BTCA Ghana Country Diagnostic

DRAFT FOR TECHNICAL REVIEW

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BTCA Ghana Diagnostic Report

Executive Summary

This Diagnostic Report demonstrates that Ghana has already started its journey towards cash-lite. Certain critical elements for a shift to digital payments are already in place, including good connectivity, growing financial infrastructure, an enabling regulatory environment, and strong government buy-in. There are, however, certain challenges on this journey, including lack of interoperability of key payment instruments, strong consumer preference for cash, and business preferences for cheques, among others. To support further progress towards cash-lite, this report recommends incentivizing digital merchant payments, digitizing government procurement, leveraging electronic fund transfer infrastructure, rolling out a biometric national ID, and implementing payment interoperability. Realisation of these measures may well bring Ghana to the tipping point on its journey to digital payments.

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Key Findings

- Good connectivity, above average level of financial inclusion, broad reaching mobile money agent networks, and enabling regulation all support a shift to digital payments.
- The Government is also leading the way, both in setting the tone from the top and in the digitization of its own payments.
- Despite this positive context, 99% of all payments by volume are currently being made in cash, due mainly to individuals purchasing consumption goods in cash.
- Although businesses are moving to electronic payments for high-value transactions, most still have a strong preference for cheques.
- The Government's agenda strongly supports the roll-out of the biometric e-zwich card for government payments, but so far this has not been adopted more widely by neither individuals nor the private sector due to lack of interoperability and limited merchant acceptance.

Government Payments

- With almost 100% digitisation of all government to person ("G2P") payments and 100% digitisation of government-to-government ("G2G") payments, Ghana has achieved the first level of digitisation of payments within these use cases. However, as e-zwich has been the digital payment instrument of choice, and most e-zwich transfers are immediately

cashed-out, there are still issues to be addressed in regard to how such funds can be retained in the electronic payments ecosystem.

- Although the Government has made great strides with G2P and G2G, they only make up a small part of overall government payments, and the main use case by volume – government to business payments ("G2B") - is still 90% in cheques.
- Almost all government procurement payments are made by cheque, and they make up 85% of all government payments by volume.
- This high prevalence of cheques in procurement is due to the fact that each government agency pays its own suppliers in the way it sees fit, rather than using a centralised system, as is the case for G2P and G2G.

Business Payments

- 78% of all business transactions are cash-based, due mainly to the prevalence of cheque payments (approximately 98%) in business to business (B2B) payments.
- Businesses prefer to make payments by cheques as they act as a cash flow management tool and are perceived to provide better legal recourse than EFT payments.
- Businesses mainly make EFT payments for salaries and pension contributions.

Individual Payments

- Payments by individuals account for the largest volume of payments in the Ghanaian economy, with person-to-business ("P2B") transactions representing 94% by volume of all payments in the ecosystem.
- 99% of all transactions by individuals are cash, due mainly to cash purchases by individuals of consumption goods.
- In addition to the informal economy, this preference for cash results from: (i) the high cost of digital payments that is often passed on to users; (ii) trust issues with using digital payments; and (iii) the convenience of cash.
- 29% of the value of all transactions by individuals is digital, due mainly to the high value of remittances, both international and domestic.

Fees & Fines to Government Use Case

- Most fee and fine payments by individuals are made in cash while payments by businesses are made by cheque.
- Ghana's e-government portal provides the necessary infrastructure for digital payments if the challenges set out in this report can be successfully addressed.
- This use case has the potential to improve revenues for the Government while benefiting citizens in terms of reduction in transaction and opportunity costs.

Public Utilities Use Case

- Cash is the main instrument, with only little high-value EFT used by businesses.

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- The potential impact of this use case is significant, as 80% of the population uses these services and payments are regular and habit-forming.
- Electricity may provide a quick win given that 20% of its infrastructure includes smart meters, which can be used for end-to-end digital payment and distribution.
- Water is more promising in the long term from the perspective of end-to-end digital delivery and payment, as its current post-paid infrastructure provides a clean slate for the introduction of a single type of smart pre-paid meter.

Fast-Moving Consumer Goods ("FMCG") Value Chain Use Case

- Cheques are the main payment instruments for FMCG companies, both for receiving distributor payments and for making vendor/employee payments.
- Because most cash transactions by individuals are for purchases of consumption goods, the FMCG value chain is cash-statured from the bottom up, with the cash entering the formal economy eventually in the form of cheques from distributors to manufacturers.
- Although FMCG companies can offer a variety of incentives to push digital payments, given the indirect distribution model, the shift must be an industry-wide effort with government support. Financial service providers that offer innovative merchant solutions may be best-placed to accelerate the shift to digital payments at the merchant/retailer level.

Key Recommendations

- Introduce private and government incentives to push merchant payments.
- Achieve digitisation of G2B payments through e-procurement.
- Incentivize the use of EFT/RTGS in B2B payments.
- Roll out a biometric centralised national ID system.
- Implement interoperability for all payment instruments.

Outline

This report consists of five primary sections. The first section is a review of the country context, which looks at macroeconomic indicators, the financial services ecosystem, and the payments landscape. The second section focuses on policy and regulation, while the third section highlights key findings from the payment grid according to type of payer. The fourth section presents the key findings for three selected use cases – government fees and fines, public utilities, and the fast-moving consumer goods ("FMCG") value chain – while the final section identifies five key accelerators for Ghana's shift to cash-lite and maps potential roadmap scenarios.

It should be noted that the terms "*electronic payment*" and "*digital payment*" have been used interchangeably, and both refer to the same types of non-cash payments.

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This report is based primarily on in-country research that was undertaken between April and June 2017, including qualitative interviews with stakeholders, as well as the analysis of primary data and secondary literature. We have followed the BTCA diagnostic methodology as first articulated by Bankable Frontiers Associates in 2013, with some minor changes that have been identified in this report.

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1. Country Context

1.1 Macroeconomic context

Ghana is a lower-middle income country with a population of 28.21 million. Ghana's Gross Domestic Product ("GDP") is USD 117.16 billion in Purchasing Power Parity ("PPP") terms and the per capita income is USD 4,150 (in PPP terms).[1] The poverty rate was 24.2% as of 2013.[2] Further, nearly 45% of the population live in rural areas.[3]

GDP growth and national spending

General economic performance during 2016 was mixed. Ghana's target of further narrowing the fiscal deficit to 5.3% of GDP failed with the deficit ballooning to 9% of GDP.[4] Provisional Real GDP grew by 6.6% year-on-year in the first quarter of 2017. This is compared to a growth of 4.4% for Q1 2016. In future projections, the Government of Ghana (the "Government") estimates that real GDP will expand by 6.3% in 2017, with non-oil GDP growing at 4.6% over the same period. Real GDP is projected to grow at 9.1% and 6.9% in 2018 and 2019, respectively.[5]

Economic prospects

The increase in near term economic prospects is supported by a positive outlook by the Bank of Ghana ("BoG") for business sentiment, which will help in encouraging private-sector investment. A rebound in commodity prices will further stabilise the exchange rate and create employment.[6]

Ghana continues to struggle with a high fiscal deficit, widening public debt and inflation.[7] To combat this, the Government is in talks with the International Monetary Fund ("IMF") regarding an extension of its previous financial assistance package due to expire in April 2018. This may help in the fiscal adjustment process, but the Government is expecting a sizeable jump in tax revenues brought on by increased compliance and a reduction in exemptions. The IMF regards these revenue projections as optimistic. Fiscal slippages and low commodity prices were listed as one of the major causes of previous economic uncertainty.[8]

This does not overlook other, substantial risks. Uncertainties in the global commodities market could negatively affect foreign direct investment ("FDI") into Ghana. Additionally, Ghana is likely to face continued high domestic and external financing costs as its debt continues to expand and global interest rates rise. High youth unemployment, delays in the resolution of debt from state-owned energy companies, and the high cost of electricity combined with the mismatch of capacity and demand present further challenges going forward.[9]

Government policies

Political stability is expected to remain strong following the victory of Nana Akufo-Addo and his New Patriotic Party in the recent 2016 elections. A main policy of the Government includes

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pushing forward industrialisation, which is expected to open opportunities for the private sector. This is restricted, however, by a tight fiscal policy that will restrain more ambitious goals such as the opening of hundreds of factories. It may be balanced out by further natural resource extraction in oil and gas.[10] Special initiatives such as the National Identification Scheme and the National Digital Address System will be implemented as part of measures to broaden the tax base,[11] further details to be discussed in Section 2.

Connectivity status in Ghana

Ghana's telecommunications ("telecom") sector enjoys great competition. There are currently six mobile telecom operators – MTN, Tigo. Vodafone, Airtel, Glo and Expresso. MTN has a market share for voice of 50.4% followed by Vodafone (21.6%) and Tigo (13.9%).[12] Mobile phone penetration stands at 135% in 2016, an 11% Compound Annual Growth Rate ("CAGR") from 99% in 2012.[13] Geographic coverage of the population is significant, with MTN covering 79% of districts in Ghana.[14] The mobile data penetration rate has also increased from 0% in 2012 to 69.8% by end 2016,[15] indicating that mobile phone access has driven Internet usage.

FIGURE 1.1: MOBILE PHONE AND SMART PHONE PENETRATION

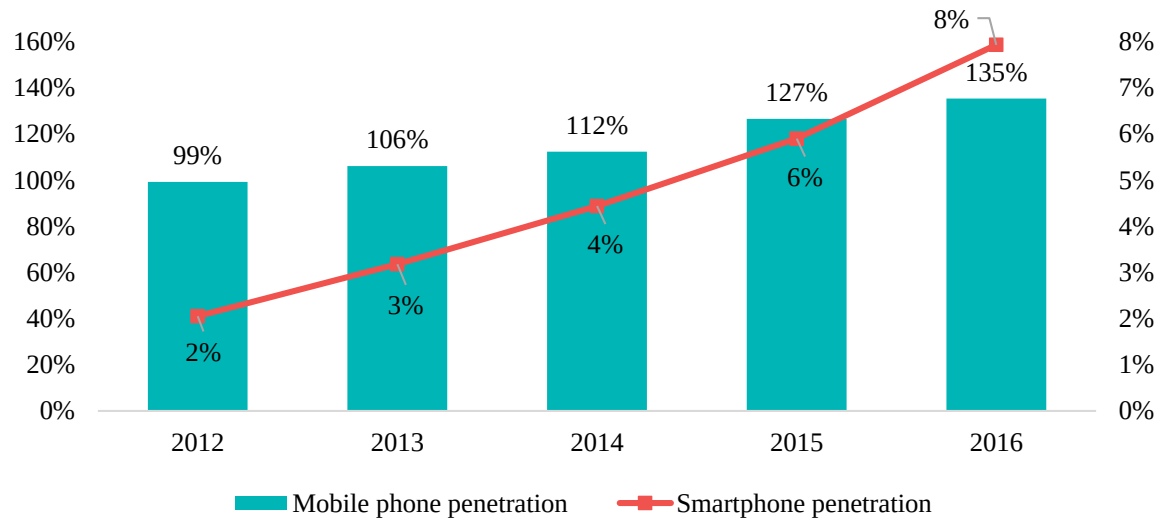

FIGURE 1.2: MOBILE DATA AND NON-MOBILE INTERNET PENETRATION

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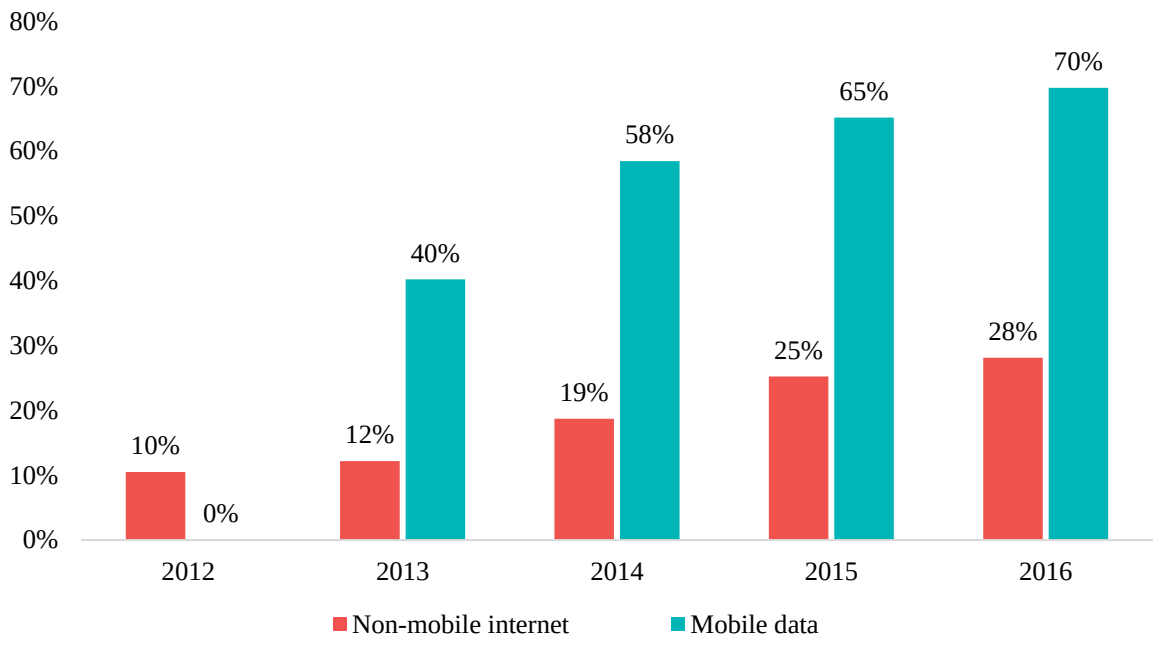

1.2 Financial sector landscape

Ghana's financial services landscape is dominated by deposit-taking institutions comprised of universal banks and non-bank financial institutions ("NBFIs") such as savings and loans companies, microfinance institutions ("MFIs") and licensed susus.

As of June 2017,[16] there are 37 deposit money banks ("DMB") operating in Ghana with a concentration of branches and Automated Teller Machines ("ATMs") in Accra, Tema, Kumasi, Takoradi, and Tamale. There were also 141 licensed Rural and Community banks as of June 2017.[17] The DMBs operated with 1,341 branches and employed 19,977 persons in 2016, having seen an increase of over 14% in bank branches from 2015.[18] With 4.8 bank branches per 100,000 persons, there is still room for growth. Additionally, agent banking, which can expand a bank's physical presence, is not yet well-developed. To date, only Fidelity Bank has an active network of agents with whom customers can perform deposit and withdrawal transactions.

In addition, there were 564 MFIs[19] and 37 Savings and Loans companies[20] as of January 2017. These NBFIs operate mainly in peri-urban and rural communities. In recent years, several NBFIs have obtained a universal banking license and transitioned to full-scale banking operations, including First Capital Plus (now Capital Bank), Union Savings and Loans (now OmniBank), City Investment Company (now Premium Bank), Beige Capital (now Beige Bank) and Ghana Home Loans (which is yet to rebrand).

Complementing the role of traditional NBFIs in deepening access to financial services are licensed Susu companies. In the Susu model, an individual agrees to make daily contributions

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(savings) to a Susu collector, who is employed by a Susu company, for a period of 31 days. The Susu company retains one day's contribution as a commission for the daily door-step collection of savings contributions. Based on data from the Ghana Cooperative Susu Collectors Association ("CSCA") as of September 2016, the association had 505 licensed members, about 264,000 customers and a total savings portfolio of GHS 20.2 million (USD 5.1 million).[21]

Industry balance sheet[22]

The aggregate assets of the banking industry increased by about 29% from GHS 74.4 billion (USD 17 billion)[23] in 2015 to GHS 96.5 billion (USD 22 billion) at the end of 2016. The growth was underpinned by a 16% (GHS 37.1 billion) increase in loans & advances. DMBs accounted for 85.6% of the total industry assets, compared with 85.1% in 2015.

The growth in total assets was funded mainly from deposits, which increased by 28% from GHS 41.3 billion (USD 10 billion) in 2015 to GHS 61.5 billion (USD 239 billion) in 2016.

Insurance, brokerage, investment management, and pensions

According to data from the Ghana Insurers Association, there were 23 life and 26 non-life insurance companies[24] as of Dec 2016. In a May 2016 *Business World Ghana* online report,[25] insurance asset ownership was about 5% in the financial sector and insurance penetration as a percentage of GDP hovered around 1.85% as of March 2016. A January 2016 research report by Ernst & Young[26] projects that Ghana's insurance market will grow by 8.5% annually between 2014 and 2018, expanding from USD 400 million to USD 600 million.

The micro-insurance sector is generally known for loyalty-based, freemium products. Micro-insurance companies such as BIMA, MicroEnsure and aYo, a joint venture between MTN Group and MMI Holdings, have formed strategic partnerships with mobile money providers ("MMPs") and banks to offer customer insurance policies that cover life, hospitalisation, maternity, and disability, among others, with a one-month validity. These micro-insurance companies also actively cross-sell paid-for policies that extend insurance coverage to families and offer higher payout benefits.

As of January 2017, the National Pensions Regulatory Authority had granted approval to 78 companies[27] to operate as Pension Fund Managers. Pension products have been developed mainly for workers in the formal sector in an economy that is largely informal. It is estimated that about 70% of the Ghana workforce is informal and does not have access to any pension scheme.[28] The People's Pension Trust has partnered with Vodafone and Dusk Capital to develop a mobile-enabled pension product that is targeted at informal workers.[29] This innovative pension product allows workers in the informal sector to make voluntary pension contributions through Vodafone Cash.

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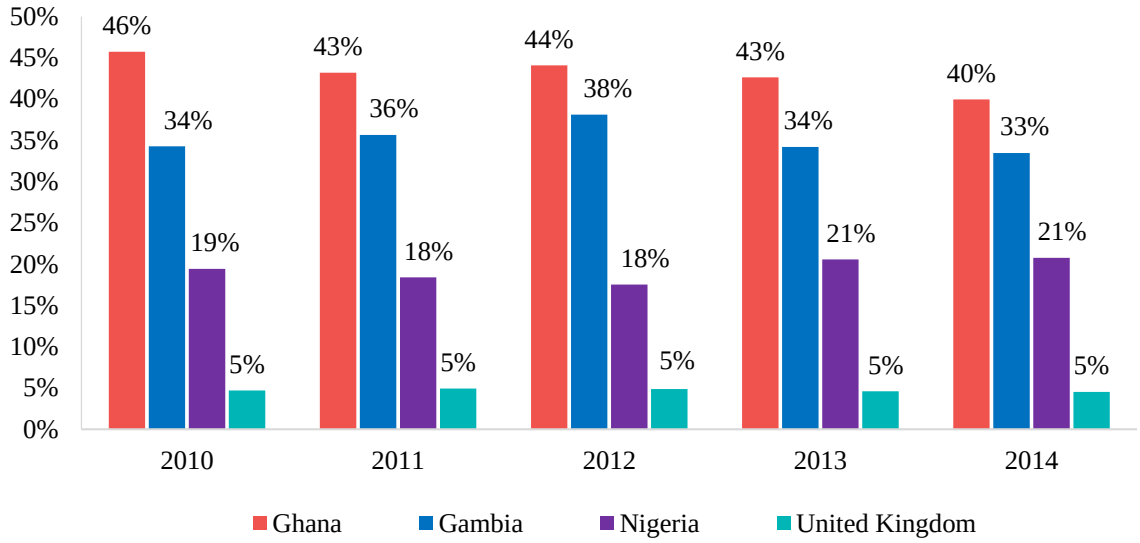
1.3 Payment landscape

The BoG, the central bank of Ghana, is entrusted with the responsibility of establishing, operating and promoting payments systems under the Payments Systems Act of 2003. It has since taken a number of steps to strengthen the payment systems infrastructure in the country and increase users' convenience and trust, including i) the establishment of infrastructure for large value payments called Ghana Interbank Settlement System ("GIS"), ii) the setting up of the Ghana Interbank Payment and Settlement Systems Ltd. ("GhIPSS") as a wholly-owned subsidiary, iii) the strengthening of the legal framework for mobile money, consumer protection and depositor protection amongst others, and iv) prototyping RegTech solutions to house users' complaints. However, Ghana continues to be a cash intensive economy with a ratio of currency outside banks to money supply (M1) that is still high at 39.96 in 2014 (although it is down from 45.72 in 2010) as compared to 20.77 for Nigeria and 4.52 for United Kingdom.[30]

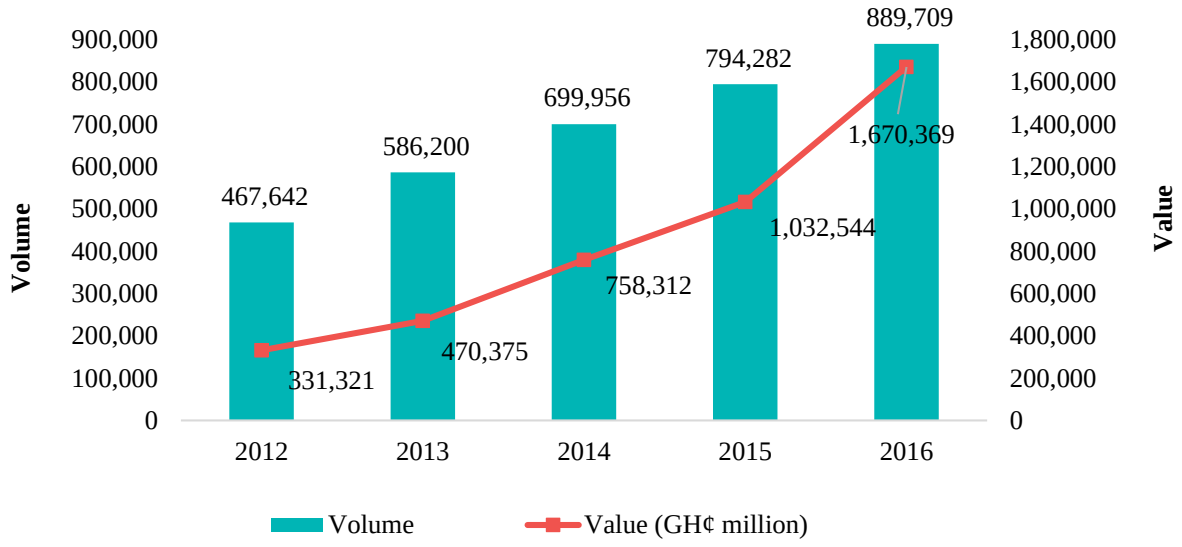
FIGURE 1.3: RATIO OF CURRENCY OUTSIDE BANKS TO MONEY SUPPLY (M1)



To ensure financial stability and reduce settlement risks in the payments systems, the BoG established the GIS system, which is Ghana's Real-Time Gross Settlement ("RTGS") system, a platform for high-value payments for banks and their customers. The total volume of GIS transactions increased by 12.0% from 2015 (794,282) to 889,709 in 2016.[31] Total value of transactions also went up by from GHS 1,032,544.0 million (USD 239,014 million) in 2015 to GHS 1,670,369.5 million (USD 386,660 million) in 2016, an increase of GHS 637,825.5 million (USD 147, 644 million) (61.8%).[32] The average value per transaction was GHS 1.9 million (USD 439,814) in 2016, compared with GHS 1.3 million (USD 300,000) in 2015, a 46% increase.[33] Current participation in the GIS is limited to licensed commercial banks and a few special entities such as the ARB Apex Bank, Social Security and National Insurance Trust ("SSNIT") — the

national pension funds manager — and the Central Securities Depository ("CSD"). The BoG is also a participant in the GIS platform.

FIGURE 1.4: GHANA INTERBANK SETTLEMENT (RTGS)



Payment systems actors

Ghana has various types of financial institutions that are active in the payments space, including DMBs, rural and community banks, and NBFIs. Over the years, DMBs have introduced a range of electronic payment channels such as internet banking and mobile banking for their customers. At the end of 2016, there were 962,487 internet banking users who performed 2.7 million transactions that amounted to about GHS 6.8 billion (USD 1.5 million), and 2.17 million mobile banking users who performed 6.8 million transactions that amounted to about GHS 357 million (USD 83 million).[34] The value of internet banking transactions is driven by business payments, which is significantly higher than the average mobile banking transaction, as these are mostly individual payments.

