



## Implications of digital economy for financial institutions in Ghana: an exploratory inquiry

Daniel Agyapong

Department of Finance, University of Cape Coast, Cape Coast, Ghana

### ABSTRACT

The digital economy has revolutionised financial service provision and compelled financial services institutions to adopt technologies that help deliver quality service at a minimal cost. Due to the recent disturbance in the financial sector in the country, there is an urgent need for financial service providers to adopt relevant technologies to help reduce operational inefficiencies and maintain service quality. This article analyses the implications of the digital economy for enhancing the efficiency of financial markets. Drawing the existing literature, it concludes that the financial institutions in the country have quite embraced and integrated digitisation into their activities. Given the perceived high level of digital illiteracy among the populace, it was surprising to discover the number of people who have signed on unto such financial products. It was recommended financial institutions integrate their operations with the necessary digital technologies as it helps reduce operational costs. Furthermore, they need to invest in digital infrastructure and skills of their staff to embrace technology in service delivery. It is also suggested that policymakers strengthen the laws, policies, and regulations such as data protection and cyber-crime to enable the players of the market to operate freely and confidently.

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## Introduction

Digitisation and the application of technology reduce cost, improve operational efficiency, and speeds up the process of service delivery. The current development in the financial sector of Ghana, especially, the quest to reduce cost and improve upon efficiency has led to many questioning the extent of application of digitisation in the reengineering of financial institutions. A major challenge that the financial institutions in Ghana face is the problem of information asymmetry leading to moral hazards and wrong lending decisions. The issue is the availability, validity, reliability, and management of client information to inform credit-granting decisions. A major problem that a number of these microfinance institutions (MFIs) faces is loan default and third party transactions. Non-performing loans (NPLs) stood at 3.7% or GH¢ 6.4 billion from GH¢ 4.7 over 12 months' period (Bank of Ghana, 2017; Mensah, 2019). The NPL fell from GH¢ 8.74 billion in June 2018 to GH¢ 6.99 billion in June 2019. This represents a 20% fall, compared to a 9.7% growth recorded in the year. Meanwhile, the private sector accounted for 97.6% of the NPL in June 2019. This showed an upward adjustment of 7.7% in June 2018 (Bank of Ghana, 2019a). This observation is not surprising because data on the creditworthiness of private-sector households are difficult to obtain. This makes it difficult for credit officers to evaluate credit applications. The problem is that individuals, household, and institutional data are often not organised.

These problems accounted for the series actions by the regulator (Bank of Ghana) between 2016 and 2019. A total of eight finance houses, two non-bank financial institutions had their operating licence withdrawn in 2019. Furthermore, 10 universal banks, 28 savings and loans companies, 347 MFIs had their licence revoked by the Bank of Ghana during the same period. These institutions were found to be insolvent and did not meet the minimum capital legally required by the regulator. Other reasons were that some had excessive risk exposure and did not have a risk management plan. Furthermore, there were cases of weak board oversight, weak internal controls, and creative accounting (Bank of Ghana, 2019b).

The Bank as per Section 123 (1) of the Bank and Specialised Deposit-Taking Institutions Act 2016 (Act 930), is mandated to revoke the licence of financial institutions, where the Bank determines that such institutions have

the potential to destabilise the financial sector. The 2019 action of the Central Bank of Ghana attracted the attention of social, political, and economic actors. This was due to the uncertainty it created concerning how customers could retrieve their deposits. A 2018 Bank of Ghana report estimated that about 705,396 customers risk losing their deposits of about GH¢741million held by distressed MFIs. Furthermore, over 5000 employees of the financial institutions' that had their licences revoked lost their jobs. Indeed, the action of the Central Bank impacted on the sector within the short term. By the end of 2018, the average growth rate of deposit in the banking industry declined to 6.0%, compared to 20% between 2014 and 2016 (PWC, 2019).

The core of the problems of the financial institutions outlined above is poor data taking, storage, and management. The system for managing client data followed the traditional economy approach, mainly through the use of paper, books, and in hard copies. This approach is common with MFIs. The most advanced case is the use of excel spreadsheets. The use of cloud computing is minimally applied. Meanwhile, Asongu and Nnanna (2018) suggest information communication technology helps to reduce information asymmetry in the provision of financial services.

