# The Dark Side of FinTech in Financial Services: A Qualitative Enquiry into FinTech Developers' Perspective

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## Abstract

**Purpose:** FinTech offers numerous prospects for significant enhancements and fundamental changes in financial services. However, along with the myriad of benefits, it also has the potential to induce risks to individuals, organisations and society. This study focuses on understanding FinTech developers' perspective of the dark side of FinTech.

**Design/Methodology/Approach:** This study conducted semi-structured interviews with 23 Nigerian FinTech developers using an exploratory, inductive methodology The data were transcribed and then thematically analysed using NVivo.

**Findings:** Three themes – customer vulnerability, technical inability and regulatory irresponsibility – arose from the thematic analysis. The poor existing technological infrastructure, data management challenges, limited access to data, and smartphone adoption pose challenges to a speedy integration of FinTech in the country, making customers vulnerable. The lack of privacy control leads to ethical issues. The lack of skilled developers and the brain drain of good developers present additional obstacles to the development of FinTech in Nigeria.

**Practical Implications:** FinTech managers, banks and policymakers can ethically collect consumer data that can help influence customer credit decisions, product development and recommendations using the mobile app and transaction history. There should be strict penalties on FinTech for selling customers' data, sending unsolicited messages or gaining unnecessary access to the customer's contact list. FinTech can offer to educate consumers about their financial management skills.

**Originality:** Whereas other studies have focused on the positive aspects of FinTech to understand client perceptions, this study offers new insights into the dark side of FinTech by analysing the viewpoints of FinTech developers. Furthermore, the study is based in Nigeria, an emerging economy adopting FinTech, adding a new dimension to the body of knowledge.

**Keywords:** FinTech, dark side, financial services, qualitative study, banking, FinTech developers

**Paper Type:** Research paper

## 1. Introduction

Banks have experienced a surge in financial technologies, known as FinTech, over the past few years, which has altered traditional banking services (Ediagbonya & Tioluwani, 2022). FinTech or financial technology refers to providing financial services through technology driven by algorithms, thus, simplifying and automating the delivery of financial services and creating new investment opportunities and revenue streams with new business models (Ogunfowoke, 2019; Ozili, 2018). FinTech has seen several developments since the initiation from analogue to digital technology, which financial banking institutions led. FinTech technologies include Artificial Intelligence (AI)-enabled platforms, Blockchain, virtual currencies, crowdfunding platforms, robo-advisors, Insuretech, and central bank digital currency (Arslan et al., 2022; Bollaert et al., 2021; Hari et al., 2021). The FinTech boom has offered consumers quick, safe, and convenient financial services, making them a preferred payment mechanism (Hsiao, 2021; Mogaji & Nguyen, 2022a). AI, machine learning, and big data drive this change, highlighting the vast prospects and bright side of Fintech for financial services provision (Ji, 2017; Martin, 2019; Kshetri & Loukoianova, 2022; Suryono et al., 2019)

Despite the benefits of Fintech, as with any form of technology, it is imperative to recognise the undoubtedly negative aspect of using technology in financial services, which can be referred to as the "dark side" of FinTech, that presents threats to organizations, individuals, and society (Alt, 2018; Anshari et al., 2021; Bollaert et al., 2021; Schwienbacher, 2019). From an organizational aspect, implementing financial technologies can negatively lead to high-frequency trading and concerns from the human workforce due to job losses (Cheng et al., 2022). On the individual side, advances in FinTech have raised several questions about the personalization of services (Gutierrez et al., 2019; Xu et al., 2019), techno-stress (Yeh et al., 2020), exposure to financial frauds (Akomea-Frimpong et al., 2019), threats to consumer privacy and security (Chang et al., 2020), and loan default (Li et al., 2021), which is expected to grow with the proliferation of algorithms used to extract and process consumer data. From the societal aspect, globally, managers have expressed ethical concerns regarding using technology in financial services (e.g., regulatory uncertainties (Till et al., 2017), loss of human or professional approach, wealth capitalization by companies using personalization technologies, unemployment, and machine bias issues) (Ashta & Herrmann, 2021; Statista, 2022b).

While recognising the growing number of studies on FinTech, it is important to iterate the significant gap in knowledge that this study aims to address. First, while there exists tremendous research on the bright side of FinTech (Chawla & Joshi, 2019; Cheng & Qu, 2020; Lee & Pan, 2022; Shaw & Kesharwani, 2019; Dwiledi et al, 2021), there is a lack of research that addresses the in-depth understanding of the dark side of FinTech from the developers' perspective (i.e. professional experts who play an integral role in designing, commercially implementing and regulating digital transformations in financial organisations), which this study aims to address. Second, previous studies have explored the dark side of FinTech from the consumer perspective (Hari et al., 2021; Muthukannan et al., 2021; Trivedi, 2019); however, the adverse effects of FinTech adoption from the developers' standpoint remain unexplored, which scholars have urged researchers to examine (Cai et al., 2022). Third, previous studies on FinTech have often focused on the experiences from the perspective of the technology-driven and market-driven western, educated, industrialised, religious and democratic (WEIRD) societies (Nguyen & Mogaji, 2022), while this study helps in comprehending how developing countries deal with and manage digitalisation in their financial services provision.

With this background, this study aims to address this research question – *What are the FinTech developers' perspectives on the dark side of FinTech in Nigeria?* Addressing this question is important for consumers, FinTech developers and policymakers. As AI-enabled FinTech systems can amplify biases and discrimination, infringe on personal data and cause cyber-attacks (Panos & Wilson, 2020), with severe consequences for vulnerable customers' credit scoring, hiring and law enforcement if they are not fair and transparent (Mogaji et al, 2021), it is imperative to understand how to manage this dark side of the technology. Likewise as developers begin to understand these consequences, they can design and implement fair, ethical, safe and transparent systems that align with societal and ethical norms (Russell et al., 2015). Implementing AI systems in financial institutions can perpetuate or amplify biases, impacting the organisation's reputation as well as serving as a potential to infringe on privacy and personal data for malicious purposes. Understanding the risks and consequences can help developers manage potential issues that may arise and minimise harm to customers, employees and stakeholders. Policymakers can also counterattack the dark side of FinTech by devising several strategies to circumvent its effects. Identifying the dark side of FinTech will uncover the challenges managers in financial institutions need to understand to enable consumers to adopt FinTech.

This study also carries theoretical and practical significance. The theoretical lens of the technology-organisation-environment (TOE) framework used in this study presents a fresh take on the dark side of FinTech from the developers' perspective, a novel aspect which has not been qualitatively examined. Past research has examined the intention to adopt FinTech, thereby placing limited attention on the underlying reasons regarding the challenges in using FinTech. Studies have examined specific technology, such as m-payment (Mouakket, 2020), contactless payment (Lee & Pan, 2022) and mobile money (Lepoutre & Oguntoye, 2018) in isolation, but an overall view of the developers' perspective on FinTech is scant. This study can be considered a pioneering work in reviewing FinTech developers' perceptions of the dark side of FinTech based on their customer interactions, thereby addressing the void in the body of knowledge. The practical contributions made by this study will enable developers to address the challenges associated with the dark side of FinTech.

