

Digital Transformation of Micro-Enterprises in Ghana



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List of Abbreviations

BoG:	Bank of Ghana
Fintech:	Financial technology
GhQR:	Ghana's universal quick response code
GhiPSS:	Ghana Interbank Payment and Settlement Systems
GHS:	Ghana cedis
GIP:	GhiPSS Instant Pay
ICT:	Information and communication technology
IT:	Information technology
KYC:	Know your customer
MSME:	Micro, small, and medium enterprises
MoMo:	Mobile Money
NBFI:	Non-banking financial institution
QR code:	Quick response code
SDG:	Sustainable development goals
SDI:	Specialized Deposit Taking Institution
SME:	Small and medium enterprises
USSD:	Unstructured Supplementary Service Data

Preface

“Digital Transformation of Micro-Enterprises in Ghana” reports on a study undertaken in 2022 by Associate Professor Stan Karanasios (University of Queensland), Associate Professor PK Senyo (University of Southampton) and Associate Professor John Effah (University of Ghana) as part of the International Telecommunication Union (ITU)’s Connect2Recover research competition.

While recent research addresses the impact of COVID-19 on business and society, this is the first research project undertaken focusing on micro-enterprises and how they leverage digital technology to adapt to the impacts of the pandemic. This resource provides an overview of the research undertaken and details the key findings. It also presents recommendations for practitioners and researchers. This report should be considered as a way of stimulating discourse on how to better support micro-enterprises, particularly those in resource constrained environments.

The study began with a thorough review of the literature. It was followed by interviews undertaken with micro-enterprises, government agencies and technology firms such as financial technology (Fintech) firms, telecommunication operators and infrastructure providers. This is a unique feature of our study – we argue that to understand digital transformation of micro-enterprises, it is necessary to investigate the ecosystem in which they operate. This also allows us to capture the different perspectives of actors in this space. Our research also analyses and draws upon key reports and data from the World Bank, Ghana Statistical Service and other national and international bodies to inform our research.

This report contains seven other sections. Section one includes an executive summary. Section two introduces the setting and the research objectives. Section three reviews the literature and draws on statistics and qualitative data relevant to the research. Section four outlines our study method and explains each of the study phases. Section five presents the key findings. Section six provides the discussions, recommendations and implications. Section seven concludes the report.

The ITU’s Connect2Recover Research Competition aimed to accelerate digital inclusion during the global pandemic recovery and preparedness for the ‘new normal’. This research was selected as a winner of the research competition. The research was presented at, and benefited from, the information sessions held by the ITU (for further information see: <https://www.itu.int/en/ITU-D/Pages/connect2recover/research-competition/default.aspx> and <https://www.itu.int/en/ITU-D/Pages/events/connect2recover/infosessions-research-competition-papers-focusing-on-Africa/default.aspx>).

We would like to thank all the study participants for their time and insights as well as the following researchers who contributed to the study, Dr Peter Hayes, Dr Tri Lam (University of Queensland), and Miss Melissa Baba (University of Reading), Mr. Isaac Clotley, Mrs. Esther Dzidzah, and Mrs. Norah Agyei-Ababio. The views presented are those of the authors only.

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1 Executive summary

The COVID-19 pandemic led to a dramatic loss of human life worldwide and presented unprecedented challenges. It demanded new ways of living and working and spurred a re-imagining of how businesses operate. At the same time, it also demonstrated that, with concentrated resources and effort, breakthroughs are possible in health, medicine and social policy.

This report zooms in to one specific challenge faced during the pandemic: how micro-enterprises in resource poor contexts were able to adapt. It examines how micro-enterprises were able to leverage digital technology—such as WhatsApp, Instagram, mobile money, and other applications—to fundamentally re-imagine their business in line with their resource constraints, while managing the impacts of COVID-19. Focusing on Africa, and using Ghana as a case study, this study provides actionable recommendations on how micro-enterprises can adopt digital technology to be more resilient to the impact of COVID-19, or future contingencies, by changing how they traditionally work.

A unique aspect of our research is that it takes the stance that to fully understand how changes occur at the level of micro-enterprises, it is necessary to examine the broader ecosystem contributing to their digital transformation. The research adopts a qualitative research design which is well suited to *how* and *why* research questions studying intrinsically complicated phenomenon. Our data relies on in-depth semi-structured interviews with several groups of actors in Ghana: micro-enterprises, government agencies, and technology firms that develop and offer services such as mobile money applications and information and communication technology (ICT) infrastructure. Our research also analyses and draws upon key reports and data from the World Bank, Ghana Statistical Service and other national and international bodies.

Our study produces three key areas of findings—on micro-enterprises, the activities of government and activities of technology firms—which should be considered as a way of stimulating discourse on how to better support micro-enterprises with COVID-19 impacts but also more broadly to support their digital transformation to remain competitive in a hypercompetitive digital world.

1.1 Micro-enterprises

While the pandemic induced lockdowns had negative implications for micro-enterprises, the pandemic also created opportunities for them. These include tangible outcomes such as new customers and exploitable niches. A common theme is that COVID-19 accelerated digitalization among micro-enterprises. In this way, we offer different findings and insights compared to the existing literature (see Table 11). We also found that micro-enterprises are increasingly becoming “digital bricoleurs”. That is, they mobilize the digital resources they have accumulated over time (e.g., WhatsApp *plus* Instagram *plus* mobile money *plus* other mobile technologies etc.) and deploy them in a specific way to adjust to the crisis at hand. Implications and outcomes of this are discussed.

1.2 Government agencies

The response to the pandemic by government agencies such as Ghana Interbank Payment and Settlement Systems (GhiPSS) and the Central Bank of Ghana included rolling out a Quick Response code (QR code), which is also known as Ghana Quick Response code (GhQR), for merchant payment. The government also introduced a fee waiver on cross-provider mobile money payments supported many micro-enterprises to continue operation during the pandemic. However, post-pandemic measures especially the removal of the fee waiver and introduction of an electronic levy (e-levy) on electronic transactions (a levy on digital payments) could erode the gains made in building resilient micro-enterprises. The efforts of government agencies should focus on introducing interventions targeted specifically at micro-enterprises.

1.3 Technology firms

For technology firms, the pandemic was viewed as a way to spur further digital transformation across Ghana. Key among these were mobile money providers increasing wallet sizes and transaction limits (up from GHS5,000 to GHS10,000). The introduction of payment innovations for motorbike delivery services to collect payment was important given the business model of most micro-enterprises during COVID-19; all micro-enterprises in our sample relied on mobile payments. Other innovations include offering overdraft services for individuals to borrow money using their mobile money wallets and platforms to collect payments. We noted how these initiatives built on an already mature and sophisticated technology-Fintech ecosystem in Ghana (Senyo et al., 2022). However, it merits mentioning that just like in the case of government initiatives, the outcomes of these on micro-enterprises were largely a byproduct of their wider activities rather than their main focus. We recommend that there is a need for the technology sector to consider, as a primary focus, the needs of micro-enterprises. This would ensure that micro-enterprises have mobile payments, mobile loans and other relevant systems specifically designed for them. Government incentives should be designed to encourage this. We also argue that it is necessary to reduce or even eliminate fees on digital payments for micro-enterprises.

2 Introduction

2.1 Research background

COVID-19 impacted many areas of business and social life. Like other businesses, micro-enterprises—such as street vendors, small-holder farmers and retailers—were faced with lockdowns and the tension between trading and exposing themselves to COVID-19, or not trading and having no income. We set out to provide evidence on how micro-enterprises were able to adjust and improvise forms of online commerce—by using Fintech (e.g., mobile money) and social media platforms such as WhatsApp, Facebook, and Instagram along with motorbike delivery services—to maintain their business operations or even thrive during COVID-19.

Focusing on Africa, and using Ghana as a case study, this study provides actionable recommendations on how micro-enterprises can adopt digital technology to be more resilient to the impact of COVID-19, or future contingencies, by changing how they traditionally work. The study also provides insight into the unanticipated benefits and the support required from the government and the technology sector to help micro-enterprises digitally transform.

2.2 Research scope

In the context of Africa, micro-enterprises are typically street and market vendors, small-holder farmers, petty-retailers and auto mechanics etc. Micro-enterprises are typically informal and have a simple organizational structure, where decisions are made by one or two people, usually the owner or manager. They face numerous constraints such as high initial capital investment, regulatory requirements, and challenges with locating premises as well as difficulties in adopting new technology. Some small established enterprises generally operate within physical shops and conduct operations via cash. However, this business model has high operating costs such as land rental fees, initial setup capital, staffing, and regulatory compliance. Given the informal nature of micro-enterprises, the majority are unregistered, do not pay direct taxes, cannot access government grants or commercial bank loans, making their operations unsustainable. As a result of these conditions, micro-enterprises are also susceptible to shocks (Turner, 2018) that make very few of them grow.

Digital technologies such as Fintech and social media platforms can be leveraged to address these institutional voids to revamp and make micro-enterprise attractive, less costly and resilient businesses. Research on larger firms suggests that businesses that are digital leaders outperform their peers (Westerman et al., 2017) and in the context of COVID-19, digitally mature organizations tended to suffer less than digitally immature firms (Fletcher & Griffiths, 2020; Seetharaman, 2020). This suggests that micro-enterprises might be able to better compete by placing digital technology at the heart of their operations. Therefore, supporting micro-enterprises should be at the forefront of government and institutions' policy and strategies during, and post, COVID-19. However, little is known about if, and how, micro-enterprises use combinations of digital technologies. In the case of mobile money applications, the majority of solutions are purposely developed for individuals and large organizations which require substantial initial capital investment, complementary IT infrastructure, digital literacy capability and in-house IT support. As many micro-enterprises do not have adequate financial resources and technical capability to adopt the range of the technologies, they rely on a brick-and-mortar business model without taking advantage of opportunities offered by emerging digital technologies.

We examine these issues in detail in the context of Ghana. We selected Ghana for several main reasons. First, the country is one of the faster-growing technology hubs in Africa with large numbers of social media users (MOC, 2019), high business usage of ICTs (WEF, 2016) and large numbers of mobile money accounts (38 million) (Bank of Ghana, 2020). Second, a large number of actors such as banks, telecommunication operators, think tanks, Fintech firms and regulators are creating new digital opportunities (Disrupt Africa, 2019). These two points suggest that there is opportunity for micro-enterprises to rapidly adjust to the demands of COVID-19 by capitalizing on these developments. Third, the country has a large number of micro-enterprises and a large informal sector, which represent about 88% of jobs (Ghana Statistical Service, 2014).

A unique aspect of our research is that it takes the stance that to fully understand how changes at the level of micro-enterprises occur, it is necessary to go beyond the actions of enterprises and consider the role of government and Fintech firms, technology firms, and multinational network operators in contributing to their digital transformation. In line with this, the research adopts a qualitative research design (Klein & Myers, 1999) which is well suited to *how* and *why* research questions to explore the complexities underlying a multifaceted and intrinsically complicated phenomenon. Our data relies on in-depth semi-structured interviews with several groups of actors in Ghana: micro-enterprises, government agencies, and technology firms that develop and offer services such as mobile money applications and infrastructure. The focus of these interviews was to delve deeper into how micro-enterprises used their services as well as the activities of those firms in digital transformation initiatives in Ghana.

2.3 Research objectives

This research sets out to provide evidence on the digital transformation of micro-enterprises and how they adapted during COVID-19 and addresses the following research objectives:

- How can micro-enterprises use digital technology such as Fintech and social media platforms to digitally transform their business?
- What unanticipated benefits are experienced by micro-enterprises that digitally transform?
- What support is needed from government and the Fintech sector to help micro-enterprises digitally transform?

By addressing these objectives our research provides evidence on how micro-enterprises were able to improvise forms of online commerce—by using Fintech (e.g., mobile payments) and social media platforms such as WhatsApp, Facebook, and Instagram along with motorbike delivery services—to maintain business operations and even thrive. We provide actionable recommendations on how micro-enterprises can adopt Fintech to be more resilient to the impact of COVID-19, or future contingencies, by changing how they traditionally work. The research also offers new insights on unanticipated benefits and the support required from government and the Fintech sector to help micro-enterprises digitally transform.