This article analyses the implications of the digital economy for attaining efficiency in the financial institutions in Ghana. This article is motivated by the need to reduce waste, improve upon service delivery, and to be competitive in financial institutions in Ghana. The scope of the digital economy in the paper is operationalised as the use of technologies in the process of delivering financial services and also for developing new products and services. Among the questions, the study sought to answer included how the digital economy contributes to speed and cost reduction in financial service delivery. Furthermore, it was to examine how digitisation contributes to financial deepening.

The article contributes to the literature on the role of digitisation and the application of technologies in financial services delivery. It provides insight into how emerging countries like Ghana are responding to changes in the digital economy ecosystem. The rest of the article was divided into four parts. Part two looks at literature reviews. Part three looks at research methods. Part four looked at the analysis and discussion. Conclusions and recommendations were contained in the last part.

## Literature review

### *Evolution of digitisation in the Ghanaian financial sector*

The journey to the digital financial sector began more than three decades ago with the installation of the first automated teller machine (ATM) by the Trust Bank of Ghana Limited in 1995. Subsequently, other financial institutions (banks, savings & loans institutions) followed with the introduction of ATMs and other financial technologies for service delivery. Currently, there are 11.65 ATMs per 100,000 of adult population. This is an increase from 3.80 in 2008 (World Bank Database, 2018). In 1997, Ghana's payment and resettlement systems changed significantly with the introduction of the magnetic ink character recognition (MICR) to facilitate daily cheque clearing between banks. Before the introduction of the MICR system, clearing and settlements were done manually and it took days for cheques clearing. The Ghana Interbank Payment and Settlement Systems (GhIPSS) platform was set up in 2007 by the Central Bank of Ghana to manage interoperable payment system infrastructures for banks and non-bank financial institutions. The platform has facilitated payment transactions over the last decade. According to the Bank of Ghana (2018), the total volume of GhIPSS Instant Pay (GIP) transactions increased to 143,879 from 41,795 in 2017. Also, the total value of transactions increased to GH¢534.04 million from GH¢83.2 million in 2017.

The late 2000s saw some digitisation of products and processes in the sector. For instance, in 2008, introduced the e-ZWICH biometric electronic payment system to promote a cashless society. As of 2018, the number of e-ZWICH cardholders was 2.77 million, up from 2.3 million in 2017 (Bank of Ghana, 2018). The total value of transactions using this card increased from GH¢3,431,49 million in 2017 to GH¢5,651.14 million in 2018. Furthermore, in 2009, trading on the Ghana Stock Exchange was moved from the centralised stock exchange to trading online. The goal was to promote trading efficiency and cross-listing by companies. Table 1 presents statistics on other digital products influencing the financial ecosystem in Ghana.

The speed of adoption of financial technologies (FinTech) and digitisation in Ghana has grown exponentially over the last 5 years. Among the developments in the sector include the use of mobile, telephone, and email for financial service delivery. Traces of FinTech are reflected in almost all areas of the sector including banking, insurance, capital markets, non-banking institutions, and for the settlement of payments. Several online and digital

**Table 1.** Volume and value of digital products.

Indicator	2016		2017			2018		
	Volume	Value (GH¢'m)	Volume	Value (GH¢'m)	Change (+/-)	Volume	Value (GH¢'m)	Change (+/-)
e-ZWICH	5,365,085	2362.96	8367,017	3431.49	+	7,759,354	5651.14	-
Mobile money	550,218,427	78,508.90	981,564,563	155,844.84	+	1,454,470,801	223,207.23	+
Internet banking	2,705,191	6779.21	2,437,785	9739.34	+	3,205,878	6267.23	-
Mobile Banking	6,821,838	357.38	7,036,285	1501.37	+	14,805,878	5658.40	+
ATM	1928		2044		+	2139		+
Debit card	46,456,021	13,582.67	60,382,177	17,785.18	+	60,118,182	21,804.83	+
Credit card	138,037	70.08	185,101	99.99	+	324,841	171.70	+
Prepared	312,143	103.26	472,071	255.88	+	590,139	326.06	+
GIPS	184	0.42	41,795	83.23	+	143,879	534.04	+

Source: Bank of Ghana.

