

## IMPACT OF DIGITAL FINANCE ON ECONOMIC GROWTH

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**Abstract.** The advent of information and communication technologies (ICT) and the resulting innovations have considerably deepened the financial sector, thanks in particular to mobile money technology which promotes financial inclusion. Digital finance has enabled populations traditionally excluded from the financial sector to have access to financial services. According to the existing literature on the link between economic growth and digital finance, it is likely to be a source of economic growth. Countries therefore have an interest in advocating for policies aimed at developing digital finance, while considering the risks that arise from this finance. Digital finance has the potential to compensate for the shortcomings of traditional financial services through innovative financial products. The main objective of the article is to evaluate the effects of digital finance on economic growth. In this article, the authors also demonstrate how the literature has addressed the impact of ICT in relation to traditional finance. The data source is the World Bank's Global Fintech database. Linear regression method is used to analyse the data.

**Keywords:** digital finance, economic growth, financial development, information and communication technologies.

**JEL Classification:** O1.

### 1. Introduction

The economic literature has not resolved the debate between financial development and economic growth.

If many authors believe that financial development has a positive impact on economic growth like Levine (2005), others believe that it is rather economic growth which is at the origin of financial development. Regardless, it remains important to seek sources of economic growth for developing countries, and this article is in line with the first stream of literature discussed above.

If it is therefore established to a certain extent that financial development can have positive effects on economic growth, it goes without saying that traditional finance struggles to truly play this role due to information asymmetries. Furthermore, there is a school of thought that believes that the low level of financial development in developing countries is due to information asymmetry (Gajigo et al., 2014; Asongu, 2015).

Digital technologies, traditionally referred to as information and communication technologies, have the potential to significantly reduce information asymmetry and change the role of financial development as a catalyst

for economic growth. Digital finance was therefore born from the contribution of traditional finance and digital technologies.

Digital finance has the potential to compensate for the shortcomings of traditional financial services through innovative financial products. The literature on digital finance tends to show that digital finance stimulates consumption as well as the quality of economic growth and development (Feng & Zhang, 2021; Liu et al., 2022a). This renewed interest in the link between finance and growth is mainly due to the benefits of digital finance.

The main objective of this study is to evaluate the effect of digital finance on the economic growth of a country. In this article, the authors also demonstrated how the literature has addressed the impact of ICT compared to traditional finance.

### 2. Methodology and research design

Considering the above, it is obvious that there is a need to analyse the effects of digital finance on the economic growth of a country. Thus, the main research question is formulated as follows: *How does digital finance affect*

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*digital and economic growth?* In order to provide an answer to this question, the main objective of the research is to show the effects of digital finance on digital and economic growth.

### 2.1. Choice of method

The article's methodology uses data provided by the World Bank's Global Fintech database. A sample of Central African countries is taken over the period 2021. These include Cameroon, Chad, the Central African Republic, the Democratic Republic of Congo, Equatorial Guinea, the Republic of Congo and Gabon. Inspired by work in the same field of study such as Liu et al. (2022a), the correlation analysis method is used to analyse the data.

The statistical analysis is carried out according to the following steps. The data recorded in Excel on an Excel spreadsheet is then imported into the 'R' software version 4.3.2 for Windows. Quantitative variables are presented as means and standard deviations in tables. A single average is used to compare GDP averages by country. Pearson correlation is used to evaluate the association between different parameters. All statistical tests are performed at  $P < 0.05$ . The method of data analysis is that of determining correlations.

The choice of the above methods is determined by the nature of the study, the main objective of the research and the associated research question.

### 2.2. Presentation of variables

Digital finance was obtained here by foreign carriers from the World Bank's global financial technology database:

- Digital payment made or received, female (% each 15 years and over).
- Male digital payment made or received (% 15+).
- Made or received a digital payment, young people (% aged 15 to -24).
- Made or received a digital payment, older (% age 25+).
- Made or received a digital payment, primary school education or less (% aged 15 and over).
- Made or received a digital payment, secondary or higher education (% 15 and above).
- Made or received a digital payment, income, 60% of the richest (% 15 and above).
- Made or received a digital payment, rural (% 15 and over).
- Made or received a digital payment, urban (% age 15+).
- Made or received a digital payment, excluding active population (% aged 15 and over).
- Made or received a digital payment, in the labour market (% aged 15 and over).

