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**The role of mobile money adoption in moderating the influence of access to
finance in firm performance**

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Abstract

Africa is becoming the fastest-growing continent despite significant challenges to accessing finance and the use of technology. This research aims to examine the direct effect of mobile money adoption on firm performance and its indirect effect by examining how it moderates the effect of access to finance on firm performance. Quantitative data were obtained from the World Bank Enterprise Survey for Cameroon, Ivory Coast and Zimbabwe. A series of hierarchical regression analyses were done to test the hypotheses. The main findings show a negative significant relationship between mobile money adoption and firm performance while access to finance had a positive relationship. The moderation effect though positive was not significant. Research examining the effect of mobile money adoption in Africa on firm performance is limited and existing studies have focused on the determinants of mobile money usage.

Keywords: Mobile money, Access to Finance, Firm Performance, Resource-based view, Sub Saharan Africa.

1. Introduction

Information and communication technology (ICT) has transformed the world by connecting people and places (Buys et al. 2009) and by digitising the way firms do business (Asongu and Nwachukwu, 2016a; 2016b; Ngoasong, 2017; Ashurst et al., 2011; Ferreira et al. 2018; Eiriz et al. 2018; Efobi et al. 2018; Koellinger 2008; Mohsen et al. 2019; Tchamyou 2019). One such technology that is currently revolutionising the way firms do business in Africa is mobile money (Lorenz and Pommet 2021; Senyo and Osabutey 2020). Mobile money is a financial technology (Fintech) that facilitate the financial transaction between firms, customers, suppliers and employees through making and receiving payments (Aker and Mbiti 2010; Ferreira et al. 2018; Tchamyou et al. 2019; Gosavi 2018; Wanyonyi and Bwisa 2013). It is a service delivery platform where money is accessed and spent using a mobile phone (Jenkins, 2008; Lorenz and Pommet 2021; Ngaruiya et al.2014). Moreover, the firms that do business can also be influenced by their financial viability as a lack of access to finance may limit their entrepreneurial activities (Bottazzi et al. 2014; Lorenz and Pommet 2021). Accessing finance is vital to entrepreneurs as it enables them to take risks and pursue entrepreneurial activities, supporting their growth and contributing to wider economic development (Pellegrina et al. 2017; Ayyagari et al. 2011).

The resource-based view (RBV) (Barney 1991; Wernerfelt 1984) highlights the configuration of resource combination to achieve a competitive advantage that produced desired firm outcomes. Access to finance and mobile money usage represents two important firms resources whose configuration has not received due consideration. First, literature on mobile money is limited and has focused on the antecedents of mobile money usage (e.g., Senyo and Osabutey 2020) and perceived intention to use mobile money (Baganzi and Lau 2017). A recent study by Lorenz and Pommet (2021) shows how mobile money influences firm innovation and that such a relationship is mediated by whether the firm is a financial constraint. An examination of the direct effect of mobile money usage on firm performance is therefore required to influence its usage as a tool for gaining competitive advantage. Second, while access to finance has been a barrier to entrepreneurial activities for firms, which limited their performance (Bottazzi et al. 2014; Tagoe et al. 2005; Fowowe 2017; Adegboye and Iweriebor 2018), the use of such technology may complement the limitations of access to finance. This is because its usage reduces the operational cost that the firm could have incurred in carrying out its business activities through creating better communication channels and increasing sales (Behera et al. 2014; Lee and Grewal 2004). The question to be

answered is, therefore: What is the moderating effect of mobile money usage on the relationship between access to finance and firm performance?

To address the above question, we obtained data from the World Bank Enterprise Survey (WBES) on mobile money usage, access to finance and firm performance for three African countries (Cameroon, Ivory Coast, and Zimbabwe) with available data. We then used hierarchical regression to test our hypotheses. We explore other variables and examine their effects to rule out alternative explanations. Our result, therefore, makes the following contribution. First, given that, existing studies have focused more on analysing the determinant and usage of mobile money (e.g., Senyo and Osabutey 2020), we extend these studies by showing how usage of mobile money affect firm performance directly and indirectly through its moderation effect on access to finance. Based on the RBV, we provide a possible explanation of what could be done for the configuration of mobile money and access to finance to have a more desirable effect on firm performance. Second, technology is rapidly evolving (Kyobe 2004) and while its effect is well established in Western economies, there is a need to explore its impact on another context (Fuller-Love 2000) and most especially on how its usage affect firms in the private sector (Islam et al. 2018; Eiriz et al. 2018). Our examination of the direct and indirect effect of mobile money usage on firms from three African countries demonstrates an understanding of how technology usage may affect firms in the private sector and therefore provide both policy and managerial implications. Finally, our context is relevant because it is characterised by resource scarcity (especially about financial availability) and a high potential for the penetration of information technology (Ngoasong 2018; Efobi et al. 2018). The context is important due to the increased use of mobile money services by firms (Islam et al. 2018; Baganzi and Lau 2017). Such increase has been facilitated by the increase in mobile phone usage (Asongu and Nwachukwu 2016a; 2016b; Essegbey and Frempong 2011).