The remaining article is organised as follows. The next section presents a review of the extant literature on FinTech. The following section elaborates on the research method and procedure for qualitative data collection. Next, this article presents the findings from the semi-structured interviews. Finally, this article offers theoretical and practical implications before concluding with its limitations.

## 2. Literature Review

### 2.1. *FinTech in emerging economies*

The FinTech revolution has emerged in developing countries as non-banks, and new institutions offer multiple financial service providers and focused financial services (Alt et al., 2018). At the beginning of the twenty-first century, FinTech in Africa grew primarily as a result of two factors: the poor state of banking and financial services and the quick use of mobile phones (Arner et al., 2016). It is believed mobile payment services such as MPesa in Kenya, WeChat in China, Fino PayTech in India, and other emerging economies may help alleviate poverty (Fall et al., 2020).

These revolutions address Sustainable Development Goals (SDGs) (Ozlii, 2020) and foster better financial inclusion. In Malaysia, e-wallets have not yet matured due to poor infrastructure, the risk of fraud and stealing, attacks from viruses and user queries related to their usage (Alam et al., 2021). FinTech innovations reach minorities and vulnerable individuals in Organization for Economic Co-operation and Development (OECD) countries by developing convenient applications (Caplan et al., 2020). However, FinTech applications

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are not as mature in developing countries compared to developed nations due to the failure of FinTech developers to understand consumer heterogeneity (Buckley & Webster, 2016). FinTech firms in China use social media platforms such as WeCash, a credit rating algorithm, to book a visit to the doctor and pay traffic fines (Paul et al., 2020).

During the COVID-19 pandemic, the risk of contracting the disease, the perceived severity of the disease, and the perceived usefulness and ease of use impacted the utilisation of contactless FinTech payment systems among GenX users in India (Singh & Sharma, 2022). The proliferation of mobile services has prompted organisations to adopt FinTech innovations (e.g. wallets, prepaid cards, payment banks, microcredit and co-branded credit cards) to retain customers (Tripathy & Jain, 2020). Prior studies have cited challenges with infrastructure, consistency, security concerns and lack of consumer experience and trust as the potential causes of consumer reluctance to use mobile payment systems (Kaur et al., 2020; Martin, 2019; Mogaji & Nguyen, 2022). In Uganda, transactions using mobile money services provided tax exemptions, leading to mobile money adoption in small and mid-sized enterprises (SMEs) and contributing to financial inclusion (Okello Candiya Bongomin et al., 2020). FinTech innovations in developing nations can aid in mitigating gender inequality (Suri & Jack, 2016) and finance SMEs (Lam & Liu, 2020). Financial literacy plays a vital role in users adopting FinTech, thereby improving their quality of life (Kakinuma, 2022).

Another area of work that FinTech supports in emerging economies is Islamic FinTech. Several Islamic FinTech startups provide peer-to-peer (P2P) lending, InsureTech, financing agents, and project financing (Muryanto et al., 2022). FinTech startups in Indonesia support traditional Islamic banks in P2P lending, which has further augmented their performance (Yudaruddin, 2022). Recently, FinTech startups have used crowdfunding platforms to keep a steady flow of funding consistent with Islamic banking practices and facilitate inclusive and equitable economic development (Abdulkadir et al., 2022). Table 1 presents a few studies that elaborate the dark side of FinTech.

**Table 1: A few studies that highlight the dark side of FinTech**

| Financial Technology | Study by | Findings |
|---|---|---|
| Blockchain | Swan (2017) | The key challenges in blockchain adoption in emerging economies are: a) the complexity and technicality involved in using the technology; b) unresolved technical issues related to the open nature of technology; c) scalability of the |

| | | technology; d) functional government regulations |
|---|---|---|
| Cryptocurrencies | Hua & Huang (2021) | Introducing cryptocurrencies could lead to obsolescence in anti-money laundering regulations and cross-border capital flow. Lack of knowledge, supervision and monitoring of cryptocurrencies can result in fraudulent transactions. |
| Robo-advisors | Ji (2017) | Robo-advisors lack human perception and use questionnaires to collect client information which may not be sufficient to gather information about the client. Robo-advisors are not equipped to handle market failures and thus cannot be fiduciaries. |
| Mobile Payment | Martin (2019) | Mobile payment platforms facilitate surveillance by service providers and government authorities. Mobile payment technology introduces people to security and privacy risks. |
| Central Bank Digital Currency (CBDC) | Kshetri & Loukoianova, (2022) | CBDCs raise sensitive privacy issues as authorities can access individual information and immutable records of user transactions. |
| Peer-to-peer lending | Suryono et al., (2019) | The challenges with peer-to-peer lending include information asymmetry, invalid determination of creditworthiness assessment, herding behaviour, regulation and policy |
| Digital Technologies (Artificial intelligence (AI), blockchain, cloud and data, mobile internet and Internet-of-Things (IoT)) | Buckley et al., (2019) | Cybersecurity threats and technological dangers to the financial stability and national security of emerging nations are the main obstacles to the fintech adoption. Second, lack of infrastructure such as cloud and data management; risks of data manipulation, data privacy |

## 2.2.    *The dark side of FinTech*

FinTech differs from traditional banking systems; thus, the current regulatory frameworks do not fit new technologies (Bollaert et al., 2021). FinTech startups offer niche services that threaten the existence of banks. FinTech firms may want to have their presence globally; however, financial services beyond the nation's boundaries require varying regulations. In emerging economies, the legal fees for the application of licenses are high, deterring FinTech players from entering the market (Faya & Ogbuefi, 2019). FinTech has difficulties with internet lenders charging unlawful fees, and they impose less stringent regulations than traditional banks (Cai et al., 2022). FinTech innovations provide more comprehensive access to consumers; however, this raises questions about how conventional bank customers could access their accounts without digital access.

The massive volumes of data analyzed by FinTech companies to segment customers to offer better products and services could cause breaches and frauds (Koffi, 2016). Similarly, AI-enabled algorithms are used in P2P lending to match the lenders with the borrowers. These aid in deciding the interest rate that can benefit the poor (Lagna & Ravishankar, 2022). However, the design of the algorithms is often questioned in terms of bias and inequality (Akter et al., 2021), lack of transparency (Haibe-Kains et al., 2020), traceability and human intervention. AI-enabled FinTech algorithms could encroach into people's lives and capitalize on their digital footprints. FinTech applications collect massive amounts of data, which can cause consumers to believe it intrudes into their private lives (Lagna & Ravishankar, 2021). Robo-advisors present immediate availability of services at a lower price; however, ethical concerns related to privacy, incorrect data processing, information misuse, consumer profiling and cybersecurity threats are often reported (Brenner & Meyll, 2020;  Shanmuganathan, 2020).

