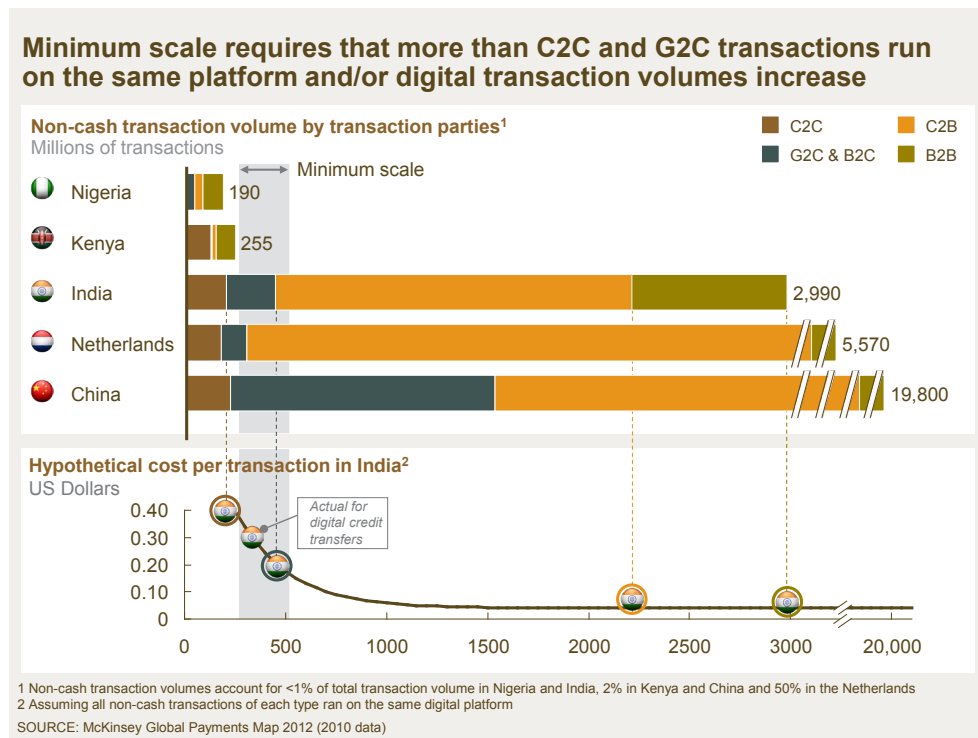
SOURCE: McKinsey Global Payments Map 2012 (2010 data); BIS

The minimum scale of 250-to-500 million annual transactions for credit transfers represents a substantial amount of payment activity. At current digital payment activity levels, most developing countries must aggregate flows and coordinate clearing and settlement to maximize transaction volume and reach scale. More than just consumer-to-consumer (C2C) and government-to-consumer (G2C) transactions must run on the same platform and/or digital transaction volumes must increase in order to reach minimum scale<sup>11</sup>.

Exhibit 35 shows that Kenya is at the low end of the minimum scale. However, its flows are fragmented (including a large portion of C2C transfers on M-PESA), so the overall system does not benefit from scale. BRICs and other large developing countries (e.g., Indonesia) should manage to meet scale requirements through C2C, G2C and B2C payments alone. Other smaller developing countries will not reach minimum scale unless people conduct a greater share of payments with non-cash instruments.

Regardless of size, countries can benefit from coordination in developing their basic network infrastructure. Countries must therefore enable a sufficient network platform to capture system benefits. This, or a functionally equivalent point-to-point clearing system, is critical for combining payments flows across types and payment sources. For small countries, these implications matter. Many of these markets can achieve sufficient volumes to realize a high-level of transaction efficiencies from scale. Moreover, working for regional payment systems offers the promise of additional savings but at the cost of increased complexity to build and manage.

EXHIBIT 35



11 Note that minimum scale requirement can differ by payment instrument. However, our analysis on other payment instruments (debit card, credit card and direct debit) indicates that the critical scale for each tends to fall between 250 and 1,000 Million transactions annually.

## Improving operational efficiency

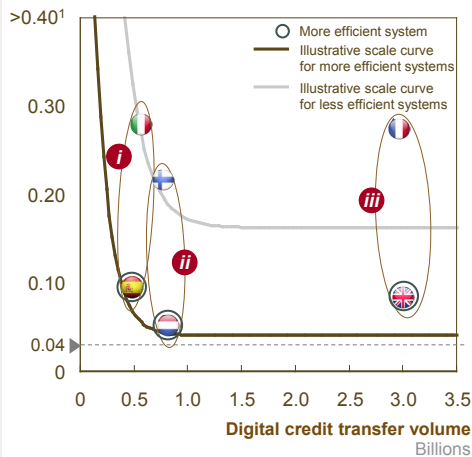
Improving operational efficiency can reduce transaction costs in systems of similar scale by 70 percent. In developing markets, we believe the efficiency gains can be even greater. Markets with similar scale still experience very different levels of efficiency (see Exhibit 36). This apparently stems from the degree of consolidation of clearing and settlement on a common platform, to the sophistication and efficiency of the process used for information exchange between banks. The most essential factors ensuring operational efficiency are automated bank processes, clear and efficient protocols and technical standards, a clear and stable rulebook determining how each instrument works, and efficient connection directly between all participants.

For example, costs of electronic credit transfers in the Netherlands are just 30% of those in Finland, despite nearly identical transaction volumes (788 million annually vs. 750 million). Payments in the Netherlands are based on a utility-model (where banks have come together to agree on standard clearing and settlement processes and low pricing),

EXHIBIT 36

### Digital credit transfer example shows how systems of similar scale can have different levels of efficiency

Transactional costs per digital credit transfer  
US Dollars



Examples of factors that may contribute to differing cost at similar scale<sup>1</sup>

- i Spain & Italy – 3x difference**  
**System fragmentation & standardization**  
Spain concentrates all small value payments, across all instruments, on one system (SNCE) with high message standardization; some Italian banks still frequently use bilateral clearing and messaging in favor of the central ACH, CI-Comp
- ii Netherlands & Finland – 3x difference**  
**Bi-lateral information exchange**  
The Netherlands has a utility-like system and mutualizes many processing activities along the value chain; Finland has not historically had an ACH, exchanging transactional info bilaterally between participants<sup>2</sup>
- iii UK & France – 3.5x difference**  
**Less sophisticated message formats**  
UK has a sophisticated and centralized processor (Vocalink); France mutualizes clearing and settlement only through its ACH (STET) and has less sophisticated and efficient message formats and standards & processes, due to focus on checks

<sup>1</sup> Differences in labor costs and rules will also be a factor in differences cost by country; <sup>2</sup> Finland recently moved to an ACH based system for clearing and settlement, leveraging SEPA migration for credit transfers to migrate to STEP2 ACH (a Pan-European ACH)

SOURCE: McKinsey Global Payments Map 2012 (2010 data); BIS

and all credit transfers between banks run through the same automated clearinghouse (ACH)<sup>12</sup>. By contrast, Finland has not had ACH system until recently, so banks had to exchange all transactional information bi-laterally, and clearing occurs through two separate systems. Bi-lateral exchange meant that Finland was not profiting fully from its scale and that banks were using inefficient processes. In 2010, the Finland ACH began operating at scale and likely will capture additional benefits from the resulting consolidation and process standardization.

Other technical factors, such as sub-optimal message formats and standards, can also

<sup>12</sup> An automated Clearing House (ACH) is an electronic network for financial transactions, processing large volumes of credit and debit transactions in batches.

hamper efficiency and raise costs. This is the case in France, which has similar electronic transaction volumes as the United Kingdom (2,914 million annually vs. 2,988 million) while the UK's per transaction costs are just 30 % of those in France. The UK has a sophisticated and centralized processor, Vocalink. In France, message formats, standards and processes are less sophisticated and less efficient, largely due to its historical focus on improving cheque efficiency at the expense of other instruments.

Operational efficiency improvements at banks or other payment providers will yield the largest cost reductions since clearing and settlement networks typically have relatively limited cost reduction potential (see Exhibit 33 above). Operational efficiency gains can include more automation in transaction processing, better exceptions handling, and higher fraud mitigation. Basic network infrastructure design choices are also critical for long-term success and efficiency because they affect bank operating processes.

System operators will need to evaluate the relative priority of striving for scale increases vs. first focusing on improving the efficiency of payment transactions (e.g., through electrification or process and operational improvements). Such efficiency gains before growing can enhance the cost-lowering effects of increased scale. However, improving efficiency can be a wasted effort if there is not strong evidence that volumes will grow.

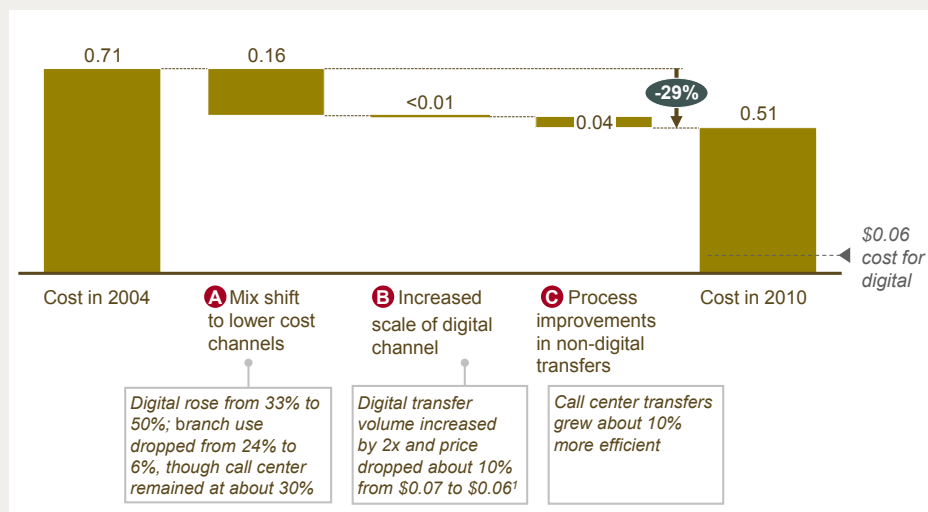


## The Netherlands gain efficiency

We can look to an efficient market such as the Netherlands for an example of how channel, scale, and operational efficiency can work together to lower transaction costs. In the example here, the Netherlands cut costs for credit transfers by 29 percent between 2004, and 2010. The shift to lower-cost channels was the most important method to achieve the cost decreases, as customers shifted away from the branch and toward digital channels. That shift was responsible for a 23% decrease in transaction costs, as the share of branch use dropped from 24% to 6%, and use of digital rose from 33% to 50%.

### In the Netherlands, the shift to more efficient channels was the most important action to decrease credit transfer costs

US Dollars per transaction



<sup>1</sup> Magnitude of the scale effect was limited since the Netherlands already had very large volumes and efficient processes for digital transactions in 2004  
 SOURCE: McKinsey Payments Map Release Q1-2012, McKinsey payments practice, RBR, ECB

Improved operational efficiency was the second largest method to reduce costs. A 10 percent improvement in call center efficiency was responsible for a 7 percent decrease in overall transaction costs. Finally, increased digital scale also made a small contribution. Digital transaction costs dropped by 10 percent as volumes increased roughly twofold. However, the absolute magnitude of this effect was less than one cent because the starting place was already at scale and relatively efficient.