The remainder of the paper is structured as follows. Section 2 developed the theoretical argument underpinning our framework. Section 3 discusses the hypothesised relationships. Section 4 presents the method and the analytical model. We present and discuss the results. Section 6 focuses on the contribution and section 7 the limitation and areas for further research.

2. Theoretical framework

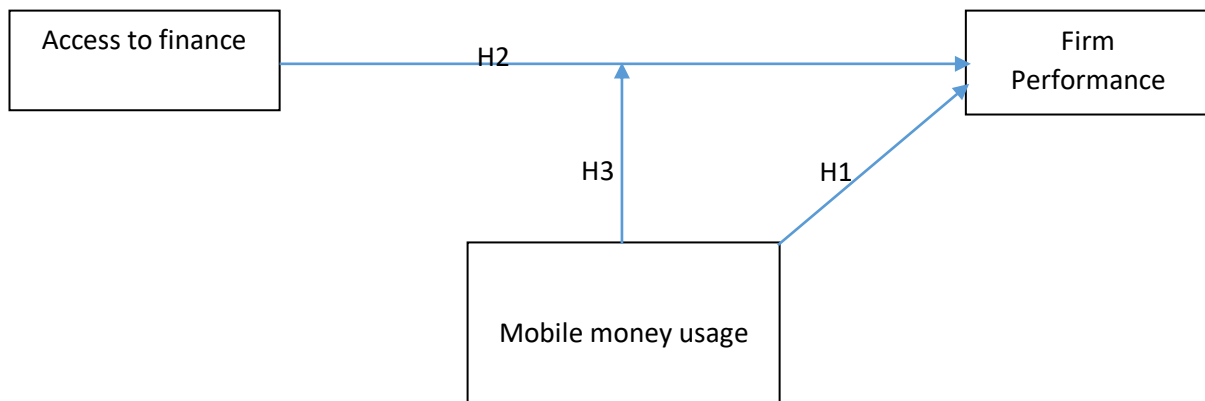
The RBV suggests that the position of a firm in the marketplace could be determined by its resources (Kim et al. 2015). A resource is “anything which could be thought of as a strength or weakness of a given firm” (Wernerfelt 1984, p. 172). Such resources can be tangible or intangible and include, amongst others; technology, finance, equipment, brand name, personal, and expert knowledge. For such resources to enable the firm to gain a competitive advantage, Barney (1991) argued for them to have specific characteristics such as being valuable, rare, inimitable and non-transferable. These characteristics create competitive advantage because their transferability will be costly and difficult. If other firms cannot imitate such resources, they create causal ambiguity due to a lack of understanding of their interactions. Scarcity makes such resources unique to the firm and act as a barrier to entry while also being able to provide value to the firm in terms of positive outcomes. Also, central to the RBV is a resource combination or configuration. Such combination involves exploring how best to use the firms to ensure they provide benefits to the firm, increase their effectiveness and efficiency, and act as a trigger for the firm’s innovation (Paladino 2007). This is important as the business environment is rapidly changing, customer’s preferences seem very volatile, and technology used can be combined to help transform these scenarios to make sure firms can sustain such competition and satisfy customers’ needs effectively.

Access to finance and the use of technology (mobile money) represent scarce and valuable resources for firms in Africa (Ngoasong 2018; Senyo and Osabutey 2020). Africa has the fastest-growing population in the world and this presents a market opportunity for businesses to exploit (George et al. 2016). Due to the lack of alternative sources of finance in Africa, we have adopted bank financing in terms of loans or overdrafts from financial institutions as a source of finance, which is consistent with existing literature (Ayyagari et al. 2011). Lack of collaterals and poor creditworthiness is a limiting factor for firms gaining access to finance in Africa as it increases their likelihood of default (Bottazzi et al. 2014; WBES, 2016). Gaining access to finance therefore gives the firm financial viability to invest in its activities and improve its performance. Due to competition in the marketplace, business efficiency in terms of developing a system that facilitates transactions is important for better customer experience and performance. This is where the role of mobile money takes centre stage to facilitate the business transaction by facilitating cashless transactions which reduce the demand for physical cash to meet business transactions and allow the firm to focus on managing its business (Wamboye and Bwisa 2013). Because buyers and suppliers are easily

connected, transaction times are reduced; there is great flexibility with suppliers which results in faster operations and better performance (Eirit et al. 2018). Cost reduction from mobile money usage free up extra resources that could be invested in other areas and increase financial transaction also reduces credit constraints and improves financial viability to operate efficiently (Lorenz and Pommet 2021). Resource combination may have a desirable effect on firm performance. However, with limited research on mobile money, we examine its interaction with other firms' resources (finance) on firm performance. This is based on the fact that mobile money creates opportunities for firms, and they can use their finances to maximise such opportunities. Based on the above, we present a framework (fig. 1) that guides our hypotheses below.

Fig. 1.