**Table 2.** Statistics of electronic methods.

Category	Indicator	2016	2017	2018	Annual change 2018 (%)
Cheque codeline clearing	Volume	7,309,406	7,334,460	7,255,220	(1.08)
	Value (GH¢'million)	152,390.42	179,555.47	203,465.32	13.32
ACH direct credit	Volume	5,242,610	6,061,093	6,645,126	9.64
	Value (GH¢'million)	19,245.65	24,327.26	30,226.94	24.25
ACH direct debit	Volume	874,846	940,649	861,169	(8.49)
	Value (GH¢'million)	127.01	126.28	139.15	10.19
Credit cards	Number of cards issued	9217	14,698	23,102	57.18
Prepaid cards	Number of cards issued	58,907	86,017	216,592	151.80
Debit cards	Number of cards issued	5,446,030	5,953,484	4,754,514	(20.14)
Mobile banking	Number of customers	2,175,644	2,110,984	3,891,269	84.33
Internet banking	Number of customers	962,487	936,965	815,904	(12.92)

Bank of Ghana, 2018.

platforms to facilitate transactions and promote financial inclusion are being set up at the firm level, industry level, and by regulators in the financial sector. Table 2 provides statistics on volumes of digital financial transactions from 2016 to 2018. It also provides a synopsis of the number of electronic cards, the number of clients participating in mobile, and internet banking over the period.

From Table 2, except for Cheque Codeline Clearing, automated clearing house (ACH) direct credit, Debit Cards, and Internet Banking, all the other processes and products recorded positive outcomes in terms of volumes and values. The fall in the Cheque Codeline Clearing which represents interbank clearing and settlements may be due to the increase in other digital modes in performing financial transactions (Bank of Ghana, 2018). The fall in the volume of transactions for the ACH direct debit was also attributed to ease of using other digital payment systems like mobile money. Furthermore, compared to a decade ago, many utility companies in Ghana have resorted to digital payment through the use of prepaid cards in the bit to reduce embezzlement and theft risk by employees.

There is still a large portion of the financial market transaction that requires manual document processing. This notwithstanding, the information technology has revolutionised the nature of financial service delivery in the country with the introduction of digital financial products and processes. The most popular of the systems is the use of mobile phone popularly known as mobile money transfer (MOMO). The population of the country is mainly dominated by the youth (about 57%) who do virtually everything with their mobile phones. Mobile data penetration in Ghana stood at 65% in 2015 (National Communications Authority, 2015). Mobile data (4G) subscription stood at 2,153,079 in November 2019. The 2G/3G mobile data subscription during the same period was 26,661,592 at a penetration rate of 88.49% (National Communications Authority, 2019).

This system of sending, receiving money, and effecting payment is now the most popular with individuals, households, and corporate bodies due to its convenience and fastness. The MOMO app is utilised by all mobile networks in Ghana. It is currently the largest digital payment platform in Ghana. A 2018 Financial Sector report indicates that MOMO accounts stood at GH¢ 29.99 million with 3,16,919 accredited agents. As of 2017, the volume of transactions was 981.84 billion with a value of GH¢ 155.84 billion (US\$35.29 billion). The half in 2018 recorded a total transaction of 655.0 million and volume of GH¢ 104.6 billion in value (Ministry of Finance, 2018). These volumes of transactions given the Ghanaian estimated population of 30 million shows a very high penetration of the MOMO. Despite its popularity, a limited number of financial institutions have attempted commercialising it. Must and Ludewig (2010) submit MOMO is a way to reduce human contacts in financial service delivery.

### ***Theoretical and empirical reviews***

One of the earliest use of the concept 'digital economy' was in the book 'The Digital Economy: Promise and Peril in the Age of Networked Intelligence' by Don Tapscott in 1995. He outlined among other things how the internet would impact business in the future (Tapscott, 1997). Studies that followed looked at the digital economy from different viewpoints including its definition, measurement, and focus. The most elusive aspect of the digital economy has been its definition. Therefore, authors have looked at it from different perspectives. As Barefoot, Curtis, Jolliff, Nicholson, and Omohundro (2018) submit, one basic difficulty with the digital economy is the lack of precise definition of the concept. From a general perspective, studies including Dahlman et al. (2016) described it as the range of economic and social activities carried out by people over the internet and related technologies. Similarly, Boiko, Verkhoglyadova, Volska, & Hranovska (2020) defined the digital economy as the implementation of high-end technologies in all aspects of life. Thus, the digital economy is associated with the application of digitalised technologies to the delivery of socio-economic activities in the society.