The collaboration between banks and FinTech firms has plagued several cybersecurity threats caused by data integrity risk, data leakage and malware attacks (Najaf et al., 2020). Banks and FinTech can be successful and sustainable if they can work on the way to reduce the severe underlying cybersecurity threats (Najaf et al., 2021). Policymakers should focus on consumer privacy and protection issues in the FinTech area. The surge in digitization offers opportunities for cybercriminals to exploit data for illegal activities. The intermediaries and certain complex transactions in FinTech may encourage predatory practices, fraudulent actions, information asymmetry and price manipulations if the regulations are absent (Murinde et al., 2022). Overall the challenges faced by FinTech include limited regulations, complex permit procedures, illegal FinTech practices and consumer disputes arising due to FinTech (Muryanto et al., 2022).

### 2.3.      Technology organisation environment

FinTech adoption has been examined using various technology adoption theories, such as the technology acceptance model (TAM) (Wang, 2021), diffusion of innovation (DOI) (Bureshaid et al., 2021), task technology fit (TTF) (Afeti & Owusu, 2022), unified theory of acceptance and use of technology (UTAUT) (Hassan et al., 2022) and others for managing FinTech. The variables in these adoption theories share a high correlation leading to high unexplained variance (Chatterjee et al., 2021). These theories are best suited for technology adoption and may not be best suited to understanding a complex issue like FinTech (de Graaf, 2016).

This study adopts the TOE framework to gain a holistic view of the dark side of FinTech in Nigeria. Tornatzky and Fleischer (1990) developed the TOE framework to understand how

organisations integrate technological innovations into their business processes based on their unique characteristics and capabilities (Kauffman & Walden, 2001; Sun et al., 2019), configurations, resources and business operations (Chatterjee et al., 2002) as well as the business environment in which they operate (Kowath & Choon, 2001). Numerous studies have utilised the TOE framework to investigate technological advancements, leading to its widespread theoretical acceptance and empirical and theoretical validity. The framework has been applied to various technological transformation studies, including business analytics adoption (Kumar & Krishnamoorthy, 2020), risk management in sustainable smart city governance (Ullah et al., 2021), technology adoption by SME firms (Awa & Ojiabo, 2016) and examining the adoption of digital technology in transportation services (Mogaji & Nguyen, 2023). The versatility of the TOE framework has been acknowledged (Baabdullah et al., 2021; Bhattacharyya & Shah, 2021; Sun et al., 2020).

Drawing inspiration from previous studies that have used this framework, the current study employs the TOE framework to address a gap in the existing knowledge regarding the negative aspects of FinTech. As Amankwah-Amoah (2019, p910) reiterated the need to contribute to the 'silent technological revolution in sub-Saharan Africa focusing on emerging issues and challenges', and Mogaji and Nguyen (2023) noted the need to comprehend how developing countries deal with and manage technological innovation, in contrast to the WEIRD societies, understanding the unique business environment (Kowath & Choon, 2001) in which organisations operate in Nigeria is imperative in addressing this research, making the TOE framework relevant for this study.

The TOE framework is best suited to explain the holistic perspective of technological, organisational and environmental dimensions of FinTech adoption in the socio-environmental and technical context (Seshadrinathan & Chandra, 2021). In our research, the technological element of TOE can expound on the technologies accessible (e.g. kind, cost) in Nigeria. The organisational context can relate to the scale of the FinTech organisations' resources available to FinTech firms and users. The environment context consists of competitors, industry structure, consumers and government regulations. According to TOE, the exposure to possibilities and risks in various situations leads to the necessity for technology diffusion. The diffusion of FinTech can be impacted by the characteristics of the business and the qualities of the technology in question. TOE provides a flexible framework that can incorporate extremely particular variables for a new study environment (Ganguly, 2022), making it very adaptable to study the FinTech landscape in Nigeria.

Accordingly, we recognise the intersectionality between the three TOE components to discuss the dark side of FinTech – *the technology*, which according to most studies, is characterised by complexity, compatibility, relative advantage and IT assets (Kumar & Krishnamoorthy, 2020; Verma & Bhattacharyya, 2017); the *organisational context*, which recognises the FinTech companies' responsibilities and capabilities for developing and deploying these technologies and the scale of the resources available to FinTech firms and users; and the *environment* – Nigeria, an emerging economy facing technological, economic and political challenges (Abdullahi et al., 2021; Soetan et al., 2021), consisting of competitors, industry structure, consumers and government regulations (Mogaji et al., 2020), with a large financially excluded population where the technology is being introduced (World Bank, 2021).

According to TOE, exposure to possibilities and risks in various situations leads to the necessity for technology diffusion. The characteristics of the business and the qualities of the technology in question can impact the diffusion of FinTech. TOE provides a flexible framework that can incorporate highly particular variables for a new study environment (Ganguly, 2022), making it very adaptable to study the FinTech landscape in Nigeria. By incorporating the TOE framework into this study, we can gain a more comprehensive and nuanced understanding of the dark side of FinTech from managers' perspectives and explore opportunities for managing the dark side. The following section outlines the methodological approach for the study.

## 3. Methodology

### 3.1. Research context

This study aims to understand the dark side of FinTech. It is contextualised in Nigeria, which is imperative for several reasons. First, Nigeria is one of the most significant emerging economies in the world (Soetan et al., 2021; Nwoba et a;. 2022), with the highest number of FinTech startups (144) in 2021 (Statista, 2022). It is ranked third among the developed financial markets in Africa (Faria, 2021) and has a low level of financial inclusion (Hinson et al., 2021; Mogaji et al., 2021). Financial inclusion highlights saving money among the population traditionally excluded from the traditional financial systems (Baber, 2020). The FinTech investment in the country is growing; between 2014 and 2019, Nigeria's FinTech industry raised more than USD 600 million in funding (PEVCA, 2022). Nigeria is home to many underbanked and financially excluded consumers who are being introduced to FinTech to integrate them into financial services (World Bank, 2021).

Second, most people in Nigeria are economically vulnerable, as they have no access to financial services and bank accounts (Soetan et al., 2021). Furthermore, financial institutions put vulnerable customers at risk by not effectively engaging with them (Mogaji et al., 2020). Access to and use of financial services make it possible for consumers to establish a link with financial institutions, which is essential for an economy's efficient operation (Czarnecka & Mogaji, 2020). Third, developing countries find it difficult to accept new technologies easily due to the unavailability of technical infrastructure, adoption challenges and inherent trust issues (Kshetri, 2021). Considering technology is an integral part of FinTech, there is a need for practitioners and policymakers to better understand how to encourage the use of FinTech amidst these challenges (Abdulahi et al., 2020; Soetan et al., 2021).

Fourth, Nigeria has high financial exclusion and is the sixth country worldwide with the highest number of unbanked adults (Ventura, 2021), leading to a high poverty rate. Studies addressing the barriers to FinTech adoption among vulnerable consumers are scant (Cai et al., 2022). Fifth, there is a growing prospect of transforming the financial sectors, with many key players, including telecommunication companies (telcos), getting banking licences (Olaleye et al., 2022). These factors are increasingly liberalising the financial services sector away from total dependence on banks (Onukwue, 2022), providing a justifiable context to understand the dark side of this emerging digital innovation in the country. FinTech businesses are increasingly competing with banks for customers in Nigeria, as some banks offer new digital banking services that incorporate digital payments, microfinance, and robo-advisor services into current bank accounts (Statista, 2022c).