The moderating effect of mobile money usage on the relationship between access to finance and firm performance



3. Hypotheses development

3.1. Mobile money and firm performance

Technology adoption is an important resource due to the variety of impacts it has on firm operations and its influence on firm performance (Eiriz et al. 2018; Islam et al. 2018; Mohsen et al. 2019; Koellinger 2008). However, empirical studies suggest contradictory evidence on how technology usage affects firm performance. On the negative side, this is evidence in Kim (2017) using manufacturing firms in Korea by arguing that firms may not be knowledgeable in maximising the benefit of technology. Also, mobile money users and providers should be wary of its risks, particularly the risk of fraud, and of providing poor services to users, which

may mean the public loses faith in the platform (Masocha and Dzomonda 2018; Baganzi and Lau 2017). Eiriz et al. (2018) indicate that the impact of technology on the performance of food retailers was not positive and suggest that technology adoption entails costs that do not generate immediate benefits (Eiriz et al. 2018). On the positive side, technology usage simplifies administrative processes by eliminating unproductive tasks and delivering products to customers in a new way different from what the firm normally does (Koellinger 2008). As a result, technological adoption such as mobile money reduces cost, time constraints, and therefore increases operational efficiencies and therefore firm performance (Senyo and Osabutey 2020; Lorenz and Pommet 2021; Ngaruiya et al. 2014; Wanyonyi and Bwisa 2013). Technology usage help firms to collect information from customers and such information could help in making strategic decision for the firm (Tagoe et al. 2005). Such decisions may include developing new products and services to satisfy customers need and sustain their competitive advantage, which therefore influences the firm's performance (Mohsen et al. 2019; Fuller-Love 2000).

Also, Bharadwaj et al. (1999) reported a positive relationship between information technology and firm performance for IT companies in the USA and based their argument on the fact that adopting technology brings plenty of intangible benefits to the firm. Such a positive effect is also confirmed by Lee and Grewal (2004) on the fact that technology adoption creates a communication channel that firms build alliances and increase sales. Focusing on the banking and software firms in India, Behera et al.(2014) argued that technology adoption enables firms to redesign the management of service delivery in a way that is opposed to traditional systems. The reduction of financial constraints and timesaving from the use of mobile money are ways through which it can influence firm performance (Lorenz and Pommet 2021; Ngaruiya et al. 2014). This is because financial transactions that could have required physical travels are being done electronically which saves time and cost (Koellinger 2008). Such time saving and cost, free up financial resources that are then allocated to productive activities and therefore help improve performance. Moreover, mobile money usage is a valuable resource that firms may use for different purposes to gain a competitive advantage. The way firms incorporate this into their business activities can be unique and therefore makes it non-transferable. Firms can conduct financial transactions without using a bank account anywhere and anytime and therefore facilitate transactions even with clients without a bank account. With existing studies focusing on behavioural outcomes by examining the antecedent of mobile money usage (e.g., Senyo and Osabutey 2020), its

actual effect on firm performance has not been examined. We, therefore, state our first hypothesis thus;

H1: Mobile money usage will have a positive effect on firm performance.

3.2. Access to finance and firm performance

Another resource under consideration in this research is access to finance, which is a significant challenge for firms in SSA (Tagoe et al. 2005; Fowowe 2017). Our sample estimates, from the World Bank Enterprise Survey 2016 data, suggest that while 85.66% of firms have a bank account, just 18.27% have access to credit, indicating a major obstacle to firm performance. Firms in SSA have limited access to finance due to lack of collateral and poor creditworthiness, amongst other factors (Bottazzi et al. 2014; WBES 2016). Tagoe et al. (2005) suggest that, unlike small firms, large firms can provide information about the current operation to the banks, have better collateral and banks can use the legal system to recover nonperforming loans. This, therefore, reduces the banks' perception of the risk of large firms. Access to finance (loans/credits from financial institutions) is an important determinant of firm performance through an increase in sales as a result of expanding its operations, being more innovative in developing new processes and products (Lorenz and Pommet 2021) and investing in the recruitment and training of staff (OECD, 2006).

Extant research (e.g., Musso and Schiavo 2008) suggests a negative relationship between lack of access to finance on firm performance in the long run and not in the short run. This is because in the short run, firms that are financially constrained often develop a strategy of cost-cutting, which helps them generate extra resources to function efficiently (Musso and Schiavo 2008). Nevertheless, in the long run, this may not be sustainable. In the longrun, Bottazzi (2014) suggests that lack of access to finance will constrain the firm's activities and they will struggle to seize growth opportunities, which further deteriorates the growth prospects for the corresponding firms. Fowowe (2017) examined 30 African countries and show that firms that are financially not constrained have faster growth than firms that are credit constrained and encourage African governments to develop policies for understanding the financial system in Africa and how firms can gain increased access to finance. Ayyagari et al. (2011) analysed data from African countries to suggest that access to external finance is associated with greater innovation. Ayyagari et al. (2011) also suggest the development of policies to improve access to finance because its effect on the firm has implications for

economic growth. We suggest therefore that access to finance will influence firm performance and therefore state our second hypothesis thus;

H2: Access to finance will have a positive effect on firm performance.