3 Literature review

To better understand micro-enterprises, digital transformation, and the impact of COVID-19 in Ghana, our review of the literature examines three key streams. We

examine the impact of COVID-19 on the business landscape overall in Ghana and the policy response. We also turn to literature on the micro-enterprise landscape in Ghana, and more broadly around the world, to better understand the key constraints they face and their level of digital technology use. Because of the difficulty in finding data on micro-enterprises specifically, we use data from the wider business landscape as the literature often blends data on micro, small and medium enterprises (MSMEs). Finally, we draw on and analyze statistical data from sources such as the World Bank's Findex survey (World Bank, 2017), World Economic Forum (WEF, 2016) Network Readiness Index (Dutta & Lanvin, 2021), the Ghana Statistical Service (GSS, 2020) and the Bank of Ghana (Bank of Ghana., 2020) to understand the technology trends in Ghana.

3.1 The impact of COVID-19 on business in Ghana

A business tracker survey by the Ghanaian Statistical Service (GSS, 2020) interviewed 4,311 firms and showed the extent of the impact of COVID-19 in 2020 on businesses. It showed:

Firm closings: 36% of firms had to close during lockdown, with 16% continuing to be closed in later months. Firms in the manufacturing sector were most impacted. This was followed by trade, and other services, and accommodation and food sectors. Of the firms that remained open, 88% of firms experienced reduction in sales (GSS, 2020).

Employment: 38% of firms reduced workers' wages (corresponding to 28% of employment in the private sector). 3.5% of firms laid off workers, corresponding to 2.3% of employment (GSS, 2020).

Going digital: Fewer than 10% of firms adopted digital solutions in doing business. Firms within the agriculture sector and other industries used relatively more digital solutions (56%). Firms in the accommodation and food sector being the least that adopted digital solutions (28%) (GSS, 2020). The low number of firms that adopted digital solutions is consistent with studies that showed that many SMEs in Ghana were not prepared to adapt (Naab & Bans-Akutey, 2021). This is not surprising given that past studies have shown as little as 25% of small firms have a website (ITC, 2016).

Mobile money: 37.5% used mobile money in business transactions (GSS, 2020).

As Ghana lifted some COVID-19 restrictions after lockdowns, businesses started to re-open with 74% of businesses fully open. However, of concern is the fact that the GSS reported that 16% of firms continued to be closed in 2020 (GSS, 2020). Even amongst the businesses that re-opened, they experienced supply issues and financial challenges (GSS, 2020). Of the firm categories (micro, small [6-30 employees], medium [31-100 employees], large [100+ employees]) micro-enterprises had the highest number of closures during lockdown (37%) and decrease in sales (92%) as well as relatively high reduced wages (46%) and reduced hours worked (34%) (GSS, 2020). Overall, the business survey suggests that to lessen the impacts of COVID-19 policies to support firms in the short and medium term are required. Along these lines, for micro firms, the UNDP Economic Advisor for Ghana and The Gambia suggested that:

“If businesses, especially SMEs are provided with the needed support to adopt best practices, particularly in the use of digital solutions, this could go a long way to increase their productivity and resilience to future challenges” (World Bank, 2020).

In other parts of the world governments responded by implementing transitioning programs to assist with the evolution of e-commerce (Dutta & Lanvin, 2021). In Ghana, a Business Continuity Planning (BCP) training programme by the International Labor Organization, has the goal of training trainers to support businesses with tools that complement their efforts to re-engineer their processes and procedures to build resilience (ILO, 2020). As an example of change, Farmerline in Ghana used to have field officers follow up with agri-dealers in its shops for loan repayments, but since COVID-19, Farmerline has transitioned to mobile money and made efforts to ensure farmers could transact with mobile money for purchases (Payne & Willis, 2021). An important factor that works in Ghana’s favor is that compared to other sub-Saharan African countries Ghana’s transport network is well-placed to accommodate these changes. For instance, it’s transportation network can link smallholder farmers to the wider national market as well as export markets (United Nations., 2021). Despite these optimistic initiatives the statistics clearly paint a picture of struggling businesses, which is likely to be even more difficult for micro-enterprises.

3.2 The micro-enterprise landscape in Ghana

In Ghana, the importance of the MSMEs sector is even more prominent than many other parts of the world. In Ghana, MSMEs are generally classified by the number of employees, with micro having less than 5 employees and less than USD\$25,000 in turnover and assets (MTI, 2019); small having between 5 and 29; and medium having 30 to 99 (Abor & Quartey, 2010). MSMEs constitute more than 85% of businesses (or as high as 92%), employ more than 80% of the workforce and generate 70% of the national output (Amankwah-Amoah et al., 2018; Owoseni et al., 2022). As in other sub-Saharan African countries, MSMEs create linkages to large and multi-national organizations by channeling goods and services from the latter to their local communities as well as the informal sector (Decker & Dankwah, 2022). In Ghana, they also dominate the industrial landscape of the country. As such, they are a key ingredient for accelerating economic development and poverty reduction. Fast-moving consumer goods, telecommunications retail services, small shops, tabletop shops and hawking, micro-finance and artisanal works are areas dominated by MSMEs. More broadly, they promote the development of the different structures of society through the generation of employment to vulnerable groups, including women, youth and low-skilled workers (MTI, 2019).

As of 2019, out of the estimated 2.1 million businesses in the Ghanaian MSME sector, about 1.7 million can be classified as micro-enterprises (MTI, 2019). These businesses employ roughly 2.5 million people (or 30% of all MSME employees), implying an average of 1-2 jobs created per micro-enterprise (MTI, 2019). In Ghana, while information technology (IT) usage amongst MSMEs is low (as also shown in the reports that captured IT use during COVID-19 (GSS, 2020)); where it is used, it is mostly based on handheld and mobile devices with mobile applications for social media, productive tools, payment systems and e-commerce services leading. Other general purpose digital technologies used include accounting systems, cloud storage, custom developed applications, content management systems and websites (Owoseni et al., 2022). The use of IT by MSMEs is also shaped by their level of formality. Generally, the informal MSMEs use mobile phones with basic features, while

the formal ones use the internet via desktop, mobile computers and smartphone (Asunka, 2016). Research also points to the trend of IT use as “before” and “during/after” COVID-19 (Arthur & Arthur, 2017; Owoseni et al., 2022; Yamoah, 2014). Before the pandemic, social media with WhatsApp were in dominant use. Following the pandemic, Fintech services such as mobile money and online banking gained more prominence while social media use continued to increase (Owoseni et al., 2022). Studies have shown that the use of IT by MSMEs leverages their capability for accessing new markets, increase firm profitability and improve employee performance. However, these benefits are constrained by high cost of internet access and IT devices; lack of government policies and IT skills; poor telecommunications infrastructure and services; and, resistance to change (Asunka, 2016). This is because micro-enterprises in Ghana share common challenges with their counterparts in other countries (Dolan, 2012; Hagin & Caesar, 2021), which includes limited access to credit or finance, limited access to equipment and technology, inadequate entrepreneurial and managerial skills, regulatory and legal constraints, and limited access to market intelligence (MTI, 2019). Other challenges include lack of capability and resources to keep adequate and proper records of their operations and transactions, poor managerial and governance structure to promote business growth and sustainability, and inability to develop business plans. In addition, high utility tariffs, intense competition, limited access to infrastructure and high taxes have been identified as constraints to MSMEs in Ghana (Ameyaw & Modzi, 2016; Oppong, 2014). The Ministry for Trade and Industry also outlines specific policy level challenges facing micro-enterprises, such as (MTI, 2019):

- The absence of a comprehensive policy framework on micro-enterprise development.
- The existence of too many agencies and institutions on micro-enterprise and SME development resulting in duplication of efforts and limited transparency to the target groups.
- The lack of comprehensive data and information on micro-enterprises.
- Greater external competition as a result of trade liberalization.
- Constrained market access due to inability to meet requirements of Standards and Technical Regulations.

In addition to recent reports and statistics on MSMEs and micro-enterprises in Ghana, the wider literature on micro-enterprises show unequivocally that they have difficulties in gaining access to appropriate technologies and relevant information. In most cases, they utilize foreign technology that usually acquire foreign licenses, because local patents are difficult to obtain. There is a link between technology adoption and micro-enterprise growth. Early adopters of modern technology could increase their annual revenue significantly faster than their competitors. However, the cost of the modern technology, including hardware, training and personnel, can be insurmountable for micro-enterprises with limited financial and technological resources.

At the same time the MTI (MTI, 2019) suggests technological innovation is unavoidable for firms which want to develop and maintain a competitive advantage and/or gain entry in to new markets. This is a tension: the literature paints a consistent picture of micro-enterprises struggling with digital technology and digital transformation across a range of sectors and countries (Barann et al., 2019; Fabian et al., 2021; Karanasios & Burgess, 2008; Li et al., 2018; Macredie & Mijinyawa, 2011; Rehm & Goel, 2017; Zhang et al., 2008). This means that micro-enterprises are in a

bind. On the one hand, digital technology can help them operate during COVID-19 as well as offer significant competitive advantages. On the other hand, micro-enterprises struggle financially, strategically and in terms of capacity with the adoption of new technology. For instance, during COVID-19 fewer than 10% of all firms adopted digital solutions in doing business (GSS, 2020). This is likely to be less amongst smaller firms. As another example, despite Ghana being globally ranked 9th in terms of hours spent on social media (MOC, 2019), it does not translate into business use. As of 2020, according to Statista (Sasu, 2021), 83.9% of Ghanaians use WhatsApp, 70.8% use Facebook, 69.7% use YouTube, 56.3% use Instagram, 47.6% use Facebook messenger, 40.8% use Telegram, 37.2% use Snapchat, 36.2% use Twitter, and 34% use TikTok. According to a Ghana Startup Ecosystem Ranking 2020 (the closest proxy to micro-enterprises available) that ranked measures, nature, and level of Ghana's Startup Ecosystem in 13 regions across Ghana, 52% percent of start-ups have a social media presence (Ecosystem Hub, 2020). However, this was as low as 5% or as high as 75% for some sectors and regions (Ecosystem Hub, 2020). For areas where there was low uptake, the report found that "*It was rather interesting that social media is well known but was not explored in the aspect of consumer awareness on products and services*" (Ecosystem Hub, 2020, p. 85). The report also suggested that "going digital" involves having a social media presence, websites, e-mails, mobile applications and other mundane IT (Ecosystem Hub, 2020).

These figures suggest there is lost opportunity for micro-enterprises. With greater accessibility of digital technology such as mobile phones that act as a vehicle to financial services such as mobile payments and loans, the cloud, platforms to sell on and social media networks, there is opportunity for a digital transformation of micro-enterprises. Such technologies have several taken-for-granted advantages for micro-enterprises. They are easier to handle, and take up less physical space (e.g., files or images stored in 'the cloud'), are low cost or free (e.g., social media) and tie into societal behavioral shifts such as a move from cash to mobile payments and sharing information and connecting via social media. In this way, unlike the bottom of the pyramid model (Hart, 2005; Prahalad, 2005), which seeks to marry a corporate logic of profit maximization with development aspirations for poverty reduction and well-being by serving 'poor' consumers with much-needed products and services (which are low price, low margin, high volume) and by opening-up employment opportunities for micro-enterprises (Dolan, 2012; Kuriyan et al., 2008), digital transformation can be an organic form of bottom up development driven by agency and entrepreneurial activity.

3.3 Ghana's digital infrastructure

In terms of digital infrastructure, over the last ten years Ghana has ranked in the bottom third of countries. In 2016, it was ranked 103rd out of 139 countries in the Global Information Technology Report (WEF, 2016) and in 2020 it was ranked 96th out of 130 countries in the Network Readiness Index (Dutta & Lanvin, 2021). However, while these rankings show that Ghana's physical infrastructure may be underdeveloped, it tends to rank higher in terms of individual and business usage of ICT (WEF, 2016). While this does not reflect the conditions amongst micro-enterprises it suggests there is supportive ICT infrastructure for large businesses. This is shown in Table 1 which shows a further breakdown for different areas measured by the Network Readiness Index and its global ranking. Like many other African countries, there is a large emphasis on mobile technology rather than computers (ITU, 2022a, 2022b). It is also

worth noting that COVID-19 accelerated adoption of and use of ICT around the world (ITU, 2021a, 2021b)

Table 1: Ranking Ghana’s digital technology readiness

Technology	People	Governance	Impact
103 / 130	98 / 130	74 / 127	102 / 123
Includes access, content, future technologies	Includes people, business, governments	Includes trust, regulation, inclusion	Includes economy, quality of life, SDG contribution

Source: Dutta and Lanvin (2021)

These reports also show that the time taken to start a business in Ghana is roughly the same as in countries such as Finland, Spain and Greece; there are less procedures than many countries like Germany, Japan and Qatar (WEF, 2016). This reflects the large significance of micro and informal businesses in the economy, the economic conditions which may demand alternative employment such as micro enterprises and an entrepreneurial spirit. While Ghana’s business registration processes have significantly improved in recent years, many micro-enterprises do not register their businesses because of the fear of taxation. Hence, there is a dominance of informal businesses in Ghana.

