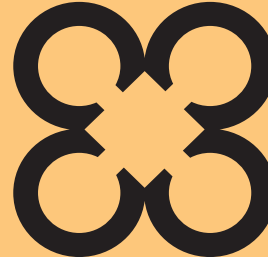




BANK OF GHANA



A REPORT ON  
BANK OF GHANA'S CENTRAL BANK  
DIGITAL CURRENCY PILOT PROJECT

# THE eCEDI REPORT

# Contents

## Chapter

	Abbreviations	3
	<b>The eCedi Report</b>	4
	Foreword	5
	Introduction	7
1.0	<b>Phase 1 eCedi Design</b>	8
	1.1 Overview of the eCedi	9
	1.2 eCedi Design Attributes and Considerations	10
2.0	<b>Phase 2 Adaptation of CBDC Solution (G+D Filia)</b>	12
	2.1 Preparations	14
	2.2 Baseline Survey	15
3.0	<b>Phase 3 Field Testing of the eCedi</b>	18
	3.1 Online Pilot	19
	3.2 Offline Pilot	20
	3.3 Enhanced Consumer Complaints Support	24
4.0	<b>Pilot Feedback</b>	26
	4.1 Endline Survey	27
	4.2 Insights from Participants	29
	4.2.1 Individuals	29
	4.2.2 Merchants	29
	4.2.3 Financial Service Providers	29
	4.3 Evaluation of Findings against Objectives	30
5.0	<b>Recommendations for Implementation</b>	32
6.0	<b>Next Steps</b>	34
7.0	<b>Project Lessons Learned</b>	36
	Appendices	40
	Term Definitions	54

# Abbreviations

AML	Anti-Money Laundering
BoG	Bank of Ghana
CBDC	Central Bank Digital Currency
CGAP	Consultative Group to Assist the Poor
DEMI	Dedicated Electronic Money Issuer
Design Paper	Design Paper on the Digital Cedi (eCedi)
DFS	Digital Financial Services
ESAG	External Stakeholder Advisory Group
GhanaCard	A biometric national identity card
GHIPSS	Ghana Interbank Payment and Settlement Systems
GIFEC	Ghana Investment Fund for Electronic Communications
G+D	Giesecke+Devrient
FSP	Financial Service Provider
KYC	Know Your Customer
MoMo Operator	Mobile Money Operator
MSE	Micro and Small size Enterprises
MSME	Micro, Small and Medium Enterprises
NCA	National Communications Authority
NDA	Non-Disclosure Agreement
Pilot Project	Pilot Project on the Digital Cedi (eCedi)
P2P	Peer to Peer
TOR	Terms of Reference



**HWEMUDUA**  
*Excellence, examination,  
quality control*



# THE eCEDI REPORT



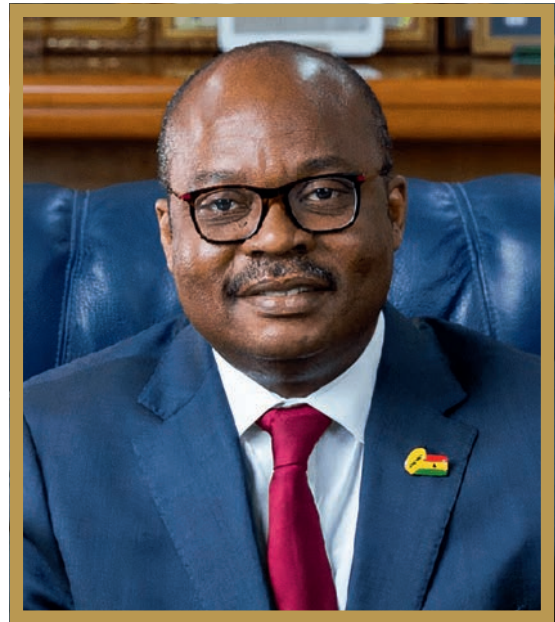
# Foreword

**Payment systems are critical to the efficient functioning of economies. They bolster the role of money as a means of exchange and therefore are of paramount interest to central banks. Equally important to central banks is the evolution of payment systems to meet the changing needs of society and the implications on monetary policy and financial stability.**

Bank of Ghana, over the past decade and a half, has been responsive to the evolving payment habits of Ghanaians through the implementation of transformational policies and payment system infrastructures. The outcome of the Bank of Ghana's interventions is the portfolio of modern retail payment systems including instant retail payment, mobile money, the mobile money interoperability platform, the GhQR code merchant acceptance solution, and the gh-link payment card. The innovations and other application-based payment solutions have accelerated the adoption of digital payments by individuals, businesses and governments.

This development has signalled another currency evolution and questions the future role of a solely physical Ghanaian currency in an increasingly digital economy. The Bank of Ghana, like other central banks, therefore, decided to explore the possibility of issuing a digital version of the Ghana cedi.

Starting with a design paper, the eCedi was conceived to be an inclusive and universally appealing digital currency that would be a catalyst for financial inclusion. It must be accessible everywhere in the country and by all eligible persons. Consequently, an offline functionality was built into the eCedi design and tested in a carefully chosen off-grid location as part of a field pilot.



The result of the field pilot, which is the subject of this document, indicates the importance of establishing clear objectives for a central bank digital currency, the value of collaboration among stakeholders and the need to preserve the architecture of the financial services industry without compromising the needed change for improvements. The document highlights key considerations for undertaking a CBDC pilot and some success factors. Ultimately, implementation of CBDC, despite the valuable insights this document presents, will require additional considerations, including internal capacity development, stakeholder engagement and incentive schemes as well as alignment with stakeholder expectations and aspirations.

This document is a good primer on CBDC and will be a good read for central banks, particularly those in emerging markets interested in exploring CBDC implementation. It will also be useful to anyone who wants to become familiar with CBDC and its implementation.

**Dr. Ernest Addison**  
**Governor of Bank of Ghana**



**NKYINKYIM**  
*Initiative, versatility and  
dynamism*



# THE eCEDI REPORT



# Introduction

**The Bank of Ghana has completed its Central Bank Digital Currency (CBDC) pilot project in a sandbox environment. The pilot project tested the feasibility of the issuance and acceptance of a digital form of the Ghana Cedi called the eCedi. This was in line with the commitment made by the Bank in November 2019 to explore CBDC in furtherance of Ghana's digital transformation agenda. Significantly, the eCedi is expected to drive financial inclusion, serve as a digital complement to cash and enhance the overall efficiency of payments.**

The pilot project was implemented in partnership with Giesecke+Devrient (G+D), which provided the retail CBDC technology solution called G+D Filia®. The solution was adapted to the Ghanaian context after extensive consultations and testing with financial service providers, merchants and consumers.

The project was divided into three phases with the third phase devoted to field testing of the solution.

## Phase 1 – eCedi Design

The framework and parameters for the eCedi pilot were specified and defined in the design phase. The issues considered in the conceptualization of the eCedi included financial inclusion, minimization of disruption to the financial service architecture, avoidance of financial disintermediation, safeguarding financial stability, ensuring regulatory certainty, system resilience and integrity and user-centric approach. This phase resulted in the publication of the eCedi Design Paper in March 2022.

## Phase 2 – Adaptation of CBDC Solution (G+D Filia)

This phase involved the adaptation of the G+D retail CBDC solution Filia to the design framework and parameters of the eCedi. It included the setup of a sandbox environment, design and assessment of solution security, user acceptance research (baseline survey), development of communication, rollout plans, user guides and implementation of training sessions.

## Phase 3 – Field Testing of the eCedi

The eCedi solution was tested in the field among user groups of diverse demographic and socio-economic backgrounds, including individuals and merchants, using mobile applications, smart cards and POS terminals over a period of four (4) months. A Focus Group Discussion (FGD) and an endline survey were carried out, after the field pilot, to obtain feedback from the pilot participants.

This document is a report on Phase 3 of the eCedi pilot project.





*DENKYEM*  
*Adaptability*



# 1.0 Phase 1

# eCedi Design



### 1.1 Overview of the eCedi

Bank of Ghana has an objective of promoting a financially inclusive and efficient payment ecosystem and considers CBDC as a fundamental enabler. The BoG seeks to achieve this objective by leveraging, to a large extent, the existing financial sector arrangement thereby benefiting from the support and experiences of FSPs in the DFS space as well as forestalling risks of disintermediation. BoG therefore tested the Retail/General Purpose and Token-Based CBDC on a two-tier distribution model, with Bank of Ghana (central bank) as the issuer and wholesale distributor of the eCedi to FSPs, while FSPs in turn were responsible for the retail distribution of the eCedi. FSPs were also responsible for developing mobile applications (Apps) for online transactions based on pilot specifications, acquiring merchants, onboarding customers and facilitating eCedi transactions. BoG tested offline transactions to assess the capability of the solution to be accessed in off-grid locations. With the eCedi, individuals were able to carry out peer-to-peer funds transfers and pay merchants for goods and services using eCedi compliant mobile phone apps, smart devices and smart cards.

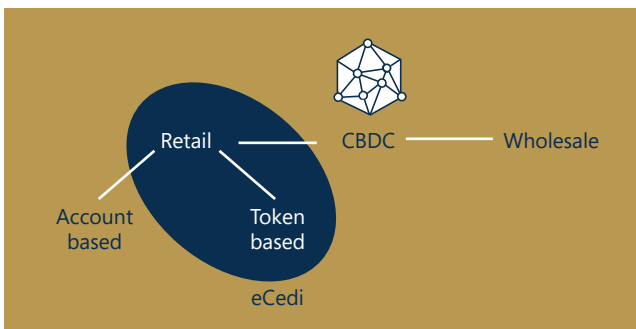


Figure 1: Ghana's eCedi design

The pilot underlies the critical policy objectives of BoG for a potential full implementation of the eCedi, which is expected to strengthen and maintain BoG's control of the payment system, engender efficiency and foster economic growth through enhanced financial inclusion. As a consequence, the eCedi pilot design and implementation took cognizance of the following strategic objectives:

- Address the payment needs of an increasingly digitalized economy;
- Anticipate the future role of Bank of Ghana as an active facilitator of the digital economy;
- Build a more efficient and resilient payment system;
- Address the emerging risk of unregulated private 'currencies' or virtual assets;
- Promote financial inclusion;
- Spur competition in the payment system;
- Strengthen the monetary policy transmission channel;
- Support financial stability, where consumers are provided with a public form of money for the digital era, guaranteed by the central bank; and
- Reduce the cost of payments and payment service delivery.

While the introduction of the Bank of Ghana's Central Bank Digital Currency (CBDC) is still in its nascent stages, the pilot has been completed. We believe that it holds great potential to positively impact the Ghana's digitalization and financial inclusion strategy. The CBDC has the capability to provide a secure, efficient, and inclusive payment system, enabling faster, more cost-effective transactions for individuals and businesses alike. By leveraging digital technologies, the CBDC can help bridge the financial inclusion gap, providing access to formal financial services for the unbanked and underbanked populations. This technological advancement has the power to foster economic growth, promote financial stability, and empower individuals to participate fully in the digital economy. As stakeholders, in the electronic money and telecommunications sectors, we are excited about the prospects that the Bank of Ghana's CBDC brings and look forward to continuing to collaborate to maximize its benefits for all Ghanaians.

Dr. Ing. Kenneth Ashigbey  
Chief Executive Officer Ghana  
Chamber of Telecommunications

## 1.2 eCedi Design Attributes and Considerations

In designing a prototype of the eCedi for use during the pilot, several elements and attributes were enhanced in response to consumer feedback and expectations.

Some of these considerations include:



### Privacy

Being keenly aware of the Ghanaian consumers' expectation of privacy in using the eCedi, the Bank pursued an architectural design that ensured that Bank of Ghana's view of transactions on the eCedi system was at the aggregate level. Thus, the activities of individual wallet holders would only be visible to wallet issuers.

This preserves the existing architecture that provides consumers the desired level of privacy without limiting the central bank or any state mandated agency's legal access to wallet or transaction related information.



### Customer on-boarding

The customer onboarding process was simplified for eCedi users. For the online pilot, participants were already existing customers of participating FSPs (subsequently referred to as pilot institutions) that on-boarded them. Thus, KYC processes had already been completed and the existing wallet authenticating procedures were implemented.

In the offline pilot, all participants were required to fill in User and Merchant Acceptance/Consent Forms that detailed how user data would be used. In addition, to ensure that there was sufficient KYC for the pilot, all participants were required to present their "GhanaCard": the biometric national ID card now mandated for use across the sector for accessing any financial service.



### Consent

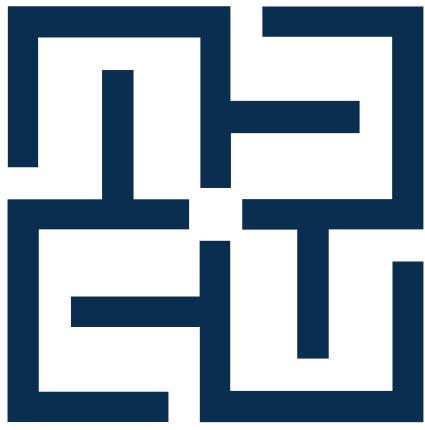
Ghana's banking and payment sector has thus far been supervised with a consent framework captured in the Consumer Recourse Mechanisms Guidelines, 2017. The eCedi accordingly adopted the same mechanism for customer consent.

Online users could utilize a Personal Identification Number (PIN) across various channels such as USSD or App, or device level authentication such as patterns or biometric authentication.



### Transaction limits

Transaction limits were implemented as a measure to mitigate the risk of AML/CFT concerns. These limits reflected the current tiered KYC transaction limits that were introduced into the Ghanaian banking and payment sector during the introduction of the Electronic Money Issuers Guidelines in 2015 to guide the mobile money industry.



**UAC NKANEA**  
*Technological advancement*



**DENKYEM**  
*Adaptability*



**EBAN**  
*Safety, security and love*







**ABAN**  
*Strength, seat of power,  
authority and magnificence*

# 2.0 Phase 2

## Adaptation of CBDC Solution (G+D Filia)



The eCedi solution was tested in the field in online and offline scenarios with the overarching objective of assessing the feasibility of introducing a user-centered and inclusive digital version of the Ghana Cedi. Testing took place in urban, peri-urban and rural areas. The target persons included males and females of eighteen (18) years and above from diverse socio-economic backgrounds. Pilot participants comprised tertiary students, small holder farming households, petty traders, micro, small and medium-sized enterprises (MSMEs), artisanal miners, bankers, engineers, and teachers.

The field tests were carried out in the following areas:

**1. Accra (online test)**

Urban/High value, high volume environment;

**2. Tarkwa (online test)**

Peri-Urban/High value, low volume environment; and

**3. Sefwi Asafo (offline test)**

Rural/Low value, low volume environment.