## The range of transaction revenue models

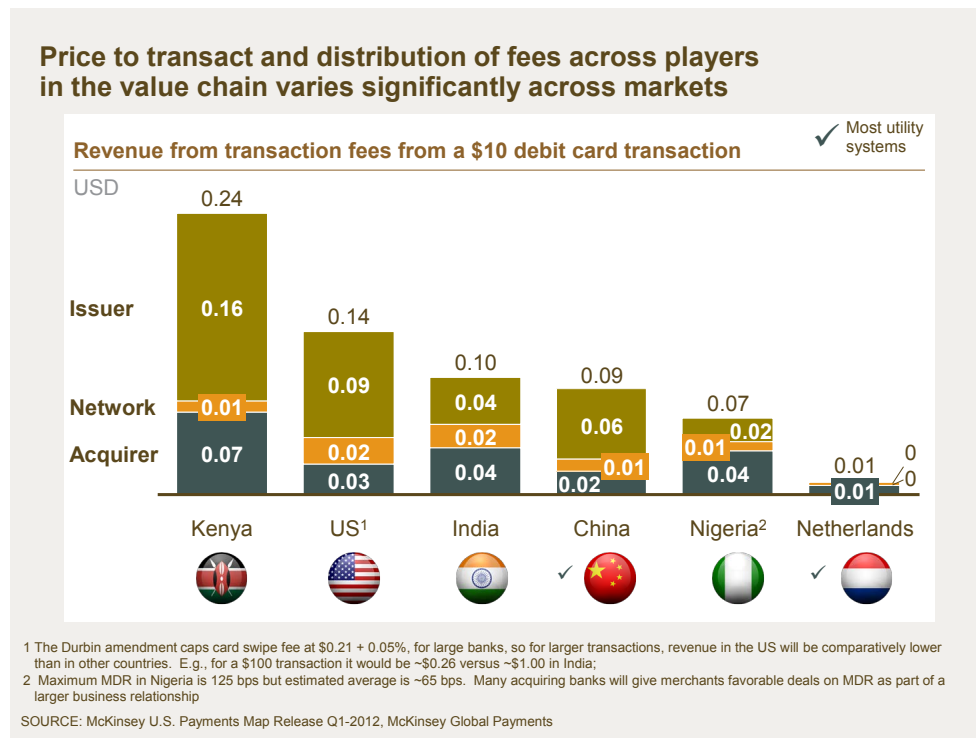
The price to transact must strike a balance – it must be low enough to allow consumers to adopt it, but high enough compared to provider costs for economic sustainability. We focus on the example of debit cards to illustrate how fees are established, how they vary across markets, and how value chain participants share revenues.

### Cost alone does not determine the price to transact

As discussed in Chapter 1, the price to transact depends on the structure and competitiveness of the market as well as on pricing for other services (e.g., account fees, and CICO services).

We look at an example: revenues generated by a \$10 debit card transaction across six countries – Kenya, US, India, China, Nigeria, and the Netherlands (Exhibit 37 has a comparison). Price differences are much larger than differences in transaction costs. In the Netherlands, a debit card transaction typically costs providers \$0.08 to complete. That is eight times more than the \$0.01 fee paid by users for a \$10 transaction. By contrast, in Kenya, debit card transactions cost providers \$0.23, less than the \$0.24 fee paid by users.

EXHIBIT 37



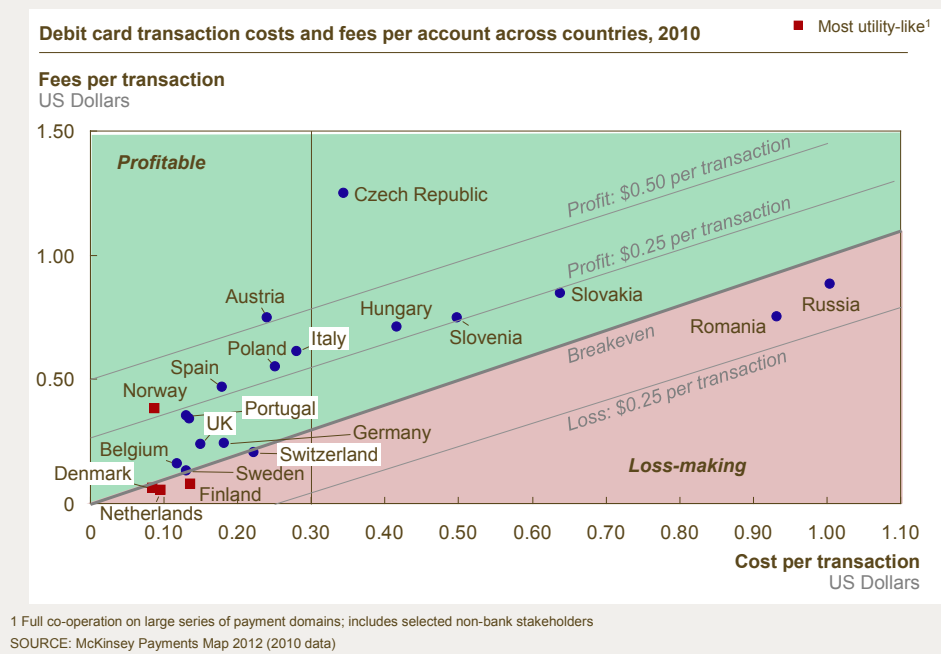
It is common for low value transactions to be loss-making, as they are in this example. Generally price to transact is a percentage of the transaction size, so that transaction fees are higher for larger transactions. For these larger transactions, margins will be positive in most markets. The balance between losses on smaller transactions and profits on larger ones determines overall system profitability on transactions<sup>13</sup>.

However, average profit across debit card transactions of all sizes also varies significantly

across countries, as Exhibit 38 demonstrates for countries in Europe. Providers in the Czech Republic make the most on a per-transaction basis, earning \$0.90 in profit per transaction. On the other hand, in Romania the system losses roughly \$0.20, on an average debit card transaction.

EXHIBIT 38

**Profit from debit card transactions varies significantly across countries**



**Models for pricing transactions**

Broadly, there are two types of models for setting transaction prices.

- Price-control models** charge prices directly linked to the cost-of-service, usually using cost-recovery, breakeven, or cost-plus pricing. These models are common when the government plays an active role in market coordination or when collective infrastructure exists. In such cases, stakeholders generally agree with the competition authority or with one another to link prices to cost in exchange for being able to collaborate. Example countries include the Netherlands and China. In the Netherlands – a utility-based model in which all payment stakeholders, including merchants co-operate – price is linked tightly to cost to transact by agreement among payments providers, merchants and the government competition authority. There the \$10 debit card transaction has a price of \$0.01. As Exhibit 38 illustrates, price-control models tend to make less, as a general rule. In most Nordic countries and the Netherlands, stakeholders collaborate over a wide-range of payments domains, including in those involving debit cards. Prices are also controlled, in-line with costs. The rule is not tight, however, and the system in Norway makes significantly more per transaction

13 Note that in both the Netherlands and Kenya a \$10 transaction loses money. In the Netherlands a transaction must be at least \$90 to be profitable for the system. In Kenya all transactions over \$40 are profitable.



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- than do systems in Denmark, Finland and the Netherlands.
  - **Market-led models** price based on market willingness to pay, generally following an ad valorem approach (i.e., charging a fee proportional to the value transacted). These models are typical in countries in which the government takes a laissez faire approach to market competition. Example countries include the United States and Kenya. In Kenya – a market-led model with limited competition – the price of a \$10 debit card transaction is \$0.24. Market-set fees designed to maximize profitability cause these high rates. As Exhibit 38 illustrates, profits in market-led models can vary significantly (in Europe, from \$0.90 per-transaction profit for debit cards in the Czech Republic to \$0.20 per-transaction loss in Romania). We have not undertaken to uncover the range of causes for this profit variation. However market-specific factors, such as number of competitors and level of vertical integration surely play a role.

We observe that countries range across a spectrum of price-control to market-led models. Many countries determine this posture based on general approaches to the marketplace and financial services (e.g., socialist or capitalist economies). Notably, markets as different as China and the Netherlands can both display strong price-control model characteristics. In addition, some countries change their posture over time through actions on pricing, control, and market entry (e.g., Canada, Australia).

Different transaction instruments have different features, however, and consumers, merchants, and larger businesses will consider not just the price when choosing which instruments to use. For example, in some cases, a merchant or business will prefer to pay the incremental cost of a pull payment. In the Netherlands, utility companies pay for customers to use direct debit to get certainty of regular bill payments. The fee to the company is \$0.05 for every \$100 bill. This is a small amount, and while the alternative instrument is free (having customers pay via a credit transfer), the free alternative might be less reliable. In the US, many merchants pay the fee to take credit and debit cards because of the sales lift they receive.

### **Distribution of revenues from fees across the value chain**

Players in the value chain perform the same general activities in each country, and the total revenue from fees to transact distributes across the value chain. In general, each of the providers holding the payer and payee accounts receive some payment as does the payment network that connects them. Debit cards again provide an example.

- **The merchant** starts off the process by paying a fee, known as the merchant discount rate (MDR) , at the moment when the customer makes the \$10 debit card transaction. The merchant pays this MDR to the acquirer (i.e., the merchant’s bank).
- **The acquirer.** In this example, the MDR the merchant pays the acquirer ranges from \$0.01 in the Netherlands to \$0.24 in Kenya . It is typically in proportion to the transaction value, sometimes with a cap or fixed component. The acquirer processes the transaction at the point-of-sale, routes it to the network branded on the debit card and, to conclude the transaction, credits the merchant’s account with the payment. The acquirer pays an “interchange fee” to the issuer (i.e., the customer’s bank).
- **The issuer.** This interchange fee is generally a percentage of the transaction value. This fee compensates the issuer for authenticating the customer and processing the

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customer's payment, as well as for the costs and related operational risks from owning the customer relationship. The fee also can serve as an incentive for issuers to get cards into customers' hands and drive more revenue from merchants and acquirers. In this example, the interchange fee ranges from zero in the Netherlands to \$0.16 in Kenya. Next, the acquirer and the issuer both pay fees to the network.

- **The network.** The network provides clearing and settlement services, acting as a switchboard between the acquirer and issuer. The structure and size of the fee received by the network can vary by country. In the countries we studied, this fee ranges from \$0.01 to \$0.02.

This flow of debit card revenue illustrates some characteristics of how money is distributed across the value chain for other payment instruments as well. In general, for a “pull” instrument, such as a debit card, the merchant (or payee) pays his bank (the acquirer in the debit card case). This merchant's bank then may compensate the payer's bank. Both banks pay a relatively small fee to the network.