Digitisation and the digital economy have been found to influence society, although its definition has been elusive for researchers. Different authors have looked at this phenomenon from different perspectives. From the broader sense, it refers to all economic activities that use digitalised data in a sense, all activities in a modern economy (IMF, 2018). Previously known as the information economy, this phenomenon has evolved over the years. Barefoot et al. (2018) described it as the dynamic changing nature of technology and its utilisation by enterprises and consumers. As suggested by UNCTAD Division on Technology and Logistics (2017) digital economy is the rise in the use of applications and internet-based technologies such as advanced robotics, artificial intelligence, cloud computing, big data analyses, 3D printing, digital finance, facial recognition among others.

In business, studies such as Mesenbourg (2001) submits that the digital economy comprises e-business infrastructure (hardware and software), conducting business using computer-mediated networks and e-commerce associated with engaging in online transactions. Bukht and Heeks (2017) submit the digital economy is economic output, resulting from digital technologies with a business model premised on digital goods and services. In their definition, Elmasry, Benni, Patel, and Moore (2016) indicated that the digital economy encompasses value creation at the new frontiers of business by using processes that help optimise the firm's resources and customer experience. This includes the application of technologies in all sectors of economic activities. In this study, the digital economy was defined to include the use of technologies and processes in the delivery of financial services and also for developing new financial products and services.

The finance growth nexus (Schumpeter, 1912/1934) reveals the critical nature of finance as a catalyst for economic growth and development. Furthermore, the neoclassical growth theory makes a case for finance in predicting economic growth by outlining capital among the other elements like labour and technology. In their work, Atje and Jovanovic (1993) and Cooray (2010) cited in Durusu-Çiftçi (2017), that capital stock was decomposed into stock market capital and non-stock market capital. This theory suggests the role of the digital economy (technology) for economic development. Several classical theories and models including the indigenous theory, neo-classical model (Solow and Swan) suggest the relevance of technology for economic growth.

The techno-economic paradigm (Perez, 2010), is at the core of the innovation-based theory of economic development. The theory combines Kondratieff's long waves of digital economy theory and Schumpeter's economic development theory. The techno-economic paradigm analyses the digital economy within the capitalist development process of technological change. Studies such as Haftu (2019) found technological spurs economic growth. Other studies including Chakpitak, Maneejuk, Chanaim, and Sriboonchitta (2018), Afonasova, Panfilova, Galichkina, and Ślusarczyk (2019), and Myovella, Karacuka, and Haucap (2020) suggest the implications of technology, especially the digital economy for economic growth and development.

Kayiska and Chekol (2011) submit that the digital economy is dependent on electronic products made by electronic business and distributed *via* electronic mode. In Strømme-Bakhtiar (2019), it was described as economic activities, commercial transactions enabled by information and communication technology. This view suggests different business models and strategies. Meanwhile, studies *ex-ante* and *ex-post* the financial market disturbance focussed on governance, risk exposure, non-compliance to regulatory requirements among others (Amuakwa-Mensah & Boakye-Adjei, 2015; Benson, 2019; Madugu, Ibrahim, & Amoah, 2020; Matey, 2019; Osman, 2019). Indeed, recent studies document evidence of the positive effects of these factors and the performance of financial institutions (Awo & Akotey, 2019; Nyarko, Yusheng, & Zhu, 2017; Osman, 2019). However, the nature of

systems, technology, products, operations, and processes installed for delivering the financial service is incidentally for the firm's survival (Mwashiyu & Mbamba, 2020; Prema, 2020).

The advent of technology and the information economy have changed the phase of financial services delivery (Nair, Kuppasamy, & Davison, 2005; OECD, 2014). In the digital economy, financial services are digitalised and powered by internet platforms and software (United Nations Conference on Trade and Development, 2019). The aim is to reduce operational costs, increase access, and enhance the efficiency of the firm. Among the operational costs of financial institutions, process costs, staff productivity, building, and sometimes vehicles and transportation (Fahlevi & Surtinah, 2019; Madugu et al., 2020; Wesselink, 1996). Meanwhile, management of the financial institution's operations is regarded as the management of risk (Aloqab, Alobaidi, & Raweh, 2018). The goal of managers, therefore, should be to identify the tools and methods to operate to minimise and in some instances eliminate these risks. Key among these risks is operational risk. This risk results from inadequate or failed internal processes, people including systems and events such as legal risk (Basel Committee, 2011; Hull & Zwiebach, 2009). In situations where these risks are improperly managed, they could result in operational inefficiencies, financial distress, and corporate failure.