### 3.2. Research design

When settling upon a research design, an exploratory qualitative approach was deemed to be the most appropriate for this investigation, given the lack of empirical studies and insights relating to this specific part of the world (Bhattacharyya & Shah, 2021; Farquah et al., 2020; Farquhar & Michels, 2015). It was considered appropriate to use this method to engage with the FinTech managers, as they are regarded as critical informants with interests linked to the phenomenon under investigation (Gaskell, 2000). An interpretive perspective was chosen that emphasises the social factors at play in society and recognises that peoples' perceptions of society can be numerous, subjective and self-constructed (Crossan, 2003). This method takes into consideration social elements as well as environmental contexts and settings, assisting the researcher in revealing the complex reality of people (Klein & Myers, 1999).

The small size of founders in the industry restricts a quantitative analysis. Moreover, to answer the research question posed in the study, an exploratory study is considered most appropriate, in line with previous studies that have adopted qualitative study to examine managers' viewpoints of FinTech (Mogaji & Nguyen, 2022). This exploratory research allows for more in-depth insight into the narrative of the subject matter to be developed (Farinloye et al., 2019; Kaur et al, 2021). The qualitative approach adopted in this study enabled the FinTech managers to share their experiences, viewpoints and the impact of these systems on their day-to-day business operations.

### 3.2. Sample and participants recruitment

Considering we wanted to engage with FinTech managers in Nigeria to explore their awareness and understanding of the dark side of FinTech, we sought to contact them and request participation in the interview. The interview method was adopted for the study as it is suitable for exploring in-depth concepts leading to exhaustive insights. We used the list of FinTech managers provided by https://startuplist.africa/industry/FinTech. We followed a purposive sampling approach, followed by snowball sampling, to identify conversant participants in the study. The respondents were professional experts in FinTech organisations who were requested to participate (Groenewald, 2004; Lincoln & Guba, 1985). The wide range of participants with diverse backgrounds was considered suitable for generating rich insights. The recruitment criteria were, a) active within the FinTech startup ecosystem in Nigeria, either as a staff, founder or co-founder, b) having a minimum of five years of experience in working with the FinTech startups, and c) implementing or having been a decision-maker in the adoption of FinTech technologies in their startup. The list has 98 FinTech companies in Nigeria; we contacted all managers via email, and only 29 responded to the request. The FinTech managers included in the study carry expertise in various roles, belong to diverse organisations and have varying experiences, suggesting diversified participation in the study. In line with past studies, the sample size in our study lies between 20 and 50, which is adequate to solicit reliable responses and conclusions (Marshall et al., 2013; Sheth et al., 2022). We provided the managers with detailed information about the project and a consent form via email. Upon returning the signed consent form, we began the interview process with them. Six were interviewed as part of the pilot study, and the final sample size was 23 managers who agreed and were available for the interview. They were predominantly male (65.2%, n=15%) and had more than five years of experience (73.9%, n=17). Table 2 presents the demographic details of the participants.

**Table 2: Demographic details of the participants**

| S/N | Gender | Age | Role | Years of Experience |
|---|---|---|---|---|
| M1 | Female | 25-30 | Quality Team lead | < 5 years |
| M2 | Female | 25-30 | Director | < 5 years |
| M3 | Female | 25-30 | Co-Founder | < 5 years |
| M4 | Female | 31-35 | Co-Founder | < 5 years |
| M5 | Female | 31-35 | Co-Founder | 5-10 years |
| M6 | Female | 36-40 | Chief Operating Officer | 5-10 years |
| M7 | Female | 36-40 | Chief Commercial Officer | 5-10 years |
| M8 | Female | 41-45 | Developer | > 10 years |
| M9 | Male | 25-30 | Founder & CEO | < 5 years |
| M10 | Male | 25-30 | Developer | < 5 years |
| M11 | Male | 25-30 | Chief Operating Officer | 5-10 years |
| M12 | Male | 25-30 | Chief Operating Officer | 5-10 years |
| M13 | Male | 25-30 | Chief Platform Officer | 5-10 years |
| M14 | Male | 31-35 | Co-Founder | 5-10 years |
| M15 | Male | 31-35 | Co-Founder | 5-10 years |
| M16 | Male | 31-35 | Chief Commercial Officer | 5-10 years |
| M17 | Male | 31-35 | Co-Founder | 5-10 years |
| M18 | Male | 31-35 | Co-Founder | > 10 years |
| M19 | Male | 36-40 | Data Engineer | > 10 years |
| M20 | Male | 36-40 | Product Develop Manager | > 10 years |
| M21 | Male | 41-45 | Product Develop Manager | > 10 years |
| M22 | Male | 46-50 | CEO/Co-Founder | > 10 years |
| M23 | Male | 46-50 | CEO/Co-Founder | > 10 years |

### 3.3. Data collection

The researchers collected qualitative data through semi-structured interviews using a consistent protocol approved by the institutional review board with a sample of FinTech managers across various cities in Nigeria. This approach provides in-depth knowledge that can be qualitatively analysed and maintain a continual questioning format for the participants (Saunders et al., 2007). There was a pilot study with six managers who were not part of the final sample. The pilot study allowed us to have a better understanding of the questions. The second author conducted the interviews via Zoom between February and March 2022. The participants were asked open-ended questions about their business practices and understanding of the dark side of FinTech. The interviews were recorded after receiving informed consent from the participants. Participants were assured of anonymity and that information declared during the interview will not be shared with any third party. The researchers ensured all other ethical

considerations were put in place. The interviews lasted between 46 and 72 minutes, with an average of 56 minutes. A professional transcribed the interviews and saved these transcripts as a PDF file for subsequent analysis.

### 3.4. Data analysis

This exploratory research adopts a qualitative data analysis approach, aimed at enhancing existing theory from data (Tuerner, 1981), following Braun and Clarks' six stages of thematic analysis. This approach ensures that the relevant themes emerging from the analysis offer answers to the research questions. (Farinloye et al., 2019). The transcripts were exported into NVivo, a qualitative data analysis software which was used for the thematic analysis. This thematic analysis follows a similar approach adopted by Mogaji and Nguyen (2022) in their study with bank managers. The second and third authors who did the thematic analysis had prior experience in qualitative coding and carried domain-specific knowledge (Compton et al., 2012). As two researchers were involved in the process, the codes, casual diagrams, linkages between variables and identification of significant themes from the data were understood and agreed upon, ensuring inter-coder reliability (Lal et al., 2021). They started with familiarisation with the data, reading all the transcripts and having a general view of the managers' conversations, followed by deducing relevant child nodes from the transcripts. Initial codes that identified the bad experiences as shared by the managers were generated through inductive analysis using the software. With the process complete, the results that emerged from the two analyses were further compiled to check for inter-judge reliability, which was approximately 85%, indicating the reliability of the study (Bapat, 2022). Additionally, all the codes were collated and assigned to a relevant overarching theme. During the investigation, some themes were removed, as there were inadequate data to support them, while others were developed further. In addition, we had series of debriefing meetings between the two coding authors and the first author to further manage the interviewer and coder biases. Furthermore, the sub-themes were sorted into three main themes addressing the research objectives. We carried out member check, which allowed the participants (of the semi-structured interviews) to read the interview transcripts and confirm them as tangible expressions (Merriam & Tisdell 2015). Though three participants declined to read it, we at least gave them the option but the rest agreed with our transcription and did not change anything. The output of the analysis is presented in Table 3 which contains the three main themes, the sub-themes, relevant examples and instances to buttress the themes.