3.4 Ghana Fintech policy response and Fintech trends

To respond to COVID-19, Ghana and the Bank of Ghana actively promoted the use of digital payments to facilitate a cash-lite society to mitigate the spread of the disease through the handling of cash (Bank of Ghana., 2020). This echoes the push in other countries such as South Africa and India for mass rollout of contactless cards (Bank of Ghana., 2020).

Building on the last five years of collaboration (Senyo et al., 2022), the formal banking sector continues to partner with mobile money operators and Fintech firms in the delivery of innovative financial services. Specifically, relevant for micro-enterprises as part of measures to promote broad-based acceptance of digital payments, changes were made to the Know Your Customer (KYC) policy on merchant accounts. Specifically, changes ensured that MSMEs can access digital merchant accounts that are appropriate to their needs (Bank of Ghana., 2020). While not specifically aimed at micro-enterprises, the Bank of Ghana in collaboration with mobile money firms also reduced mobile money charges, waived transaction fees on transactions of less than GHS100 and increased wallet limits to promote the use of mobile money during the pandemic (Bank of Ghana., 2020). In addition, daily and monthly transaction limits were increased as were maximum account balance limits (Bank of Ghana., 2020). These act in favor of micro-enterprises because there are no charges for small transactions which dominate their activities.

These measures also fit with the Bank of Ghana’s strategy of financial inclusion. For instance, the Bank of Ghana implemented a moratorium on payment of interest on digital credit, three months’ moratoria for bank credit borrowers and introduced a universal QR code payment solution to promote the use of contactless payments (Bank of Ghana., 2020). Showing commitment to Fintech as an enabler of innovation, the Bank of Ghana also established a dedicated Fintech and Innovation Office to

manage all Fintech related activities and to test new and emerging payment technologies which required regulation.

Digital technology was also leveraged by banks to find new ways of interacting with customers. For instance, banks began using WhatsApp and Chat banking as a way of providing financial services to customers remotely. By shifting to these technologies, banks enabled customers to make enquiries and continue to perform basic financial services (Bank of Ghana., 2020). At the same time, banks partnered with other financial technology firms to provide mobile credit products and savings to individuals through the use of Unstructured Supplementary Service Data (USSD) short codes (Bank of Ghana., 2020).

Demonstrating innovation in this space, in 2020, 32 products/services were approved for banks and specialized deposit taking institutions compared to 37 in 2019. This shows that despite the disruption, there was impetus to create the conditions for innovation. As shown in the list below (Table 2), the bulk of these services were remittance and mobile banking related.

Table 2: Products/services approved in 2020

Products/services	%	Products/services	%
Remittance services	38%	Chat banking	6%
Mobile banking	22%	WhatsApp banking	3%
Card issuance	10%	Virtual card	3%
Agency banking*	6%	QR code	3%
Digital micro credit	6%	Remote account opening	3%

Source: Bank of Ghana. (2020)

*Allows banks to contract third-party retail networks

Combined, such measures allowed businesses to continue operating and create new opportunities for micro-enterprises to pursue a digital transformation as a means to continue operating during COVID-19.

The table below (Table 3) offers insights into the financial and Fintech landscape in Ghana, based on data from the World Bank Findex Database (World Bank., 2017), the Ghana Payment Systems Report (Bank of Ghana., 2020). As can be seen, in 2020 there was a significant increase in active mobile money agents (45% higher than in 2019), mobile money accounts (18%), volume of transactions (42%) and value of transactions (82%). The table only shows digital related trends. It merits mentioning that debit cards, credit cards and prepaid cards also increased in the number of cards used, and volume and value of transactions. However, overall these trends point to a significant step away from cash based transactions, which have been historically and culturally instrumental to micro and informal enterprises (Slavova & Karanasios, 2018).

Table 3: Fintech trends in Ghana

	Indicators	2017	2018	2019	2020	Annual Change 2020 (%)
Overview	Population	28 million	29 million	30 million	31 million	2.88
	Nominal GDP GHS million	256,671	300,596	349,480	288,155	15.55
Institutions offering payment services	Licensed banks	34	23	23	23	-
	Bank Branches	1,491	1,557	1,179	1,177	0.17
	Rural and community banks	141	144	144	145	0.69
	NBFI/SDIs	71	67	42	42	-
	Micro finance institution	566	566	180	180	-
	Mobile money operators	3	3	3	3	-
	Active mobile money agents*	151,745	180,664	226,298	328,329	45.09
Mobile money	Total number of mobile voice subscription (cumulative)	37,445,048	40,934,875	40,173,115	40,173,115	-
	Regular mobile money accounts (cumulative)	23,947,437	32,554,346	32,470,793	38,473,734	18.49
	Active mobile money accounts	11,119,376	13,056,978	14,459,352	17,142,677	18.56
	Regular agents (cumulative)	194,688	396,599	306,346	423,892	38.37
	Total vol of mobile money transactions	981,564,563	1,454,470,801	2,009,989,300	2,859,624,191	42.27
	Total value of mobile money transactions (GHS' Million)	155,844.84	223,207.23	309,352.25	564,155.90	82.37
	Balance on float (GHS Million)**	2,321.07	2,633.93	3,633.83	6,980.03	92.08
	Average volume of transactions per day	2,689,217	3,984,851	5,506,820	7,834,586	42.27
	Point of Sales terminals	Number of terminals (cumulative)	7,356	8,253	8,802	10,489
Volume of transactions		7,198,029	10,218,088	14,251,259	15,159,237	6.37
Value of transactions (GHS)		4,158,052,064	8,261,737,489	8,104,491,560	11,271,897,541	39.08
Internet banking	Number of regular customers	936,965	815,904	1,106,270	1,019,073	-7.88%
	Volume of transactions	2,437,785	3,205,878	4,651,290	7,055,793	51.70
	Value of transactions (GHS)	9,739,336,941	6,267,223,830	12,014,728,578	24,208,653,517	101.5
Mobile banking	Number of regular customers	2,110,984	3,891,269	4,245,479	4,767,719	12.30
	Volume of transactions	7,036,285	14,805,878	18,770,721	34,842,318	85.62
	Value of transactions (GHS)	1,501,372,536	5,658,399,344	6,687,332,884	12,940,760,028	93.51

Source: Bank of Ghana. (2020)

* The number of agents who transacted at least once in the 30 days prior to reporting

** The float is money within the banking system that is briefly counted twice due to time gaps in registering a deposit or withdrawal

Table 3 paints a picture of growth in the wake of COVID-19. For instance, mobile money accounts experienced 18% growth. Approximately 73% of all transactions nationwide are now conducted using mobile money. This includes making payments at various physical and online retail stores, to buying phone credit and goods and services (Huawei, 2020). What these changes mean for micro-enterprises are yet to be studied. Despite these growth statistics, there are some challenges that may impact on the successful uptake of mobile money financial services amongst micro-enterprise. Mainly, that there is a consistent significant difference in the use of digital payments by the richest and poorest segments of Ghanaian society. For instance, the G20 financial inclusion data shows that the richest 60% of the population (age 15+) make and receive more digital payments as compared to the rest of the population (55% vs 41%) (GPFI, 2022). They, as compared to the rest, also make more payments via mobile/internet banking (47% vs 36%) (GPFI, 2022). Similarly, data from the World Bank Findex shows that the richest 60% of the population (age 15+) make and receive more digital payments as compared to the rest of the population (39% vs 30%) (World Bank., 2017).

4 Methodology

4.1 Sample and data description

This study adopts a qualitative research design (Klein & Myers, 1999). This approach is well suited to *how* and *why* research questions to explore the complexities underlying a multifaceted and intrinsically complicated phenomenon. Important for our research was to go beyond research that focuses on micro-enterprises, or Fintechs, or technology firms, or government, and consider the multiple levels of actors that influence digitalization of micro-enterprises. Thus, our study required an approach to enable us to obtain a richer understanding of multiple stakeholders' practices. Our qualitative approach allows us to understand the shared perspectives of all these actors. Importantly, our data collection was informed by our in-depth analysis of the literature and secondary data presented in the literature review section (Section 3). That is, the existing knowledge and data informed data collection.

We conducted in-depth semi-structured interviews with several groups of actors in Ghana: micro-enterprises, government agencies, and technology firms that develop and offer services such as mobile money applications and infrastructure. All interviews were semi-structured, tailored to each participant, and conducted in English. Interviews were conducted face-to-face during the fieldwork phases (some were by virtual means due to COVID-19 requirements).

Table 4 summarizes the total number of participant organizations and interviews conducted. It also shows a breakdown of the three types of technology firms—mobile network operators, technology infrastructure providers, and Fintech firms that provide financial technology services and applications. The focus of these interviews was to delve deeper into how micro-enterprises used their services as well as the activities of

those firms in digital transformation initiatives in Ghana. In the subsequent sections, we explain each of the data collection sources in turn.

Table 4: Summary of data collection

Organization type	No. of organizations	No. of interviews
Micro-enterprises	25	25
Government	1	5
Mobile network operators	1	4
Technology firms	1	5
Fintech firms	6	8
	34	47

Source: the authors

4.2 Micro-enterprise data collection

Our main goal was to understand how micro-enterprises used digital technology during COVID-19 and as such our study necessitated getting close to micro-enterprises. In total, we interviewed 25 micro-enterprise owners. Because of the context and the need to get to informally know micro-enterprises, our sampling also necessitated snowballing (Baker & Nelson, 2005). The interviews specifically zoomed in on the practices of micro-enterprises and their responses to COVID-19 and how they were able to leverage and render their stock of digital resources at hand during COVID-19. A copy of the interview questions is presented in Appendix I.

All interviews were semi-structured, tailored to each participant, and conducted in English. Interviews were conducted face-to-face during the fieldwork phases in Accra, Ghana, or by virtual means due to COVID-19 requirements (the same approach was followed for interviews with government and technology firms). Interviews lasted on average between 30 to 45 minutes and were recorded. A table of micro-enterprises and details of their size and products/services offered is presented in Table 5.

As Table 5 shows, the micro-enterprises spanned a number of different sectors and offered a range of services and products. Almost all could be classified as sole proprietorships, roughly 15 were formally registered. As noted in the “Bricks and/or clicks” column, several businesses offer services online and via shopfronts. Some micro-enterprises only made the transition to online during COVID-19. While some interviewees referred to themselves as owners, managers or CEOs, they all effectively were in charge of the management and day-to-day operation of the business.

Table 5: Micro-enterprise details

	Products/service offered	Years in operation	Role	Bricks and/or clicks
1	Herb product	3	Owner/manager	Both
2	Footwear	4	Owner/manager	Clicks
3	IT services	9	CEO	Both
4	Cosmetics	3	Owner/manager	Clicks
5	Footwear, apparel	3.5	Owner/manager	Clicks
6	Apparel	5	Owner/manager	Both
7	Electronic appliances	4	CEO	Both
8	Jewelry, home decorating	4	Owner/manager	Clicks
9	Fabric	4	Owner/manager	Clicks
10	Baby products	3	Owner/manager	Both
11	Apparel	4	Co-founder/partner	Both
12	Books	1	Owner/manager	Clicks
13	Bedding	2	Owner	Clicks
14	Apparel	5	Owner/manager	Both
15	Event equipment	3	CEO	Both
16	Food (catering)	8	Owner/manager	Both
17	Food (catering)	4	Owner/manager	Clicks
18	Makeup artist	3	Owner/manager	Both
19	Food distributor	2	Owner/manager	Both
20	Apparel	<1	Owner/manager	Clicks
21	Tailor	5	Owner/manager	Clicks
22	IT services	3	Owner/manager	Both
23	IT services	5	Owner/manager	Clicks
24	Lending	10	Owner/manager	Clicks

25	IT services and recruitment	3	CEO	Clicks
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Source: the authors

4.3 Government

As noted, we also included stakeholder organizations that play important roles in the digital business ecosystem (Senyo et al., 2022; Senyo & Karanasios, 2020). This is important because while in the study of larger firms it is possible to pose similar questions to various respondents from the same firm, it is not the case in micro-enterprises. Thus, data collection from government and technology firms offers triangulation as well as helps to shed light on matters around government and technology activities that impact micro-enterprises. The government agency that contributed to the study was GhIPSS, a wholly owned subsidiary of the Central Bank of Ghana. GhiPSS as the central organization responsible for cross-payment settlement between Banks, Fintech firms and Telecommunications operators (Telcos) is a critical actor in the Ghanaian FinTech ecosystem.