However, for “push” instruments, such as credit transfers, the person paying generally pays the fee, which goes to his bank. Some fraction of this fee is often passed on to the payee bank.

## Implications for poor people in developing countries

Our analysis indicates that increased financial inclusion and access to digital transactions tend to go hand-in-hand. The most promising approach to setting prices to promote digital transactions among poor people will vary by country. Good choices for a given country will require a robust understanding of its payment system economics.

### The link between digital transactions and financial inclusion

Only countries with relatively widespread access to digital transactions, through either a bank or a mobile money provider, achieve high levels of financial inclusion. As Exhibit 39 shows, in every country in which more than 70% of the people can pay digitally, more than 85% have an account at a financial institution. On the other hand, in every country in which 35% or less of the population can pay digitally, fewer than 80% have an account at a financial institution (and in most such countries formal financial inclusion levels are well under 50%).

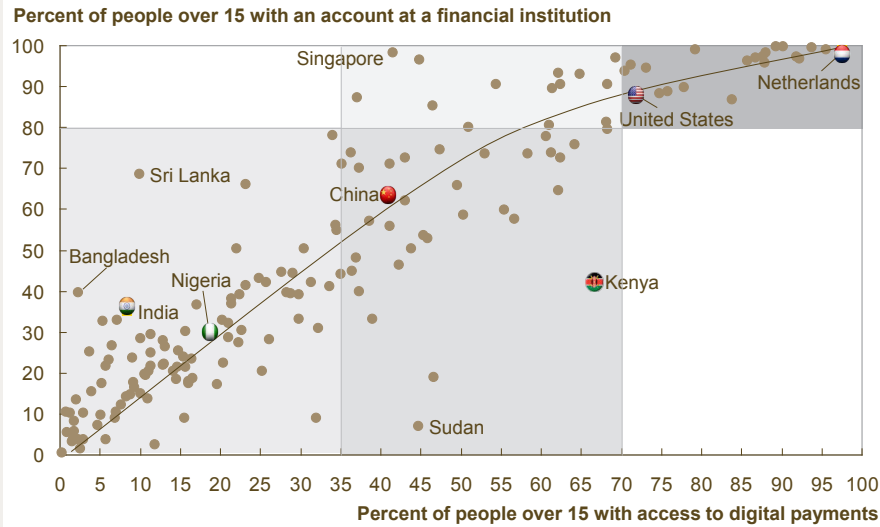
However, access to digital payments does not ensure high levels of financial inclusion. For example, in Sudan nearly 45% of the adult population reports using their mobile phone to send money, but formal financial inclusion is under 10%. Likewise in Kenya, formal financial inclusion has not kept pace with growth in access to digital payments (nearly 70% of adults can pay by mobile phone while formal financial inclusion is less than 50%).

### The role of market structures in promoting digital transactions among poor people

Governments and others working to increase financial inclusion will need to decide

EXHIBIT 39

**Increased financial inclusion and access to digital payments tend to go hand-in-hand, but with significant variation**



SOURCE: Global Findex, 2011 data

whether and when to adopt price-control models and when to promote market-led approaches. Each model has both potential benefits and downsides. The most promising approach will vary by country.

As discussed above, price-control models can ensure that price stays close to cost, so that consumers do not subsidize large provider profits. However, as the \$10 debit card example in Exhibit 37 illustrates, if prices are set too low, providers may avoid serving poor people. In serving wealthy consumers, banks make up for money lost on small transactions by earning profits both on larger transactions and through interest on relatively large balances in current accounts (these profits are typically \$100-to-\$200 per account in western European countries). Poor consumers, however, rarely transact in large amounts and generally maintain small balances. Providers will not want these people as customers if they cannot be profitable under mandated prices for transactions.

In market-led approaches, providers have the freedom to charge prices that poor people cannot afford, and may do so as their more profitable customers are willing to pay. However, competition can also push prices downward. Moreover, providers have incentive to innovate to uncover business models and pricing structures that will make even low income consumers profitable. While the resulting business models may charge poor people high prices and run the risk of taking advantage of the less savvy, they may also provide financial services to people who would otherwise remain without access.

In a given country, the most appropriate policy and regulatory structures for transaction prices will depend upon the full economics of the payments value chain. Wise choices will require a significant fact base and a robust understanding of not only direct effects, but also second and third order consequences of potential approaches. Country-specific answers to two questions will play a particularly central role.

- 1. What is the cost structure for providing transactions?** Stakeholders should seek to understand whether a potential price control will make it unprofitable for providers to serve poor consumers. If the price control will have this effect, providers likely will lack incentive to acquire new poor consumers or to promote system use among any existing poor customers.
- 2. What is the shape of the demand curves for transactions among both wealthy and poor consumers?** Broadly speaking, providers have a choice between charging higher fees and serving fewer, wealthier users, or charging lower fees and serving more users, including poor consumers. Relative profitability of these two choices depends on just how much both wealthy and poor consumers are willing to pay. Competition between providers complicates this dynamic somewhat. As a general rule, however, more competition will push prices down, but that depends on consumer demand.



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# V. Adjacencies: Generating revenues through relationships with users

## Chapter summary

Adjacencies are the final element in four-part ACTA model of payment system economics<sup>1</sup>. Beyond storing funds and transacting, providers of payment services make money in multiple other ways. The economics of these “adjacent revenues” are critical as they provide profit pools that can reduce consumer prices, or cover operating costs in other parts of the system. Moreover, they also create an important bridge to a diverse set of providers that may offer new products and services to customers.

What are adjacencies? Adjacencies are activities that support revenue-earning products and services linked to the payment system. There are three types of adjacencies: (i) those driven directly by payment activities, (ii) those linked to the broader set of financial services, and (iii) those linked to non-financial products and services. The profitability analysis of the ACTA framework in Chapter 1 of this report incorporates the first type of adjacencies, but does not size or incorporate revenues from the second two, since they are not directly connected to the payment system.

**The first type of adjacency involves accounts designed for payment transactions** (e.g., mobile money, current account, stored value account). Banks earn interest on money that users deposit in these accounts. This interest is a significant, low-cost source of adjacent revenue. In developed countries, current account balance revenues typically can range from about \$100-to-300 annually<sup>2</sup>.

**The second type of adjacency stems from a broader set of financial services** that link to, and are enabled by, the payment system. These services include long-term savings, insurance, lending, and brokerage accounts. Many of these services are possible only when tied to a functioning digital payment system, and they all yield adjacent revenues to providers. In addition, payment transaction data can yield tremendous operational insights for financial service providers, especially for alternative risk and credit models. This is an increasingly important source of adjacent revenues because much of this data has previously been unobtainable. Innovative players in China, Brazil, and elsewhere are capitalizing on these new insights.

**The third type of adjacency is particularly important. These are non-financial sources of revenue** (e.g., new customer acquisition, more effective advertising and marketing based on targeted data, or lower customer attrition for mobile operators). Reducing customer attrition, or “churn,” is vital for mobile operators’ business performance, since churn can be as high as 25%-to-30% per year. Looking across markets, lowering churn by 10 percentage points can deliver approximately \$1 in profit per customer annually. Safaricom, for example, generates an estimated \$3 profit per customer from churn reduction through its ownership of M-PESA. In addition, large and small retailers that provide payment services can benefit from increased store traffic and new customer acquisitions.

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<sup>1</sup> ACTA stands for: Accounts, Cash-in-cash-out, Transactions, and Adjacent opportunities for profit

<sup>2</sup> Assuming a 3% net interest spread, the pre-financial crisis average across Western Europe, this is the interest earned on an account balance of \$3,000-\$10,000.

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Walmart, for example, has expanded its Money Center in markets from Mexico to the U.S. to provide financial services to customers and reinforce its retail sales goals.

**Adjacencies will play a strategic role in shaping the value chain of services to low income consumers.** Adjacencies' impact on the economic sustainability of the system will have a major influence on which players will likely operate profitably in poor consumer segments. Reaching further into these segments can require adjacent revenues, and may require multiple sources for any given household to be sufficiently attractive to providers. In the short-run, adjacencies can provide revenue to validate the business case to serve the poor. In the long-run, they will likely help lower basic transaction pricing and accessibility. Profits from adjacencies can allow lower prices for other payment services as well, thereby expanding access for the poor. Bank providers in many markets, for example, offer accounts at no charge if overall customer balances are sufficiently profitable. In addition, adjacencies will create an important shift in the value chain to attract and harness diverse interests that can make money – not just traditional banks and mobile operators. Lastly, adjacencies will ultimately help the poor by broadening the services available to help them, if providers capitalize on the payments value chain correctly.

**For adjacencies, profit drivers are often less visible to the end-user.** Users are frequently unaware of full economics for providers. Increasing customer engagement and reducing churn, for instance, is critical for mobile phone operators, but not a direct concern for individual users. Bank spreads on loans are not well understood by most consumers, and yet they are vital to the system. Retailers often participate in financial services (e.g., by taking credit cards) to drive store traffic and additional customer spending.

**Our main findings on adjacencies highlight the pivotal role they play in enabling affordable payment services.** Just as important, adjacencies expand opportunities to a fuller suite of financial services and non-financial benefits. We believe that the world's most effective providers of services to low income users will take full advantage of adjacent revenue streams. In summary, our findings on adjacencies include:

- **A sustainable digital payments model will require both financial and non-financial adjacencies,** as stored balances and total spending are low in many cases. While usage-driven models are likely to succeed in the near-term, the greater a role that adjacencies can play over time, the more prices can shift down for low income users.
- **Direct payment system adjacencies can contribute up to \$5 in provider revenue annually for each customer with an average balance of \$100** by taking advantage of emerging markets' commonly higher interest rate spreads and assuming typical behavior. For many developing markets, adding an additional \$10 in average balances can often deliver an additional \$0.25-\$0.5 in interest revenue.
- **For non-financial adjacencies, there are six main strategies to capturing value from a digital payment system:** customer acquisition, cross-selling, new business enablement, improving collections, reducing customer attrition, and generating value from transaction data. Given consumer spending patterns across all categories, revenues from non-financial adjacencies can be 2-to-5 times larger than financial services revenues. This, in turn, has substantial implications for closing the access gap for the poor because it presents a large potential profit pool for providers.

- **‘Plugging-in’ new providers is important.** Many non-financial players that can capture value from a digital payment system are not naturally enabled to become payment system providers. As a result, payment systems should take regulatory and other steps to enable these players to plug-in and generate value.
- **Adjacencies will pose varying levels of execution and financial risk to the stakeholders seeking to capture value.** The design of the digital payment ecosystem must take these factors into account and ensure that value is sufficiently distributed to provide a sustainable system. If a single provider captures all of the value, others will simply exit the market.

**To offer our detailed analysis on the wide variety of adjacencies, we have divided this chapter into four parts:**

- Direct payment system adjacencies
- Financial services adjacencies
- Non-financial services adjacencies
- Implications for poor people in developing countries

## Direct payment system adjacencies

This type of adjacent revenue generally comes from the interest that providers earn from money users store in their accounts (i.e., consumer balances that can support loans). We include such payments adjacencies in the ACTA framework. Two main factors determine interest revenue.