The pilot was expected to provide an opportunity of gaining a deeper understanding of the goals of consumers with the use of the eCedi, the challenges and limitations associated with its use, and the potential value of a successful full-scale implementation.

**The key objectives of the pilot were as follows:**

- a) Testing the utility of the eCedi as a physical currency complement;
- b) Testing the usefulness of the offline variant of the eCedi;
- c) Testing the ease of integrating the eCedi into the existing financial service infrastructure; and
- d) Testing the sustainability of the eCedi.



Figure 2: Field pilot test locations

## 2.1 Preparations

Preparatory measures that were taken included:

- **Project Governance:**

Oversight of the eCedi implementation is the responsibility of a Steering Committee chaired by the First Deputy Governor. Its role is to consider and explore the introduction of a digital version of the Ghana Cedi in a manner that will not compromise Bank of Ghana's statutory responsibility for maintaining price stability, ensuring a safe and resilient payment system and safeguarding public trust in money. A Technical Committee consisting of persons from relevant departments of BoG with expertise in FinTech, payment systems, information technology, law, currency and banking has been charged with the eCedi implementation. The Technical Committee reports to the Steering Committee and a Project Secretariat provides administrative support and secretarial services to the project.

- **Terms of Reference (TOR):**

A TOR was developed to provide clarity to the eCedi pilot scope of work, the responsibilities of implementing parties as well as project deliverables.

- **Non-Disclosure Agreement (NDA) and Memorandum of Understanding (MOU):**

In line with data protection and privacy principles as well as best practices in intellectual property management, BoG drafted and executed NDAs with and among all entities that played key roles in the project. The entities included G+D, Ghana Interbank Payment and Settlement Systems (GHIPSS), banks, PSPs, a DEMI and an External Stakeholder Advisory Group (ESAG). BoG also executed an MOU with selected pilot institutions to clearly indicate the respective roles of the parties.

- **eCedi Workshop:**

A number of targeted workshops were held to explain the eCedi concept to the Project Committee, pilot institutions, FSPs and the ESAG.

- **FAQs Document:**

A reference document was created to guide stakeholders and the general public to an understanding of the eCedi concept and its policy objectives. It is regularly updated with new inquiries from stakeholders.

- **External Stakeholder Advisory Group (ESAG):**

The ESAG is made up of individuals with diverse subject matter expertise including product development, blockchain, electrical engineering, user experience and user interface design, consumer research, payments, banking, accounting and consumer advocacy. The role of the group is to offer expert advice and insights from industry to shape the eCedi concept, user experience design and implementation.

- **Selection of Pilot Institutions:**

Entities were selected to reflect the diversity of service providers in the Ghanaian payments landscape as a first stage. The second stage of the selection process, however, considered capacity issues including stable and agile technology infrastructure, capacity and willingness to dedicate resources to the project and key management commitment to participate in the project.

- **Consumer Research:**

A comprehensive consumer research strategy was implemented to ensure that the eCedi concept, solution design and implementation reflect user needs. The strategy included;

- a baseline survey before initiating the pilot to assess the expectations, views and transaction habits of consumers as well as inform the final eCedi design features to be piloted;
- a focus group discussion mid-way during the pilot to obtain feedback and course-correct elements of the eCedi's deployment; and
- an endline survey to measure changes in the variables assessed during the baseline survey.

## 2.2 Baseline Survey

A baseline survey was carried out to obtain first-hand information about payment habits and the challenges associated with the available means of payments so as to inform the design of the eCedi to make it complementary to the existing means of payments. A total of 2,253 people were interviewed, of which 1,639 were individuals and 614 merchants.

The sample had a regional distribution of 838 respondents from Accra, 191 from Sefwi Asafo and 606 from Tarkwa. About 65% of merchants were educated up to the high school level, and 57% of individuals had a bachelor's degree or higher. In all, 59% of the total respondents were educated at the tertiary level, thus above the national average of ~7%. It was observed that respondents in urban and peri-urban areas were generally more

educated than respondents in rural areas. The majority of merchant respondents fell within the age group of 29-45 years while the age group of 23-28 years represented the highest age group for the individuals. Most merchant respondents had an operating tenure between 1-5 years.

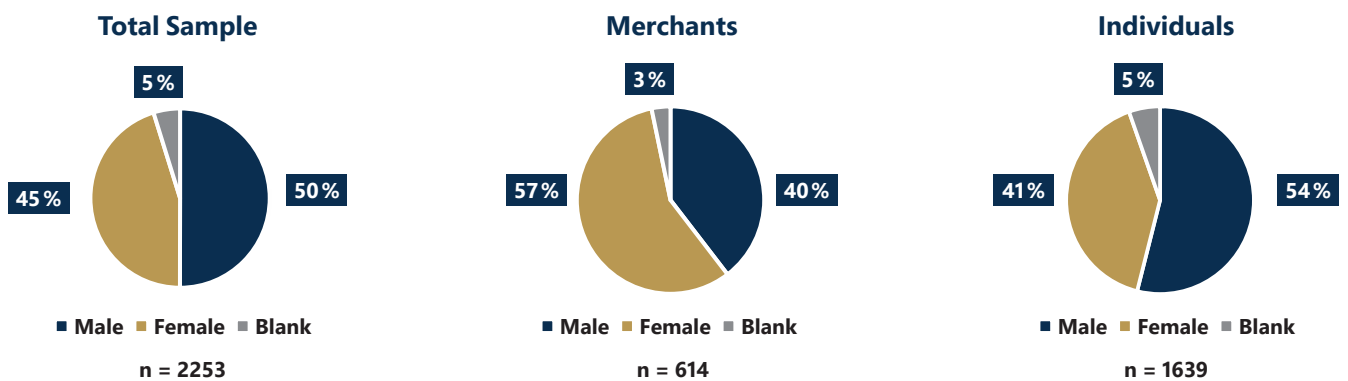


Figure 3: Demographics – Gender

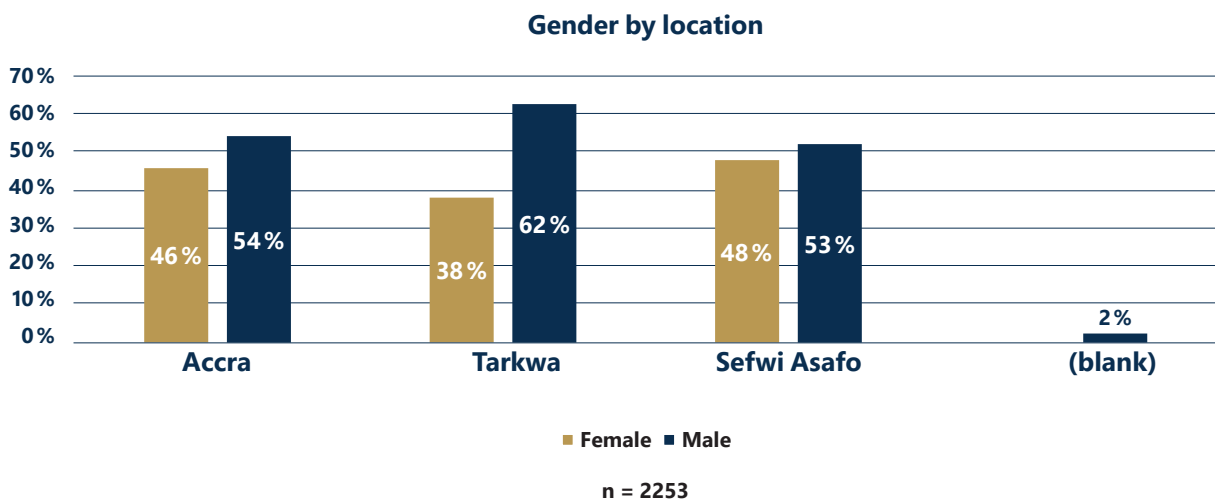


Figure 4: View on location and gender

## Level of education

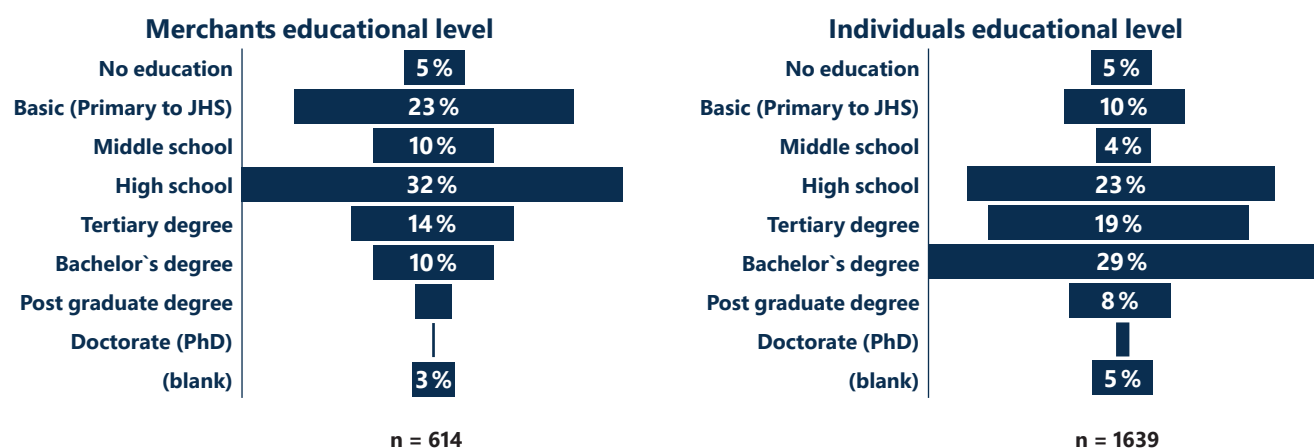


Figure 5: Demographics – Educational background. Question: What is your highest level of education?

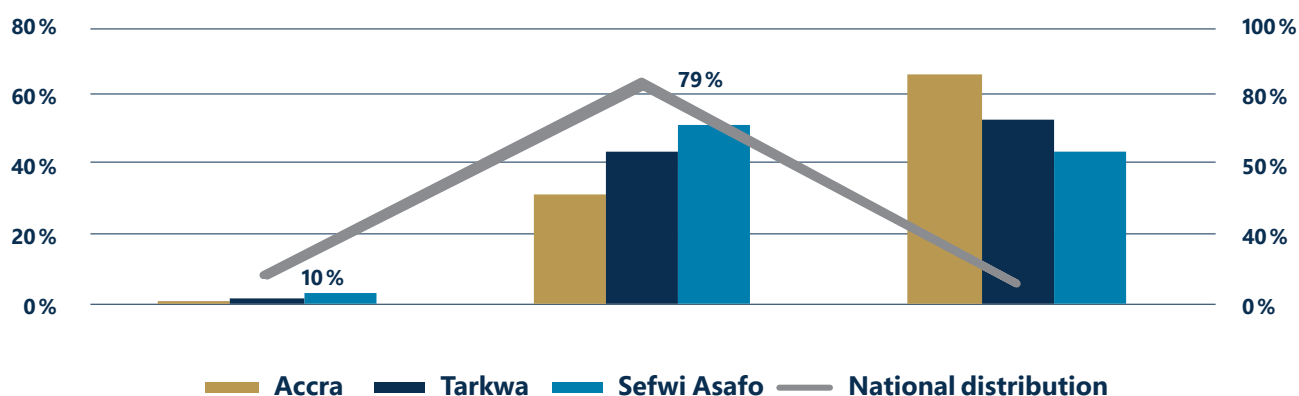


Figure 6: Highest educational level by location

## Age groups

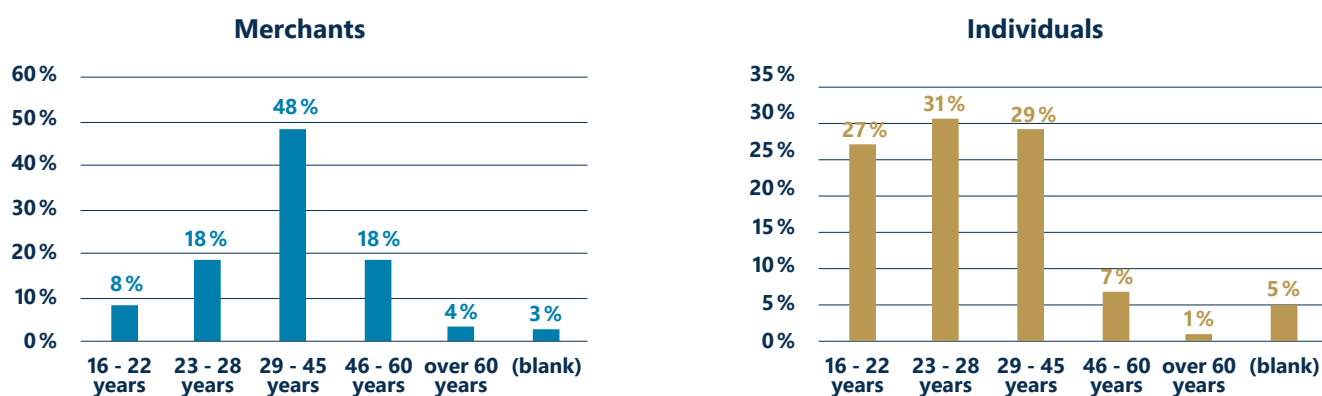


Figure 7: Demographics – Age groups. Question: What age group do you belong to?



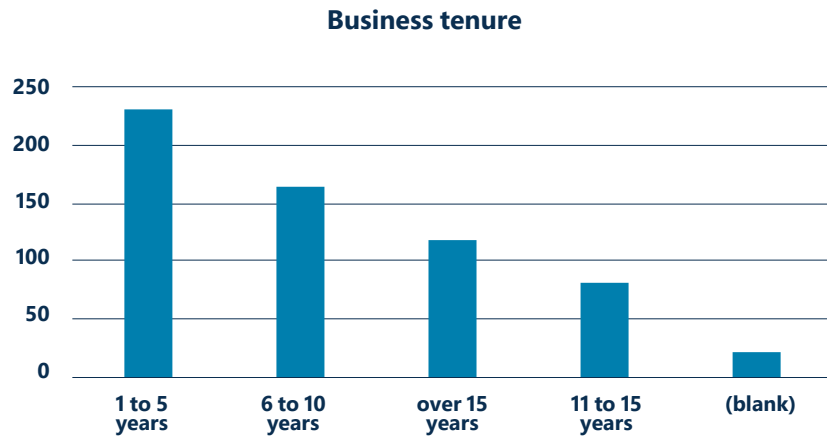


Figure 8: Merchant employment tenure. Question: How long has your business been operating?