4.4 Technology firms

Technology firms within our dataset comprise FinTech firms, mobile money providers (i.e., Telcos), and technology infrastructure providers (as per Table 4). We focused on these technology firms because they provide the technical infrastructure and mobile money services (Senyo & Karanasios, 2020) used by customers and merchants, including micro-enterprises. As the main focus of this project is micro-enterprises and how they digitally transformed during the pandemic, there was a need to understand from the perspective of infrastructure and mobile money providers how they support these groups of merchants. Appendix 1 provides details of questions asked during the data collection with technology firms.

4.5 Data analysis technique

To ensure rigor in our analysis, we followed established guidelines for qualitative research. As qualitative researchers, we followed the established process of discovering new knowledge by thematically analyzing the data. Like the data collection, the data was analyzed by two Ghanaian academic researchers and one international researcher. Our coding and analysis therefore adopted an insider/outsider approach to help reduce bias and ensure rigor. We began the analysis by reviewing interview transcripts and developing common themes. For the micro-enterprises, this meant recording the different experiences and responses to COVID-19 as well as understanding their digital practices. Where relevant, we drew on evidence from at least two sources, such as either interview data from two different participants (e.g., government or technology firm) or secondary data sources. We used NVIVO 12 software as the main repository for data as well as Excel for analysis.

During this process, we met frequently to discuss the main themes, codes, and questions and developed each other's ideas and underlying assumptions. In our analysis, we cross-checked and looked for contradictions rather than only seeking conformity and coherent interpretation (Sandberg, 2005). Through this analysis, we were able to identify different practices at each level of organization interviewed. For instance, amongst the micro-enterprises we found the emergence of what we refer to

as “digital bricolage” (defined as constructing a digital business from a diverse range of available technology) as well as the different strategies adopted by government and technology organizations.

5 Results

5.1 Micro-enterprise perspective

5.1.1 The impact of COVID-19

In our analysis of micro-enterprise data, we focused on the interplay between the digitalization of enterprises along with the impact of COVID-19. In Table 6, we show the impact of COVID-19 lockdowns along with the broader impact of COVID-19 on the enterprises. As shown in the first row, 52% of firms experienced a high negative impact from lockdowns, with 26% having little or no impact and 13% having high positive impact for their business from the lockdowns. However, a different picture is painted regarding the broader/longer-term impacts of COVID-19, with 60% of enterprises experiencing moderate or high positive impact.

Table 6: Impact of COVID-19 on micro-enterprises

	High negative impact	Moderate negative impact	Low/no impact	Moderate positive impact	High positive impact
Impact of COVID-19 lockdowns	12 (52%)	1 (4.3%)	6 (26%)	1 (4%)	3 (13%)
Broader impact of COVID-19	0 (0%)	1 (4%)	8 (35%)	12 (52%)	2 (8%)

Source: the authors

Note: Two of the 25 enterprises started after COVID-19 lockdowns

The impact on enterprises from the lockdowns and the wider pandemic spanned all areas of business, especially for enterprises that interacted with customers on a regular basis. Below are extracts from the micro-enterprise data that emphasize the early difficulty they faced. They demonstrate that for many micro-enterprises, COVID-19 meant that the business had to enter a period of hibernation or face disruption. For others, the breakdown in supply chains meant that the costs of their products and supplies increased. It merits mentioning that no micro-enterprise referenced received any government support during any period of COVID-19. While some were aware of support schemes, they had not received any benefit from it:

“No, I didn’t, but I learnt the government brought something, like government brought something that we should go online then fill some application, but we did, but we never hear anything from them.” (ME3)

“During COVID-19 my business didn’t receive any support from the government. But there were, they, they made announcement that you can get support from the government. But I applied and then I didn’t get any.” (ME6)

“I even filled a form online. I submitted my application, but I didn’t hear anything from them.” (ME15)

The Box below provides evidence of quotes from the micro-enterprises on the negative impacts they experienced.

Examples of the (negative) impact of COVID-19:

It really had a very great effect on my business. You see, the things that we sell here are not produced in Ghana. Some are imported and others are also produced here, but huge, or majority of them are imported. So, the closure of the borders, you know, really affected the going and the coming of the goods. So, that is one aspect of it. The school during the COVID-19 closed-down and my target market is the students, so when they went home, we closed the shop. We didn't operate during the COVID-19 era. (ME2)

Because of the virus system and stuff, people were not having events and the government shut down the events, so we were not operating. (ME3)

My business virtually came to a halt as at that time. So, it was really a year and a half of disruption. (ME5)

We experienced lockdown. So, we had to close down our shops and still be able to stay safe. So business wasn't running as it used to be. It impacted so much on the business. Since we couldn't meet our customers face-to-face for them to purchase from us. It took a very big blow on our sales. During COVID-19, since we had to stay home and stay safe we had to go online so that the people can purchase their clothes and other stuff, online. And then it would be delivered to them under comfort of their homes. So, we had to go online as well. (ME6)

People were not buying because they didn't know what was going to be the outcome of the pandemic. Items were not coming in anymore. Prices of imports went high. The cost of items, the ones already in the system were getting expensive as well. (ME23)

However, the data also points to some adjustments and forced digitalization as some enterprises moved from physical-traditional modes of business to digital business, with significant benefits. This points to a flip side of the pandemic where some enterprises were able to leverage their digital readiness to meet customer demands and reach new markets. The chart below (Figure 1) emphasizes the polar impacts of the COVID-19 lockdowns versus the wider impacts of COVID-19 (longer term impacts beyond the early imposed lockdowns), as it shows that the pandemic in general was seen as a spur for business whilst the lockdowns were seen as a negative force.

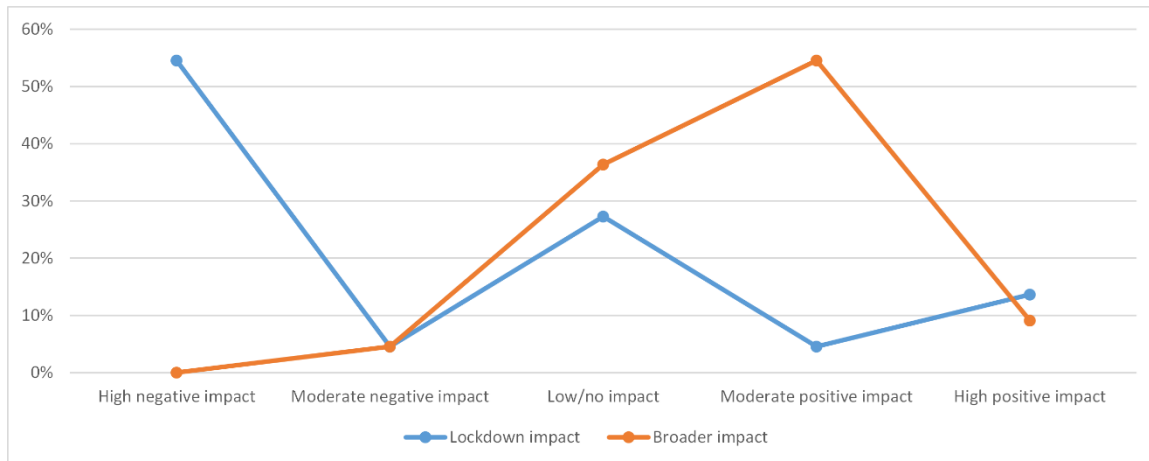


Figure 1: Impacts of lockdowns and broader pandemic impacts

Source: the authors

Note: two of the 25 enterprises started after COVID-19 lockdowns

The Box below shows examples of positive impacts for business. It also shows that micro-enterprises were able to boost profits, advance their business, seek new customers, and importantly, change the way they worked.

Examples of the (positive) impact of COVID-19:

The first few months was really difficult because there were so many things that I didn't know how to go about because we are at home. So later on, then, I was introduced to this online business. It (the business) changed, the COVID changed the way I was doing things, because it was during the COVID that I was also able to know that if I do the online business, it's the same thing, it will help me to let the organisation to grow. Because during that time, instead of me going around from house to house, now I was using my WhatsApp. Reduced the number of staff and my hours of operations. (ME1)

COVID-19 nudged the business to adopt online sales and use of mobile money (ME4)

I don't think COVID impacted me...If anything, COVID did well for me. Then it became easier. The online stuff became much better, so people saw the need to order online, so COVID actually helped in that regard. Apart from the rates being high during the COVID and then ordering for goods and those things, I don't think we experienced a direct impact in terms of sales. For the first few weeks where there was lockdown, of course, we were not selling, so we had to take a step back to reanalyse the business and see how we're going to go about it. Except for the rates and ordering became difficult, I don't think we had a direct impact when it comes to sales. (ME 11)

COVID didn't affect my business so much that I lost profits. It rather boosted my business. Because people in SMEs started having challenges operating their business due to the lockdowns, so they tend to come to me for loans. Because the demand for the loan is very high, it made me have the advantage to increase

my interest. I was even helping others to grow their business online. I want their business to grow so that they'll be able to pay the loan when they request. Because the demand for the loan was very high. I saw that people will also pay, because if I give them the loan and they succeed in their business, they will turn to ask for more, and with that I increased my interest rate. (ME24)

5.1.2 Using digital technology to manage COVID-19 disruption

The enterprises ranged in their level of digitalization. Table 7 summarizes the totals for each of the common digital tools used by the enterprises. All the businesses were run on smartphones, whilst just under half used a laptop/computer also. In fact, smartphones were the dominant means for conducting business operations. This is evident in the applications used by the enterprises (noted below). Clearly, the nature of their business model meant that functioning on a mobile device aligned well with their business activity. As noted by ME25: *"I can just sit here and take my phone and connect to a client and then work with them"* (ME25).

A range of different software and applications were used, such as MS Office, Google Docs as well as a range of different specialized software. Email was only used by less than half of the enterprises (as there was a heavy preference for social media platforms for communication) whilst only one had a business website. The lack of use of email and websites suggests a shift away from these traditional tools as well as the prohibitive costs involved with setting up websites. Cloud storage such as DropBox and Google Drive were used by seven of the enterprises. While some cloud storage solutions are free, they only offer limited storage which may not be conducive to business operations.

Social media was at the core of the micro-enterprise business model. Facebook, Instagram, and to a lesser extent, platforms such as TikTok were used for advertising and reaching out to customers. Instagram was the most prominent for advertising goods and services. In the context of COVID-19, these platforms became the business shopfront. Likewise, WhatsApp, and to a lesser extent, Telegram and Messenger, were the modes of conducting business and were used by all the enterprises. The Box below shows quotes that emphasized the importance of social media.

Examples how social media acts as the enterprise platform:

So, it (social media) gives you the advertising exposure. It also gives you how you relate with your customers. You know where your customers are now coming from and how to target your customers and what you want. (ME17)

Well, I started using these platforms before this business commenced. So, I was already into WhatsApping and Facebooking. And I saw many of my colleagues or many people advertising their products on WhatsApp and Facebook. So, that's mainly the reason why I started this business, because I didn't have a shop, and I saw some people advertising their products on Facebook and WhatsApp. (ME2)

I use all of them. I use WhatsApp. I use Facebook. I use Instagram. But I focus more on Instagram because Instagram, if I should call, the layout. The layout

makes it easier for people to see an item, and then click on it, and then buy. (ME10)

I don't think the business would be where it is now without social media, and how much the business blew up was from Instagram. And then basically, it's about taking live pictures and the kind of models we have on the page and being consistent. When we first started, in our first year, we were not wearing the products. We just put it on a dummy and then we take a picture and then people like it and then they'll go through the process of ordering. And then we got a model. You know how people are every interested in curvy people? And to be fair, those people are attractive and all that. So, we decided to use someone who was attractive and curvy, and that was, I think, the breakthrough. And then the more models we brought, the more different figures... We're trying to do a body inclusivity something where we're not just trying to look a particular size. Just look on our page. We have all sizes on our page. We have from 16 models on the page, so you see whoever you seem to close-up to in size. Then you can relate to that person. Then if you see a size 6 or a size 8 wearing it, and she looks good, then you're like, I'm an 8 too. I'm going to look good in this, so that's how we use social media, and it blew up. We built the shop completely from online sales, and even now, what we sell online is 70% of our walk-ins. We are mainly an online shop. In fact, we're an online shop. The walk-ins are a few though because somebody is around the package route or some people say they don't trust you yet, so they'd rather come. Others will say, I want to try on clothes. You want to try on and see what you are getting or something. Now we have 530,000 followers. (ME11)

Mobile money was also used by all the enterprises to make and receive payments. Mobile money loans were used to a lesser extent and mainly in the start-up phases of business. As noted by ME23, mobile money is the most efficient means of business transactions, especially during COVID-19:

"I wouldn't say it's 100% secure. I'll say nothing is 100% secure. It's for the best. It makes it easier, but there are more secure platforms, like the bank transactions." (ME23)

Despite the popularity of platforms like Jumia and Tonaton, they were not used by many of the enterprises. In fact, several enterprises reported that the cost of using these were very high. Again, none of the micro-enterprises in the study used the GhQR (Ghana's universal quick response code) payment platform because it was more suitable for businesses that have physical locations. Moreover, since customers of micro-enterprises are used to making payment to them via their personal mobile money accounts, it was difficult for the micro-enterprises to introduce GhQR.