- **Average balance held** – the average time-weighted account balance that, in aggregate, dictates how much is available for a bank to lend. The higher the balance, the more lending is possible, subject to regulatory restrictions.
- **Interest rate spread** – the difference between the current account deposit rate that banks pay customers and the reference rate at which banks can borrow from other banks determines the profitability of holding current accounts. The higher the spread, the higher the profits, for a given average balance.

### Average balance held

In developed systems, the average account balance is the largest contributor of adjacent revenue from interest on balances. Simply put, the larger the average balance, the greater the opportunity for a provider to earn float revenue. Across Europe, varied current account balance levels explain roughly 72% of the variability in profit from adjacencies (which range from \$6 per account in Slovakia to \$244 in Italy<sup>3</sup> (see Exhibit 40).

Their low account balances are a central reason that the poor are particularly difficult to serve profitably. Current accounts in Romania have an average balance of \$400, the lowest in Europe, and on average each generates roughly \$13 in yearly profit. In contrast, by some accounts the average annual balance of a poor person in India is only \$30. Assuming the same yield that accounts in Romania produce, this would generate adjacent profit

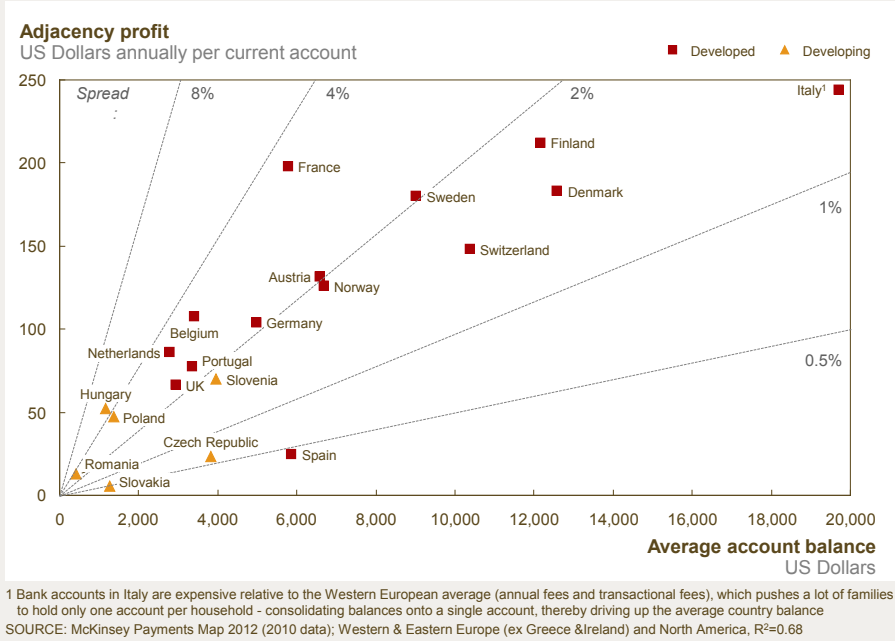
<sup>3</sup> As calculated via the Pearson product-moment correlation coefficient relating average account balance to average profit from adjacencies per account

of less than \$1. As Chapter 2 showed, accounts cost roughly \$5 annually to maintain in very low cost circumstances.

It should be noted that, to generate interest revenue, balances need to be maintained in the account over time. Flow through the account is not sufficient if it does not stay to generate interest. An example from India illustrates this dynamic. India introduced no-frills accounts to expand financial inclusion and subsequently began pilots to distribute government benefits via these accounts. Unfortunately, without quick and reliable access to CICO distribution points, most government benefit recipients would withdraw their funds from their account as soon as they were able to, making the effective average time-weighted balance of their account negligible. This obviously limits the potential to profit from the balance, thus making the accounts unsustainable.

**EXHIBIT 40**

**In Europe, average account balance explains 68% of the variability in profit from interest earned on current account balances**



In order for us to believe that a system could drive meaningful increases in revenue from this adjacency, providers would need to encourage significantly higher average balances stored in current accounts (e.g., channeling large payments such as salaries, enabling government cash transfers). Doing so would have two positive effects: improving the financial lives of the poor by allowing them to withstand financial emergencies, and expanding account profitability, which would enable the market to reach a wider set of people.

Comparing China and India provides a useful example of higher balances in expanding financial access. While there are numerous factors at play, we can see that higher average savings rates and balances have contributed to higher overall financial inclusion. In China, 64% of adults have access to a formal financial services account and 38% have saved money in the past year<sup>4</sup>. Reach in rural areas is high due to government-led investment, with 33% of rural consumers saving money. By contrast in India, just 35% of adults have



access to a formal financial services account and just 12% have saved money in the past year. Moreover, reach in rural areas is more limited in India than China, with only 12% of rural consumers saving money. In part, banks in China are able to move further down the income pyramid because they can generate balances that are high enough that they can profitably maintain accounts.

### Interest rate spread

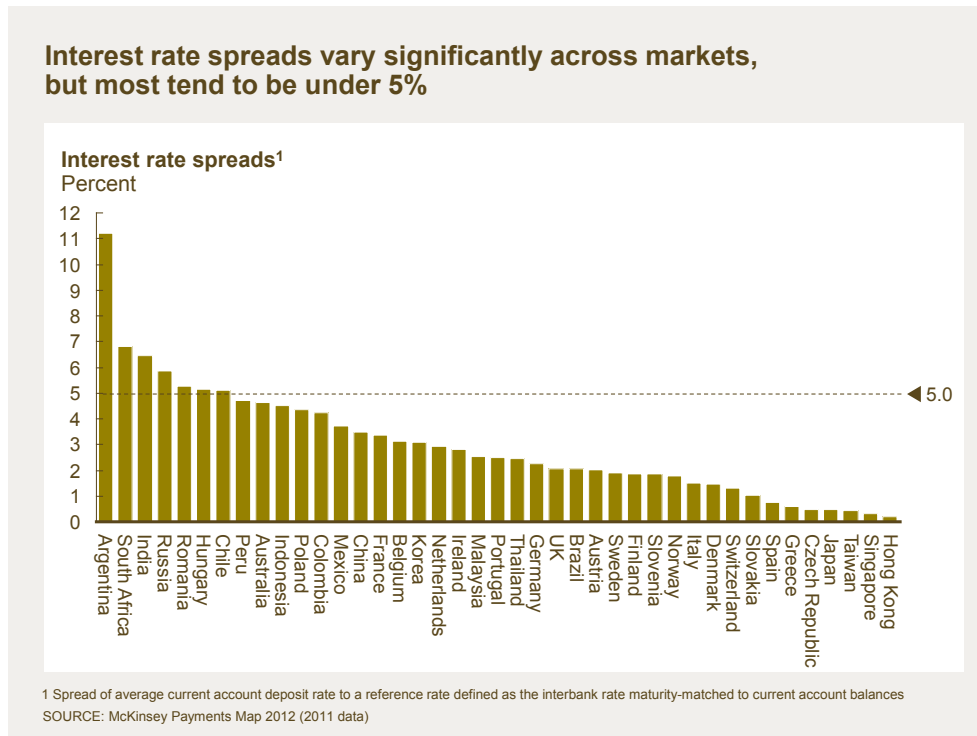
Interest rate spread is the second major driver of balance-linked adjacency revenue. Across the sample of European countries analyzed, we find that interest rate spreads explain 28% of the variability in profit from adjacencies per account<sup>5</sup>.

Unfortunately, macro-economic effects largely determine interest rate spreads and an individual payments provider can do little to affect them. In general both spreads and volatility are higher in emerging markets (and those that have the highest proportion of very poor people). Exhibit 41 shows spreads across a range of countries. While they vary significantly across markets, they tend to be under 5%.

Mobile phone operators often do not hold account balances directly (instead, relying on a partner bank) and therefore do not earn interest revenue directly. They do, however, often share revenues as part of the commercial arrangements.

### Potential to generate profit from direct payment system adjacencies

EXHIBIT 41



4 Source: World Bank – Global Findex

5 As calculated via the Pearson product-moment correlation coefficient relating interest rate spread to average profit from adjacencies per account

In the short-term, extending financial services for the poor is unlikely to be sustained on account balances alone, but these direct financial adjacencies can contribute important revenue when poor people are given incentives to maintain money in their transactional accounts. Exhibit 42 illustrates the profitability points for a bank, assuming \$5 in annual account maintenance costs. With a 5% spread and \$100 balance, the bank can cover its costs.

This may not seem like much money, but it may be enough to sustain a poor person’s account over time, if the bank can combine it with other actions to generate profits, such as cutting account maintenance costs below \$5 or designing low-cost payment instruments. Take for example, a low income user who saves 5% of her income for 3 years, keeping it hidden in her home. Had she kept a bank account, her average balance of \$110 would have earned a bank nearly \$6 in annual interest revenue<sup>6</sup>. That’s enough to cover over half the cost of an account that costs \$10 to maintain, the high-end of our estimate for the current account maintenance costs that banks in the developing world can feasibly attain in the near to mid-term.

EXHIBIT 42

**At a 5% interest rate spread, average account balance must be \$100 for providers to cover a \$5 annual account maintenance cost**

Profitability of interest on stored balances  
US Dollars

Average stored balance	Interest rate spread							
	1%	2%	3%	4%	5%	6%	7%	8%
\$150	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0
140	1.4	2.8	4.2	5.6	7.0	8.4	9.8	11.2
130	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4
120	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6
110	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8
100	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
90	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2
80	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4
70	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6
60	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8
50	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0

Legend:   
■ Interest > \$5 maintenance cost   
■ Interest < \$5 maintenance cost

## Financial services adjacencies

Financial services adjacencies are important for full financial inclusion. Digital payments not only provide important transaction services to low income consumers, they also create the opportunity for other financial services to be offered by reducing an institution’s marginal cost of accessing these customers. These financial services, in turn, generate adjacent revenues that can also provide incentives for sustainable services to the poor. While our analysis has created the economic case for a broader set of adjacencies as an integrated part of the value chain to reach the poor, this report did not size the explicit

6 Assuming 5% interest rate spread

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profit pool for these other adjacencies and they are not included in the ACTA framework profit summary from Chapter 1.

Digital payment systems can create adjacency revenue by facilitating the distribution of other financial products, such as long-term savings accounts, insurance and micro-credit. For instance, digital infrastructure can create the opportunity to embed poor people in a system of automatic savings deposits, regular bill payment reminders, and positive default options that can help them overcome psychological barriers to saving. Moreover, because digital transactions leave a “digital footprint,” payment system providers can use them to construct portable financial histories of poor customers, enabling the providers to develop customized credit and insurance services that match individuals’ unique financial needs and risk profiles. A digital payment system can provide cheaper and easier payments associated with other financial services. For example, insurers in South East Asia and Africa are experimenting with making crop insurance payouts via mobile phone, triggered by remote measurements of rainfall (e.g., kilimo salama).