Table 3: Key themes and practical recommendations

| Main themes | Sub themes | Examples | Implications |
|---|---|---|---|
| Consumers' vulnerability | Limited access to prospects of fintech<br><br>Limited access to financial options<br><br>Unethical access to data<br><br>Exposure to fraudulent activities | • Limited access to data to better understand the financial needs of the consumers.<br>• Limited data touchpoints to aggregate data and make an informed decision.<br>• Inability to manage their credit.<br>• Insufficient evidence and digital footprint to establish their credibility.<br>• Fraudulent activities like using stolen telephone numbers to register for financial services and get loans.<br>• Cloned cards and fake credit alerts. | • FinTech companies should also demonstrate responsibility for educating consumers about their financial services options and financial management skills.<br>• FinTech companies should educate customers about what they can benefit from Fintech.<br>• FinTech companies should endeavour to ethically collect data that can help influence credit decisions for customers, product development and recommendations.<br>• FinTech companies should use the collected information responsibly to ensure that customers' data are protected and solely used for what the customers are subscribed to.<br>• FinTech companies should lend responsibly.<br>• FinTech companies should also take responsibility for protecting the customers from fraudulent activities. |
| Technical inability | Human resources to support growing demands<br><br>Limited growth options<br><br>Deviant patterns of use of FinTech | • Skilled developers are leaving the country for developed countries.<br><br>• Taking a safe option, Fintech companies are doing a similar thing, and startup founders are afraid to explore other areas of FinTech.<br><br>• Anyone thinking they can start a Fintech company without the right regulatory permission or | • FinTech companies needs to ensure they improve the human resources pipeline in the industry.<br>• FinTech companies to offer better working conditions, offer training to recruit and retain talent.<br>• FinTech companies should work with higher education institutions to help develop more talent for the industry.<br>• Entrepreneur skills and initiatives from perspective tech developers working on innovative fintech ideas should also be supported through fundings, grants and capital venture investments.<br>• Banks and Fintech companies should also be able to hold themselves responsible and self-regulate their |

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|---|---|---|---|
| | | authorization from the Central bank. <br><br> • <br> • Possibilities of companies selling data of customers, especially fintech apps providing loans to financially literate and financially vulnerable consumers. | operations. <br> • The trade association and self-regulatory organization for FinTech should disseminate information about reregistered members to allay fears and curb the sector of exploitative developers |
| Regulatory irresponsibility | Consumer protection <br> Overlapping business operations <br> Overlapping regulatory control (banks vs telco regulators) <br> Governance, strategy, legislation | • Many consumers not aware if their fintech companies are registered and regulated. <br> • Many consumers don't know their rights with regards to fintech services <br> • Overlapping business operations between high street banks using Fintech and Fintech companies <br> • Overlapping business operations between high street banks, Fintech companies and telecommunication companies <br> • Who regulates who – the bank regulator or the telecom regulator? | • Regulators are expected to manage the relationship between the key stakeholders – FinTech companies, Telcom banks and customers. <br> • The business operations between FinTech companies, Telco and banks need to be better streamlined. Banks should not see FinTech as competitors and not sabotage their business operations but see FinTech as collaborators enhancing the financial service experience of consumers. <br> • There should be a drive for interoperability between the stakeholders. <br> • Regulators to become more aware of the dark side and put measures in place to address them. There should be regulatory measures to ensure that customers are not exposed to fraud. <br> • There should be regulatory measures to ensure that customers are not exposed to fraud, <br> • The regulators must continually reassure the customers by providing information about the regulated FinTech in the ecosystem. |

## 4. Findings

The thematic analysis of the qualitative data revealed the dark side of FinTech in Nigeria, summarising three key themes: 1. customer vulnerability, 2. technical inability, and 3. regulatory irresponsibility. These themes are subsequently discussed and supported with relevant anonymous quotes from participants.

### 4.1 Customer vulnerability

This aspect of the dark side highlights the impact and experience of consumers as they use FinTech for their financial transactions. Managers recognise that the poor existing technological infrastructure, data management challenges, and smartphone adoption pose a challenge to a speedy integration of FinTech in the country. Managers noted that they are developing innovation that is meeting the needs of their local consumers but is not yet up to global standards by stating, *'FinTech in Africa is solving the basic needs of Africans; we have our challenges that need to be solved. It's a unique FinTech industry in this part of the world'* (M13). Another manager said, *'When you think that mobile money is so pertinent to Africa, you will know that we are still scratching the surface with FinTech in Nigeria'* (M20). Managers believe things are getting better but that the consumers are not getting the best because of many inherent and institutional challenges that affect the industry.

Limited access to data to better understand the financial needs of the consumers was another aspect managers believed made consumers vulnerable. Managers recognise that there are not enough data touchpoints to aggregate data and make an informed decision about their customers' needs. They acknowledge that some consumers may be disadvantaged because there is insufficient evidence and digital footprint to establish their credibility. Managers recognise that things are growing, but more needs to be done.

One shared her experience, saying: *'How do you know if a customer can pay their loan? You give them a small loan, but that information is just with you, the company. We need to have different places to corroborate the information we have and be able to help customers with better offers'* (M8).

Another manager called for open banking, saying: *'We need open banking in Nigeria; it's a big dream, but that would help integrate all FinTech and financial products'* (M6).

Considering the massive benefit of FinTech is providing access to more financial services, managers believe that it also presents a dark side that makes many consumers

vulnerable because of their inability to manage their credit and further exposes them to financial difficulties.

*'With your phone, you can access many loan FinTech companies and can just borrow money. It is left for you to know if you can afford to pay back in time'* (M15).

Another manager reiterated this point: *'Many people who keep borrowing on this app are now exposed to borrowing money from the comfort of their phones, and paying back can be an issue making them more exploitable'* (M11).

The current situation of the country and the growing drive for financial inclusion through FinTech opens opportunities for some FinTech to be exploitative when offering services to consumers. Managers reiterate the provision of loans with high interest, which many people may not be able to pay back.

*'Money is readily available, but at what expense? We have seen the high rates that some of these loan apps offer, and we believe our products should be affordable'* (M6). Managers believe that tech should solve a problem (of financial inclusion) but should not create another problem (financial vulnerability and debt management).