Table 7: Digital profile of the micro-enterprises

Category	Technology	No.
Device	Smartphone	25
	Laptop/computer	10
Business software	MS Office	5
	Google Docs, OZE, Invoice Bee, Canva, TeamViewer, QuickBooks, HardTel, Any Desk	11

	Email	12
	Business website	1
Social media	WhatsApp, Messenger, Telegram etc	25
	Facebook, Instagram, TikTok, etc	24
Mobile money	Mobile money payments	25
	Mobile money loans	3
Platform	Online selling platforms (e.g., Jumia, Tonaton, etc.)	2
Cloud	Online or cloud-based: Dropbox, Google Drive, One Drive, AWS	7

Source: the authors

The above findings point to a digitalization of micro-enterprises in Ghana in the context of COVID-19. It merits mentioning that despite the steps forward in digitalization, many of the enterprises were reluctant to change, but still recognized the need to change, whilst others considered themselves as innovators. This is evident in the comments below from the enterprises:

“For now, I can't say I'm a digital innovator because I am now learning and I'm not perfect.” (ME21)

“Yes, I do see myself as a digital innovator. I think I am 40% there already, and 40%, that's including my blogging, the website, and the YouTube. If I should add the business, as well, I think I would be 60% there.” (ME20)

“It has changed into 100%. It's digitalisation every day, in and out, the technology is fast, forward-moving and changing a lot of lives. And, yes, we are in a digital world, so, yes, you have to learn it and improve.” (ME17)

The digitalization of firms also has led to unintended consequences. For instance, the reliance on mobile money has created a reliance on fast, cheap and easy means to move money. However, as noted, recent change to the e-levy has meant that this will have some impact on enterprises who will struggle to take on the extra burden:

“What I'm afraid is the e-levy, because with the mobile money transactions, it is going to affect my business, because of the high interest they're tending to put on the charges. I'll be visiting the bank to make transactions or to send money to people through their bank account or using their bank account.” (ME24)

5.1.3 Micro-enterprises as digital resource bricoleurs

Based on analysis of the digital profile of enterprises and the impact of COVID-19, our findings suggest that the enterprises were engaged in what we refer to as “digital bricolage”. We observe three distinct yet interdependent ways in which this occurred: (1) resource mobilization through the constitution of digital resources over time, (2) resource combination through digital / non-digital configurations, and (3) resource deployment through a specific way of using these resources. While these may be interpreted as sequential, our preliminary analysis shows that they sometimes occur concurrently rather than linearly. We discuss each of these in the following subsections.

5.1.3.1 *Resource Mobilization (the Constitution of Digital Resources Over Time)*

The micro-enterprises faced resource constraints, and for them, the first step in their adjusting to COVID-19 involved resource mobilization. By resource mobilization, we mean the process by which micro-enterprises actively pursue and obtain resources critical for digital business operations. We observed that digital resources such as digital payment and social media platforms, which were initially used for personal transactions were mobilized for business activities. We noted two forms of resource mobilization, namely repurposing and improvisation/appropriation (summarized in Table 8). Under repurposing, micro-enterprises typically use resources meant for personal use for business. For instance, to make do with available resources, micro-enterprises tend to repurpose personal resources such as mobile money, WhatsApp, and Facebook accounts for business. These resources come from internal sources since they are owned by the bricoleurs and initially meant for personal use. A micro-enterprise owner summarized:

“For advertisement, receiving payment and for customer engagement, I use my personal mobile phone so that I don’t have to buy another phone for the business.” (ME20)

We also noted another form of mobilization—improvisation/appropriation, which we define as using a resource differently from its originally intended purpose. A case in point is borrowing micro-loan meant for individual use as a source of startup capital. Since these resources are primarily not owned by the micro-enterprise, we designate this as an externally sourced resource. This form of resource mobilization is summarized by a micro-enterprise owner as:

“... so, I borrowed from MTN [mobile money] and they started giving me small, small, small. And that small, small I was taking it [microloan] consistently so I will be able to grow...So, it was personal money they were giving to me. Of course, they wouldn’t know it’s for business.” (ME5)

Table 8: Resource mobilization

Resource mobilization	Definition	Sources of resource	Examples
Repurposing	Using an object differently than its originally intended	Internal	Using a personal mobile money account for business
Improvisation/ Appropriating	Using a tool (e.g., micro loan) for a different purpose	External	Borrowing startup capital through mobile money designed for individuals

Source: the authors

5.1.3.2 Resource Combination (Digital / Nondigital Configurations)

Resource combination concerns how the micro-enterprises put together digital and nondigital resources. As most of the micro-enterprises are primarily involved with buying/selling, they tend to favor the combination of complementary resources that align with the trading business model.

From our findings, we find two main instances of resource combination during the adjustment: (1) digital-digital, and (2) digital-nondigital combinations (summarized in Table 9). The digital-digital combination is where two or more digital resources are leveraged to support the transformation process. For instance, we observed that micro-enterprises tended to combine two or more social platforms as their mode of advertisement since they wanted to make do with whatever resources available at their disposal to enhance their businesses. A micro-enterprise owner noted:

“I already had a Facebook account there, so I started using it, and then I was using my WhatsApp account too, in addition. So that was what I started before I started going to Instagram and others ...you'll be there and they [customers] call you [on the phone]’or you'll be there on WhatsApp, and then even through Facebook or DM you.” (ME4)

We also noticed a combination of digital and non-digital resources as part of this process. For instance, despite running a purely digital business, micro-enterprises were still open to using electronic and cash payment channels. While cash transactions could have been completely discarded, some micro-enterprises chose to combine the use of both digital and non-digital payment channels since this will ensure their business did not completely neglect customers who might prefer the physical payment option.

A micro-enterprise owner explains why they combined digital and non-digital payment options:

“So, I use my personal number for MoMo (Mobile Money) Pay [digital payment]. But many customers request to pay cash. Sometimes, people are skeptical about online shopping so people would like to see their item and then pay. In situations like that, we insist that the delivery guy takes the money [cash payment].” (ME10)

Table 9. Resource combination

Resource Combination	Definition	Examples
Digital-Digital	Levering two or more digital resources	Combining two or more social media platforms (e.g., using both WhatsApp and Instagram for advertisement)
Digital and Non-digital	Amalgamating digital and nondigital resources	Using two or more physical and digital payment channels (e.g., cash and digital payment)

Source: the authors

5.1.3.3 *Resource Deployment (a Way of Using these Resources)*

At this stage, micro-enterprises deploy the mobilized and combined resources for business purposes. We defined resource deployment as the utilization of bricolage resources for business operations in a digitalized business environment. Building on the resources mobilized, we observed that micro-enterprises tended to adopt a combination of three resource deployment approaches, namely (1) multi-channel, (2) lean and (3) alliance (summarized in Table 10). While these approaches may appear exclusive, we witnessed that micro-enterprises adopted a combination of these based on their business model, offerings, and digital savviness of owners. The multi-channel deployment focused on using resources to deliver business operations by using more than one online/offline medium. The multichannel resource deployment is analogous to the “brick and mortar” business model where resources are deployed to support the operation of a physical shop in addition to an online presence. The owner of a micro-business explained the rationale for this approach:

“Some people say they don’t trust you yet, so they’d rather come. Others will say, I want to try on clothes. You want to try on and see what you are getting or something.” (ME11)

The lean approach focuses on using resources sparingly for efficient business operations. Under this approach, micro-enterprises operated a purely virtual business that does not hold stock. Rather, they focused resources heavily on advertising through social media so that whenever there are orders, they then place the orders with the supplier, who delivers directly to the customers. A micro-business owner explains the lean approach as follows:

“Thanks to social media, you don’t actually have to keep stock, especially if you are young [business], if you’re a small business...You don’t need to keep stock. You can just go and take the pictures in another [suppliers’] shop and post. Somebody will order it then you can go and buy.” (ME5)

On the other hand, the alliance approach focuses on deploying resources to develop strategic relationships with auxiliary services such as motorbike delivery services, Fintech firms, etc. With these alliances, micro-enterprises are able to rely on their partners to perform critical business functions on their behalf while they focus on other core operations. For instance, by developing alliances with motorbike delivery companies that provide efficient logistics services at a commission. Thus, instead of always spending critical resources to deliver orders to customers, there is a guarantee that the motorbike delivery partners will do so efficiently. This is similar for technology solution providers who handle the digital operations of micro-enterprises whose owners are not highly digitally savvy. A micro-enterprise and a Fintech owner explain:

“The business let me say it doesn’t have a delivery service. So, what we do is we outsource to an agency. Normally it does the delivery at a cost. The customer actually pays for the service, for the delivery service.” (ME12)

“Yes, we rely on the drivers, we, we rely also on the riders. I have, ah, two riders that I use. Those are the people that when they, I get an order, then they just go and then they deliver as well.” (ME1)

Table 10. Resource deployment

Resource Deployment	Definition	Examples
Multi-channel	Deploying digital resources across multiple channels to support business operations	Using digital resources to operate a physical shop to complement the digital business
Lean	Deploying digital resources sparingly to support business operations	Using digital resources to operate a purely digital business which doesn't hold stock or direct employees
Alliance	Deploying digital resources to form strategic relationships to support business operations	Using digital resources to form key relationships with partners (e.g., motorbike riders, Fintech firms, social commerce platforms)

Source: the authors

5.1.3.4 Outcomes of Digital Bricolage

Through digital bricolage, micro-enterprises were able to achieve outcomes such as increased customer base and sales, improved operational efficiency, flexible working arrangements and reduced overheads. For instance, the micro-enterprises did not need to pay rent for a physical shop, thereby reducing their overhead. Similarly, the micro-enterprises could reach more customers and increase their sales. The micro-enterprise owners linked their digital transformation to business outcomes that otherwise would not be possible:

“Yes, it [digital transformation and COVID-19] has really changed the face of my business because before I was even thinking that I had to get a shop but now I am able to get more sales. Like what I said earlier on, before I wasn't even selling much like the way now, I'm doing online, because I have the platforms there and it's really growing, I'm telling you. It's really helping me.” (ME4)

At the same time, there were challenges that the micro-enterprises faced, as well as the limitations of the speed at which some enterprises transformed. For instance, a micro enterprise that produced and sold ginger paste had managed to create an online only firm, however its suppliers (farmers) were still stuck in the old ways of operating.

“The thing is most of our market, the farmers, especially in Africa here, most of them, they don't know all those things, digital, digital, whatever. So, there are so many things that you cannot do through the online or whatever. So that one, you have to go to them physically.” (ME1)

Based on our preliminary findings, we propose a model of digital bricolage in micro-enterprises (see Figure 2). Our model suggests that micro-enterprises develop an assemblage of practices that enable them to repurpose, improvise and appropriate the value of limited available resources; they also develop configurations of digital and non-digital resources and employ these in multi-channel and lean ways to support their business operations.