It is worth mentioning that the economic group variable here is represented by the growth rate of gross domestic product per capita.

## 3. Related work and literature review

### 3.1. Contributions of ICT to the relationship between finance and economic growth

Some work highlights that information and communication technologies can increase the efficiency of the financial sector, in particular by combating the asymmetry which makes financial markets imperfect and inefficient.

Information and communication technologies can facilitate the flow and sharing of information among market actors in various development sectors in developing countries. Information and communication technologies can also reduce marketing costs and improve stakeholder participation. The high penetration of mobile telephony promotes financial inclusion by providing access to financial services to populations excluded from the traditional financial system (Jappelli & Pagano, 2002).

It should also be noted that many developing countries undertook reforms of their financial sector with the aim of liberalizing it from the 1980s. This liberalization was to enable the development of the financial sector. These measures allowed the end of government interventionism and the privatization of several public banks (Gelbard et al., 2014).

Realizing that information and communication technologies have the potential to boost economic growth, these countries will also undertake reforms to liberalize the information and communication technology sector. These reforms aimed to ensure rapid diffusion of information and communication technologies and better investment attractiveness, particularly in the mobile telephony sector. In this process of diffusion of ICT, one of the most dynamic user sectors where information and communication technologies have been integrated in a spectacular manner remains the service sector. It is widely recognized that one of the most visible consequences of this rapid diffusion of information and communication technologies is the increasing use of mobile phones in financial transactions. This observation sufficiently shows that there is a link between the diffusion of ICT and financial developments on the one hand and financial inclusion on the other hand (Inoussa et al., 2020).

The first development seems to indicate that information and communication technologies are likely to strengthen the role of financial development on economic growth. The emphasis will therefore be placed on digital finance and its impact on economic growth.

### 3.2. Digital finance

Several definitions have been developed to understand the notion of digital finance. This concept describes the digitalization of the financial sector in general. It includes all digital products and services in the financial sector, for example credit cards, e-commerce systems, Internet banking and e-commerce services as well as automated teller machines.

Likewise, according to Gomber et al. (2017), digital financial revenues flow through a multitude of new financial products, financial companies, finance-related software and new forms of communication and interaction with customers, provided by innovative financial technology companies and financial service providers. Although there is no common definition of the term “digital finance,” there is consensus that it encompasses all products, services, technologies and/or infrastructure that enable individuals and businesses to access payments, savings and credit facilities using the internet without the need to contact a bank or a financial service provider.

Furthermore, digital finance has certain advantages. Indeed, the expansion of financial services into non-financial sectors and basic consumer services can lead to greater financial inclusion, since almost 50% of people in developing countries already use only a mobile phone (World Bank Group, 2014).

Additionally, Gomber et al. (2017) developed the concept of “Digital Finance Cube” which applies 3 central dimensions to describe the field of digital finance. The first dimension contains the business functions of digital finance, the second dimension concerns relevant technologies and technological concepts, while the third dimension corresponds to institutions providing digital finance solutions.

Indeed, business functions cover digital financing, digital investments, digital currency orders, digital payments, digital insurance and digital financial advice (Klöhn & Hornuf, 2012; Dodgson et al., 2020).

Concerning the technologies and technological concepts of digital finance, they enable the business functions of digital finance. In fact, the key technologies and concepts that are driving recent changes and developments in the field of digital finance are Blockchain technology, near-field communication and analysis (Big data), as well as technological tools (enablers), such as mobile devices and security technologies (Gomber et al., 2017; Want, 2011).

Furthermore, the third dimension concerns digital financial institutions. They include both FinTech (financial technology) companies and established companies entering the financial space and traditional service providers.

Indeed, FinTech refers to innovators in the financial sector who exploit the accessibility of universal communication, mainly through the use of the Internet and the automated processing of information. These are companies with new business models that promise more flexibility, security, efficiency and opportunity than established financial services. Furthermore, traditional financial service providers have launched initiatives to adopt new technologies and make digital finance business functions increasingly innovative (Gomber et al., 2017).