Many consumers have signed up to use these FinTech services and are unaware of the control they give the companies regarding their data. This is an emerging trend in Nigeria and a negative consequence of FinTech adoption – people borrow through payday loans, and the application gives access to all their data on the phone, including their contact list. Peradventure the person does not payback the payday loan, the FinTech companies will send messages to all their contacts saying the person has defaulted on their loans (See Appendix 1). The manager highlights this as an ethical issue for developers who need data but also need to use it correctly. Three managers cited cases where text messages were sent to a customer's phone contacts because they had collected a loan and could not pay it back. *'We have seen situations where these loan companies abuse the customers' trust and defame their customers' character by sending text messages. This can be degrading'* (M1). Managers further question if companies are collecting the data and are unsure how to use it. *'I will not be surprised if these data are being sold off to another loan company. You can't really trust anyone in this industry'* (M4)

Fraudulent activities like using stolen telephone numbers to register for financial services and get loans were another aspect of the dark side of FinTech that managers recognise makes consumers more vulnerable. The managers noted that while technology is making access to financial services easier through mobile phones, it also exposes customers to several risks. One manager shared a customer's experience, saying: *'She told me her phone was stolen, and before she could retrieve her sim, the thief used it to register and get loans on different loan*

*apps with no possible intention of paying back, causing further damage to her credit files'* (M5). Managers also reiterate examples of other fraud, such as using cloned cards and fake credit alerts. She concluded by saying, *'It is not surprising that many people are not versed with technology, which exposes them further to fraud'* (M5).

## 4.2. Technical inability

Managers acknowledge that they have enormous prospects for FinTech in the country but recognise their technical inabilities to meet these innovative needs. Our participants were critical of suggesting that they could do better, give the customer more and change the narrative about financial services providers. Still, many technical limitations affect this technological growth. High among them was the human resources needed to manage the demands.

*'Skilled developers are leaving the country for other developed countries, jeopardising the level of innovations they anticipate. Everyone is ready to leave the country once you have the skill. Those who are not leaving are working virtually with UK companies and getting paid in pounds'* (M14). *'We have problems with the pipeline of skills for the future growth of this industry'* (M22).

In recognising these challenges with human resources, many FinTech companies are doing a similar thing, and startup founders are afraid to explore other areas.

*'Do you know how many FinTech are providing ways of paying for airtime and bills? Too much is out there, turning into pure water [something cheap and accessible for all]'* (M7).

*'People do not have the technical abilities to try out different things; we all want to create FinTech solely for processing payments'* (M18). *'Customers deserve more; we would like to expand more into providing personal savings solutions, using artificial intelligence to understand consumers' spending habits and offering personalised recommendations. Still, you can only do so much based on the resources that are available to you'* (M2).

In addition, managers recognise that the shortage of skills is opening their business operations to security threats from fraudsters, which may also affect the consumers. *'Fraudsters are working smart, but we need to be more innovative; we need more people to do checks, reassure customers and reinforce our security systems'* (M23). *'People are now using FinTech, but the backbone is weakening before the swindling technical capabilities'* (M11). Managers also acknowledge the need to train their staff to deal with complaints of customers, especially for unsuccessful transactions, technical problems and onboarding. They noted that these issues affect customers' experiences, and they are trying to address them.

## 4.3. Regulatory irresponsibility

Managers recognise that the regulatory challenges they face present a concerning aspect of the dark side of FinTech in the country. They noted that they are stuck between the regulators, meeting customers' expectations and the competition within the industry.

*'The customers come to you saying their transaction is not processed, but they won't know we need to go through clearing. The banks and many regulatory limitations affect us'* (M19). *'Consumers do not see this dark side; the developers and companies experience these issues, but ultimately, it cascades down to the consumers'* (M23).

The managers recognise that their position as tech companies and not full-fledged commercial banks opens them to various regulatory interventions and increased regulatory scrutiny, which affects their business operations. While they acknowledge that the Central Bank of Nigeria (CBN) (the regulator for financial services provision in Nigeria) works for the best interests of Nigeria, there should be an easy way of doing tech business in the country. Managers also mention the impact of other regulatory bodies, like the Nigerian Communications Commission (NCC), which regulates telcos, and the Securities and Exchange Commission (SEC), the main regulatory institution of the Nigerian capital market.

Managers also highlight that the banking and telco companies, which are more established and regulated by CBN and NCC, respectively, possess a challenge for their growth.

*'Banks are afraid of FinTech, and also the telcos are going into FinTech space and leaving the startup companies to suffer from this competition'* (M3).

*'These are established brands that want to squeeze these startups; it is a dangerous world here, but we are surviving'* (M6). One manager illustrated this concern with a proverb saying: *'"If elephants are fighting, the grass suffers", ... the irresponsibility of regulators is affecting the innovation and the anticipated service delivery for consumers'* (M11).

With telcos coming on board into the FinTech industry, developers recognise the need for interoperability. However, they feel it is still in its infancy and believe the regulators should be able to do more to provide a primary level ground for all stakeholders. Managers said FinTech is coming in to disrupt the financial service system and make things go swiftly, yet these traditional banks are slowing things down.

*'Banks are stifling their business operations and would expect more protection from other more established players in the financial service sectors'* (M21).

Even among FinTech (not banks or telcos), there is a growing concern from the managers for regulators to scrutinise the industry further and ensure that only licensed operators are

allowed. Managers believe that some bad eggs offer exploitative and unethical businesses and should be removed from the ecosystem. One manager said: 'There are over 200 loan apps in Nigeria. Many people think they can create an app and offer loans. This is where we need CBN to regulate this industry before they all give us a bad name'. Another manager mentioned the role of the FinTech Association of Nigeria, the self-regulatory, not-for-profit and non-political organisation for FinTech companies, to bring some regulations into the ecosystem and ensure that members and providers are vetted to provide ethical financial services.

## 5. Discussion

While the major benefits of FinTech in enhancing financial services experiences cannot be denied (Buckley et al., 2019; Kshetri & Loukoianova, 2022; Suryono et al., 2019), this study fills a gap in knowledge with regards to FinTech. Specifically, we have recognised customer vulnerability, technical inability and regulatory irresponsibility as the dark side of FinTech. With the study contextualised in Nigeria and qualitative data collected through interviews with FinTech managers, we build on previous studies that have focused on the bright side of FinTech (Chawla & Joshi, 2019; Cheng & Qu, 2020; Lee & Pan, 2022; Shaw & Kesharwani, 2019). Furthermore, we provide theoretical insights from managers, extending established knowledge from the customers' perspective (Hari et al., 2021; Muthukannan et al., 2021; Trivedi, 2019) and importantly move away from the WEIRD societies to showcase how developing countries are managing FinTech digital transformation.