3.3. Moderation effect of mobile money adoption

The above hypotheses have argued for the direct effect of access to finance and mobile money usage on firm performance. However, the centre of the RBV is also the aspect of how firms can reconfigure their resources to achieve the desired outcome or whether the effect of combining resources is better than the effect of individual resources. Mobile money adoption can transform the management process of firms in terms of how they deal with different stakeholders such as customers and suppliers. Mobile money adoption enables real-time transactions that provide a cost-effective way of functioning. The impact of this cost-effectiveness is an increase in performance. Mobile money is a classic example of recent technological change blowing across Africa that provides firms with new opportunities as well as enables them to sustain their competitive advantage. In such a situation where technology automatically creates market opportunities, firms do not need to spend financially to maintain a competitive advantage and sustain their performance. Besides, the reduction of transaction cost via mobile money usage may reduce liquidity equipment and therefore free up resources that can be invested in other areas (Lorenz and Pommet 2021). By reducing transaction cost through mobile money usage, what the firm needs is to focus on and leverage its financial viability to attain its competitive edge. Therefore, firms with access to finance from financial institutions will benefit from improved performances. This is because the firms will be able to invest in R&D to introduce new products and services and expand their operations and the efficiency of their business activities. We, therefore, suggest state our third hypothesis thus;

H3: Mobile money usage will moderate (strengthen) the positive effect of access to finance on firm performance.

4. Research context and data

Sub-Saharan Africa (SSA) is witnessing a dramatic increase in access to, and use of the mobile telephone (Wamboye et al. 2015; Ejemeyovwi and Osabuohien 2020) with mobile-cellular telephone subscriptions per 100 inhabitants currently at 75.3% (ITU 2019). The

research context is Cameroon, Ivory Coast, and Zimbabwe, which reflect some of the SSA countries that have embraced mobile money and based on available data. These countries have distinctive geographic context commonalities and yet notable institutional and technology contextual differences. They are contexts that are underexplored and characterised by resource scarcity (Ngoasong and Kimbu, 2016) or institutional voids (George et al. 2016). The data used for this research is obtained from the World Bank Enterprise Survey 2016 (WBES 2016). WBES 2016 data is selected since it is the most comprehensive year, with available data for the three countries under investigation and is collected from enterprises across emerging economies using the same methodology (Cumming et al. 2014). Using a random stratified sample, the WBES collects data on a variety of firm variables from manufacturing, service, and other firms, to understand the investment climate in emerging economies. Due to the quality of the WBES data, it is increasingly used in business research (e.g, Cummiing et al.2014; Tajeddin and Carney 2018; Islam et al. 2018). The WBES was used to collect data on firms' adoption of mobile money. As a result, we obtained a total sample of 1,322 firms with 361 from Cameroon, 361 from the Ivory Coast, and 600 from Zimbabwe.

4.1 Measurement of variables

4.1.1. Independent variables

The first independent/moderator variable is mobile money usage. This was obtained from the WBES in which firms were asked, “does the establishment uses mobile money?” This is a binary variable with “1” = yes indicating that firms use mobile money and “0” = no, implying that they do not. The second independent variable is access to finance. Studies such as Gosavi (2018) have measured it based on whether the firm has a bank account or not, and whether the firm also has a bank loan from a financial institution. We have measured access to finance as captured by the WBES data based on whether “the establishment has a line of credit or loan from financial institutions?” with “1” = yes indicating that they do have loans from financial institutions and “0” = no, implying they do not. These measures represent the most available external source of finance for small businesses in Africa (Ayyagari et al. 2011)

4.1.2. Dependent variable

Total annual sales are used as our dependent variable. Firms were asked to know their total annual sales in the last fiscal year (WBES 2016). Annual sales were logged to make the

variables comparable. The use of such objective measures against perception measures helps minimise issues of common method bias (Podsakoff et al. 2003).

4.1.3. Control variables

We have taken into consideration some firm characteristics that may influence firm performance. We have therefore controlled for the size of the firm based on the number of employees (micro = < 5 employees; small = ≥ 5 and ≤ 19 ; medium = ≥ 20 and ≤ 99 and large = ≥ 100 employees). Respondents had to respond with “1” = small, “2” = medium and “3” = large. Literature (e.g, Lorenz and Pommet 2021) suggest how firm size may influence their access to credit and or performance. We also controlled for managers’ experience (based on the number of years of managerial experience, and this was a continuous variable that was logged normalised). Also, we control for the gender of the manager, with a value of 1 assigned as the answer to the question of when the gender of the manager is female and 0 when the gender is not female. Research suggests women are more risk-averse, spend the firm’s money carefully by making a careful investment decision, which affects the firm’s performance. We control whether formal training is being provided to staff with “1” = yes and “0” = no. Whether they invest in research and development with “1” = yes and “0” = no. Moreover, innovation in terms of new product/service being introduced over the past three years with “1” = yes new product/service was introduced and “0” = no and control for the sector. Table 1 below presents a summary of the variables and their measurements as obtained from the WBES.