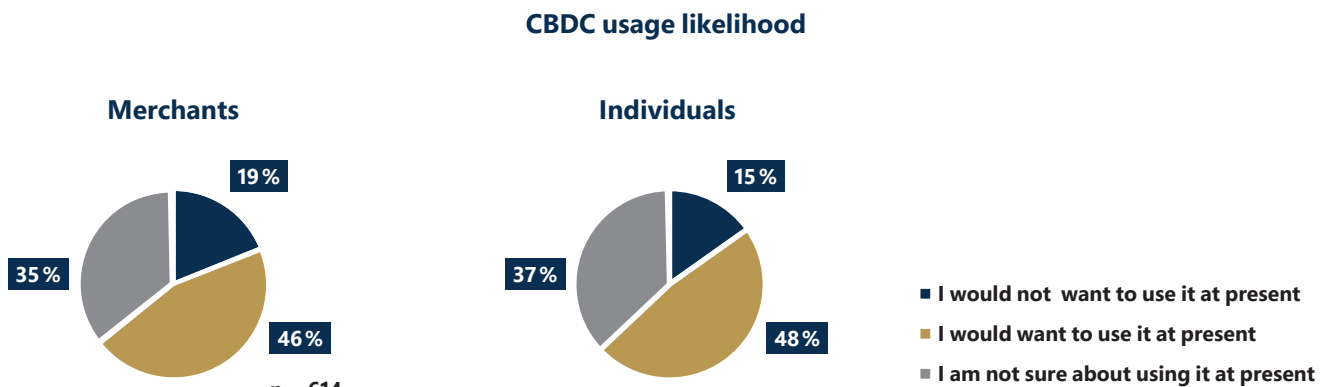


Figure 9: User response on likelihood of CBDC adoption. Question: Based on your current knowledge about "Central Bank Digital Currency" (CBDC), would you want to use CBDC?

Despite being a new payment concept that had been explained to them for the first time during the interview, many respondents were either willing to use the eCedi or were open minded about using it presumably after experiencing it.

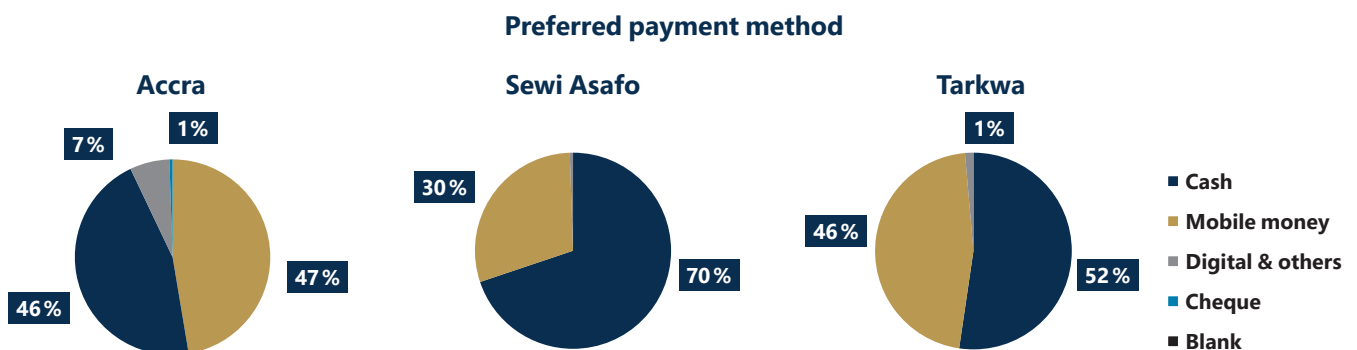


Figure 10: User payment option preference by location. Question: What is your most preferred method of making payments in general?

Cash and mobile money were noted to be the two (2) most preferred payment methods in the peri-urban and rural areas (Tarkwa and Sefwi Asafo). In the case of the rural area (Sefwi Asafo), cash was significantly dominant. This could be attributed to the limited access to telecommunications infrastructure, which supports efficient delivery of mobile money services. This underscores the importance for offline CBDC in off-grid locations.



**AKOBEN**

*Call to action, readiness,  
voluntarism*



# 3.0 Phase 3

## Field Testing of the eCedi

### 3.1 Online Pilot

The online pilot was carried out in urban (Accra) and peri-urban (Tarkwa) areas, and involved five (5) Financial Service Providers (FSPs) including Fidelity Bank, CAL Bank, Vodafone Mobile Financial Services, IT Consortium and ExpressPay.

The FSPs leveraged their existing apps to enable eCedi transactions and on-boarded existing customers who were interested in testing the eCedi. **A total of 2,750 persons participated in the online pilot** and carried out various types of transactions including peer-to-peer, person-to-business, business-to-person, and bill and merchant payments. In general, use cases replicated the existing use cases of FSPs payment solutions.



The Bank of Ghana's CBDC known as the "eCedi" is a refreshing identity and evolution of the Ghanaian Cedi, which revolutionizes the Ghanaian banking and payment eco-system and ushers in new opportunities for individuals and businesses. As a bank that thrives on digital innovation, we are glad to be the pioneering financial institution in piloting the "eCedi". We embrace the new future of money and the possibilities that it unlocks for banking, financial inclusion and the Ghanaian payment eco-system. We envision an "eCedi" that is widely adopted domestically and interoperable with other CBDCs within the sub-region, the continent and globally.

Mr. Philip Owiredu  
Managing Director  
CalBank Limited



We implemented the eCedi pilot on MyVodafoneApp (MVA) to test P2P transfers, merchant payments, and transfers from Vodafone Cash wallets to eCedi wallets and vice versa. The pilot was impactful – about three hundred (300) Vodafone Ghana staff and twenty (20) Vodafone Cash Merchants participated, representing the Greater Accra and Western parts of Ghana. Subsequently, we look forward to partnering with the Bank of Ghana to expanding the opportunity to the public and promote financial inclusion across the country, particularly in remote communities.

Mr. Philip Amoateng  
Director  
Vodafone Cash



### 3.2 Offline Pilot

The offline solution was tested by BoG at Sefwi Asafo, in the Western-North region of Ghana. The area was selected among other areas within the region on account of its relatively limited telecommunication network availability. The G+D Filia Connect point of sale (POS) devices and smart cards were used to test the eCedi offline solution. The key objective was to test whether the eCedi offline solution could support consecutive payments without access to the network or internet, thus, providing opportunities for persons living in off-grid communities to access digital forms of payments and improve their

livelihoods. **A total of 173 participants took part in the pilot** of which 163 were individuals and 14 were merchants. Person-to-business (P2B) was the primary use case for the offline testing due to the significant opportunity it presents for promoting acceptance of digital payments by micro and small size enterprises (MSEs), thereby serving as an alternative to cash in the rural communities. It was also further noted that while the smart cards with the eCedi were used by consumers as a means of transacting, they were also used as a store of value.

The figure below describes the user's journey:

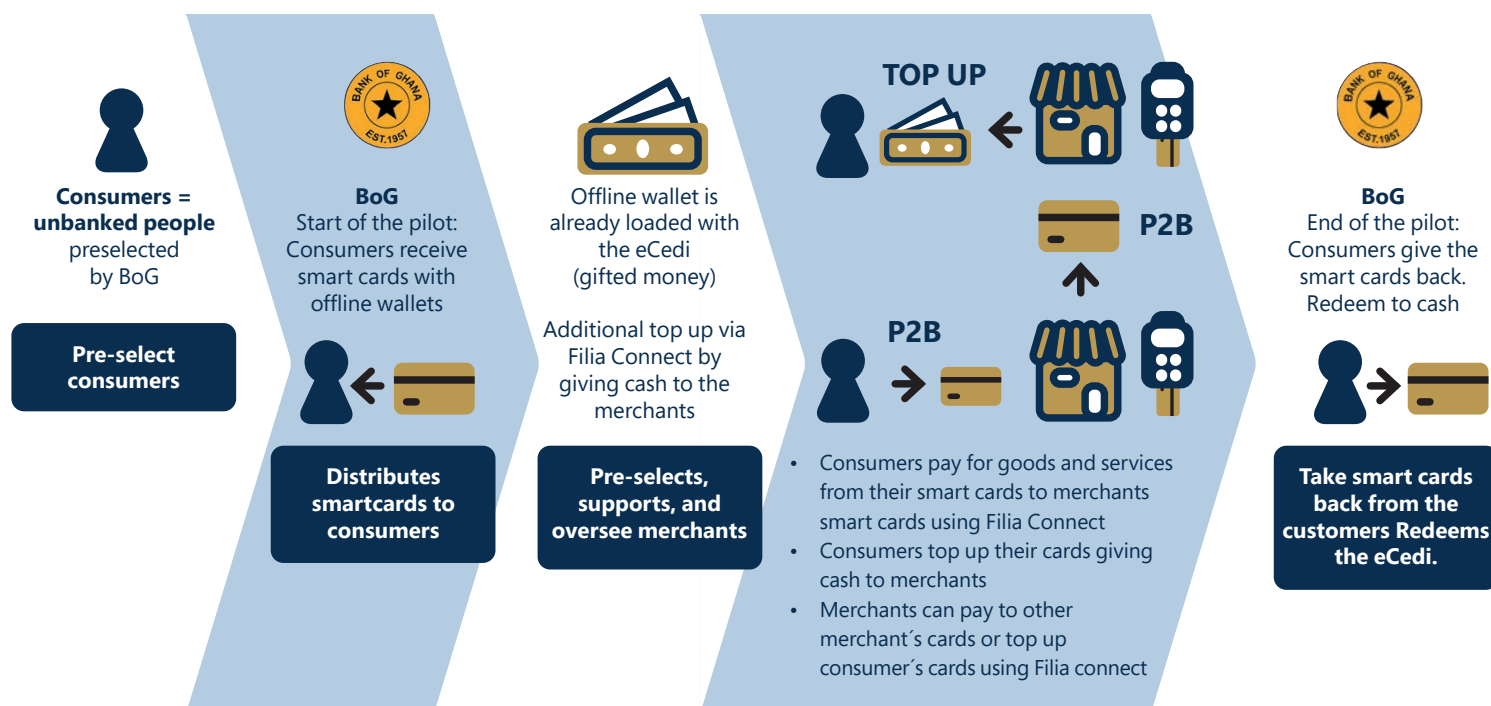


Figure 11: Process flow – Offline pilot



In selecting the offline location, BoG obtained data on network availability across the country from the Ghana Investment Fund for Electronic Communications (GIFEC) and validated the data with the National Communications Authority (NCA). This was further supported by the analysis of mobile money transaction data on BoG's Supervisory Intelligence platform. Sefwi Asafo, a predominantly farming settlement in the Western-North region was noted to have poor GSM network coverage and thus was selected for testing the offline solution.

### The offline test sought to answer three key questions:

#### a. Can it work offline?

Technical feasibility was demonstrated. The Filia platform by Giesecke+Devrient utilised a simplified form factor - smartcards and Filia Connect devices which were easy to use and intuitive.



Figure 12: Offline smart cards and Filia Connect Device

**b. Will target users be able to use it?**

It was observed that users' and merchants' familiarity with mobile money made it easier for them to use the eCedi for payments after a brief training. Testing began almost immediately with users making purchases and top-ups at pubs, grocery shops, food vendors, a mobile money agent and a printing service shop.

**c. Will target users want to use it?**

Besides the 173 users onboarded to participate in the test, a number of persons and businesses, estimated to be fifty per cent (50%) of the users, also expressed interest in joining the pilot to carry out transactions in the eCedi offline scenario.



The early results from the consumer research that accompanied the pilot indicated that there is strong trust in the eCedi on account of it being issued by the BoG. In general, individuals and merchants reported positive experiences with the eCedi and indicated their willingness to use it if introduced. Users stated that affordability, user-friendliness, safety and service availability were of prime importance in digital payment solution and recommended that the issues be considered in mainstreaming the eCedi. The chart below shows the trend of offline transactions between April and July 2022.

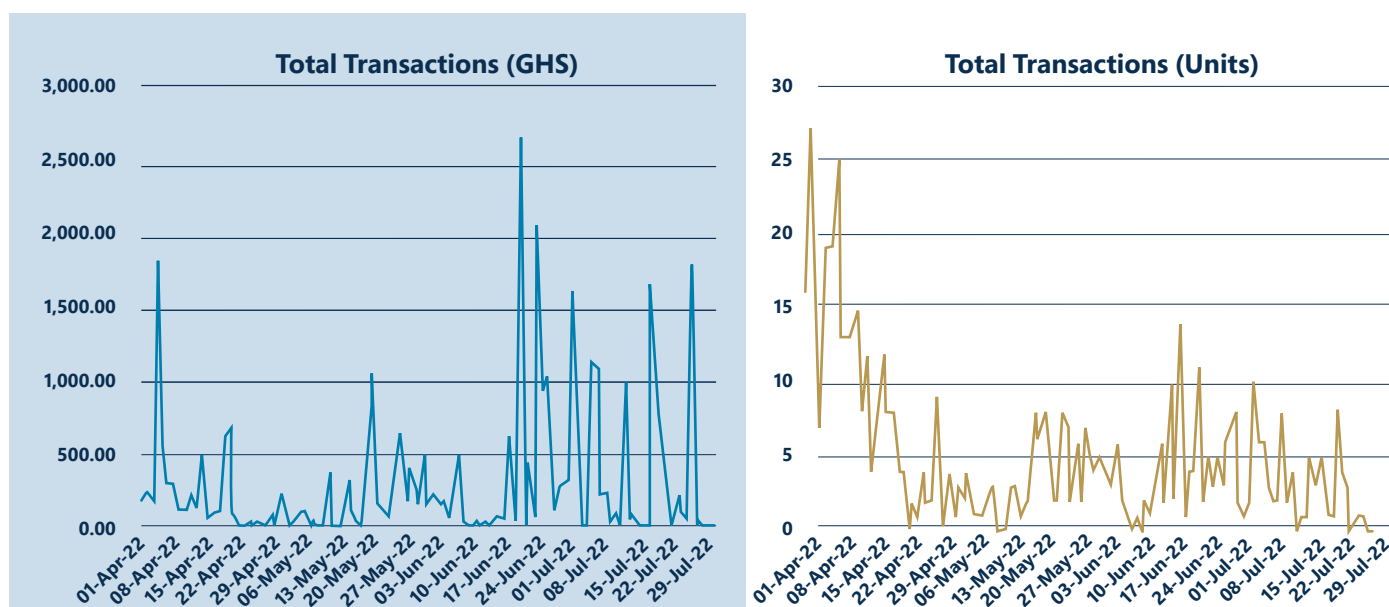


Figure 13: Trend of transactions - Sefwi Asafo

**During the period, the eCedi pilot recorded total transactions of GHS 473 Million and 96,000 in value and volume respectively. These transactions were from principal users (FSPs) and customers. Offline transactions contributed 0.004% and 0.475% of transaction value and volume.**

The insights were further corroborated by an independent research undertaken by the Consultative Group to Assist the Poor (CGAP). (See Financial Inclusion Diaries – Appendix 1).