Digital payments can also help in two vital aspects of financial services provisioning – the onboarding process and regular repayment services.

**Onboarding.** First, a significant challenge in offering financial services to the poor is the lack of a transaction history on which to base decisions for extending credit. When most transactions are cash-based, it becomes impossible to measure a potential customer’s credit worthiness based on cash flows, and therefore risky to extend credit. A digital payment system allows users to build a financial history that they can use later to prove their creditworthiness with a credit provider. Players like Alibaba, Experian, Cignifi, and others are improving credit scoring for low income segments.

**Payment.** Second, a digital payment system has significant benefits in facilitating the flow of money between user and provider. If it is too costly for banks and insurance companies to make (or accept) these payments, they will not offer the underlying financial service. A digital payment system reduces these costs significantly, turning expensive cash exchanges into a single electronic transaction that often happens automatically.

Notably, overdraft accounts are an example of an intermediate product that links a consumer’s account (e.g., current account, mobile money account) with a liquidity-enhancing line of credit. It is often free to get this overdraft facility but -- as it is essentially a special purpose consumer loan -- the bank must explicitly approve the account<sup>7</sup>. Consumers also pay to use it – generally as some combination of a fee for drawing money from the overdraft and interest charged on the overdrawn amount. Overdraft accounts are relevant for serving the poor because of their usefulness in managing day-to-day liquidity. As discussed, one challenge of being poor is the uncertainty and irregularity of income. The \$4 per day population does not actually receive \$4 per day; rather, their total yearly income averages out to that amount. Overdraft accounts could be useful in helping these people manage their day-to-day income challenges, provided that fees are transparent and reasonable. Including overdraft protection in the account opening process can reduce total operating costs by combining account activities.

Finally, thinking of a representative user, we can further understand why these financial adjacencies are important. If this user has never had a bank account or made a digital transaction, a bank would not lend to her (she would find it difficult to even fulfill the bank’s “know your customer” regulatory requirements). As a result, she would likely

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<sup>7</sup> For example, across Western and Eastern Europe, only UK banks have an annual charge to have an (unused) overdraft account.

occasionally have to borrow from the local money lender at an extremely high rate of 1% per day. Even if she opens a transactional account today, she would not be approved for a credit line, but over time she hopes to build enough of a financial history that she might. When she does, her occasional liquidity-balancing borrowing will generate additional revenues for her bank – at an interest rate much more affordable to her.

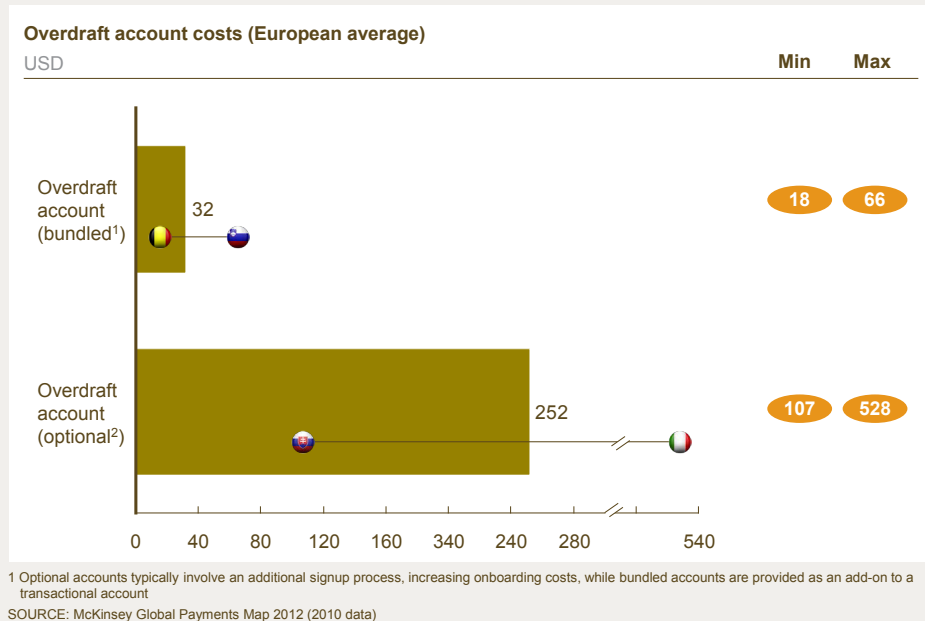


## Overdraft lines of credit: two varieties with different cost profiles

Overdraft lines linked to current accounts are common in many markets. They illustrate the importance of streamlining account-related activities and in integrating deposit and credit products for consumers. There are two basic models for establishing overdraft accounts, which lead to very different per account costs (see Exhibit). In the first, overdraft facilities are bundled with a transaction account – the account simply comes with a related line of credit. In the second, overdraft accounts are separately negotiated, as an optional product that consumers can apply for.

Costs for bundled overdraft accounts are both lower and less variable than their optional counterparts. Across Europe, the average cost for such accounts is \$32, with a minimum of \$18 and a maximum of \$66. There is no separate onboarding cost for these accounts since the onboarding process covers both the transactional account and overdraft simultaneously<sup>8</sup>. Maintenance costs vary with usage, which tends to be relatively low since people have not selected these as distinct products for which they have a specific need.

### Overdraft account costs are significantly reduced when they are 'bundled' with a transactional account

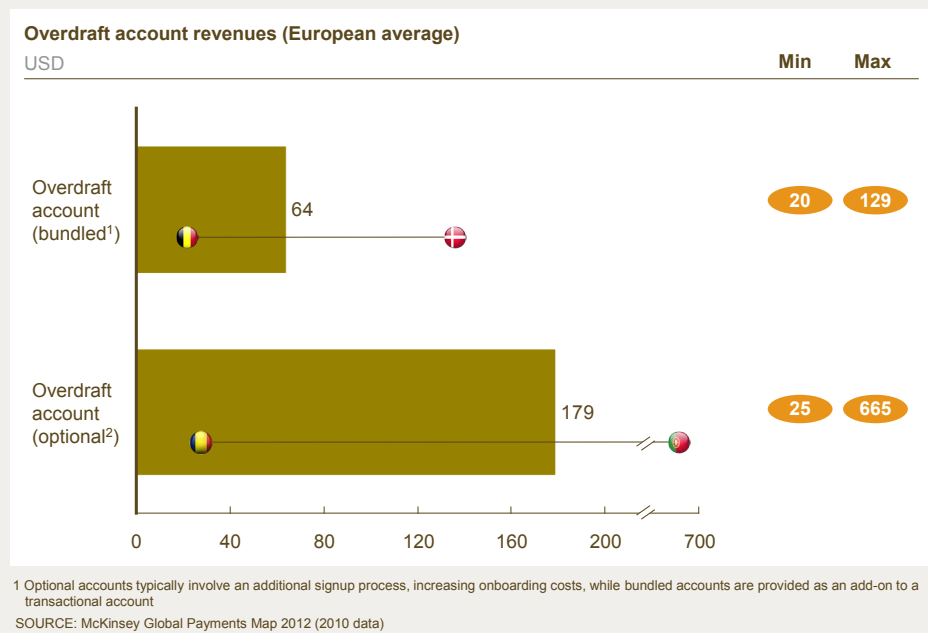


For separately negotiated optional accounts, current account holders must apply for an overdraft line in a separate process from getting a transactional account. Total costs for these accounts are markedly higher than transactional accounts in the same countries. Across Europe, the average cost is \$140, with a minimum of \$50 in Slovakia and maximum cost of \$330 in Italy.

<sup>8</sup> In such cases, onboarding costs for the overdraft account are so intertwined with those for the transactional account that they are difficult to disaggregate.

The high cost is driven both by (i) higher onboarding costs—as each new account requires a new onboarding process—and (ii) higher maintenance costs—as only customers who had a specific need apply for these accounts and they tend to use them heavily. The onboarding process for overdraft accounts also tends to shape their usage. Customers are more likely to use the facility in countries where they must explicitly sign up for it, with average outstanding balances of \$2,600. In contrast, customers in countries where overdraft accounts are bundled – where more people have the facility but fewer actively use it – have an overall average balance of \$1,000. These balances generate an average \$179 and \$64 respectively in revenue from interest, incident fees and account maintenance revenues (see Exhibit).

### Overdraft account revenues are higher when they are optional and customers must sign up explicitly



Predictably, average balance is the main driver of overdraft account revenue, explaining approximately 90% of revenue variability across countries. Banks face a trade-off here; overdraft account costs are markedly lower when bundled because many costs can be shared with those of a transactional account. However, bundling the account results in a much higher proportion of accounts that are either dormant or with little usage and likely unprofitable.

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## Non-financial service adjacencies

Non-financial adjacencies are any other profit pools that stakeholders capture indirectly through a digital payment system. This is a broad and diverse set of profit pools. Non-financial players such as telecommunications companies, Internet companies, and retailers are all well positioned to take advantage of these adjacent revenues, thereby widening the potential set of payment service providers.

Because of the large number of potential providers, and products and services they might provide, we did not attempt to estimate the size of this pool. Of course, the total value a provider might earn from a single poor person might be low, simply because that person has little money to spend (which we estimate as from \$300 to \$2,000 a year). Nonetheless, providers can capture important adjacent revenue across a large group of these consumers by plugging into a digital payment network.

There are six major strategies available for capturing these non-financial adjacencies:

- 1. Customer acquisition.** Companies may succeed in gaining new customers if they provide digital payment services that people seek. For example, Sprint entered into a partnership with Google to be the first U.S. mobile phone carrier to provide Google Wallet, a service allowing shoppers to make payments anywhere using their phone. Given interest in Google Wallet, Sprint reasonably expected the partnership would increase its sales of mobile phone services.
- 2. Cross-selling.** Companies can garner new revenue from becoming part of the payment system without increasing their fixed costs. For example, several years ago Diconsa, operator of 22,000 grocery stores in rural Mexico, began a program to deliver cash payments from government benefit programs to people in its stores. Since then it has seen customer visits and foot traffic increase by 20%. These visits have increased Diconsa store sales.
- 3. New business enablement.** Companies can facilitate additional businesses that require payments (e.g., content downloads, e-commerce). For example, Apple created iTunes accounts so that people could buy digital content and apps easily, and it introduced direct billing by mobile carriers to simplify purchase of content. In China, internet giant Tencent is integrating payments into WeChat, its widely used instant messaging platform. One of the major use cases is leveraging the social network to allow urban users to send funds to family members in poorer, rural areas. Tencent is likely aiming to monetize its messaging service, and in the process expand digital payment options for lower income segments.
- 4. Improve collections.** Providers can use the payment system to increase payment reliability and timeliness of provided services and products (e.g., utilities). For example, Manila Water introduced collective billing in poor communities to minimize collection risk and simplify account management.
- 5. Reducing customer attrition.** As already mentioned, providers can protect existing revenue streams by preventing attrition. Safaricom introduced M-PESA to lock in customers and reduce attrition (see sidebar below).
- 6. Generating value from transaction data & user information.** Providers can use additional customer and transaction data to increase other revenue streams (e.g., better marketing and targeting, better customer management). In the U.S., Google stands to generate significant value from transaction data; however, it does not have a natural way to 'plug in' to a payment ecosystem. Google Wallet is an effort to enter that ecosystem as an intermediary between merchants and financial institutions. Despite uneven market development, Google has clearly indicated the importance of this service to its overall strategy.