The result of employing the traditional system is that the firm would have to hire more people; thus increasing its staff cost. Among the chunk of the financial institutions' costs is staff cost (Jenkins & Mathurin, 2012). Adjei-Frimpong, Gan, and Hu (2014) cite high staff cost as one of the problems of banks in Ghana. To reduce staff costs, financial institutions now employ systems and platforms that facilitate self-service. Hence reducing the human factor that often tends to slow down or even impede quality financial service delivery. ATMs revolutionised financial service delivery in Ghana since its introduction over three decades ago. The advent of ATMs increased banking hours and customers' access to their deposits at all times. Since the beginning of the 2000s, debit and credit cards have become popular in Ghana as a mode of payment. The popularisation of these systems means that the use of checkable accounts was expected to reduce. This is not the case until today.

Studies (Aker & Wilson, 2013; Must & Ludewig, 2010; Kang & Bae, 2019) show that financial platforms such as MOMO help increase access to financial services and also mobilising savings. Due to the concentration of financial service firms in the urban areas, using digitisation, platforms and mobile phones are efficient ways of mobilising savings. Powered by technology, the use of platforms and the internet for financial services providers have received that much attention due to its speed of service delivery. For example, compared to traditional banking, mobile and online banking are faster in terms of service delivery as it reduces human contacts. Online banking transactions include stopping cheque payment, mini bank statement access, fund transfer, balance inquiry, cheque requests, and payment confirmation (Jakšič & Marinč, 2019; Nirmala & Prasath, 2020). Furthermore, many more people in Ghana are resorting to prepaid, credit, and debit cards to facilitate online business transactions.

According to the Bank of Ghana (2016), about 9.4 million cards were issued by banks in Ghana in 2016. This generated a total volume of transactions of 54.3 million, valued at GH¢ 14.2 billion. The cards are mainly debit cards with a limited number in the form of credit and pre-paid. Others are in the form of cards meant for domestic or international or for both. However, the cards that can be used both domestically and internationally are often those issued by foreign institutions (e.g. Visa, MasterCard, etc.). Examples of some of the domestic cards are e-ZWICH and the different debit cards that are used on the Ghana Link (Gh-Link). The Gh-Link platform was set up in 2012 to connect financial institutions to share their ATMs and point of sales terminals. The objective of the Gh-Link is to promote the country's agenda of moving into a cashless society. However, there are still a lot of unbanked people in the society who can only use platforms such as the MOMO. Therefore, there is a need to integrate these different platforms to facilitate smooth digital financial transactions by all market participants.

The advent of the digital economy has promoted financial innovation with the development of new products and processes. Currently, the 23 banks in the country have at least one innovative product. These products are either web or mobile phone-based. Similarly, other financial institutions including Savings and Loans Companies, Mortgage Houses, Rural Banks, and MFIs are switching to internet-based processes or products or both. These innovations are in the form of products (e.g. credit cards, debit cards, electronic wallets, mobile money, etc.), process (ATMs, internet banking, mobile banking, e-payment, etc.). Some specific products by some financial institutions in the country include Diaspora Current Account for Ghanaian nationals living outside the country.

There are also the Non-Resident Ghanaian Account services that enable them to access a wide range of products including savings, current accounts, forex account, investments in the money markets, and e-banking services. There are also marketing innovations with the adoption of new service delivery methods including email

banking, personalised financial service delivery using mobile banking. Such innovations were expected to improve banking operations and make them more efficient. For instance, it was expected that financial institutions can sensitise their clients to perform more transactions online to reduce the volume of activities in the banking hall. However, there are still more financial transactions taking place in the banking hall using manual systems. One reason for the low speed in the technology adoption in the country is the problem of digital fluency among the large portion of the population.