TABLE 1.1: VOLUME AND VALUE OF DIFFERENT PAYMENT INSTRUMENTS

	Debit cards	Credit cards	Mobile banking	Internet banking	Prepaid cards	Mobile money	E-zwich	Cheque
Volume	46,456,021	138,037	6,821,838	2,705,191	312,143	550,218,427	5,365,085	7,309,406
Value	13,583	70	357	6,779	103	78,509	2,363	152,390

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(GHS million)												

Other electronic payments (e.g., debit cards, credit cards and e-zwich) witnessed a similar increase in the number of registered customers, volume and value of transactions (see Table 1.1). A number of banks are running marketing campaigns to drive adoption and usage of these digital payment products. Interestingly, banks invest more resources in creating awareness of Visa and MasterCard card products than in the GhIPSS e-zwich biometric card.

Despite the surge in electronic payments, the Ghanaian economy continues to be predominantly cash-based. The main non-cash instrument continues to be cheques.

The main payment delivery channels are bank branches, ATMs, point-of-sale ("POS") terminals, and remote delivery channels such as internet and mobile. Bank branches are the main payment distribution channels for cheques and credit transfers. ATM networks and POS terminals are mostly used for payment card transactions. However, some ATMs have been configured to accept card-less transactions such that cash can be withdrawn from mobile money wallets without the use of a card. The deployment of ATMs and POS terminals increased by 111% to 1,928 and by 34% to 6,501 respectively in 2016.[35]

Inter-bank payments infrastructure

GhIPSS owns and operates e-payments schemes and infrastructure within the country for retail payments. GhIPSS was incorporated in May 2007 with a mandate to implement and manage interoperable payment system infrastructures for banks and NBFIs in Ghana. GhIPSS currently manages the following interbank systems:

i) *Cheque Codeline Clearing ("CCC") with Cheque Truncation* is a cheque clearing system including a cheque imaging system that provides standard and express clearing functions. The total volume and value of interbank cheques cleared during the year 2016 went up by 2.3% to 7.3 million and 16.2% to GHS 152,390.4 million (USD 35,275 million) respectively.[36] (See Table 1.1)

ii) *Automated Clearing House (ACH)* enables processing and settlement of bulk debit and credit transfers between banks. The system is primarily used for salaries, pensions, welfare benefits, commissions, supplier payments, dividends and refunds, interest payments, government payments, and business-to-business ("B2B") payments. In 2016, the total volume of transactions cleared through the direct credit system was 6.1 million while the value was GHS 19,245.7 million (USD 4,445 million).[37] Payment of SSNIT pensions by BoG on behalf of the Government continued to be the major contributor to the growth in the direct credit transactions.

iii) *gh-Link* is the inter-bank switch for domestic ATMs and POS transactions. A total of thirty-six (36) member institutions were connected to the gh-link ATM as of the end of 2016, comprised of 26 banks and 10 NBFIs. It also provides a platform for e-commerce

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payments. Gh-Link platform has also developed GhiPSS Instant Pay ("GIP") as a platform that allows instant account-to-account bank transfers on a 24/7/365 basis. There were 2.06 million transactions on the gh-Link platform in 2016.[38] There have also been discussions in the last few months to achieve interoperability between MNOs and the banks through the gh-Link infrastructure.

iv) *E-zwich* is an interoperable biometric smart card payment system that offers a suite of electronic payment and banking services accessible from a POS terminal or ATM. These services include payments at merchants' POS, withdrawal of cash, deposit onto the card and transfer of funds. The e-zwich system also facilitates the distribution of payments such as loans, salaries, wages and pensions. There has been a significant increase in the transactions through the e-zwich system in the last few years. The number of e-zwich card holders has increased to 1.88 million in 2016[39] (up from 1.36 million cards in 2015). The number of transactions have more than doubled from 2.25 million in 2015 to 5.36 million in 2016. Similarly, the value of transactions has increased by 156% from GHS 922 million (USD 213 million) to GHS 2.4 billion (USD 555,000).[40] The significant increase in e-zwich transactions is from the use of the system for payment of salaries for civil servants, payments to beneficiaries of Livelihood Empowerment Against Poverty ("LEAP"), and personnel of the National Service Scheme ("NSS") apart from other government payments. However, the adoption of e-zwich beyond government payments has been a constant challenge. E-zwich is driving other use cases for the card, such as introduction of an international remittance platform in 2016 to enable individuals and businesses to send remittances from Europe, UK and North America directly onto their e-zwich cards.

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FIGURE 1.5: DIRECT & CREDIT ("ACH")

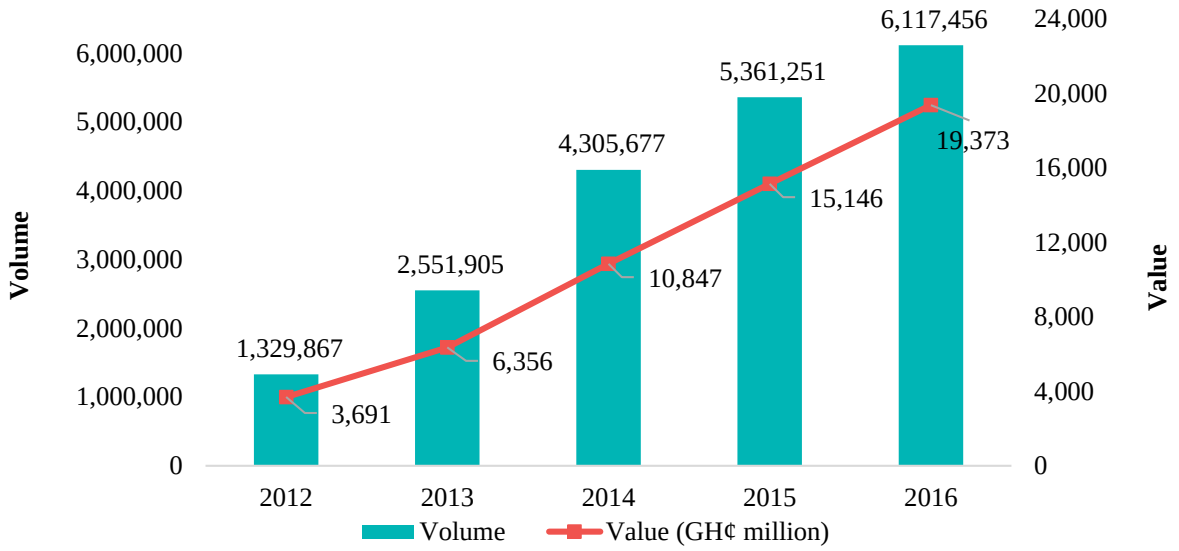
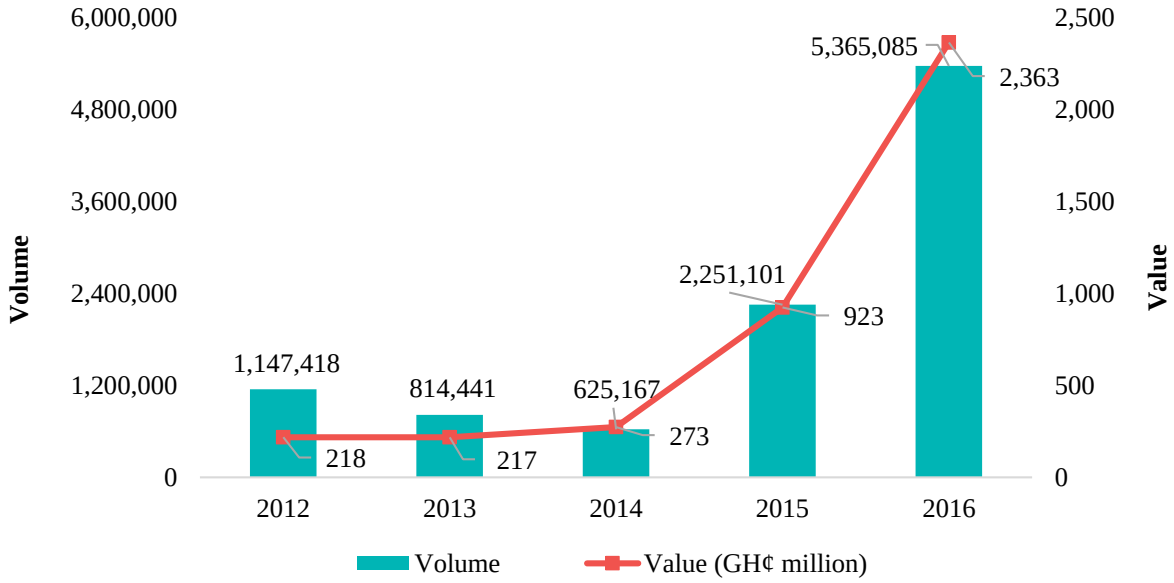


FIGURE 1.6: E-ZWICH



Mobile money in Ghana

The mobile money space has four providers— MTN Mobile Money, Tigo Cash, Airtel Money and Vodafone Cash, with MTN being a dominant market leader (80 % market share as of June 2016)[41] and the front runner, who first introduced mobile money to Ghana in July 2009.[42] All the key industry metrics have seen a significant growth since 2014. The number of registered mobile

money customers as at end 2016 was 19.73 million, up from 7.1 million in 2014 and 13.12 million in 2015.[43] The active subscriber base has grown from 2.5 million in 2014 to 8.3 million in 2016, and the number of active mobile money agents has increased from 20,722 in 2014 to 107,415 in 2016.[44] During 2016, the mobile money industry facilitated 550 million transactions worth GHS 78.5 billion (USD 18.2 billion), a five-fold increase from 113 million (USD 26 million) in 2014, and GHS 1.25 billion (USD 289 million) was held in float in partner banks.[45]

FIGURE 1.7: MOBILE MONEY SUBCRIBERS

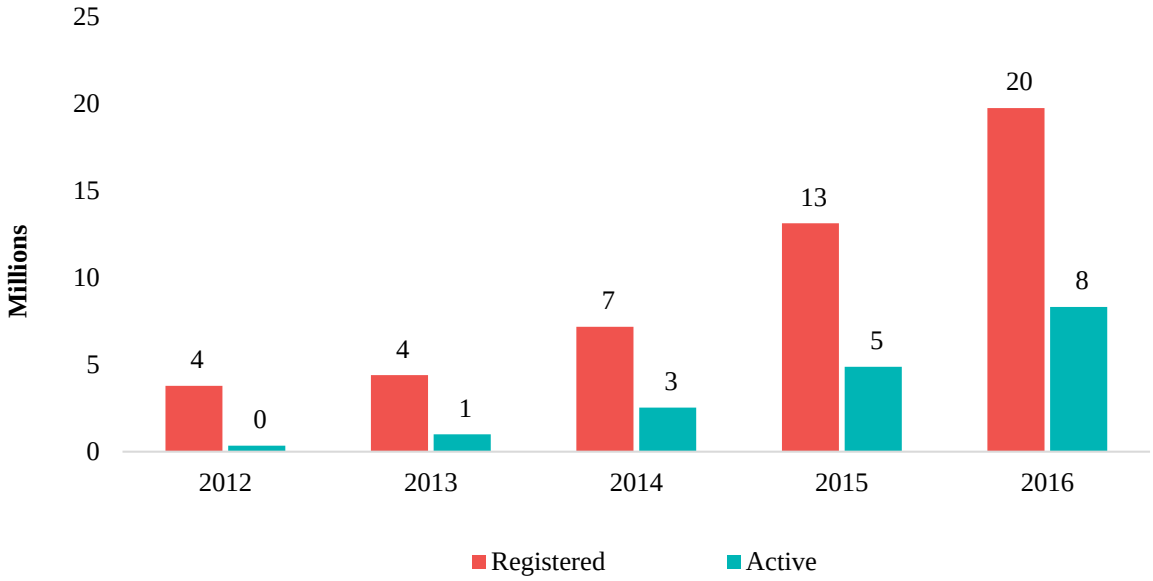


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FIGURE 1.8: MOBILE MONEY AGENTS

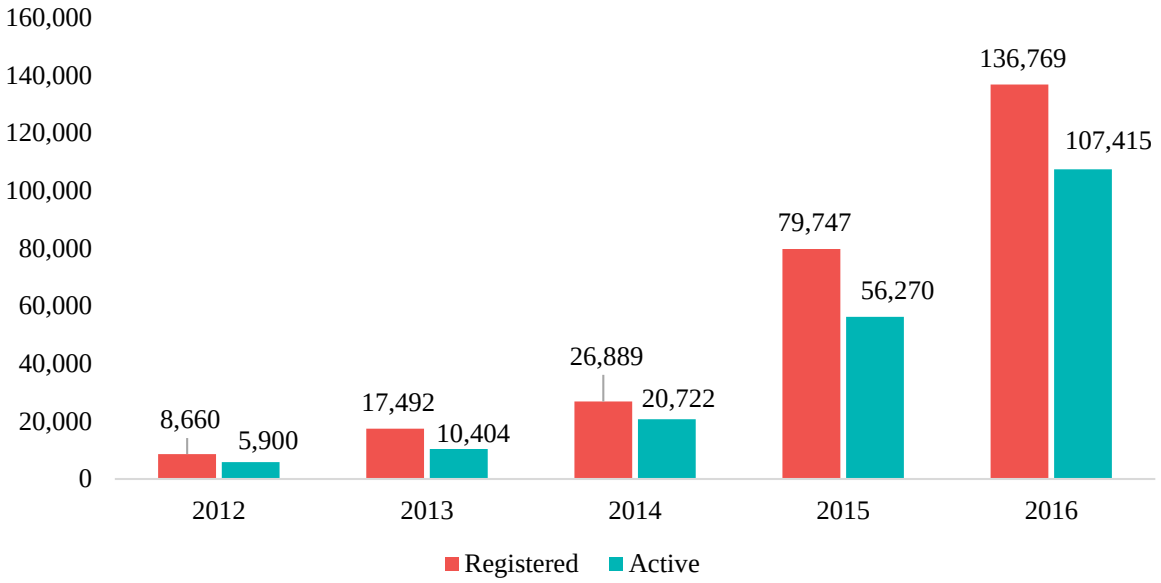
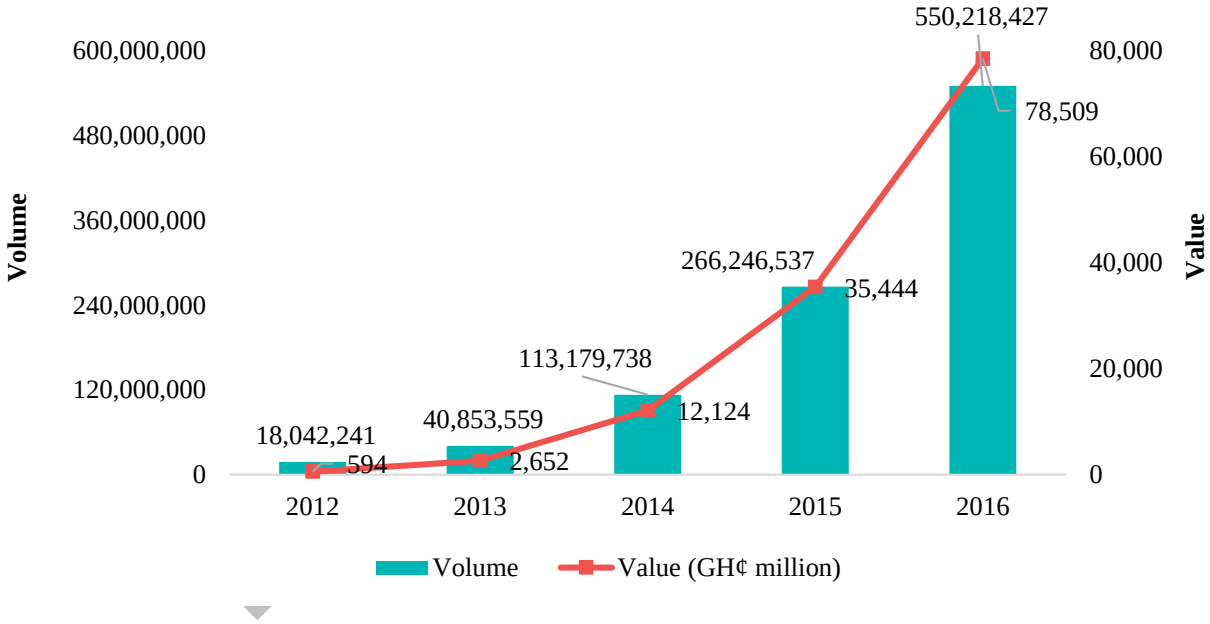


FIGURE 1.9: MOBILE MONEY TRANSACTIONS



In the absence of an interoperable platform that has the capabilities to handle cheques and all forms of digital payments, mobile money providers and payment aggregators have integrated with multiple banks, merchants, and billers. Through these bilateral integrations, digital payment providers are able to offer a broad range of innovative payment solutions that include card to wallet, card to account, account to account, account to wallet, wallet to wallet, and wallet to account payments.

Growing competition in the financial technology ("fintech") space is driving innovation and increasing the number of use cases for digital payments. For example, in September 2016, Ecobank Capital Advisors Ltd., a subsidiary of Ecobank, launched Ecobank TBill4All in collaboration with MTN Mobile Money. Ecobank TBill4All is a self-service digital product that allows Ghanaians to invest in 91-day and 182-day Treasury bills using MTN's mobile money platform. Payment aggregators, such Interpay, Slydepay and expressPay, and some mobile money providers also offer a platform for customers to conveniently pay school fees to many educational institutions in Ghana with their mobile phone.

Challenges affecting Ghanaian payment systems

Despite a significant growth in various digital payment methods such as cards, e-zwich and mobile money in the last two to three years, there are several issues that continue to impact the scale of digital payments in Ghana. For example, despite the strong policy push by GhIPSS and the Government, the adoption of the e-zwich card has been sluggish other than for government-to-person ("G2P") payments such as salaries and social transfer programs. Merchant acceptance of e-zwich is limited to very few merchants (there are less than 1,000 active POS currently) and there is no interoperability with other cards or payment schemes. GhIPSS is only now rolling out hybrid POS devices, which some banks find to be relatively expensive. It is evident that both the payments industry and the general population are not currently coalescing around e-zwich, but rather preferring other digital payment options such as mobile money.

The growing number of payment aggregators such as expressPay, eTranzact, Zeepay, and IT Consortium have further improved Ghana's payment infrastructure and, to a certain extent, facilitated interoperability. These fintech companies have invested in developing platform infrastructure that supports card, mobile, and web (internet banking) payments and offers interoperable person-to-person ("P2P") transfers and electronic payments for government services, utility payments, and merchant payments. Some payment aggregators have also deployed technologies like Near Field Communication ("NFC") to make electronic payments more convenient. However, at a systemic level, interoperability between the banks and the MMPs is yet to be achieved. Recently, GhIPPS announced that bank and MNO interoperability will be achieved by November 2017 through the development of an interoperable switch.

GhIPSS' role in the market has been questioned and critiqued by some industry players. The BoG is seeking to divest approximately 70% of its 100% ownership in GhIPSS to Ghanaian commercial banks while still retaining the oversight. The MMPs are concerned that this could hinder their ability to connect to the new switch, both from a commercial and/or technical standpoint, as the commercial banks may try and push for their interests. Moreover, some industry players also consider GhIPSS to be more of a competitor (e.g., for merchant acquisition regarding e-zwich) than a neutral payment and settlement platform provider. The proposed change in ownership of GhIPSS and the concerns of MMPs may have significant repercussions on the feasibility of a truly interoperable payments platform.

1.4 Frontier issues: Fintech innovation

The financial service and payment landscape in Ghana is already facing competitive pressures from fintech firms such as aggregators expressPay and Zeepay. Although they are not financial institutions, these firms offer competitive services in the payment sector including bill payment, airtime top up, merchant payments and P2P transfers. The BoG has seen the potential that these companies offer in terms of increasing innovative product offerings, lowering consumer pricing and augmenting access for the bottom of the pyramid, and has thus included provisions for regulation of fintech providers in the draft Payment Services and Systems Act ("*PSSA*"). Although the *PSSA* has yet to be implemented, the BoG has started the conversation with these entities, having requested that they pre-submit their applications for *PSSA* authorisation, and providing no-objection letters for specific individual products. The BoG sees fintech as having an important role to play in promoting and accelerating financial inclusion, and this embracement of innovation reflects the Government's general attitude towards change and digital payments.

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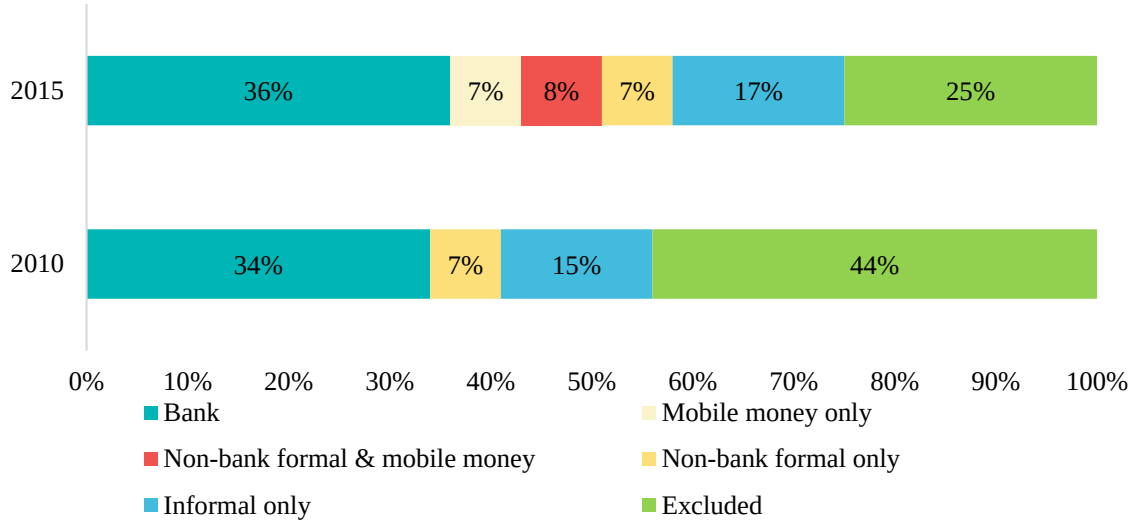
2: Evolution of policy towards digital payment

2.1 Financial inclusion & cash-lite: Upping the game

According to a 2015 report,[46] 58% of the population in Ghana is "financially included," with 36% having access through a bank, and 22% through non-bank formal financial institutions (of which 7% access solely through mobile money, although over 40% overall—banked and non-banked—are active mobile money users[47]). Access through non-bank formal institutions has significantly increased from 2010, where only 7% were in this category, and there was no mobile money to speak of.

FIGURE 2.1: FINANCIAL INSURANCE



Although significant investments from major ecosystem stakeholders, such as MTN and Airtel, account for some of this increase,[48] the influence of the Government's policy and regulatory agenda during those years should not be overlooked. In 2012, the BoG committed "to review the regulatory framework of branchless banking to create an enabling environment and promote innovation towards the achievement of 70% financial inclusiveness in Ghana by the year 2017," as part of Ghana's acceptance of the *Maya Declaration*. Commissioned in 2013, Standard Chartered Bank delivered the *National Payment Strategy* (the "NPS") to the BoG in March 2014, which provides a strategic payments roadmap until 2019, focusing on the twin goals of a cash-lite economy and greater financial inclusion. Several of the proposed measures have been implemented or are in the process of being realised, such as the recent establishment of the payments council[49] (see above for further details). Ghana became a full member of the *Better than Cash Alliance* ("BTCA") in December 2014, and its Government has since shown an active

support for digital payments in recent policy pronouncements, including the Vice President's call in May 2017 to "push the electronic payments agenda higher" at GhIPPS' 10th anniversary celebration.[50] The support from the top has been strengthened by the commissioning of this report, as well as a 2016 report on people-to-government ("P2G") payments by CGAP.[51]

Concurrently, with its support of a push towards cash-lite, the Ministry of Finance is currently working on a *National Financial Inclusion Strategy* ("NFIS*"*), to be released in 2017. It is in this key document that Ghana is fixing its new targets with the most recent draft of the *NFIS* setting a target of 75% financial inclusion of all adults by 2023. To achieve this, the *NFIS* will set five priority areas for the Government to focus on—financial stability; access, quality and usage of financial services; financial infrastructure; financial consumer protection; and financial literacy and capacity. From our research, the Government has already taken many initiatives that the NFIS will seek to build on, although several have yet to be fully concretised, as set out below.

