



Digital financial services measurement framework

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Established and driven by



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About insight2impact

insight2impact is a resource centre that aims to catalyse the provision and use of data by private and public-sector actors to improve financial inclusion through evidence-based, data-driven policies and client-centric product design.

insight2impact is funded by the Bill & Melinda Gates Foundation in partnership with The MasterCard Foundation.

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1. Executive summary

The primary objective of this project is to develop a measurement framework for digital financial services with a focus on digital payments specifically.

Fully digital payments

While some definitions of digital payments include all non-cash payments¹, the definition used in this analysis is narrower, requiring the channel as well as the store of value to be digital². These “fully digital” payments are the focus of this report.

A framework for measuring fully digital payments

A range of indicators are used to measure the digital financial services and payment landscapes. For instance, the Bill & Melinda Gates Foundation’s theory of change identifies key digital finance indicators that it monitors on an ongoing basis. In addition, various institutions – including the International Monetary Fund (IMF), FinMark Trust and the Alliance for Financial Inclusion (AFI) – publish potentially useful indicators for digital payments specifically.

As part of this project, the team developed a framework to characterise various measurable components of the digital payments ecosystem that could be tracked over time. This framework enables us to identify new digital payment indicators and to structure existing ones.

The primary analytical framework developed by the team, together with proposed headline indicators for fully digital payments, is presented below. This framework considers access, adoption and usage indicators, distinguishing between receiving payments and making payments. In addition, a further layer of the framework considers key drivers that are material in shaping the propensity to adopt and use digital payment solutions. We note that receiving income into a digital store of value is of interest in its own right *and* is itself a driver of making fully digital payments – an assertion supported by an analysis of survey data. We have therefore included it under both headings of the framework.

Of the identified indicators, three key indicators are highlighted (in bold in Figure 1): the percentage of adults who have access to a mobile phone (an access indicator), the percentage of adults who receive income directly into a digital store of value and the percentage of adults who make fully digital payments.

Given that existing published indicators tend to explore access and adoption, the focus of this analysis is principally on *usage*.



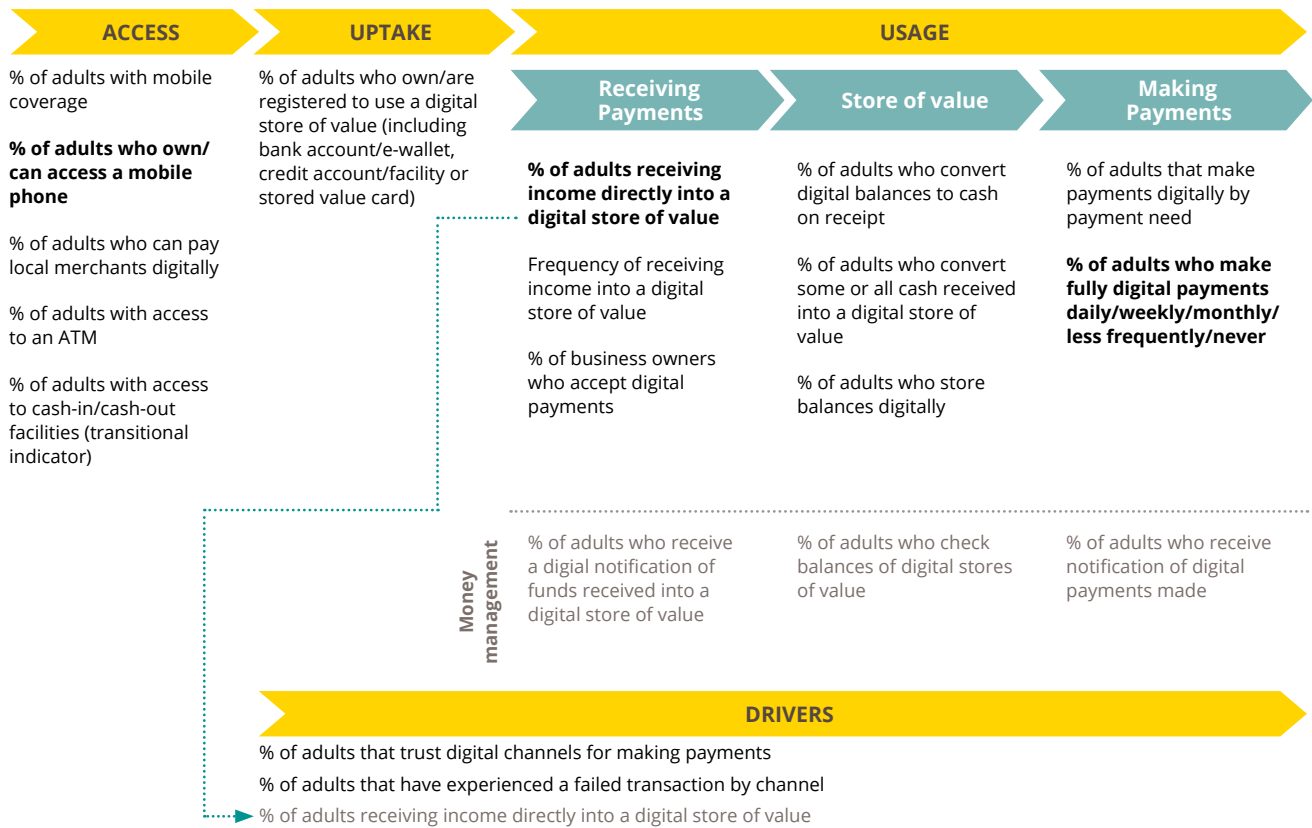
As part of this project, the team developed a framework to characterise various measurable components of the digital payments ecosystem that could be tracked over time.



1 See the International Telecommunication Union’s “The Digital Financial Ecosystem” published in 2016, which includes counter to counter transfers.

2 See the Digital Frontiers Institute’s (DFI) three-tiered framework to define a digital payment. In line with this framework, a payment can be regarded as a fully digital payment if the store of value is digital (i.e. it is not in cash) and the channel used to issue the instruction is digital.

Figure 1: Headline indicators: Fully digital payments



Populating the framework

The principal data typology that supports the development of these indicators is demand-side survey data. Five instruments were explored in detail for this report, including two nationally representative surveys (EFinA biannual Access to Finance (A2F) Nigeria survey from 2016 and the 2017 Cameroon Finscope survey). Three standalone finneeds surveys were also analysed (the 2018 Zimbabwe pilot and the 2018 insight2impact pilot surveys from Mexico and Nigeria). Aside from demand-side survey data, supply-side data – most commonly on infrastructure, product offerings and pricing – can also be used to populate indicators. In addition, there is growing interest in developing indicators linked directly to transactional data. While not the focus of this report, we include some preliminary comments in that regard informed by a recent analysis of transactional data generated in Mexico and Nigeria in 2018.

The population of indicators, including the headline indicators in Figure 1, was not always feasible. Survey instruments were not necessarily designed with this measurement framework in mind. None of the survey instruments include questions on usage of digital account features that enable money management (shaded in grey in Figure 1). In addition, questionnaires differ, sometimes significantly, making it difficult to derive results for a common set of indicators across survey instruments. Inconsistencies include differing timeframes, channels and use cases. The basis for calculating indicators from this data and their precise meanings therefore differ. Some suggestions for refining indicators and aligning the questions are made in the report, mindful of the specific circumstances that prevail across countries and segments of the market.



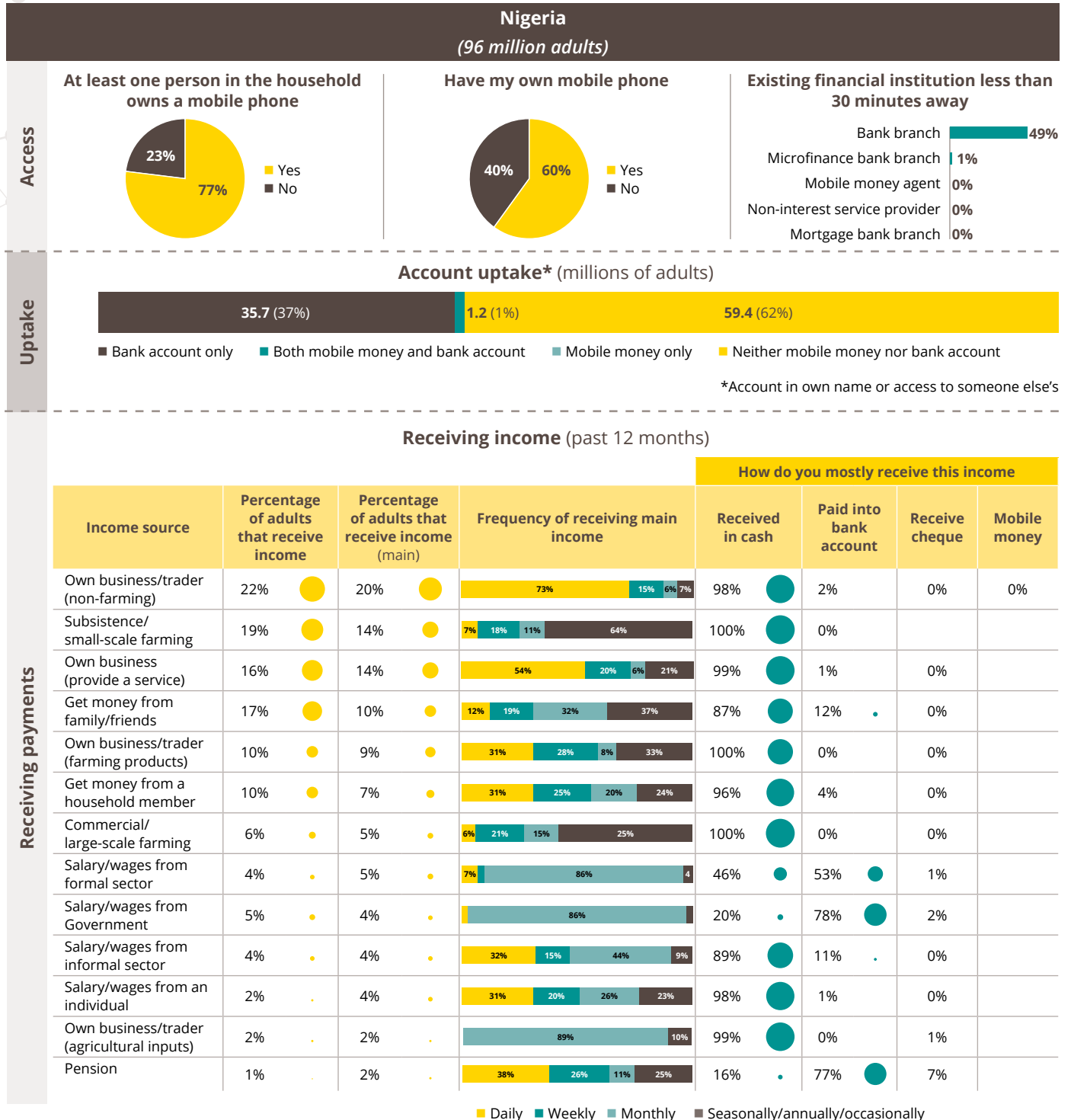
Aside from demand-side survey data, supply-side data can also be used to populate indicators.



Summarising the output

Many of the headline indicators can be visualised into a country dashboard that provides a summarised view of the status of fully digital payments in that country. An example dashboard based on the EFINA Nigeria 2016 data can be found in Figure 2. The dashboard includes a payments usage chain, exploring mechanisms used to receive funds and make payments. While not all headline indicators could be populated for this dataset, it is the only nationally representative dataset considered as part of this study and therefore one that contains sufficiently representative data.

Figure 2: EFINA Nigeria 2016: Digital payments dashboard



Source: EFINA Nigeria 2016

Nigeria
(96 million adults)

Receiving remittances (past six months)

Receiving payments	Needs relating to receiving a remittance	Percentage of adults that make this payment	Channel/device used to receive this payment										
			Family/friend	Runner (e.g. taxi/bus/boat)	Cash card/prepaid card	Recharge card	Got airtime that you sold for cash	Cheque	Western Union	Money Gram	Agent (mobile money, bank or Bureau de Change)	Mobile money	Bank transfer (via Internet, telephone, account to account)
	You received money from friends or family members within Nigeria	33%	57%	7%	0%		2%	1%			0%	0%	49%
	You received money from friends or family members outside Nigeria	3%	24%	2%	0%	0%		0%	19%	10%	2%		55%

Main method of receipt for main income source and remittances (millions of adults)



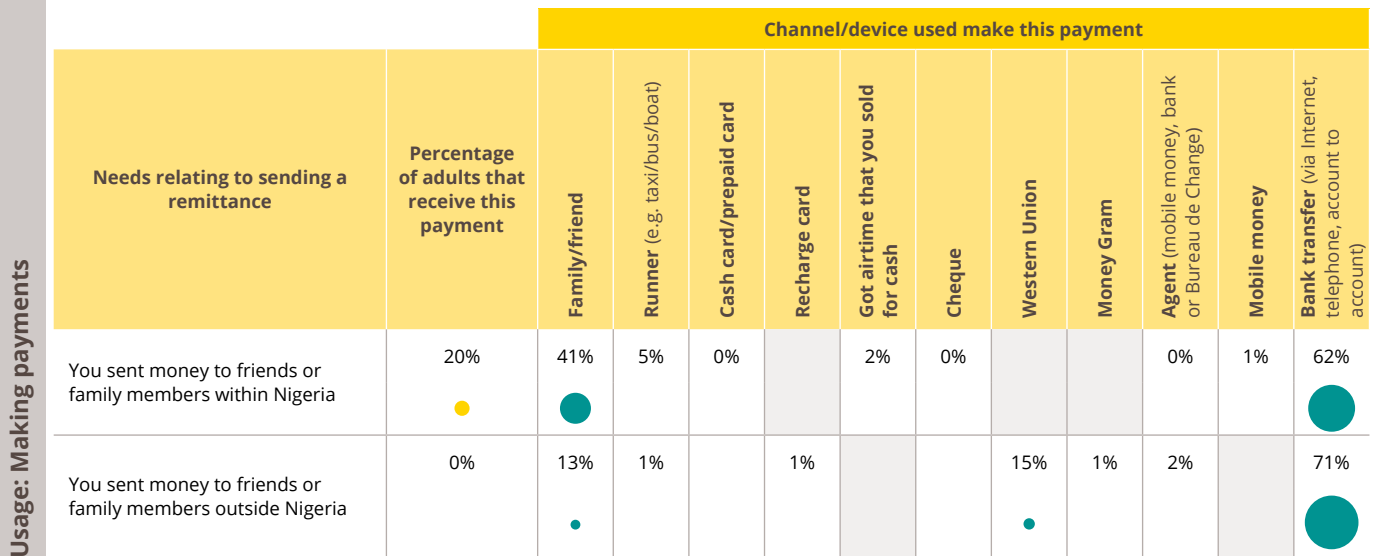
Making payments

Making payments	Needs related to transfer of value	Percentage of adults that make this payment	Channel/device used to make payment								
			Cash	Cheque	Over-the-counter bank transfer	Cash card/prepaid card	ATM/debit card	Credit card	Internet banking	Mobile banking	Mobile money (e-wallet)
	Payments for goods and services	99%	99%	3%	11%	1%	11%	0%	1%	1%	0%
	Transport	81%									
	Social activities/entertainment	66%									
	Airtime/data bundles	64%									
	Medical expenses	63%									
	Education/school fees	41%									
	Utility bills	32%	99%	1%	11%	0%	7%	0%	1%	1%	0%
	Fuel (car, motorbike or generator)	31%									
	Rent	25%									