“

The eCedi pilot revealed areas where new systems and applications could streamline processes and reduce frictions in the traditionally cash-heavy economy. There are many openings to craft customized offerings for banks, merchants and other Ghanaian financial players leveraging learnings from the project. At IT Consortium, we were especially thrilled about the possibilities of real-time settlements and the offline capabilities intrinsic to eCedi.

Mr. Romeo Bugyei, Managing Director, IT Consortium

”

### 3.3 Enhanced Consumer Complaints Support

A dedicated support team was on standby to provide timely assistance for an enhanced user experience. The issues addressed by the support team included:

#### Replacement/Repair of Faulty Devices

New Filia Connect devices were provided to replace faulty ones. The faulty devices were repaired by G+D technicians and given out to merchants to use.

---

#### Liquidity Support

Merchants occasionally requested cash to purchase wares to restock their shops. This was done by giving them the cash requested and receiving the equivalent in eCedi. There were other times that eCedi was given to merchants in exchange for the cash equivalent.

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#### Education Support

Users were educated on the use of the smart cards, the types of transactions that could be performed and its similarity to cash.

---

#### Replacement of Cards

New cards were issued in replacement of faulty cards.

---

#### Reset of PINS

Individual users and merchants were supported with the reset of their PINS anytime they had issues with them. This was done frequently as some had the tendency to forget their PINS.





### **AKOFENA**

*State authority, legality. Legitimized authority of a ruler. Gallantry, heroic deeds*



### **DENKYEM**

*Adaptability*



### **AKOBEN**

*Call to action, readiness, voluntarism*







**AGYINDAWURU**  
*Faithfulness, alertness and  
dutifulness*



4.0

Pilot Feedback



#### 4.1 Endline Survey

Subsequent to the pilot, an endline survey was conducted in all pilot locations. It is worth highlighting the following two peculiar conditions during the study:

- The Accra and Tarkwa studies were conducted in an uncontrolled environment since the Bank deliberately did not engage in mass education and awareness in these locations.

- The public knowledge of the likely passing of the Electronic Levy Act 2022 coincided with the Baseline and Endline Surveys and heightened the price sensitivity of individuals.

The result indicated a strong possibility of all participants adopting the eCedi if it were to be mainstreamed.

In general, pilot participants demonstrated a substantial likelihood of using the eCedi, with those who are users of digital payment instruments indicating a far higher preference for the eCedi.

#### CBDC Usage Likelihood

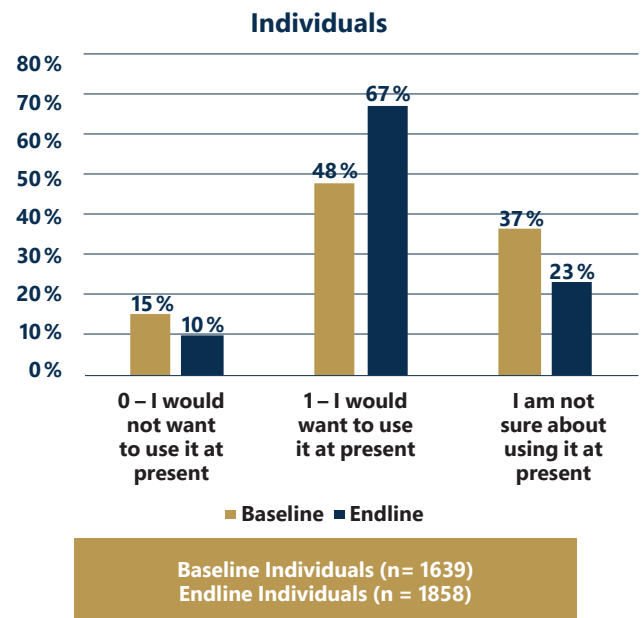
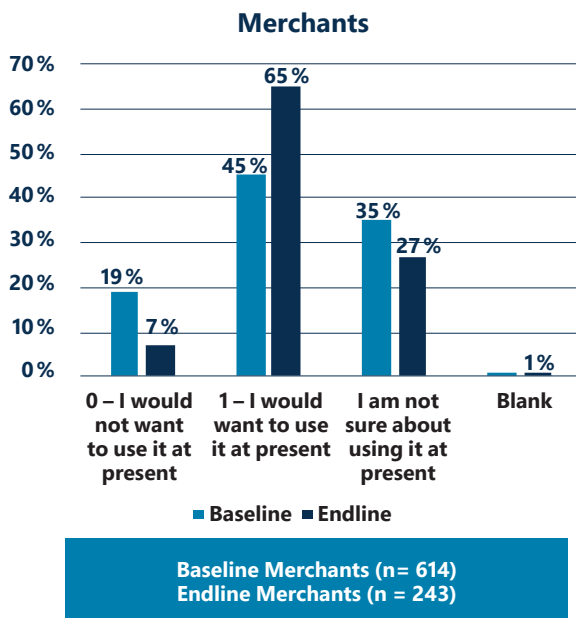


Figure 14: Change in likelihood of adoption from Baseline to Endline.  
Question: Based on your current knowledge about "Central Bank Digital Currency" (CBDC), would you want to use CBDC?

#### CBDC Knowledge Ranking

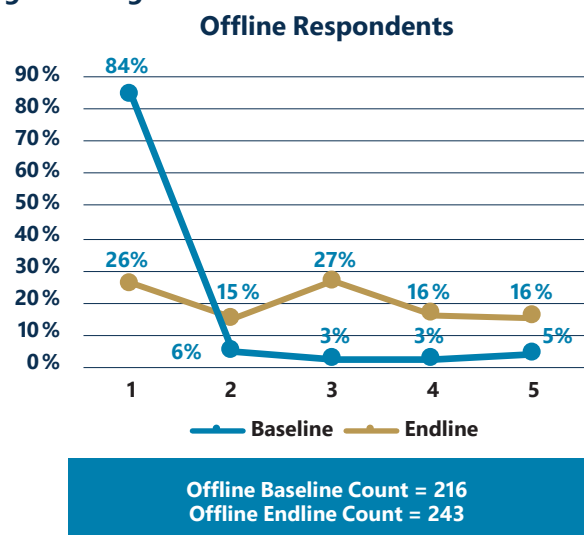
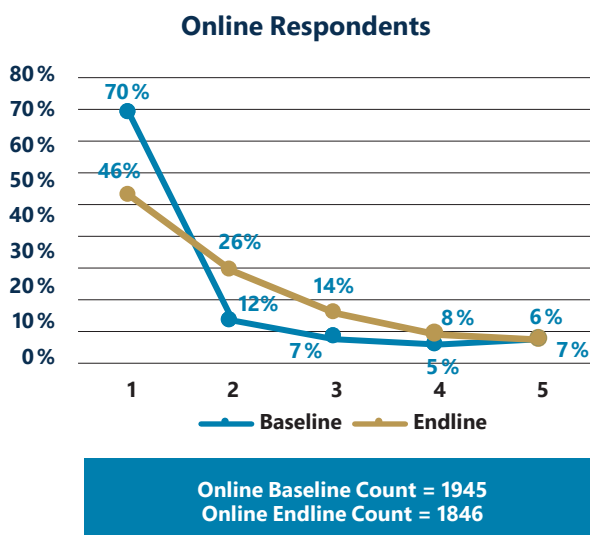


Figure 15: Knowledge ratings offline & online.  
Question: On a scale of 1-5, how would you rate your current knowledge about the term "Central Bank Digital Currency?"

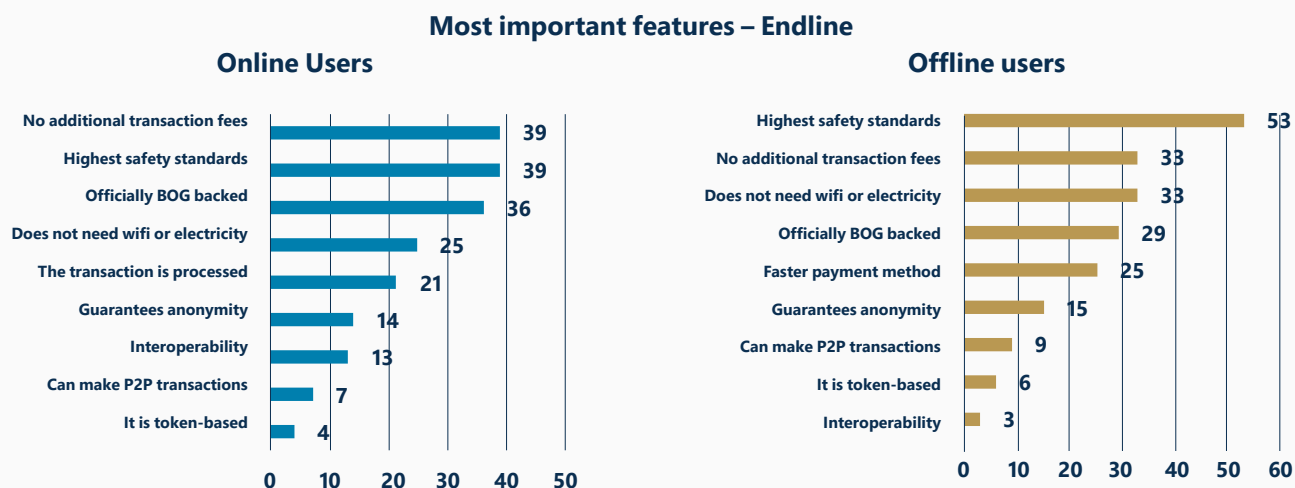


Figure 16: Priority features.

Question: What is the most important feature to you about this payment method?

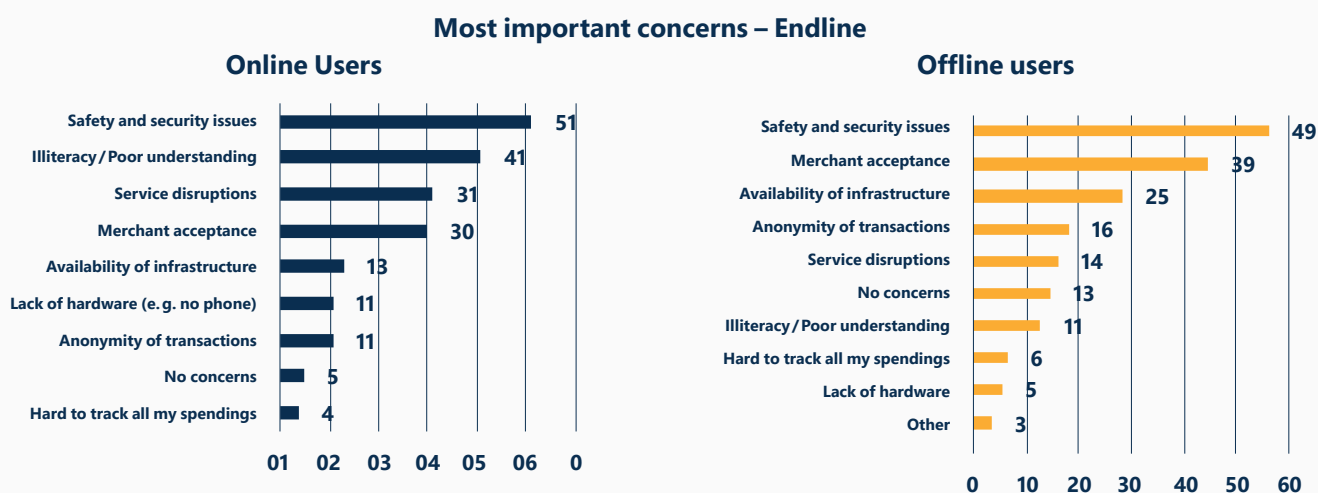


Figure 17: Most important concerns.

Question: What are your main concerns about implementing this payment in everyday payment behaviour?

## 4.2 Insights from Participants

### 4.2.1 Individuals

1. The eCedi must be designed to be safe, affordable, capable of offline use, and backed by BoG.
2. The eCedi should be free for the user. However, a revenue model could be developed on value added services and fees and charges levied accordingly.
3. Mass education and awareness campaigns are needed for general acceptance and usage.
4. About fifty per cent (50%) of the respondents were willing to use the eCedi after a brief education, and a third were more open to the eCedi option, subject to implementation.
5. There was a correlation between the level of education, employment status, past DFS usage and the eCedi adoption.
6. The offline eCedi solution is critical to dealing with the last mile financial inclusion challenges.
7. The offline eCedi could address cash dependency outside of urban areas.
8. Policy support may be required to ensure the availability of eCedi hardware in rural areas.

### 4.2.2 Merchants

1. The eCedi point of sale device and apps were user-friendly and easily understood due to their experience with mobile money and other digital payment solutions.
2. Merchants noted that there was not much difference between the eCedi and the physical currency since it was easy to switch between the two form factors of the Ghana Cedi.
3. Readily available technical and operational support ensured smooth execution of transactions.
4. The POS and merchant acceptance apps were found useful for record keeping and reconciliation of transactions as they stored records of receipts and payments.
5. Acceptance of payments in eCedi serves as safe custody for funds.
6. Widespread deployment of eCedi will improve its utility and reduce reliance on cash for transactions.
7. Merchants indicated that eCedi charges, if any, should be insignificant to encourage usage.

### 4.2.3 Financial Service Providers

1. It was easy to adapt their existing payment apps to make and accept eCedi transactions.
2. Users and merchants did not encounter challenges in using the eCedi to make and accept payments.
3. No difference was noted between eCedi transactions and other existing digital payment solutions.



CBDCs hold promise for boosting financial inclusion and economic growth. While the devil is always in the detail, the Bank of Ghana's focus on inclusive access and seamless integration in the design and implementation of the eCedi indicates a thoughtful approach. As such, we are cautiously optimistic that, with continued industry and end-user engagement, we will realise the potential of the eCedi to advance financial inclusion and innovation in Ghana.