Interoperability

Lack of interoperability, especially between MMPs and between MMPs and banks, was already identified in 2008 as a driving force behind the BB Guidelines' "many-to-many" model. Although the regulatory framework has evolved, the preoccupation with payments interoperability has remained on the top of the Government's agenda. The Government's initial awarding of a tender for an interoperable switch — the Ghana Retail Payments Infrastructure ("GRPI") — to Sibton Switch Systems for GHS 4.6 billion (approx. USD 1.1 billion) came under considerable criticism.[52] Thus the Government re-awarded the project to GhIPSS, which is committed to developing an interoperable switch with all four MNOs and the e-zwich platform by November 2017.[53]

G2P

The Government has unsurprisingly led by example on the subject of digitisation of G2P payments, with e-zwich becoming the digital payment instrument of choice. In 2013, student loans were switched to sole disbursement through e-zwich. Then, in 2015 and 2016, national service salaries and LEAP social subsidies[54] respectively moved to e-zwich. Although the payment of civil servant salaries is by electronic funds transfer ("EFT"), the Government has been trying to push the payment of at least 10% of civil servant salaries by e-zwich as well, in line with its policy to grow e-zwich and to benefit from the removal of duplicates and ghosts through e-zwich's biometric function. However, this, so far, has been met by strong resistance from the unions. Thus, the Government has changed tactics and, to fight leakage, the Controller and Accountant General ("CAG") has required registration of all civil servants on the SSNIT biometric database by the end of March 2017. In conjunction with a similar campaign for pensioners that took place in October 2016, the Government removed close to 50,000 "ghost" names on the payroll and pensions registry, which is expected to create savings of over GHS 250

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million (USD 58 million) in 2017.[55] Also, since June 2017, CAG has been piloting the bulk pay of some civil servant salaries.

With almost 100% digitisation of all G2P payments and 100% digitisation of government-to-government ("G2G") payments, Ghana achieved the digitisation of payments within this use case and is benefiting from digitisation's ability to reduce leakage and thwart corruption (as set out above). However, most e-zwich transfers are immediately cashed-out because the biometric card is not accepted at retail stores or for household bills (and to a lesser degree, we are witnessing a similar dump and pull from EFT into bank accounts), so there are still issues to addressed in regards to how such funds can be retained in the electronic payments ecosystem.

G2B

Most government-to-business ("G2B") payments are in cash (90% in volume in 2016). The Government has taken a few initiatives to push digital payments. In 2014, the National Health Insurance Authority (NHIA) started piloting the electronic payment of insurance claims to 47 health care providers.[56] The Ministry of Gender, Children and Social Protection ("MGCSP") launched the electronic payment of caterers under the School Feeding Program in 2015, with payments to the northern regions using e-zwich and the remaining regions using MTN mobile money.[57] As a significant first step in the digitisation of public procurement, the Ministry of Communications ("MoC") in collaboration with the Public Procurement Authority ("PPA") is implementing an electronic system for government-wide procurement in Ghana in 2017.[58] Further, the Government is in the process of implementing a Treasury Single Account as per the *Public Financial Management Account (PFMA) (Act 921)*[59]. Currently, the status of these programs is unclear, but given that G2B is the least developed digital payment stream involving the Government, this is where the Government can most focus its efforts for payment digitisation.

P2G

Regarding P2G payments, the Government has been equally proactive with setting up the Ghana E-Payment Portal ("GEPP"), which provides critical backend infrastructure to enable online payments for government services. Launched in 2014 with World Bank ("WB") funding, GEPP began accepting payment of taxes online in 2017, commencing with large taxpayers. So far, however, the GEPP has been rolled-out in only twelve Municipal and District Assemblies ("MDAs") and very few services are offered, such as the marriage registration fee payment under Accra Metropolitan Assembly ("AMA") services. Those services that are offered generally require only one-off payments and do not result in end-to-end digital delivery. Coupled with the fact that a transaction fee is charged to customers for usage of the portal, it is not surprising that there is low uptake of these services to date, as further considered in Section 4 of this report.

In addition, the Government has partnered with the private sector on specific use cases to push digital P2G payments. For example, in 2014 the Ghana Education Service partnered with MTN to launch "Back to School", a mobile payment product that allows for the payment of school,

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college and university fees. As of 2016, over 100 schools were using the "Back to School" service, and 5% of MTN mobile money customers used "Back to School" to make school fee payments.[60]

National ID

The Government relaunched the national ID and national digital property schemes to facilitate the efficient delivery of public and private services and help formalise the economy. Both schemes are expected to be implemented by the end of 2017. Even though 98% of Ghanaians have some sort of ID,[61] Ghana currently has 9 separate databases across various government and public entities and no unique property addressing scheme in place. The introduction of a biometric national ID and an address scheme based on GPS coordinates will help extend financial inclusion to those currently lacking any form of ID or address, as well as facilitate, in the future, remote activation of mobile money accounts through electronic Know Your Customer ("KYC") procedures, thereby further spreading financial inclusion to remote areas.

2.2 Regulation: Embracing innovation and plugging the gaps

Ghana has a history of proactive, reforming legislation in the financial service sector, starting with the establishment of its own independent central bank, the BoG, immediately after independence in 1957. Modern payment regulation was first introduced through the *Bank of Ghana Act, 2002*, that made the BoG responsible for payment and settlement systems in the country, and the *Payment Systems Act, 2003*, that empowered the BoG to play a pivotal role in establishing, operating and promoting payments systems.

Seeing the potential of using new channels such as mobile phones and networks of agents as a tool to extend financial inclusion, Ghana became one of the first African countries to embrace such opportunity by issuing the *Branchless Banking Guidelines* ("*BB Guidelines"*) in August 2008, some six years before Kenya's *National Payment Systems Regulations* were enacted. Although the guidelines were forward-thinking as they were flexible on who could be an agent, including MNOs and merchants, and what services could be provided by such agents, they restricted branchless banking services to a bank-led "many-to-many" model that forbade exclusive partnerships. This model aimed to increase interoperability between mobile money services as well as augment consumer access, while ensuring support for the biometric smart card payment system branded as e-zwich, and a common electronic platform for bank transactions, gh-link.

Unfortunately, this policy vision misaligned stakeholder interests, as there were no clear incentives for either banks or non-banks to invest or take risks. The resulting disappointing uptake prompted the BoG to reconsider its approach and issue the *Guidelines for E-Money Issuers in Ghana* (the "*E-Money Guidelines*") and the *Agent Guidelines* in 2015. Once the E-Money Guidelines are implemented, electronic money will be issued by both regulated financial institutions and duly licensed non-bank entities (such as subsidiaries of MNOs and other third

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parties) engaged solely in the business of e-money and incidental activities, defined as Dedicated Electronic Money Issuers ("DEMIs"). Concurrently, a framework is now established that promotes agents as a channel for financial service delivery and ensures the necessary safeguards and controls to mitigate risks and protect consumers. Most recently, the BoG issued the *Consumer Recourse Mechanism Guidelines for Financial Providers 2017*. In parallel, Parliament passed the *Banks and Specialised Deposit Taking Institutions Act 2016*, which seeks to address the supervisory and regulatory gaps in current regulations regarding regulated financial institutions, and the long-awaited *Ghana Deposit Protection Act 2016*, which introduces deposit insurance.

Although there are still gaps in the overall regulatory and supervisory framework of payments[62] and the implementation of parts of the recent guidelines and Acts is still pending,[63] it is clear the BoG and the Government have been proactive in the creation of an enabling and forward-thinking framework for digital payments. Ghana now provides pass-through deposit insurance for e-money accounts and requires the payment of interest on e-money accounts (subject to certain restrictions). Further, the BoG's enforcement powers have been strengthened, and the BoG is currently drafting specific consumer protection regulations for digital financial services. Lastly, the BoG has implemented many of the recommendations of its 2014 *National Payment Strategy* including the creation of a payments council, and the passage of the *E-Money* and *Agent Guidelines*, while other recommendations, such as the cost of cash index and the imposition of maximum monetary thresholds for non-digital payments, are still in progress[64].

The BoG sees the current patchwork of regulations as problematic, and thus is in the process of supporting the *PSSA* that will amalgamate the various guidelines and ensure a more homogenous regulation of both payment service providers ("PSPs") and payment system operators. Further, it sees the *PSSA* as a vehicle to embrace fintechs which will be licensed as PSPs under this new legislation. On this basis, the BoG has already started engaging these entities to pre-submit their applications even though the *PSSA* is not in force.

There are, however, some issues concerning the *PSSA* and the licensing of DEMIs. There is some ambiguity in the latest draft of the *PSSA* regarding the scope of the legislation, including which entities are subject to the Act and which provisions apply to particular payment-related activities. If not properly addressed prior to enactment, this lack of clarity may dissuade certain entities from entering the market.

In addition, although the *E-Money Guidelines* have been in effect since July 2015 and direct licensing of DEMIs is possible in theory, e-money issuers have not yet been licensed and are still being regulated informally. The BoG is issuing no-objection letters for each individual product and requiring bank sponsorship for each application until the *PSSA* is passed. Some fintech providers consider this a barrier to scaling up as, although the fees for individual product authorisations are relatively low (GHS 3,000— approximately USD 700), such providers often require authorisations for several products at a time and the processing time is long (9-10 months). In contrast, the fee for a DEMI license under the *E-money Guidelines* is only GHS 6,000

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(approximately USD 1,400), and once an entity is licensed, it will not need to apply for any product-specific no-objection letters.

Overall, the regulatory framework is sufficiently enabling to support the shift from cash to digital payments, and this is largely due to the BoG's forward-thinking disposition. That said, issues concerning the regulation of DEMIs, coupled with the lack of an effective competition law to ensure a fair playing field for these new entrants, may reduce the effective number of new ecosystem competitors, and this is an issue the upcoming *PSSA* should address.

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TABLE 2.1: PAYMENT SYSTEM MILESTONES

Year	Event
1957	Establishment of BoG
1980s	First ATM installed by Trust Bank
2002	Bank of Ghana Act, creates responsibility for payment systems
2007	GhIPSS established; first Visa card introduced by Ecobank
2008	Branchless Banking Guidelines issued; E-zwich platform and smartcard launched
2009	Mobile Money first launched by MTN
2012	Acceptance of Maya Declaration
2013	Student loans disbursed by e-zwich
2014	National Payments Strategy issued; GEPP launched by National Information Technology Agency; Ghana becomes a member of BTCA
2015	E-money and Agent Guidelines issued; national service salaries disbursed by e-zwich
2016	*Ghana Deposit Protection Act 2016* and *Banks and Specialised Deposit Taking Institutions Act 2016* passed; LEAP subsidies disbursed by e-zwich
2017	*Consumer Recourse Mechanism Guidelines for Financial Providers* issued; bulk pay of civil servant salaries; online payment of tax on GEPP

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3: Current state of transition to digital

3.1 Headline Indicators

The Ghanaian economy runs almost entirely on cash. Of the 6.8 billion annual transactions conducted in 2016 (see Table 3.1), 99% were in cash. The dominance of cash in payments is not

surprising given the large informal sector in Ghana, the low acceptance of payment cards in small and medium businesses, and the fact that small value, high frequency payments account for a large percentage of payment volumes.

Unsurprisingly, this headline number stems from the prevalence of cash in payments by individuals, as cash accounts for 99.6% of the overall payments by individuals, and individual payments make up 97% of all payments in Ghana by volume.

This, however, is only half the story. Overall, 26% of the annual value of GHS 561 billion (USD 130 billion)[65] is paid through electronic channels, suggesting that Ghana is making some progress on the "cash-lite" journey in terms of payment value, but not volume. The transition from cash to electronic in terms of value is mainly led by business payments; although they are only 22% digital, business payments make up 76% of all payments by value (see Table 3.2 below).

Any discussion of payments, however, should take into consideration the important informal sector in Ghana, as both businesses and individuals see several incentives to remain outside formal systems that imply tax and financial transaction fee collection. The low prevalence of electronic payments in business and individual transactions is likely to be driven by persistent informality in the Ghanaian economy.

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3.2 Payment data by payer and payee

TABLE 3.1: PAYMENTS BY PAYER IN GHANA

Payer	Total # of annual payments (million)	% volume electronic	Total value of annual payments (GHS billion)	Total value of annual payments (USD billion)	% value electronic	Total cash (GHS billion)
Govt.	106	23%	36	8	86%	5
Business	100	22%	425	98	20%	339
Individuals	6,606	0.4%	100	23	29%	71
Total	**6,813**	**1%**	**561**	**130**	**26%**	**415**

Individuals

According to Table 3.2, individuals account for the largest volume of payments in the Ghanaian economy[66]. Person-to-business ("P2B") transactions, especially the purchase of consumption

goods alone, represent (94%) of the volume of all payments followed by P2G payments such as utilities, taxes, social security contributions, and fees and fines, representing 2% of all payments by volume.

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TABLE 3.2: PERCENTAGE OF ELECTRONIC PAYMENTS AND OF TOTAL TRANSACTIONS, VOLUME AND VALUE

	Volume electronic	Value electronic	% of total transactions volume	% of total transactions value
Government	**23%**	**86%**	**2%**	**6%**
G2P	100%	100%	0.1%	2.5%
G2B	10%	60%	1%	2.2%
G2G	100%	100%	0.1%	1.7%
Businesses	**22%**	**20%**	**1%**	**76%**
B2P	33%	35%	1%	6%
B2G	31%	40%	0.2%	16%
B2B	2%	13%	1%	54%
People	**0.4%**	**29%**	**97%**	**18%**
P2G	9%	27%	2%	1%
P2B	0%	4%	94%	10%
P2P	16%	66%	1%	7%

Nearly 100 % of personal transactions are in cash, and these payments make up nearly 97% of all payments by volume. In addition to the existence of the informal economy, based on qualitative interviews with industry stakeholders, several factors contribute to this preference for cash: (i) the high cost of digital payments that is often passed on to user; (ii) trust issues with using digital payments; and (iii) the convenience of cash.

From a value perspective, individual payments also represent a large pool of cash as 71% of all their transactions in value terms, the equivalent of GHS 71 billion (USD 16 billion) annually, are made in cash to the Government, businesses and other individuals. The 29% electronic payments by value is driven mainly by remittances that are processed through bank transfers and Money Transfer Operators ("MTOs") for international remittances, and by mobile money services for domestic remittances. Speed and trust factors are critical to this preference for digital payments versus informal remittances.

Businesses

We estimate that 22% of the transactions made by businesses are electronic by volume. This low electronic proportion in business payments is because a majority of B2B transactions are processed through cheques. In specific, 98% of B2B transactions are in cash/cheques. Based on qualitative data, businesses prefer to make payments by cheques as they act as a cash flow management tool (it takes 2-3 days for a cheque to clear). Also, a cheque is often preferred to an

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EFT because a cheque is perceived to have more legal recourse if it bounces,[67] compared to chasing after unpaid debt if the transfer is unsuccessful.

From a value perspective, Ghanaian businesses make about GHS 339 billion (USD 78.5 billion) in annual payments to the Government, businesses and individuals, in cash or cheques, equivalent to 77% of the value of all business payments. The 22% of value of business payments that are digital are mainly salaries, pension contributions and digital taxes.

Government

The Government is taking the lead in the shift to digital payments, with 86% of the total annual GHS 36 billion (USD 8 billion) of government payments being made through electronic means. Table 3.2 shows that for both volume and values of payments, G2G and G2P are the most cash-lite in percentage terms at close to 100% digital. This is due to the use of digitised payment systems for inter-governmental transfers and the use of e-zwich for certain salaries and cash transfer programs such as LEAP. However, these use cases make up a very small amount of government payments overall (e.g., G2G makes up only 5.5% of all government payments by volume). Rather, 85% of all government payments are procurement payments, and these are almost all paid by cheque (with only 10% digital by volume). This high prevalence of cheques is because each MDA pays its own suppliers in the way it sees fit, rather than using a centralised system.

The Government's push to digitisation of all its payments can be applauded as it sets itself as a role model for the ecosystem. But in real terms, this digitisation has little effect on the overall payment ecosystem, as these payments represent only 6% of all payments in the ecosystem by value (and 2% by volume). Thus, even if the Government successfully reforms G2B, this will ultimately only have a very small effect on payments overall, as these payments currently account for only 1% of all payments by volume (and 2% by value).

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TABLE 3.3: NUMBER OF MONTHLY PAYMENTS BY PAYER AND PAYEE

		Payee		
		Government	**Business**	**Individuals**
Payer	**Government**	496,119	7,561,417	771,276
	Business	1,308,057	2,850,222	4,203,320
	Individuals	10,685,254	534,110,135	5,733,472

Comparing values and volumes for all payers and payees in Table 3.3 above[68], we see that a higher percentage in value than in volume of payments is paid electronically.[69]

Comparing the Ghana findings with other African countries where diagnostics have been undertaken (Figure 3.1 and Figure 3.2 below), the trend in individuals' high cash payments by volume is relatively similar. However, compared to Nigeria and Uganda, the value of digital payments by government and businesses is lower in Ghana than in Nigeria and Uganda. This may be because Nigeria and Uganda have already implemented an Integrated Financial Management Information System ("IFMIS") which allows the Office of the Accountant General to manage revenue into and payments from a Treasury Single Account (TSA).[70, 71]

FIGURE 3.1: PERCENTAGE OF VALUE PAYMENTS MADE DIGITALLY BY DIAGNOSTIC COUNTRIES IN AFRICA

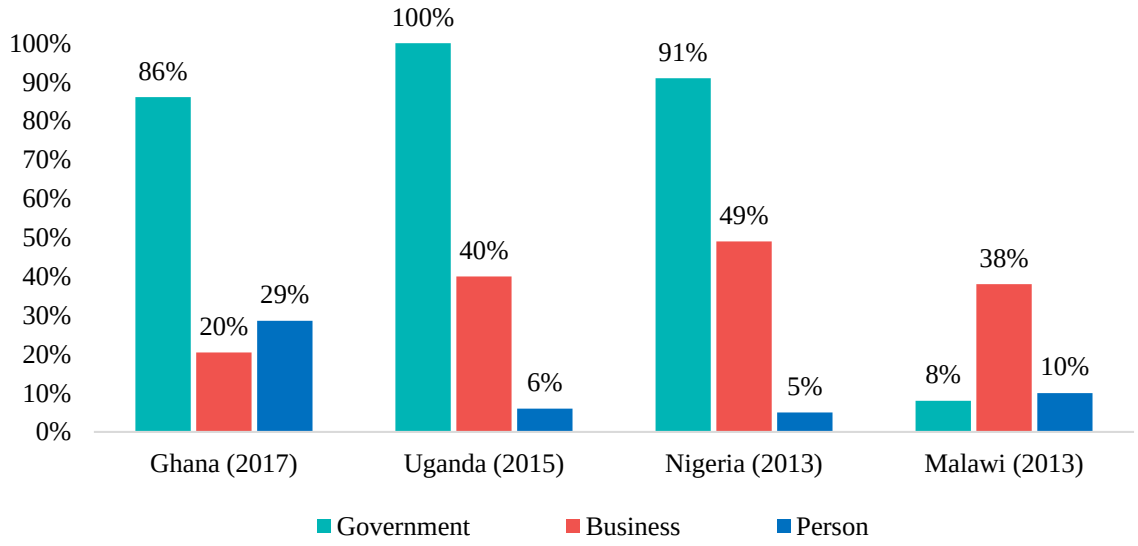

FIGURE 3.2: PERCENTAGE OF VOLUME PAYMENTS MADE DIGITALLY BY DIAGNOSTIC COUNTRIES IN AFRICA

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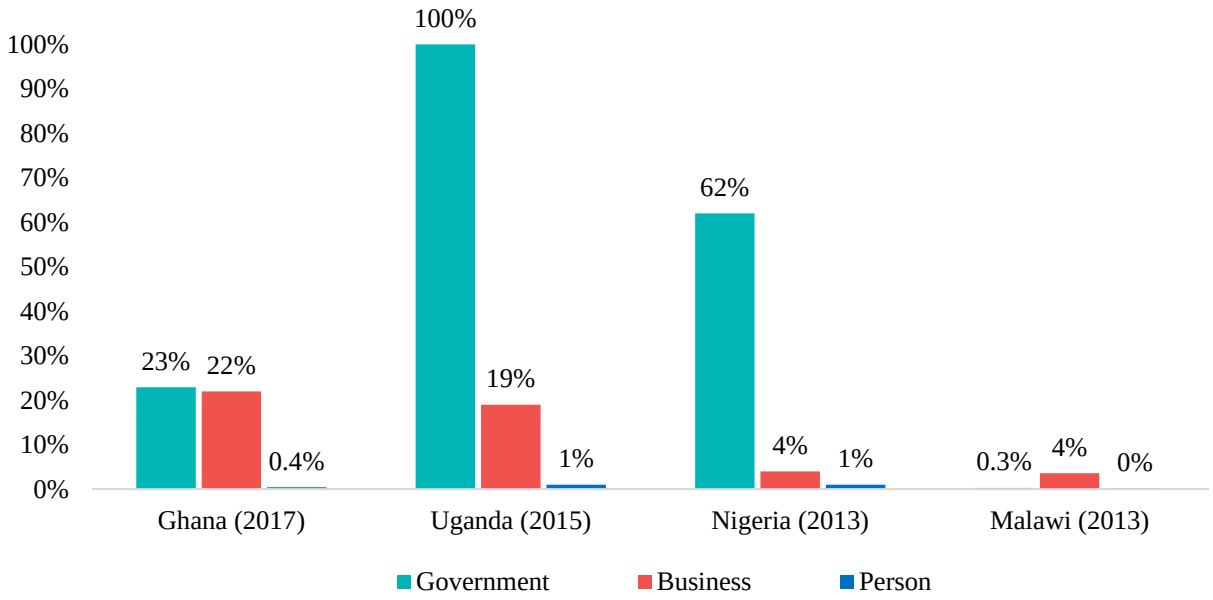
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
23%
22%
0.4%
100%
19%
1%
62%
4%
1%
0.3%
4%
0%
Ghana (2017)
Uganda (2015)
Nigeria (2013)
Malawi (2013)
Government
Business
Person

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4: Trajectory of the shift: A look at three use cases

BTCA country diagnostics seek to assess the trajectory of the shift to digital payments through the lens of particular payment use cases (see Annex X for more information). This section explains the current state and momentum of the shift to digital payments regarding three use cases – two of which relate to government payments:

i) Government Fees and Fines;
ii) Public Utilities; and
iii) Fast Moving Consumer Goods ("FMCG") Value Chain.

The Ministry of Finance prioritised these three areas where cash is still highly prevalent and the shift to digital may have a lasting impact on the payments ecosystem.

Box 4.1: The Evolution of the Use Case Methodology

It should be noted that this diagnostic is moving away from the classic understanding of use cases as considered in previous diagnostics, which were focused on the flow of transactions between different numbers of actors. The current conception of use cases focuses on a central use case driver to better reflect the state of the payment ecosystem today and its priorities.

In specific, in the process of the research and analysis of the chosen use cases, it became clear that for each, there is one key driver (ex. the FMCG industry or the public utility companies) that will play a significant role in any potential shift to digital payments. In previous diagnostics, on the other hand, the financial service providers ("FSPs") were considered the central actors for the use case. With this new type of focus, this diagnostic is moving away from an abstract description of payment flows (ex. many-to-few), which characterised the use case definitions in previous diagnostics, to one with much more concrete implications and, thus, more tangible use case categories.

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To reflect this shift, the "use case scoring methodology" has been updated. As a summary, key changes include (i) a dedicated section for the use case driver; (ii) a separate section dedicated solely to government payments, distinct from the Government's role as a regulator; (iii) new weighting that considers the importance of the use case driver; and (iv) a new scoring method and scale that is consistent with the data quality index ("DQI"). A full copy of the updated scorecard can be found in Annex F.

FIGURE 4.1: USE CASES AND PAYMENT TYPES IN GHANA

		Recipient		
		Government	Business	Person (individual)
Entity making the payment	G	G2G • Central government disbursements to local level • Social security contributions • Public utilities	G2B • Supplier payments by national and local governments • Corporate tax refunds	G2P • Salaries by national and local govt. • Pensions by national and local govt. • Social welfare payments
	B	B2G • Taxes • Fees and fines to national and local revenue authorities • Public utilities • Social security contributions	B2B • Private utility payments • Supplier payments • Distributor payments	B2P • Salaries • Pensions • Input purchases
	P	P2G • Taxes • Fees and fines to national and local revenue authorities • Public utilities • Social security contributions	P2B • Private utility payments • Expenditures for goods and services • Loan payments	P2P • Domestic remittances • Other non-consumption expenditures (gifts, contributions, informal remittances)

A: Fees and Fines to Government

B: Public Utilities

C: FMCG

4.1 Trajectory assessment model

This report adopts a revised trajectory assessment model of the transition to digital payments of specific use cases, in comparison to previous diagnostics (See Box 4.1 for more details). The model's methodology is set out in Annex E. In summary, the model ranks the prospective trajectory of each use case on a scale of 1-4, detailed below (see Figure 4.2). The assessments made by this diagnostic study using this model are set out thereafter.