### 3.3. Economic growth and its sources

In order to model economic growth as an endogenous phenomenon, it is necessary to question the hypothesis

of diminishing returns to the accumulation of production factors (human capital and physical capital). This can be done by considering the externalities linked to capital accumulation. If a company’s investment involves positive externalities on other companies or on individuals, the private return (that which returns to the company) of this investment is lower than its social return (the return which returns to the company). It is therefore possible that private returns to capital continue to decrease, thus not contradicting the results of the empirical literature while social returns turn out to be constant. Let’s take the example of investments in research, of these profits with diminishing returns, of the companies which made them. If the returns to research and development were constant, companies would invest infinite amounts of money in it.

Growth theorists have emphasized the importance of the research and development sector which, on the basis of technological advances, develops new products or improves the quality of existing products (see Aghion & Howitt, 1998 as well as Grossman & Helpman, 1991). This theory grants the research and development sector a fundamental role in wealth creation. It also highlights the crucial importance of the relationship between innovation and market power. The incentive to innovate comes from monopoly rights over new products or processes, a monopoly that creates new profits.

The existence of these monopolies has opened debates that are both fascinating and fundamental on policies for protecting innovations through mechanisms and on the optimal level of research subsidies. Regarding the issue of patents, their scope of application, dormant patents and the control of monopoly prices applied by patent-holding companies are the most discussed topics; the debate on the pricing of triple therapies in developing countries is an edifying example.

Human capital accumulation is another way to support the growth process. Indeed, even if a country cannot increase its labour supply indefinitely, it can improve the quality of its labour force. The term “quality” refers to human capital which includes, among other elements, the education, experience and health capital of workers. Human capital can be accumulated in two ways: from the beginning of life, by going to school or more generally by becoming educated; then, through the accumulation of experience (learning by doing) or through professional internships.

Another source of growth noted in the literature is financial development. Indeed, following Schumpeter (1911), Goldsmith (1969) argues that the development of local financial markets positively affects economic growth through the efficiency of capital accumulation (or the increase in the marginal productivity of capital).

McKinnon (1973) and Shaw (1973) expand on Goldsmith’s (1969). They debate that financial development involves both an increase in capital productivity, an increase in the savings rate and a greater volume of investment. Unlike Goldsmith (1969) who endogenized

growth and financial intermediaries, McKinnon (1973) and Shaw (1973) instead analysed the effects of “financial repression”, that is to say the maintenance of low interest rates on investment and public intervention in economic activities. Financial repression reduces incentives to save; this negatively influences investments and economic growth. Thus, McKinnon and Shaw (1973) are in Favour of financial liberalization allowing an increase in interest rates, which encourages households to increase their savings.

The importance of financial factors can be discussed in a new category of autogenic growth models integrating the financial sector. In such models, the financial system as a whole (banks, financial intermediaries, stock/bond markets) enables savings as well as their proper use. The financial system makes it possible to bring together agents, collect, analyse and transmit information at low cost. An efficiently functioning financial system channels available resources towards the most lucrative projects likely to improve productivity and, therefore, economic growth; it eliminates the risk of untimely liquidation of productive assets allowing the accumulation of human capital and physical capital – the foundations of economic growth.

In summary, financial intermediation and financial development, as a whole, stimulate economic growth (see among others King & Levine, 1993; Demirguc-Kunt & Détragiache, 1998; Beck et al., 2000; Levine, 2005). These results are also highlighted by the studies devoted to sub-Saharan Africa mentioned above. However, there is an antithesis led by Robinson (1952), who advocates the passivity of finance in economic development. More precisely, as Robinson says, financial development follows economic growth, and the sources of growth must be sought elsewhere. A similar point of view is developed by Friedman and Schwartz (1963) on the demand for money. This vision is based on the fact that the ratio between the money supply (M2 or M3) and nominal GDP, which is the classic measure of financial development, is also the inverse of the rate of circulation of money (cash).

Therefore, a positive correlation between the level of financial development and real GDP may result from a slowdown in the pace of money circulation. If this is the case, then the positive link between financial development and real GDP per capita may reflect an income elasticity of money demand greater than one.

So, on this basis, the direction of causality would run from real GDP to financial development, via money demand.