Dr. Augustina Odame  
Chief Executive Officer  
Ghana Chamber of Technology



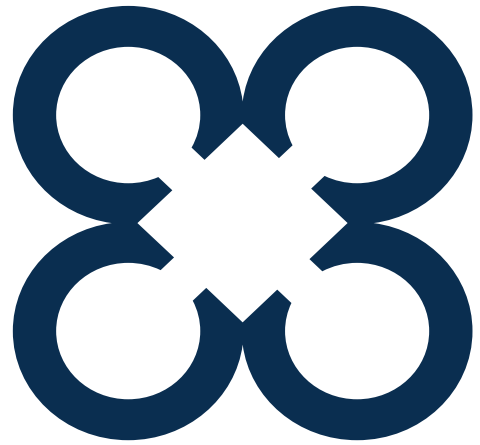


### 4.3 Evaluation of Findings against Objectives

Variable	Criteria	Status	Remarks
<b>Utility of eCedi</b>	Role of eCedi in various payment scenarios	Met expectations	It was used for in-person and online payment of goods and services
<b>Usefulness of offline solution</b>	Facilitate payments without the need for telecommunication services	Met expectations	Payers and payees were able to make and receive payments with the use of eCedi smart cards and POS devices in offline mode without any hitches
<b>Integrating solution into existing ecosystem</b>	Ease of adopting existing payment apps and interbank infrastructure for eCedi transactions	Partially met expectations	FSPs were able to adapt their existing payment solutions, relying on existing payment networks, customers and merchants to rollout the eCedi. However, it was on a limited scale and did not afford the opportunity to assess all possible scenarios
<b>Sustainability</b>	Ability of the eCedi to have widespread adoption and usage into the foreseeable future	Partially met expectations	The demand for digital payment solutions such as the eCedi was endorsed by the pilot. Also, individuals, businesses and FSPs indicated their willingness to use the eCedi when rolled out. They further made recommendations for enhancing the solution



**HWEMUDUA**  
*Excellence, examination, quality control*



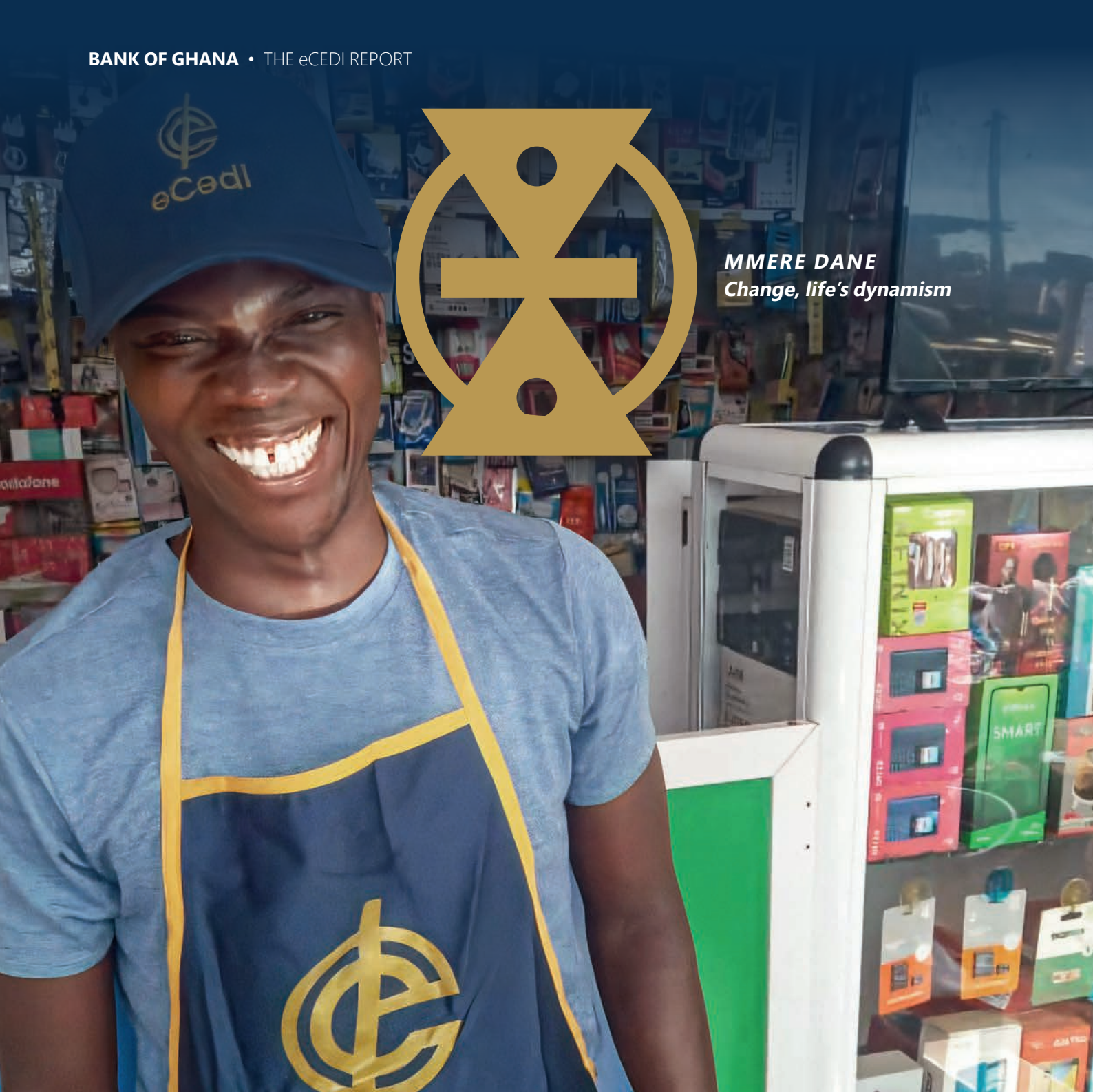
**AGYINDAWURU**  
*Faithfulness, alertness and dutifulness*



**ABAN**  
*Strength, seat of power, authority and magnificence*







**MMERE DANE**  
*Change, life's dynamism*

5.0

Recommendations  
for Implementation



1. Extensive and intensive public education and awareness programmes are needed to enhance understanding of the **eCedi** among the general population prior to implementation.

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2. BoG should **expand and enhance** the project governance to include all relevant industry stakeholders for smooth and effective implementation.

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3. **Robust security** of eCedi infrastructure, free to minimal fees, extremely high level of service availability and responsive support services are essential for widespread adoption.

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4. Offline and online eCedi solutions as well as support services should be **available across the country** to make it truly inclusive thus serving as a suitable complement to cash.

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5. Develop **a set of policies and procedures** to guide industry in the implementation of the eCedi.

---

6. The production solution should strike **a balance between security and efficiency** so as to forestall unnecessary delays in the execution of transactions.



**AKOFENA**

*State authority, legality.  
Legitimized authority of a ruler.  
Gallantry, heroic deeds*

6.0

Next Steps



The **eCedi** pilot is considered to be successful based on the assessment of its outcome. However, considering the prevailing economic conditions, it is imperative that economic stabilization is prioritised before initiating a new venture such as this. Nevertheless, the goal of the Bank is to be fully prepared and equipped to navigate challenges that may arise in the current climate; and we intend to focus on achieving institutional readiness during this period to ensure a seamless and successful launch of the eCedi at the appropriate time.

**Dr. Maxwell Opoku-Afari**  
First Deputy Governor of Bank of Ghana







WOFORO DUA PA A  
*Support for good causes*



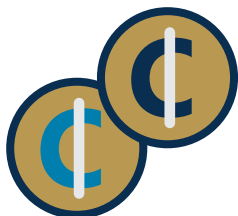
7.0

# Project Lessons Learned

**As Bank of Ghana concludes this phase of CBDC exploration, some practical lessons learned in the piloting of the eCedi will prove beneficial to other central banks who intend embarking on a similar pilot.**

### 1. Be clear, CBDC is still a currency

It is imperative that the foundational notion of CBDC being currency guides any conceptualization, design and implementation process. The capabilities and the functionalities of CBDC-related technologies can be alluring, and easily misdirect an implementation into an unintended outcome such as the development of a full-blown payment service for which most central banks are unprepared. Whether real or perceived, a CBDC viewed as a competitor product could antagonize the payment ecosystem actors who would have little incentive to promote adoption.



### 2. Strong executive commitment

CBDC projects are demanding, resource intense and require agility and commitment. As such, the level of executive commitment, particularly that of the Governor, is an important indicator of project success.



### 3. Design for your country's context

Local market context plays a significant role in the successful introduction of new products, services, policies and initiatives in every country. The core concept of CBDC will similarly have to be subjected to enhancements that successfully meander around any local market barriers such as literacy, incomes and infrastructure, while it adapts to key drivers such as local user expectations and payment market dynamics.



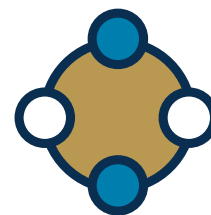
### 4. Learn via pilot

CBDC is still relatively uncharted waters with few actual deployments, in spite of the overwhelming interest in testing among central banks. Its significance as currency also raises the stakes further, leaving minimal room for missteps. It is therefore advisable to learn about the concept, how consumers might interact with it and its impact through a pilot process.



### 5. Understand and enable the ecosystem

The banking and payments ecosystem will play a critical role in ensuring the uptake of a retail CBDC, depending on the chosen model. For centuries, central banks have introduced new currency notes and coins mostly as part of an internal process with limited involvement of market actors. However, CBDC is a radical shift to a new form of currency which will require market participants to retool their operations to provide consumers with the ability to hold and spend it, and also align their business models.



An extensive assessment of the ecosystem will be relevant to understand the actors, their roles, their challenges, their motivations and other competitive dynamics. A continual engagement and alignment with industry players will be in the interest of the central bank and the uptake of CBDC.

## 6. Policy decisions before technology

With the emergence of new, often complex technology, is likely that client institutions might build their businesses around it. Central banks are not beyond this snare. It is important to have a well-reasoned and “clear eyed” policy objective(s) and intended approach before proceeding with CBDC technology selection.



This will also help avoid the needless assumptions of technology capabilities for which there is limited skilled staff to manage.

## 7. Enlist expertise within your community

In line with the recommendation to explore, understand and align with the ecosystem, CBDC projects need to enlist the expertise of many resources who may often be external to the Bank.



This is based on the sobering assessment that while the average central banking environment is well staffed with technical resources across a range of subjects such as economics, finance and accounting, skills such blockchain engineering and commercial product management expertise is often lacking by default.

In the case of BoG, the external stakeholder advisory group members were instrumental in giving independent feedback and advice on a range of issues including user experience design, information security and consumer understanding.

## 8. High risk of scope creep

The functional possibilities enabled by CBDC technologies for central banks, consumers, businesses and associated intermediaries are numerous. This can often entice CBDC projects to explore various possibilities mid-way which appear likely to enhance the outcome of the study and key learnings.



Such opportunities have to be examined carefully to assess their relevance to achieving the core project objectives or whether they represent a potential breakthrough.

## 9. Vox Dei

Finally, with the consumer being the ultimate arbiter of CBDCs success, projects are highly encouraged to consider incorporating a consumer understanding research component into their project design. The study should focus on at minimum, identifying the usage patterns and attitudes of users in order to extract insights about the true drivers and barriers of adoption.



This will equip the central bank in developing a consumer centric CBDC prototype with a comprehensive set of features and a user experience that can accelerate adoption.

The Bank of Ghana took note of an IMF paper that was published subsequent to the implementation of the eCedi pilot, on “How Should Central Banks Explore Central Bank Digital Currency? A Dynamic Decision-Making Framework” which highlights the 5P CBDC management methodology.

This comprehensive framework emphasizes the critical phases of “Preparations, Proof of Concepts, Prototype, Pilot and Production”, aligning closely with the various activities included in the bank’s three-stage pilot.





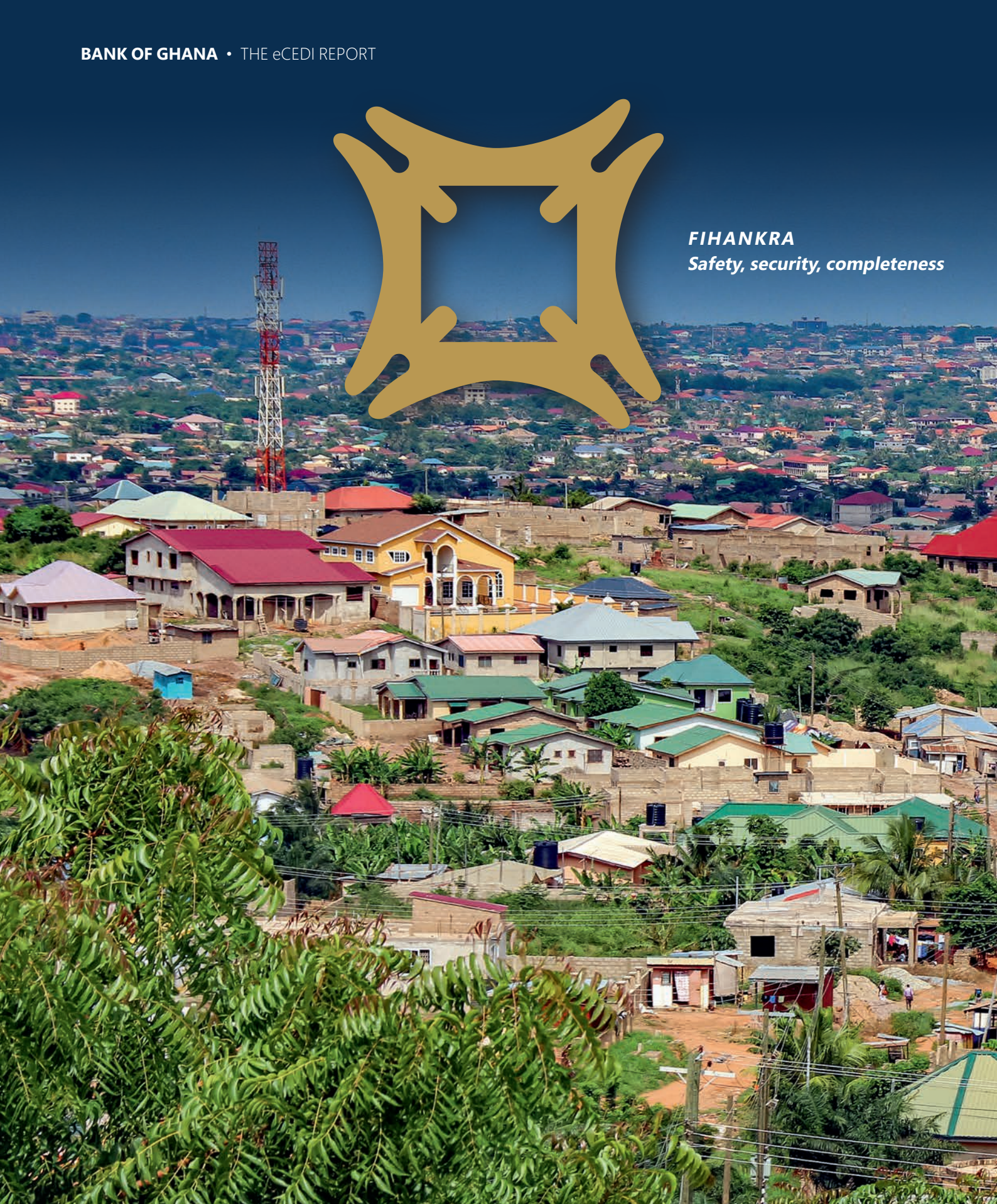
**WOFORO DUA PA A**  
*Support for good causes*







**FIHANKRA**  
*Safety, security, completeness*



# Appendices



## Appendix 1

### Financial Inclusion Diaries

#### Consumer Insights:

#### eCedi Financial Diaries Study

**In June 2022, our global research partner began a three-week primary data collection in Sefwi Asafo, which sought to understand how eCedi pilot participants experienced and used eCedi since it was launched, especially compared to transactions they made with cash, mobile money, and bank transfers. Through the Interactive Voice Recording (IVR) system, Decodis conducted interviews with eCedi pilot participants including two merchants in Sefwi Asafo over a period of three weeks from June 20 to July 9, 2022. The findings presented in this brief are based on analysed responses from five rounds of surveys and financial diaries with 82 pilot participants and two merchants in Sefwi Asafo.**

### I. Synopsis of Key Findings

#### **1. For a pilot, eCedi was used for a significant number of transactions:**

- Within a set of all transactions undertaken by participants during the three-week period – including with cash, MTN MoMo, other mobile money, bank transfers, as well as eCedi – eCedi merchant payment was used for 3% of total transactions, while eCedi to cash withdrawals were 1% of transactions and cash uploads to eCedi were 1% of total transactions.
- Most transactions were with accepting merchants. The size of these transactions was, on average, GH\$ 66.
- From the point of view of merchants participating in the research, cash was used in 48% of transactions over the period while eCedi was used in 18% of transactions. In comparison, MTN MoMo to cash withdrawals were 17% of transactions.