FIGURE 4.2: USE CASE TRAJECTORY RATINGS

Rating	The use case's readiness for a shift to digital payment
4	Fully ready. Most or all of the required factors are in place to support a shift to digital payments.
3	Nearly Ready. Many of the required factors are in place to support a shift to digital payments. A few important factors are not yet in place.
2	Progressing. Some of the required factors are in place to support a shift to digital payments. Several important factors are not yet in place.
1	Not Ready. Few of the required factors are in place to support a shift to digital payments.
N/A	Not applicable / no evidence is available to score this factor.

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4.2 Use case A: Government fees and fines

Trajectory Assessment: 2.1

Progressing. Some of the required factors are in place to support a shift to digital payments yet several important factors are not yet in place.

- *Most fee and fine payments by individuals are in cash, and businesses are by cheque.*
- *The GEPP Platform provides the necessary infrastructure, if the challenges set out below are successfully addressed.*
- *This use case has potential to improve revenues for the Government while benefiting citizens in terms of reduction in transaction and opportunity costs.*

This use case deals exclusively with the various fees and fines that are paid by Ghanaian residents. This includes payments by individuals and businesses for government services, such as the issuance of driving licenses, vehicle registrations, and passports, as well as fees and fines[72] paid by individuals and businesses to the various government agencies, such as the local authorities (e.g. Accra Metropolitan Authority) and the Ghana Ports and Harbours Authority ("GPHA"), etc. Unlike payments for utilities (electricity, water etc.), these payments are generally one-off payments/ yearly payments that may have their own challenges in terms of scale up for digital payments.

The Ministry of Finance in Ghana is keen to push digital payments in the country, and the buy-in for this digital payment push comes from the most senior levels of the political establishment. To date, however, most payments received by government agencies are still made largely by way of cash and cheque. Payments data shows that there are approximately 1.7 million payments annually in this category, and only 2% of the payments by volume and 33% of value are paid through digital means. Businesses account for approx. 900,000 payments annually, of which 1% of payments by volume and 36% of payments by value are paid through digital means. Businesses pay by cash/cheque for various fees and fines often due to government agencies' inability to accept digital payment. Individuals account for approx. 800,000 payments annually for this use case, of which 3% by volume and 16% by value are paid digitally, and equally face the challenge of lack of digital payment options.

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TABLE 4.1: PAYMENTS FOR FEES AND FINES

	% electronic (volume)	% electronic (value)
All fees and fines	2%	32%
Business	1%	36%
Individuals	3%	16%

One of the main government projects in P2G is the launch in 2014 of GEPP[73], an e-services portal that offers select government services including digital payment options through a common interface. The current payment options allowed on the Ghana e-payment portal are (i) debit and credit cards, (ii) mobile money, (iii) eTranzact cards issued by partner banks, (iv) cash and cheque payment through Payall at Payall payment points (within 30 days of requesting the service online), and (v) bank transfer (local and foreign.)

Of note, there are certain MDAs that offer online applications on GEPP but no payment options, such as the Driver and Vehicles Licensing Authority ("DVLA").

Of the MDAs currently live on GEPP, we could obtain primary data concerning the DVLA and the AMA only. Although the DVLA allows citizens to complete an online application form for some of its services, payments for the services are still made in cash at the DVLA offices. AMA, on the other hand, started accepting mobile money for a few select services, such as marriage registration fees. Other MDAs, such as the Ghana Police, offer most of their services online along with digital payment options.

Certain MDAs that are not on GEPP are working on their own programs to accept digital payment. GPHA already implemented online payments facilities for marine and port charges that helped to reduce delays in clearance at the Tema Port. However, payments made by the local clearing agents etc. are largely cash-based and efforts have been made by GPHA to install POS machines to enable card-based payments. Further, for payment of tolls at GPHA the port authorities have introduced the e-zwich card but adoption has been poor as it requires the presence of the card holder (due to biometrics).

Box 4.2: NITA and GEPP Portal

To give impetus to a digital interface with the citizens, in 2013 the Government launched "e-Transform Ghana" with funding from the WB. The program aims to leverage the latest Information and Communication Technologies ("ICTs") for improving the efficiency and coverage of government service delivery. Apart from supporting legal and regulatory changes, the project aims to improve institutional capacity to support electronic government services. The

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Government established a separate National Information Technology Agency ("NITA") under the Ministry of Communications Act 771 in 2008 that is responsible for promoting ICT in Ghana. With the support of the e-Transform Ghana, NITA launched GEPP in 2014.[74] GEPP is an e-services portal with plans to offer all government services through a common interface including options for digital payments. The following is the current list of MDAs for which digital payments are available:

i) AMA
ii) Births and Deaths Registry
iii) Food & Drugs Authority
iv) Ghana Police/ Criminal Investigation Department
v) Minerals Commission
vi) Ministry of Foreign Affairs and Regional Integration/ Passport office
vii) National Communication Authority
viii) National Identification Authority
ix) Ghana Tourism Authority
x) NITA
xi) DVLA

A sample of services offered on GEPP include payment of fees for marriage registration, transfer and change of ownership of commercial vehicles, services related to visitors permit and visas, etc.

Key Findings

i.) GEPP roll-out is still in the early stages and uptake has been limited

Several MDAs (11 as of date) are mostly at a pilot stage with GEPP for offering online services for the last two years. Although having a central portal for various Government of Ghana ("GoG") services is a welcome step as it has the potential to ease the integration issues for various payments providers and the MDAs, progress has been slow to date. Reasons for this include:

i) The transaction fee charged to customers for usage of the portal;
ii) Few of the services regularly used by people/businesses are offered online e.g. driving license, vehicle registration, local taxes etc., are not offered.
iii) Even for the services where payment is online, delivery of the services is mostly offline, still requiring the individual to travel to the MDA, albeit with some reduced waiting time due to prepayment; and
iv) Low frequency of payments processed—the majority of services currently offered on the platform require only one-off payments (i.e., birth & death register, passport renewal, business registration, and police ID).

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ii.) There are internal constraints within MDAs for rapid adoption of digital payment methods.

Where digital means of payments have been promoted, key constraints for rapid adoption include:

i) lack of internal capacity of various MDAs to integrate with GEPP;
ii) fragmented backend databases of MDAs;
iii) lack of champions in the MDAs; and
iv) inadequate IT infrastructure.

These constraints have been augmented by the fact that there is no specific government policy mandating digital payments from a particular date or over a specific amount.

iii.) Not all MDAs wish to use digital payments, and if they do, some want to use another platform other than GEPP

While some government agencies expressed concern in terms of revenue leakage and are thus keen to adopt digital payment methods, others such as the DVLA had no issue with cash being the predominant method of payment for their services. And of those MDAs interested in digital payments, some, such as the GHPA, appeared uninterested in the GEPP platform. They prefer to create their own infrastructure, which will lead to the fragmentation of platforms. This was also clearly the case for the public utility companies, especially Ghana Water Company, which prefers to create its own platform.

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4.3 Use case B: Public utilities

Trajectory Assessment: 2.2

Progressing. Some of the required factors are in place to support a shift to digital payments yet several important factors are not yet in place.

- *Cash is the main instrument, with only little high-value EFT used by businesses.*
- *The potential impact of this use case is significant, as 80% of the population is dependent on these services and payments are regular and habit-forming.*

This use case considers solely potable water and on-grid electricity, and focuses on the payments received by the public utility companies for the distribution of water and electricity to individuals, businesses and government institutions. This is considered to fall in the category of government payments, as the main public utility companies are government-owned monopolies in their specific geographic regions. Although this use case encompasses, in theory, P2G, business to government ("B2G") and G2G payments (as depicted in the payment grid in Figure 5.1), as all G2G payments are accounting set-offs, these have not been considered in the analysis below.

Overall, public utility payments make up 1.4% of all payments by volume, and 11.7% by value, and thus carry the most weight of all three selected use cases in the context of the Ghanaian payments ecosystem. Cash is extremely prevalent, as 99.84% of public utility payments are made in cash by volume, and 70% by value. Businesses are the only significant users of digital payment instruments—0.16% of all public utility payments by volume and 30% by value, are EFT payments by businesses. To put this into context, business payments make up only 3% of all public utility payments by volume, but almost 96% of all those payments by value. Aside from high value EFT (which makes up approximately 5% of all business public utility payments by volume and almost 30% by value), 95% of all business payments are lower value payments by cheque. Individuals, on the other hand, make almost all their payments in cash at utility cash collection points, with some insignificant amounts of mobile money due to certain mobile money pilots.

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TABLE 4.2: PAYMENTS FOR UTILITIES

Payer	Volume electronic	Value electronic	% electronic payments of total utility payments for that payer (volume)	% electronic payments of total utility payments for that payer (value)	% of total utility payments (volume)	% of total utility payments (value)
Business	0.16%	30%	5%	30%	3%	96%
Individuals	0%	0%	0%	0%	97%	4%

To better understand how payments are made and how payments interact with distribution, it is necessary to distinguish between water and electricity.

80% of the Ghanaian population is electrified[75], and distribution is provided by two separate state monopolies, the Electricity Company of Ghana ("ECG") for Southern Ghana and urban areas (overall 70% market share[76]) and the Northern Electricity Distribution Company for the rural Northern part of Ghana. Additionally, there is one privately-owned distribution company, the Enclave Power Company, that is mainly responsible for the industries in the Free Zone Enclave of Ghana in Tema. From a billing infrastructure perspective, half of all distributed electricity is post-paid (customers receive an invoice based on a manual meter reading), while the other half is pre-paid (customers must upload credit on a token), of which 20% are currently smart meters (allowing for remote reporting and credit top-up). In urban areas, where 80% is prepaid, there is a company push towards prepaid as it is easier to collect revenue, while rural customers are post-paid only.

All users/households are required to purchase electricity directly from the distributor. Post-paid residential customers can pay at ECG pay points, at banks and in rural areas, or at a bonded cashier, while pre-paid residential customers can top up at ECG pay points or from third party vendors, in both cases with cash or cheques. Commercial customers may pay using the same methods of payment as residential customers, and also have the possibility to pay by EFT or direct debit[77] for post-paid only.[78] For post-paid, only cash or cheque payments at ECG pay points are provided an immediate receipt; with all other payments, a receipt is only provided when money is credited to ECG. Although MMOs often advertise that they offer payment for utility payments, in reality this is not currently possible for electricity, except for off-grid "Pay As You Go" ("PAYG") solutions such as PEG (which is 100% mobile money-based).

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Similarly, approximately 80%[79] of the population has access to improved water supplies, and distribution is provided by one state company, the Ghana Water Company ("GWC") that services urban areas, and one state agency, the Community Water and Sanitation Agency, that covers rural areas. From a billing infrastructure perspective, water is entirely post-paid, and for GWC, 74%[80] of customers are metered, with the water company staff physically reading the meters once a month and providing invoices based on consumption. GWC has been trying to roll-out a pre-paid water pilot in Tema over the last few years (last declaration of intention dates to July 2016[81]) to stop water losses and increase payment collection, but it has faced resistance from civil society groups.

Not all households pay the distributor directly for water as water provision in rural areas is often assured by the municipality or through communal water systems that are managed by local governments. Customers that do pay directly, 90% of whom are residential, can pay by cash or cheque at GWC pay points or third party vendors, or by cash and card at banks (GWC is currently rolling out a POS with card capabilities in banks). For commercial customers, in addition to the payment options listed above, approximately 10 companies pay by EFT and there is a direct debit payments pilot currently ongoing through five banks. Regarding mobile money, a previous Airtel pilot failed due to delayed reconciliation and delayed posting with third party collection points, among other issues. In theory MTN Mobile Money customers can currently make water payments[82], but usage is insignificant.

Of note, in April 2017 GWC launched an e-billing system to transition from paper bill delivery to electronic billing via Short Messaging Service ("SMS") and email. A new pilot with all mobile money providers and the creation of a GWC application are in development, and are due to be rolled out by 1 August[83].

Key Findings

i.) Issues with reconciliation of non-cash transactions have resulted in customer preference for cash payment.

Both the EGW and GWC have had issues with the reconciliation of mobile money and bank payments for post-paid accounts with their central accounting platforms, resulting in delayed and even non-crediting of these payments to client accounts. This has caused decreasing payments at banks for ECG and failed mobile money pilots for both companies. These issues are due mainly to weak internal processes and fragmented infrastructure in both companies.

As only the utility pay points currently provide immediate receipts upon payment (clients having used either mobile money or paid via the bank do not receive such a receipt of payment until their account is credited), customers have a strong preference to pay for utility bills in cash at the utility pay points. From qualitative interviews with

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FMCG companies, if a receipt were provided immediately when a client pays with digital payment means, many clients would prefer to pay digitally given the other benefits associated with digital payments, such as security and lower costs.

ii.) There is a lack of suitable smart infrastructure for full end-to-end digital payment & distribution.

Post-paid utilities disintermediate payment and service delivery. Although it is easier to offer digital payments in a post-paid context, as the digital payment is unrelated to the utility distribution, such payment provides only an incremental benefit to the parties, as the there is no end-to- end digital distribution. Both public utilities wish to move to pre-paid to eliminate payment delinquencies (e.g. currently GWC fails to collect payment for 20% of all post-paid bills), as then service delivery can be made dependent on payment. However, to benefit fully from the efficiencies of digital payment in pre-paid, the delivery of the service equally needs to be digitised. Introducing digital payment but still requiring the customer to upload the token at a utility paypoint greatly decreases any benefit for the utility company or the customer.

The solution for end-to-end digital payment and distribution is the smart pre-paid meter, which allows for remote meter reading and crediting via digital payment means such as mobile money. Currently there are no smart water meters, and only 20% of post-paid electricity meters are smart (of which there seem to be many different meters that require different communication protocols). The roll-out of smart meters is a significant capital investment for a public utility whose services are often billed out at a below-cost rate.

iii.) There are clear benefits from payment and distribution digitisation for customers and providers.

Water and electricity are essential services, thus the facilitation of digital delivery and payment in all cases will provide benefits to customers in their daily lives. The digitisation of payment and service delivery also reduces customer's wait and travel time, and gives them more control over supply. Pre-paid payment schedules are relatively flexible, allowing households to pace the use of energy and/or water according to their cash flows and ability to pay.

The digitisation of payment and distribution would also lead to large cost savings for both public utilities. It would allow for a significant reduction in the number of utility pay points, and thus lead to a significant decrease in salaries, rent, and other running costs. Further, it would reduce the theft of both cash and the utility service being provided, increase revenue collection, and improve data accuracy.

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iv.) Ghana Water Company seems to have internalised the benefits of digital and is interested in pursuing a digital payment agenda.

GWC is actively pushing digital payments by rolling out receipt machines that accept card payments at banks, piloting electronic billing as well as direct debit for commercial customers, developing internal API integration, and working with MNOs to develop a successful mobile money solution. Clearly, the move to digital payments is internally driven, and there are several partners (e.g., DEMIs, banks, fintechs) willing to support the move. For example, GWC asked MMOs in the next payment pilot to waive transaction fees for their customers for one to two years and pay for advertising and publicity.

This is exactly the type of champion required for such a push, although there will need to be political will as well to support roll-out of pre-paid smart meters, given the sensitivity towards water as a human right i.e. that denying a such a service due to lack of payment may have inhumane consequences.

Box 4.3: Learnings from the Off-Grid Sector on "Pay As You Go"

Ghana itself has been fertile terrain for Pay as You Go (PAYG) electricity and water pilots, albeit off-grid.

Headquartered in Accra, PEG is an off-grid solar company that since 2011 has been providing solar home systems based on PAYG financing to off-grid households in Ghana. PEG provides households a solar home system comprised of a battery, an 8W solar panel, two lamps, a torch, a radio and a phone charger, on a credit that is paid back through 12 monthly payments made by mobile money. Ownership of the asset transfers to the household once the credit is repaid, allowing households thereafter to access electricity through solar power without any further costs. PEG had 16,000 customers in 2016 and currently covers 22,000 households in Ghana.

In addition to increasing access to electricity, PAYG solar appears to support the uptake of digital payments. In a recent study[84] published by CGAP based on work with Tigo Cash and PEG, it was found that PAYG can drive the usage of mobile money: Tigo Cash wallet holders who were PEG customers generated 122% more revenue per active user for Tigo Cash than did non-PEG Tigo Cash wallet holders. In addition, average Tigo Cash PEG users made more use of all mobile money services— they checked their balances more frequently, cashed in and out more frequently, and made over three times as many P2P transfers per user.

"Pay As You Drink" powered by mobile payments is similarly making inroads in Ghana through the work of NGO Safe Water Network, with the support of CGAP. Safe Water Network provides water supplies to communities who lack access to on-grid water through household connections fed from nearby small water enterprises. As part of a new project[85] funded through a partnership

with CGAP, Safe Water Network is piloting as of July 2017 100 smart meters in the towns of Tetrem and Beyin and three surrounding communities. The smart meters will allow for mobile money pre-payment for a set volume of water determined by the consumer. The pilot will measure the level to which mobile money can improve operational efficiency in meter reading and collecting revenue from household connections, with findings to be published by the end of 2017.

Both pilots offer insights on the benefits derived from a move to pre-paid utility provision that can be integrated in the business plans and strategies of the public utilities and Mobile Money providers.

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4.4 Use case C: FMCG value chain

Trajectory Assessment: 2.4

Progressing. Some of the required factors are in place to support a shift to digital payments yet several important factors are not yet in place.

Because most cash transactions by individuals are for purchases of consumption goods, the FMCG value chain is cash-statured from the bottom up, with the cash entering the formal economy eventually in the form of cheques from distributors to manufacturers.

Although FMCG manufacturers can offer a variety of incentives to push digital, the shift must be an industry-wide effort with government support. FSPs that offer innovative merchant solutions may be the best place to accelerate the shift to digital payments.

This use case examines payments across the fast-moving consumer goods ('FMCG") value chain, with a focus on how FMCG companies make and receive payments[86]. FMCG companies manufacture a range of frequently-purchased consumer goods that are sold either through a direct or an indirect distribution model. A direct distribution model is where FMCG companies sell products directly to retailers without any intermediary, and an indirect distribution model is where FMCG companies sell products to retailers through a network of intermediaries—distributors and wholesalers.

Most of the FMCG companies in Ghana are subsidiaries of global multinationals such as Unilever, Coca Cola, Nestle, Diageo, and AB InBev Group, and sell a variety of brands in various product categories such as beverages (alcoholic, soft drinks and water), health and beauty, toiletries, food, and confectionery. The product portfolios of most FMCG companies consist of a mixture of locally manufactured and imported brands.

Cheques are the predominant mode of payment at the FMCG level. About 99% of the volume and value of distributor payments to FMCG companies are by cheques and about 50% of the volume and 40% of the value of payments made by FMCG companies themselves are also by cheques; bank transfers are mostly used for the non-cheque payments. The value of payments made through bank transfers is relatively high because many FMCG companies import both raw materials and finished products, and these foreign payments are initiated electronically through Society for Worldwide Interbank Financial Telecommunication ("SWIFT"), a global provider of secure financial messaging services.

Distributors receive about 95% of payments from wholesalers/retailers in cash (making up 65% of all payments received, mostly from retailers) and cheques (mostly from wholesalers), with mobile money making up the remaining 5% of payments. At the retailer level, about 98% of individual payments for consumption goods is in cash; personal cheques are not widely accepted

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and mobile money usage for merchant payments is low. Part of the cash that retailers receive from consumers is also used to pay distributors for stock. Distributors then have this cash picked up by the banks and deposited to issue

To better understand how payments are made and the various dynamics at play, it is helpful to distinguish between the various levels of the FMCG value chain.

FMCG Companies

Distributors lodge pre-signed blank cheques with the FMCG company for stock orders. Once orders are placed and supplied, the FMCG company's finance staff fills out the face value of the pre-signed cheque based on the value of the invoiced order and then deposits the cheque at the bank in line with the credit days that the DFMCG has attributed to each distributor.

Although FMCG companies issue cheques frequently to their suppliers, many of them have successfully integrated their vendor management module of their Enterprise Resource Planning (ERP) system with their bank's electronic banking platform and are, therefore, able to make electronic payments to vendors when invoices are approved.

Distributors

Most distributors are effectively sole proprietorships, where the owner is the sole person who authorises payments. Few distributors use internet banking to make payments because they consider the platform to be relatively expensive. Distributors also have a strong preference for cheque payments to FMCG companies because the cheque clearing days eases the pressure on their working capital. Payments for vehicle expenses, utilities, insurance, and salaries are mostly paid in cash or cheque where physical receipts are issued for recordkeeping purposes. In some cases, the payee influences the mode of payment.

Distributors' sales teams sell largely on a cash-and-carry basis (about 90% of sales) and serve wholesalers about once a week and retailers about three times a week; cheques are accepted from a few trusted customers only. Generally, wholesale and retail customers know the value of the stock they intend to purchase from the distributor sales team and make the exact amount of cash readily available. About 95% of sales proceeds are in cash and cheques. The potential risk of holding substantial amounts of cash is mitigated by banks that provide daily, on-site cash pick up. Mobile money, card (prepaid, debit and credit) and e-zwich adoption and usage remains low.

Retailers

Retail outlets are where consumer purchases happen and competition for a share of the consumer's wallet is fierce. FMCG company trade marketing teams and distributor sales teams need to build a trusting relationship with the retailers to ensure that the retail outlets have adequate

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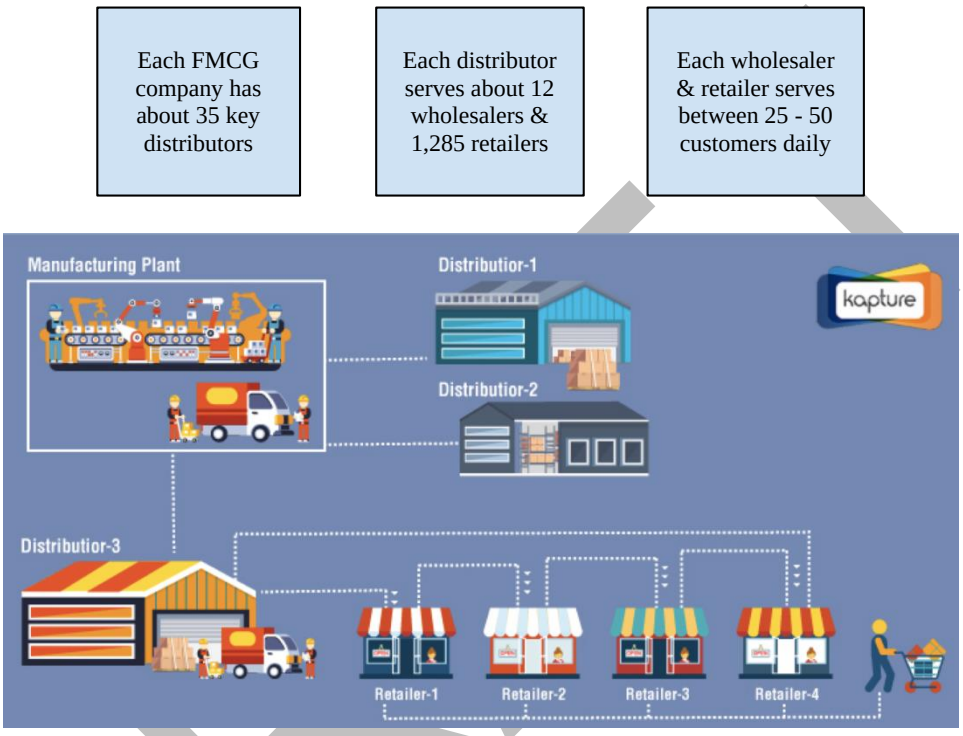
stock levels, good product positioning and appropriate branding. The typical retail outlets are small and informal businesses; the owner is not likely to accept cheques, e-zwich or cards, and may not have an active mobile money wallet.

FIGURE 4.3: FMCG VALUE CHAIN

For BTCA – We suggest you insert a graphic of the value chain like this (adding wholesalers):



Key Findings

i.) FMCG companies actively use digital payment products/channels and already offer incentives to distributors to facilitate a shift across the value chain.

Some FMCG companies have invested in proprietary mobile-based software that staff and distributors use to electronically capture stock orders and track sales activity at the distributor level, which is often integrated with the FMCG company's ERP system. This tool is not only important for sales planning, supply chain management, and production planning but also presents a potential opportunity for FMCG companies to integrate a payment functionality.