Source: EFINA Nigeria 2016

Nigeria (96 million adults)

Sending remittances (past six months)



Made at least one fully digital payment (millions of adults)

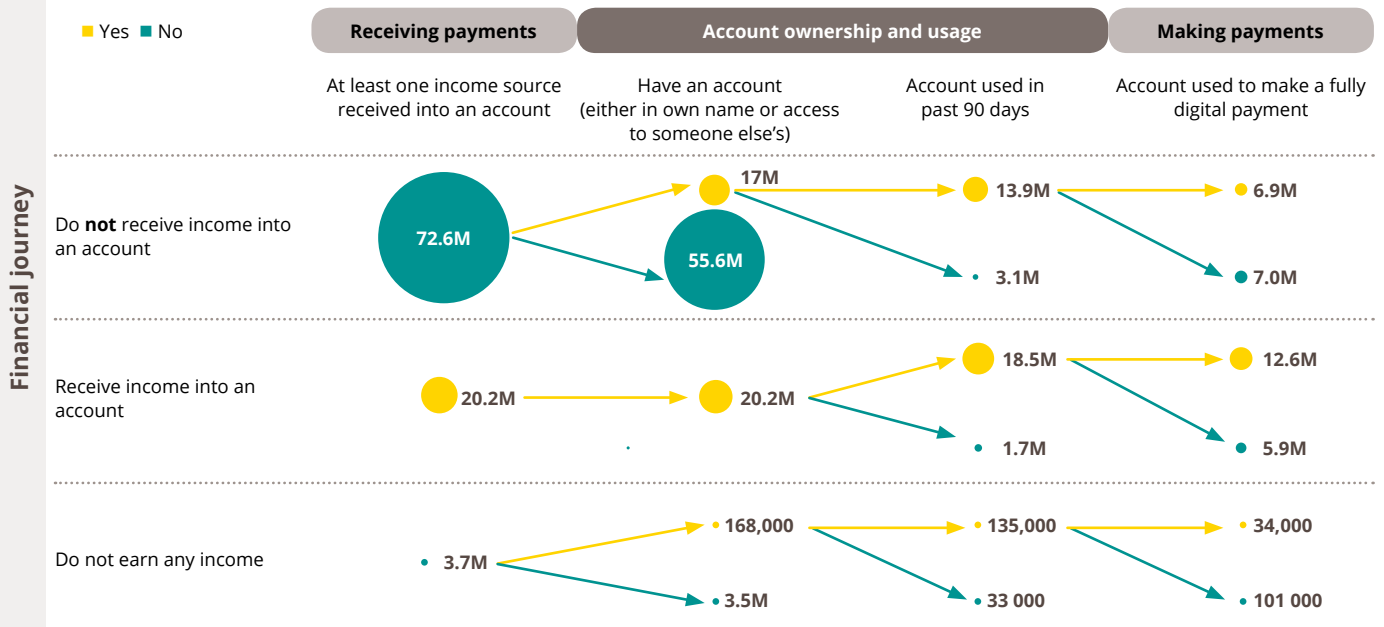


■ Yes ■ No

Note: Fully digital payments include: payments for goods and services and utilities done via card, internet banking, mobile banking, mobile money and remittances done using bank transfer (via internet, telephone, account to account, etc.). This last category could include over-the-counter transfers but the survey instrument does not split these out and so the category has been included under fully digital

Usage journey

■ Yes ■ No



Source: EFINA Nigeria 2016



The process of populating digital financial services headline indicators using demand-side survey data highlighted five key learnings for questionnaire design and analysis.

1. Start with a framework in mind

During the questionnaire design phase, there should be a common understanding of what outputs the survey needs to measure to ensure that the required questions are included. For example, if the focus is on measuring fully digital payments, questions on payment channels become indispensable. Many of the surveys explored as part of this research were not created with this framework in mind and so do not include questions on channels.

2. Question structure is important

The choice of single versus multiple response questions related to receiving and making payments has material ramifications. For example, questions on incomes and payments are often asked in single-response format, such as “How is your income mostly received?” and “What is the main way of making payment?”. Given that cash dominates in many countries, digital usage will be under-reported.

3. Be cognisant of the trade-off between (i) a highly detailed questionnaire and (ii) respondent (and analysis) fatigue

A detailed understanding of specific payment use cases and of the payment channels used to meet these use cases provides valuable insight into payments and value chains that can be digitised. However, the inclusion of questions regarding specific payment use cases has a significant impact on survey length as well as analytical complexity. There is a trade-off between the number of variables (use cases and corresponding channel options) and the length of the survey and time required to analyse the results. Finding the right balance is critical, as oversimplification will lead to a loss of insight. Defining priority use cases and channels is therefore an important aspect of implementing the framework successfully.





4. Think about timeframes

Timeframes are necessary to standardise and contextualise the answers provided by respondents. Financial inclusion indicators typically refer to usage in the “past 90 days”; however, this may not be optimal when considering specific payment use cases that are, by nature, infrequent. For example, rental payments in Nigeria tend to be made annually. While infrequent, this payment is a significant household expense. On the other hand, when considering the recency and frequency of digital payments in general (i.e. not per payment use case), a shorter timeframe is more useful and likely to provide more accurate data because respondents are likely to recall more recent activity.

5. Consider transactional or alternative data sources

Certain questions can be better answered by alternative data sources, specifically transactional data. For example, demand-side surveys may be less effective at accurately gauging usage intensity. While respondents may be able to confidently answer questions regarding their payment use case and the payment channels used to meet these use cases in general, they may struggle to answer more detailed usage questions regarding the frequency, recency and value of payments. Where available, transactional data could be used to fill this gap. Transactional data provides a reliable record of actual behaviour that includes a time stamp as well as value and other useful data points such as channel and whether the transaction failed. In the case of mobile payments, the data may also be geo-coded, therefore enabling detailed spatial analysis.



2. Introduction

Of the various financial products or services that could be digitised, payments are at the forefront. In OECD countries, 95% of all account holders make or receive at least one digital payment into their account each month. This is noticeably lower in developing countries, where almost 40% of account holders transact only in cash³. There is evidence that shifting payments out of cash and into digital transactions can have positive benefits for business, government and consumers by lowering transaction and administrative costs⁴, increasing the speed⁵ and security⁶ of transactions and enhancing visibility of economic activity, thereby facilitating access to credit⁷ and inclusion into formal economies. In addition, data from Nigeria highlights the importance of instant payment platforms and digital channels in broadening bank account usage. According to data published by the Nigerian Inter-bank Settlement System (NIBSS), transactions conducted over the instant payment platform introduced in 2011 now account for over 70% of all transactions processed by NIBSS. The volume of transactions reported in December 2018 was more than four times higher than in January 2017, and over two-and-a-half times higher than POS transactions⁸. Recent customer-level analysis of NIBSS data conducted as part of a recent insight2impact study showed that the vast majority of customers that use this channel transact via USSD.

Given the importance of digital payments, adoption and usage should be measured and reported on regularly and consistently in line with a coherent framework. The primary objective of this project is therefore to develop a measurement framework for digital financial services, with a focus on digital payments specifically. The digital financial services measurement framework seeks to identify well-defined financial inclusion indicators in line with criteria for good measurement frameworks as documented by insight2impact. As a starting point, the project takes several frameworks developed by insight2impact as part of their broader measurement framework work as well as the Gates Foundation's *Financial Services for the Poor* theory of change.

While indicators can be developed from a range of data sources, including demand-side survey data, supply-side data (most commonly infrastructure, location and reach) as well as transactional data (typically data from financial service providers), this review focuses principally on demand-side data, using a nationally representative survey from Nigeria and Cameroon as well as pilot surveys from Mexico, Nigeria and Zimbabwe. This data enabled the team to populate various indicators and identify key gaps or limitations in existing survey instruments. This, in turn, can strengthen demand-side measurement tools to ensure that they gather useful contextual and attitudinal data that is poorly captured or entirely absent in other data sources.

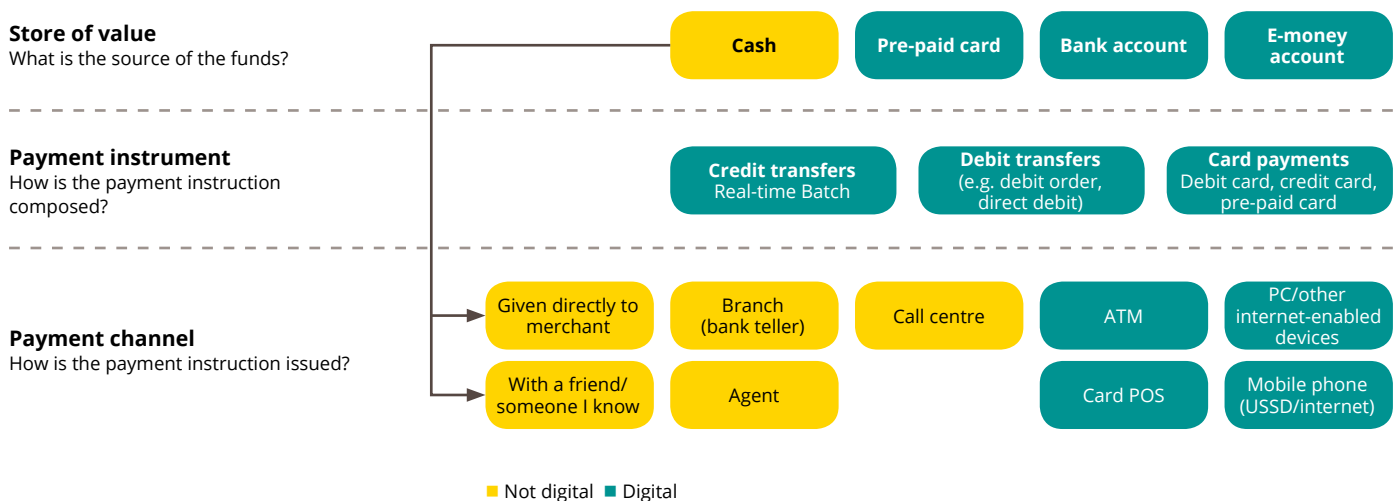
While not the primary objective of the project, the team also includes preliminary findings from studies in Nigeria and Mexico that draw on transactional data to populate key indicators.

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- 3 A. Demircuc-Kunt, L. Klapper and D. Singer, *Financial inclusion and inclusive growth: A review of recent empirical evidence* (2017)
 - 4 J. Aker, R. Boumniel, A. McClelland and N. Tierney, *How do electronic transfers compare? Evidence from a mobile money cash transfer experiment in Niger* (2013)
 - 5 BTCA, *Thousands of Ebola workers paid in Liberia* (2015)
 - 6 R. Wright, E. Tekin, V. Topalli, C. McClelland, T. Dickinson and R. Rosenfeld, *Less cash less crime: Evidence from the Electronic benefit Transfer Program* (National Bureau of Economic Research, 2014)
 - 7 T. Cook and C. McKay, *How M-Shwari Works: The Story So Far* (Consultative Group to Assist the Poor (CGAP) and Financial Sector Deepening (FSD) Kenya, 2015)
 - 8 *Analysis of transactional data in Nigeria reveals growth in instant payments driving financial inclusion*

3. A starting point: What is a digital payment?

In line with the descriptive framework developed by the Digital Frontiers Institute (DFI)⁹, a payment can be decomposed into three levels. The first level – the store of value – distinguishes between cash and digital stores of value, including bank accounts and e-money accounts. Level 2 describes the payment instrument or device through which the payment instruction is processed. These include payments that are “push” (credit transactions initiated by the account holder) and “pull” (debit transactions initiated by a third party). Within credit transactions, a critical distinction is between real-time or instant payments, and batch transactions. The third level covers the channel through which the user issues the payment instruction. These channels include face-to-face channels, including bank branches and agents, as well as digital channels such as ATM, point-of-sale (POS), the internet and mobile-phone-based applications. Figure 3 describes these common payments use cases, highlighting the distinction, where meaningful, between cash and digital payments.

Figure 3: Digital payments framework¹⁰



Source: Adjusted from the Digital Frontiers Institute digital money course referring to the payment use case

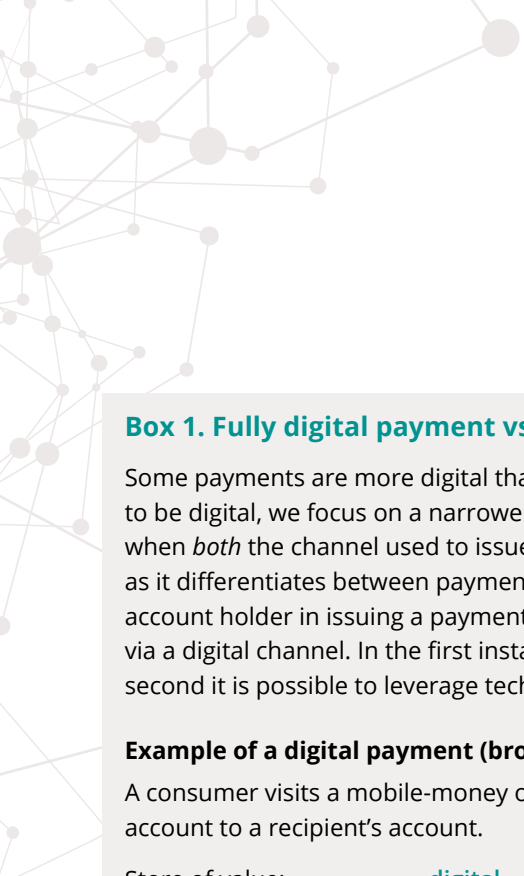
In line with this framework, a payment can be regarded as fully digital if the store of value is digital (i.e. it is not in cash) and the channel used to issue the instruction is digital. Thus, a person-to-person transfer conducted via a mobile phone would be regarded as a fully digital payment; the store of value is a bank account or wallet, and the channel used to issue the instruction (a mobile phone) is digital. In contrast, an over-the-counter bank transfer is not digital. While the store of value may be digital (if the funds are already in a bank account), the payment instruction is issued over the counter at a bank branch.

Note that this definition of a *fully* digital payment is stricter than other definitions of digital payments. For example, the International Telecommunication Union defines a digital payment as any payment initiated or processed electronically¹¹. Using this broad definition, a consumer who makes an over-the-counter remittance payment initiated in cash (i.e. the client presents cash to an agent

9 We have adjusted the payment use cases to include cash payments. See <https://www.digitalfrontiersinstitute.org/the-institute/>

10 Based on Digital Frontiers Institute's digital payments classification

11 The digital financial services ecosystem



who, in turn, sends the funds electronically to a recipient's accounts) would technically be regarded as having made a digital payment because the payment is processed electronically. However, the ability to rapidly scale up adoption and usage of these solutions is constrained by the need for a human interface and physical footprint. This clearly diminishes the digital payment proposition.