Non-financial adjacencies can be a powerful force that will positively guide payment systems. And yet, we recognize that the value created by all of the players in the value chain must provide sustainable returns. Access to payment transaction data, for example, has generated intense competition in developed markets among value chain players. Emerging payment ecosystems that aim to serve the poor will need to determine if there is a way to 'plug-in' these kinds of players, and ensure that value generated is distributed in such a way that the system is made sustainable.





## M-PESA and adjacencies

Adjacent revenue streams have played a critical role in M-PESA as it has pioneered mobile money services for low income consumers in Kenya, Tanzania and other markets. While the service and user base has grown rapidly in Kenya over the past several years, the business model and economics have also evolved. After failing to generate a profit for years, M-PESA is now believed to be profitable in Kenya. Adjacencies have played a major role in this business. In fact, as seen in Safaricom's Fiscal Year 2012 report<sup>9</sup>, M-PESA is now the second largest revenue stream for the company (16%), which is more than SMS (7%) and data (6%) combined. M-PESA generates direct revenues and profits from CICO and transaction fees paid by Safaricom mobile customers who use the M-PESA service. In addition, however, churn reduction for Safaricom from engaged M-PESA users provides a material benefit by stemming lost customers and unrecovered investments across its business.

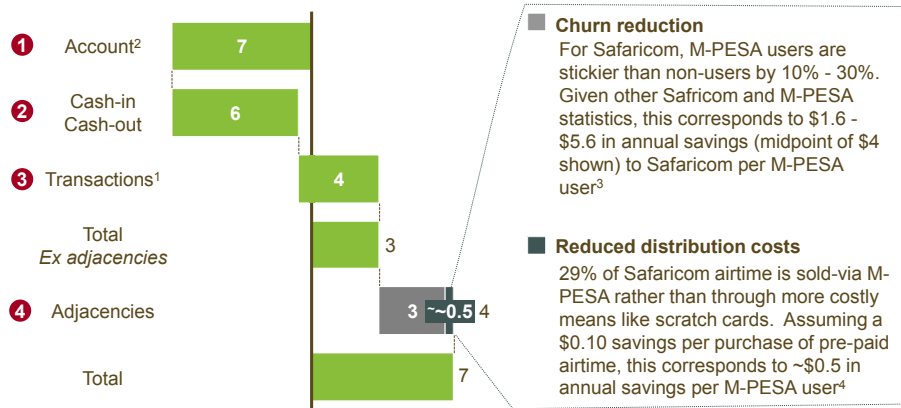
Overall, Safaricom realizes \$2-to-\$6 of profit per M-PESA user from adjacencies created by the service (see exhibit). To start, M-PESA users are more loyal customers by approximately 10%-to-30%, and that drives real profit to Safaricom's bottom line. Safaricom customers spend about \$51 per year on voice and data services.

Overall churn for Safaricom is approximately 28% per year, meaning that nearly one-third of its base is leaving or onboarding every year. That's expensive for a mobile provider. Within Safaricom's customer base, approximately 78% use the M-PESA service, generating higher engagement from a sizable portion of the base, and causing less churn and lower costs per year.

Next, Safaricom enjoys reduced distribution costs through the M-PESA service. Roughly 29% of Safaricom airtime is sold through M-PESA, rather than through other channels. Scratch-card based airtime purchases, for example, have real costs – card production, distribution, inventory management – that create operating costs for Safaricom. Making airtime purchases completely digital saves Safaricom roughly \$0.50 per M-PESA customer per year. In total, adjacent benefits may account for roughly half of M-PESA's profitability of Safaricom and are a vital component of its strategy.

### Churn reduction and reduced distribution costs can add ~\$2-6 of profit per customer for a mobile money provider

Illustrative decomposition of profit per customer including adjacencies, based on MPESA, 2012 USD



<sup>1</sup> Transactions include all transfers, including bill pay and salary payments; <sup>2</sup> Includes customer service and support center costs and estimate of back-office processing costs as well as licensing fees paid to Vodafone; <sup>3</sup> For 2012: \$51: annual other voice and data revenue per Safaricom subscriber. 28%: Overall Safaricom mobile subscriber churn. 78%: fraction of mobile subscribers also signed up as M-PESA users. Benefit per M-PESA user is given by the formula: (revenue per Safaricom subscriber) \* (Safaricom subscriber churn) \* (stickiness differential between M-PESA users and non-users) / (1 - fraction of mobile subscribers using M-PESA \* stickiness differential between M-PESA users and non-users); <sup>4</sup> Safaricom has 19M in monthly purchases of paid subscriptions and there are ~15M M-PESA subscribers

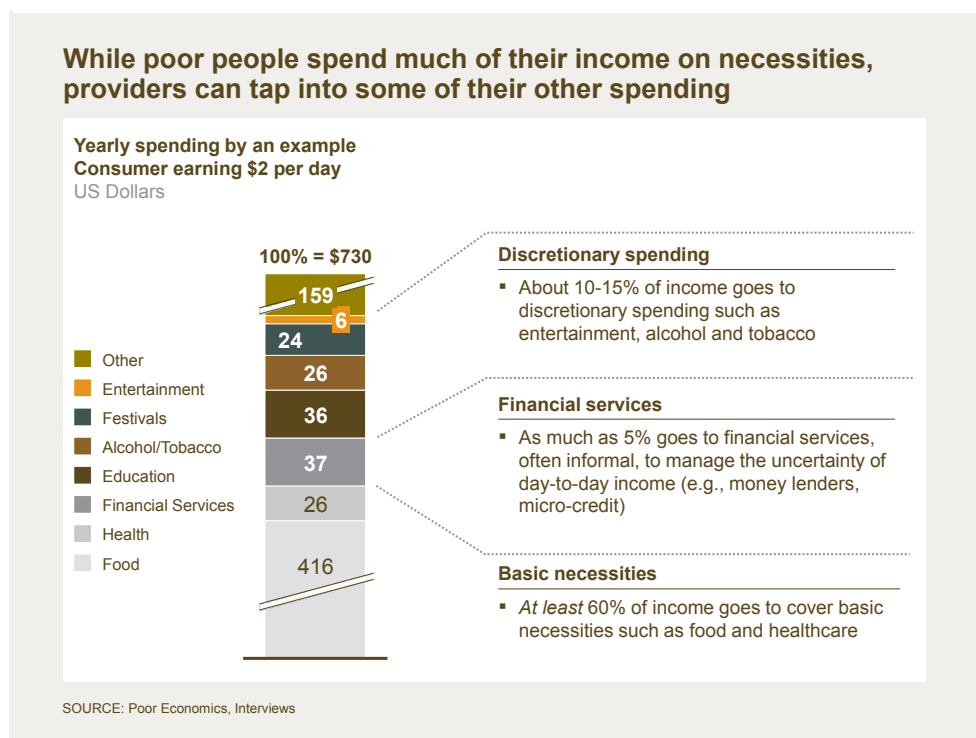
SOURCE: Central Bank of Kenya; Safaricom Annual reports; WDI; Oandal CCK; Expert interviews

9 [http://www.safaricom.co.ke/images/Downloads/Annual\\_Reports/fy\\_2012\\_annual\\_results\\_presentation.pdf](http://www.safaricom.co.ke/images/Downloads/Annual_Reports/fy_2012_annual_results_presentation.pdf)

## Implications for poor people in developing countries

The notion of adjacencies can seem abstract when applied to low income consumers. What really matters is their full lives as consumers as they earn income, purchase goods, and manage their financial lives. Companies that integrate digital payments into their offerings can support these consumer goals by offering new products and services – financial and otherwise – while earning themselves adjacent revenue streams. While it will always be true the poor people spend a disproportionate amount of their income on basic necessities, they also spend a portion on financial services and on discretionary items (see Exhibit 43)

EXHIBIT 43



If we assume that only a portion of annual spending by the poor is addressable, it still represents a significant potential revenue stream for providers who offer cost-effective financial and non-financial services. These providers don't need to ask consumers to spend more, but rather they can divert existing spending to support new, more cost-effective services – just as M-PESA, Google, Walmart, Apple, DiConsa and others are already doing.

In conclusion, we believe that adjacencies have a powerful, yet largely untapped role to play in creating financial inclusion. On the one hand, they hold the potential to lower user-facing costs as providers earn revenue through these services. Moreover, they make a case for new players to join and innovate in the system and play important roles in providing financial and other services to low income consumers.

On the other hand, these opportunities are difficult to capture and new players increase the burden of coordination in a system that is currently poorly equipped to manage these collaborative interactions. Overall, we believe that robust payment and financial services for the poor will require creative business models and multiple providers. As a result, adjacencies offer a broad set of opportunities for lowering costs and expanding access.



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# Conclusion

As we conclude this report, we return to our key belief that, for a payment system to successfully serve the poor, it needs to meet three criteria. First, it must have robust functionality. Users need reliable access to the system and trusted providers. A broad assortment of users must accept the system, and it must offer them a suite of payment services. Second, it must have low costs and low prices. Providers need sufficiently low costs and sufficiently high probability of attractive returns. Lower costs allow them to offer lower priced services. Higher returns attract them to begin serving the poor, and grow the system. Lastly, it must have effective coordination to ensure that providers achieve better outcomes, and that the system evolves successfully over time. Effective coordination will include both cooperation and competition among providers.

The evaluations we offer in this report have strengthened our conviction that there is a major opportunity to create significantly more sustainable payment systems, with greater incentives to meet the three criteria necessary to serve the poor. Our examination of payment system economics showed us three indicators that this opportunity is real and achievable across countries. First, in both developed and developing markets, providers have significant potential to reduce costs. Our research shows that the drivers of cost vary widely across systems, and that there are numerous approaches for reducing these costs throughout these systems. Lower costs will expand consumer reach. Second, no system has reached its full potential; all can improve economic performance. As a result, the potential to lower costs and broaden access is available to all markets. Finally, innovations are developing continuously across markets, expanding the potential for improvements to payment systems as new technology and business models emerge.

Together, these indicators show us that payment system providers have the ability to lower costs, expand margins, and broaden their services. If they can do these things and generate more value for themselves, they will coordinate more with each other, increase their investments, and focus on growth. Together, these improved economics can give much larger portions of the population a first step to financial inclusion and the financial service support they can use to better their lives.

As we look ahead, we encourage our readers to continue studying, analyzing, and working to expand financial services for the poor. As you do, we encourage you to contact us directly. To assist you in your study, analysis and work, we also offer a selection of important sources of additional information in the appendix to this report.