Certain FMCG companies actively encourage digital payments by offering distributors digital discounts or by negotiating competitive interest rates on working capital facilities through bank partners, thereby nudging distributors to bank with the same bank as the FMCG company. Once the FMCG company and distributor are

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customers of the same bank, EFT transactions are quicker and cheaper. FMCG companies may also offer discounts to distributors to encourage early payment of stock through EFT.

ii.) ***FMCG companies and financial institutions are piloting innovative electronic payment solutions across the value chain.***

Ecobank is piloting a relatively inexpensive merchant payment solution, Masterpass QR, with one key Unilever distributor and its network of about 200 retailers. The Masterpass QR code is significantly cheaper to deploy than POS devices and allows for payment with Ecobank's mobile banking app. In addition, retailers no longer need to charge a POS device and worry about connectivity issues that sometimes result in failed payments.

Three key distributors are participating in a pilot with MTN Mobile Money. MTN has offered significant discounts on mobile money transaction charges for this pilot. Currently, a total of 90 retailers are making mobile money payments in the context of this pilot.

Some FMCG companies are also proactively negotiating with partner banks for competitive pricing for distributor financing facilities. This is aimed at incentivising distributors to open accounts with the FMCG company's partner bank, where payments are processed in near-real time.

iii.) ***Although FMCG companies are keen to shift from cheques to electronic payments from distributors, they have less influence on the rest of the value chain.***

Payments in the value chain are predominantly cheque-based at the FMCG company level and mostly cash-based at the distributor and retailer levels. FMCG companies are keen to shift from cheques to electronic payments because of benefits such as a faster processing time and the lower cost of digital payments.

Most of the incentives offered by FMCG companies for driving a shift to electronic payments in the value chain are largely limited to how distributors pay for stock and to minimise the risk of distributors' cash being stolen. Theft of a distributor's sales proceeds is likely to disrupt the FMCG company's sales, as the distributor's ability to buy stock would be negatively impacted.

FMCG companies do not have a contractual relationship beyond the distributors, and thus they cannot impose any contractual terms such as payment nor directly incentivise behaviour of players further down the chain.

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iv.) ***Distributors have a strong preference for cheques to manage cash-flow, and perceive electronic as more expensive.***

Distributors have a strong preference for cheques when making payments to FMCG companies because the two–three cheque clearing days delay payments and help them to better manage their working capital. Despite the cash incentives offered by FMCG companies to encourage distributors to shift to electronic payment and pay early, distributors continue to pay FMCG companies with cheques due to this benefit.

In addition, the distributors who have access to electronic payment platforms find them to be expensive, particularly as the general perception is that transacting in cash is free, or less costly. This is reinforced by cash management services offered by commercial banks, where bullion vans pick up cash daily from distributors and some big retailers, and often the banks pick up the tab or the costs are passed on elsewhere. Such services reduce the risk of holding significant amounts of cash onsite and potentially diminish the need to shift to digital in certain respects.

v.) ***Retailers are cash–rich from consumer payments, which pushes cash up the value chain.***

Transactions at the retailer level are predominantly cash-based for several reasons. Firstly, approximately 42%[87] of Ghanaians are financially excluded, and they have no option other than to pay in cash. Further, many individuals that have access to bank and non-bank products prefer to transact in cash because, among other reasons, it is convenient, cash does not carry apparent costs, and the electronic payment products are perceived as costlier. This means that retailers will continue to transact in cash until digital payment options become more convenient and are perceived as less expensive. Changing consumer behaviour would require a concerted, collective industry effort with some element of government support.

Secondly, if the process of converting physical cash to e-value is not convenient, then retailers are likely to pay distributors in cash. Thirdly, small retailers are mostly informal businesses, and the proprietors usually do not have bank accounts or mobile money wallets, making cash the only acceptable form of payment. Fourthly, many retailers prefer to make and receive payments in cash to evade taxation or under-declare taxable income.

Retailers use part of the cash they receive from customers to pay wholesalers and distributors for stock purchases. Wholesalers and distributors use part of the cash received from retailers to make payments and part is deposited into their bank accounts, which funds cheque payments to FMCG companies.

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Box 4.4: FMCG industry dynamics

All FMCG companies we engaged with for this diagnostic use an indirect distribution model, where products are sold to distributors that are responsible for sales to wholesalers and retailers in specific territories; it is our understanding that this is representative of the broader FMCG industry in Ghana. On average, FMCG companies have a network of more than 30 distributors and over 40,000 retailers nationwide. Strategic outlets such as large supermarkets, hotels, and restaurants tend to be serviced directly by the FMCG company's own sales team because of the profile of shoppers, the large sales volume, the branding opportunities through merchandising and facing, and the potential to collaborate on sales activations and promotions.

In a bid to drive sales, FMCG companies often give distributors a credit limit and extend interest-free credit of between 10 to 15 days. As part of the terms of trade, some FMCG companies pay commissions to distributors specifically to ease the interest expense burden on overdrafts and term loans that distributors utilise to manage their business.

The FMCG Sales or Trade Marketing teams play a key role in managing distributors and retailers. Trade development involves building strong relationships across the value chain and providing training on business management, financial planning, and sharing other useful information. Developing a strong relationship with the trade is important in pushing new products into the market and influencing decisions around piloting new payment mechanisms.

FMCG companies with parent companies that are listed on some international stock exchanges, particularly US-based exchanges, have shifted from receiving pure cash payments in compliance with US Securities and Exchange Commission anti-money laundering ("AML") laws. By accepting cheques and electronic payments, these FMCG companies are essentially passing on the burden of compliance with AML laws to the banks.

Box 4.5: Memorable Quote from the Field

"…distributors treat us like banks. They get stock on credit and receive mostly cash payments from retailers, yet they pay us in cheques so that they can play around with the clearing days." –a Head of Finance at one FMCG company

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4.5 Use cases: Recommendations to accelerate the shift

The three use cases were chosen as cash is still highly prevalent in these use cases today, and their shift to digital could have a lasting impact on the payments ecosystem. Of the three use cases, the

Government fees and fines use case seems to be the farthest along in terms of the shift, given the existence of the GEPP payment infrastructure, the support from the top, and the fact that the Government is clearly leading by example. There are, however, certain challenges, including the lack of champions and resources on the MDA level, that have affected its trajectory score. In terms of potential to bring individuals into the digital payments fold, the public utilities case offers the most potential as it relates to an essential service that over 80% of the population uses. The FMCG use case, if focused solely on the B2B relations between manufacturer, distributor and retailer, may immediately touch less people, but the potential downstream impact is exponential, because the largest number of cash payments in the economy relate to the purchase of consumption goods.

Use Case 1: Fees and fines to Government

Although this use case may not be critical in terms of the number of transactions (it makes up only 0.02% of all payments by volume) and it is centred around one-off payments, it has immense potential to ease the friction of P2G interactions for millions of Ghanaians, mainly by reducing transaction time and costs. This is especially the case for services that can be delivered digitally e.g. AMA offers the facility of a Marriage Certificate request on the GEPP portal at a cost of GHS 20 (USD 4.60) which could potentially save an individual at least two trips (minimum) to the AMA office, a few hours of waiting and the additional cost of commute.

This use case is also very close to the heart of the Government, as it is part of their vision of offering e-services to the citizens and showcases them as leading the digital payment efforts in the country. It also has the potential to improve revenue collection for the Government as it can circumvent fake receipt books that lead to revenue leakage. Digital payments also could reduce rent-seeking behaviour in the economy as there is no face-to-face interaction required.

Ghana could be a leader in the region in terms of offering online services. It has already walked the difficult path of building a central e-services and e-payments portal and on-boarded most of the payment providers/payment options. The remaining work involves the Government laying down a clear policy direction in terms of making digital payments mandatory for fees and fines in phases. The Government may also need to (i) invest in improving the internal capacity of the MDAs, (ii) re-engineer some of the internal processes that may impede the offering of online services and digital payment options for services, (iii) bring all MDAs and all services onto the common GEPP gateway, (iv) negotiate a lower transaction charge with the providers and (v) increase public awareness about the digital payment options (anecdotal evidence suggests that many people were often not even aware that they could apply for and pay digitally for some services). If these challenges are addressed, it would be a quick win as most of the infrastructure is there.

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For the use case to gain more traction, we recommend firstly that the Government clearly state its policy to move to digital payments exclusively for government fees and fines. Second, we suggest it improves the technical capacity of MDAs to migrate to digital payments, possibly by soliciting external technical assistance from the private sector and/or donors. Thirdly, to address the fragmentation of payment portals, the Government could mandate the use of GEPP as the central infrastructure for all government agencies. Lastly, the Government, in all cases, should negotiate low/no charges for digital payments by providers for services offered through GEPP.

Use Case 2: Public utilities

Currently cash is extremely pervasive in this use case, with 99.84% of payments being made in cash. Yet the potential for impact is enormous—80% of the population is dependent on at least one, if not both, of these services, and these are payments that are regular and thus quickly habit-forming. If even a fraction of the population is shifted into digital payments due to this use case, that would be a big win, as studies have shown in the domain of off-grid electricity that access to energy provides a tangible incentive to register for, and actively use, digital payment means such as a mobile wallet for customers that had not previously seen the value or relevance of mobile money to their lives.[88]

Looking at the two utilities more closely, water provides some low-hanging fruit regarding the current post-paid system, where issues such as fragmented databases and manual reconciliation can be easily tackled if there is sufficient will and resources. As was recently shown in a CGAP report on the Dar es Salaam Water Supply Company, simply digitising payments can reduce the time required to pay a water bill by 82%[89], resulting in the saving of millions of dollars for the utility as well as generation of significant new revenue. Such a solution, although it forms a good building block going forward, will unfortunately only digitise part of the transaction.

Electricity, on the other hand, may provide a quick win from the perspective of end-to-end digital delivery and payment, as there are many more tariff payers and some smart pre-paid metering already exists (20% of all transactions) that could be converted to end-to-end digital. Further, there are plans to have private sector participation in the management of ECG under the MIDA Power Compact II[90]. It is likely that the ECG concessionaire will be more aggressive in blocking revenue leakages, and thus will probably invest more in smart meters and relevant billing infrastructure. This would mean that an even quicker shift to digital may be on the horizon.

Ultimately, however, water is more promising in the long term from the perspective of end-to-end digital delivery and payment. As it is currently entirely post-paid, there is a clean slate for the introduction of a single type of smart pre-paid meter given sufficient capital investment and political will to overcome activist resistance. Given that the GWC is proactive towards digital payments (ex. API integration, direct debit pilot, mobile money & pre-paid metering project) and that valuable lessons can be extracted by government from successful “pay as you drink” models

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elsewhere in Africa[91], there are certainly many elements that could favour the success of this use case.

To accelerate the shift to digital payments for both water and electricity, we recommend firstly the provision of financial and technical support to the public utility companies in the updating of their internal accounting processes, including their accounting/reconciliation software/platform(s), to facilitate the quicker and more accurate reconciliation of digital payments. Secondly, technical support could be provided by government and donors to assist public utilities in crafting effective partnerships with FSPs, including both banks and mobile money providers, to roll out the acceptance of cards, mobile banking, and mobile money payments both for pre-paid and post-paid utilities and, particularly, for existing smart meters. In the long-term, financing and support for the purchase and installation of homogenous smart meters for both sectors would be the ultimate accelerator.

Use Case 3: FMCG value chain

The potential of the FMCG use case depends on what part of the value chain is prioritised for the shift. At the top end of the chain, we have mainly payments received and made by FMCG companies and distributors; we estimate the total monthly volume and value of B2B (formal large and medium only) payments to be about 509,000 and USD 5.1 billion respectively, of which about 95% of the volume and 73% of the value are cash payments, and these make up 0.1% of all payments by volume. Thus, the potential impact on the payment ecosystem is limited. However, at the bottom end of the chain, we have mainly individual payments to small retailers for consumption goods; we estimate the total monthly volume and value of individual payments for consumption to be 530 million and USD 977 million respectively, of which about 99.9% of the volume and 96% of the value are cash payments, and these make up 93% of all payments by volume and 9% by value. Even if a fraction of these payments is shifted into digital, the potential impact on the payment ecosystem is exponential. Therefore, to ensure optimal impact, in addition to tackling the low hanging fruit of payments by FMCG companies, the focus of any shift should equally be on small retailers and individuals.

Looking at the specific benefits of the use case for the sector's main actors, FMCG companies will receive electronic payments quicker than by cheques, thereby improving their cash flow positions. Distributors and retailers, on the other hand, will minimise their risk of robbery of significant amounts of cash. In addition, making and receiving electronic payments will improve recordkeeping for all involved and assist owners in better understanding the profitability of their businesses. Financial services providers can also use the digital footprint created by electronic payments to develop relevant products, particularly for unbanked small retail businesses. Lastly, digital payments can facilitate the formalisation of small informal businesses, which has the potential to improve government's tax collection.

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It is important to note that several factors required for the shift of the entire value chain are already in place—this is a dynamic private sector, many FMCG companies understand the benefits and have some desire to push digital payments, and there already exist innovative products from FSPs that can support the technical aspects. On the other hand, the shift will require a change in consumer and business behaviour, a real understanding of the cost of cash, and the pushing of levers throughout the value chain, as FMCG companies' influence can only partially reach down the chain.

To accelerate the shift throughout the entire value chain, we recommend firstly a concerted, collective industry effort with some element of government support. For example, FMCGs could run campaigns where the cash incentives offered to encourage distributors to pay electronically (which have, so far, not been effective) are passed on to retailers and consumers. The Government could support this initiative by offering a small tax incentive to merchants and even consumers. Any initiative that offers cash incentives should be informed by a business case for all stakeholders—FMCG companies, FSPs and government—to ensure its sustainability in the short- to medium-term.

Secondly, FSPs should consider extended free trial campaigns for electronic banking products for the sector to drive adoption and usage, which will both ultimately increase their market footprint as well as support a shift for the rest of the value chain. Lastly, we recommend further in-depth research to understand how payments flow throughout the value chain, especially focusing on the small retailer and wholesaler behaviour, incentives and challenges.

5. Roadmap for accelerating the shift to digital payments

5.1 Five accelerators

This chapter provides a high-level roadmap for Ghana for the next ten years with regards to payment digitisation. In previous sections of this report, we have highlighted areas where cash is prevalent in the payment grid as well as several barriers and issues relating to the shift to digital payments and focused on three specific use cases. We are now returning our focus on Ghana's entire payment ecosystem, and looking at how the entire ecosystem can be best incentivised for a shift. On this basis, we present below a roadmap focused on five specific accelerators. We particularly set out key recommendations and prioritised actions going forward, and the dependencies of each of the various stakeholders for each action item.

As this roadmap is focused on the next decade, the accelerators and recommendations identified are those that can be best realised in this time span and which will provide the greatest impact therein. We thus have not concentrated on activities that are already making incremental progress, such as Ghana's enabling regulatory framework or its expanding payment infrastructure. Rather, our focus is on opportunities that show promise but will require some assistance from the public

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and/or private sectors to ignite, and which ultimately may be game changers in the shift to digital payments.

BTCA's recommended digital payment accelerators

The BTCA report "*Accelerators to an Inclusive Digital Payments Ecosystem*" (the "BTCA Accelerator Report"), published in September 2016, reviewed 25 countries, including Ghana, and distilled ten tangible steps or "accelerators" that both the public and private sector can take to push the digitisation of payments. These were:

1. Develop a Unique Identification Program in a centralised database that both public and private sector players can access to verify identities to drive digital payments and financial inclusion.
2. Establish regulation that promotes innovation and responsible practices by understanding the gaps and barriers of existing regulation and engaging all stakeholders.
3. Establish interoperability in a digital payments ecosystem to reduce barriers that confine digital transactions to a single payment platform.
4. Promote merchant acceptance infrastructure across Micro, Small, and Medium Enterprises to boost adoption among consumers and large players higher in the value chain.
5. Establish shared digital infrastructure to reduce barriers to entry and promote innovation.
6. Leverage existing networks, such as social media platforms to quickly extend digital payment services to far-reaching user bases, improve the business case, and reduce costs.
7. Identify and digitise use cases that individuals frequently use for transactions to increase comfort with digital payments and increase digital transaction volumes.
8. Digitise government and corporate payments to advance a digital payments ecosystem.
9. Digitise government receipts to advance digital payments ecosystems and build familiarity with digital payments among individual users and businesses, as well as raise revenues for government.
10. Implement policies that incentivise and improve the convenience of digital payments to drive quicker and more widespread access and adoption of digital payments.

In this section, we have identified five possible areas of action that can be taken in Ghana based on BTCA's accelerators above.

Accelerator #1: Private and Government incentives to push merchant payments

To date, there have not been noticeable efforts by the private sector and government to offer tangible incentives that make the cost of adopting electronic payment for small businesses and other merchants less than the cost of transacting in cash. Retailers who complain about the cost of electronic payment platforms are usually informed about the less tangible benefits of digital payments, such as minimising the risk of theft and the convenience of digital payments.

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Some FSPs tend to run short-term campaigns (3 months) that offer cash incentives to individuals to drive adoption and usage of specific electronic products and channels. These product campaigns, which often target customers that already have access to electronic payment products, offer prizes to some customers drawn in a raffle or discounts on purchases for a limited period. For example, Airtel[92] and Vodafone[93] partnered with Roverman Productions to offer 10% discounts on theatre tickets purchased using mobile money. MTN, in partnership with Silverbird Cinemas, has offered one free movie ticket when customers paid for one movie ticket using MTN mobile money[94].

Short-term campaigns tend to generate short-term results that are usually not sufficient to change habits formed over many years. Accelerating the active usage of electronic payment products by merchants and individuals will require broader industry collaboration, a sustained effort, and significant investment by industry to fund tangible incentives such as specific trade discounts, campaigns to create awareness, and the deployment of resources to educate and handhold merchants that are new to electronic platforms.

SABMiller's subsidiary in Peru, Backus, grew sales by collaborating with companies, governments, and civil society to support small retailers. Among other interventions, the company provided retailers with skills training and worked with banks and microfinance companies to increase small retailers' access to finance through mobile phones[95].

Government can also offer tax incentives (i) to FMCG companies that successfully shift merchant payments to electronic through trade discounts and/or (ii) to retailers and individuals that actively adopt electronic payments. The governments in Uruguay, India and South Korea have taken bold actions to accelerate the shift of merchant payments. Uruguay amended its VAT law and offered a temporarily lower VAT rate for purchases up to USD 400 paid with a credit card[96]. As a result, the POS network tripled between 2011 and 2015, while debit card transactions grew seven-fold[97]. In India, merchants with an annual turnover of up to INR 20 million (about USD 316,000) will pay a lower deemed profit tax rate of 6% for amounts received through banks and digital channels and 8% for amounts received in cash[98]. Lastly in South Korea, in addition to threatening companies with tax audits for not accepting cards, the Government gives consumers income tax rebates for reporting their annual expenditure using credit cards.[99]

Given the current context in Ghana, a combination of private-sector incentives fuelled by collaborative industry efforts and tax incentives for digital merchant payments may be the right combination to ignite adoption, both by consumers and by large players higher up the FMCG value chain.

Accelerator #2: Digitising procurement and G2B payments

Payment grid data shows that only 10% of Government procurement payments by volume are made digitally. These payments make up 85% of G2B payments and are mostly made by cheques

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(treated as cash for the purposes of this report). However, the Government has announced in the 2017 budget that e-procurement will be launched this year by promulgation of Regulations following the passage of the *Public Procurement (Amendment) Act, 2016 (Act 914).* This would kick-start e-procurement in Ghana and has the potential to save millions of dollars in terms of better prices for the Government, reduction in printing costs for tender documents, etc. For example, Portugal has saved EUR 185 million (approximately USD 220 million)[100] between 2009 and 2011 by using e-procurement[101].

It is suggested that this is the opportune time for the Government to also mandate electronic payments for all e-procurements. This may need process re-engineering within the Government Financial Management systems and integration/development of a payments module in the e-procurement system. However, this could spur not just G2B digital payments but also has potential to improve trust in digital payments for businesses.

Accelerator #3: Leveraging EFT/RTGS for B2B payments

Our analysis of Ghana's payment ecosystem made clear that business-to-business payments are 98% in cash by volume and 87% by value, with the predominance of high-value payments being made by cheque (as evidenced by the data on cheque clearing). From qualitative interviews, it was apparent that businesses prefer to make payments by cheques as they act as a cash flow management tool, providing them 2-3 days of short-term credit. In addition, there is a perception that a cheque provides more legal recourse if it is not honoured (and on the flipside, that a cleared and processed cheque presents an irrefutable proof of payment.)

Given that B2B payments make up 72% of all business payments and business payments contribute to 76% of all payments by value, a shift from cheques to digital payment would have a large impact on high-value payments. The ability to leverage existing payment networks or platforms for B2B, such as EFT, is one potential accelerator that could be applied.

Adoption of digital payment methods such as EFT/RTGS could be an accelerator for B2B payments if a cheaper price is offered to incentivise businesses to take advantage of rapid payments (and the accompanying efficiencies). Secondly, the Government could consider providing income tax incentives for businesses. For example, the Government of India has recently introduced tax incentives for small traders for digital payments. Further, the private-sector FSPs could focus on developing EFT in internet banking and mobile money by proposing quicker, user-friendly, convenient and more secure platforms. For example, since 2007, internet banking customers in South Africa have had the option to expedite payments to real-time by selecting the RTC payment stream instead of the standard EFT credit.[102] Dr. Settor Amediku, of the BoG, voiced support for incentives that push the market in a recent interview.

Beyond the push towards EFT— a "carrot"—the public authorities could concurrently legislate that all corporate transactions over a certain value that are not digital be penalised—the "stick'.

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For example, the Central Bank of Nigeria imposed penalties in 2012, in the context of its "Cashless Nigeria" policy, on all businesses and persons who deposited or withdrew more than N500,000 (approx. USD 1,600[103]) and N3,000,000 (approx. USD 9,500) from their bank accounts.[104] This was in addition to a policy that limited all cheques to N150,000 (USD 475), requiring digital payment for any larger amounts, as well as other initiatives such as restrictions of cash pick-up services for merchants and investment in the deployment of POS terminals.[105] The BTCA Accelerator Report found that as a result of these policies, the volume of digital payments increased 14% year-over-year between 2012 and 2015.[106]

Ghana already has legislation that no more than GHS 5,000[107](USD 1,157) may be withdrawn from a bank teller at one time, but this rule seems to be circumvented by repeated withdrawals under GHS 5,000. It is of note that an e-payment only regulation for payments above a certain threshold was one of the key recommendations of the *National Payment Strategy*.[108] Although the BoG supports this recommendation, the need for infrastructure to support this type of legislation is currently a roadblock.

Although leveraging existing payments infrastructure such as EFT to push more B2B transactions will allow for synergies that can facilitate and magnify efforts towards digital, one needs to be cognisant that any policy needs to correspond to the reality of Ghana's current payment infrastructure. Given the lack of readiness of its current infrastructure for a full cash-lite policy, until more investment is made, incentives that provide a carrot may provide the best levers at this point of time.

Accelerator #4: Roll out a biometric national ID system

A unique digital ID is a critical pillar of digital transformation in a country. A centralised identification system that both public- and private-sector players can access to verify identities can drive digital payments and financial inclusion. India is an example of large-scale deployment of a biometric-based ID system in a developing country. The Indian government developed the Aadhaar system that provides a unique identification number supported by biometric data to more than 1.15 billion of India's 1.3 billion people. It is a cardless digital ID system wherein an individual can just quote her number and present her biometrics to obtain an instant bank account, instant SIM card, etc. using e-KYC services of the ID system. This has enabled hundreds of millions of hitherto unbanked customers to obtain bank accounts in India and even conduct digital transactions without a card or even a mobile phone by just using their biometrics at thousands of merchant locations. The Government of India has plans to deploy 2 million such biometric enabled terminals (smart phone and a fingerprint reader) during 2016-17[109].

In Ghana, although 98% of Ghanaians report having at least one form of ID, market participants across Ghana struggle with the wide variety of forms of identification and identity databases in existence. There are currently nine separate databases in use across the various government and

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public entities, which makes it difficult for any entity to uniquely identify individuals. Further, these ID systems do not allow any online verification services, thus exposing the financial service providers to KYC risks.

Although Ghana had initiated a biometric-based unique ID system in the year 2006, the National Identification Authority has had limited success. It has captured data for just 3 million Ghanaians and even that has not been processed. Further, the Ghanacard that was proposed to be issued under the project did not conform to international standards such as International Standards Organisation ("ISO") and International Civil Aviation Organisation ("ICAO"), etc. From qualitative interviews, we have learned that a revamped National ID will follow international standards and capture all ten fingerprints. The revamped National ID system is being supported by the World Bank and is expected to be rolled out shortly.