Table 1

Variable description

4.2. Common method bias and endogeneity

Endogeneity arises as a result of many factors and no amount of ex-post analysis could completely control its effect (Richardson et al., 2009). We have used cross-section data for our analysis, which may be associated with issues of common method bias (CMB). As a result, we have used different techniques to control for such based on existing literature. According to Chang, Van Witteloostuijn, and Eden (2010), using data from different contexts minimises the occurrence of multicollinearity. We also examine correlations between our variables and compute the variance inflation factor (VIF). Our highest correlation is 0.5 (see table 2 below) and our mean VIF for each model is less than 2 and given the fact that both are

within acceptable ranges, CMB does not present a threat to our data (Tabachnick and Fidell 2001). We believe therefore that the data collection process by the WBES is robust and reliable to minimise such threat of CMB based on the following reasons: (1) it guarantees anonymity and confidentiality of participants, 2) the questions are asked in simple English for easy understanding and there is no use of vague and terminology that participants can miss interpreting. Podsakoff et al., (2003) these points as ways of minimising CMB, 3) With participants being required to answer more than 50 questions of different scales, their cognitive ability to recall previous responses to try to establish relationships are reduced (Baker et al., 2016) and it is also unlikely that the cognitive ability of respective participants across countries will be the same (Podsakoff et al., 2003). To control for endogeneity, we have carefully selected theoretically sound control variables (see 4.1.3), adopt a hierarchical analysis by regressing our control variables against our dependent variable without the independent variables in the first regression. We then add our independent variables to the regression and finally our interaction term. By adding more variables, we can observe changes between our dependent and independent variables. Finally, by using other variables to test for the robustness of our model, we help provide alternative explanations that help control for endogeneity (Jean et al., 2016).

Table 2

Descriptive and correlation statistics

5. Data analysis and results

We report the result of the hierarchical regression that provides an understanding of the moderating effect of mobile money usage on the access to finance – firm performance relationship. A series of hierarchical OLS regressions were conducted. The starting point was to regress the control variables against annual sales (i.e. firm performance), as shown in Table 2, model 1. In doing so, we were able to see how much the controls could provide an alternative explanation for our respective models. After this, we test the direct effects of access to finance and mobile money usage on firm performance followed by the interaction effect of mobile money usage and access to finance on firm performance. In addition to all these, we ran a series of robustness tests to strengthen the contribution of our model. However, before presenting the results corresponding to the tested hypotheses, for contextual relevance, we will present the findings on the cross-country analysis for an overview of access to finance and mobile money usage for contextual relevance.

The results of the effect of mobile money usage on firm performance, as shown in table 3 model 3 is significantly negative ($\beta = -0.821$, $SE = 0.195$, $P = 0.000$). This result was contrary to our hypothesis about the positive effect of mobile money adoption on firm performance. This negative significance, therefore, suggests the adoption of such technology will have a negative effect on firm performance.

Table 3

Regression results on the moderation effect of mobile money usage and access to finance on firm performance

We, however, found a significant positive effect on access to finance on firm performance as shown in table 3 model 1 ($\beta = 1.763$, $SE = 0.254$, $P = 0.000$) and therefore hypothesis H2 is confirmed. This means that firms with access to finance (loans from financial institutions) will experience an increase in performance due to the impact of the loan on their businesses. With regards to the interaction effect of mobile money usage and access to finance, table 3 model 4 suggest that despite the interaction effect being positive, it was not significant ($\beta = 0.393$, $SE = 0.488$, $P = 0.427$) but such a positive effect shows how valuable it could help a firm sustain its competitive advantage and improve performance.

5.1. Robustness Checks.

To check the robustness of our results, we have used other measures of access to finance. This includes a bank overdraft in which firms are asked in the WBES whether the firms have an overdraft from a financial institution with “1” =Yes and “0” = No, they do not. Just as financial loans, bank overdraft offers firms an alternative source of finance to invest and expand on their business activities and therefore improves performance. Table 3 model 5 shows that the direct effect of bank overdraft on firm performance was significant ($\beta = 1.969$, $SE = 0.187$, $P = 0.000$). Nevertheless, the interaction effect between mobile money usage and bank overdraft on firm performance through positive was not significant as shown in table 3 model 6 ($\beta = 0.311$, $SE = 0.409$, $P = 0.451$). The literature review provides a variety of reasons why firms adopt mobile money and the uses of mobile money services. We, therefore, examine whether any of this is associated with performance improvement as a way of providing evidence for policy and practical implications. Table 4 models 2 and 3 suggest the reasons for and uses of mobile money adoption were not significantly related to firm performance. The only significant effect, which was negative, was that its use was to align with competitors’ usage of the technology.

Table 4

Robustness test.

6. Discussion, contributions to knowledge and managerial implications

This research aimed to examine whether the interaction effect of mobile money adoption and access to finance on firm performance was significant. We developed hypotheses suggesting that the impact of adopting such technology on the firm performance will be positive and that firms with access to finance will benefit from positive performance. With the main effects well established, we then build our argument for the interaction effect of mobile money usage and access to finance on firm performance. Using data from the WBES on SSA countries, we were able to test our framework (see fig. 1 above) and contributes to the existing literature on mobile money in several ways. First, we draw on the resource-based view to develop and test our framework for examining the interaction effect of mobile money adoption and access to finance on firm performance in SSA. Our result shows that the effect of individual firm resources was not positively related to the firm's performance. As expected, having access to finance either in the form of credit or bank overdraft enables the firms to invest in its business activities to sustain competitive advantage and improve its performance, which is in line with existing literature (e.g., Ayyagari et al. 2011; Fowowe 2017; Bottazzi 2014). Surprisingly, however, mobile money usage had a negative significant effect on firm performance which was contrary to existing literature demonstrating the positive effect of technology usage on firm performance (e.g., Bharadwaj et al. 1999; Kyobe 2004; Lee and Grewal, 2004; Behera et al., 2014). Specifically, we contradict the limited studies on mobile and firm performance in Africa. This includes Ngaruiya et al. (2014), who used self-administered questionnaires to collect data in a single city (Nakuru- Kenya), measuring firm performance using sales revenue. Masocha and Dzomonda (2018) also used self-administered questionnaires from various towns in Zimbabwe and measured firm performance using a composite measure. Wanyonyi and Bwisa (2013) used questionnaires to collect data in a single town in Kenya and used sales increases for firm performance.