Box 1. Fully digital payment vs digital payment

Some payments are more digital than others. While standard definitions of digital payments require the store of value to be digital, we focus on a narrower definition to focus on *fully digital* payments. A payment is regarded as fully digital when *both* the channel used to issue the payment instruction *and* the store of value are digital. This distinction is critical, as it differentiates between payments that require a human intermediary (such as an agent or bank teller) to assist the account holder in issuing a payment instruction, and payments that can be made independently by an account holder via a digital channel. In the first instance, a network of agents or tellers would be required to enable access, while in the second it is possible to leverage technology to achieve scale at low cost.

Example of a digital payment (broad definition)

A consumer visits a mobile-money outlet and uses an agent to initiate a remittance payment from the consumer's account to a recipient's account.

- Store of value: **digital** **(mobile-money account)**
- Payment instrument: **digital** **(credit transfer)**
- Payment channel: not digital (agent)

Example of a fully digital payment (strict definition, used in this report and explained in section 3)

A consumer sends a remittance from her/his account by initiating the transaction using a USSD menu on a mobile phone. The bank system receives the payment request and sends the funds electronically to the recipient's account.

- Store of value: **digital** **(bank account)**
- Payment instrument: **digital** **(credit transfer)**
- Payment channel: **digital** **(mobile phone)**



4. Identifying useful indicators

Indicators are proxies for a condition that is typically impossible or very difficult and costly to measure directly. They consist of, or are based on, observations – empirical data – that reflect the dynamics of a phenomenon¹². A good indicator is relevant, easy to understand, reliable, and can be populated using accessible data that is either readily available or could be gathered within a feasible timeframe and at a reasonable cost.

To develop coherent and meaningful indicators, it is useful to ground them in a robust measurement framework. The insight2impact team, in consultation with various stakeholders, has developed several measurement frameworks to assist the financial inclusion community in using data effectively to improve the value delivered by financial inclusion¹³. This project builds on the usage measurement framework specifically¹⁴.

In line with this emphasis on usage (and drivers of usage) several recently published reports highlight a range of indicators that characterise the current status of digital financial inclusion¹⁵. These studies and measurement frameworks shift the focus away from simply owning or having access to a financial product or service and explore whether targeted populations derive meaningful benefit from using that product or service.

Aside from these frameworks, the Gates Foundation’s theory of change¹⁶ considers indicators for market development towards an inclusive “cash-lite” society¹⁷, which aligns closely with the focus on digital payments explored by this study. Indicators used by the Gates Foundation include access to a mobile phone, and active bank and mobile-money account users.

12 insight2impact, Measurement Note 1: Introduction to measurement frameworks (2017)

13 Read more about the measurement frameworks here

14 insight2impact, Measurement Note 4: Catering to every need

15 Central Bank of Nigeria, Exposure draft of the national financial inclusion strategy refresh in Nigeria (2018); RJ Lewis, JD Villaseñor and DM West, The 2017 Brookings financial and digital inclusions project report: Building a secure and inclusive Global Financial Ecosystem (Brookings Institute, 2017); Alliance for Financial Inclusion, Financial inclusion measurement for regulators: Survey design and implementation (2010); Lagos Business School, Digital Financial Services in Nigeria: State of the market report (2016); Reserve Bank of India, Report of the committee on medium-term path on financial inclusion (2015); AD Kunt, L Klapper, D Singer, S Ansar and J Hess, The global Findex database 2017: Measuring financial inclusion and the fintech revolution (World Bank Group, 2017); E Rhyne and SE Kelly, Financial inclusion hype vs reality: Deconstructing the 2017 Findex Results (Center for Financial Inclusion, 2018); International Monetary Fund, Financial Access Survey (2017); FinMark Trust, FinScope Consumer Survey South Africa 2016, (2016); Intermedia, Financial Inclusions Insights Nigeria 2016 Annual Report. Wave 4 (2016)

16 The Gates theory of change highlights policy and regulations, infrastructure and private sector engagement as important “building blocks” for stimulating digital financial services. Effective policies and regulations protect stakeholders while promoting usage of financial instruments, creating a stable and fair operating environment. The development of relevant infrastructure makes access to financial services possible, while private sector engagement stimulates consumer interaction and use of the infrastructure.

17 Bill & Melinda Gates Foundation, Financial services for the poor (2012)





Indicators derived from numerous sources¹⁸ are published on an ongoing basis by various institutions. For instance, the World Bank’s G20 Financial Inclusion Indicators¹⁹ include indicators derived from demand-side surveys, including Global Findex, various consumer protection and financial literacy surveys as well as supply-side data sources, including the IMF’s Financial Access Survey²⁰ and the World Bank’s Global Payments Systems Survey²¹. These indicators include access and usage indicators as well as “quality” indicators that consider various drivers and barriers to usage of digital financial services.

The team used these and other indicators and frameworks to develop a master indicator list of existing indicators for digital financial services, and digital payments in particular, adding to the list during the course of the project. The master list generated by the team comprises over 80 indicators. However, a short list of priority or headline indicators are highlighted in Figure 1.

To navigate through the full list of indicators, they have been structured in line with a framework focusing on digital payments specifically. This framework explores access indicators, uptake indicators and usage indicators in line with the customer adoption journey. Usage indicators can, in turn, be split into receiving payments and making payments. A further set of indicators relates to “drivers” in line with the drivers of usage measurement framework and the Gates indicators mentioned above. These drivers capture underlying pre-conditions or factors that shape the propensity of targeted segments of the market to take up and use digital financial services and specifically, digital payment solutions²². The framework is illustrated in Figure 4.

18 Alliance for Financial Inclusion, Financial inclusion measurement for regulators: Survey design and implementation (2010); AD Kunt, L Klapper, D Singer, S Ansar and J Hess, The global Findex database 2017: Measuring financial inclusion and the fintech revolution (World Bank Group, 2017); E Rhyne and SE Kelly, Financial inclusion hype vs reality: Deconstructing the 2017 Findex Results (Center for Financial Inclusion, 2018); International Monetary Fund, Financial Access Survey (2017); FinMark Trust, FinScope Consumer Survey South Africa 2016, (2016); Intermedia, Financial Inclusions Insights Nigeria 2016 Annual Report. Wave 4 (2016)

19 Available at https://databank.worldbank.org/data/download/g20fidata/Indicators_note_formatted.pdf.

20 The IFC’s Financial Access Survey is a supply side survey of access to and usage of financial services covering deposits, mobile money, credit and insurance. See <http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C&slid=1412015057755>

21 The World Bank’s Global Payments Systems Survey gathers data from central banks and monetary authorities and combines qualitative and quantitative measures of payment system performance. See <http://www.worldbank.org/en/topic/financialinclusion/brief/gpss>

22 We note that we have not included outcomes-based indicators. As per insight2impact’s focus note, outcomes are defined as “the extent to which a person’s financial needs are met (or undermined) as a result of their engagement with financial services.” In the case of payments, the act of transferring value is the outcome. For example, if a person has a specific transfer of value use case (such as sending a remittance to a family member) and uses a financial device towards this use case (such as mobile money), the need to transfer value has been met.

23 Along with receiving payment and making payments, usage would normally also include indicators which consider store of value. However, this research focussed on payments and therefore omits store of value indicators.

Figure 4: Framework for indicators²³



Past research undertaken by AFI, Global Findex and the IMF, among others, have documented access and uptake indicators in some detail. This research includes most of these access and uptake indicators but focuses on the measurement of usage.

5. Data

As noted, underlying data to populate indicators is available from a range of data sources. Typically, demand-side surveys provide the richest source of data and have been the primary source of data used to develop financial inclusion indicators. These surveys include FinScope and derivative surveys (such as Nigeria's EFINA and Kenya's FinAccess surveys), Global Findex, Financial Inclusion Insights (FII) surveys, as well as various financial literacy surveys.

In addition, various institutions – such as the International Finance Corporation (IFC) and the International Telecommunications Union (ITU) – have published a range of supply-side indicators that track financial service provider (FSP) points of presence and mobile network infrastructure and coverage. Examples of supply-side indicators include the number and location of ATMs, bank branches, mobile agents or cell-phone base stations. Indicators are typically reported on as density (e.g. number of ATMs per 100,000 population), proximity (e.g. proportion of the population within x kilometres or x minutes from a service point) or coverage indicators (e.g. proportion of the population that have mobile coverage).

Besides these more traditional demand-side and supply-side data sources, transactional data generated and retained by FSPs, payment switches or in some cases regulators can also be useful. The interest in transactional data reflects an increased focus on more detailed usage patterns together with improved data storage infrastructure, data management and analytical capabilities within institutions that generate vast amounts of transactional data. Where a unique customer identifier exists, it is possible to link accounts and transactions back to specific customers and explore transactional data at a customer level. Given that this data is generated automatically as transactions are processed, it offers an opportunity to track usage in real time and at a low cost.

“

Where a unique customer identifier exists, it is possible to link accounts and transactions back to specific customers and explore transactional data at a customer level.

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This study draws mainly on five demand-side surveys made available for this project from Cameroon, Mexico, Nigeria (both EFINA 2016 as well as a more recent pilot survey) and Zimbabwe. Just one of the surveys – the 2016 EFINA Access to Financial Services in Nigeria survey – is a nationally representative survey, while the others are pilot surveys conducted by insight2impact. These data sources support the development of indicators denominated at a customer level (e.g. percentage or total number of customers who can access a mobile phone, have recently used a bank account, have made a payment through a digital channel) and can be generated at segment level if sufficiently large sample sizes exist.

Table 1: Survey instruments analysed

Country	Survey instrument	Pilot (yes/no)	Sample size
Cameroon	FinScope Consumer Survey 2017	Yes	504
Nigeria	EFinA Access to Financial Services in Nigeria Survey 2016	No	23,072
Nigeria	insight2impact Financial Needs Survey 2018	Yes	2,397
Zimbabwe	insight2impact Financial Needs Survey 2017 (with specific credit usage focus)	Yes	1,006
Mexico	insight2impact Financial Needs Survey 2017	Yes	1,154

In Mexico and Nigeria, transactional data was made available as part of two separate studies conducted in country by insight2impact. In the case of Nigeria, this data was generated by the Nigerian Inter-Bank Settlement System (NIBSS), the Nigerian central switch. In that country, all banked customers are issued with a unique Bank Verification Number (BVN). Each transaction includes this BVN, thereby making it possible to explore data on inter-bank transactions and POS transactions processed by NIBSS at a customer level. In Mexico, transactional data was provided by a large retail bank. This data includes the age and gender of account holders, as well as transactions and balances, together with channel information that can be linked back to specific customers using a unique customer identifier generated by the bank. Given that the analysis of transactional data in those two countries is documented in detail in other reports, this document refers to these studies in brief.



6. Populating indicators

Demand-side data has been used to populate headline indicators in line with the framework developed for this project. All indicators can be explored further or segmented by a range of demographic variables, including age group, gender, location, income level and income source. However, for the sake of brevity the indicators that follow are, in the main, reported for all applicable respondents.

Access indicators

Access indicators consider the extent to which a population has access to required infrastructure or can comply with criteria to open an account and make digital payments. Listed in Table 2 are suggested headline indicators, including ownership of, or access to, a mobile phone and access to various points of presence required to open an account or mobile wallet. Included in this list is access to cash-in/cash-out facilities. We include this as a transitional indicator, which is critical in enabling a pathway to digital adoption; given that cash will be required for at least some critical or frequent payments for some time, consumers will only migrate to digital if there is seamless exchange between cash and digital stores of value.



The survey also includes questions on access to branch or agent infrastructure; just under half of Nigerian adults are less than 30 minutes away from a bank branch.

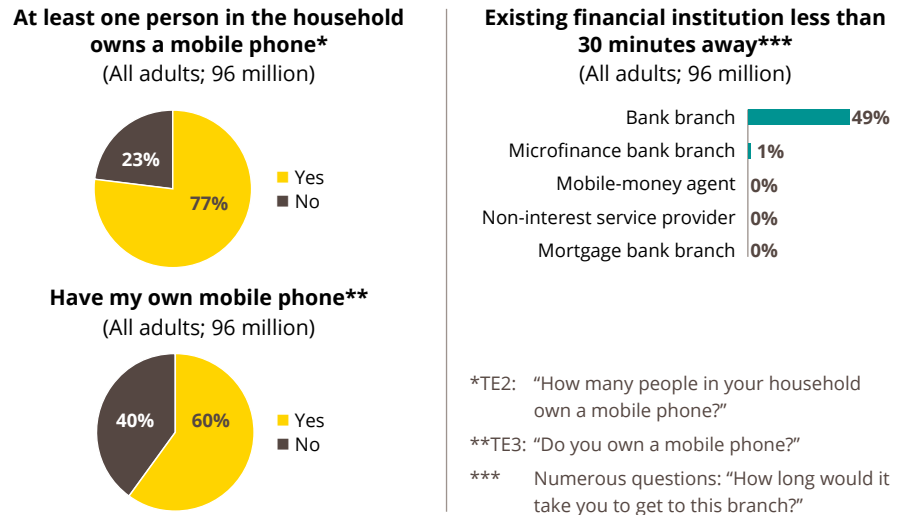


Table 2: Access headline indicators

Indicator	Measurement instrument example
Percentage of adults that live in areas where there is mobile coverage	Gathered by mobile service providers
Percentage of adults who own/can access a mobile phone	EfInA Nigeria: TE3: "Do you own a mobile phone?" TE2: "How many people in your household own a mobile phone?"
Percentage of adults who can pay local merchants digitally	Nigeria Pilot survey: "Do businesses in your community accept card payments or bank transfers (other non-cash payments)?"
Percentage of adults who have access to an ATM	<i>No indicative questions in surveys</i>
Percentage of adults who have access to cash-in/cash-out facilities (transitional indicator)	EfInA Nigeria: MM12b. How long would it take you to get to this mobile money agent? BA2. How long would it take you to get to this branch? MF2. How long would it take you to get to this branch? NB2. How long would it take you to get to this provider?

Key access indicators for Nigeria are summarised in Figure 5, using the EfInA 2016 data. In Nigeria, 77% of adults (over the age of 18) live in a household where at least one person owns a mobile phone, while 60% have their own mobile phone. We note the survey does not explore whether the mobile phone is internet enabled. However, some of the other surveys explored as part of this research do distinguish between basic and smartphones. The survey also includes questions on access to branch or agent infrastructure; just under half of Nigerian adults are less than 30 minutes away from a bank branch. The survey does not include questions on distance to ATMs or access to merchants who accept digital payments whether enabled by POS devices or mobile phones.