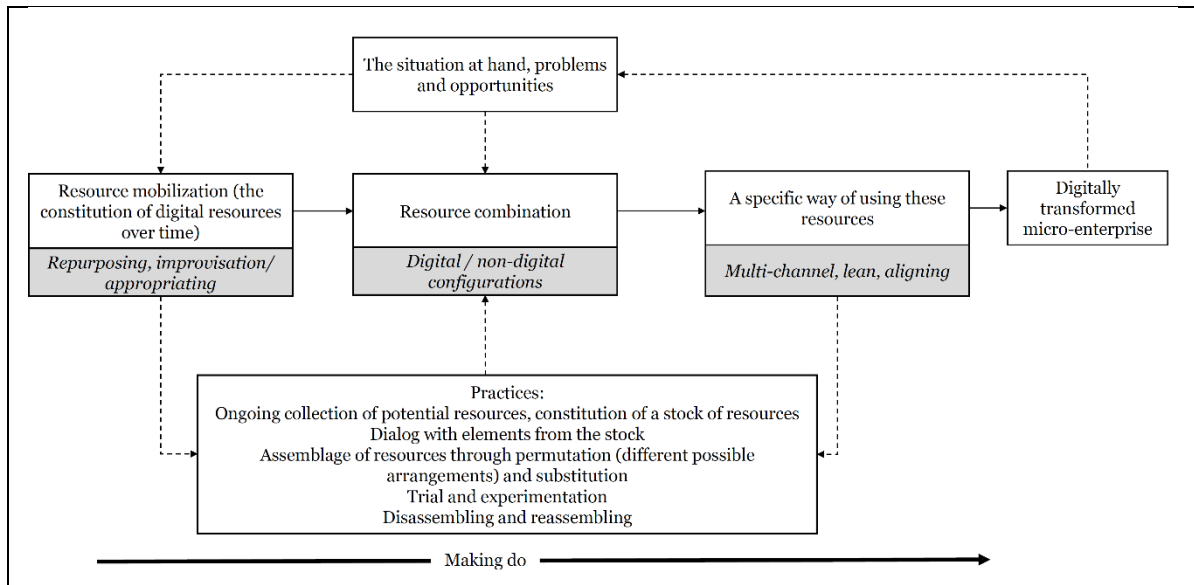


Figure 2. Digital bricolage and digital transformation of micro-enterprises

Source: the authors

As shown in the model, our findings highlight key processes and practices (the bottom box in Figure 2) based on which bricolage with digital technologies enables micro-enterprises with limited resources to digitally transform successfully. These processes specify the key phases of bricolage suggested by Baker and Nelson (2005) and their suggested practices and extend the value of these for digital transformation of micro-enterprises. Our findings also contribute to research on organizational digital transformation by extending currently limited insights on digital transformation of micro-enterprises facing severe resource constraints during the pandemic. Our findings show that enacting digital technology during COVID-19 depends on organizational ability to use digital technologies to recombine organizational resources and capabilities.

5.2 Technology firm perspective

From our analysis, we observed that technology firms introduced some interventions for customers including micro-enterprises to cope with the pandemic. The technology firms viewed the pandemic as a springboard for many businesses to adopt digital technology. Indeed, some of the technology firms were unhappy that the pandemic was gradually coming to an end. A technology firm participant explained:

“If you know, business owners in Ghana are very particular about the deduction that you are making or the 1% or the 2% or 3% that you are taking. It’s not so easy for them to accept certain solutions. But by virtue of COVID, certain things have been accepted so far. And the sad part about it is that COVID is gradually ending. I really wish we could have continued just having [?] this moment and then we would have been able to finalize most of these solutions. But unfortunately, everything that begins has got to come to an end.” (TF1)

Thus, the pandemic enabled technology firms to innovate and introduce new services. By their nature of being digitally savvy, technology firms themselves did not face many difficulties during the pandemic apart from working remotely due to the lockdown and social distance restrictions. Another technology firm manager stated:

“COVID, I remember when we started with the lockdowns, initially it was difficult. Because once there was lockdown, our agents were struggling because customer interactions were impacted. But once the lockdown issues were behind us and they could now operate with specific protocols in place, then that opened. But at the same time, what it also helped us to do is to bring many more people who didn’t want to interact physically to use digital forms for business transactions for that matter.” (TF2)

In terms of interventions and innovations introduced during the pandemic, we noted the following unique approaches. First, because of social distance and lockdown restrictions, and the increased use of digital payment, the mobile money providers increased wallet sizes and transaction limits. Before the pandemic, there was a daily limit of GHS5,000 on each wallet. This meant that individuals could not perform transactions above GHS5,000 because of the low KYC requirements for having a mobile money account. However, with the pandemic and the increasing use of digital payment, the service providers increased the daily wallet limit to GHS10,000 to enable people to perform more digital payments.

Another intervention that some of the mobile money providers introduced was to waive fees on every transaction up to GHS100. This intervention created a more efficient avenue for people to make payments below GHS100. By waiving transaction fees of up to GHS100, more people could utilize mobile money to make merchant payments instead of using cash. Again, with the pandemic in full force and the need to maintain social distance, the fee waiver represented a significant intervention to help people reduce physical interactions and observe social distance restrictions.

We also noted the introduction of payment innovations for motorbike delivery services to collect payment as there was a surge in online shopping. Motorbike delivery was considered an essential service during the COVID-19 lockdowns in Ghana. As such, enterprises used motorbikes to deliver online purchases and accept mobile payments (the motorbike couriers were also micro-enterprises). We also noted other innovations such as offering overdraft services for individuals to borrow money using their mobile money wallets. Although some service providers offered mobile money micro-loan before the pandemic, they noticed an increase as people and micro-enterprises in need of working capital used this service to access loans.

In addition, we noted that as more merchants transitioned online, there was a need for a platform to collect payments. As such, many Fintech and mobile money providers formed new partnerships to offer payment collection services. Though mobile money has significantly penetrated the Ghanaian population, merchant payment remained limited. However, there has been a rise during the pandemic as many people prefer digital payments. This led to new partnerships between merchants and technology providers. A technology firm manager explained the new partnership arrangement as follows:

“We do provide collection services to government agencies. And sometimes we do it through our banking partners. What happens is that the banking partner has the account of the government agency. And the government agency is looking for a solution. We basically work with our banking partners to provide solutions for the government agency. Sometimes it’s direct. Sometimes it’s through our banking partners. And that’s basically the leverage of having great relationships within the space, even though we’re still competing. Is the COVID-19 Sector Fund case study an

example of that? Yes. Because we basically facilitated the collections into the COVID-19 Fund. We were a part of that.” (TF3)

The box below provides support quotes for some of the interventions introduced by the technology firms during COVID-19. While the pandemic is gradually ending, it is important to note that the majority of these interventions have not been removed and have become the new norm.

Examples of interventions introduced by technology firms during COVID-19:

The other thing, there were some interventions as well. We increased wallet sizes and people could do more transactions. And most of those interventions, we kept post-COVID. For instance, we were waiving fees on every GHS100. We haven't changed it. We've kept it. People will continue to enjoy free transactions up to 100 when they send money. And then the wallet, the daily limit moved from 5,000 to 10,000. (TF2.1)

We kept that also, courtesy of the support of the central bank. Those interventions and aggregate sum of monthly transactions, the wallet limit in terms of how much you can keep in your wallet, those interventions also helped to promote... Because then people could do more with their wallets. And that helped us to gain more customers who use the platform to perform... And in that process, we were also able to build on our merchant ecosystem. (TF2.2)

Because then we brought many more people into the ecosystem who could accept digital forms of payment and therefore promote digital transactions. And I don't know the last time you came, but you should see a lot more mobile delivery. (TF2.1)

You should see it more vividly now. Different companies into motorbikes that do deliveries, those were part of the COVID moments where people now order food to be delivered. And it has come to stay. Those habits are not going away. People are still... We wanted lunch. We ordered. The only downside was that the rider ended up somewhere else whilst we were waiting for our food. But otherwise, it's been very helpful. You order food and they deliver it for you. Exactly. I've seen new companies [moto bike delivery businesses] every day, I see new branding. Of motorbikes with that container at the back. It used to be just a few of them at the time, but it's now become a business on its own, because that is the way people are buying now, in terms of food and even other groceries. It gets delivered.

It's actually one of the services indirectly we offer to these, small, small businesses, as you're talking about. More of the offline transactions. Just pay and then they will deliver. No face to face, exactly. (TF2.4)

Of course. There are people who don't even need to develop apps and things. They just go on to WhatsApp, load their stuff there, people share it around and then they've started doing business. People pay them through MoMo and then they figure out how to pull the things across to them. (TF2.1)

5.3 Government perspective

Our analysis showed that GhiPSS, as the primary government agency for digital payment implementation, offered some interventions in response to the pandemic. Two major interventions that GhiPSS introduced were: (1) GhQR (Ghana's universal quick response code) payment platform and (2) removal of fees on electronic payments below GHS100. GhQR, launched during the pandemic in 2020, is Ghana's national payment platform that enables merchants, including micro-enterprises to accept electronic payment without a point-of-sale (POS) device. A registered merchant is given a unique QR code and a 10-digit terminal ID, which customers scan or enter through a USSD process to make payment (GhiPSS, 2022). Unlike a POS, which requires a dedicated device connected to and powered by electricity, the QR code is printed on paper and displayed in the shop (see Figure 3).



Figure 3: Vice President of Ghana using GhQR to buy Waakye from a micro-enterprise (Source CitiNewsRoom, 2020¹)

One of the main benefits of GhQR is that it is interoperable across all digital payment providers in Ghana, meaning irrespective of the mobile money account or bank account of the merchant, they can receive payment from any provider. In addition, payment via GhQR is free for customers. Moreover, merchants receive instant payment. One of the added benefits of the GhQR is that it works with smart or feature phone. With the outbreak of the COVID-19 and the need to maintain social distance, and coming in force of lockdowns, GhQR became a useful platform for merchants to manage disruptions and ensure business continuity. The quotes below demonstrate how GhQR was operationalized during COVID-19:

¹ <https://citinewsroom.com/2020/11/bawumia-buys-waakye-using-qr-code-urges-ghanaians-to-sign-up-for-digital-payments/>

Examples of how GhQR was used during COVID-19:

I mean, from the onset, the mindset was, this service is for the informatic type person to be able to receive payment from all their funding services. So, that allows the merchant who are registered. So, when I say merchants, it's anybody who's in any kind of business, basically. Anybody with any business that's registered. The platform allows that individual to be issued with their GhQR. And, so, the only thing is that the individual will need to get an account, a wallet, to receive the funds. And, so, the platform allows the Mobile Money wallet to be linked to it. It allows a bank account to be linked to it. And then even if you are leveraging on a Fintech, you have an account. Or get your wallet with a Fintech. And then, the payment will end up in that account that has been linked to that GhQR. And, so, that is one platform that ensures that anybody, be it an institution, be it informal, be it whoever you are, can receive payments. (GA2)

Now the other thing we added on top of that, beyond just the merchant site, we also have an interest in how the customers are going to pay for the service. And, so, there are customers who are using smartphones, who are using mobile apps on smartphones, and their customers who are using feature phones. And how do you ensure that these customers who are using smart phone or feature phone are not left out? Typically, QR codes are purely scan and pay. So, as part of it, one thing we did was how were we going to capture the customers who are using feature phones to be [not] left out? (GA3)

Because, today, if you look at mobile money, in Ghana today, highly USSD. So, if it's smartphones, it means that a large chunk of the market will be cut off. So, we added something to the regular QR code that we have in the market, which is, instead of just a bitmap, the black and white squares, just a bitmap, every QR code who comes with a unique terminal ID. Numeric. Some are 8-digits, some are 10-digits. And, so, it's uniquely tied to that specific QR code. (GA3)

And, so, if you are using a feature phone, you dial your feature phone, you go to payment and you select the merchant. And then, you enter the code you find on top of the merchant bitmap. And then, the merchant's name will be displayed in the [unclear] the payment. (GA3)

Another significant intervention that GhiPSS introduced was the waiver of transaction fees on payments equal below GHS100. Before the pandemic, cross-provider payments attracted high transaction fees and were cumbersome. However, the introduction of Ghana's interoperable payment platform by GhiPSS in 2018 lowered the fees and streamlined the process. During the peak of the pandemic, GhiPSS

waived transaction fees to enable people to use more electronic payment services instead of cash to reduce physical interactions. While GhQR was also launched to facilitate merchant transactions, the majority of micro-enterprises whose businesses were not legally registered did not adopt the GhQR. Rather, they relied on money transfer directly to their personal mobile money account. As such, the fee waiver enabled micro-enterprises and customers to perform more electronic transactions. Indeed, statistics from GhiPSS and the Bank of Ghana showed a significant increase in electronic transactions during the fee waiver. However, when the pandemic receded, the fee waiver was removed. The quotes below show the effect of the fee waiver during the pandemic:

Examples of the effect of removing transactions fees during COVID-19:

During the COVID we actually reduced the fees. That's in the sense that we decided to waive our parts, our portion and then would allow people to do a lot of digital transactions. So, and of course, some Fintechs were not, happy, okay, because they were also, just like, Vodafone. Vodafone is not charging anything [fees] for transfer. (GA3)

And it's all actually, admitted from the COVID line because we want to help people to tele transfer but at no fees. So, we, also did same as a company by actually, waiving our side of the fees for people to do a lot of transactions. It was a good cause, even though most of them were not happy but a good cause. We exceed our aim by...and, and we look at the statistics, during COVID we had a lot of transactions coming through on the GhiPSS Instant Pay (GIP) side. (GA2)

6 Discussion, implications and recommendations

This project has generated a wide range of data, observations, and insights on micro-enterprises, digital transformation and the impact of COVID-19 in Ghana. This section discusses these findings and identifies implications and recommendations.