#### **2. Sefwi Asafo has a higher level of DFS (Digital Financial Services) sophistication than may be expected:**

- Cash-to-cash transactions made up of 45% of transactions only while 30% involved the respondent making a payment via mobile money to an outside digital account.
- Mobile money payments were equally split between “high value” payments, such as paying for school fees and buying construction materials, and “low value” remittances to friends and family.
- Most study participants understood, and many had used, transaction-based digital loan products.
- About 15%-20% of study participants understood complex concepts such as what a central bank does and that transactions can be exposed to cybersecurity threats at DFS providers.
- Nevertheless, existing digital products have left a gap in digital merchant payments which eCedi filled.

#### **3. Study participants were very enthusiastic about eCedi:**

- Participants mentioned the benefits of eCedi repeatedly and could articulate the benefits it provided.
- Study participants had no problems using eCedi.
- Study participants saw eCedi mostly as a purchasing tool and much fewer discussed other use cases.
- Study participants consistently asked that eCedi be expanded to more areas outside Sefwi Asafo.
- Bank of Ghana was seen as trustworthy and a “bank of the people.”
- About 31% of study participants would like to see the eCedi product features expanded to providing balances online and confirming payments with SMS text messages.



#### 4. In addition, user perceptions provide insights into why pilot respondents value eCedi, which could have implications when eCedi is rolled out more broadly.

- a. Respondents clearly appreciated not having to pay charges and e-levy. However, it is important to note that charges and e-levy were mentioned less frequently than other factors such as safety and convenience. Moreover, concerns about charges and e-levy were most often mentioned in the middle or at the end of talking about something else, signalling that these are not their most primary concerns.
- b. The notion of a central bank is difficult for most to understand. Many see Bank of Ghana as a competitor to other banks and eCedi itself as a competitor to mobile money. With this in mind, participants trusted eCedi because they had not heard about Bank of Ghana being fraudulent.
- c. In the final analysis, all the findings combined suggest that eCedi was very highly regarded because it enables the digitalization of merchant payments, which is the most frequent transaction use case that respondents undertake.

## II. Detailed Analysis

### a. How did eCedi pilot participants use eCedi compared to other financial tools?

Findings from individual eCedi pilot participants<sup>2</sup>

Chart 1 shows the percentage of each type of pairing of transactions on the left-hand axis and the average amount of those pairings on the right-hand axis. For example, a “cash to cash” transaction is where the payment is in cash at the origin and ends in cash. A MoMo to outside digital transaction is from a respondent’s MoMo account and sent to an “Outside Digital” account, which is a digital account (either MoMo or another type of mobile money) of someone else. This is considered “Outside Digital” because the sender did not specify what type of digital account it was. An explanation of every transaction type is in Annex 3.

Over a three-week period, between June 20 – July 9, there were a total of 864 transactions in aggregated diaries for a total of 82 individuals with a total transaction value of GHc 691,580. The transactions of these 82 participants are highly digitized.

Only 45 % of transactions were “cash to cash” while 30 % involved the respondent making a payment via mobile money to an outside digital account. It was striking that of those MoMo to outside digital transactions, only 48 % were outward remittances to friends and family, i.e., the typical use case for mobile money transactions. The average value of these transactions was GHc 359. In contrast, 52 % were “high value payments” with an average of GHc 778. The most common items paid for were not only airtime, but also higher value items such as school fees and construction materials.

Given how recently these customers had been introduced to eCedi, there were a significant number of transactions made. The transaction type “eCedi to outside digital” represents a payment of eCedi to other’s digital device – in most cases this was the merchants’ eCedi device. These types of eCedi transactions made up 3 % of the total transactions while “cash to eCedi” which is depositing cash into the eCedi account, made up 2 %. This is about the

same as more long-standing transaction types such as receiving a payment from someone else's digital device into MoMo, "bank to cash" which is withdrawing from a bank account or "MoMo to cash" which is cashing out from mobile money.

**The key take-away from Chart 1 is that:**

- **The financial transactions of pilot participants are already quite digitized**
- **Yet, for a pilot that was in the early stages, eCedi transactions were relatively high compared to other transactions**

### Findings from merchants

This study also captured transactions from two merchants involved in the eCedi pilot. Chart 2 below shows the types of paired transactions as in Chart 1 above. The data from these merchants was captured by asking them to manually record all the transactions they had each day. In total, these merchants had 834 transactions over the study period.

**Chart 1** Percent of each pairing of transactions and average amount of each pairing of transactions for individual eCedi pilot participants (GHc)

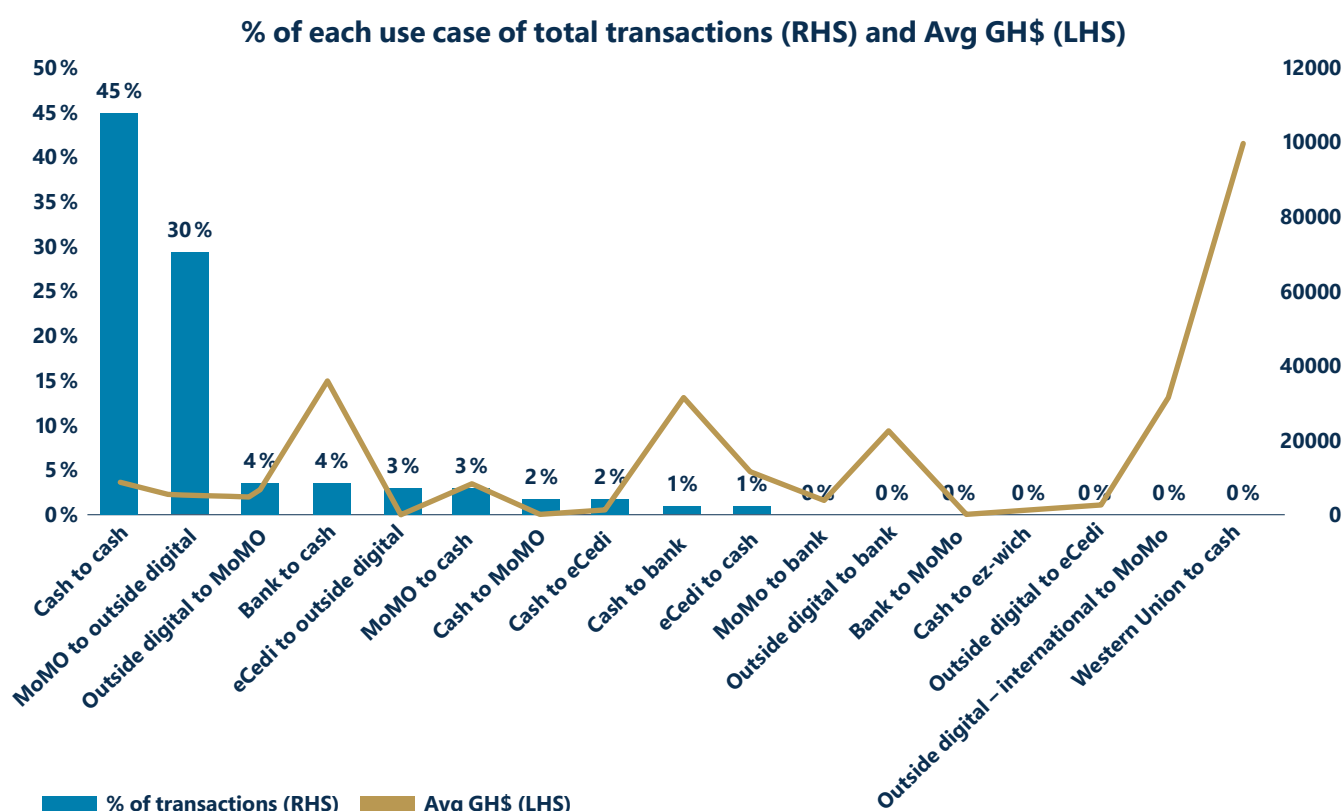
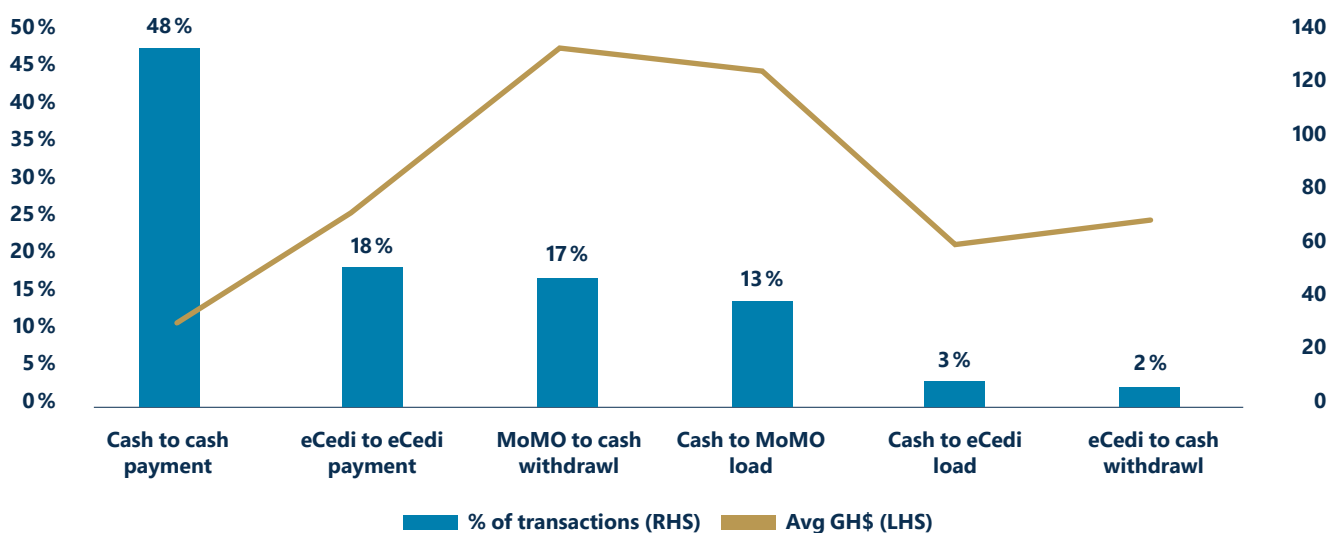


Chart 2 reflects the low level of cash-to-cash payments in Chart 1 above. For these two merchants, only 48% of the transactions during the study period were initiated in cash and received in cash, with an average amount of GHc 69. With respect to eCedi transactions, Chart 2 shows an even stronger picture for eCedi than Chart 1 above. Customers who used eCedi to make a payment to the merchants' eCedi device (shown as "eCedi to eCedi payment" in Chart 2) were 18% of the total transactions. Moreover, the average value of eCedi transactions was GHc 75. eCedi payments happened more often than MoMo money withdrawals to cash (17%) and cash deposits into MoMo wallets (13%). Even loading cash into eCedi accounts was 13% of transactions.

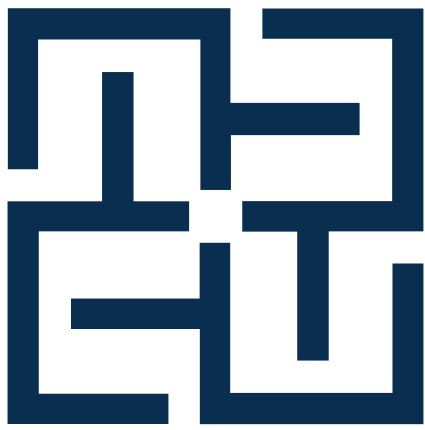
***The key take-away from Chart 2 is that, from a merchant point of view, eCedi payments were a substantial percentage of all transactions, especially given that the pilot was in the early stages.***

**Chart 2** Percentage of each pairing of transactions and average amount of each pairing of transactions for two merchants engaged in eCedi pilot (GHc)



Please note that all transactions data in this brief are self-reported by pilot participants.





**UAC NKANEA**  
*Technological advancement*



**NKYINKYIM**  
*Initiative, versatility and dynamism*



**FIHANKRA**  
*Safety, security, completeness*



### **b. Did users find using eCedi easy or difficult to use?**

In addition to questions about their transactions, the pilot participants were also asked open-ended questions about how they felt about the eCedi product.

For example, Chart 3 shows the responses to the question “Tell me what has been easy or difficult about using eCedi so far?” All the responses were positive. About 36% simply said that it was easy, but another 40% not only said it was easy but they either specified why it was easy (36% said it was fast) or what they hoped would happen with the product (24% said they wished it would expand to other parts of the country). These participants who wished eCedi would expand the product went on to say that they felt limited because they could use it only in Sefwi Asafo and with few merchants. The remaining 4% of the responses were varied. Some participants said they experienced problems with their cards while others said that merchants experienced network problems. However, this was a very small percentage of the responses.

***The key take-away is that nearly all the participants said it was easy and none of the participants said that it was difficult.***

### **c. Did users know what they could do with eCedi?**

Pilot participants were also asked about their knowledge of eCedi in terms of their understanding of what they could do with eCedi. Chart 4 below provides the responses to the question “What do you know about what you can do with eCedi and what have you mostly been doing?” This provides insights into the different types of use cases they know they can do compared to what they remember doing. Note that the responses to what they were doing are generalized compared to the Diaries questions reported above which tracked the transactions they did on a day-to-day basis.

As Chart 4 below shows, two-thirds of pilot participants knew eCedi was a purchasing tool, and that is what they used it for. Eleven percent said they knew they could use it to save money while 3% said they could use it as tool to manage their money, i.e., so they would not be able to spend it unnecessarily as they would if they carried cash.