Figure 5: Access headline indicators



Source: EFinA Nigeria 2016

Aside from demand-side data and supply-side data, including spatial data on mobile coverage or points of presence (such as location of bank branches and ATMs) can be used to generate access indicators. For example, according to the ITU, in 2016 the proportion of the population in Mexico with mobile coverage was 100%. In Nigeria it was 99%, while the proportion in Zimbabwe and Cameroon was 88% and 58% respectively²⁴. It is worth noting that although all areas of the countries have some form of mobile coverage, access depends on a customer's location and chosen MNO.

Uptake

Uptake indicators consider the proportion of the population who currently have an account or electronic wallet, either in their own name or via someone else's account. The headline indicator for uptake is included in Table 3.

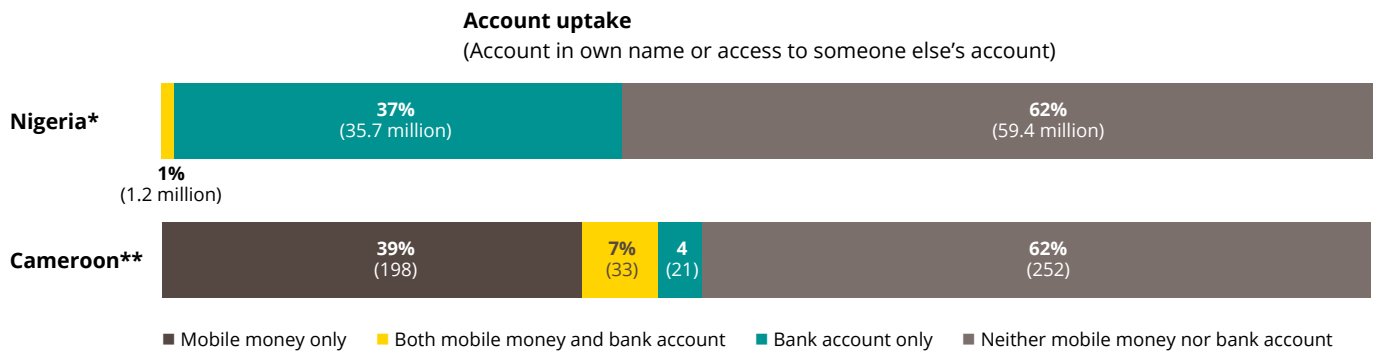
Table 3: Uptake headline indicators

Indicator	Measurement instrument example
Percentage of adults who own/are registered to use a digital store of value (including bank account/e-wallet, credit account/facility or stored value card)	<p>EFinA Nigeria:</p> <p>BA3a: "You said that you use commercial banks. I now want to ask you about this. Do you use..."</p> <p>MM1: "Which of the following statements best describes your experience with mobile money?" - You are a registered mobile money user</p>

This indicator can be published as a standalone statistic or combined into a hierarchical strand with mutually exclusive categories, as illustrated in Figure 6, which summarises account uptake in Nigeria in 2016 and data from the Cameroon pilot survey. While strands typically start with bank accounts (reading from left to right) reflecting the traditional bias in favour of bank accounts as the foundational financial product, in light of the focus on digital payments specifically, the strands on the next page start with mobile-money accounts.

²⁴ International Telecommunication Union, Mobile network coverage - country rankings

Figure 6: Uptake headline indicator dashboard example



- * Bank account: Have your own account, have a joint account, use somebody else's, do transaction without using your own
- * Mobile money: You are registered but you have never used mobile-money services, You use mobile-money services but you are not registered, You are a registered mobile-money user
- ** Bank account/mobile money: Currently use

Source: EFINA Nigeria 2016, Cameroon pilot survey

Note that the Cameroon data is from a pilot survey; indicators calculated from that data should be regarded as illustrative only.

The questions used as input into the strands created in Figure 6 differ, which can make a direct comparison between countries difficult.

Box 2. Differences between survey questions and the importance of precision

There are often differences between survey instruments with regard to account uptake questions; and in some cases, it can be difficult to explore take-up or access, as opposed to usage. For example, the question from the Nigerian A2F survey (used to populate Figure 6) is as follows:

BA3a: "You said that you use commercial banks. I now want to ask you about this. Do you ...?"

- ... have your own account; ... have a joint account; ... use somebody else's; ... do transactions without using your own?

In contrast, the question on mobile money in that survey highlights the distinction between being registered for mobile-money services and actually using the service.

MM1: "Which one of the following statements best describes your experience with mobile money?"

- You are not registered and have never used mobile-money services; You are registered but you have never used mobile money services; You have used it before but not anymore; You use mobile-money services, but you are not registered; You are a registered mobile-money user.

This is explored differently in the Cameroon pilot survey. That questionnaire includes three options: a bank account, mobile money and "mobile banking".

B1: "Do you currently use, did you use to use, or have you ever used [a bank; mobile banking; a mobile-money provider; a co-operative; microfinance; a group]"

- Currently use; used to use; have never used

In that survey, there is a distinction between bank accounts, mobile banking (which is likely to be a channel) and mobile money. While indicators generated from these different survey questions are seemingly similar and comparable between the countries, the questions used to calculate the indicators differ, making it difficult to compare results in a strict sense. For instance, the Nigerian analysis does not necessarily require adults to "currently use" an account but only be registered, while adults in Cameroon must "currently use" the account to be included in the indicator.

In light of these various options, it is clearly important for the questionnaire design team to think carefully about the indicator that will be generated from the data. If it relates to take-up or adoption specifically, we would suggest a formulation closer to questions used in Nigeria (are you registered for, or do you have an account in your name).



Usage indicators

As noted, usage indicators have been split into receiving payments, store of value, and making payments. At a composite level, there are broad indicators in various surveys that explore whether account holders use their accounts more generally. For instance, one of the Gates indicators explores whether account holders are active (have used their accounts in the past 90 days).

Receiving payments

Receiving payments indicators explore sources of income and the way in which these income sources are received (i.e. in cash or into an account or electronic wallet). Headline indicators are summarised in Table 4. While indicators refer to the population in general, we have included a specific focus on merchants.

Table 4: Receiving payments headline indicators

Indicator	Measurement instrument example
Percentage of adults receiving income directly into a digital store of value	EFinA Nigeria: E9: "Please tell me from where/from whom do you usually get money to buy the things you need?" E12: "How do you receive the money you get from...?"
Percentage of business owners that will accept digital payments	Nigeria Pilot: "You said you are a business owner, do you collect payments from customers using POS or do you have an Mcash/merchant code or accept instant transfers into your account?"
Percentage of adults receiving income directly into a digital store of value who receive a digital notification of this receipt	<i>No indicative questions in surveys</i>

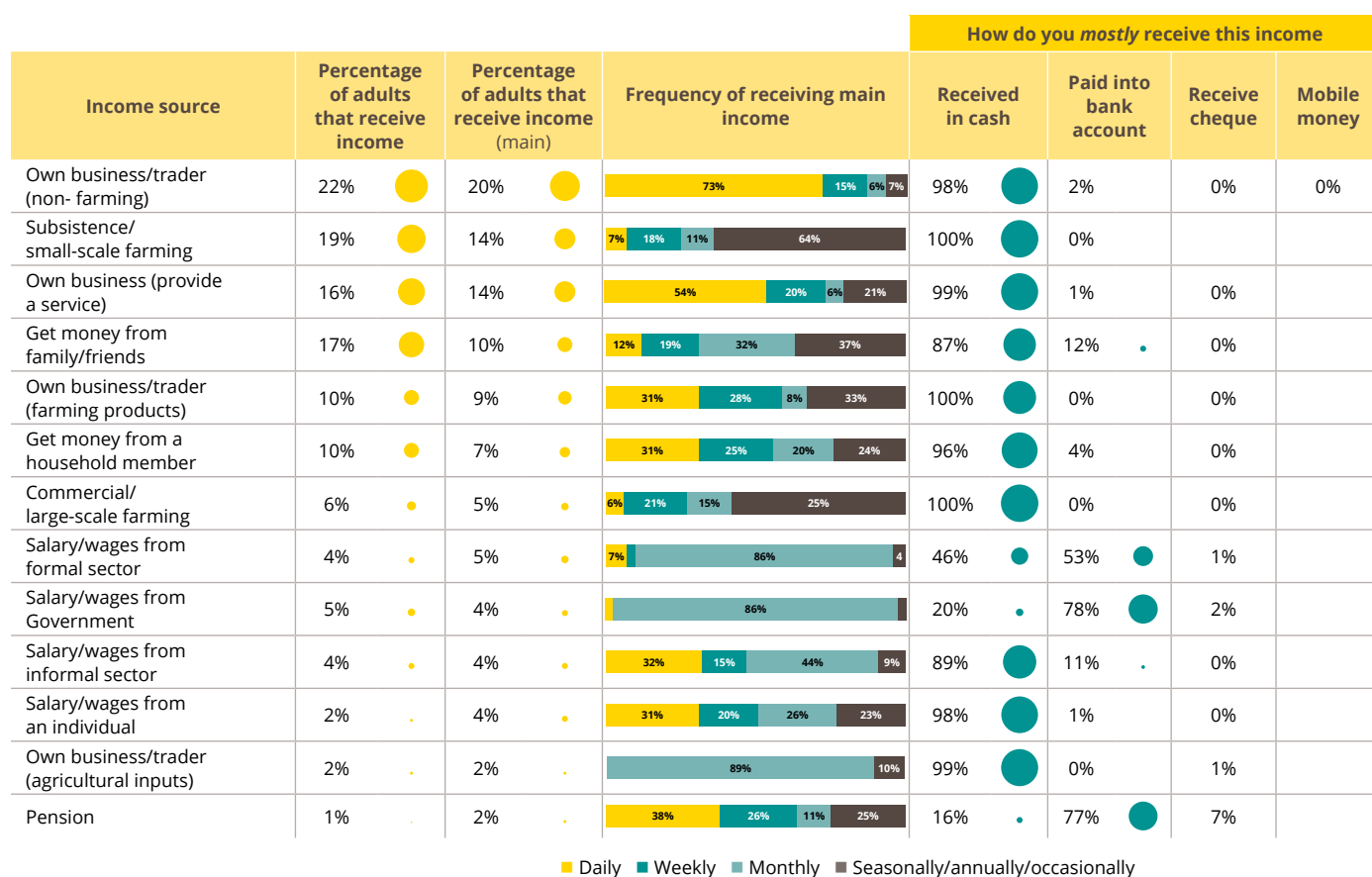


Receiving payments indicators explore sources of income and the way in which these income sources are received (i.e. in cash or into an account or electronic wallet).



Some of these indicators have been populated in Figure 7 with data from Nigeria's 2016 EFinA Access to Financial Services survey. The chart includes the proportion of adults in Nigeria who receive each income source (multiple response question) and the proportion of adults who report a particular source as their main income source, indicated by the yellow bubbles in the chart. The chart also includes data on the frequency of receiving the main source of income (represented by the stacked bar) as well as the way in which that income source was mostly received (represented by the blue bubbles on the right of the figure).

Figure 7: Receiving payments headline indicator dashboard



■ Daily ■ Weekly ■ Monthly ■ Seasonally/annually/occasionally

*E9: "Please tell me from where/from whom do you usually get money to buy the things you need?"
 **E10: "Which of these sources of money you told me about do you rely most on to cover your expenses?"
 ***E11: "How often do you usually receive the money you get from...?"
 ****E12: "How do you MOSTLY receive the money you get from...?"

Source: EFINA Nigeria 2016

In line with this data source, self-employment is the dominant income generation activity in Nigeria, with just under half of all adults reporting that their main source of income is from their own business²⁵, while 17% say their main source of income is a salary or wage²⁶. Salaries from the formal sector and from government are generally paid monthly and into an account, whereas business owners tend to earn income frequently (daily or weekly) and mostly receive this income in cash. While there is some scope to digitise salaries of those in formal employment further, digital penetration in that segment is already high, and the segment is small. Arguably, the primary digitisation effort should target business owners. Given that this segment is fragmented and diverse, a focused effort should target high-frequency transactions.

While most of the survey instruments include a question that refers to all incomes received (multiple response question), these gather data on income frequency and how the income is received for the main source of income only, and report on the mechanism mostly relied on to receive this income. This will likely undercount the proportion of respondents receiving some form of income directly into an account. An exception is the Cameroon survey, which asks about all income sources (not just the main income source), and on the method of receipt it includes a "both cash and electronically" option to cover those respondents that receive their incomes via multiple methods.

25 "Own business" includes: Own business/trader (non-farming), Own business (provide a service, e.g. hairdresser, tailor, mechanic), Own business/trader (farming products), Own business/trader (agricultural inputs)

26 "Salary or wage" includes: Salary/wage from a business/company (formal sector), salary/wage from government (including NYSC payments), salary/wages from individual with own business (informal sector), salary/wages from an individual for chores such as domestic work

A composite indicator that summarises the information in Figure 7 is shown in Figure 8. According to the EFINA 2016 survey, just 9% of Nigerian adults mostly receive their main income source into an account.

Figure 8: Receiving payment excluding remittances: mechanism mostly used

Main method of receipt for main income source in the past 12 months
(All adults, 96 million)



- Receive main income source mostly in cash*
- Receive main income source mostly into an account*
- Do not receive an income*

*E12: "How do you MOSTLY receive the money you get from...?" – mobile money, bank account

Source: EFINA Nigeria 2016

In line with the focus on digitising remittance payments in the past, surveys typically explore remittances (received and paid) in a specific, more detailed section of demand-side questionnaires. The data from Nigeria is summarised below. According to that data, income from remittances is also relatively common in Nigeria, with 33% of adults receiving a remittance from within the country and a further 3% receiving a remittance from abroad within the past six months. In contrast with data on income sources more broadly, the question on how remittances are received is a multiple-response question, exploring all potential mechanisms and not the dominant mechanism only. Arguably, this aligns better with the framework and objective of the analysis. According to the survey, almost half of all those who receive domestic remittances receive them via a bank transfer, with 38% receiving remittances via a bank transfer only.

Box 3. Remittances

The EFINA questionnaire includes a category under income sources termed "get money from family/friend". This could be categorised as a remittance. A total of 17% of adults cite money from family and friends as an income source (as per Figure 6). This is significantly lower than the 33% of adults that say they received a domestic remittance in the past six months as per Figure 8. The discrepancy arises because the questions are framed differently and have different timeframes ("usually" vs "past six months").

Question used in Figure 6 (income source):

Different people get money to buy the things they need in different ways. Please tell me from where/from whom do you usually get money to buy the things you need?

Question used in Figure 8 (remittances):

How have you received money from within Nigeria in the past six months?

