Impacts of Tax Digitalisation on Tax Revenues in Sub-Saharan Africa: A Systematic Review

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Abstract

This study investigates whether and how tax digitalisation reforms operated in sub-Saharan African countries generate more tax revenues. To this end, we performed a systematic literature review based on case-country studies. Our conceptual model shows that new business creation, tax morale, tax compliance, efficiency in tax collection and e-governance are channels through which the digital economy affects the mobilisation of tax revenues. We also found that tax digitalisation significantly improved tax revenues in the sample. However, our findings reveal a scarcity of evidence on the nexus of digitalisation and tax revenues. Further research is needed to fill this gap.

**JEL Code:** M15, E62, O55.

1. Introduction

The main problem underlying this study is the lack of tax resource mobilisation in SSA countries. Recent statistics indicate that the share of tax revenue in the SSA region was approximately 15.39% in 2019 (WIDER). This performance is far below that of Latin America and the Caribbean countries (23.1%) and the Organisation for Economic Co-operation and Development countries (33.8%), (OECD, NU-CEPA, 2020). Moreover, there has been an average decrease of 1.8% in tax mobilisation over the past two decades in sub-Saharan Africa (World Bank, 2020). This low tax performance arises in the context of five main development issues.

First, SSA region remains the poorest region worldwide, with more than 41.2% of the population leaving under the level of extreme poverty, far from the world average of approximately 9.3% (World Bank, 2021). Second, SSA countries poverty reduction strategies have relied on foreign development aid from developed countries since the 1970s. Despite the allocation of these funds at zero or low interest rates, SSA countries continue to excel in the external debt crisis despite the enormous endowment of natural resources. Some authors concluded the “curse of natural resources” in Africa (Auy, 1990; Sachs et al. 2011; Acar, 2017; Smith and Waldner, 2021). These authors observed that countries with great natural resource wealth (fossil fuels, minerals) nevertheless tend to have less governance quality and grow more slowly than resource-poor countries. Third, SSA countries remain characterised by a lack of public infrastructure required to promote private investment. According to the African Development Bank (AfDB), Africa should invest in public infrastructures at least USD 130 billion per year until 2025 to reduce the lack of physical capital (AfDB, 2019). Indeed, these investments are needed to attract private investments and improve access to some basic services, such as education, health, clear water, and electricity. Fourth, since the 2007 economic and financial crisis coupled with the current COVID-19 pandemic, developed countries have faced many economic challenges, leading to a reduction in FA allocation. The total FDA allocated to SSA countries passed from 10.3% of the GDP in 2007 to 6.7% in 2019, indicating a decrease of 35% over the last decade. Last, according to the International Union of Telecommunication (IUT), SSA countries have experienced the highest rate of ICT penetration in the world since the 2000s. The average penetration rate growth of the internet is approximately 51.82% per month in Africa over the period 2000–2021, while the world average is 5.29% (Internet World Stats, 2021). More than 80% of Africa's population has a mobile phone subscription.

Many studies have investigated the impact of ICT on economic growth in Africa (Adeleye & Eboagu, 2019; Chimbo, 2020; Myovella et al. 2020; Solomon & van Klyton, 2020). However, it is less known about the tax revenue generation implications of the digital economy on the continent. Indeed, the digital economy designs activities based on digital computing technologies and the internet. Consequently, sub-Saharan African countries need to improve the mobilisation of domestic resources to reach sustainable goals, in particular, that of alleviating extreme poverty. As these countries already face many challenges, such as the importance of the informal sector and the lack of an industrial sector, one could think that sub-Saharan Africans could take advantage of the digital economy to tackle some of the main constraints of the mobilisation of domestic resources. In theory, digitalisation generates substantial economic growth (Bukht and Heeks, 2017). In particular, endogenous growth theories argue that information communication technologies (ICTs) act as an engine of economic growth (Romer, 1990; Jorgenson and Vu, 2016; Niebel, 2018). Despite these externalities of ICTs on economic growth, less is known about their adoption in the space of the tax system in SSA countries.

From this background, the main question of this paper is to know whether and how the digitalization of tax collection systems could improve tax mobilisation in SSA countries. Specifically,

i. What is the mechanism through which tax digitalisation affects tax revenue mobilisation?

ii. What are the effects of tax digitalisation reform on tax collection performance?

Tax digitalisation is a very recent experience in the SSA region. Thus, the rationale of this paper is twofold. First, by giving insight into past experiences on the continent, this research may guide new countries aiming to implement tax digitalization policies to optimise their performance. Second, by drawing on insights from the survey, this paper provides several suggestions for further research on tax digitalisation in SSA.

2. Tax Digitalisation Experiences In Sub-Saharan Africa

Tax digitalisation can be defined as a process through which governments use information communication and technologies to obtain more accurate and timely information on taxpayer operations. In addition, this new tool of tax systems e-governance improves service delivery by reducing the time and cost of tax declarations to citizens. Indeed, Besley and Persson (2014) indicated that tax systems in developing countries are characterised by
high tax declarations’ costs, which may discourage citizens from paying their taxes. Moreover, these manual tax systems promote corruption through the frequency of in-person interactions between taxpayers and tax collectors.