***The key take-away from Chart 4 is that participants saw eCedi mostly as a purchasing tool and many fewer discussed other use cases. Future trainings should emphasize the different use cases for eCedi.***

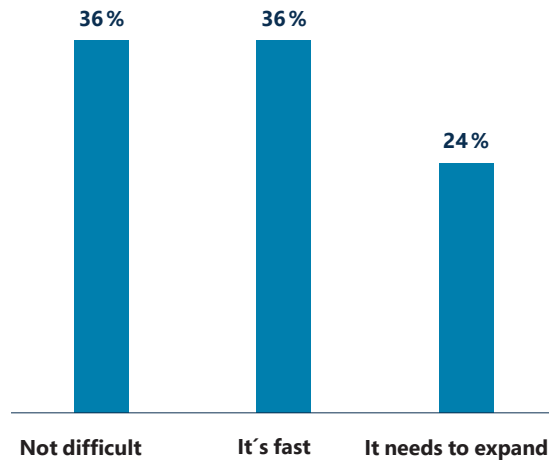
### **d. Did participants feel that eCedi was helpful to them and how?**

Pilot participants were also asked about what they knew about eCedi. Chart 5 below shows responses to the question, “Can you please tell me what you know about eCedi and what eCedi is all about?” However, because the participants could record their answer any way they liked, most chose to talk about how eCedi was helpful to them. This indicates that they were eager to talk about their experience and why eCedi was helpful.

As Chart 5 shows, 32% said eCedi was convenient while 26% said that eCedi was good and helpful. Other participants talked about how the eCedi card protected their money from theft and fraud while others said that having money on the card was better because physical money would often get torn.

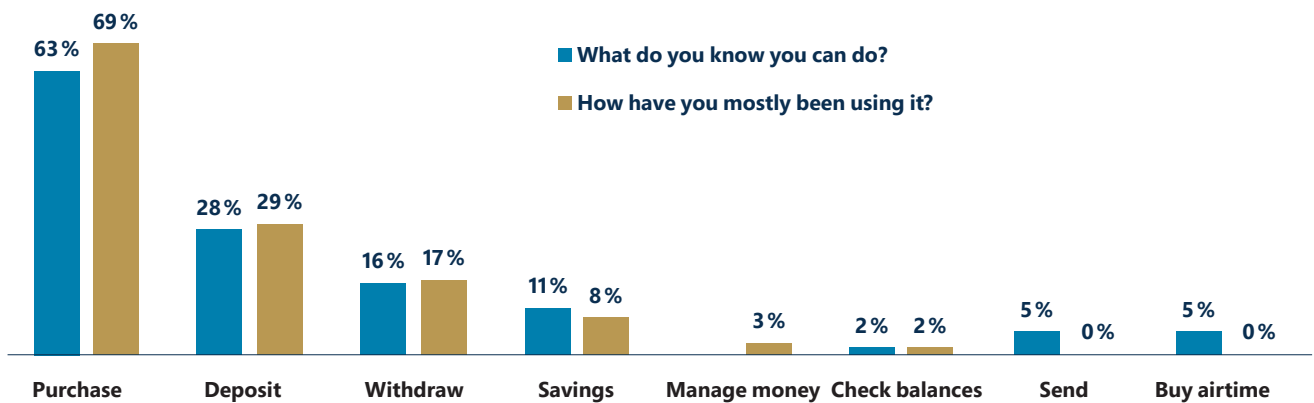
***The key take-away from these questions is that participants found eCedi convenient and helpful and were eager to talk about that.***

**Chart 3** Percentage of each type of response to the question “Tell me what has been easy or difficult about using eCedi so far?” (% of those who responded)

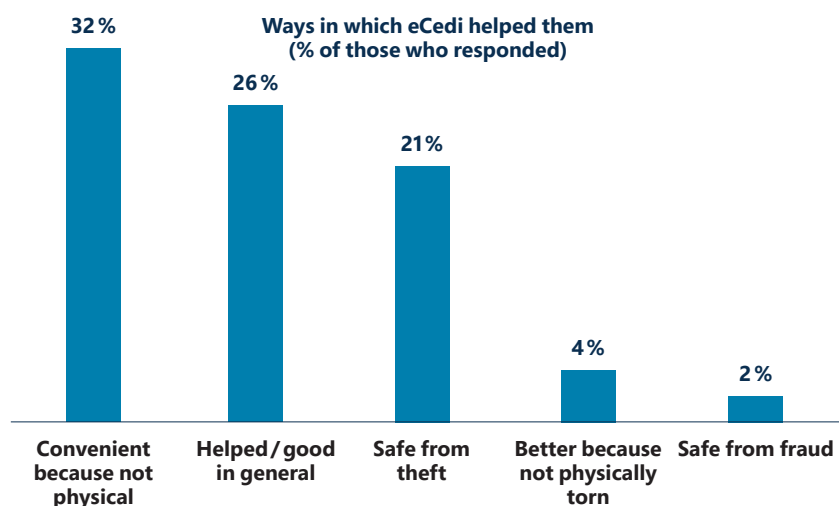


**Note:** The remaining 4 % of responses were varied.

**Chart 4** Percentage of each type of response to the question “What do you know about what you can do with eCedi and what have you mostly been doing?” (% of those who responded)



**Chart 5** Percentage of each type of response to the question “Can you please tell me what you know about eCedi and what eCedi is all about?” (% of those who responded)





### **e. How did participants feel about the idea that their digital footprint could help assess their eligibility for loans?**

Pilot participants were also asked what they thought about their digital footprint being used to assess whether they are eligible for loans. Chart 6 below shows how participants answered the question, “What do you think about the idea that your transactions from mobile money, banking and eCedi could be used by financial institutions to assess your eligibility for loans?” Most participants were aware of this type of lending, and some said that they thought the loan products they had knowledge about were good. Some participants had the perception that Bank of Ghana products would have lower interest rates compared to other loans products. This could be because eCedi did not add transaction charges in the pilot phase.

As Chart 6 shows below, most participants had knowledge of loan products that are available to them. About 42% said they knew about these products, while 15% said they liked the loan products they had used. About 17% said they hoped that Bank of Ghana would lower interest rates on loans when eCedi is rolled out.

***The key take-away from Chart 6 is that most participants are aware of this type of lending. Some participants associate Bank of Ghana with lower interest rates.***

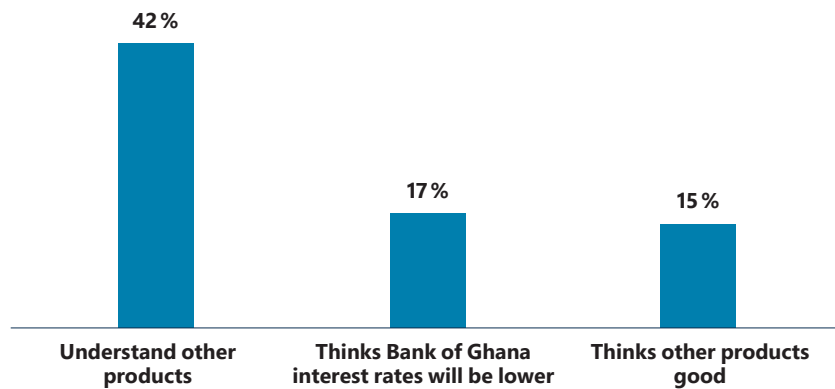
### **f. Did participants feel that it was easy to get information about their eCedi balance and past transactions?**

Pilot participants were asked how they obtained information about their balances and past transactions on eCedi. Chart 7 below shows how participants answered the question, “How was it getting information about your account on eCedi like balances or past transactions? What could be better?” Most said that they simply asked the merchant to check their balances. However, note that Chart 7 covers only about two-thirds of the participants – the others had very vague responses which suggests that they had not considered checking their balances.

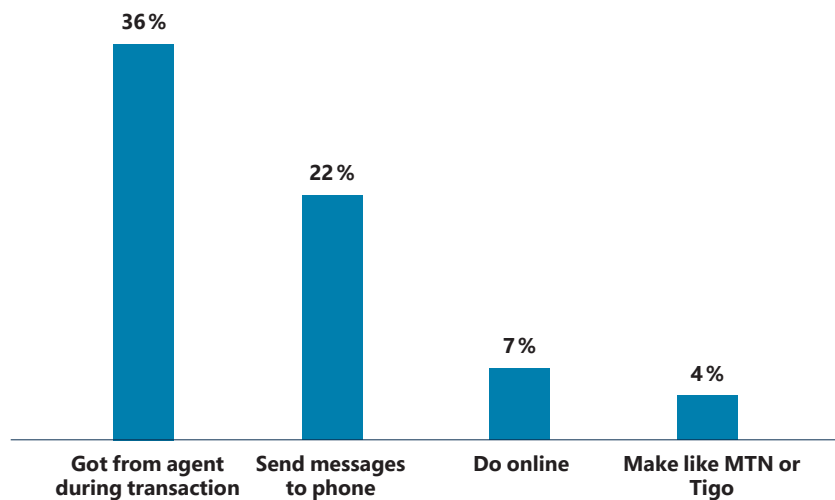
As Chart 7 below shows, 36% said they asked the agent for their balance during the transactions. Similar to other questions in this study, this was an open-ended question and participants could answer in any way they liked. Some participants chose to make suggestions about balance checking to Bank of Ghana. Twenty-two percent suggested linking eCedi to their mobile phones so they could receive messages on balances and transactions, while 7% suggested having eCedi online and 4% suggested making balance checking on eCedi like mobile money.

***The key-take-away from Chart 7 is that the most predominant method for balance checking for participants was to ask the agent with whom they had been doing the transactions, although a number of participants suggested other methods. These features could be added to future iterations of the eCedi product.***

**Chart 6** Percentage of each type of response to the question  
 “What do you think about the idea that your transactions from mobile money, banking and eCedi could be used by financial institutions to assess your eligibility for loans?”



**Chart 7** Percentage of each type of response to the question  
 “How was it getting information about your account on eCedi like balances or past transactions?  
 What could be better?”



### g. Did participants understand what Bank of Ghana does?

When asked if they understand what Bank of Ghana does most participants perceived it as another commercial bank. Chart 8 below shows the participants' answers to the questions, "What do you think the Bank of Ghana is?" For most participants, it was not easy to understand how Bank of Ghana is different from other commercial banks and they saw it as a competitor. Only a few of the participants understood the concept of a central bank. Again, because study participants were not restricted in how they could answer this question, some of the participants took this as another opportunity to express their appreciation for the Bank of Ghana.

As Chart 8 shows below, 21% compared Bank of Ghana to other banks, 15% described Bank of Ghana as a bank that is "aligned with the people" while 6% described it as the "mother of all banks." Most – 62% – chose to use this question as another opportunity to express appreciation saying, "they helped us." Understanding what a central bank does is a sophisticated notion, yet 12% of participants were on target, with some describing it as a bank that helps other commercial banks.

***The key take-away from Chart 8 is that it was not easy for participants to differentiate Bank of Ghana from other commercial banks.***

### h. Did participants feel that Bank of Ghana could keep their data private?

Participants were also asked how they felt about the privacy of their eCedi transactions. Chart 9 below shows how participants answered the question, "How do you feel about the Bank of Ghana keeping safe the data privacy of your transactions compared to others?" Note that this chart shows responses from only half of the participants because others were too vague in their answers to classify the responses. This typically means that they did not understand the concept of keeping data private or had thought about it before. However, the other half, shown in Chart 9 below, talked about distinct notions of privacy.

As Chart 9 shows, 20% of participants said they felt safe because Bank of Ghana protected them from cyber threats, 18% said they felt safer with carrying money on eCedi than cash as it reduces theft and 15% said they felt safe as Bank of Ghana is not fraudulent like other institutions. These are the three distinct notions that participants expressed when thinking about "safe," "data" and "privacy".

***The key take-away from Chart 9 is that participants felt that eCedi is safer than cash as well as other institutions.***

### i. What suggestions did participants have for the Bank of Ghana about eCedi

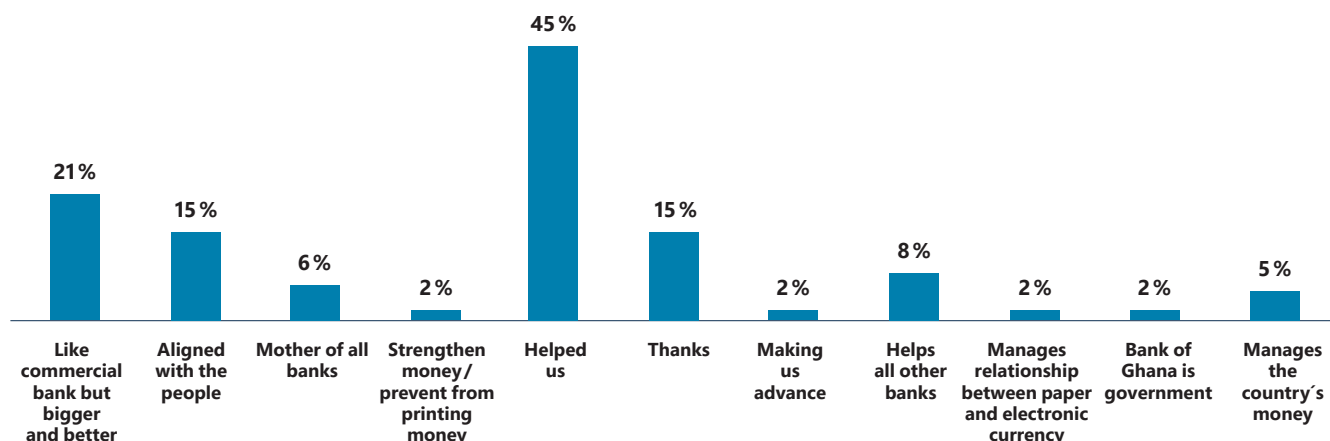
The last question participants were asked was if they had suggestions for Bank of Ghana about eCedi. Chart 10 below shows the answers to the question, "What suggestions would you make to the Bank of Ghana about eCedi?" About two thirds of the participants talked about expansion. These participants felt limited because they could use eCedi when in Asafo but not when they travelled to other areas like Kumasi. In addition, that the 6 merchants in Asafo who accepted eCedi were not enough and wished they would have more merchants to transact with. Some participants enjoyed the fact that eCedi did not have transaction charges and wanted that to continue.

As Chart 10 below shows, 67% suggested that eCedi be expanded to other areas, saying that their experience with eCedi was limited because they could not use it outside Sefwi Asafo. About 12% suggested that no charges should be added to eCedi transactions, 10% were worried about losing their cards and suggested adding biometric data to the card, while 5% suggested using eCedi on mobile phones, just like mobile money. Other suggestions were varied, including increasing the deposit limit and having a feature that would help identify the agents engaged in misconduct.