Figure 9: Receiving remittances within the past six months
(MT1*: Adults who receive remittance; 32.5 million)

Needs relating to receiving a remittance	Percentage of adults that make this payment***	Channel/device used to receive this payment**										
		Family/friend	Runner (e.g. taxi/bus/boat)	Cash card/prepaid card	Recharge card	Got airtime that you sold for cash	Cheque	Western Union	Money Gram	Agent (mobile money, bank or Bureau de Change)	Mobile money	Bank transfer (via Internet, telephone, account to account)
You received money from friends or family members within Nigeria	33%	57%	7%	0%		2%	1%			0%	0%	49%
You received money from friends or family members outside Nigeria	3%	24%	2%	0%	0%		0%	19%	10%	2%		55%

*MT1: "Which of the following did you do in relation to receiving and sending money within the past six months?" – You received money from friends/family members within Nigeria, You received money from friends or family members outside Nigeria – Multi

**MT2a: "How have you received money from within Nigeria in the past six months? Did you get it through ...?" – Multi

***MT12a: "How have you received money from outside Nigeria in the past six months? Did you receive it through ...?" – Multi

Source: EFINA Nigeria 2016

While the receipt of income and remittances data is not aligned in terms of timeframes, for the purposes of illustration we have combined this data into a composite indicator considering all the income sources (i.e. main source of income and receiving a remittance in the past six months). In total, 21% of adults in Nigeria, or just over 20 million people, received their main source of income mostly into an account, or received a remittance (at least some of the time) into an account as shown in Figure 10.

Figure 10: Receiving payments headline indicator

Main method of receipt for main income source and remittances in the past 12 months (All adults, 96 million)



- Receive main income source or remittance in cash*
- Receive main income source or remittance into an account**
- Do not receive an income or remittance***

*E12: "How do you MOSTLY receive the money you get from...?" – mobile money, bank account

**MT2: "How have you received money from within Nigeria in the past six months? Did you get it through ...?" – cash card/prepaid card, Got airtime on your phone that you sold for cash, bank transfer (via Internet, telephone, account to account, etc.), mobile money

***MT12: "How have you received money from outside Nigeria in the past six months? Did you receive it through ...?" – cash card/prepaid card, bank transfer, recharge card

Source: EFINA Nigeria 2016



The second headline indicator included in this category is the proportion of business owners that accept digital payments. In all surveys, it is possible to restrict the analysis to business owners only and consider how they say they receive their incomes (in cash or into an account). However, as noted previously, most of the surveys ask for the main way in which funds are received. This is likely to understate digital incomes received by business owners more than other income earners, because they are likely to receive funds from multiple customers, most of whom may pay in cash.

Most of the surveys considered as part of this research do not explore adoption of specific platforms or solutions that enable merchants to receive payments digitally.

Box 4. Collecting data on merchant payments: ability to receive a digital payment

The Kenya FinAccess 2018 survey and Nigeria pilot survey both include questions that refer to business' ability to collect payments digitally.

Kenya FinAccess 2018:

Q11: Does your business have (a)?

- Till number (e.g. Lipa na M-Pesa, Equitel) for merchant payments
- **Card reader machine (e.g. POS device/PDQ)**
- Business insurance (e.g. property, liability or fire) (exclude personal health or life insurance)
- Bank account in your business name

Nigeria pilot:

FS7.1: You said you are business owner/farmer; Do you collect payments using POS or do you have an mCASH/merchant code or accept instant transfer into your account?

- PoS
- Through the phone/mCASH/you do not have a merchant code
- Through the phone/Electronic Fund Transfer (NIP/NEFT) such as USSD or using mobile app

Supply-side data can also be used to fill this gap. For instance, NIBSS publishes data on the number of POS terminals that are deployed across Nigeria²⁷. Subject to data quality, this data can support an analysis of transactional data for specific use cases as merchant registration processes designate merchants under standardised merchant category codes (MCCs).

The final headline indicator in this section refers to money management through the receipt of notifications. A key advantage of digital transactions is that they are recorded automatically and can easily be referenced for record-keeping or expenditure monitoring. Besides enabling account holders to keep track of their spending, these notifications may well create trust and enhance the digital proposition relative to cash in that they enable consumers to better manage their financial lives. Indicators in this regard may therefore be valuable. None of the survey instruments included in this analysis explore usage of, or utility generated by, account activity notifications embedded in some digital mechanisms. Some indicators in this regard can feasibly be generated from transactional data, although demand-side data might provide some evidence as to their perceived importance or value to the customer.

27 NIBBS POS Analysis 2018 annual report



Store of value

Store-of-value indicators track how those who receive income in cash or digital form retain value. While not strictly speaking a payment indicator per se, choices with respect to mechanisms that are used to store value are material in shaping the pathways to digital adoption.

A critical cautionary indicator is the proportion of consumers who are paid directly into a digital store of value but convert all balances into cash shortly after receipt. Conversely, a positive indicator tracks the proportion of consumers who generate income only in cash but deposit some or all of their cash into a digital store of value that can be used to make digital payments.

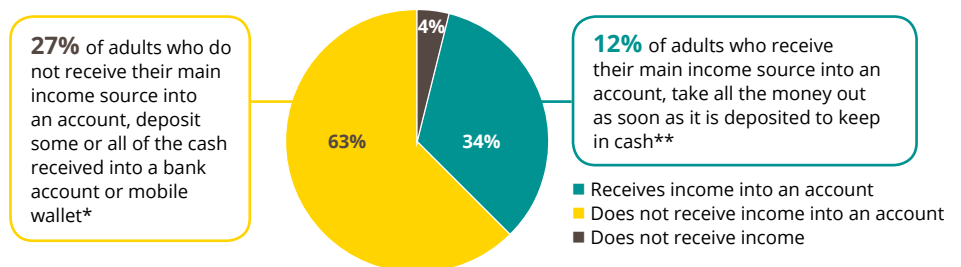
A final suggested indicator is the percentage of customers who check account balances. Transactional data generated by the NIBSS highlights that the most common reason for failed instant payment transactions is that account holders have insufficient funds²⁸. Knowledge of account balances affects the success of digital transactions, particularly where balances are not visible to users at the time the transaction is initiated.

Table 5: Store of value headline indicators

Indicator	Measurement instrument example
Percentage of adults who convert digital balances to cash on receipt	Nigeria Pilot: "You said you received money into your bank account/mobile wallet, what do you usually do with the money once it has been received?" – Take all the money out to hold as cash
Percentage of adults who convert some or all cash received into a digital store of value	Nigeria Pilot: "When you get cash as your income (from main income source), what do you usually do with it?" – Deposit all/some into my bank account/mobile wallet
Percentage of adults who store balances digitally	<i>No indicative questions in surveys</i>
Percentage of adults who check balances of digital stores of value	<i>No indicative questions in surveys</i>

With the exception of the Nigeria pilot survey, none of the demand-side instruments in this study include questions relating to these indicators. Data from the Nigeria pilot for Lagos on the first two indicators is illustrated in Figure 11. Note that the survey is not nationally representative.

Figure 11: Method of income receipt for main source of income and subsequent behaviour for respondents in Lagos (1,339 respondents)



* You said you received money into your bank account/mobile wallet, what do you usually do with the money once it has been received?" – Take all the money out to hold as cash

** When you get CASH as your income (from main income source), what do you usually do with it?" – Deposit all/some into my bank account/mobile wallet

Source: Lagos Nigeria Pilot (**note:** survey is not representative)

28 See Final Report, Nigeria Pilot, March 2019

Making payments

“Making payments” indicators consider various payment use cases together with the channels used to make these payments. The headline indicators and indicative survey questions are shown in Table 6.

Table 6: Making payments headline indicators

Indicator	Measurement instrument example
Percentage of adults who make fully digital payments by payment use case	insight2impact Mexico Pilot: QA1a: “In the past 12 months, did you (use case) using (device/channel)?” <i>Use cases must be defined</i> <i>Devices/channels must be defined</i>
Percentage of adults who make fully digital payments daily/ weekly/monthly/less frequently/ never	EFiNA Nigeria: MM7: “How often do you carry out these transactions?”
Percentage of adults who receive notification of digital payments made	<i>No indicative questions in surveys</i>

Payments data can be collected according to a specific use case (e.g. transport, education, food) and payment channel. Data from the Nigeria pilot survey for Lagos is shown in Figure 12.



Figure 12: Payments made in the past 12 months and channel used to make payment in Lagos

Transfer of use cases	Percentage of adults that made this payment	Channel used to make payment								
		Cash directly to merchant/ other non-digital channel	ATM	POS	Vendor merchant portal	Computer – Use internet banking	Phone – Use USSD	Phone – Use mobile phone app	Phone – Use internet banking	
Airtime/data bundles	98% ●	97% ●	8%	1%				28% ●	6%	2%
Food	97% ●	100% ●	1%	5%				1%	1%	
Public transport	93% ●	100% ●								
Clothing	89% ●	99% ●	3%	6%				5%	2%	1%
Hair care/visit hair salon	83% ●	100% ●	1%							
Send remittance inside Nigeria*	67% ●	69% ●	15%	4%				35% ●	11%	3%
Utility bills (water, electricity)	59% ●	99% ●	2%	2%				1%	1%	1%
Medical expenses	51% ●	99% ●	3%	4%				4%	1%	
Religious donations	50% ●	100% ●	1%	1%	1%			2%	1%	
Fuel	48% ●	100% ●	1%	10%				1%		
House rent	45% ●	94% ●	2%				1%	7%	3%	1%
Education	45% ●	90% ●	6%	1%	1%	2%	6%	5%	3%	
Contribution to savings group	24% ●	98% ●	1%					3%	1%	
Gambling	12% ●	99% ●	2%	1%	1%	1%	5%	5%	2%	
Business supplier/employees	9% ●	97% ●	7%	2%	1%	2%	11%	9%	2%	
Government rates and taxes	8% ●	89% ●	5%	2%	1%	2%	2%	3%	1%	
Paying off loans	7% ●	97% ●	6%	1%	1%	3%	14%	9%	3%	
Insurance	5% ●	72% ●	8%	3%			5%	8%	3%	
Investment savings/pension	4% ●	79% ●	6%	2%	2%	2%	15%	4%	2%	
Agricultural supplier/employees	1%	Small sample size								

*past six months

Q C1.1: "In the last 12 months, have you paid for the following...?"

Q C1.1.2: "You said you made payments for [... responses in C1.1...], can you tell me **all** the ways you have made payment for this?"

Q C2.3: "In the past 6 months, did you send money to family, friends or colleagues, or other people over a distance but still in Nigeria using ..."

Q C2.4: "In the past 6 months, did you send money to family, friends or colleagues or other people outside Nigeria using..."

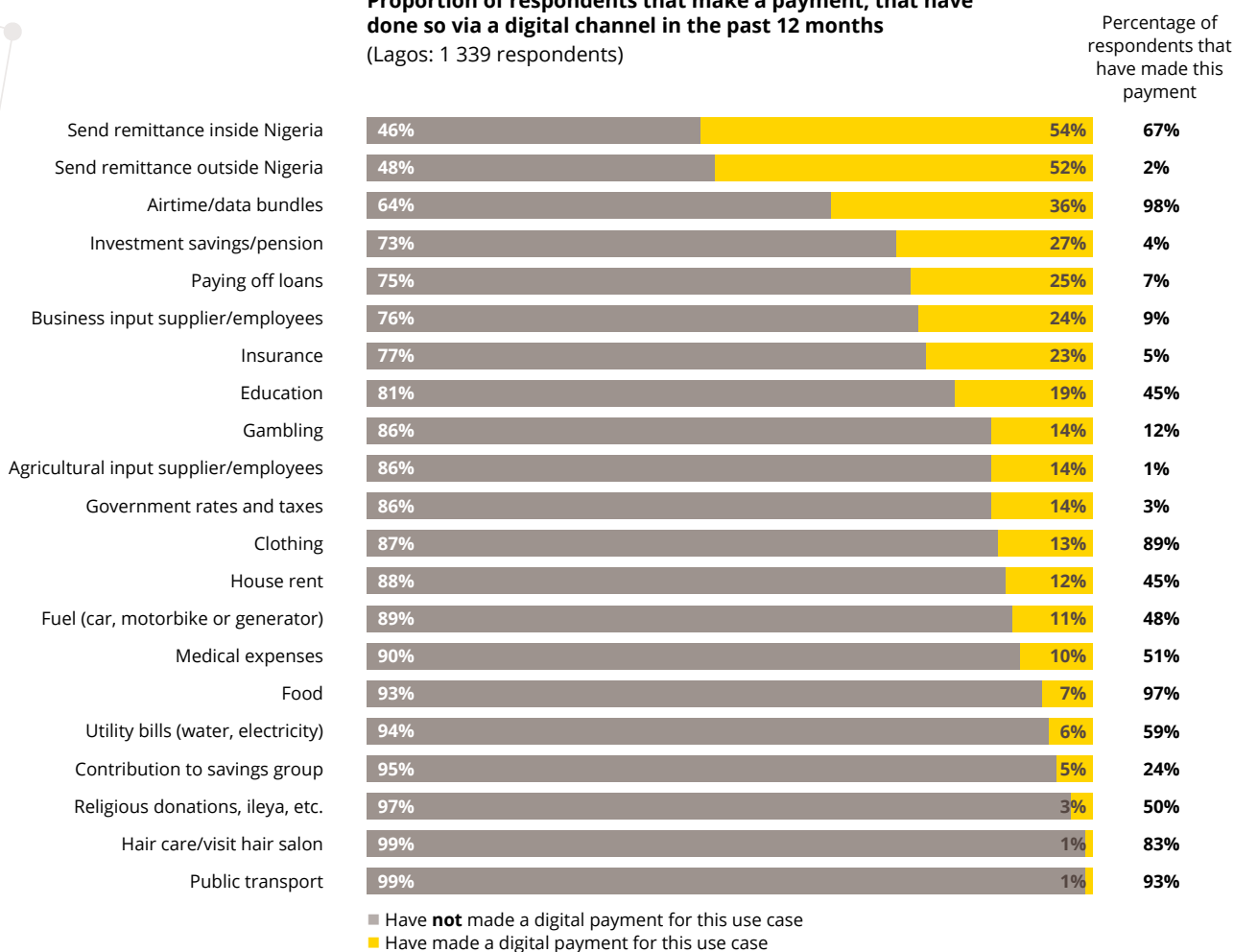
Source: Nigeria 2018 pilot

This data can be simplified to identify the extent to which a use case has been successfully digitised. As per Figure 13, the use case that is most commonly digitised is remittances, followed by airtime. A particularly interesting use case is gambling, a potentially useful cautionary indicator. Classifying payments in this way provides valuable detail about payments and value chains that could be digitised and can allow digital payment service providers and policymakers to identify specific opportunities to drive usage.

Figure 13: Making digital payments

Proportion of respondents that make a payment, that have done so via a digital channel in the past 12 months

(Lagos: 1 339 respondents)



Note: Digital channels include POS, ATM, phone and computer

Q C1.1: "In the last 12 months, have you paid for the following:...?"

Q C1.1.2: "You said you made payments for [... responses in C1.1...], can you tell me **all** the ways you have made payment for this?"