6.1 Micro-enterprises and digital technology during COVID-19

From the data collection, there is strong evidence to suggest that COVID-19 impacts micro-enterprises, but at the same time there is unequivocal evidence that micro-enterprises were able to adjust and sometimes thrive in the newly constrained environment. In this way, our sample of micro-enterprises paints a different picture than compared to the literature, as well as builds on emergent research, as summarized in Table 11.

Table 11: Comparing findings with the literature

Evidence from the literature	Evidence from our study
Digital maturity: Digitally mature organizations tend to suffer less than digitally immature firms (Fletcher & Griffiths, 2020; Seetharaman, 2020) (Karanasios, 2022; Naab & Bans-Akutey, 2021).	Our study shows that COVID-19 either pushed micro-enterprises rapidly down the path of digitalization or COVID-19 meant that micro-enterprises were able to capitalize on their untapped accumulation of digital resources.
Digital profile of micro-enterprises: Low numbers of micro-enterprises have	We show that micro-enterprises were able to leverage their stock of digital

successfully adopted digital technologies. MSMEs typically make basic use of IT (Asunka, 2016; ITC, 2016).	resources, combine them in new ways and create new ways of working.
Pre and post COVID-19 and use of IT: Emerging research points to the trend of IT use as “before” and “during/after” COVID-19 (Arthur & Arthur, 2017; Owoseni et al., 2022; Yamoah, 2014).	Our research supports the notion that digitalisation of micro-enterprises can be siloed into two phases: pre and post COVID-19.
Micro-enterprise conditions: Micro-enterprises share common challenges which includes limited access to credit or finance, limited access to equipment and technology, inadequate entrepreneurial and managerial skills, regulatory and legal constraints, and limited access to market intelligence (Dolan, 2012; Hagin & Caesar, 2021; Karanasios & Burgess, 2008; MTI, 2019).	Our research lends support to the research that shows that micro-enterprises continue to experience these challenges. However, we show that some managers were able to shrug off traditional limitations by evolving into digital innovators.
Digitalization: Reports show that despite Ghana being globally ranked 9 th in terms of hours spent on social media, it does not translate into business use (Ecosystem Hub., 2020; MOC, 2019).	Our research unequivocally shows that social media is fully integrated into micro-enterprises. For many micro-enterprises, it is the lifeblood of the businesses and they have used it to tap into national usage trends.
COVID-19 impacts: Micro-enterprises had the highest number of closures during lockdown (37%) and decrease in sales (92%) as well as relatively high reduced wages (46%) and reduced hours worked (34%) (GSS, 2020).	Our research supports that during the lockdown period micro-enterprises suffered the most and went into hibernation, cut hours or staff.
Going digital during COVID-19: Fewer than 10% of firms adopted digital solutions in doing business. 37.5% used mobile money in business transactions (GSS, 2020).	Our study shows that even micro-enterprises with limited resources can successfully make the transition to digital businesses. All micro-enterprises used mobile money as a dominant payment tool during COVID-19.
Longer term impacts of COVID-19: As Ghana opened up, businesses started to re-open with 74% of businesses fully open. 16% of firms continued to be closed in 2020 (GSS, 2020).	Our study shows that micro-enterprises were able to bounce back stronger. It merits mentioning that closed micro-enterprises are difficult to sample in research.
Government support during COVID-19: Reports show several initiatives offered by government to support micro-enterprises during COVID-19 e.g., reduction of fees on transactions of GHS100 and below, increased wallet	While micro-enterprises may have benefited from the mobile money initiatives, no micro-enterprises received direct assistance from the government.

limits and reducing KYC requirements as well as other support schemes (Bank of Ghana., 2020).	
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Source: the authors

6.1.1 Implications and recommendations

As noted in Table 11, our research provides a different perspective to what is presented in the literature. We showed a more positive picture for micro-enterprises that may be linked to their digital readiness and/or ability to break away from the invisible chains of traditional business models and environmental limitations. We showed evidence that enterprises were able to use the enforced lockdowns to reimagine how they do business. This meant that leaning more heavily on digital technology led to a longer term behavior change. For government, this suggests that businesses should be supported throughout lockdowns—via financial assistance to businesses affected by lockdowns and restrictions—to help them with their digital transformation. While some micro-enterprise owners viewed themselves as “digital innovators”, others were more reluctant to make the necessary digital adaptations and relied on family and friends to help them navigate social media and financial technologies in order to continue business operations. That is, some enterprises were already on their path to digital transformation, but most were forced to accelerate their digital transformation due to COVID-19. This suggests that many enterprises across Ghana may not have been able to successfully adapt. This reinforces the need for more widely available and rapidly deployed support to assist micro-enterprises. Along these lines, while the review of the context, statistical data and interviews from government suggested that government support was available in our sample, no micro-enterprises was able to make use of the government support. Two had attempted to obtain support but gave up. Part of the challenge may be around the unregistered nature of the businesses. It may also be a limitation of the large number of enterprises in need of support at the same time. To overcome frictions in this process, more easily accessible support is required. This links to earlier raised concerns from MTI (2019) that there is a lack of a policy framework for micro-enterprises and that bureaucratic processes prevent them from accessing the support.

The case of Ghana also provides lessons that may be transferable to other contexts. For instance, while the lockdowns impacted on businesses negatively in most instances, the broader impacts of COVID-19 were less dramatic. This suggests that from a micro-enterprise perspective, a right balance of restrictions was imposed that allowed them to continue to function. Interestingly, some businesses only viewed the impact of COVID-19 favorably as it spurred their business forward in ways that were not possible in the pre-pandemic era.

Our findings support previous studies illustrating that bricolage helps organizations to maintain their capacity to act, rather than being paralyzed, and grow in resource-scarce contexts (Baker & Nelson, 2005; Duymedjian & Rüling, 2010). We extend these findings to contemporary organizational digital transformation context by focusing on the value of bricolage with digital technologies and contributing to emergent studies on digital bricolage (Cui et al., 2021; Hartl & Hess, 2019). Our findings highlight key processes and practices based on which bricolage with digital technologies enables micro-enterprises with limited resources to successfully transform. Further, our

findings also contribute to research on organizational digital transformation by extending currently limited insights on digital transformation of micro-enterprises facing severe resource constraints. Our findings support arguments that successful digital transformation depends on idiosyncratic organizational ability to use digital technologies to recombine organizational resources and capabilities (Hartl & Hess, 2019; Vial, 2019).

6.2 Government

Our study offers insights into how digital technology supported micro-enterprises. As noted in the previous section, micro-enterprises did not access any government support initiatives to help them cope with the pandemic, and in particular, lockdowns. However, our investigation points to several ways that the government implemented macro level policies around mobile money that helped businesses, in general, as well as micro-enterprises, in particular. Two major interventions were introduced by GhiPSS. First was the GhQR payment platform. This solution was implemented in the local context, where a QR code is printed on paper and displayed (as per Figure 3). Second was the removal of fees on electronic payments below GHS100. This was significant because it meant that micro-enterprise could perform more electronic transactions. This is supported by statistics from the GhiPSS and Central Bank of Ghana which showed significant increase in electronic transactions during the period of fee waiver. However, when the pandemic receded, the fee waiver was removed. This is a challenge for micro-enterprises who may have been dependent on the fee waiver as a vital part of their business model

Government decision-makers may use our findings to inform their own strategies to balance government interventions to encourage micro-enterprise development while also encouraging innovation (from Fintechs) that targets the specific needs of micro-enterprises. This is important because there is a rapidly evolving financial sector with a range of multilevel actors pursuing new opportunities and launching new products and services. For instance, Table 2 (section 2) showed 32 products launched in 2020, building on similar figures in past years. However, few of these initiatives target micro-enterprises directly. Rather, micro-enterprises need to co-opt and make do with products created for individuals or larger enterprises. A related challenge is how to supervise and spur innovation while not stifling innovation in other directions. This challenge is faced by regulators across financial services globally, as new Fintech firms enter established markets. In Ghana, the unique position of GhiPSS as a technical arm of the Central Bank and the pivot for fintech-enabled innovation helps to somehow manage this challenge.

6.2.1 Implications and recommendations

Our research suggests several key strategies that the government could adopt to support micro-enterprises. The first is to maintain (reintroduce) the COVID-19 fee waivers and reduce fees on digital payment transactions. As noted, all micro-enterprises in our study relied on mobile money. The removal of the waiver would disproportionately impact micro-enterprises. Another recommendation is to remove the e-levy for micro-enterprises. The e-levy seeks to draw tax income from the informal economy, but it may also reduce the attractiveness of starting and operating a small-scale business. A micro-enterprise in our study also referenced it as an issue.

“What I'm afraid is the e-levy, because with the mobile money transactions, it is going to affect my business, because of the high interest they're tending to put on the

charges. I'll be visiting the bank to make transactions or to send money to people through their bank account or using their bank account.” (ME24)

Crucially while the initiatives by the government can be seen as favourable, and other governments can learn from them—especially around mobile money—we find there is a disconnect from the needs of micro-enterprises. To demonstrate this, Figure 4 below shows the macro-level actors—in our study, these actors are GhiPSS, government and the Central Bank of Ghana. The figure also shows connections with Fintech firms, banks and technology firms as well as micro-level actors such as mobile money agents, citizens/consumers and large businesses. However, this ecosystem neglects micro-enterprises. The policies of macro level actors do not place micro-enterprises at the centre, nor does the innovation of technology firms consider their needs. Given the importance of micro-enterprises and some of the possibilities demonstrated in our study there is a need for government to specifically target the digital development of micro-enterprises.

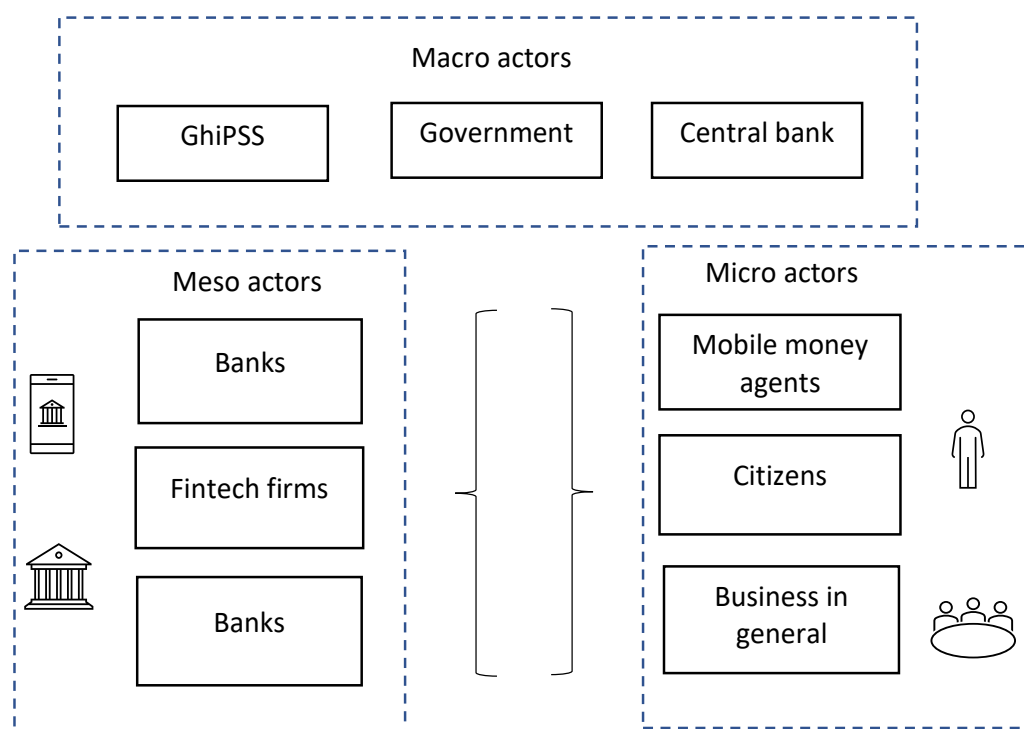


Figure 4 Ghana ecosystem – the missing focus on micro-enterprises

Source: the authors

As noted in Figure 4 and the discussion above, there is a missing focus on micro-enterprises. This is also emphasized in other reports by the Ministry of Trade and Innovation (MTI, 2019). At the time of writing of this report, the Bank of Ghana showed that it continues to recognize that MSMEs “have the potential to accelerate economic development necessary for wealth creation and poverty reduction” (BoG, 2022) as well as recognized that Fintech (e.g., mobile payments) and the Fintechs (firms that are developing applications) can play a large role in addressing the forementioned gaps. Along with the findings in our report, this is a promising development.