The digitalisation of tax systems may have many features, such as the electronic filing of taxes that refers to the online submission of tax declarations. According to the 2016 World Bank report on Digital Dividends, the electronic filing of taxes is used in 85% of developed and 65% of emerging countries (World Bank, 2016). Recently, the use of electronic fiscal machines has increased. These machines transmit to tax authorities all information about the enterprise invoices, i.e., the buyers, the nature of articles, the value, the number of transactions. The main advantage of these machines is their ability to record and monitor VAT compliances.

Thus, since the 2000s, digitalisation policies of tax administrations have been implemented in sub-Saharan African countries. The main goal of these digitalisation policies is to improve tax revenue collection by taking advantage of the increasing rate of ICT penetration in the region. Table 1 shows that the adoption of tax digitalisation in SSA countries is very recent and that its diffusion is very scant. Only 12 out of the 45 SSA countries fully digitalised their tax administration, representing 27% of the countries. Kenya is the first country in the sub-Saharan region to digitalise its taxation system. In particular, this country rolled out the use of electronic fiscal machines in 2005. Recently, West African countries have engaged in the digitalisation of their tax systems.

<table>
<thead>
<tr>
<th>N°</th>
<th>Country</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Kenya</td>
<td>2005</td>
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<td>2</td>
<td>Ethiopia</td>
<td>2008</td>
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<td>3</td>
<td>Uganda</td>
<td>2009</td>
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<td>4</td>
<td>Tanzania</td>
<td>2010</td>
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<td>5</td>
<td>Rwanda</td>
<td>2014</td>
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<td>6</td>
<td>Malawi</td>
<td>2015</td>
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<td>7</td>
<td>Nigeria</td>
<td>2015</td>
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<tr>
<td>8</td>
<td>Zimbabwe</td>
<td>2015</td>
</tr>
<tr>
<td>9</td>
<td>Cote Ivoire</td>
<td>2018</td>
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<td>10</td>
<td>Sierra Leone</td>
<td>2019</td>
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<td>11</td>
<td>Benin</td>
<td>2021</td>
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<tr>
<td>12</td>
<td>Liberia</td>
<td>2021</td>
</tr>
</tbody>
</table>

3. Conceptual Framework

Endogenous theories of economic growth have well documented the impacts of ICTs on economic development (Romer, 1990). Many authors also support the positive effects of the digital economy on tax revenues (Gupta et al., 2017; Ndung’u, 2017). In this study, we develop a conceptual model that conceptualises channels through which the digital economy could affect tax revenue mobilisation. From Fig. 1, we show that there are four main channels through which digitalisation has an impact on tax revenues. First, the digital economy generates new business, which in turn increases the country tax base. Second, the digital economy improves tax compliance by giving better information to the tax authority on the identification of individuals and economic activities such as bank transactions and interest income of the private sector. Thus, this information enhances the ability of tax administration to collect and disseminate tax timeliers. Third, the digital economy increases the efficiency of tax administration, implying more cost reduction in tax collection and inspection. Finally, the digital economy allows e-governance by reducing the cost of administrative procedures to citizens. Hence, digitalisation improves public service delivery, which in turn motivates citizens to be good taxpayers.

4. Methodology

The empirical strategy adopted consists of three steps: data collection, data cleaning, and data analysis.

4.1. Data collection and data sources.
In this first step, we undertake a literature search of published academic papers on the effects of tax digitalisation on tax revenue mobilisation in SSA countries. This literature search is done by using a set of keywords related to the relationship between tax digitalisation and tax mobilisation in the SSA region. Therefore, we have two interest variables, namely, digitalisation, tax revenues, and Sub-Saharan Africa.


After collecting the target papers, we scanned the reference list of each paper collected and looked at those articles closely related to our theme of interest. This process is repeated until no appropriate article is found.

The article search was performed on the most popular databases of academic papers, including Scopus, Web of Science, Directory of Open Access Journals (DOAJ), JSTOR, Google Scholar, and Science Direct. Overall, we found 182 articles when using the different above-listed keywords in the first step of the literature search.

4.2. Data cleaning

We used three criteria to manually screen 182 articles obtained from the first step of our literature search. These criteria are as follows: the paper should address the hypothesis of the causal effect or impact of tax digitalisation on tax revenues and should use data from at least one of the 45 SSA countries. These countries are: Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Democratic Republic of Congo, Republic of Côte d’Ivoire, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe. The article should use quantitative approaches (regression analysis, impact evaluation approaches, analysis of variance) for hypothesis tests.

5. Results And Discussion

Table 2 presents the academic published articles found after different screenings related to the relationship between tax digitalisation and tax performance in SSA countries. These results show that fourteen (14) academic published articles used rigorous quantitative approaches to evaluate the effects of tax digitalisation on tax revenue mobilisation in SSA countries. This limited number of articles confirms that tax digitalisation reforms are very recent in SSA countries. To obtain more statistical information from these results, some descriptive statistics are presented.