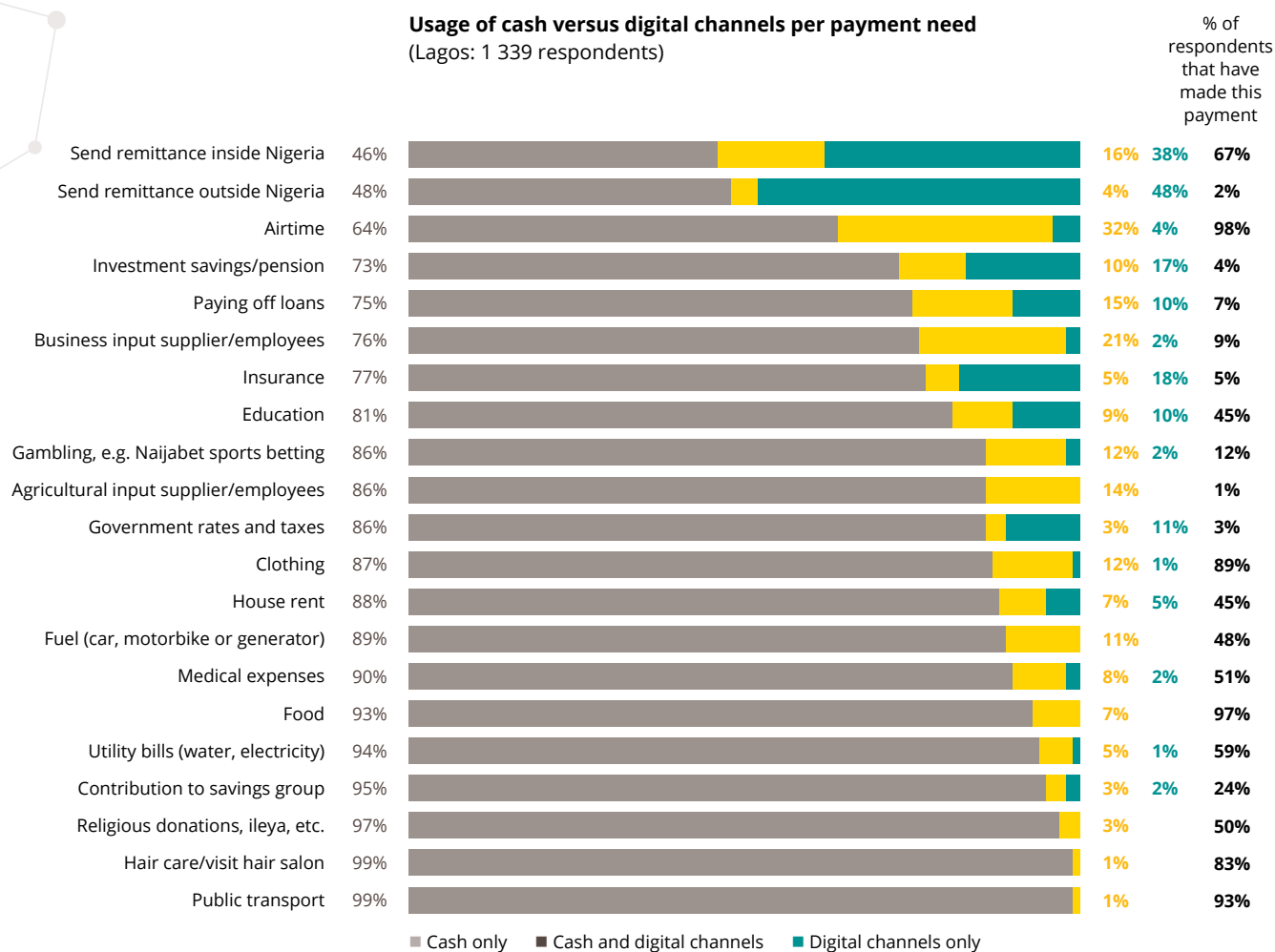
Q C2.3: "In the past 6 months, did you send money to family, friends or colleagues or other people over a distance but still in Nigeria using ..."

Q C2.4: "In the past 6 months, did you send money to family, friends or colleagues or other people outside Nigeria using..."

Source: Nigeria 2018 pilot

Unlike data on receiving income, data on making payments is collected in this survey instrument using a multiple-response format, identifying all ways in which payments for a specific use case are made, and not only the most common way in which the payment is made. This data can enable the identification of customers who only cite digital channels for specific use cases and those that use both cash and digital channels as shown in Figure 14. The significant level of overlap between cash and digital channels for some payment use cases demonstrates the value of a multiple-response format as opposed to single response. In countries where cash dominates, a single-response format will crowd out useful data on sporadic digital channel usage.

Figure 14: Overlap of cash and digital channels per payment use case



Note: Digital channels include POS, ATM, phone and computer

Q C1.1: "In the last 12 months, have you paid for the following...?"

Q C1.1.2: "You said you made payments for [... responses in C1.1...], can you tell me **all** the ways you have made payment for this?"

Q C2.3: "In the past 6 months, did you send money to family, friends or colleagues or other people over a distance but still in Nigeria using..."

Q C2.4: "In the past 6 months, did you send money to family, friends or colleagues or other people outside Nigeria using..."

Source: Nigeria 2018 pilot

In most of the surveys explored, questions relating to remittances sent to family, friends or colleagues are included in a separate stand-alone section of the questionnaire and may also be included with the more general list of payments. The timeframes on the two sets of questions differ; the remittance-only questions specify a six-month timeframe, whereas the more general payments refer to remittances over the past 12 months. In addition, the digital channels listed in the remittances section differ from those used for other payments.

Many of the surveys explored as part of this research did not include questions required to populate indicators relating to payment use cases by channel. For instance, the EFINA Nigeria 2016 survey includes a question about different payments made (payment use cases) but does not explore channels used to pay for each of these use cases. The Mexico survey also does not explore channels

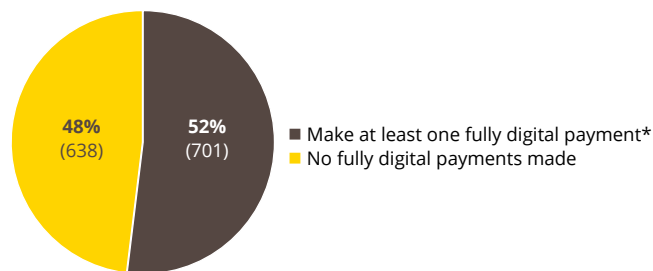


specifically. For example, that survey can indicate that the payment was made via a “transfer from an account” but does not specify whether the respondent initiated the transfer at a bank branch (not a digital channel) or via a phone (a digital channel).

The impact on survey length and complexity of a detailed exploration of use cases and channels may make researchers reluctant to adopt this indicator. It may therefore be optimal to reduce the number of variables (payment use cases and channel options) or to explore other ways of asking the question. This will, of course, reduce the granularity of the data, making the research instrument less useful for some audiences, particularly those looking for insights on specific payment use cases. Clearly, finding the right balance is critical; oversimplification may lead to a loss of insight, but at the same time a “laundry list” style survey may limit adoption. Defining priority use cases and channels is therefore an important aspect of implementing this framework successfully.

Where the data allows, as is the case with the Nigeria pilot survey data, it is possible to combine the data presented in Figure 12 into a composite indicator that considers all payments made. Based on the Nigeria pilot survey, 52% of respondents in Lagos have made at least one fully digital payment²⁹ in the last 12 months. The composite indicator, as illustrated in Figure 15, also includes those who sent a remittance via a digital channel in the past six months.

Figure 15: Made at least one fully digital payment in the last 12 months (Lagos, 1339 adults)



* Digital channels include ATM, vendor merchant portal, on the phone, via the internet

Q C1.1: “In the last 12 months, have you paid for the following...?”

Q C1.1.2: “You said you made payments for [... Responses in C1.1...]; Can you tell me **all** the ways you have made payment for this?”

Q C2.3: “In the past 6 months, did you send money to family, friends or colleagues or other people over a distance but still in Nigeria using ...”

Q C2.4: “In the past 6 months, did you send money to family, friends or colleagues or other people outside Nigeria using ...”

Source: Nigeria 2018 pilot

This composite indicator refers to any fully digital payment made in the past 12 months, which is arguably too long. On the other hand, some surveys do not specify a period for payments at all. This makes the composite indicator less useful because there is no sense of frequency or recency of usage. For example, the Cameroon survey refers to “regular payments” but includes no specified timeframe.

Determining an appropriate time interval is difficult and should be considered carefully. Some payments are by nature less frequent and would not be captured

²⁹ Digital channels include ATM, vendor merchant portal, on the phone, via the internet



if a narrower window is applied. For example, in Figure 12, 45% of respondents in Lagos say they pay rent. In Nigeria, rent is generally paid annually and, while this payment is infrequent, it is a significant household expense. By restricting the question to payments made in a specified window, such as the past 90 days, many of these less frequent payment use cases would fall away or be understated. We would therefore suggest that frequency indicators with regard to fully digital payments be reported on in aggregate and not by use case.

As with receiving income, none of the survey instruments analysed for this project explore digital payment notifications.

Box 5. Alternative approaches to collecting data on digital payments

A possible alternative to a detailed case-by-case exploration of use cases, payment frequency, platforms and channels is to include questions on frequency and recency of channels used to make payments. Some examples follow:

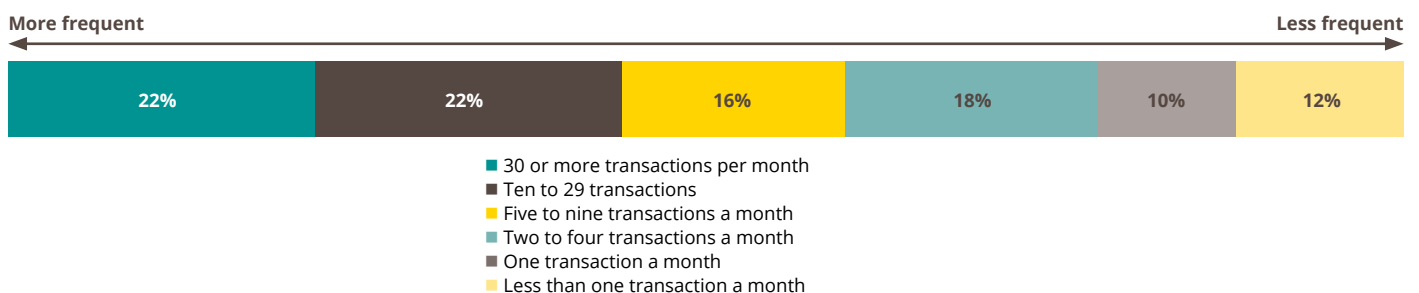
“How often do you make payments for goods and services using a [mobile phone/card swipe or POS/ATM etc.].?” (daily/weekly/once every two weeks/monthly/once every two to three months/less often/never)

“Thinking about the past 90 days, which of the following channels have you used to make a payment for a good or service?” (POS/mobile phone/ATM/etc.)

These questions could then be used to determine the proportion of the population that make fully digital payments on a weekly basis, or the proportion of adults that have made a fully digital transaction in the past 90 days.

An alternative or complementary data source for exploring digital payment usage behaviour in more detail is transactional data. This is arguably a better source of usage information, as it reflects actual behaviour, as opposed to reported behaviour that depends on accurate recall. An analysis of transactional data can include recency, frequency and value indicators, and in some cases can identify specific use cases where merchants are identifiable, for instance, using the merchant category codes (MCC) captured on POS payments. Some examples using NIBSS data are presented in Figures 16, 17 and 18, describing the frequency and recency of POS usage as well as usage of specific merchant codes. While that data is useful, we note it is not always accurate. There is no process to verify that merchant codes align with business activity. Beyond this, there may be incentives for merchants to misrepresent the nature of their business. In Nigeria, wholesalers are charged less than retailers, which explains the prominence of wholesalers in the data.

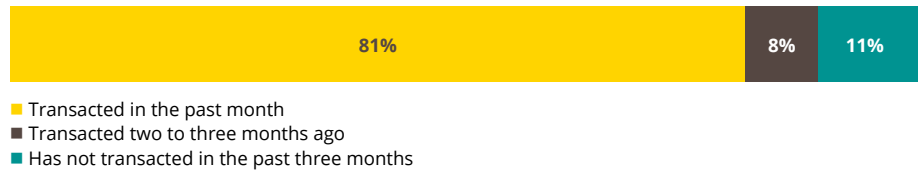
Figure 16: Frequency of transacting - number of POS transactions conducted per month (Unique customers from NIBSS data sample)



Source: NIBSS data sample

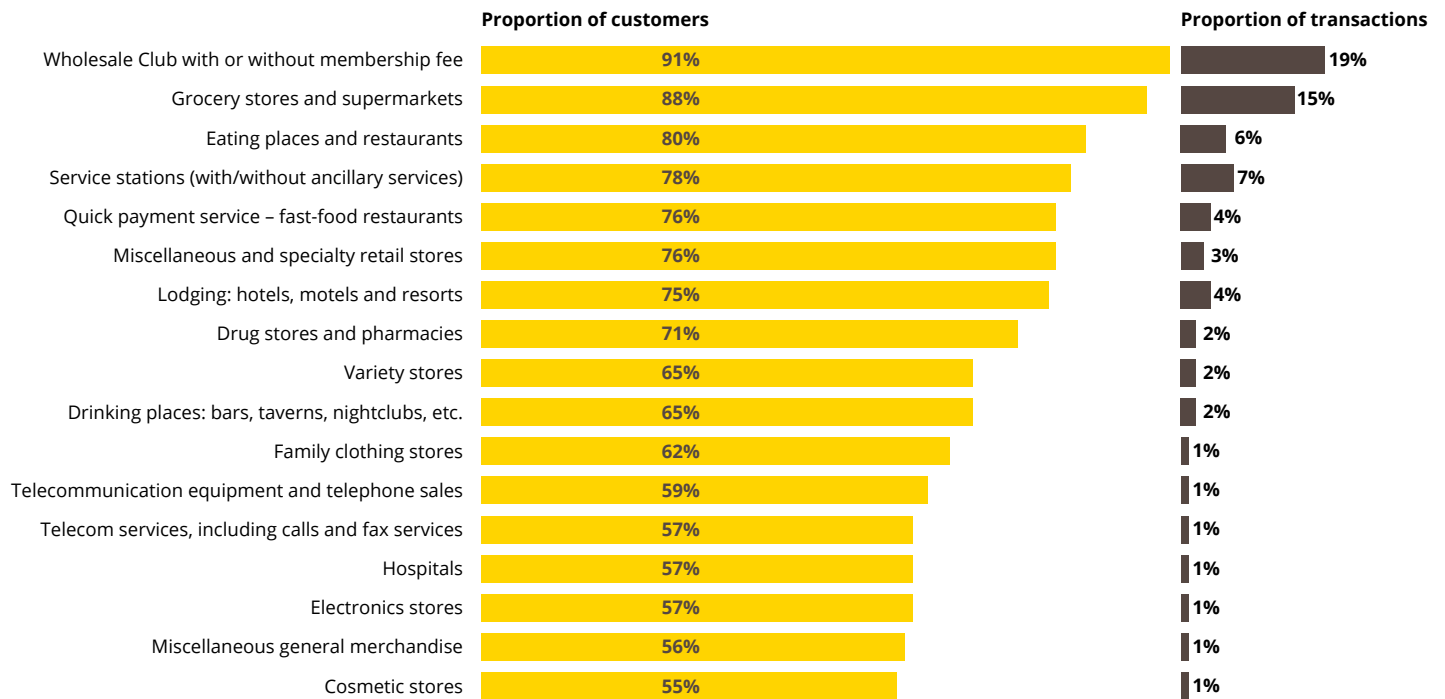


Figure 17: Recency of conducting a POS transaction (instant payment) (Unique customers from NIBSS data sample)



Source: NIBSS data sample

Figure 18: MCC code usage (top 10 visible codes)



Source: NIBSS data sample

Drivers

Indicators relating to drivers consider the motivations and barriers to using digital payments, such as perceptions of cost and convenience, trust in various channels, perceived reliability, experience of unsuccessful transactions, number of complaints lodged and resolved, and access to mechanisms for recourse.