The digital economy has not only exposed financial institutions to the domestic but also global financial services provider. For instance, digital banking allows people to hold and operate savings, chequeable accounts, across borders. Although statistics are not readily available, public conversations and media reports show a lot more Ghanaians are getting involved in the trading of digital finance products including bitcoin and cryptocurrency. Besides, there is the use of an international platform including PayPal, Visa, MasterCard, American Express, Discover, and expressPay. The provision of such services by international financial institutions in the country exposes the sector to much stiffer competition. Although there are barriers to physical entry by foreign institutions, virtual financial services provided through the use of digitalised technologies make entry easy. Thus, intensifying the level of bank competition in the country. The effect of such competition is that it helps improve customer service delivery by providing service options available to clients. However, it impacts negatively on domestic banks that do not have the financial resources to acquire technologies needed in the provision of digitised financial services.

The next major problem is how to regulate virtual financial institutions, especially in situations of unfair competition and inappropriate banking practices. The digital economy in Ghana has also come with its complication. As Hutton (2017) submits digital data and information online provide intrinsic value to the cybercriminal and what business transaction. Poor regulation of the digital economy could lead to the emergence of an underground digital economy. Grabosky, Smith, Smith, and Dempsey (2001) submit that opportunity for crime abounds in the digital age. The problem of cybercrime and financial fraud in Ghana and some West African countries attracted national, regional, and international attention in the mid and late 2000s. The operations of internet financial transaction fraudsters led to Ghana being ranked among the top ten countries for the sources of cybercrime activities in 2008 (Boateng et al., 2011). Akomea-Frimpong, Andoh, Akomea-Frimpong, and Dwomoh-Okudzeto (2019) cite some instances of mobile money fraud resulting from weaker internal controls and the absence of a policy on digital financing. In a 2018 notice financial institution, the Bank of Ghana informed the general public that there were no regulations on digital currency. Furthermore, the digitisation of financial services promotes anti-money laundering, Ponzi schemes, and fraudulent investments (Mugarura, 2017).

The internet has been used to promote businesses and schemes such as pyramid banking and fraudulent financial games. Internet criminals are often early adopters of new digital currency technologies, especially where the features of the said products have the potential to help them evade the law (Fanusie & Robinson, 2018). As indicated earlier, the rate at which financial institutions are responding to process and product digitisation are very slow. Among the reasons assigned include cyberattacks, promote anti-money laundering, encourage unlawful online gambling and financial scam especially in countries without strong cyber laws (Popper & Ruiz, 2017; Şcheau & Pop Zaharie, 2017; Fanusie & Robinson, 2018; Esoimeme, 2020). These vents make financial institutions without a strong ICT infrastructure sceptical in fully engaging in the provision of digital financial services. There is huge capital required for building a stronger ICT infrastructure for providing digitised financial services. Due to the inadequate investments by many financial institutions in the country, servers and IT solutions are often provided by international IT companies. This comes with its risks as the local financial institutions do not have absolute control over customer data. Furthermore, the numerous reported cases of online fraud reduce public confidence in digitised financial services.

## Research methods

The article employed an exploratory inquiry. The main source of data was from secondary data. These include articles, magazines, books, newspapers, case studies, unpublished thesis, and projects. These data were obtained from websites, online materials, and databases. Data were analysed with the help of qualitative content analysis (Hsieh & Shannon, 2005; Sándorová, 2014). As a subjectivist interpretation of text and data, this method was appropriate in analysing the meaning, topic, and subject matter of the digital economy. The objective of the

paper was to explore the digital economy and draw implications for the financial sector in Ghana. The methods helped explore the views and tenets of this phenomenon. In the end, themes emerged from the contents of the various materials synthesised. This helped draw relevant conclusions on the subject matter.

## **Analysis and discussion**

From the syntheses of the previous studies, the following themes emerged; consumer preference for digital financial service delivery; digital platforms as a source of savings mobilisation increased financial deepening; the digital economy is a source of financial innovation; digitisation promoting financial sector competition; digitising the financial sector exposes financial institutions and customers to risk.

### ***Consumer preference for digital financial service delivery***

There was evidence that the use of digital technologies in the country is increasing at a relatively slower to medium rate. For a society with a large population leaving in locations with poor road networks and underdeveloped infrastructure, the only appropriate strategy to deepen financial access and promote inclusion is the use of digital technologies. This is one of the business models to attract to reach out to untapped markets and to increase the financial institution's customer share and make sustainable. However, this has implications for investment in infrastructural development.