We provide a possible explanation for this negative relationship. First, these studies are however are focused on just one city in a country. They are also methodologically weaker than our research and are not based on a sound theoretical underpinning. Our research involves firms from major business cities across three different SSA countries. Our research is also more robust because we have conducted a series of tests on possible reasons why firms

adopt mobile money and the uses of mobile money on firm performance. Second, the negative effect of our results aligns with Kim (2020) arguing that firms may not be knowledgeable in maximising the benefit arising from the usage of such technology. This could be relevant in SSA where technology infrastructures are still developing and integration of such technology into the firm's operating system may take a long time to materialise real benefits (Eiriz et al. 2018). Such evidence is supported by Kyobe (2004) who said that lack of technical knowledge and skill to make technology works might hinder its benefit from materialising. Firms, therefore, need to develop this unique resource and better incorporate it into their business activities. This will increase their resource base and enable them to develop and expand on business activities which increase their performance. We did not, however, find a significant interaction effect of mobile money adoption and access to finance on firm performance as expected. What this implies is that in situations where technology (mobile money) automatically creates a competitive advantage, firms should be cautious on how they invest financial resources to introduce innovation and take advantage of this competitive edge. Therefore, firms need to use their financial resources not just to develop new products and services and expand their business activities but also to engage in other areas that can give them a competitive advantage. This is because the usage of such technology may not compensate for the competitive advantage that could have been developed through financial investment. Such firms will need to build alliances to minimise cost and benefit from external knowledge or resources. Another reason for the lack of interaction effect may be that the competitive advantage of mobile money turns to provide are not beneficial in improving the firm's performance. This is evidence of our robustness test in which the reasons for using mobile money and the uses of mobile money were not positively and significantly influencing firm performance.

Second, we contribute to the existing literature on mobile money, which has focused on the antecedents of mobile money usage (Senyo and Osabutey 2020), perceived intention to use mobile money (Bganzi and Lau 2017) and how firm financial constraints mediate the relationship between mobile money usage and firm innovation (Lorenz and Pommet 2021). For example, Senyo and Osabutey (2020) examine whether performance expectancy (a benefit that may accrue from mobile money usage) influences the intention of the firm to use mobile money. Our research examines the direct and indirect effect of mobile money usage on firm performance and our negative direct effect shows that these behavioural expectations of mobile money usage may not provide a desirable impact in practice. This is further

demonstrated by the fact that our analysis of the reasons and uses of mobile money usage was not found to significantly and positively influence firm performance. Given the fact that existing studies on mobile money have focused on the technology acceptance model, the use of resource-based, the view provides a different perspective to understand how we can conceptualise the use of such technology as a resource that has implications on the firm performance. Third, we respond to existing studies calling on how technology is used by firms in the private sector (Islam et al. 2018; Eiriz et al. 2018) and in a different context (Fuller-Love, 2000) to inform and operationalise businesses (Kyobe 2004). We showed that why mobile money usage by firms in Africa is growing, there should be caution about its direct and indirect effect on firm performance. Lack of significant moderation effect and the presence of a direct negative effect of mobile money on firm performance may be due to some factors. For example, the development and integration of such technology into the firm's business processes may need good leadership, architecture planning, and business system thinking to ensure the benefit does not outweigh the cost of using such technology (Ashurst et al. 2011). Also, firms may need to use such technologies to differentiate and introduce new product/service that differentiates them from their competitors and meet the needs of their customers (Kyobe 2004).

7. Limitations and further research

The contribution we make is not without its limitation. First, our study focuses on three SSA countries with available data on mobile money, access to finance and firm performance in a specific year, which is the most comprehensive we could get. However, while these countries may not be too different from others within SSA due to institutional similarities (George et al. 2016), broad generalisation of our findings could only be possible when more data is collected from other SSA countries or non-African developing countries. Given that the value of technology usage on firm performance is dependent on the capabilities that have been built to make it work, we have not explored the types of capabilities that these firms have to engage to maximise the benefits of mobile money usage. Such is left for future research. Moreover, because it takes time for the impact of technology adoption to materialise (Eiriz et al. 2018), studies that use longitudinal data are also worthwhile in assessing the effect of time on mobile money adoption (Baganzi and Lau 2007). Firms have different uses and reasons for using mobile money, which may influence their effect on firm performance. An examination of how these reasons and uses of mobile money mediate its effect on firm performance will be a welcome avenue for further research and will complement Lorenz and

Pommet(2021) calling for research to examine mechanisms through which mobile money usage may influence firm innovation.