# Glossary

<b>Term</b>	<b>Definition</b>
<b>Acquirer</b>	Financial entity that captures a payment transaction on a payee's behalf (i.e., a payer's bank). Acquirer activity also often includes recruiting and managing merchants who accept the type of payment in question (e.g., card payments).
<b>Adjacencies</b>	Revenue-earning opportunities that are tied to the basic payment system but not explicitly core to any payment activity (includes payments adjacencies, financial adjacencies and non-financial adjacencies)
<b>Agent</b>	see Business Correspondent
<b>Anti-money laundering (AML)</b>	Legal controls that require financial institutions to prevent, track and report suspicious transactions as related to money laundering
<b>ATM, payment transaction channel</b>	A payment channel referring to payments initiated at an ATM; only applicable to credit transfers. Note that ATMs are also a significant channel for CICO.
<b>Authentication</b>	Confirming the identity of a customer; providers today use magnetic stripe cards, EMV cards, personal identification numbers (PINs), official identifications, signatures, biometric information or a combination of the above to do this
<b>Automated clearing house (ACH)</b>	An electronic, automated clearing house; see Clearing house
<b>Bank-led</b>	A payment system in which a bank owns the relationship with the customer; may rely on support of other players to deliver a full service (e.g., leverages a mobile network for connectivity)
<b>Bi-lateral clearing agreements</b>	Agreements between two banks under which payments (e.g., cheques, credit transfers, direct debits) from one bank are cleared and settled by the other without going through a central clearing house.
<b>Branch, channel</b>	A bank's main physical retail location, where customers can interact directly with bank employees to open an account, make transactions, withdraw and deposit cash, resolve inquiries and contract other financial services

<b>Business correspondent (BC)</b>	Individuals or firms designated by a provider to accept and distribute cash on their behalf, operating on a commission. Individual BCs either pick a base from which they provide service on a pre-set schedule, or they can be ‘roaming’, in which case they traverse a pre-determined route and schedule.
<b>Call center, channel</b>	A payment channel referring to payments initiated via a phone call (e.g., paying for a bill or purchase by dictating card information to a call center agent, who will enter it into a payment gateway)
<b>Capture &amp; authorization</b>	Activities related to collecting and approving payment information including validating payer’s identity at payment, capturing, transmitting & authorizing financial and transaction information
<b>Cash distribution center</b>	Centralized distribution centers for counting, cleaning, storing and redistributing cash
<b>Cash handling network</b>	Infrastructure and set of processes to manage the flow and transport of cash between a central bank, distribution outlets and others who handle cash (e.g., merchants)
<b>Cash recycling</b>	Using cash received from one customer to distribute cash to another
<b>Cash-in-transit</b>	The physical transport of cash between locations
<b>Cash-in/cash-out (CICO)</b>	Providing access points at which consumers can deposit and withdraw cash to and from their accounts
<b>Channel</b>	The interface through which a transaction or CICO is initiated; includes POS, digital, mail, call center, branch, ATM.
<b>Cheque</b>	A payment instrument initiated by the exchange and deposit of a cheque—a paper slip containing account and transaction information—which initiates a ‘pull’ transaction from the payer’s to the payee’s current account. Commonly used for salary payments, consumer-to-consumer payments and bill payments
<b>Clearing &amp; Settlement</b>	Activities related to adjusting account balances resulting from a payment transaction, including authorizing payment across counterparties and transferring funds between payer’s & payee’s financial institutions

<b>Clearing house</b>	A financial institution that provides clearing and settlement services for transactions across distinct banks
<b>Cost of funds</b>	The opportunity cost, in potential lost interest, of funds not actively invested (e.g, when distributed across CICO networks)
<b>Credit card</b>	A payment instrument initiated by a card linked to a credit account, where the capture of card and transaction information initiates a ‘pull’ transaction from the payer’s credit account to the payee’s account. The user pays the balance on the credit account on a regular basis, most often through a different payment instrument (e.g., direct debit). Commonly used for POS consumer purchases
<b>Credit transfer</b>	A payment instrument where a payer ‘pushes’ a transaction to a payee by entering the payee’s account information (usually two numbers, one identifying the bank and another identifying the account) and transaction information. Commonly used for salary payments and consumer-to-consumer payments
<b>Current account</b>	An account that allows users to store money, make payments, receive payments and, in some cases, earn interest on stored balances
<b>Customer activation</b>	see Onboarding
<b>Debit card</b>	A payment instrument initiated by a card linked to a current account, where the capture of card and transaction information initiates a ‘pull’ transaction from the payer’s account to the payee’s account. Commonly used for POS consumer purchases
<b>Digital payment platform</b>	An electronic transaction platform which facilitates the transfer of electronic money between accounts
<b>Digital, channel</b>	A payment channel referring to transactions initiated digitally; includes transactions initiated by mobile phone, online (e.g., online shopping) and batch transactions initiated through a file upload (e.g., some salary payments).
<b>Direct debit</b>	A payment instrument where a payer pre-authorizes access to his or her account and the payee ‘pulls’ the transaction from the payer’s account. Direct debits are a relatively sophisticated instrument often used for repeating bill payments, requiring strict control, and not commonly used in emerging markets

<b>Financial adjacencies</b>	Revenue captured from offering financial services linked to a current account (e.g., credit card, life insurance, overdraft line)
<b>Interchange (fee)</b>	A fee paid between banks and payment processors for accepting digital payments from other bank's customers
<b>Internal transfers</b>	Digital transactions made between two accounts within a single financial institution
<b>Issuer</b>	Financial entity which issues a payment instrument (i.e., the payer's bank)
<b>Know-your-customer (KYC)</b>	Diligence activities a financial services company must legally perform in order to confirm the identity of customers it does business with
<b>Mail, channel</b>	A payment channel referring to payments initiated via a postal system (e.g., mailing a cheque, writing card information on a form that is mailed in)
<b>Merchant discount rate (MDR)</b>	Fee paid by a merchant to payment system provider(s) for use of a payment service
<b>Mobile money</b>	A financial account that can be accessed and used for making and receiving transactions from a mobile phone
<b>Non-financial adjacencies</b>	Indirect profit pools that a stakeholder may be able to capture through a digital payment system. These include reducing churn on another product/service, cross-selling and capturing value from the transaction information collected, among other
<b>Overdraft account</b>	An credit line tethered to a current account; when an item presented to the transactional account (a withdrawal or outgoing transaction) would take its balance below zero, funds transferred from the overdraft account cover the gap
<b>Payment system</b>	A system consisting of instruments, banking procedures, and, typically, interbank funds transfer systems that ensure the circulation of money.
<b>Point-of-sale (POS)</b>	The location where a retail transaction is completed and payment is made



<b>Point-of-sale (POS) terminal</b>	An electronic device that reads a payee’s payment information (e.g., debit card) and transmits the transaction and payment information to a payments provider over a network. POS terminals are most commonly at a merchant’s checkout counter, but can be mobile as well.
<b>POS, channel</b>	A payment channel referring to payments initiated at a merchant POS (e.g., paying with a debit card at a card terminal)
<b>Processing</b>	A series of actions performed to complete payment transactions, typically involving high volumes of payment request for authorization, clearing, settlement, and reporting.
<b>Processing &amp; adjustment</b>	Activities related to fulfilling a requested transaction including communicating between parties, processing transaction information, data control & error identification and debiting/crediting payer/ payee accounts
<b>Processing platform</b>	A provider of payment services that connects multiple stakeholders, to complete payment processing. For example, the merchant acquirers provide platforms to connect merchants and payment networks, to facilitate transactions.
<b>Processor</b>	Processes the transaction at the point-of-sale and routes it to the appropriate network and/or financial institution
<b>Pull payments</b>	Payment in which the transaction is initiated by the payee, ‘pulling’ a payment from the payer with prior approval
<b>Push payments</b>	Payment in which the transaction is initiated by the payer, ‘pushing’ a payment to the payee
<b>Short message service (SMS)</b>	A text messaging service component of phone, Web, or mobile communications systems, using standardized communications protocols that allow the exchange of short text messages between fixed line or mobile phone devices.
<b>Statementing</b>	see Invoicing
<b>Transactional accounts</b>	See Current Account

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# Financial Services for the Poor

## Reading List

### Key reads

#### Non-technical books illustrating the need by poor people for financial services

*Portfolios of the Poor*, Collins, Morduch, Rutherford, and Ruthven (2009). Based on the financial diaries project data, this book describes and quantifies the financial lives of poor families in South Africa, India, and Bangladesh.

*The Poor and Their Money*, Rutherford (2001). This is an essay, written by Stuart Rutherford, and based on his long experience working with the poor. It is a foundational piece describing different reasons poor people need financial services, and how they get by using informal arrangements.

#### A selection from the impact literature

William Jack and Tavneet Suri (2011). This is a paper published by the National Bureau of Economic Research, with key data on the diffusion and usage patterns of M-PESA in Kenya. It is based on a study funded by FSP through our grantee the Consortium on Financial Systems and Poverty (at the University of Chicago). The paper contains a preliminary version of the impact results that Jack and Suri have found using this data. They plan to release a more formal working paper soon.

*A Penny Saved: How Do Savings Accounts Help the Poor?*, Kendall (2010). This paper reviews the experimental evidence (from both randomized controlled trials and natural experiments) regarding the impact of improved access to savings. It finds a limited but growing body of research that supports the claim that savings accounts improve welfare.

#### Academic pieces that explore finance for the poor

*How Gambians Save*, Shipton (1990). This is a good explication of the different ways in which poor people save through the informal mechanism available to them.

*Saving in Developing Countries*, Deaton (1989), a discussion and model of factors that make poor people's financial needs differ from those of rich people (and thus why our intuition might fail us in thinking about the poor).

*Income and Consumption Smoothing*, Morduch (1995). In this piece, Jonathan Morduch argues that because people lack financial tools to smooth consumption, they then make choices that smooth their income, which can reduce their productivity.

*Income Risk and Coping*, Dercon (2002). This looks at various indigenous methods for smoothing consumption in the face of emergencies, disasters, etc. without using formal finance.

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## Explorations of specific topics

### Access to finance

*Household Financial Behavior*, Oliver Wyman (2008) consultant report with lots of relevant data.

*Household Saving in Developing Countries*, Morduch (2008). Written at FSP's request, this framing note provides a list of academic and non-academic papers on the demand for, and impact of, savings mechanisms in developing countries.

*Financial Access 2009 and 2010*. CGAP provide data and mapping of the high-level financial inclusion picture around the world.

*Access to Finance: Chapter 2, Handbook of Development Economics*, Karlan Morduch (2009). An academic review of recent innovations that are improving the quantity and quality of financial access.

*A Digital Pathway to Financial Inclusion*, Dan Radcliffe and Rodger Voorhies.

*Savings as Forward Payments*, Colin Mayer and Ignacio Mas.

### Branchless banking

*Early Successes in Branchless Banking*, CGAP (2008). An early piece that explores the potential of branchless banking to reach the poor.

*Banking Through Everyday Stores*, Mireya Almazan and Ignacio Mas (2011). This paper in *Innovations Journal* reviews the opportunities and strategic choices facing banks considering branchless banking options.