### ***Financial deepening with digital platforms***

The syntheses of the previous works revealed digital platforms serve as a source of savings mobilisation and means of increasing financial deepening. The mobile transfer was found to be the most used digital financial services provision technology in the country. This is not surprising as Ghana is one of the countries with very high mobile phone penetration in Africa. With mobile data penetration of over 80%, the use of the mobile phone is certainly a tool for digital financial services. The other reason also stems from the fact that over 56% of the population is in the youth bracket often referred to as digital natives.

### ***Financial innovations***

The digital economy as a source of financial innovation was one of the issues that emerged. This implies that financial institutions focus more on online, internet, and mobile banking as against traditional locational and branch financial services. Such financial services provision practice tends to reduce the human element that normally tends to reduce service speed. This also could reduce staff costs and other operational costs (stationery costs) that tend to increase financial services charges.

### ***Financial sector competition***

One critical issue emerged from the digitisation promoting financial sector competition. It was revealed from the issues discussed that digitisation breaks the barrier to entry into the financial sector. This implies financial institutions currently compete with financial institutions and products on the domestic markets and those online. On the part of the customers, this helps them have access to quality and variety of financial products at competitive prices.

### ***Exposure to risks***

From the review, it emerged that digitising the financial sector exposes financial institutions and customers to risks. One of the worst of the risks was online financial fraud. Digitisation of financial services also lends itself to online criminals including anti-money launderers, unlawful online gamblers, and financial scammers. This has implications for public confidence in the use of digitisation and online financial transactions. Therefore, for financial institutions to take advantage of the opportunities offered by the digital economy; there is the need to develop and maintain strong IT infrastructure and maintain a reliable and credible database.

## Conclusions and recommendations

From the analyses of the financial services ecosystem in the country, it can be concluded that there are efforts by the financial institutions at integrating digitalisation into their service provision. There is the acceptability of the use of mobile money platforms as the most used medium of transferring money and for effecting payments. Furthermore, the digital economy facilitates savings mobilisation and increases access to financial services provision. Moreover, digitisation and the use of the platform help reduce bank operational costs. The adoption of the digital economy tends to promote a cashless society, thereby, making funds available to businesses for productive activities.

As indicated earlier, the Central Bank's move to clean the financial sector between 2016 and 2018 exposed the firms to several operational inefficiencies including costs, management, and strategy. Raising the minimum capital required for operating in a particular sub-sector meant additional costs for the firms involved. This implies financial institutions should operate in a much more efficient way through the application of technology in service delivery. From the results, it was concluded the digital economy tends to reduce costs of operations through the reduction of labour and transactional costs. It also contributes to access to financial services and increased consumer preference for service options. It also helps reduce settlement risk, cost, and delay associated with cheque clearing. It helps facilitate timely service delivery to customers.

The digital economy is the bases for collecting and storing big data on clients of financial institutions. Such data are incidental to the decision making of the institution. However, there are risks associated with the digitisation of financial services. Key among these risks is clients' data protection, which could promote anti-money laundering in countries with weak financial regulations and data protection laws.

### Practical recommendations

There is a need for human resource development and capacity building of staff of financial institutions. This starts with the development of corporate strategy and integration of the digitisation into financial services provision. Furthermore, it requires investment into the needed infrastructure including both hard and software. Moreover, for financial institutions to take full advantage of the opportunities of the digital economy; there is the need to sensitise the primary stakeholders including customers of the institutions. Education on the use of an application of a financial institution by a customer helps promote its use. There is a need for the Central Bank to employ digital technologies in their monitoring and supervision of financial institutions in the country. Acquisition of applications that enable the Bank to monitor and even authorise some categories of transactions undertaken by the institutions in the financial sector should be introduced. This should be done along with on-sight visitation to the financial institutions.

### Policy recommendations

This should commence with the legal framework, guidelines, rules, and code of conduct. There is a need for strengthening laws, policies, and regulations on data protection and cybercrime. System to hold and provide creditor information. There is a need to build a database to support financial institutions in dealing with the problem of information asymmetry and moral asset selection.

Future studies may focus on the use of quantitative methods to test the effect of the elements in the digital economy on the efficiency of financial institutions. Future research should define and operationalise the elements in the digital economy. There is also the need to re-look at the supervision role of the central bank.

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