8. Conclusion

Our research aimed to examine the direct and indirect relationship between a firm's usage of mobile money and access to finance on firm performance. Using the RBV, we conceptualise finance and mobile money usage as valuable resources that could influence a firm's performance directly. Moreover, due to resource configuration, we whether the interaction effect of mobile money usage and access to finance could be desirable for the firm's performance. Our result shows that while access to finance had a positive significant effect on firm performance, mobile money usage had a negative effect and the interaction effect between mobile money usage and access to finance through positive was not significant. We moved away from existing studies focusing on the determinants of mobile money to a focus on the effect of its usage on a firm's outcome using objective measures of performance (annual sales). While providing a possible explanation for our results and how they contribute to existing literature, our study provides avenues for more exploration on how mobile money influences firm performance.

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Table 1**Variable description**

Variables	Measure	Data Source
Annual Sales	Log total annual sales	WBES
Mobile money usage	A dummy variable, coded as '1' if a firm uses mobile money technology and "0" if not.	WBES
Access to finance	A dummy variable coded as "1" if the firm has a loan from a financial institution "0" if not.	WBES
Firm size	A categorical variable coded as "1" = small firms, "2" = medium and "3" = large	WBES
Managers experience	A continues variables on the number of years of experience the manager has in the industry (log)	WBES
Formal staff training	A dummy variable coded as "1" if the firm provides training to staff and "0" if not.	WBES
The firm is part of a large establishment	A dummy variable, coded as "1" if the firm is part of a large establishment and "0" if not.	WBES
Investment in R&D	A dummy variable, coded as "1" if the firm invests in R&D and "0" if not.	WBES
Introduction of new products	A dummy variable, coded as "1" if the firm introduces a new product and "0" if not.	WBES
Sector	A categorical variable coded as "1" if it is a manufacturing sector, "2" = retail services, and "3" = other services.	WBES
Managers experience	A continues variables on the number of years of experience the manager has in the industry (log)	WBES
Male manager	A dummy variable, coded as "1" if the firm has a male manager and "0" if not.	

Table 2: Descriptive and correlation statistics

	1	2	3	4	5	6	7	8	9	10	11	12
Annual Sales (1)	1.0000											
	(0.0000)											
Mobile money usage (2)	-0.1871	1.0000										
	(0.0000)	(0.0000)										
Access to loan (3)	0.3423	-0.0390	1.0000									
	(0.0000)	(0.3609)	(0.0000)									
Firm size (4)	0.5080	-0.1349	0.1704	1.0000								
	(0.0000)	(0.0015)	(0.0001)	(0.0000)								
Managerial experience (5)	0.2196	-0.0332	0.1125	0.1435	1.0000							
	(0.0000)	(0.4371)	(0.0083)	(0.0007)	(0.0000)							
Formal staff training (6)	-0.2894	0.0241	-0.1866	-0.1204	-0.0572	1.0000						
	(0.0000)	(0.5735)	(0.0000)	(0.0047)	(0.1802)	(0.0000)						
Firm is part of a large establishment (7)	-0.3474	-0.0014	-0.0982	-0.2764	-0.0338	0.1344	1.0000					
	(0.0000)	(0.9730)	(0.0213)	(0.0000)	(0.4283)	(0.0016)	(0.0000)					
Investment in R&D (8)	-0.1967	-0.0136	-0.0618	-0.1794	0.0315	0.1042	0.0926	1.0000				
	(0.0000)	(0.7505)	(0.1475)	(0.0000)	(0.4616)	(0.0144)	(0.0299)	(0.0000)				
Introduction of new product (9)	-0.1246	-0.0376	-0.1599	-0.0431	-0.0482	0.1713	0.1446	0.1400	1.0000			
	(0.0034)	(0.3792)	(0.0002)	(0.3126)	(0.2588)	(0.0001)	(0.0007)	(0.0010)	(0.0000)			
Sector (10)	-0.0240	0.0332	-0.0144	-0.1439	-0.0636	-0.1127	-0.0396	0.0639	-0.0056	1.0000		
	(0.5745)	(0.4378)	(0.7353)	(0.0007)	(0.1365)	(0.0082)	(0.3541)	(0.1345)	(0.8961)	(0.0000)		
Firm experiences power outages (11)	0.0873	-0.0570	0.0872	0.0502	0.0948	-0.0622	-0.0486	-0.0411	-0.0509	-0.0578	1.0000	
	(0.0408)	(0.1821)	(0.0410)	(0.2401)	(0.0263)	(0.1451)	(0.2549)	(0.3362)	(0.2332)	(0.1757)	(0.0000)	
Male manager (12)	0.0579	0.0630	0.0949	-0.0280	0.1125	0.0464	-0.0321	0.0421	0.0619	0.0067	0.0151	1.0000
	(0.1748)	(0.1398)	(0.0260)	(0.5128)	(0.0082)	(0.2778)	(0.4523)	(0.3239)	(0.1474)	(0.8751)	(0.7239)	(0.0000)
N	1243	717	1259	1305	1269	1308	1322	1305	1316	1322	1320	1322
Mean	15.8286	0.200837	0.18189	1.675862	2.68442	1.664373	1.614221	1.882759	1.667173	1.97882	0.828788	0.80938
SD	3.343251	0.400906	0.385907	0.758333	0.704551	0.47239	0.486963	0.321831	0.471404	0.854877	0.376837	0.392939
Min	10.12663	0	0	1	0.693147	0	0	0	0	1	0	0
Max	24.12335	1	1	3	3.912023	1	1	1	1	3	1	1
Robust p values in parentheses												