#### **4. Digital finance and its effects on economic growth**

It is recognized in the literature that finance is the central element of economic development (Teng & Ma, 2020). Digital finance is defined here as a product resulting from the combination of transitional finance and digital technological innovation, making it possible to overcome

the problems of low access to traditional financing as well as low quality and efficiency of services (Teng & Ma, 2020), depending on the economic development needs of financial services.

Digital finance is increasingly integrated into economic and social fields and thus plays an important role in stimulating consumption, promoting innovation and entrepreneurship (Tang et al., 2020; Wan et al., 2020). This tends to boost exports, which promotes economic growth. Additionally, during the COVID-19 period, digital technology and digital finance have played a leading role in sustaining economic activity. According to Liu et al. (2022b), digital finance is becoming a key force in restructuring global factor resources, reshaping the global economic structure, and changing the global competition pattern.

Digital finance has the potential to fill gaps in traditional financial services through innovative financial products. This is due to its advantage of being a low-cost service, as well as its speed in terms of coverage. Digital finance thus reduces the threshold of access to financial services as well as the costs of these services (Huang & Huang, 2018), thus improving the convenience of financial services. This convenience not only promotes the economy of financially developed regions, but also the efficiency of financial services in financially less developed regions.

It must also be said that small and medium-sized businesses which occupy an important place in economic development encounter difficulties in financing themselves in the traditional financial system. These small and medium-sized businesses are therefore faced with the thorny problem of credit rationing that digital finance can solve because it modifies payment methods and considerably reduces search, evaluation and transaction costs.

The development of digital finance can also alleviate farmers' credit constraints (Fu et al., 2021) and promote the improvement of agricultural total factor productivity, thereby improving economic growth.

#### **5. Level of connectivity in sub-Saharan and central African countries**

The information presented in this subsection is based on data provided by the (Abdychev et al., 2020).

After the arrival of submarine cables in this region in 2019, the quality of digital connectivity has evolved. The quality of service has also seen a marked increase. This state of affairs has led to a rapid evolution of mobile financial services in the sub-region. In Cameroon, for example, we saw the creation of the entities Orange Money SA, a subsidiary of the mobile telephone company Orange, and MTN Mobile Money, supported by the company MTN. These structures specialize in mobile finance and promote financial inclusion. However, we see that the Central African region is lagging behind the rest of the world. The main barrier is affordability,

which hinders the adoption of digital technologies given their high overall cost relative to income. In addition, the connection in this region of Africa remains poor: the average mobile download speed is 7.4 Mbps, three times slower than in other regions of the globe. It should be noted that there is also a large disparity in connectivity in this region:

- Technological infrastructure appears to be the main factor that can explain this disparity between these countries.
- Differences in education and quality also matter, but to a lesser extent.
- It is also worth noting that the high cost of doing business, the degree of urbanization and better access to financial services are generally linked to better digital connectivity.
- Countries that benefit from a better business climate, particularly those that encourage the emergence of women entrepreneurs, are likely to have better connectivity.

It is worth mentioning that there are also disparities within countries. The majority of rural communities do not have access to the Internet (even with mobile devices). Added to this is a considerable gender gap, with only 23% of women in sub-Saharan Africa having access to the Internet, compared to 34% of men. The gender gap in the region is widening from 21% in 2013 to 33% in 2019 and is well above the global average (17%). However, the rate of e-commerce in SSA remains relatively low compared to other regions. E-commerce revenues grew by an average of 24% in sub-Saharan Africa, and active online payment users made up a quarter of the region's population, compared to around half the population in other regions of the world and 90% in developed countries. There is also a strong disparity in the region. If more than half of the population uses online commerce in certain countries (South Africa, Botswana, Gabon, Nigeria), in others, this proportion remains less than 15% (Malawi, Niger, Democratic Republic of Congo, Sierra Leone and Chad). The same trend is found on social networks. The region is below the global average in social media usage (Facebook, Twitter, etc.), but experienced the fastest growth in this area over the period 2012–2016 (Abdychev et al., 2020).

If there is one area in which sub-Saharan Africa leads in terms of digital penetration, it is the financial sector. Mobile money transactions account for almost 25% of GDP, compared to just 5% in other parts of the world. Innovation is also growing in the region in the area of financial technology (fintech), giving rise to new services and new applications.