A rollout of a digital ID system in Ghana would thus act as an accelerator for digital payments as it would not only allow financial services providers a unified approach to KYC, but can also enable other digital payment innovations leveraging the Digital ID, such as remote KYC for remote account activation by MNOs, etc.

Accelerator #5: Implement interoperability for all payment instruments

At an industry level, P2P mobile money transfers and transfers between bank accounts and mobile money wallets are currently not interoperable. Ghana's national switch, which is managed by GhIPSS, handles the electronic clearing of cheques and the processing and settlement of bulk debit and credit transfers between banks. The national switch currently does not have the capability to handle other types of payments such as bank-to-mobile wallet, mobile wallet-to-bank, and wallet-to-wallet transactions. This means a mobile money subscriber cannot send money directly to a mobile wallet provided by a different network; such payments are received in the form of a token or voucher code, and the beneficiaries have to go through a cumbersome process of first cashing out at a fee and then either cashing into a mobile wallet or depositing into a bank account. Payments from mobile wallets to some bank accounts are possible, but this depends on whether the mobile money operator and the bank in question are integrated.

Interoperability has a strong potential to accelerate a shift to electronic payments because it enhances the convenience of making and receiving electronic payments and increases their efficiency. Some third-party payment aggregators are developing innovative solutions that enable "semi-interoperable" payments. In September 2016, expressPay partnered with Visa to launch a semi-interoperable solution called Direct Bank[110], that facilitates the transfer of money across mobile money operators in addition to transfers between some bank accounts and mobile money wallets. ExpressPay's Direct Bank does not offer industry-wide interoperability, as only 11 out of 37 banks are presently integrated into the platform[111].

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In March 2017, the Government of Ghana tasked GhIPSS with developing a new interoperable switch that will support bank and mobile money payments by November 2017[112]. We believe this a positive development in Ghana's quest to become a cash-lite economy.

Tanzania is a good example of a country that is seeing growth in interoperable mobile money payments after mobile money operators collaborated to achieve interoperability – Airtel and Tigo have reported a significant growth in interoperable P2P transfers[113].

Although GhIPSS is well-positioned to deliver on this mandate, plans by the BoG to divest about 70% of its 100% shareholding in GhIPSS to commercial banks through the Ghana Association of Bankers may discourage some stakeholders from connecting. The Ghana Chamber of Telecommunications and some mobile money operators have expressed their concerns about the proposed future ownership structure of GhIPSS and are pushing for broader consultation.

It is important that all stakeholders have confidence in the neutrality of the owners and managers of the national switch to avoid some of the challenges RSwitch faced in Rwanda. The ownership structure of Rwanda's national electronic payments switch operator, RSwitch, has been mentioned as one of the reasons why it did not achieve the desired impact. Millicom International SA, owners of Tigo Rwanda, acquired an 88% stake in RSwitch in June 2014. MTN Rwanda, the market leader, decided not to connect to RSwitch because it was majority-owned by a competitor's parent company. We believe Ghana's push for interoperability is likely to face similar challenges if key mobile money operators decide not to connect to GhIPSS' new switch for strategic and commercial reasons.

Given the value of interoperability as an accelerator for the shift to digital payment, Ghana has a great opportunity to draw on valuable lessons from Tanzania, Rwanda and other markets that have launched an interoperable switch across payment platforms.

5.2 Scenarios mapped on a high-level roadmap

The percentage of electronic payments for Ghana is currently 1% by volume and 28% by value. We have plotted in Figures 5.1 and 5.2 what potential effect, in terms of increase in volume and value, the implementation of all or some of the accelerators will have on Ghana's current shift trajectory to digital payments.

FIGURE 5.1: TRAJECTORY SCENARIOS FOR TRANSACTION VOLUME

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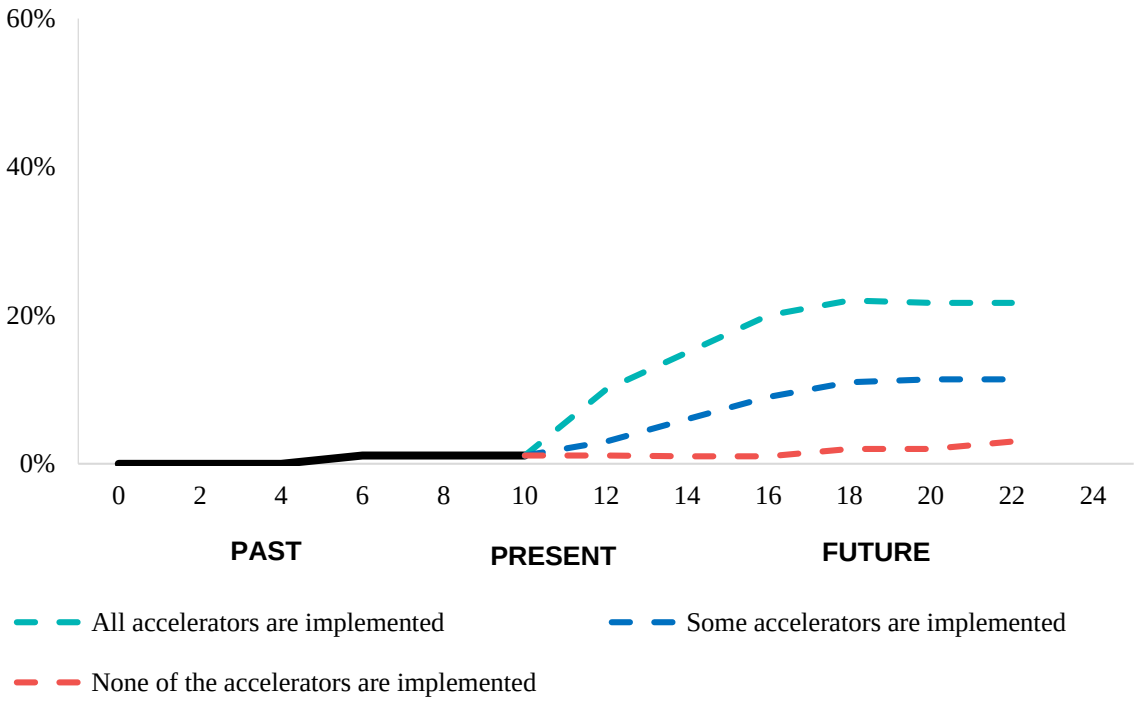
60%
40%
20%
0%
0
2
4
6
8
10
12
14
16
18
20
22
24
PAST
PRESENT
FUTURE
All accelerators are implemented
Some accelerators are implemented
None of the accelerators are implemented

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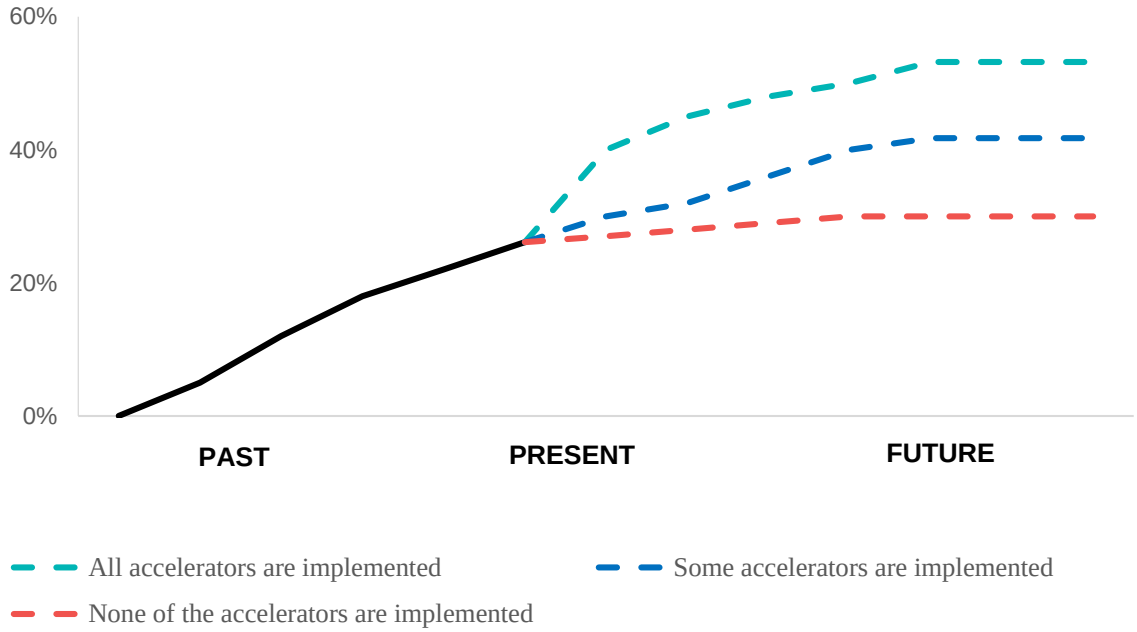
FIGURE 5.2: TRAJECTORY SCENARIOS FOR TRANSACTION VALUE



In both Figures 5.1 and 5.2 the X-axis represents time, with the present reflecting the situation as of time of publication of this report, a five to 10-year horizon for the past, and five to 10-year horizon for the future. In Figure 5.1 the Y axis represents percentage of volume of electronic payments, while in Figure 5.2, the Y axis represents percentage of value of electronic payments.

We explored the potential effect of the accelerators in three scenarios at a high level in Figures 5.1 and 5.2. Scenario 1 is based on full implementation of the five recommended accelerators identified in this report. By volume, it depicts Ghana reaching 22% of digital payments within five to 10 years., and reaching 53% by value. Scenario 2 assumes that some of accelerators have been implemented, resulting in 42% by value, 11% by volume. Scenario 3 is the worst-case scenario, where none of the accelerators are implemented, or even if some are, a currently unforeseeable event occurs that perturbs the shift, such as a regulatory regime change. In such a scenario, the trajectory may still increase but at a much slower rate, achieving 30% by value and 3% by volume in five-10 years.

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5.3 Additional research studies

We identify below additional areas for future research with respect to the shift to digital payments in Ghana.

TABLE 5.1: FURTHER RESEARCH AREAS

Research	Audience	Description
Consumer insights study	Government, Business	A study to understand how consumers pay, including whether cost, literacy and ease of use are an issue.
Deep dive on wholesalers and small retailers	Government, Business	Research on how payments flow throughout the FMCG value chain, especially focusing on the small retailer and wholesaler behaviour, incentives and challenges.
Cost of cash report	Government, Business	A formal cost of cash analysis for Ghana. This was one of the NPS recommendations, and it is our understanding that BoG is currently working on such a study.

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6. Annexes

Annex A: List of Acronyms

ACH	Automated Clearing House
AMA	Accra Metropolitan Assembly
AML	Anti-Money Laundering
ATM	Automated Teller Machine
B2B	Business to Business
B2G	Business to Government
B2P	Business to Person
BDR	Births and Death Registry
BoG	Bank of Ghana
BTCA	Better Than Cash Alliance
CAG	Controller and Accountant General
CAGD	Controller Auditor General Department
CAGR	Compound Annual Growth Rate
CCC	Cheque Codeline Clearing
CGAP	The Consultative Group to Assist the Poor
CID	Criminal Investigation Department (Ghana Police)
CSCA	Cooperative Susu Collectors Association
CSD	Central Securities Depository
DEMI	Dedicated Electronic Money Issuer
DFS	Digital Financial Services
DMB	Deposit Money Bank
DQI	Data Quality Index
DVLA	Driver and Vehicle Licensing Authority

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ECG	The Electricity Company of Ghana Limited
EFT	Electronic Fund Transfer
EMI	Electronic Money Issuer
FDA	Food and Drugs Authority
FDI	Foreign Direct Investment
FMCG	Fast Moving Consumer Goods
FSP	Financial Service Providers
G2B	Government to Business
G2G	Government to Government
G2P	Government to Person
GDP	Gross Domestic Product
GEPP	Ghana E-Payment Portal
GIP	GhIPSS Instant Pay
GhIPSS	Ghana Interbank Payment and Settlement Systems
GIFMIS	Ghana Integrated Financial Management Information Systems
GIS	Ghana Interbank Settlement System
GoG	Government of Ghana
GPHA	Ghana Ports and Harbours Authority
GRA	Ghana Revenue Authority
GRPI	Ghana Retail Payments Infrastructure
GSS	Ghana Statistical Services
GTA	Ghana Tourism Authority
GWC	Ghana Water Company
ICAO	International Civil Aviation Organisation
ICT	Information and Communications Technology

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IFMIS	Integrated Financial Management Information System
IMF	International Monetary Fund
ISO	International Standards Organisation
KYC	Know Your Customer
LEAP	Livelihood Empowerment Against Poverty
MDA	Municipal and District Assembly
MC	Minerals Commission
MFI	Microfinance Institutions
MMO	Mobile Money Operators
MMP	Mobile Money Providers
MNO	Mobile Network Operator
MTO	Money Transfer Operator
MoC	Ministry of Communications
MGCSP	Ministry of Gender, Children and Social Protection
NBFI	Non-Bank Financial Institutions
NCA	National Communication Authority
NFC	Near Field Communication
NITA	National Information Technology Agency
NFIS	National Financial Inclusion Strategy
NHIA	National Health Insurance Authority
NIA	National Identification Authority
NSS	National Service Scheme
OTC	Over the Counter
P2B	Person to Business
P2G	Person to Government

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P2P	Person to Person
POS	Point of Sale
PPA	Public Procurement Authority
PPP	Purchasing Power Parity
PSP	Payment Service Provider
PSSA	Payment Services and Systems Act
RGD	The Registrar General Department
RTGS	Real-Time Gross Settlement System
SMS	Short Messaging Service
SSNIT	Social Security and National Insurance Trust
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TEN	Tweneboa, Enyenra, Ntomme
USD	United States Dollars
WB	World Bank

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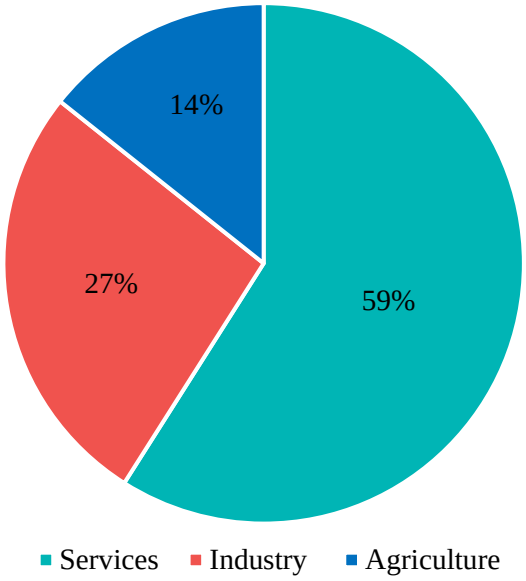
Annex B: Additional Country Indicators

Sectoral Distribution of GDP

Ghana's economic distribution in the first quarter of 2017 was mostly reliant on services (59.0%), followed by industry (26.7%) and agriculture (14.3%).[114]

FIGURE B.1: GHANA SECTORIAL DISTRIBUTION



Economic growth is expected in 2017, spurred by improvements in both oil and non-oil sectors. Government estimates project the economy to expand by 6.3 per cent in 2017, with non-oil GDP growing at 4.6 per cent.[115]

Balance of Trade

Despite weak commodity prices, Ghana's external balance of trade improved in 2016, reflecting a fall in imports and a growth of exports. This provided Ghana with a surplus of USD 247 million, the first surplus since 2011, compared to a deficit of USD 129 million in 2015.[116]

Gross foreign assets grew to an estimated USD 61.6 billion in 2016 due to an improved current account, supporting the stability of the international exchange rate. The current account deficit narrowed to 6.4% of GDP in 2016, from 7.6% of GDP in 2015. This led to growth in gross foreign reserves to an estimated 4.9 billion in 2016, equivalent to 2.8 months of imports at the end of 2016. This growth was driven by an increase in gold export receipts and a decline in non-oil

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imports.[117] The merchandise export earnings totalled USD 11.06 billion in 2016, indicating a rise of 7.2% from USD 10.3 billion recorded for the same period in 2015. The increase in export receipts was mainly attributed to higher earnings from gold, timber and aluminium alloy exports. The provisional estimates of value of merchandise imports for the year amounted to USD 12.8 billion, indicating a 4.6% fall in level recorded in the same period of 2015.[118]

Oil production is set to increase as repairs on the Jubilee fields are completed and the Tweneboa, Enyenra, Ntomme ("TEN") field extraction continues to grow to meet full capacity.[119] Reports suggest that oil production did see an increase in early 2017. However, globally low oil prices may challenge the country's ability to use the increased production to reduce a fiscal deficit.[120]

Ghana's reliance on oil exacerbated an economic crisis in 2014 brought on by low oil prices and high government spending, leading to the country receiving a loan from the IMF in 2015. Ghana is also in a conflict with Cote d'Ivoire over maritime oil fields in the Atlantic Ocean, with a final judgment expected from the International Tribunal of the Law of the Sea by September of 2017.[121]

GDP Growth and National Spending

GDP growth of 3.6% in 2016 was lower than a revised projection of 4.6%. Non-oil real GDP grew at an estimated 4.6%, same as the target. Inflation also fell slightly to 15.4% in December, against a target of 10.1%. Non-oil provisional Q1 Real GDP for 2017 grew by 3.9% year-on-year compared to 6.3% for Q1 2016.[122] Ghana's debt was at 73% of GDP at the end of 2016, from 72% in 2015.[123]

The Government further has set growth targets for the medium term (2017-2019) as follows: (i) real GDP growth to average 7.4 %; (ii) real non-oil GDP growth to average 5.6%; (iii) inflation to be within the target band of 8 +/- 2% in the 2018-2019 period; (iv) the overall deficit to reduce to 3% by the end of 2019; and (v) Gross Foreign Assets to cover not less than 3.5 months of imports of goods and services in the medium term.

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Annex C: Payment Grid

	Number of Monthly Transactions	Percentage of Electronic Transactions	Number of Electronic Transactions	Total Monthly Value (GHS)	Total Monthly Value (USD)	Percentage of electronic payment	Total Value of Electronic Payment (GHS)	Total Value of Electronic Payment (USD)
Government								
G2P Total	771,276	100%	771,276	1,182,767,799	273,788,842	100%	1,182,767,799	273,788,842
Wages and salaries	496,320	100%	496,320	1,009,166,667	233,603,395	100%	1,009,166,667	233,603,395
Pension	168,456	100%	168,456	167,351,132	38,738,688	100%	167,351,132	38,738,688
Social welfare programs (e.g., LEAP)	106,500	100%	106,500	6,250,000	1,446,759	100%	6,250,000	1,446,759
G2B Total	7,561,417	10%	756,556	1,028,666,667	238,117,284	60%	614,240,833	142,185,378
Procurement of goods and services	7,558,656	10%	755,866	908,250,000	210,243,056	61%	554,032,500	128,248,264
Corporate tax refunds	2,761	25%	690	120,416,667	27,874,228	50%	60,208,333	13,937,114
G2G Total	496,119	100%	496,119	776,394,022	179,720,839	100%	776,394,022	179,720,839
Transfers to local government (metropolitan, municipals and districts assemblies)	72	100%	72	717,250,000	166,030,093	100%	717,250,000	166,030,093
Social security contributions	496,047	100%	496,047	59,144,022	13,690,746	100%	59,144,022	13,690,746
Government Total	**8,828,812**	**23%**	**2,023,950**	**2,987,828,488**	**691,626,965**	**86%**	**2,573,402,654**	**595,695,059**
Business								
B2G Total	1,308,057	31%	405,431	7,361,553,381	1,704,063,283	40%	2,914,150,801	674,571,945
Fines and fees to Govt.	77,538	1%	676	262,561,740	60,778,181	36%	93,821,132	21,717,855
Taxes	176,720	10%	17,672	1,760,821,517	407,597,573	68%	1,188,554,524	275,128,362

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	Number of Monthly Transactions	Percentage of Electronic Transactions	Number of Electronic Transactions	Total Monthly Value (GHS)	Total Monthly Value (USD)	Percentage of electronic payment	Total Value of Electronic Payment (GHS)	Total Value of Electronic Payment (USD)
Utilities	249,879	5%	12,494	5,242,318,124	1,213,499,566	30%	1,572,695,437	364,049,870
Social security contributions	803,920	47%	374,589	95,852,000	22,187,963	62%	59,079,708	13,675,858
B2B Total	2,850,222	2%	43,106	25,319,469,753	5,860,988,369	13%	3,340,502,731	773,264,521
Formal large businesses	359,474	3%	9,530	20,396,476,336	4,721,406,559	14%	2,779,442,663	643,389,505
Formal medium businesses	149,422	3%	3,961	1,650,493,039	382,058,574	14%	224,913,887	52,063,400
Formal small businesses	305,485	3%	9,257	960,655,442	222,373,945	11%	104,961,687	24,296,687
Formal micro businesses	85,489	1%	855	693,616,542	160,559,385	10%	69,361,654	16,055,938
Informal businesses	1,950,350	1%	19,504	1,618,228,394	374,589,906	10%	161,822,839	37,458,991
B2P Total	4,203,320	33%	1,389,200	2,767,080,396	640,527,870	35%	974,803,551	225,648,970
Employees' salaries	2,954,550	47%	1,376,680	1,345,149,398	311,377,176	62%	829,101,470	191,921,637
Pensions	33	100%	33	3,898,868	902,516	100%	3,898,868	902,516
Input purchases (from micro and informal businesses)	1,248,737	1%	12,487	1,418,032,130	328,248,178	10%	141,803,213	32,824,818
Business Total	**8,361,599**	**22%**	**1,837,737**	**35,448,103,531**	**8,205,579,521**	**20%**	**7,229,457,083**	**1,673,485,436**
People								
P2G Total	10,685,254	9%	993,896	667,844,063	154,593,533	27%	178,322,799	41,278,426
Fines and fees to Govt.	68,504	3%	1,913	53,256,778	12,327,958	16%	8,337,600	1,930,000
Taxes	2,775,027	35%	964,983	383,261,817	88,718,013	44%	168,635,199	39,035,926
Social security contributions	150,000	18%	27,000	7,500,000	1,736,111	18%	1,350,000	312,500
Bill pay: water & electricity	7,691,723	0%	-	223,825,469	51,811,451	0%	-	-

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	Number of Monthly Transactions	Percentage of Electronic Transactions	Number of Electronic Transactions	Total Monthly Value (GHS)	Total Monthly Value (USD)	Percentage of electronic payment	Total Value of Electronic Payment (GHS)	Total Value of Electronic Payment (USD)
P2B Total	534,110,135	0%	557,706	4,561,141,972	1,055,819,901	4%	172,315,292	41,549,592
Payments for consumption	530,129,553	0%	557,706	4,219,309,802	976,692,084	4%	172,315,292	39,887,799
Bill pay: Housing and private utilities (gas)	3,980,583	0%	-	341,832,171	79,127,817	0%	-	-
Loan payments (formal)	2,682,618	11%	299,540	64,293,238	14,882,694	11%	7,178,947	1,661,793
P2P Total	5,733,472	16%	890,005	3,080,832,510	713,155,674	66%	2,023,265,475	468,348,490
Domestic Remittances	463,821	56%	257,420	293,069,700	67,840,208	56%	162,653,683	37,651,316
International Remittances (incoming)	583,099	68%	398,256	2,719,152,688	629,433,493	68%	1,857,181,286	429,903,075
Loan payments (informal)	4,686,553	5%	234,328	68,610,122	15,881,973	5%	3,430,506	794,099
People Total	**550,528,862**	**0.4%**	**2,441,607**	**8,309,818,546**	**1,923,569,108**	**29%**	**2,373,903,567**	**549,514,715**
Grand Total	**567,719,273**	**1%**	**6,303,294**	**46,745,750,564**	**10,820,775,593**	**26%**	**12,176,763,304**	**2,818,695,209**