In discussing the findings of this study, it is imperative to reflect on the unique features of the country and how these may have contributed to the dark side that has been recognised. Like any other emerging economy and developing country, Nigeria has its struggles. The vast population is a predominantly under-banked, largely informal economy and has a cash-based economy, so there is limited trust in what technology can do (Abdullahi et al. 2022; Soetan et al. 2021,). Many people aren't using FinTech because they do not find it appealing to their present needs (Mogaji & Nguyen, 2022). In addition, the economic situation in the country has warranted the need for people to explore alternative means to access cash; they are willing to share their data because they aren't aware of how it can be used and are open to many predatory FinTech offers (Adeola et al., 2021). These are critical issues that undermine the value of FinTech for financial inclusion.

The different aspects of the dark side affect different stakeholders, starting from the consumers who are often at the receiving end, experiencing vulnerability; to the developers themselves as they struggle to meet the growing needs of the consumers; and then to the regulators who have to deal with the different players within the industry (Hua & Huang, 2021; Ji, 2017; Martin, 2019). This interaction with various stakeholders presents tension in managing these issues, especially for the FinTech developers striving to provide excellent customer service, who are often technologically driven but hindered by various limitations around their business operation. This suggests that one size doesn't fit all; what is applicable in this part of the work is not a standard experience of the dark side, highlighting a significant contribution of this study towards a much deeper theoretical exploration of this matter.

*5.1. Theoretical contributions*

Theoretical contributions

First, we extended the TOE framework to include the significant peculiarities of, 1) FinTech in a highly regulated financial services ecosystem, 2) being operated in a developing and emerging economy, 3) having a large number of financially excluded adults. Like any form of technological innovation with an established dark side (Baccarella et al., 2018; Faccia et al., 2020; Talwar et al., 2019), the study makes a significant theoretical contribution to our understanding of the dark side of FinTech by highlighting the country's unique context. This is a developing country, and its cash-based economy and limited technology adoption exacerbate the dark side. Our updated TOE framework illustrated in Figure 1 aligns with the three key themes from our research findings. First, the customer vulnerability as tech developers introduce their services to consumers in an informal, emerging economic environment – expounding on the internal and external technology accessibility factors and consumers' attitudes towards technology in Nigeria. Second, the inability of FinTech organisations to provide technological innovations that meet the growing needs of the consumers. The organisation variable describes the firms' resources, such as their size, degree of formalisation, degree of centralisation, managerial structure and human connections among employees. Third, irresponsibility of the regulators to regulate a diverse and emerging technology, recognising the scale of the FinTech organisations in the country and the environmental context consisting of competitors, industry structure, consumers and regulations laid by the government.
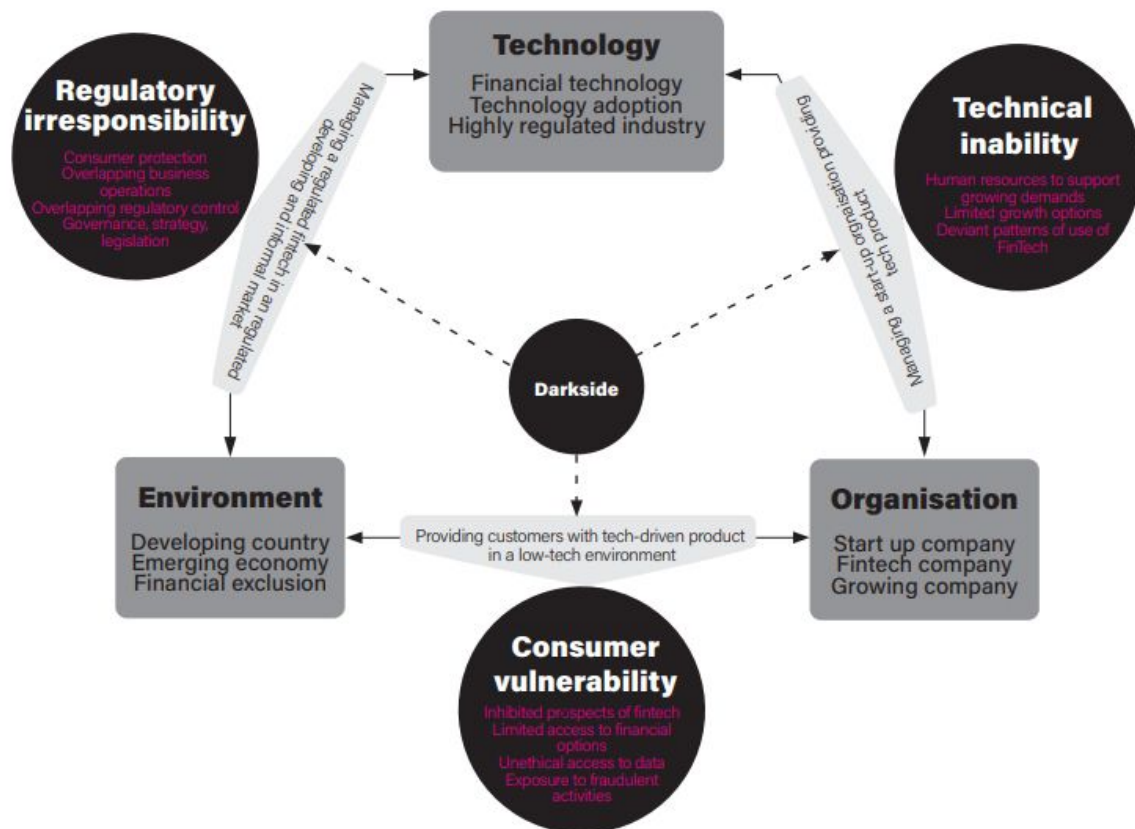
Figure 1: Theoretical framework showing updated TOE framework and emerging darkside of Fintech

Second, we provided theoretical insights from the managers' perspectives. Previous studies on the dark side of FinTech in emerging economies has often come from the consumers' perspective – Shaikh et al. (2023) and Dzandu et al. (2022) collected data from mobile money users in Ghana; Djahini-Afawoubo et al. (2023) collected from customers from Togo; while Mogaji and Nguyen (2023) interviewed financially vulnerable customers in Nigeria. While not doubting these insights from the customers, our study provided a deeper understanding into the dark side through the managers' reflections on their business practices as they relate to the customers they are serving, their technical capabilities to provide financial services and their regulatory dilemmas. Our findings align with the struggles of managers, as reported by Mogaji and Nguyen (2022) when they try to integrate artificial intelligence into their banking operations. While Mogaji and Nguyen (2022) may have focused on some positive aspects, our study contributes to the theoretical understanding of how managers are handling the negative and unintended consequences of their business operations.