6.3 Technology firms

Because our study is concerned with digital transformation, we considered that it was necessary to engage with firms offering technology solutions, whether mobile money, loans, infrastructure or other technology. By their nature of being digitally savvy, technology firms themselves did not face many difficulties during the pandemic apart from working remotely due to the lockdown and social distance restrictions.

Technology firms have introduced interventions to help micro-enterprises to cope with the pandemic. Indeed, for much of our technology firm sample, the pandemic was viewed as a way to spur on further digital transformation across Ghana. Key among these was mobile money providers increasing wallet sizes and transaction limits (up from GHS5,000 to GHS10,000). Similarly, some of the mobile money providers waived fees on every transaction up to GHS100. The introduction of payment innovations for motorbike delivery services to collect payment was important given the business model of most micro-enterprises during COVID-19; all micro-enterprises in our sample relied on mobile payments. Other innovations include offering overdraft services for individuals to borrow money using their mobile money wallets and platforms to collect payments. We noted how these initiatives build on an already mature and sophisticated technology-Fintech ecosystem in Ghana (Senyo et al., 2022). However, it merits mentioning that just like in the case of government initiatives, the outcomes of these on micro-enterprises were largely a byproduct of their wider activities rather than their main focus.

6.3.1 Implications and recommendations

As per our recommendation in 6.2.1 and in Figure 4, we argue that there is a need for the technology sector to consider, as a primary focus, the needs of micro-enterprises. This would ensure that micro-enterprises have mobile payments, mobile loans and other relevant systems that are designed for them. Building on recent emphasis on micro-enterprises (ITU, 2022c), government incentives should be designed to encourage this. Given what we learnt from the analysis, we also argue that it is necessary to reduce or even eliminate fees on digital payments for micro-enterprises. This would also support efforts to increase the use of e-finance and more broadly to help them to be more active online (Broadband Commission, 2022).

As noted in our micro-enterprises digital profiles, micro-enterprises largely rely on free technologies for communication, advertising and promotion, and operations. This is a barrier to their growth. While the bricolage strategy helps micro-enterprises to develop low cost and dynamic business operations, there is little evidence that this business model can significantly scale up. This raises the question: with the large numbers of micro-enterprises in Ghana how can they be better supported to grow? We see the role of technology firms as key to help with this step change. Greater focus on systems and services for micro-enterprises and MSMEs will have two major impacts. First, it supports and encourages the growth of micro-enterprises. Second, it creates more revenue streams for technology firms. These two outcomes combined will spur on further innovation.

7 Conclusions

COVID-19 demanded new ways of living and working and spurred a re-imagining of how businesses operate. This report considers one specific challenge faced during the pandemic: how micro-enterprises in resource poor contexts were able to adapt. In particular, it examines how micro-enterprises were able to leverage digital

technology—such as WhatsApp, Instagram, mobile money, and other applications—to fundamentally reimagine their business in line with the resource constraints while managing the impacts of COVID-19. Based on data collected from Ghana, we illuminate on how micro-enterprises adopt digital technology to be more resilient to the impact of COVID-19, which may translate into learnings for future contingencies.

A unique aspect of our research is that it took the stance that to fully understand changes at the level of micro-enterprises, it is necessary to go beyond the actions of enterprises and consider the role of government *and* Fintech firms, technology firms, and multinational network operators in contributing to their digital transformation. Along these lines, we collected data from all these actors. Our research also analyses and draws upon key reports and data from the World Bank, Ghana Statistical Service and other national and international bodies to inform our analysis.

Our study produces three key areas of findings—actions of micro-enterprises, government, and technology firms—which should be considered as a way of stimulating discourse on how to better support micro-enterprises with COVID-19 impacts but also more broadly to support their digital transformation to remain competitive in a hypercompetitive digital world.

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9 Appendices

9.1 Appendix I: Indicative interview questions for micro-enterprises

Background questions

How long has the business been in operation?

Who runs the business?

Where is it based? physical location or virtual location

What areas does it service?

How many direct/indirect employees?

What products or services are offered?

Did your organization experience lockdowns and disruption during COVID-19? (ask about first few months as well as later)

How did COVID-19 change the organization's ways of working?

What support did your organization receive during COVID-19?

When did you register your business? (as a sole proprietor, company, partnership etc.)

What has changed since Covid-19?

How has your organization responded to such changes?

The organization

Why did your organization start as a small firm?

Could you talk about your digital journey, how has your organization begun using Fintech, social media, platforms, online services etc?

Do you see yourself as a digital innovator?

Do you have a background in technology or interest in it? (try to get a sense of how much/how they use IT day to day).

Digital profile

What digital technologies does your organization use to run the business? (Jumia, or other platform)

How did you do this historically?

How do you use Fintech/mobile money (or other fintech)?

How did you do this previously?

How do you use platforms (like Jumia, Tonaton)?

How did you do this previously?

How do you use social media?

How did you do this previously?

Does Fintech offer you opportunity for trade credit (Trade credit enables entrepreneurs to receive goods and services on credit from suppliers and potentially offer goods and services on credit to customers?)

Does Fintech offer you opportunity for external finance/micro loans?

How did you access loans/credits previously?

How has this changed since COVID-19

Community

Tell me a about your employees? (their digital skills etc.)

Who are your partners and suppliers?

Who are your regulators?

How do you use Fintech/social media/platforms to work with these groups?

Who are your customers?

How do you use Fintech/social media/platforms to interact with your customers?

How do you interact with mobile money agents/providers and what role do they play?

How do you use social media to interact with your customers?

Do you rely more on drivers/riders (motor bike delivery) or other networks of people that support your business?

How has this changed since COVID-19

Division of labor

Who does what in your business? (who makes strategic decisions, who is responsible for day-to-day operations)

How has Fintech changed the nature of internal and external tasks? (how were these tasks done before hand, i.e. visiting banks, storing cash, staying at a shop front etc.)

How has social media changed the nature of internal and external tasks?

How have platforms change the nature of internal and external tasks?

Is there a digital expert within or outside the firm that you rely on?

How has this changed since COVID-19

Rules and norms

How has business changed since using social media/fintech/platforms?

How did you perceive the role of your business before and after digitally changing?

Culturally, in Ghana how has the perception of small businesses changed?

What regulatory changes have supported/influenced your business?

How has this changed since COVID-19

Outcomes

To what extent does mobile money/fintech/platforms address resource constraints? (what constraints were overcome?)

To what extent does mobile money/social media/platforms address gaps?

Because of your digital transformation:

Is your work more flexible?

Are you achieving more sales?

Do you have more customers?

Have you reduced overheads?

Safer, affordable, and secure payment alternatives?

Have your processes become easier?

Has it led to follow on innovation/products/services?

9.2 Appendix II: Indicative interview questions for government/technology firms

Background information for all participants

Can you kindly describe your role within your organization and how long you have been in this position?

Is your organization private or public?

Can you describe your firm in terms of its size, history, vision and mission?

What is the headquarters service (e.g., Accra)?

How many employees work for the organization?

How long has the agency/business been in operation?

Fintech firms

What are the objectives of the organization?

Who do you service? (businesses, individuals, unbanked etc., government agencies)

What Fintech solutions/products does your organization provide, or is planning on providing?

How has COVID19 impacted the firm? (How did your offerings change due to COVID?)

Did you identify any changes in how customers use your services during covid?

Do you have specific strategies for the unbanked?

How are these solutions developed?

Do you consider these solutions innovative and why?

How do you organize innovations development within your firm?

Who are your targeted users and how do they use your solutions?

Do you serve the international market?

How do you think your digital solutions promote financial access and inclusion?

How will you characterize your relationship with other Fintech firms?

Have your firm developed any solution in partnership with a Fintech in the last year?

Do you consider your external environment conducive for innovations?

What is your assessment of the policy, legal and regulatory provisions for Fintech in Ghana?

Can you describe the challenges you are facing in terms of: Innovation, Service Delivery, Regulation, Infrastructure, Socioeconomic conditions?

Can you describe solutions you think can address each of these challenges?

We are interested in small/micro/informal businesses.

Can you explain how you develop services for such businesses?

- How do they use your service?
- Are they a significant market?
- Do you follow how they use Fintech? If so, can you provide some insights?
- Have you seen an uptake of the use of Fintech during COVID19? Please explain...
- How important are small/micro/informal businesses in the Fintech space in terms of users?

- What could be done to help support the digital transformation of these businesses through Fintech?
- Do users of your service (e.g. citizens) use Fintech to interact with small businesses? Can you provide details of this? (i.e. percentage of transactions, volume etc).

Regulator

In your opinion, can you describe Ghana's Fintech ecosystem journey?

What do you think has changed over recent years in Fintech industry?

How has COVID19 impacted on regulation of Fintech?

What roles do you think Government policies played in fostering development of the Fintech ecosystem in Ghana? How do you think these policies have performed so far?

What is Ghana's regulatory direction for the future of Fintech industry?

What is your assessment of your Fintech and Innovations office to date?

What is your role in facilitating innovations?

Can you describe the challenges you are facing in terms of: Innovation, Service Delivery, Regulation, Infrastructure, Socioeconomic conditions?

How have Fintechs been compliant with regulatory requirements?

What challenges constrain regulations and compliance

Can you describe solutions you think can address each of these challenges?

We are interested in small/micro/informal businesses.

- Can you explain how/if you develop strategies to support such businesses with Fintech?
- Do you follow how they use Fintech, if so, can you provide some insights?
- Are they significant users of Fintech??
- Have you seen an uptake of the use of Fintech during COVID19? Please explain...
- How have you support such businesses during COVID19?
- How important are small/micro/informal businesses in the Fintech space in terms of users?
- What could be done to help support the digital transformation of these business through Fintech?

MNOs and technology firms

What are the objectives of the organization?

Who do you service? (businesses, individuals, unbanked etc.)

Can you describe the services you provide in the area of Fintech?

Can you describe your mobile money journey, especially how it started, where you are now and where you want to be in the future?

How has COVID19 impact the firm? (How did your offerings change due to COVID?)

Did you identify any changes in how customers use your services during covid?

Do you have specific strategies for the unbanked?

What specific solutions do you provide or are planning to provide to users in the mobile money ecosystem: for individuals or businesses?

Do you consider these solutions innovative and why?

How do you organize innovations development within your firm?
What business or technological enhancements are in place or being developed to complement this emerging business model?
How do your digital solutions aim to continue promoting financial inclusion and financial access?
How will you characterize your relationship with Fintech firms?
Have your firm developed any solution in partnership with a Fintech in the last year?
Do you consider your external environment conducive for innovations?
What is your assessment of the policy, legal and regulatory provisions for Fintech in Ghana?
Can you describe the challenges you are facing in terms of: Innovation, Service delivery, Regulation, Infrastructure, Socioeconomic conditions?
Can you describe solutions you think can address each of these challenges?
We are interested in small/micro/informal businesses. Can you explain how/if you develop strategies to support such businesses with Fintech/technology?
Do you follow how they use technology? If so, can you provide some insights?
Are they significant users of Fintech/technology?
Have you seen an uptake of the use of Fintech/ technology during COVID19? P
How have you support such businesses during COVID19?
How important are small/micro/informal businesses in the Fintech/ technology space in terms of users?
What could be done to help support the digital transformation of these business through Fintech/ technology?