Figure 2 here

Figure 2 shows that the majority of the studies concluded that tax digitalisation reforms had positive effects on tax revenues generated in SSA countries. Indeed, 62% of the studies argued for positive effects again 37% of the absence of a statistical effect. These results are in line with the theoretical assumptions that digitalisation of tax systems leads to more tax revenue mobilisation. Moreover, our results indicate a zero negative effect of tax digitalisation in the sample of studies investigated.
<table>
<thead>
<tr>
<th>N°</th>
<th>Authors</th>
<th>Title</th>
<th>Year</th>
<th>Journal</th>
<th>Response Tax variable</th>
<th>Tax Digitalisation</th>
<th>Methods</th>
<th>Country</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Abdu Mohammed, Zemenu Tesafa</td>
<td>The Impact of Electronic Tax Register Machines on VAT Compliance in Ethiopia, the case of Bahir Dar city</td>
<td>2015</td>
<td>Journal of Information Engineering and Applications</td>
<td>VAT Compliance</td>
<td>Electronic Tax Register Machines</td>
<td>Logistic Regression</td>
<td>Ethiopia</td>
<td>Positive</td>
</tr>
<tr>
<td>7</td>
<td>OLAOYE &amp; ATILOLA</td>
<td>Effect of E-Tax Payment on Revenue Generation in Nigeria</td>
<td>2018</td>
<td>Journal of Accounting, Business and Finance Research</td>
<td>Tax revenue</td>
<td>Electronic Taxation</td>
<td>Regression</td>
<td>Nigeria</td>
<td>Positive</td>
</tr>
<tr>
<td>No.</td>
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<tr>
<td>10</td>
<td>Chukwuebuka et al.</td>
<td>EFFECT OF E-TAXATION ON REVENUE GENERATION IN NIGERIA A PRE-POST ANALYSIS</td>
<td>2020</td>
<td>Academy of Entrepreneurship Journal</td>
<td>Tax revenue</td>
<td>Electronic Taxation</td>
<td>Regression</td>
<td>Nigeria</td>
<td>Positive</td>
</tr>
<tr>
<td>13</td>
<td>Mascagni, Mengistu, &amp; Woldeyes</td>
<td>Can ICTs increase tax compliance? Evidence on taxpayer responses to technological innovation in Ethiopia</td>
<td>2021</td>
<td>Journal of Economic Behavior &amp; Organization</td>
<td>PIT</td>
<td>Electronic sales registration machines</td>
<td>RCT</td>
<td>Rwanda</td>
<td>Insignificant</td>
</tr>
</tbody>
</table>
To investigate the interest of authors on the structure of the response interest variable, namely, tax revenues, we decomposed the latter into tax revenues, value-added tax (VAT) revenues, personal income tax revenues (PIT) revenues and tax compliance. The results presented in Fig. 3 indicate that the majority of studies (44%) used tax compliance as an indicator of tax performance, followed by total tax revenues (25%) and VAT revenues (25%). Less attention has been given paid to personal income tax revenues (PITs). This result can be explained by the importance of the VAT in the total tax revenues in SSA countries.

Finally, Fig. 4 presents the spatial distribution of the studies. From this figure, we note that half of the studies are focused on Ethiopia and Nigeria, while some countries recorded no study. Apart from Tanzania, countries that did not record a study are all new adopters of the tax digitalisation reform. In addition, these results are subject to our methodology used, especially the criteria for the inclusion of articles.

6. Conclusion
This research attempts to examine the impacts of the digitalisation of tax administration in sub-Saharan Africa through a systematic review of academic published articles. First, we developed a conceptual framework that shows new business creation, better tax compliance, and the reduction in the cost of tax collection are the main channels through which digitalisation impacts tax revenues. Second, we found that tax digitalisation in the region is scanty and very recent. Only 27% of countries operated the tax digitalisation reform with the first experience in 2005. From fourteen (14) academic published articles investigated, we finally concluded that tax digitalisation has significant positive effects on tax revenue collection in Sub-Saharan Africa. Further studies are encouraged to conduct empirical studies on the effects of tax digitalisation policies using rigorous impact evaluation methods in Sub-Saharan Africa.

Declarations
Purpose
This study investigates whether and how tax digitalisation reforms operated in sub-Saharan African countries generate more tax revenues.

Design/methodology/approach
To this end, we performed a systematic literature review based on case-country studies.

Findings
Our conceptual model shows that new business creation, tax morale, tax compliance, efficiency in tax collection and e-governance are channels through which the digital economy affects the mobilisation of tax revenues. We also found that tax digitalisation significantly improved tax revenues in the sample. However, our findings reveal a scarcity of evidence on the nexus of digitalisation and tax revenues.

Research limitations/implications
Further research should focus on empirical work in the digitalisation-tax revenue nexus in Africa.

Originality/value
This study in the one rare work that focused on the literature gap in digitalisation-tax revenue nexus in Africa.
References


Figures
Figure 1
Revenue impacts of digital economy

Figure 2
Effect on Digitalisation on Tax Revenues
**Figure 3**
Composition of tax revenue

**Figure 4**
Spatial distribution of studies