*Transactional Models to Bank the Poor*, Mireya Almazan and Ignacio Mas (2010). This paper from *The American Banker* discusses why banking the poor is about a fee for transaction-based business model, rather than making money on the float.

### Mobile money key reads

*Emerging Platform*, Kendall, Machoka, Maurer, and Veniard (2011). A recent investigation of the new financial services that are launching over the mobile money platform in Kenya.

*Bridges to Cash: The Retail End of M-PESA*, Frederik Eijkman, Jake Kendall, and Ignacio Mas (2010). This article in *The Economist*, and the paper it references, go into detail to describe the challenges inherent in liquidity management for a mobile money deployment.

*Mobile Money: The Economics of M-PESA*, William Jack and Tavneet Suri (2011). This NBER working paper explores the economics of M-PESA from the perspective of both users and agents, based on extensive survey data

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*How M-PESA Works*, CGAP Video. An easy-to-understand video - This CGAP video explains in 3½ minutes how M-PESA reached 13 million Kenyans in just 3 years.

*Building a Network of Mobile Money Agents*, Neil Davidson and Paul Leishman (GSMA) (2010). This article explores issues operators face as they build an agent network. It discusses what agents do, how big an agent network should be, how agents are recruited, and other important questions

*Managing a Mobile Money Network*, Neil Davidson and Paul Leishman (GSMA) (2010). This article explores how to manage and motivate an agent network, answering questions such as ‘How do operators ensure agents are liquid?’ and demonstrating options for selling electronic value to the channel.

## **Regulation**

*Non-Bank E-Money Issuers: Regulatory Approaches to Protecting Customer Funds*, Michael Tarazi and Paul Breloff (CGAP) (2010). The success of Kenya’s M-PESA has raised the question of how most effectively to regulate nonbanks—most notably mobile network operators (MNOs)—who contract directly with customers to issue electronic value against receipt of equal funds (“e-money”).

*Regulating New Banking Models that Can Bring Financial Services to All*, Claire Alexandre, Ignacio Mas, and Dan Radcliffe (2010). This work highlights five areas where sharpened regulatory analysis could help strike a better balance between maximizing the opportunities of these models and containing risks

*On Harnessing the Potential of Financial Inclusion, Bank for International Settlements (BIS) Working Paper*, Peter Dittus and Michael Klein (2011). The paper describes one commercially viable initiative in more detail, M-PESA in Kenya, and analyses in detail the transactions involved

*Financial Inclusion and Law Enforcement: United by a Common Enemy*, Claire Alexandre and Ignacio Mas (2011). Discusses the conflict between the goals of financial inclusion and those of law enforcement.

*Enabling mobile money transfer: The Central Bank of Kenya’s treatment of M-PESA*, Alliance for Financial Inclusion (2010). This case study examines the process that the Central Bank of Kenya (CBK) used to assess risk of the mobile banking service, M-PESA.

## **Additional information, and blogs**

*Financial Services for the Poor Strategy*, Gates Foundation. Financial Services for the Poor program aims to play a catalytic role in broadening the reach of digital payment systems, particularly in poor and rural areas, and expanding the range of services available on these platforms.

<http://www.gatesfoundation.org/What-We-Do/Global-Development/Financial-Services-for-the-Poor>

*FSP external site and Global Savings Forum page*. Global Savings forum is part of the Financial Services for the Poor initiative of The Bill & Melinda Gates Foundation.

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*Findex Global Database* This is a project funded by the Bill & Melinda Gates Foundation to measure how people in 148 countries - including the poor, women, and rural residents - save, borrow, make payments and manage risk.

<http://econ.worldbank.org/wbsite/external/extdec/extresearch/extprograms/extfinres/extglobalfin/o,,contentmdk:23147627~pagepk:64168176~pipk:64168140~thesitepk:8519639,00.html>

*Global Savings Forum – Session Briefs* - These are briefs from the GSF, written by FSP staff, which express some of our core insights and ideas.

*Mobile Money for the Unbanked.* This blog was created by GSMA in 2008 to accelerate the availability of mobile money services to the unbanked and those living on less than US\$2 per day. It works with mobile operators and the financial services industry to deliver affordable, safe, and convenient financial services to millions of previously unbanked customers.

<http://www.gsma.com/mobilefordevelopment/programmes/mobile-money-for-the-unbanked/mmu-blog>

*The CGAP Technology Blog.* CGAP develops innovative solutions for financial inclusion through practical research and active engagement with financial service providers, policy makers, and funders. This blog has many pieces on branchless banking and mobile money.

<http://www.cgap.org/blog>

*The NextBillion Blog.* NextBillion.net is a Web site and blog bringing together the community of business leaders, social entrepreneurs, NGOs, policy makers and academics who want to explore the connection between development and enterprise.

<http://www.nextbillion.net/blogfeed.aspx>

*Mobile Money Deployment Tracker.* This site monitors the number of live and planned mobile money services for the unbanked.

<http://www.gsma.com/mobilefordevelopment/programmes/mobile-money-for-the-unbanked/tracker>

*Safaricom: M-PESA statistics and presentations.*

<http://www.safaricom.co.ke/personal/m-pesa/m-pesa-resource-centre>

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# Sources

## Databases

CIA World Fact Book

Findex Global Database

International Telecommunication Union - World Telecommunication/ICT Development database

Kenya Statistical Bureau

McKinsey Global Payments Map, 2012 edition

MixMarket

Nigeria National Bureau of Statistics

Reserve Bank of India

The Economist Intelligence Unit : CountryData - Annual Time Series and Market Indicators

World Bank (World Development Indicators database, Data Bank)

## Print & Online

Alternate Channel Benchmarking Survey 2008

Assosiazione Bancaria Italiana

AtoS Worldline Indian Payment Card Industry Survey 2011

Banco d'España

Bank of International Settlements - Committee on Payments & Settlement Services  
“Red Book”

Bankable Frontier Associates - “Research on the scope of cash versus non-cash payment methods in Kenya”

Bridges to Cash: The Retail End of M-PESA

Central Bank of Kenya

Central Bank of Nigeria (annual reports, The journey so far and the road ahead, website)

CGAP (blog, China Papers on Inclusiveness No. 7 & No. 3, Advancing Financial Inclusion to Improve the Lives of the Poor, and various others)

China Household Finance Survey

China Union Pay

European Central Bank

EFinA (Scoping Study on Payment Systems in Nigeria, Access to Financial Services in Nigeria 2010, among others)

European Financial Inclusion Network

Federal Reserve

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Finalta  
Financial Services 360  
Gartner  
Grameen  
Hindu Business Line  
IMF  
International Telecommunication Union - World Telecommunication/ICT Indicators Report  
Kenyan Bankers Association  
Lafferty World Cards Nigeria 2009  
McKinsey ACH, Cheque, WIRE benchmarks  
McKinsey European Banking IT Benchmark  
McKinsey European Banking Operations Benchmark Survey  
McKinsey Retail Cost per Product Benchmark, 2012  
McKinsey U.S. Payments Operations Benchmarking Studies  
National Payments Corporation of India  
New Cash Policy (Cashless Lagos Stakeholder Implementation Session Oct 2011, Stakeholder Engagement Presentation Oct 2011)  
Nigeria Inter-Bank Settlement System Plc  
Nigeria National Bureau of Statistics  
Norges Bank  
Payment Systems: From the Salt Mines to the Board Room (2008), Rambure & Nacamuli  
People's Bank of China  
PoorEconomics.com  
Population Reference Bureau (Kenya)  
RAND Corporation – “Banking System Reform in China”  
Reserve Bank of India (Payments System Vision Document – 2012-15, website)  
Retail Banking Research (RBR)  
Safaricom Annual Report  
SWIFT (Mobile payments: Three winning strategies for banks – May 2012)  
The Little Data Book on Financial Inclusion 2012  
Unique Identification Authority of India  
WDI  
World Bank (World Development Indicators report and others)  
WMM: Global Insights  
Yankee Group

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## **Other**

Bank and company websites

## **Interviews**

Business people, regulators, policy makers, industry analysts and experts, academics

- 8 EAB Members
- 20 in China
- 20 in India
- 30 in Kenya
- 5 in the Netherlands
- 21 in Nigeria
- 8 in the United States
- 24 Additional experts on payment systems across the world



# Authors



**Rodger Voorhies**, is Director of the Financial Services for the Poor (FSP) initiative, within the Global Development Program at the Bill & Melinda Gates Foundation. Rodger leads the foundation's effort to make high quality financial services widely accessible to poor people throughout the developing world. The FSP team works with a wide range of public and private sector partners to foster the development of digital payment systems—such as mobile money—that can reach hundreds of millions of people with the financial tools they need to mitigate risks and capture opportunities to move out of poverty. Rodger lived for nearly 20 years in emerging markets. He worked extensively in Africa and

Eastern Europe to establish and grow successful and sustainable microfinance organizations with client-driven organizational cultures that delivered innovative financial services to poor households and communities. He served most recently as the CEO of Opportunity Bank of Serbia where he managed the bank through a successful turnaround, using data to reach small holder farmers. He also founded Opportunity Bank of Malawi, the first commercial microfinance bank in Malawi and grew it to become one of the largest providers of financial services in the country using alternative delivery channels (e.g., biometric smart cards, mobile banking). Today, nearly one out of every five Malawi families has a relationship with the bank. Rodger was a post-graduate student in Organizational Behavior and Sociology at Northwestern University. He holds a Master's degree in Management from Kellogg School of Management, and a Bachelor of Science degree in Business Administration from Biola University.



**Jason Lamb** is the Deputy Director, Global Partner Engagement in the Financial Services for the Poor initiative at the Bill & Melinda Gates Foundation. Prior to joining the foundation in November 2009, Jason spent 6 years at Washington Mutual Bank where he managed the consumer chequing portfolio, product strategy, and team. In addition, he spent time managing the operational risk strategy for the retail bank, and as an organizational consultant to the Executive Committee, and their teams. Jason gained experience in the financial institutions sector during 7 years at McKinsey & Company, where he advised banks in Central and Eastern Europe, Africa and North America. He was a founding member of the McKinsey Budapest office. Jason holds a BA in Economics and

History from the University of California, Davis, and an MBA from the Ross School of Business at the University of Michigan.



**Megan Oxman** is a Program Officer of Innovative Finance in the Financial Services for the Poor (FSP) initiative at the Bill & Melinda Gates Foundation. Megan manages private sector relationships and helps structure investments in for-profit institutions. She also helps identify and create innovative financing tools to leverage the resources of the foundation and its strategic partners more effectively.

Prior to joining the foundation in 2009, Megan worked as a financial associate in the capital markets group of Schnitzer West, a real estate developer in Seattle. She also was an analyst at Cedarview Capital, a hedge fund, and at Ivy Asset Management, a hedge fund of funds, both in New York City. She holds a BA in Economics and in International Relations from the University of Pennsylvania. Megan also holds an MBA from the Wharton School and an MA in International Studies (focusing on Latin America and Spanish) from the University of Pennsylvania.