Table 7: Drivers headline indicator

Indicator	Measurement instrument example
Percentage of adults that trust digital channels for making payments	FinScope Consumer Survey Cameroon: J1: "Thinking about your financial needs, how do you feel about using a [insert service]? Do you trust it, neither trust nor mistrust it, or would you say you do not trust it?"
Percentage of adults that have experienced a failed transaction by channel	Gathered by banking service providers or the central bank
Percentage of adults receiving income directly into a digital store of value	EFInA Nigeria: E9: "Please tell me from where/from whom do you usually get money to buy the things you need?" E12: "How do you receive the money you get from...?"



While all surveys reviewed as part of this research ask about trust at an institutional, product or device level, none explore trust at a channel level (e.g. USSD, internet banking or ATM). This is clearly a gap.

A key factor that shapes the willingness to use fully digital payment solutions is the perceived reliability of the solution on the part of both payers and receivers. Data on transaction failures is therefore useful. The Nigeria pilot survey includes a question on failures experienced per channel. That data indicates that 47% of respondents in Lagos who sent a domestic remittance via USSD have experienced a transaction failure. The vast majority of these respondents (more than 90%) indicate that these failures are linked to mobile networks, as opposed to payment platform instability.

Transactional data can also be used to track failures. For example, the data generated by NIBSS in Nigeria indicates that in most months less than 0.1% of instant payments fail. From a customer perspective, 16% of those who made an instant transfer have experienced one or more failed transactions in the past 18 months. Note that transactional data will only track transaction failures for transactions that have been initiated. Where there is a network problem that inhibits customers from initiating the transaction, this will not be visible through transactional data.

While the receipt of a digital payment is a useful indicator in itself, we have included it as a driver of making a fully digital payment. According to EFINA Nigeria 2016 data, of the 20.2 million adults who receive their main source of income or a remittance into an account, 12.6 million (62%) go on to make a fully digital payment. In contrast, of the 72.6 million adults that did not receive their income into an account, just 9% have made a fully digital payment.

Of course, a range of factors determine whether a consumer will make a digital payment, including age, gender, location (rural/urban), levels of education, income, income source and so on. To explore how significant receiving a digital payment is in determining whether a consumer makes a digital payment, we have used a conditional inference tree³⁰. The tree starts with the banked adult population and uses a t-test to identify the most significant predictor of whether a person makes a fully digital payment. The tree will split on this factor, creating two segments of adults. For each of these segments a t-test is run again to identify the next most significant predictor of whether a person in the new segment will make a fully digital payment and splits on this factor, and so on. The tree indicates segments that are the most or least likely to make a digital payment as per the chart in Figure 19. All splits are statistically significant at the 1% level.

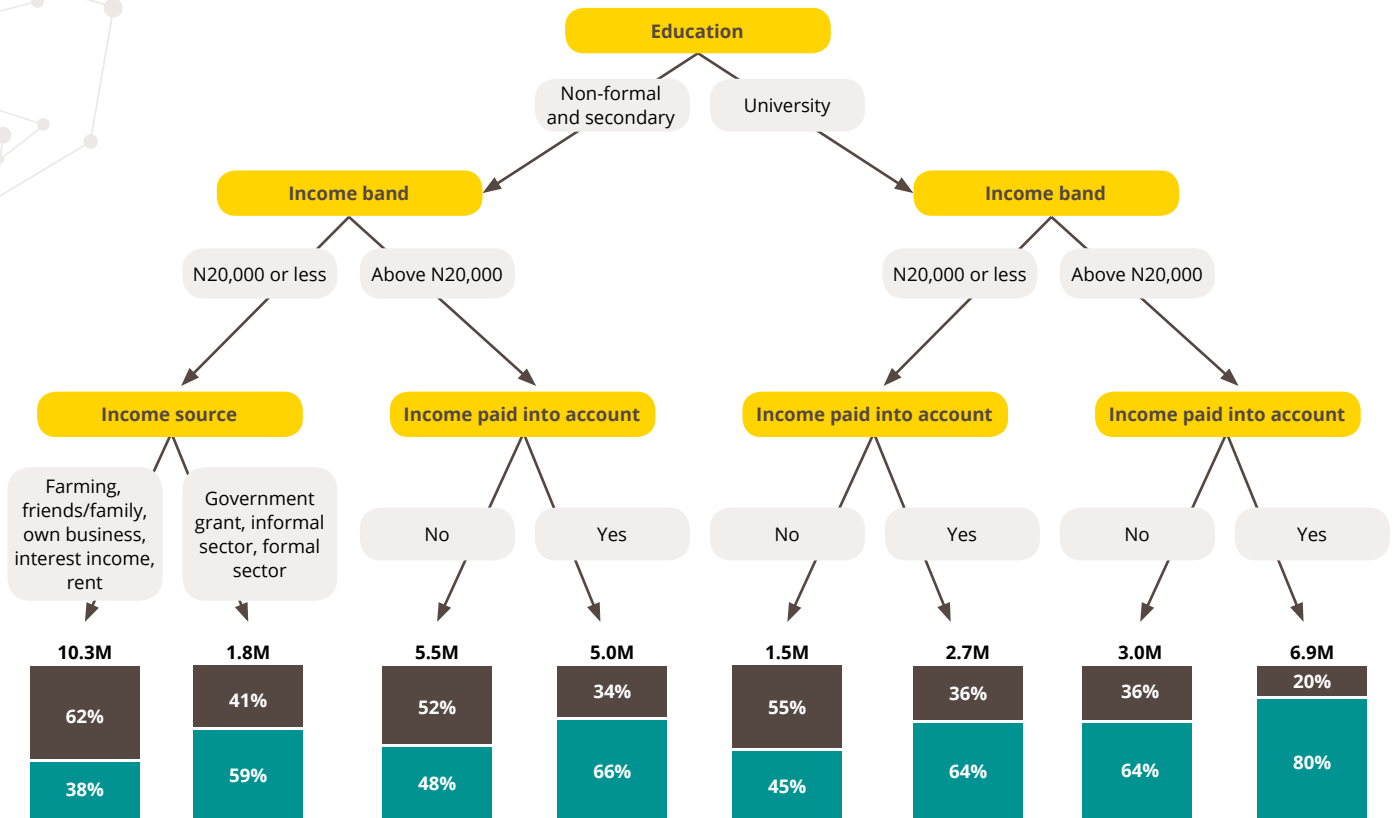
“

A key factor that shapes the willingness to use fully digital payment solutions is the perceived reliability of the solution on the part of both payers and receivers.

”

³⁰ The full list of independent variables used in this analysis are age, highest level of education, income band, gender, location (rural/urban), received payment into an account and main income source.

Figure 19: Conditional inference tree: factors associated with making a digital payment – banked population



■ Made at least one fully digital payment
 ■ Do not make a fully digital payment

Source: EFINA Nigeria 2016

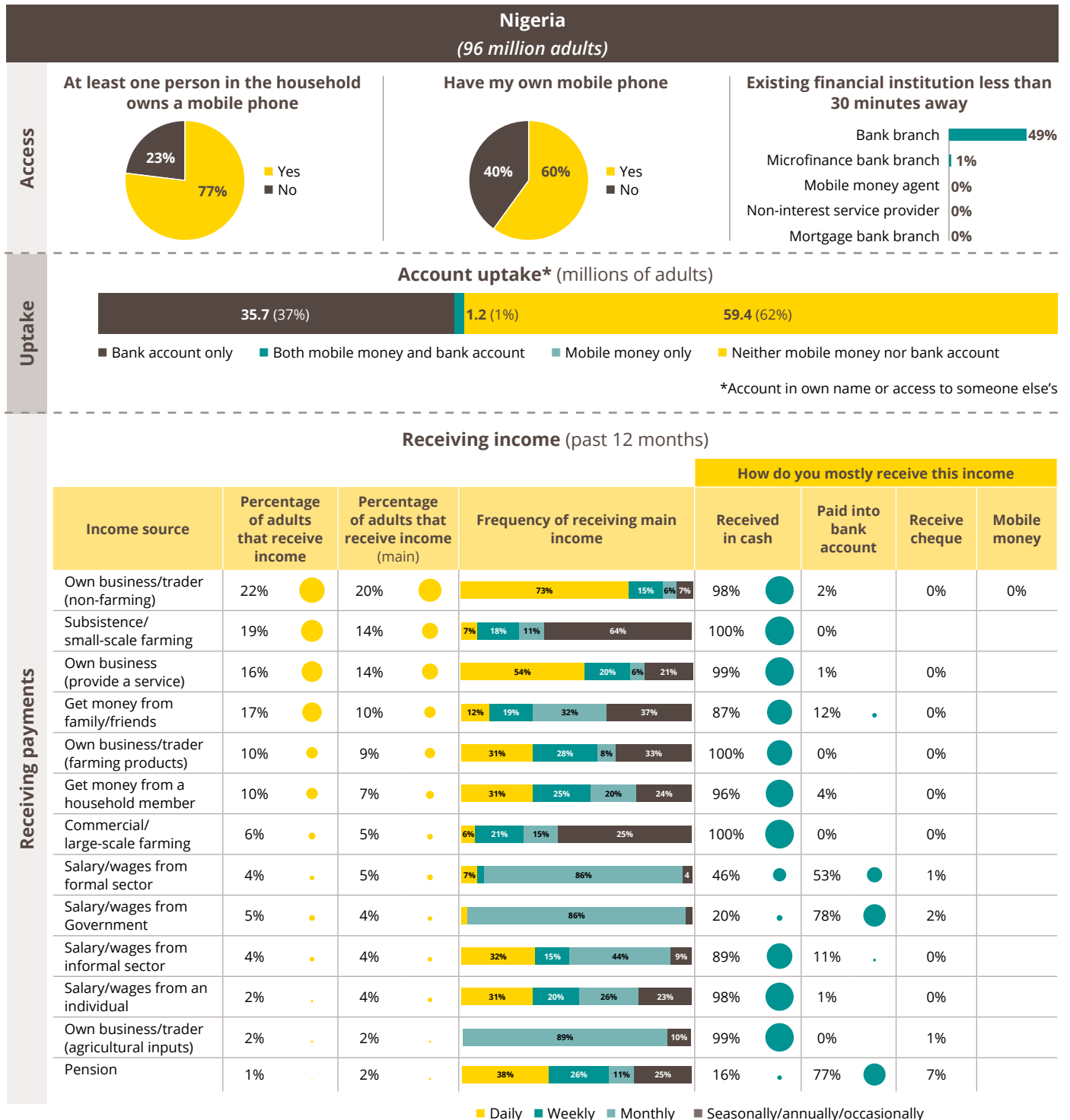
The analysis indicates that the four most significant determinants of making a digital payment are education level, income band, whether income is received into an account and income source (all significant at the 1% level). The remaining factors (age, gender, location) are also significant predictors of making a fully digital payment (also all significant at the 1% level), but they are not as significant as the factors displayed in the tree. In line with this analysis, the banked segment most likely to make a fully digital payment has a tertiary education, an income of more than N20,000 per month and receives that income into an account. This segment consists of 6.9 million adults, and 80% of them have made a fully digital payment. The segment least likely to make a digital payment has a secondary education or less, has an income of less than N20,000 per month, has farming as a main source of income, owns a business or receives money from friends or family. This segment consists of 10.3 million adults, and 38% have made a fully digital payment.

Clearly, education and income levels cannot directly be addressed by a digitisation strategy (they are relatively static, exogenous variables). However, there is some scope to influence how people receive their incomes, which the analysis suggests will have a material impact on whether they, in turn, make digital payments.

7. Summary and conclusions

Headline indicators can be combined into a digital-payments dashboard, providing a useful all-round view of the status of digital financial services in that country. In addition, some of the indicators described can be brought together to better understand the pathways to making fully digital payments. This is shown in the last panel of Figure 20 for the EFINA Nigeria 2016 data.

Figure 20: EFINA Nigeria 2016: Digital payments dashboard



Source: EFINA Nigeria 2016

Nigeria
(96 million adults)

Receiving remittances (past six months)

Receiving payments	Needs relating to receiving a remittance	Percentage of adults that make this payment	Channel/device used to receive this payment										
			Family/friend	Runner (e.g. taxi/bus/boat)	Cash card/prepaid card	Recharge card	Got airtime that you sold for cash	Cheque	Western Union	Money Gram	Agent (mobile money, bank or Bureau de Change)	Mobile money	Bank transfer (via Internet, telephone, account to account)
	You received money from friends or family members within Nigeria	33%	57%	7%	0%		2%	1%			0%	0%	49%
	You received money from friends or family members outside Nigeria	3%	24%	2%	0%	0%		0%	19%	10%	2%		55%

Main method of receipt for main income source and remittances (millions of adults)



Making payments

Making payments	Needs related to transfer of value	Percentage of adults that make this payment	Channel/device used to make payment								
			Cash	Cheque	Over-the-counter bank transfer	Cash card/prepaid card	ATM/debit card	Credit card	Internet banking	Mobile banking	Mobile money (e-wallet)
	Payments for goods and services	99%	99%	3%	11%	1%	11%	0%	1%	1%	0%
	Transport	81%									
	Social activities/entertainment	66%									
	Airtime/data bundles	64%									
	Medical expenses	63%									
	Education/school fees	41%									
	Utility bills	32%	99%	1%	11%	0%	7%	0%	1%	1%	0%
	Fuel (car, motorbike or generator)	31%									
	Rent	25%									

Source: EFINA Nigeria 2016

Nigeria
(96 million adults)

Sending remittances (past six months)

Usage: Making payments

Sending a remittance needs	Percentage of adults that receive this payment	Channel/device used make this payment										
		Family/friend	Runner (e.g. taxi/bus/boat)	Cash card/prepaid card	Recharge card	Got airtime that you sold for cash	Cheque	Western Union	Money Gram	Agent (mobile money, bank or Bureau de Change)	Mobile money	Bank transfer (via internet, telephone, account to account)
You sent money to friends or family members within Nigeria	20%	41%	5%	0%		2%	0%			0%	1%	62%
You sent money to friends or family members outside Nigeria	0%	13%	1%		1%			15%	1%	2%		71%

Made at least one fully digital payment (millions of adults)



■ Yes ■ No

Note: Fully digital payments include: payments for goods and services and utilities done via card, internet banking, mobile banking, mobile money and remittances done using bank transfer (via internet, telephone, account to account, etc.). This last category could include over-the-counter transfers but the survey instrument does not split these out and so the category has been included under fully digital