Third, we provided theoretical insights from the perspective of an emerging economy. While FinTech may be considered a universal form of digital transformation, it has become

imperative to recognise the inherent challenges of how emerging economies adopt and integrate FinTech. Moving away from the technology adoption narratives from WEIRD societies, we align with previous studies on digital transformation and FinTech in developing countries (Abduquadri et al., 2022; Dzandu et al., 2022; Mogaji & Nguyen et al, 2022; Shaikh et al., 2023) and posits that FinTech operations in a developing country differ from those in developed countries with better technological infrastructure and institutional acceptance. This study recognises that basic banking operations through FinTech are still not well adopted, highlighting the need to be more open-minded about the global practicalities of FinTech (Dzandu et al., 2022; Mogaji & Nguyen et al., 2022; Sortan et al., 2021). This insight further aligns with the earlier theoretical positioning of the study around the TOE framework. Specifically recognising that FinTech may be adopted globally irrespective of the country context, the organisation and environmental factors present a different dynamic. This suggests that the dark side experienced within FinTech at its infancy in an emerging country would more likely be different from what is applicable in other developed countries. The organisational capabilities of FinTech and the environmental challenges of an emerging economy present a business case worth exploring to understand how FinTech can manage its business operations in countries with inherent institutional and regulatory challenges (Soetan et al., 2021). This understanding will greatly benefit researchers working on financial services, technology adoption and digital transformation.

## 5.2. Managerial implications

By highlighting the dark side, we provide practical implications relevant to key stakeholders, including FinTech managers, banks and policymakers. These implications are centred around the three key themes presented in the findings.

In addressing *customer vulnerability*, managers should take responsibility for educating consumers about their financial services options and financial management skills. Customers must know how they can benefit from FinTech, including its opportunities and prospects. Specifically aligning with the environmental factors of the TOE framework, the 'Nigerian factor' is very important. This is a country where a majority of adults are financially excluded – they do not have access to a bank and do not have a bank account. As with other countries with large numbers of financially excluded adults, managers must recognise the inherent challenges and promote awareness about FinTech's financial inclusion and financial services provision when engaging with customers. Education could be a form of corporate social

responsibility to inform financially vulnerable consumers about their money management skills, as this group is more likely to struggle with FinTech and be exploited by some FinTech companies (Soetan et al., 2020).

As our findings illustrated customers' vulnerability and their limited control over their data, managers are expected to act responsibly when engaging with their customers. First, FinTech should endeavour to ethically collect data that can help influence credit decisions for customers, product development and recommendations. Second, FinTech should use the collected information responsibly to ensure that customers' data are protected and used solely for what the customers are subscribed to. FinTech should be reminded of not selling customers' data, not sending unsolicited messages, or gaining unnecessary access to the contact list of customers. FinTech should not contact people on their customers' contact list to ask for loan refunds. There should be a proper mechanism to address the non-payment of loans. Third, FinTech should lend responsibly. They should be responsible in how much they offer their customers, aligning with what Czancka and Mogaji (2019) described as not tempting customers into debt. Likewise, these financial products should not be exploitative; managers should ensure that their interest rates are competitive and personalised, recognising each individual's unique characteristics and experience. Last, FinTech companies should also take responsibility for protecting customers from fraudulent activities. While we acknowledge that a lot has been done concerning customer security, it is important to reiterate a continued effort; as the fraudsters are getting more innovative, there should be more awareness campaigns for customers, more training and support from the FinTech developers and regulatory measures to ensure that stolen IDs can't be easily used to register for loans.

Addressing the *technical inability*, we recognise the environmental factor that may motivate tech workers in Nigeria (as a developing country) to choose to migrate and work in other developed countries, but notwithstanding, FinTech companies need to ensure they improve the human resources pipeline in the industry; they need to offer better working conditions, offer training to recruit and retain talent and possibly work with higher education institutions to help develop more talent to champion the anticipated digital transformation within the FinTech sector. Entrepreneur skills and initiatives from perspective tech developers working on innovative FinTech ideas should also be supported through funding, grants and capital venture investments. This support will move the scope of FinTech beyond just buying airtime and processing payments to the other end of the spectrum, such as open banking, credit ratings and cryptocurrencies. Banks and FinTech managers should also be able to hold themselves

responsible and self-regulate their operations. As managers in the interview alluded to the 'bad eggs' within the industry and previous studies highlight some unethical banking operations that can jeopardise customers' trust (Mogaji & Nguyen, 2022), banks should be able to address these dark sides, open channels for whistleblowing and ensure trust in the sector. The trade association and self-regulatory organisation for FinTech also have a role to play in disseminating information about reregistered members to allay fears and curb the sector of exploitative developers.

Addressing the *regulatory irresponsibility*, CBN has a responsibility and duty of care to ensure that all stakeholders' interests are protected. Regulators are expected to manage the relationship between the key stakeholders – FinTech, telcoms, banks and customers – and it is imperative they are aware of the dark sides and put measures in place to address them. There should be regulatory measures to ensure that customers are not exposed to fraud, and the drive for interoperability between these stakeholders needs to be intensified. Likewise, the business operations between FinTech and banks need to be better streamlined. Banks should not see FinTech as competitors and not sabotage their business operations, but rather see FinTech as collaborators enhancing the financial service experience of consumers. Importantly, the regulators must continually reassure the customers by providing information about the regulated FinTech in the ecosystem. Unlike banks and telcos with well-recognised brand visibility and regulated numbers, the number of FinTech companies is actually in doubt. One report suggests that out of about 250 companies within the competitive FinTech space in Nigeria, only about 80 are registered with the CBN. This limited information about regulated providers further questions the experience of consumers with those companies the regulators do not register.

## 6. Conclusion

Our study has provided qualitative insight into the dark side of FinTech in an emerging economy. We recognize that the slow adoption of technology, institutional and infrastructural challenges, and the country's economic situation provide a unique context to explore this dark side. While there are positive attributes of FinTech, like digitally transforming access to financial services, ensuring financial inclusion and creating employment, it is imperative that the dark side is recognized and appropriately addressed. The study provides significant theoretical and managerial insights, challenging managers to take responsibility and have a

duty of care for the customers and regulators to effectively manage the working relationship between all stakeholders, especially the banks, telco and FinTech.

While we have taken utmost care in conducting this study, we acknowledge there are a few limitations that present future research opportunities. First, the qualitative methodology of the study affects its generalisability; therefore, future studies should consider adopting a quantitative approach and developing a scale to measure the dark side of FinTech. We also acknowledge that the qualitative study could suffer from social desirability bias where the FinTech developers might report socially desirable behaviours to avoid methodological biases, and therefore experiments and longitudinal studies can be carried out in future. Second, though the study has focused on Nigeria, recognising the country as one of the largest emerging economies and most populated countries in the world, findings from our study cannot be generalised beyond Nigeria, in which this study is contextualised. The study's primary limitation is that it is based on interviews conducted in a particular regulatory, cultural and business environment, i.e. Nigeria. Further investigation from other emerging economies, larger samples and more global context will likely produce cross-cultural insights. While this limitation doesn't affect the understanding emerging from this study, it opens opportunities for future research. Third, we focused on the general exploration of the dark side of FinTech from the developers' perspective and did not account for consumers to understand their challenges while using FinTech services. Future studies can look at extending this work to include the customer viewpoints and test them empirically. It is anticipated that these research strands will provide a holistic understanding of the dark side of FinTech and ultimately contribute towards managing it and ensuring an overall positive experience for all stakeholders.

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Appendix 1

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