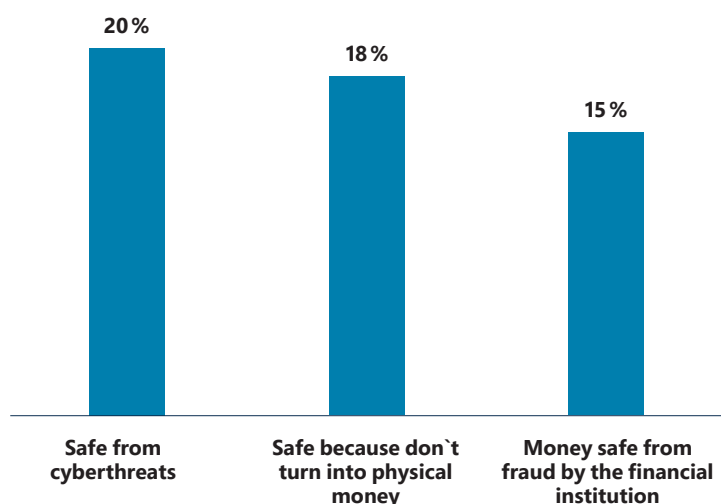
***The key take-away from this question is that most participants liked eCedi but felt limited. They want to be able to use eCedi outside Sefwi Asafo.***



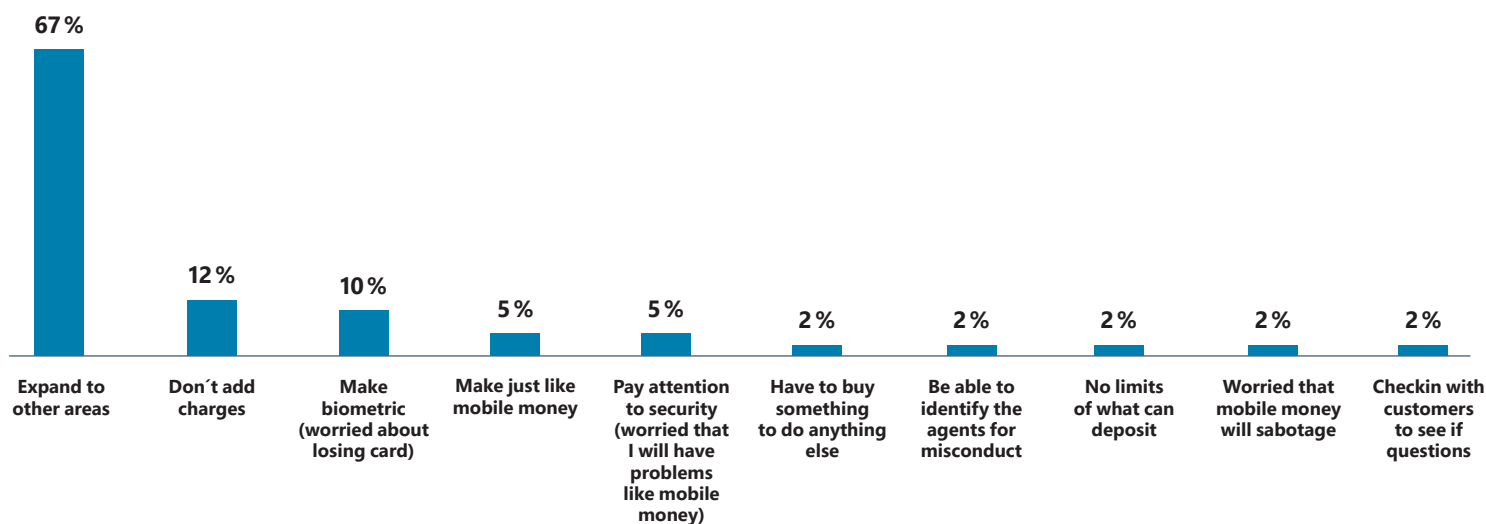
**Chart 8** Percentage of each type of response to the question  
“What do you think the Bank of Ghana is?”



**Chart 9** Percentage of each type of response to the question  
“How do you feel about the Bank of Ghana keeping safe the data privacy of your transactions compared to others?”



**Chart 10** Percentage of each type of response to the question  
“What suggestions would you make to the Bank of Ghana about eCedi?”



## Appendix 2: Sample overview

Decodis analysed the responses of 82 eCedi users who completed all five modules of the survey as well as the responses of two merchants. Overall, there were more male participants – 66%, compared to female – 34%. The average number of people in the household is nine, with four out of those engaged in some form of income generating activity. About 98% of the participants in the sample use mobile money, with 83% using a mobile app and 15% USSD. Approximately 65% of the participants have a bank account.

### Annex 2: Methodology

The data was collected through automated phone interview using an Interactive Voice Recording (IVR) system for the 82 eCedi users and two merchants. Users completed five surveys including background questions which consisted of some closed-ended and open-ended questions, eCedi user experience open-ended questions, and four financial diaries surveys.

#### Collecting socio-economic data about the participants

In call one, Decodis collected data on social economic factors including age, gender household income, education, and employment. The data Decodis collected was based on both closed-ended and open-ended questions. On the same call, Decodis also collected data on the participants' perspective and feedback about their experience with eCedi.

## Financial Diaries

In calls two to five, users answered open-ended questions about their transactions. The four diaries' surveys were conducted three days apart and asked users to report the digital and cash transactions that they had done over a three-day period. First, they would enter the total number of transactions using their phone keypad. They would then enter the number of cash transactions using the keypad again followed by the number of digital transactions. For each of the transactions they reported Decodis asked users to report the amount and purpose of the transaction. Each diary call took a maximum of 15 minutes to complete.

Merchants kept an ongoing physical record of every eCedi transaction, and our team input the transactions into a spreadsheet to tabulate.

The data collection for the two merchants slightly differed from the users' process. While the two merchants answered the background questions and eCedi user experience questions, they did not answer the diaries questions via IVR. The merchants recorded daily transactions on paper. Decodis later transferred these transactions into a spreadsheet and tabulated them.

Chart 11 Appendix 2

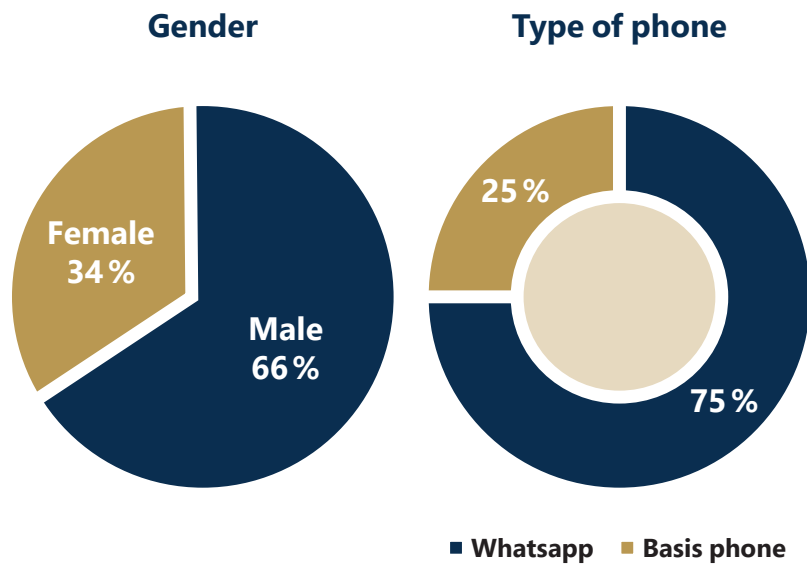
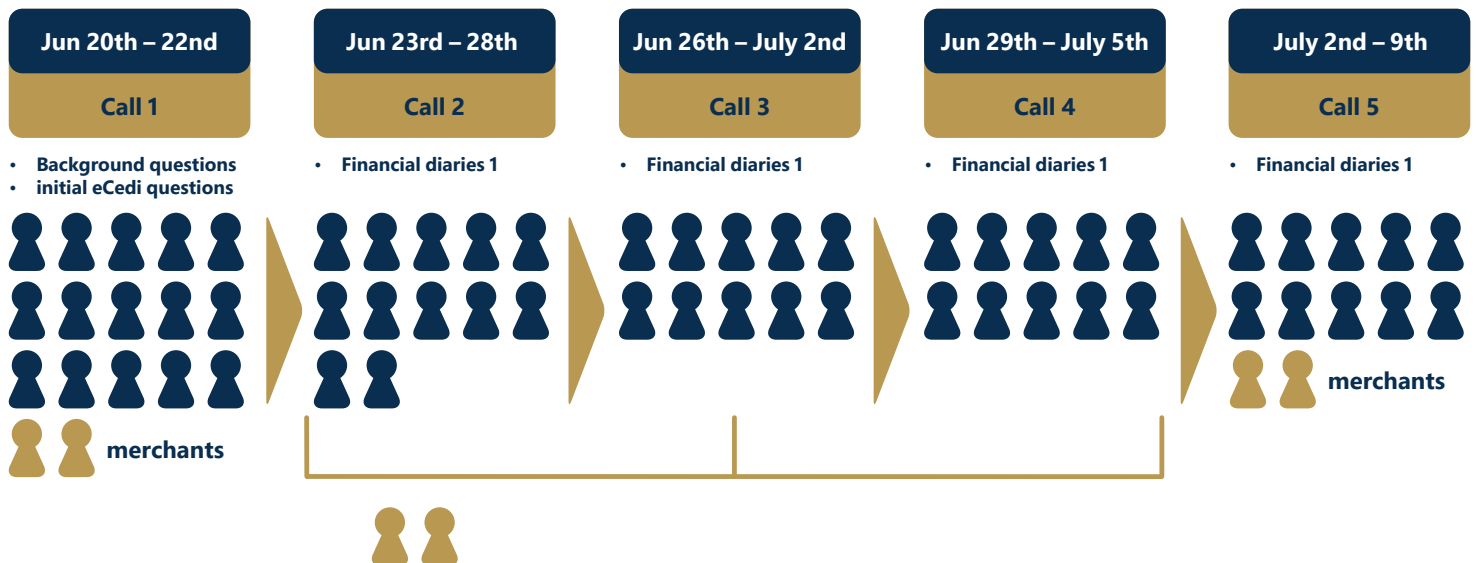


Chart 12 survey flow

Along 5 IVR calls





## User experience, perspectives, and suggestions

In call five, pilot participants were also asked a range of questions about their user experiences, perspectives, and suggestions about eCedi. The questions included:

***Can you please tell me what you know about eCedi and what eCedi is about?***

***Can you please tell me how you have been using eCedi so far?***

***What do you think about the Bank of Ghana being the organization that offers the eCedi service?***

***How do you feel about the Bank of Ghana keeping safe the data privacy of your transactions compared to others?***

***What do you think about the idea that your transactions from mobile money, banking and eCedi could be used by financial institutions to assess your eligibility for loans?***

***What has been easy and difficult about using eCedi so far?***

***How was it getting information about their account on eCedi, like balances or past transactions?***

***What prevented you from using eCedi more than you have?***

***What would make you enthusiastic about using eCedi if Bank of Ghana launched it?***

***What suggestions would you make to the Bank of Ghana about eCedi?***

These questions were asked in an open-ended way which would generate answers where the participants could freely express themselves verbally in their own language. Decodis first wrote the questions in English but tested the wording in Twi during piloting with a local research partner, Urika Insights.

Decodis then recorded the questions in Twi. These recordings are what participants heard one by one in the Interactive Voice Recording (IVR) survey. All the questions were open-ended, meaning that Decodis did not provide a range of choices to pick from, and encouraged participants to speak freely for as long as they wanted to speak.

All the audio responses were transcribed and translated in English. Using the translated scripts Decodis developed relevant themes and topics which are the responses in each of the charts above.

## Term Definitions

**Cash to cash** – participants exchanged cash with the receiver, mostly for payments but includes lending cash or giving cash to family and friends

**MoMo to outside digital** – participants used MoMo to digitally transfer money to another person either for payments, remittances, or lending

**Outside digital to MoMo** – participants received a MoMo transfer from another person who sent it digitally

**Bank to cash** – participants withdrew cash from a bank

**eCedi to outside digital** – participants used eCedi for payment to a merchant or someone else with eCedi

**MoMo to cash** – participants withdrew cash from MoMo

**Cash to MoMo** – participants deposited /loaded cash on MoMo

**Cash to eCedi** – participants deposited /loaded cash on eCedi

**Cash to bank** – participants deposited cash in a bank

**eCedi to cash** – participants withdrew cash from eCedi

**MoMo to bank** – participants transferred electronic money from MoMo wallet to their bank account

**Outside digital to bank** – participants received a bank transfer from another person

**Bank to MoMo** – participants transferred electronic money from the bank account to their MoMo wallet

**Cash to e-zwich** – participants deposited cash on their e-zwich account

**Outside digital – international to MoMo** – participants received an international transfer in their MoMo wallet

**Western Union to cash** – participants withdrew cash from Western union







# Addresses and Telephone numbers

## Head office

BANK OF GHANA  
1 Thorpe Road  
P. O. Box GP 2764  
Accra

Cable Address: GHANABANK, Accra  
Telex: 2052, 2541 GHBANK GH  
Swift Code: BAGHGHAC International  
Dial Code: 233  
Telephone Numbers: 030-2666174-6  
2666361-5, 2666902-8, 2666921-5

Fax: (0302) 662996, 665074  
E-mail: [bogsecretary@bog.gov.gh](mailto:bogsecretary@bog.gov.gh)  
Website: [www.bog.gov.gh](http://www.bog.gov.gh)

Cedi House (Head Office Annex)  
030-2665252, 2665253

General Services Complex  
030-2811301, 2811006

BANK OF GHANA Clinic: 030-2224837

## Regional offices

### Ashanti Region

P. O. Box 1989  
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Fax: 032-2026317

### Bono Region

P. O. Box 598  
Sunyani  
Tel: 035-2023814-6, 2023813, 2027161  
Fax: 035-2027260

### Northern Region

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037-2022664  
Fax: 037-2022329

### Western Region

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Takoradi  
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Fax: 031-2024705

### Volta Region

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Hohoe  
Tel: 036-2722045, 2722122, 2722992  
Fax: 036-2722013

### Currency Office

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## Agencies held by BANK OF GHANA

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Cape Coast  
Central Region  
Tel: 033-2132812-3, 2132354  
Fax: 033-2132549

### Ghana Commercial Bank Ltd.

Tema Main  
P. O. Box 272  
Tema – Greater Accra Region  
Tel: 030-3202760, 3202768  
3202769

### Ghana Commercial Bank Ltd.

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Agona-Swedru  
Central Region  
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Fax: 033-2020414

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Koforidua  
Eastern Region  
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### Ghana Commercial Bank Ltd.

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Upper West Region  
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