Table 3

Regression results on the direct effect of access to finance and mobile money on firm performance

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Annual Sales	Annual Sales	Annual Sales	Annual Sales	Annual Sales	Annual Sales
Access to loan		1.763***		1.234***		
		(0.000)		(0.000)		
Mobile money usage			-0.821***	-0.946***		-0.976***
			(0.000)	(0.000)		(0.000)
Access to loan*Mobile money usage				0.393		
				(0.427)		
Bank overdraft					1.969***	0.903***
					(0.000)	(0.000)
Bank overdraft*Mobile money usage						0.311
						(0.451)
Medium firms	1.076***	0.855***	1.086***	0.961***	0.902***	1.053***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Large firms	2.872***	2.621***	2.950***	2.739***	2.558***	2.872***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Retail sector	1.257***	1.242***	0.328	0.320	1.192***	0.299
	(0.000)	(0.000)	(0.154)	(0.170)	(0.000)	(0.200)
Other sectors	0.869***	0.861***	0.145	0.225	0.820***	0.144
	(0.000)	(0.000)	(0.519)	(0.314)	(0.000)	(0.527)
Year of managerial experience	0.929***	0.892***	0.555***	0.495***	0.832***	0.525***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
formal staff training	-1.308***	-1.151***	-1.067***	-0.902***	-1.174***	-0.938***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm is part of a large establishment	0.247	0.239	-1.145***	-1.183***	0.384**	-1.049***
	(0.180)	(0.194)	(0.000)	(0.000)	(0.032)	(0.000)
Firm invest in R&D	0.107	0.093	-0.851***	-0.819**	0.007	-0.669**
	(0.733)	(0.772)	(0.009)	(0.014)	(0.981)	(0.045)
Firm introduces new products	-0.762***	-0.621***	-0.134	-0.027	-0.483**	0.016
	(0.000)	(0.002)	(0.477)	(0.889)	(0.012)	(0.936)
Firm experiences power outages	0.509**	0.434*	0.203	0.071	0.483**	0.197
	(0.021)	(0.052)	(0.420)	(0.779)	(0.025)	(0.437)
Male manager	0.050	-0.063	0.515**	0.388*	0.083	0.502**
	(0.810)	(0.767)	(0.019)	(0.081)	(0.685)	(0.023)
Country effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	14.154***	13.738***	20.753***	20.538***	13.140***	19.596***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,166	1,128	578	550	1,121	543
R-squared	0.248	0.288	0.405	0.446	0.320	0.436
Mean VIF	1.17	1.17	1.19	1.25	1.17	1.33
Robust p values in parentheses; *** p<0.01, ** p<0.05, * p<0.1						

Table 4

Robustness test

	(1)	(2)	(3)
VARIABLES	Annual Sales	Annual Sales	Annual Sales
Reasons for adopting mobile money			
To reduce time in transaction		-0.240	
		(0.597)	
To reduce risk in transaction		0.038	
		(0.950)	
To Satisfy suppliers		-0.713	
		(0.164)	
To satisfy consumers		-0.043	
		(0.929)	
To align with competitors use		-2.988***	
		(0.000)	
Uses of mobile money			
To receive payments from customers			0.156
			(0.155)
To pay employees			-0.156
			(0.754)
To pay suppliers			0.082
			(0.442)
To pay utility bills			-0.042
			(0.896)
Medium firms	1.076***	0.255	0.041
	(0.000)	(0.499)	(0.918)
Large firms	2.872***	1.978***	1.891***
	(0.000)	(0.004)	(0.004)
Retail sector	1.257***	1.058**	0.929**
	(0.000)	(0.012)	(0.026)
Other sectors	0.869***	0.491	0.515
	(0.000)	(0.256)	(0.237)
Year of managerial experience	0.929***	0.529**	0.588**
	(0.000)	(0.042)	(0.022)
formal staff training	-1.308***	-1.537***	-1.501***
	(0.000)	(0.000)	(0.000)
Firm is part of a large establishment	0.247	-0.303	-0.404
	(0.180)	(0.429)	(0.311)
Firm invest in R&D	0.107	-1.736***	-1.750***
	(0.733)	(0.003)	(0.002)
Firm introduces new products	-0.762***	-0.236	-0.231
	(0.000)	(0.482)	(0.491)
Firm experiences power outages	0.509**	0.940**	0.932**
	(0.021)	(0.016)	(0.029)
Male manager	0.050	0.127	-0.007
	(0.810)	(0.811)	(0.990)
Country effect	Yes	Yes	Yes
Constant	14.154***	20.901***	20.999***
	(0.000)	(0.000)	(0.000)
Observations	1,166	112	114
R-squared	0.248	0.475	0.464

Mean VIF	1.17	1.41	1.32
Robust p values in parentheses; *** p<0.01, ** p<0.05, * p<0.1			