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Annex D: Glossary of Terms

Term	Definition
ACH/Automated Clearing House	A payment clearing network that provides clearing and settlement services for demand deposit account (DDA) transactions. Many countries today have at least one ACH in operation to service their domestic payment industry. An ACH handles either (or both) Credit Push or Debit Pull (also called Direct Debit) payments. Most banks in the country will typically belong to the ACH, either directly or through intermediary banks. The ACH Switch moves transactions from one bank to another, and either provides, or interfaces with, a Net Settlement system. Payment orders are exchanged primarily via magnetic media or telecommunications networks, and handled by a data processing centre.
Bank Account	The arrangement between a depositor and a bank, where the depositor has entrusted the bank to safeguard its funds, and the bank provides access to those funds through various channels.
Bill Payment	A payment made by a person to a biller or a billing organisation in exchange for services provided.
Biometrics	An authentication technology that employs digital values derived from the human body, which a service provider captures for checking from users via sensors. A wide variety of biometric technologies exist, including input derived from the user's fingerprint, palm, face, iris, retina, ears, gait, heartbeat, and others.
Branchless banking	The delivery of financial services outside conventional bank branches, often using agents and relying on information and communications technologies to transmit transaction details – typically card-reading POS terminals or mobile phones.[124]
Business-to-Business	Services provided by a business entity to another business entity.
Cash In	The process by which a customer credits his account with cash. This is usually via an agent who takes the cash and credits the customer's account with the same amount of e-money.
Cash Out	The process by which a customer deducts cash from his account. This is usually via an agent who gives the customer cash in exchange for a transfer of e-money from the customer's account.
Central Bank	A government agency responsible for supervising and operating banking activities for the national government. Central Bank activities generally include maintaining reserve accounts required of depository institutions, regulating money supply, transferring funds, and acting as fiscal agent for the government.
Cheque	A paper payment instrument that allows a payer to pay a payee with monies drawn against the payer's bank account.
Clearing	The process in a payment system whereby the paying bank or PSP posts individual transactions to their customer accounts. Clearing may be done in Batch or Real-Time. Often referred to in conjunction with Settlement.
Clearing House	An organisation formed to handle payments in an open loop bank transfer system. A clearing house may handle transaction switching, or facilitate

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Term	Definition
	clearing and interbank settlement. The term is most typically used for cheque or ACH systems.
Credit Card	A payment card, where the cardholder account with the issuer features a line of credit against which payments can be initiated.
Debit Card	A payment card where transactions create a debit to the cardholder's bank account.
Digital Financial Services (DFS)	The definition includes card-based services, EFT and MFS.
Financial Inclusion	The concept of enabling access to financial services for disadvantaged populations, which otherwise may be excluded from partaking of these services.
Financial Institution (FI)	A bank or other institution authorised under applicable law to provide bank account services, and possibly other types of financial services, to individuals or organisations.
Government-to-Person (G2P)	Services provided by a government agency to an individual (sometimes also referred to as G2C (government to consumer).
Gross Settlement System	A transfer system in which the settlement of funds or securities transfer instructions occurs individually (on an instruction by instruction basis) as opposed to creating a net settlement file at periodic intervals.
International Remittance	A cross-border payment from one consumer to another.
Internet Banking	Access to banking services over the Internet from any connected device
Interoperability	The ability of an end-user dealing with one bank or PSP to exchange a transaction with an end-user who is dealing with a different bank or PSP. Interoperability may be achieved either through participants all using the same system, or through inter-system networking agreements.
Know-Your-Customer (KYC)	The process of identifying and authenticating a customer, for purposes of risk management and regulatory compliance.
Merchant	Generally used in the payments industry to describe receivers of funds, where payments are made for goods and services. Such recipients are a broad group, and include stores, service providers (often referred to as billers), not-for-profit enterprises, and governments.
Merchant Payment	A payment made from a mobile wallet via a mobile money platform to a retail or online merchant in exchange for goods or services. It can help mobile money providers facilitate customer adoption and increase financial inclusion, especially in rural areas.
Mobile Banking	When customers access a bank account via a mobile phone; sometimes, they can initiate transactions.
Mobile Financial Services (MFS)	Financial services, including payments, loans, savings, insurance and others, provided to customers via the mobile channel.
Mobile Money	Monetary value that is: available to a user to conduct transactions through a mobile device; accepted as a means of payment by parties other than the issue;

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Term	Definition
	issued on receipt of funds in an amount equal to the available monetary value; electronically recorded; mirrored by the value stored in an account(s) usually open in one (or more) bank(s); and redeemable for cash.[125]
Mobile Money Account	An e-money account that is primarily accessed using a mobile phone and that is held with the e-money issuer. In some jurisdictions, e-money accounts may resemble conventional bank accounts, but are treated differently under the regulatory framework because they are used for different purposes (for example, as a surrogate for cash or a stored value that is used to facilitate transactional services). An active Mobile Money Account is a Mobile Money Account that has been used to conduct at least one transaction during a certain period of time (usually 90 days or 30 days).
Mobile Network Operator (MNO)	A telecommunications company that operates a market-facing mobile voice and data network, which customers access using mobile devices.
Mobile Payment	A payment transaction initiated or received on a mobile device.
Mobile Point of Sale	A smart device or dedicated wireless device that performs the functions of a POS terminal.
Mobile Wallet	A mobile wallet is a type of payment service through which businesses and individuals can receive and send money via mobile devices.
MFS Agent	A person or business that is contracted to facilitate transactions for users. The most important of these are Cash-In and Cash-Out (i.e., loading value into the mobile money system, and then converting it back out again); in many instances, agents register new customers too. Agents usually earn commissions for performing these services. They also provide front-line customer service – such as teaching new users how to initiate transactions on their phone. Typically, agents will conduct other kinds of business in addition to mobile money. The types of individuals or businesses that can serve as agents will sometimes be limited by regulation, but small-scale traders, microfinance institutions, chain stores, and bank branches act as agents in some markets. Some industry participants prefer the terms "merchant" or "retailer" to describe this person or business to avoid certain legal connotations of the term "agent" as it is used in other industries.
Money Transfer Operator (MTO)	An organisation that remotely transfers cash value between geographically separated payers and payees using agents, where the agents manage the physical cash, accepting it from payers and disbursing it to payees.
Payee	The person or organisation receiving payment in a transaction. Synonyms include 'Merchant' (in card-based payment systems) and Receiver (in Remittances). In all payment systems, other than currency (including digital currency), the payer holds an account with a PSP or FI, which is credited when a payment is received.
Payment Instrument	Any instrument enabling the holder/user to transfer funds.
Payment Service Provider (PSP)	The entity that does not participate directly in a payment system but specialises in managing payment transactions for the public.

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Term	Definition
Payment Switch	B2B facility, often operating as a consortium, which routes and switches payment authorisation and clearing messages among a group of participating PSPs or banks.
Personal Identification Number	A numeric password, usually 4-6 digits in length, which is used to authenticate a user to a system.
Point of Sale (POS) Terminal	An electronic device used by merchants to capture payment transaction data from a payer device, and transmit and receive related authorisation and clearing data to and from payment networks. Commonly used methods for POS terminals to communicate with Payer devices include reading of the magnetic stripe, EMV chip, NFC chip, QR code, or Barcode on a payment card or mobile device. Communications with the payment network take place across a fixed-line or wireless network.
Push Transaction	A type of payment transaction initiated by the paying person or entity's bank or PSP, who sends a message to the payee's bank or PSP.
Real-Time Gross Settlement (RTGS) System	Funds transfer systems where the transfer of money takes place from one bank to another on a "real time" and on a "gross" basis. The 'Real Time' aspect is that Settlement of the payment transactions is not subject to any waiting period. RTGS systems are typically used to clear high-value, bank-to-bank transactions.
Real-Time Payments	A payment system in which the processing and clearing of transactions occurs in real time. Real-Time transactions are usually Push Transactions. Participant or interbank settlement may occur at the same time (as in an RTGS system) or later, on a net basis. Real-Time Payment systems are typically used to clear lower value retail transactions.
Remittances	Transfer of funds between individuals
Settlement	The exchange of monetary value to settle a payment transaction between FIs. Settlement may be on a gross basis, where only the face value of the transaction is settled and exception items (such as fees or reversals) are deferred to a later time—or on a net basis, where associated fees and exception items are settled all at once.
Switch	A processing entity in a payments system that routes a transaction from one participant to another. A system may operate its own Switch, or this function may be done by one or more third parties.

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Annex E: Measurement and Data Quality and Index

E.1. Measurement and Data Quality

The measurement approaches use all available data to compile the payments grid as accurately as possible as described in detail in Annex H. This process involves finding and analysing a broad range of different data sources of different time intervals and quality. In many cases, extrapolation

or interpolation is necessary to make up the gaps in data availability. For this reason, and to be explicit about the basis from which data is drawn, the data relating to each payer group in the grid is assessed for data quality and availability using the scale provided in Table E.1 below.

TABLE E.1: DATA QUALITY AND AVAILABILITY

Rating	Data Quality	Data Availability
5	Complete, recent, and from credible sources.	Available from one or few up-to-date websites or online publications.
4	Recent and from credible sources. 1-2 components of estimate based on expert opinion or assumptions.	Available from disparate websites or from a combination of scholarly and popular publications.
3	Incomplete, recent, and based on expert opinion or available data. Few assumptions required.	Available in-person through simple records requests or interviews with public-facing officials.
2	Incomplete and/or outdated, and informed by local sources, ad hoc research, and international heuristics. Some assumptions required.	Available from proprietary sources through non-disclosure agreements.
1	Incomplete and/or outdated, and informed by local sources, ad hoc research, and international heuristics. Multiple assumptions required.	Additional measurement activities required to capture meaningful data.

E.2. Data Quality Index

Quantitatively mapping the payments landscape is a necessary first step to a targeted effort to convert cash to digital payments. However, with large segments of transactions taking place in cash, aggregate estimates—especially data on payment volumes—are not available and need to be constructed from multiple sources. Figure E.1 below provides an at-a-glance indication of the quality and availability of the data relating to each payer in the grid, based on the scoring below, and hence the country team's confidence in the overall calculations.

Unlike other previous diagnostics where the quality and availability of data relating to government payments has been better than for business or individuals, for Ghana all payment grid calculations have relied on extrapolation based on assumptions from a variety of estimates. Both government and business entities were willing to participate in the research and provided qualitative data to support our assumptions. However, only a few of them were ready to share quantitative data on payments.

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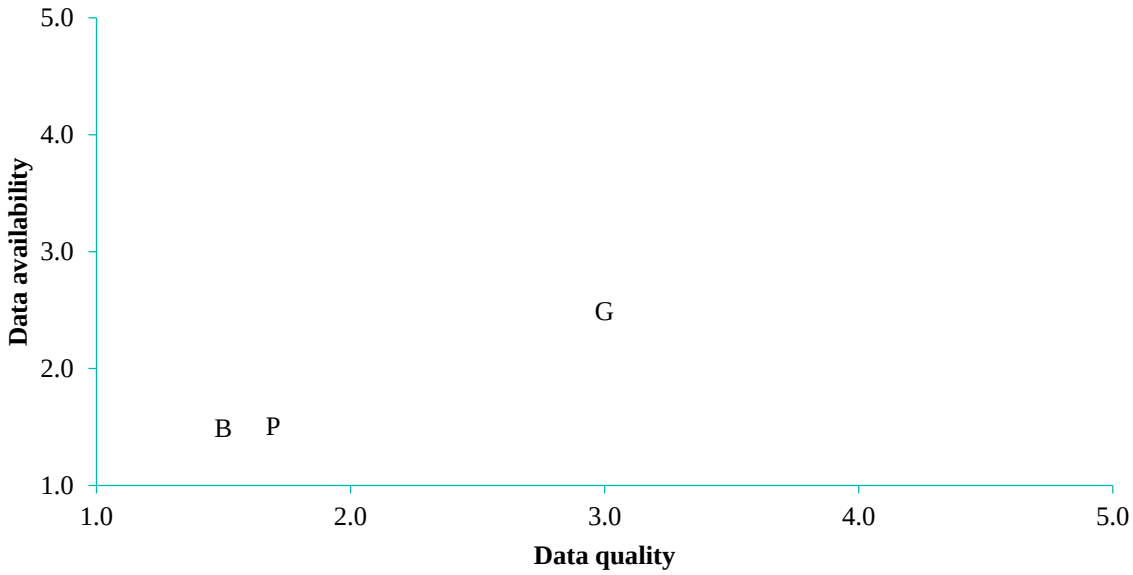
Government payments received scores of 3 for data quality and 2.5 for data availability out of 5. While data from select government institutions was reliable and available to the research team, other key government data points were gathered using information from public news articles and required multiple assumptions. Business and consumer payments received scores of 1.5 for quality and availability because the diagnostic team had to estimate the volumes and values using pre-existing surveys, studies and international heuristics, such as the World Bank Global Payments System Survey.

FIGURE E.1: DATA QUALITY AND AVALIABILITY FOR GHANA



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Annex F: Use Case Trajectory Scorecard

	Public Utilities	Fees & Fines to Government	FMCG
Country environment	**2.71**	**2.71**	**2.71**
Legal environment to support the shift	3	3	3
The telecommunications infrastructure and coverage to support connectivity for digital payments	3	3	3
Variety of FSPs offering payment services on a competitive basis	3	3	3
Settlement and clearing infrastructure supports the defined use case	3	3	3
Availability of data on digital payments	2	2	2
Oversight environment for payments	3	3	3
Regulatory protection for digital payments users	**2**	**2**	**2**
Government as a Payer/Payee (for use cases involving government payments)	**2.40**	**2.40**	**N/A**
National lead agency responsible for the shift to digital payments	4	4	
Resources of the national lead agency for coordination of the shift across departments/agencies	2	2	
Law or binding regulation requiring transition to digital payments for some or all of government payments	1	1	
Awareness of the costs and benefits of shifting to digital payments within the national lead agency	3	3	
Digitised government payments	2	2	
Financial Service Providers (FSPs)	**2.25**	**1.75**	**2.25**
FSPs' business case in providing digital payments for this use case	3	2	3
FSPs' CapEx investments to provide digital payments for this use case	2	2	2
FSPs' OpEx investments (including marketing) to provide digital payments for this use case	2	1	2
FSPs' understanding of user experience and need for this use case	2	2	2
Use Case Driver(s)	**1.75**	**1.75**	**2.50**

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	Public Utilities	Fees & Fines to Government	FMCG
Understanding the costs and benefits of shifting to digital payments for the use case	2	2	3
Champion to drive the shift for the use case	2	2	2
Infrastructure and IT and human resources to drive the shift for the use case	2	2	3
Additional incentives for the use of digital payments in the use case	1	1	2
Users	**2.40**	**2.40**	**2.00**
Users' trust digital payments	2	2	2
Ubiquity of cash in and cash out points	2	2	2
Financial literacy	2	2	2
Financial inclusion	3	3	3
Transaction and opportunity costs for the use case	3	3	1
Total prior to weighting	2.30	2.20	2.37
Overall (including weighting)	**2.2**	**2.2**	**2.4**

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Annex G: List of Sources for Data Points

Table G.1. Government Payments

Payment Grid	Type of Payment	Sources
G2P	Salaries and allowances	a. The Budget Statement and Economic Policy of the Government of Ghana for the 2017 Financial Year (Presented to Parliament on, 2nd March 2017) b. Ghana Statistical Services, Integrated Business Establishment Survey (IBES) Summary Report, September 2015
	Pension	a. Social Security National Insurance Trust (SSNIT) website for payments volumes (Active contributors in December 2016), https://www.ssnit.org.gh/about-us/, accessed on 13 June 2017 b. National Pensions Regulatory Authority Annual Report 2015 c. SSNIT 2014 annual report d. Ghana Business Finance news article, https://ghanabusinessnfinance.com.gh/2017/04/11/i-will-improve-contributors-benefits-new-ssnit-boss/, accessed on 13 June 2017 e. The Budget Statement and Economic Policy of the Government of Ghana for the 2017 Financial Year (Presented to Parliament on, 2nd March 2017)
	Social cash transfer (LEAP)	a. The Budget Statement and Economic Policy of the Government of Ghana for the 2017 Financial Year (Presented to Parliament on, 2nd March 2017) b. Mr. Thomas Boateng Quaison, Head of Monitoring and Evaluation, LEAP Programme, interviewed by Aneth Kasebele, 22 May 2016
G2B	Procurement of goods and services	a. The Budget Statement and Economic Policy of the Government of Ghana for the 2017 Financial Year (Presented to Parliament on, 2nd March 2017) b. The World Bank, General Guidelines for the development of government payments programs, World Bank Payment Systems Policy and Research, July 2012 c. Ghana Statistical Services, Integrated Business Establishment Survey (IBES) Summary Report, September 2015
	Corporate tax refunds	a. The Budget Statement and Economic Policy of the Government of Ghana for the 2017 Financial Year (Presented to Parliament on, 2nd March 2017) b. The World Bank, General Guidelines for the development of government payments programs, World Bank Payment Systems Policy and Research, July 2012
G2G	Transfers to local government	a. The Budget Statement and Economic Policy of the Government of Ghana for the 2017 Financial Year (Presented to Parliament on, 2nd March 2017) b. Metropolitan, Municipal and District Assemblies in Ghana, http://www.ghanadistricts.gov.gh/UserImg/3_22_7_30_9_breakdown_mmdas_LI.pdf, accessed on 20 June 2017
	Social security contribution	a. National Pensions Regulatory Authority Annual Report 2015 b. SSNIT 2014 annual report c. Ghana Business Finance news article, https://ghanabusinessnfinance.com.gh/2017/04/11/i-will-improve-contributors-benefits-new-ssnit-boss/, accessed on 13 June 2017

Table G.2. Business Payments

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Payment Grid	Type of Payment	Sources
B2G	Fines and fees	a. Interview with Driver and Vehicles Licensing Authority (DVLA), 18 May 2017 b. Interview with Registrar General Department ("RGD"), 18 May 2017 c. Interview with Ghana Ports and Harbour Authority (GPHA), 16 May 2017
	Taxes	a. The Budget Statement and Economic Policy of the Government of Ghana for the 2017 Financial Year (Presented to Parliament on, 2nd March 2017) b. The World Bank, Doing Business Report 2016 - Measuring Regulatory Quality and Efficiency
	Utilities	a. Interview with Electricity Company of Ghana, 15 May 2017 b. Interview with Ghana Water Company, 16 May 2017 c. Interview with Ghana Ports and Harbour Authority (GPHA), 16 May 2017 d. The World Bank, General Guidelines for the development of government payments programs, World Bank Payment Systems Policy and Research, July 2012
	Social security contributions	a. National Pensions Regulatory Authority Annual Report 2015 b. SSNIT 2014 annual report c. Ghana Business Finance news article, https://ghanabusinessnfinance.com.gh/2017/04/11/i-will-improve-contributors-benefits-new-ssnit-boss/, accessed on 13 June 2017
B2B	Formal large businesses	a. Eben Tawaiah Anuwa-Amarh, Understanding the Urban Informal Economy in Ghana: A Survey Report, 2015 b. Ghana Statistical Services, Integrated Business Establishment Survey (IBES) Summary Report, September 2015 c. Interview with Coca-Cola Bottling Company, 18 May 2017 d. PZ Cussons 2015 Annual Report e. Fan Milk Limited 2016 Annual Report f. Cocoa Processing Company (CPC) 2016 first quarter report
	Formal medium businesses	a. Eben Tawaiah Anuwa-Amarh, Understanding the Urban Informal Economy in Ghana: A Survey Report, 2015 b. Ghana Statistical Services, Integrated Business Establishment Survey (IBES) Summary Report, September 2015 c. Starwin Products Limited 2015 Annual Report
	Formal small businesses	a. Eben Tawaiah Anuwa-Amarh, Understanding the Urban Informal Economy in Ghana: A Survey Report, 2015 b. Ghana Statistical Services, Integrated Business Establishment Survey (IBES) Summary Report, September 2015 c. Samba Food Limited 2016 Annual Report d. Sam Woode Limited 2015 Annual Report e. Interview with Jumia, 17 May 2017
	Formal micro businesses	a. Eben Tawaiah Anuwa-Amarh, Understanding the Urban Informal Economy in Ghana: A Survey Report, 2015 b. Ghana Statistical Services, Integrated Business Establishment Survey (IBES) Summary Report, September 2015
	Informal businesses	a. Eben Tawaiah Anuwa-Amarh, Understanding the Urban Informal Economy in Ghana: A Survey Report, 2015 b. Ghana Statistical Services, Integrated Business Establishment Survey (IBES) Summary Report, September 2015
B2P	Employees' salaries	a. Eben Tawaiah Anuwa-Amarh, Understanding the Urban Informal Economy in Ghana: A Survey Report, 2015

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Payment Grid	Type of Payment	Sources
		b. Ghana Statistical Services, Integrated Business Establishment Survey (IBES) Summary Report, September 2015
	Pensions	a. National Pensions Regulatory Authority Annual Report 2015 b. SSNIT 2014 annual report
	Input purchase (from micro and informal businesses)	a. Eben Tawaiah Anuwa-Amarh, Understanding the Urban Informal Economy in Ghana: A Survey Report, 2015 b. Ghana Statistical Services, Integrated Business Establishment Survey (IBES) Summary Report, September 2015

Table G.3. Individual Payments

Payment Grid	Type of Payment	Sources
P2G	Fines and fees	a. Interview with Driver and Vehicles Licensing Authority (DVLA), 18 May 2017 b. Interview with Registrar General Department (RGD), 18 May 2017 c. Interview with Ghana Ports and Harbour Authority (GPHA), 16 May 2017
	Taxes	a. Ghana Living Standards Survey Round 6 (GLSS 6) - Labour Force Report 2014 b. Ghana Revenue Authority tax rates, http://www.gra.gov.gh/index.php/tax-information/income-tax, accessed on 20 June 2017 c. The World Bank, General Guidelines for the development of government payments programs, World Bank Payment Systems Policy and Research, July 2012
	Social security contributions	a. National Pensions Regulatory Authority Annual Report 2015 b. People's Pension Trust (PPT) c. Metropolitan Pensions Trust Ghana Ltd
	Bill pay: Government owned utilities (water, electricity)	a. Ghana Living Standards Survey Round 6 (GLSS 6) - Labour Force Report 2014 b. International Organisation for Migration, Baseline Assessment of Household Remittances in Ghana, March 2017
P2B	Payments for consumption, i.e., retail goods, consumer durables, etc.	a. Ghana Living Standards Survey Round 6 (GLSS 6) - Labour Force Report 2014 b. International Organisation for Migration, Baseline Assessment of Household Remittances in Ghana, March 2017 c. Bank of Ghana Transaction Volume and Value Reported by Banks, received
	Bill pay: Housing and private utilities (gas)	a. Ghana Living Standards Survey Round 6 (GLSS 6) - Labour Force Report 2014 b. International Organisation for Migration, Baseline Assessment of Household Remittances in Ghana, March 2017
	Loan payments (formal)	a. Global Findex 2014 b. Dzadze P. et al., Factors determining access to formal credit in Ghana: A case study of smallholder farmers in the Abura-Asebu Kwamankese district of central region of Ghana, Sept. 2012 c. Samuel Sekyi, Rural household's credit access and loan amount in Wa, Municipality, Ghana, 2017

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Payment Grid	Type of Payment	Sources
		d. Francis Ayensu et al., High-interest rate in Ghana: An empirical study of Societe Generale Ghana [SG-GH], 2016
P2P	Domestic Remittances	a. Collins Yeboah, Internal Migration, Remittances and Welfare Impacts: A Case Study in Dormaa Municipality, Ghana, 2016 b. International Organisation for Migration, Baseline Assessment of Household Remittances in Ghana, March 2017
	International Remittances (incoming)	a. Collins Yeboah, Internal Migration, Remittances and Welfare Impacts: A Case Study in Dormaa Municipality, Ghana, 2016 b. International Organisation for Migration, Baseline Assessment of Household Remittances in Ghana, March 2017
	Loan payments (informal)	a. Global Findex 2014 b. Dzadze P. et al., Factors determining access to formal credit in Ghana: A case study of smallholder farmers in the Abura-Asebu Kwamankese district of central region of Ghana, Sept. 2012 c. Samuel Sekyi, Rural household's credit access and loan amount in Wa, Municipality, Ghana, 2017 d. Francis Ayensu et al., High-interest rate in Ghana: An empirical study of Societe Generale Ghana [SG-GH], 2016