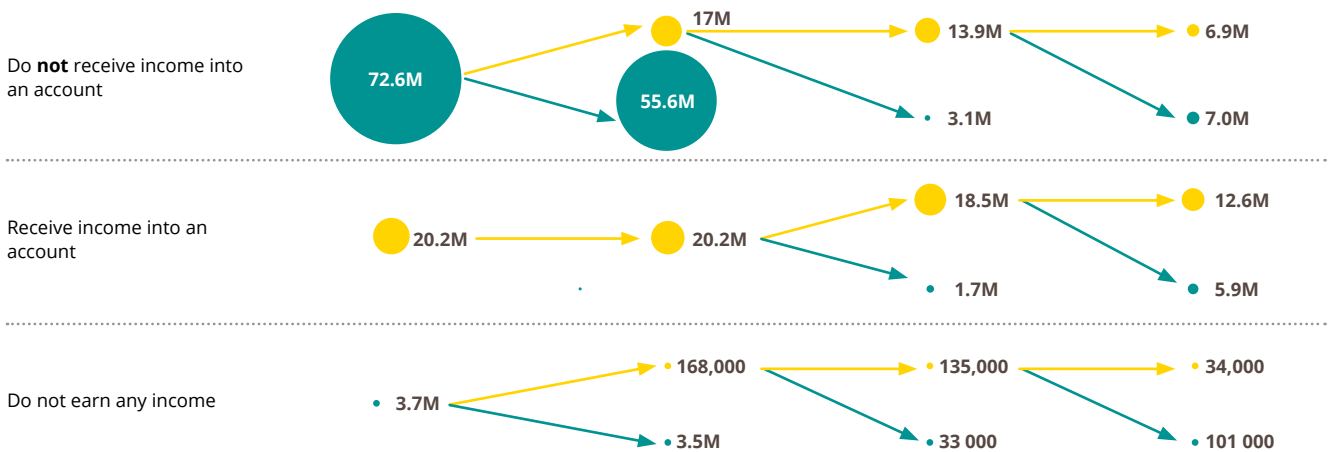
Usage journey

■ Yes ■ No



At least one income source received into an account Have an account (either in own name or access to someone else's) Account used in past 90 days Account used to make a fully digital payment

Financial journey



Source: EFINA Nigeria 2016

Note: Fully digital payments include payments for goods and services done via card, internet banking, mobile banking, mobile money and remittances done using bank transfer (via internet, telephone, account to account, etc.). This last category could include over-the-counter transfers, but the survey instrument does not split these out.



The master list of digital payments indicators identified through this study includes over 80 indicators. To make the list more manageable, these indicators have been structured into a framework, and a core set of headline indicators generated from demand-side data has been selected. While these indicators are relevant, reliable, easy to understand and feasible to populate, there is room to include other indicators. Not all the proposed headline indicators are useful to all audiences, and some audiences would arguably find other indicators more useful. In addition, the data sources used to determine and populate a final list of core digital payments indicators should incorporate supply-side and transactional data, and not only demand-side data. Nevertheless, the proposed core indicators serve as a platform around which to generate further discussion.

In addition, the process of populating indicators using demand-side instruments from four countries has itself produced five useful insights that may improve data collection. Of the 80 indicators identified as part of this research, very few could be populated for all four countries. Those that are populated across all countries often have seemingly small differences in the question and answer options that make a significant difference to the meaning, and meaningfulness, of resultant indicators.

The process of populating the indicators highlighted five key learnings for questionnaire design and analysis.



Not all the proposed headline indicators are useful to all audiences, and some audiences would arguably find other indicators more useful.



1. Start with a framework in mind

This study focuses on fully digital payments, where both the store of value and the channel used to make the payment are digital. This is stricter than other definitions that might incorporate face-to-face channels to initiate a payment instruction as long as the store of value is digital. Agents and bank tellers are necessary for cash-in/cash-out. However, they cannot match the anytime-anywhere proposition offered by digital channels. Many of the questionnaires reviewed as part of this research do not explore the channel used to make a payment. For example, many of the surveys refer to “bank transfers” or a “transfer from an account”. This could, however, be initiated with cash at a bank branch (not a fully digital payment) or via a phone (a fully digital payment). During the questionnaire design phase, there should be a good understanding of what the survey needs to measure so that the right questions be included. If the survey aims to focus on broader digital payments (any payment from an account), this requires different questions to a focus on fully digital payments.

2. Question structure is important

Questionnaires vary in their use of multiple-response versus single-response formats for receiving incomes and making payments. In some cases, surveys explore which mechanisms are mostly used (single response), as opposed to exploring all mechanisms. In countries where cash dominates, a single-response format will crowd out digital options, and digital payments will be under-reported.



More generally, subtle differences in question structure can have a big impact on indicators, especially when trying to compare across countries. While it would be ideal to work off a uniform or harmonised questionnaire, it is often not feasible or optimal to implement a rigid survey instrument given the differences across countries. To ensure full transparency, the exact question used should be noted when quoting an indicator to ensure it is interpreted in a way that is true to the data.

3. Be cognisant of the trade-off between a highly detailed questionnaire and respondent (and analysis) fatigue

A key component of this measurement framework is the payments grid, which describes the prevalence of various payments and the channels used to make these payments. Characterising payments in this level of detail can help to identify specific digitisation opportunities. It can also be used to track cautionary indicators such as spending on sports, betting or excessive take-up of digital loans. However, while useful, the inclusion of questions relating to specific payments and the channels used has a material impact on survey length. It also increases the analytical complexity of calculating a composite digital payment indicator derived from multiple underlying payment/channel variables. Think-tanks that conduct surveys, and donors who fund them, may therefore be reluctant to adopt this indicator.

In light of this, it may be optimal to reduce the number of variables (payment and channel options) or to explore other ways of generating similar data. This will, of course, significantly reduce the level of detail supported by the survey, possibly diminishing its utility for some audiences. Finding the right balance is



critical; oversimplification may lead to a loss of insight; but, at the same time, a “laundry list” survey may limit adoption. Defining priority use cases and channels is therefore an important aspect of implementing this framework successfully.

4. Think about timeframes

Timeframes are necessary to standardise and contextualise the answers provided by respondents. Financial inclusion indicators typically refer to usage in the “past 90 days”. However, this may not be optimal when considering specific payment use cases and payments that are, by nature, infrequent. For example, rental payments in Nigeria tend to be made annually. While infrequent, this payment is often a significant household expense. When considering the recency and frequency of digital payments in general (i.e. not per payment use case), a shorter timeframe is more useful and likely to provide more accurate data.

5. Consider transactional or alternative data sources

Demand-side surveys are less useful at gauging usage intensity. While it is easy for a respondent to provide data on adoption of bank accounts or mobile-money wallets, and even the various items and services they have recently paid for, accurate recollection of frequency, recency and value may prove more difficult – particularly over longer periods. Transactional data can be used to fill this gap, as it generally includes a time stamp as well as a value and other useful data points such as channel and whether the transaction failed. In the case of mobile payments, the data may also be geo-coded, which enables detailed spatial analysis. Aside from the richness of transactional data, it is costless to gather; it is generated as a by-product of the transaction itself.

However, transactional data is not without limitations. In some cases, customer or merchant data (as opposed to the data relating to the transaction itself) gathered by FSPs is of poor quality and may not be well maintained. In the case of merchant codes provided in Nigeria for instance, the data relies on merchants themselves to classify activity and reflects a bias in line with the differentiated pricing structure that requires some industries to pay higher interchange fees than others. In addition, in most countries the analysis of transactional data requires the active cooperation of FSPs directly. While these institutions may undertake customer level analysis for internal consumption, they may be reluctant to share findings. For the time being, their willing cooperation is critical; regulators typically do not gather transactional data but rely on aggregated data collected periodically, while central infrastructure such as payment switches may not have a unique customer identifier to facilitate a customer-level analysis. That said, there may be sufficient interest in financial inclusion and a growing appreciation of the potential value of industry-wide collaboration on key research topics. Likewise, the supervisory activities of regulators may in the future include an analysis of transactional data as the potential of that data becomes more apparent and as the costs of sharing the data decline.

“

Financial inclusion indicators typically refer to usage in the “past 90 days”. However, this may not be optimal when considering specific payment use cases and payments that are, by nature, infrequent.

”

8. Appendix:

Full list of indicators, populated by country

Access					
Sub-category	Indicator	Nigeria	Cameroon	Zimbabwe	Mexico
Infrastructure density	Number of bank branches per 100,000 adults/per 1,000 sq. km	-	-	-	-
	Number of ATMs per 100,000 adults/per 1,000 sq. km	-	-	-	-
	Number of POS devices per 100,000 adults/per 1,000 sq. km	-	-	-	-
	Number of mobile agents per 100,000 adults/per 1,000 sq. km	-	-	-	-
	Percentage of adults with access to an ATM	-	-	-	-
	Percentage of adults with access to cash-in/cash-out facilities (transactional indicator)	-	-	-	-
Mobile and internet access	Percentage of adults that live in areas where there is mobile coverage	99%	58%	88%	100%
	Percentage of adults that can access a mobile phone	77%	99%	-	-
	Percentage of adults who own a mobile phone	60%	99%	-	-
	Percentage of adults who can access a smartphone	-	61%	-	-
	Digital literacy; % of adults that use their phone for more than just phone calls	-	89%	-	-
	Percentage of adults who use the internet	-	59%	-	-
Service availability	Availability of bill payments via mobile money (yes/no)	-	-	-	-
	Availability of international remittances via mobile money (yes/no)	-	-	-	-
	Availability of merchant payments via mobile money (yes/no)	-	-	-	-
	Availability of credit via mobile money (yes/no)	-	-	-	-
Awareness	Awareness of mobile money	16%	-	-	-
	Aware of mobile money provider/s (awareness of at least one provider)	11%	-	-	-
	Awareness of channels (debit order, mobile payments, etc.)	-	-	-	-
	Awareness of ombudsmen, awareness of regulators	-	-	-	-
Regulatory environment	Prudential/market conduct strategy in place (yes/no)	-	-	-	-
	Financial inclusion strategy/policy in place (yes/no)	-	-	-	-

Uptake					
Sub-category	Indicator	Nigeria	Cameroon	Zimbabwe	Mexico
Bank account uptake	Percentage of adults with bank account in their own name	33%	10%	52%	10%
	Percentage of adults that do not have a bank account in their own name, but make use of someone else's account	5%	1%	6%	-
	Percentage of adults that had a bank account in the past, but do not currently have one	-	11%	14%	-
	Percentage of adults that have never used a bank account	-	78%	26%	-
Mobile-money account uptake	Percentage of adults that are registered mobile money account holder/have account in own name	1%	40%	81%	-
	Percentage of adults that have used a mobile money service but are not registered/ use someone else's account	0%	6%	0%	-
	Percentage of adults that had a mobile money account in the past, but do not currently have one	0%	15%	3%	-
	Percentage of adults that have never used mobile money services	98%	15%	9%	-
Account access (both bank and mobile money)	Percentage of adults who own/are registered to use a digital store of value (including bank account/e-wallet, credit account/facility or stored value card)	38%	50%	91%	-
	Percentage of adults that have access to a bank and mobile money account	1%	18%	-	-

Account usage					
Indicator	Nigeria	Cameroon	Zimbabwe	Mexico	
Percentage of adults that have access to a bank account that have used the account in the past 90 days	88%	-	-	-	
Percentage of adults that have a mobile money account that have used the account in the past 90 days	78%	-	-	-	
Percentage of adults that have access to an account (either a bank or mobile money account) and have used the account in the past 90 days	88%	-	55%	-	

Receiving payments				
Indicator	Nigeria	Cameroon	Zimbabwe	Mexico
Percentage of adults that receive income source (business owner/salary and wages/farming etc.)	Multiple indicators			
Frequency of receiving income by income source	Multiple indicators			
Percentage of adults that receive income source into account by income source	Multiple indicators			
Percentage of adults that receive an income (non-remittance) into an account	9%	24%	-	14%
Percentage of adults that receive an income (non-remittance) in cash	91%	70%	-	57%
Percentage of adults that receive an income in cash, that deposited as least part of this cash into an account	-	-	-	5%
Percentage of adults that receive their income (non-remittance) into an account and withdraw all the funds immediately	-	-	-	-
Percentage of adults that receive a domestic remittance	33%	31%	-	11%
Percentage of adults that receive a cross-border remittance	3%	7%	-	8%
Percentage of adults that receive any remittance (domestic or cross-border)	34%	33%	-	15%
Percentage of adults that receive a domestic remittance, % that did so into a mobile money account	0%	45%	-	-
Percentage of adults that receive a domestic remittance, % that did so into a bank account	49%	11%	-	28%
Percentage of adults that receive a cross-border remittance, % that did so into a mobile money account	-	22%	-	-
Percentage of adults that receive a cross-border remittance, % that did so into a bank account	55%	29%	-	13%
Percentage of adults that receive any income or remittance into an account	22%	-	77%	16%
Percentage of business owners that accept card payments	-	-	-	-
Percentage of business owners that accept account transfers	-	-	-	13%
Percentage of business owners that accept any non-cash payments	-	-	-	-

Making payments					
Sub-category	Indicator	Nigeria	Cameroon	Zimbabwe	Mexico
Payment devices	Percentage of adults that have used a card to make a payment	-	-	-	7%
	Percentage of adults that have used a cheque to make a payment	-	-	-	-
	Percentage of adults that have made a transfer from their account into another account	-	-	-	-
	Percentage of adults that have made a payment via debit order or direct debit	-	-	-	-
Payment channels	Percentage of adults that have used the internet to make a payment from their account	1%	-	1%	-
	Percentage of adults that have used a mobile phone or internet to make a payment from their account	1%	-	52%	-
	Percentage of adults that have used an ATM to make a payment from their account	-	-	-	-
	Percentage of adults that have used a card swipe to make a payment from their account	-	-	-	-
	Percentage of adults that have made a fully digital payment	-	-	-	-
Payment by need	Percentage of adults that sent a domestic remittance	20%	31%	-	8%
	Percentage of adults that sent a cross-border remittance	0%	3%	-	-
	Percentage of adults that sent either a domestic or cross-border remittance	20%	32%	-	-
	Percentage of adults that sent a domestic remittance, % that did so using a digital channel	-	-	-	-
	Percentage of adults that sent a cross-border remittance, % that did so using a digital channel	-	-	-	-
	Frequency of making payment by payment need	-	-	-	-
	Percentage of adults that make payment for airtime/transport/education/utility bills, etc.	Multiple indicators			
	Percentage of adults with each payment need, percentage that used a digital channel to make payment	Multiple indicators			

Drivers				
Indicator	Nigeria	Cameroon	Zimbabwe	Mexico
Percentage of adults that trust banks	-	45%	60%	-
Percentage of adults that trust mobile money providers	-	69%	80%	-
Percentage of adults that trust channels for making payments (mobile phone, internet, ATM etc.)	-	-	-	-
Number of lodged/resolved complaints	-	-	-	-
Percentage of adults that have experienced a failed transaction per channel used	-	-	-	-
Percentage of adults receiving income directly into a digital store of value	22%	-	77%	16%

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