Generally speaking, sub-Saharan Africa is experiencing a proliferation of digital and fintech innovations, in the areas of health sciences, education, commerce, finance and agriculture. Currently, 600 active technology hubs are operating in Africa (an increase of 40% compared to previous years). These structures provide premises and support to entrepreneurs in the technological

and digital sector (Global System for Mobile Communications Association, 2019). It is increasingly easy to find general data on digital progress (for example the creation of mobile telephony applications or innovation in information and communication technologies) in the countries of the region. This data makes it possible to better monitor the role of the region in the innovation dynamic. Digital transformation in the public sector is progressing. Also recently, technological innovation has accelerated the development and inclusion of the financial sector in Sub-Saharan Africa. In particular, the rapid and early expansion of mobile money accounts in the region has opened up the financial sector to previously left-behind populations and has proven to be a valuable tool during the COVID-19 pandemic. Data shows that widespread mobile money can reduce poverty and accelerate growth (Abdychev et al., 2020). In Sub-Saharan Africa, the number of mobile money service providers is steadily increasing, from zero in 2008 to an average of over 38,000 in every SSA country in 2018. Additionally, the number of mobile money accounts now exceeds this figure. Traditional deposit accounts, 21% of adults in the region now have a mobile money account.

Recently, mobile money transactions in SSA more than tripled, from an average of 8% of GDP in 2014 to 25% in 2018. For comparison, the rest of the world saw an increase of 3.5%. In 2018, transaction volume in countries that adopted mobile money services most recently (Burkina Faso, Ivory Coast and Ghana) caught up with those in countries that implemented them first (Kenya, Uganda and Tanzania). Along with increasing financial inclusion, during the COVID-19 pandemic, mobile money has proven to be a safe and reliable substitute for physical transactions. More generally, it is gradually becoming a platform for other financial services, for example loans, savings and cross-border payments.

The economies of the CEMAC zone are experiencing slow progress in the aspects of job creation, due to strong structural barriers: the mobile telephone subscription rate (66.9%) remains 10 points lower than the African average. Only 9 out of 100 people use a computer in Central Africa, a region where a third (34.2%) of the CEMAC zone has access to 4G connectivity. The high cost of subscriptions explains the low Internet penetration rate, at 26% compared to 35% on average in Africa, as well as the few jobs created by digital technology (OECD, 2021) thanks to digital technology. In Cameroon, the number of direct jobs created in information and communication technologies (ICT) represents, according to some sources, 3% to 5% of the active population, while each job in ICT would generate 4% to 9% of jobs in other sectors (Wamba & Ndjé, 2019). Supported by start-ups with little or no structure, jobs are less sustainable.

Fintech, in Central Africa, facilitates access to financing for young entrepreneurs and start-ups. With bank coverage of 30.1% in 2017, Central Africa records the lowest rate on the entire continent. However, in recent years, mobile payment has experienced remarkable

development, despite its recent introduction. Additionally, fintech acts as a source of job creation through its innovative financing solutions that meet the personalized needs of start-ups and entrepreneurs. For example, Guanxi Investment, an equity crowdfunding platform, offers companies the possibility to raise funds from the general public in exchange for a stake in their registered capital. However, low-income levels and lack of financial education, systematic malfunctions of IT systems, as well as electricity shortages and limited digital infrastructure are hampering the growth of fintech across the region.

### 6. Empirical verification of the relationship between digital finance and economic growth in Central Africa

In order to empirically verify the effect of digital finance on economic growth, examples from Central African countries were taken, including the following countries: Cameroon, Chad, Central African Republic, Democratic Republic of Congo, Republic of Congo, Guinea equatorial and Gabon. The World Bank's Global Fintech database was used as the data source.

The results of the analysis are shown in Figure 1.