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Annex H: Calculations

Table H.1. Government Payments

Payment Grid	Type of Payment	Sources
G2P	Salaries and allowances	Total Value: Divided the reported 2016 expenditure into wages and salaries from the 2017 budget by 12, given salaries are paid monthly. Number of Transactions: Assuming the salary and wages expenditure include payments to employees of Ministries Departments and Agencies (MDAs), parastatal government, quasi-government and statutory government entities, we have used the estimated number of employees from such entities from an Ghana Statistical Services, Integrated Business Establishment Survey (IBES) 2014 to calculate the number of payments made per month (we extrapolated the 2014 number to 2016 by assuming the growth to be in line with the average annual population growth rate of 2%). Electronic proportions: Qualitative interviews with Ghana Statistical Services, Accra Metropolitan Assembly, Ghana Revenue Authorities, etc., suggested that all civil servants are paid directly into their bank account. We assumed 100% of salaries and wages payments are made electronically.
	Pension	Number of Transactions: Estimated the number of pensioners and survivor benefits beneficiaries from SSNIT website for December 2016 and National Pensions Regulatory Authority Annual Report 2015 (assuming the reported eight cases paid in 2015 were pending from the previous year and the twelve pending cases from 2015 were paid in 2016), respectively. Note that we have assumed survivors' benefits are paid once in lump sum. Transaction Value: Estimated amount of pension paid out in 2016 to be the difference between the reported expenditure on total employees' compensation and wage & salaries in the 2017 budget. We calculated the distribution of pension by claim type (old age/invalidity pension, lump sum, survivor) based on data in SSNIT 2014 annual report and assumed similar distribution in 2016 and estimated the total value paid to old age/invalid beneficiaries and survivor benefits that are paid out by government through SSNIT. Electronic: Assumed 100% of benefits are paid electronically based on the fact that the submission of bank account information on the benefits claim application is mandatory.
	Social cash transfer (LEAP)	Number of Transactions: Interview with LEAP M&E officer indicated the program has 213,000 beneficiaries who are paid once every two months. We divided the number of recipients by 6 to estimate the monthly transactions volume. Transaction Value: Assuming LEAP is the only social welfare program, we used the social benefits expenditure item from the 2017 budget to estimate the value of LEAP payments. Electronic proportions: Interview with LEAP program officer indicated that all beneficiaries are paid electronically to their e-zwich card. Therefore, we assumed transactions are 100% electronic by both volume and value.
G2B	Procurement of goods and services	Transaction Value: Used the reported government expenditure amount on goods and services in 2016 and divided by 12 to get monthly value. The goods and services included are low-value payments such as consumable goods (stationaries), capital equipment (computers, equipment, etc.), services (cleaning, maintenance, professional services), transport expenses (gasoline, travel

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Payment Grid	Type of Payment	Sources
		expenses) and large-value capital expenditure contracts (valued at GHS 7,678 million in 2016). Number of Transactions: Estimated monthly transaction volume by multiplying the average number of monthly transactions from DVLA and GPHA data with the number of state-owned entities in Ghana. The number of state-owned entities (excludes public-private partnerships (PPPs) that are included in private owned entities) was derived from the IBES 2014, with assumption that the same number of entities existed in 2016. Electronic proportions: Used estimates from the World Bank Global Payments System Survey whereby 61% of procurement payments by value are paid electronically. Given cheques are still prevalent in the Government payment system, we can assume most of the low-value but high-volume payments are made in cheques, and that about 10% of these payments by volume are electronic.
	Corporate tax refunds	Transaction Value: Estimated the value of corporate refunds from the 2017 government budget. Number of Transactions: Assumed that about 50% of taxpaying corporate entities receive a tax refund annually. Electronic proportions: Used estimates from the World Bank Global Payments System Survey whereby 50% of corporate tax refunds by value are paid electronically. This is reasonable for Ghana given the prevalence of cheque payments. Similarly, we can assume half of this proportion is for electronic payments by volume given the likelihood of cheque payments for low-value payments.
G2G	Transfers to local government	Number of Transactions: To estimate the monthly volume we have assumed that transfers to MMDAs are done on quarterly basis (4 transfers per year) to all 216 MMDAs in Ghana. Transaction Value: To estimate the monthly value we divided the amount spent on grants to other government units from the 2017 budget by 12. Electronic proportions: Assumed these transfers are done electronically both by volume and value based on the fact that the MoF has operationalised the Ghana Integrated Financial Management Information System ("GIFMIS").
	Social security contributions	Number of Transactions: Estimated several monthly volumes of transfers based on estimates of contributors from Controller and Accountant General's Department & Government Subvented Organisations such as Ghana Statistical Services. We assumed the distribution (private vs. CAGD and government subvented organisations) of active contributors in SSNIT 2014 annual report to remain the same in 2016. Transaction Value: We used the total amount contributed in 2016 and divided it by the estimated number of contributors to get an estimate of the annual average contribution per member. We have multiplied the covered members from CAGD & government subvented organisations to get an estimate of total annual contribution. Electronic proportions: We have assumed these contributions are transferred electronically from the Treasury to SSNIT.

Table H.2. Business Payments

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Payment Grid	Type of Payment	Sources
B2G	Fines and fees	Transaction Volumes and Values: To estimate the volumes and values of fees and fines paid to the government, we have relied on data provided by the Driver and Vehicles Licensing Authority (DVLA), the Registrar General Department (RGD), and Ghana Ports and Harbour Authority (GPHA), which represents country-wide payments. We also extrapolated fines and fees paid to Accra Metropolitan Authority (AMA) to the rest of the country. The values and volumes may be underestimated because the figures do not include fees for government services from entities such as Food & Drugs Authority (FDA), Ghana Police Criminal Investigation (CID), Ghana Tourism Authority (GTA), Minerals Commission ("MC"), National Communications Authority (NCA), National Identification Authority ("NIA"), and Passport Office (PO).
	Taxes	Number of Transactions: From 2016 World Bank Doing Business Report, businesses make an average of 32 tax payments to the central government (excluding property taxes that are paid at local government level) per year in Ghana. This number was multiplied by tax-paying registered businesses (which is about 10% of private businesses) to get the annual volume of business tax transactions. Transaction Value: The annual amount of business tax paid was estimated to be the difference between the tax revenue collected in 2016 and the estimated value of tax paid by individuals (see the specific section below for how this was calculated). Electronic proportions: Given large taxpayers (assuming only large and medium sized businesses belong to this category) form about 10% of all business taxpayers and pay taxes through EFTs (as confirmed by Vodacom, the fifth largest taxpayer in Ghana), we can assume that 10% of tax payments by volume are done electronically. Also, large taxpayers contribute at least 65-70% of all tax payments (as per interview with eGovernment), implying that 68% (average between 65% and 70%) of tax payment by value is done electronically.
	Utilities	Number of Transactions: We used GPHA utility payment data (42 per month) as a proxy and assumed large businesses make half of these payments per month. This approach was extrapolated to medium and small businesses and multiplied the number of transactions by the number of entities under each type of business size. Note that B2B payments for micro and informal businesses include utility payments. Transaction Value: We relied on companies' annual reports for estimates of annual expenditure on utilities for a sample of large, medium and small entities. Electronic proportions: Majority of businesses use cheques to pay for utilities. Given that 30% of payments by value to ECG are electronic (as per interview with ECG), we can assume about 5% of payments by volume from large and medium sized businesses are electronic and that the 30% electronic payments by value to ECG are from large and medium businesses. The assumption of 30% by value might be appropriate based on the fact that large and medium sized businesses such as Unilever, which might be paying large amount of money for utilities, have reported to pay through EFTs.
	Social security contributions	Number of Transactions: We have followed the same approach used in estimating contributions from government social security contributions above. We have estimated the monthly volumes of transfers based on estimates of contributors from private sector. We have relied on the total amount contributed in 2016 and divided it by the number of contributors to get an estimate of the annual average contribution per member. Transaction Value: We have multiplied the covered members by the private sector to get an estimate of total annual contribution.

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Payment Grid	Type of Payment	Sources
		Electronic proportions: We have assumed these contributions are transferred electronically to SSNIT.
B2B	Formal large businesses	Number of Transactions: Using Coca-Cola as a proxy, we have estimated the volume of payments for intermediate consumption goods (value of the goods and services that are consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital), by multiplying the average number of transactions that Coca-Cola makes per month (226) as production expenses minus estimated monthly expenses for utilities as explained above. Transaction Value: To estimate the value of intermediate consumption goods, we have relied on cost of production estimates reported on annual reports of a sample of large public businesses in Ghana (PZ Cussons (extrapolated to 2016 using the average, 4% GDP growth rate), Fan Milk Limited, Cocoa Processing Company). These have included the cost of raw materials, rental charges, distribution charges, etc., that we have assumed are paid to other businesses. Electronic proportions: To estimate the volume and value of electronic payments we have also relied on data from Coca-Cola and assume other large businesses are likely to conduct transactions similarly as Coca-Cola. Coca-Cola makes 661 of the 679 quarterly payments in cheques and 18 of the 679 through bank transfer. Similarly, it makes GHS 48.5 of GHS 56 million through cheques and GHS 7.7 million of GHS 56 million through bank transfers.
	Formal medium businesses	Number of Transactions: We have used the 5.30 estimated number of input transaction made by informal businesses and extrapolated it for medium businesses. Since medium sized businesses are more complex and on average deal with more suppliers than informal businesses do, we estimated medium sized businesses would make at least five times as many payments. We have multiplied the resulting number by the estimated number of formal medium sized businesses in Ghana. Electronic proportions: For simplicity, we can assume that medium sized businesses transact similarly as large businesses above and therefore assume similar proportions of electronic payments by both volume and value.
	Formal small businesses	Number of Transactions: For volumes, we have used the 5.30 estimated number of input transaction made by informal businesses and extrapolated it for small formal businesses. We have assumed small formal businesses will make at least twice as many inputs transactions as made by informal businesses on a monthly basis. We have multiplied the resulting number by the estimated number of formal small businesses in Ghana. Transaction Value: To estimate the value of intermediate consumption goods, we have relied on cost of production estimates reported on annual reports of a sample of small public businesses, Samba Food Limited and Sam Woode Limited. Electronic proportions: Assuming the use of mobile money for payments is about 1/5 by volume and 2/5 by value of those of Jumia (categorised as a small business based on number of employees, 30 but is more digitally focused than the average small business in Ghana), Jumia makes 15% and 27% of its inventory transactions electronically, both by volume and value, respectively.
	Formal micro businesses	Number and Value of Transactions: We have assumed the transaction patterns/behaviour of formal micro businesses is similar to that of informal businesses. We have used a similar approach to estimates the volume and values as explained below.

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Payment Grid	Type of Payment	Sources
	Informal businesses	Number of Transactions: As per the survey, informal businesses make about 5.30 inputs transactions per month. We have multiplied this number by the total estimated number of informal businesses in Ghana. Transaction Value: To estimate the value, we have again relied on the survey whereby informal businesses weekly purchases have been valued at USD 235. Assuming there are fifty-two weeks in a year we have calculated the estimated monthly value [USD 235*(52/12)] by multiplying by the total number of informal businesses. Electronic proportions: Most informal businesses pay for production inputs, i.e., raw materials and utilities in cash and cash equivalents (credit and commissions). We have assumed a small proportion, 1% by volume and 10% by value, are using mobile money to make payments.
B2P	Employees' salaries	Number of Transactions: We have estimated the volume of employees based on the total number of individuals employed in the private sector (both formal and informal, non-household jobs) as estimated in the IBES survey. Transaction Value: We have estimated the monthly values by multiplying the average monthly wages for employees in formal and informal sectors by their respective number of employees. Electronic proportion: To estimate the electronic proportion of salary payments we have assumed about 75% of workers, except those working in informal or for micro-sized businesses, are paid directly to a bank account or mobile money account.
	Pensions	Number of Transactions: Estimated the volume and value based on the number of lump sum pension recipients. Transaction Value: Reported on SSNIT annual reports. Electronic proportions: Assumed that all beneficiaries are paid directly into their bank accounts, and hence the proportion of electronic payments by volume and value is 100%.
	Input purchase (from micro and informal businesses)	Number of Transactions: We have used a similar approach as micro and informal businesses B2B payments above. The survey on informal sector businesses indicates that about 38% of informal businesses purchase inputs directly from individuals. We have assumed the same proportion for micro-sized formal businesses and estimated the monthly transactions volume. Transaction Value: Assumed the same value of transactions as for those from businesses as explained above. Electronic proportions: We have also assumed similar proportion of payments through mobile money, by both volume and value.

Table H.3. Individual Payments

Payment Grid	Type of Payment	Sources
P2G	Fines and fees	Transactions Volumes and Values: To estimate the volumes and values of fees and fines paid to the Government we have relied on data provided by the Driver and Vehicles Licensing Authority (DVLA), the Registrar General Department (RGD), Ghana Ports and Harbour Authority (GPHA), which represents country-

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Payment Grid	Type of Payment	Sources
		wide payments. We also extrapolated fines and fees paid to Accra Metropolitan Authority (AMA) to the rest of the country. The values and volumes may be underestimated because the figures do not include fees for government services from entities such as Births & Death Registry (BDR), Ghana Police Criminal Investigation (CID), Ghana Tourism Authority (GTA), National Identification Authority (NIA), and Passport Office (PO). Electronic proportions: The calculated electronic proportions are 3% and 16% by volume and value, respectively.
	Taxes	Number of Transactions: The monthly volume of taxes paid by individuals was based on the assumption that about a quarter (26.1%) of employed people (both formal and informal, public and private) in the GLSS6 survey pay taxes. We used that basis to calculate the number of people paying income taxes in Ghana. Transactions Value: To calculate the total amount paid monthly, we multiplied the number of payments by the average monthly income and tax rate for formal private and public employees. The average tax rates for different income brackets are listed on the Ghana Revenue Authority ("GRA") website. Note that we assumed informally employed individuals are those categorised as self-employed individuals (smaller taxpayers). According to an interview with Deputy Commissioner for Smaller Taxpayers at GRA, these taxpayers pay a fixed range (GHS 5 to 45) of income tax on a quarterly basis. Electronic proportions: To estimate the electronic payments by volume we relied on GRA data where 1.2 million payments are made electronically. Given the prevalence of cheque payments from both the private and public sector, we relied on data from World Bank Global Payments System Survey where payments of taxes by individuals are only 44% electronically by value.
	Social security contributions	Number of Transactions: The National Pensions Regulatory Authority Annual Report 2015 provides the number of members for this scheme that we have used as an estimate for monthly volume of contributions. Transactions Value: We have used the available minimum monthly contribution amount as the average amount paid by a member. We have multiplied this value by the total number of members to estimate the monthly value. Electronic proportions: People's Pension Trust (PPT) suggests that a majority of their members pay their contributions in cash either at an agent or bank branch. PPT is one of the providers with 81,000 members that launched a mobile money payment option this year. Assuming a third of the members have started paying their contribution through mobile phone, this results in an estimate of about 18% of payments by volume and value being processed electronically.
	Bill pay: Government owned utilities (water, electricity)	Number of Transactions: We used a similar approach as for consumptions goods below except that we have estimated the volume of payments based on the estimates of proportion of households paying for different electricity, gas and housing as provided in the IOM study. For water, we have relied on volume and value data provided by GWC. Transactions Value: We have calculated the average price for water and for simplicity we have assumed about the same monthly price for all utilities. Electronic proportions: We have assumed all individuals' utility payments are paid by cash based on the expert opinions/interviews with Ghana Water Company (GWC) and Electricity Company of Ghana (ECG).

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Payment Grid	Type of Payment	Sources
P2B	Payments for consumption, i.e., retail goods, consumer durables etc.	Number of Transactions: To estimate the volume of transactions for household consumption goods we relied on estimated number of adult population (15+) from Ghana Statistical Services and our proprietary Financial Diaries data for an estimate on the average number of household transactions per month. Multiplying these two numbers gave us an estimate of volume of transactions for consumption goods. Transactions Value: To estimate the value of transactions we have used the average monthly per capita expenditure from GLSS6 and multiplied it by the number of adult population. Electronic proportions: Assumed all transactions at a Point of Sale (POS) are made by individuals for retail products. We used the average monthly volume and value of POS transactions from the Bank of Ghana to estimate the proportions of electronic payments by both volume and value.
	Bill pay: Housing and private utilities (gas)	Number of Transactions: Estimated the volume of payments based on the estimates of proportion of households paying for different utilities as provided in the IOM study. Transactions Value: We have calculated the average price for utilities and for simplicity we have assumed about the same monthly price for all utilities. Electronic proportions: We have assumed all individuals' utilities payments are paid by cash based on the expert opinions/interviews with Ghana Water Company (GWC) and Electricity Company of Ghana (ECG).
	Loan payments (formal)	Formal is defined as a loan from a financial institution, a private lender or employer. Number of Transactions: We have estimated the volume of borrowers based on Global Findex estimates and the number of adult population from Ghana Statistical Services ("GSS"). Transactions Value: We have used estimated loan amounts and repayment plans to calculate the value of monthly repayments. Electronic proportions: We have assumed the proportion of electronic loan repayments are from individuals working in the formal sector and repay their loans through direct deductions from their salary accounts at banks. The formal sector employees with formal loan makes up 11% of all formal loans by volume and value. Therefore, we estimated the proportion of electronic repayments to be 11% both by volume and value.
P2P	Domestic Remittances	Number and Transaction Values: The cited studies provided estimates of population receiving domestic remittances, average amounts, frequency and channels used for receiving. We have relied on these estimates to calculate the volume and value of monthly domestic remittances. Electronic proportions: Given the proportion of electronic payments was provided for transaction volumes, for simplicity we have assumed the same proportion for transaction values.
	International Remittances (incoming)	Number and Transaction Values: The cited studies provided estimates of population receiving international remittances, average amounts, frequency and channels used for receiving. We have relied on these estimates to calculate the volume and value of monthly domestic remittances.

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Payment Grid	Type of Payment	Sources
		Electronic proportions: Given the proportion of electronic payments was provided for transaction volumes, for simplicity we have assumed the same proportion for transaction values.
	Loan payments (informal)	Informal is defined as a loan from friends, family or a shopkeeper. Number of Transactions: We have estimated the volume of borrowers based on Global Findex estimates and the number of adult population from GSS. Transactions Value: We have used estimated loan amounts and repayment plans to calculate the value of monthly repayments. Electronic proportions: Given over 40% of the adult population actively use their mobile money account, we have assumed at least a quarter of the loan repayments by volume and value are done electronically through mobile money.

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Annex I: List of Organisations and Persons Interviewed

Organisation	Name	Designation
Accra Brewery Ltd.	Graham Henry Lurie	Finance Director
Airtel	Edmund Barwuah	Head Corporate, Airtel Money
Accra Metropolitan Assembly	Ellis Commey	Deputy Director of Finance
Accra Metropolitan Assembly	Philip Quantson	Deputy Director of Budget and Rating
Bank of Ghana	Dr. Settor Amediku	Head, Payments Systems
Bank of Ghana	Clarissa Kudowor	Assistant Director, Payment Systems
Bank of Ghana	Francis Blankson	Financial Stability
Bank of Ghana	Ignatius Wilson	Financial Stability
Cargill Ghana	Pieter Reichert	Managing Director
Coca Cola Bottling Company	John Ackah	Senior Treasury Manager
Coca Cola Bottling Company	Martin Nzanga	Route To Market & Business Transformation Manager
Coca Cola Bottling Company	Rexford Oake	Shared Services Manager
Driver and Vehicle Licensing Authority	Ernest Antwi-Barimah	Manager, Finance
Driver and Vehicle Licensing Authority	Asare Nyarko	Manager, Finance
Driver and Vehicle Licensing Authority	Andrews Denteh	Deputy Director of Finance
Electricity Company of Ghana	James Asante	Principal Accountant
Electricity Company of Ghana	Esther Water Quaye	General Manager - Treasury
Electricity Company of Ghana	Gloria- Ann Saakwa-Mante	Ag. Manager -Tariffs
Electricity Company of Ghana	Amy Gavor	Revenue Management - Manager
Electricity Company of Ghana	Nana Agyeman	Principal Customer Service Officer
Electricity Company of Ghana	Rita Sasraku	Customer Service Department
Electricity Company of Ghana	Fred Bediako	Billing - Manager
Electricity Company of Ghana	Mr Oti Boateng	IT
Electricity Company of Ghana	Isaac Larbi	Principal Revenue officer

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Organisation	Name	Designation
Electricity Company of Ghana	Godwin Kyeremanteng	Principal Officer - financial accounting
Ecobank Ghana	Owureku Asare	Regional Head, Consumer Distribution for Ecobank Ghana & Anglophone West Africa
eTranzact	George Babafemi	COO
eTranzact	Bismark Odoom	Sales & Marketing Manager
expressPay	Curtis Vanderpuije	CEO
FrieslandCampina Ghana	Samuel Chemenu	Finance Manager
Ghana Bankers Association	Daniel Mensah	CEO
Ghana Chamber of Telecommunications	Derek Barnabas Laryea	Research and Communications Manager
Ghana Cocoa Board	Michael Owusu-Manu	Senior Research Manager
Ghana Cooperative Susu Collectors Association	Obed Yaw Asamany	General Manager
Ghana Employers Association	Kingsley Amoah	Director of Industrial Relations
Ghana Interbank Payments and Settlement Systems	Clara B. Arthur	General Manager, Projects & Business Development
Ghana Interbank Payments and Settlement Systems	Kwadwo Ntim	General Manager, Technology & Operations
Ghana Ports and Harbours Authority	Chris Amedor	General Manager - Finance
Ghana Ports and Harbours Authority	Tebon Zumah	Financial Manager - Tema
Ghana Revenue Authority	Paul Kwakyi	eGov Project Lead
Ghana Revenue Authority	Vivian Adusei	Deputy Commissioner - Small Taxpayers
Ghana Revenue Authority	Alex Asamoah-Bonti	Deputy Commissioner - Medium Taxpayers
Guinness Ghana Brewery Limited	Stephen Nirenstein	Finance Director
Guinness Ghana Brewery Limited	Gabriel Opoku-Asare	Corporate Relations Director
Ghana Water Company	Cynthia Ackah	Commercial Manager
Ghana Water Company	Serena Kwakye-Mintah	ICT Manager
Ghana Water Company	Edmund Clottey	Treasury Officer
Ghana Water Company	James Abbey	Chief Manager – Finance
Ghana Water Company	Henry Quacopoome	Finance Manager
Ghana Water Company	John Sackey	Finance Manager

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Organisation	Name	Designation
Jumia	Ore Odusanya	CEO
Jumia	Frank Acquaye	CFO
LEAP Programme, Ministry of Gender, Children and Social Protection	Thomas Quaison	Head of Monitoring and Evaluation
Ministry of Finance and Economic Planning	Godwin Anku	Head, Development Finance Unit
Ministry of Finance and Economic Planning	Benjamin Torsah-Klu	Principal Economics Officer
Ministry of Finance and Economic Planning	Magdalene Apenteng	Director*
Ministry of Finance and Economic Planning	Sampson Akligoh	Director, FSD
MTN	Eli Hini	General Manager, Mobile Financial Services
National Statistical Service	Robert Kwami	Director of Finance
Nestle West and Central Africa	Fatih Ermis	Head of Agric Services
National Identification Authority	Prof Ken Attafuah	Executive Director
National Identification Authority	Josef Iroko	Head, Administration, Legal & Compliance
National Identification Authority	Charles Boakye	Chief Technical Advisor
National Identification Authority	Ezekiel Obuobisa	Chief Accountant
National Information Technology Agency	Veronique Boateng	Director of ePortal
OLAM	Kenneth Ntoso	Cocoa Sustainability Head
PBC	Nana Agyenim Boateng	Deputy Managing Director
Planiter Company Limited	Pamela Aba Turkson	Managing Director
Registrar General's Department	Vivian Ampere	Senior Accountant
Registrar General's Department	Yvonne Serwaa Sarpong	Internal Audit
Registrar General's Department	Teddy Eduyaw	Assistant Programmer
Registrar General's Department	Mr Tetteh	Director of Finance
Registrar General's Department	Mr Nunoo	Chief Accountant
Unilever Nigeria & Ghana	Adesola Sotande-Peters	CFO

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Organisation	Name	Designation
Unilever Nigeria & Ghana	Kenneth Onwudinjo	Lead Finance Business Partner supporting Customer Development, Brand Building and Brand Development
Unilever Ghana	Mary Ogembo	Lead Finance Business Partner Supporting Customer Development, Brand Building and Brand Development
Vodafone	Carl Ashie	MFS Manager
Zeepay	Andrew Takyi-Antwi	CEO
Zeepay	Nana Yaw	COO

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[64] Pursuant to an interview with Dr. Settor Amediku, Head of Payment Systems, Bank of Ghana.

[65] The total value of annual payments estimated in our analysis is larger than Ghana's USD 42 billion GDP because the analysis follows payment streams through multiple transactions.

[66] Many individual payments may actually be informal business payments, although these are difficult to identify, so for the purposes of this study they have been treated as individual payments.

[67] It is a criminal offence to issue a cheque that cannot be honoured. As per the relevant law is section 313A of the Criminal Offences Act, 1960, Act 29, the punishment for issuing a dishonoured cheque upon presentation is a fine or imprisonment. Also, the Bank of Ghana allows banks to charge 10% for a bouncing cheque, although this charge is not always applied.

[68] For some variables such as proportion of remittance payments that are electronic, we assumed equal proportions for both volumes and values, so actual differences may be greater than what is estimated on this study.

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