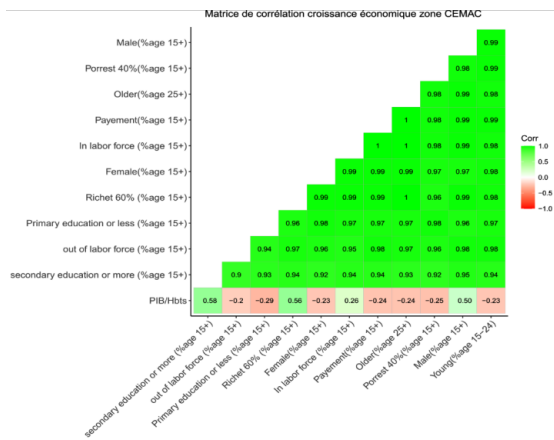


Figure 1. Correlation analysis results

The final results tend to show that not all digital finance variables have a positive correlation with economic growth. However, we see that high school students over the age of 15 and belonging to the richest 60% of the population using digital finance have a positive effect on economic growth. This effect can be significant ( $P \geq 5\%$ ) and it is mainly men who are at the origin of this economic growth. This result confirms several studies which show that women continue to lag behind men in the use of ICT, thus accentuating the problem of the digital divide between men and women. Another important, but not significant, result shows that individuals in the labour market who use digital finance can have a positive impact on economic growth.

The authors also analysed the growth of gross domestic product per capita of the countries in the chosen sample. Table 1 presents an ANOVA analysis, the results show that countries like Cameroon, Central African

Republic, DRC, Republic of Congo and Guinea have a statistically identical economic growth rate over the period 2014 to 2022.

Table 1. Analysis of economic growth in Central African countries

	GGDPP	GGDPP/HBTS
Cameroon		1.3 ± 1.1 <sup>a</sup>
Central Africa Representative		2.6 ± 0.0 <sup>a</sup>
Congo, Rep. Beginning		2.9 ± 2.8 <sup>a</sup>
Congo, Rep.		-1.7 ± 5.9 <sup>a</sup>
Gabon		-0.58 ± 1.47 <sup>b</sup>
Guinea		3.3 ± 3.6 <sup>a</sup>
Chad		-2.4 ± 4.9 <sup>c</sup>

Note: Data are presented as mean ± standard deviation a, b, c. A one-way analysis of variance (ANOVA) was performed to compare average GDP/capita between countries. Means with the same letters in the same column are not statistically different at  $p < 0.05$ .

Figure 2 shows the evolution of the growth rate of GDP per capita for each country in the sample.

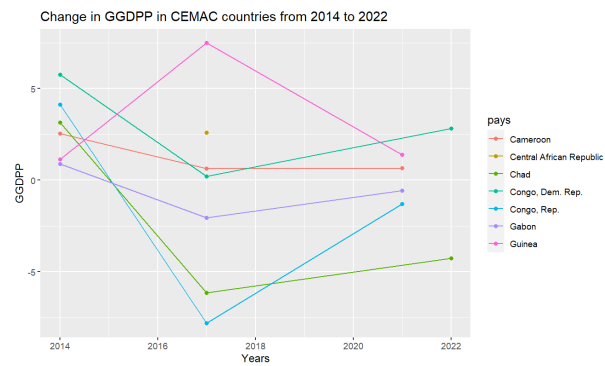


Figure 2. Evolution of the growth rate of GDP per capita

An obvious observation that emerges from this figure is that during the period 2014–2016, all the countries in our sample experienced a decline in their economic growth with the exception of Cameroon which experienced strong growth. However, this country's economic growth has declined significantly since the 2020s, while other economies have seen a recovery.

### 7. Conclusions

The research results demonstrate that financial development plays a major role in supporting a country's economic growth and that ICT tends to strengthen this role. Subsequently, the rapid development of innovations in the ICT sector thanks to the advent of technologies such as the Internet of Things, artificial intelligence, 5G have given birth to a new concept which is that of digital finance.

The results of the analysis carried out by the authors also show that digital finance is an important vector of economic growth, to the extent that it facilitates access

to financing for small businesses and is also a source of productivity growth.

At the national level, the authors chose a sample of seven Central African countries (Cameroon, Chad, Central African Republic, Democratic Republic of Congo, Republic of Congo, Equatorial Guinea and Gabon). Through Pearson correlation analysis, it was established that there is a positive correlation between certain digital finance variables and GDP per capita growth.

The main limitation of this research lies in the measurement of digital finance, which remains a fairly new concept. This novelty of the concept does not yet make it possible to have time series of this variable in order to have more in-depth analyses. Limitations also include the time period covered by the study and the research sample. Further work should then be carried out on this topic also by expanding the research sample to other African countries and beyond the time horizon.

### Disclosure statement

The authors have no competing financial, professional, or personal interests from any other parties.

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