

## Reflections on promotion of digital payments among smallholder tea farmers in Kanungu district

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### Abstract

The study aimed to reflect on the promotion of digital payments among smallholder tea farmers in Kanungu District, Uganda. The study was guided by specific objectives, namely, investigating the effect of digital payments on financial deepening, assessing the effect of inflation rates on Uganda's economic literacy, determining the influence of per capita income on Uganda's economic literacy, and evaluating the effect of foreign direct investment on Uganda's economic literacy. The study used a descriptive research design utilizing a quantitative approach. The average cash payment was 3,862,241,831 before the introduction of digital payments such as mobile money and banks and after the introduction of digital systems, the cash payment decreased significantly to 3,895,754. However, after introducing digital systems, the payment of smallholder farmers increased significantly from 2,379,988,876 to 2,500,825,890 which implies that there was a huge improvement as well as an increase in the profitability rate of the factory. There was a strong significant negative relationship between digital payments and gross domestic product (-0.768). Understanding the factors that influence the adoption of digital payments can assist in identifying the obstacles that hinder some societal groups from using digital financial services. Then, specific actions can be developed by policymakers as well as financial institutions to encourage financial inclusion. The flexibility of the created models to satisfy the requirements of agricultural stakeholders and to react to their limits is crucial for the success of innovative tools in rural areas.

**Keywords:** Digital payments; Digitalization; Financial assets; Growth domestic; Smallholder tea farmers.

### 1. Introduction

Worldwide, improved access to digital payments can help with agricultural development, supply

chain efficiency, and ensuring that farmers are fairly compensated for their produce, all of which support food security and Goal 2's "Zero Hunger." Goal 3's "Good Health and Well-being" is also improved by using digital payments to increase access to healthcare services and ensure

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that healthcare workers are paid on time. Achieving Goal 10 of the sustainable development objectives can also be done through increasing access to financial services and ensuring that low-income and marginalized communities can participate in the formal financial system.

The act of conducting financial transactions electronically while utilizing different digital platforms and technology is referred to as "digital payment (Gupta and Singhal, 2021)." Digital payments, rely on online systems, electronic devices, as well as the internet to move money safely and effectively rather than actual cash or conventional payment methods like cheques or money orders. These include credit cards, online banking, and mobile wallets (Bella and Efendi, 2021; Sultana, 2023). It is critical to address security with digital payment systems, such as data breaches, identity theft, and online fraud. (Wang Nnaji and Jung, 2020).

Digital payments denote a superseded conventional form of paying for goods and services through an electronic medium that does not necessarily, use cash or cheque (Hermanus Smidt and Jokonya, 2022). Various financial institutions throughout the world have continued to grapple with cut-throat competition, growth coverage, supervision, investment, portfolio optimization, management challenges, and risk mitigations (Kaku, 2019). To this end, there is an urgent need for massive investment, upgrade, diversification, and in re-design of powering financial technologies to supply competitive goods and services, by financial institutions, if they are to stay afloat.

The current usage of online money transfers and payment systems in financial transactions has grown to be a tremendous and powerful force to be reckoned with, not just in developed countries but also in developing countries. The growth of new payment solutions and structures from direct cash payments across bank counters to digital or electronic payment methods has been aided by new developing technological trends (Nguimkeu

and Okou, 2021). Interestingly, this new form of payment has quickly permeated every fabric of society and has connected locations and filled gaps in the financial system, especially in rural regions where conventional banks are few. With digitalization, payment for goods and services has become so convenient, handy, and now tailored to one's need, that it fits client needs better than any other traditional payment and cash transfer system. The method makes it easier and more convenient to execute financial transactions anywhere, in the comfort of one's environment. Depending on one's location, and network connectivity, one can use online (Internet) banking at any time to deposit, withdraw, and transfer funds, and pay for utilities and taxes through the use of e-wallets, credits, and debit cards (Yu *et al.*, 2020).

Current digital or e-commerce configured transactions (e-payments) such as Real Time Gross Settlements (RTGS) and Electronic Fund Transfers (EFT) have eased individual inter-account and bulk funds transfer of funds from one account to another, respectively, while, the International Telegraphic transfers (ITT's) such as Western Union, MoneyGram and PayPal are leading key global means of electronic fund transfer, as mobile money funds transfer takes lead, in both urban and rural settings. Locally and internationally, there is no doubt, that advancements in computer technology, data management, storage, and transfer, have catapulted the world into a "financial technological shock". And in this ensuing development, the world appears condensed into a global village, held in the palms of information technology experts, with fingers left to click on the buttons to deliver the desired result. To this end, all conventional forms of payments that ordinarily, were transacted through the use of banknotes and coins are gradually being replaced by digital financial transactions epitomized by the emergence of cashless e-commerce transactions (Shelton *et al.*, 2022).

In the study, conducted by the Bank of Uganda, it was noted that in Uganda, population access to formal financial services such as savings, loans, insurance, and payment options has a high propensity to stimulate inclusive economic growth in a country. Resultantly, it has become one of the key public policy objectives in the National Development Plan (NDPIII) to ensure that all citizens have access to timely, accessible, and sufficient financial services in the economy (Lee *et al.*, 2022). The promotion of digital financial services is one of the critical pillars under financial sector development in Uganda's National Development Plan (NDP111) F/Y2020/2021-2024/2025 anchored on Uganda Vision 2040, focused on increasing household incomes and improving the quality of life and transformation of Ugandan society from a peasant to a modern and prosperous country within 30 years. In pursuance of this vision, the government intends to increase household incomes, build savings, and more so effectively manage income shocks, and access to financial services for all impoverished persons. This is premised on the shreds of evidence of the study carried out by the Bank of Uganda and the Ministry of Finance, Planning, and Economic Development, during the formulation of the National Financial Inclusion, (Shen and Zhang, 2023) which showed that low-income and financially excluded community have active financial lives and demand a wide range of financial services, although it is estimated that 15% of Ugandans are financially excluded (UBOS, 2014).

Electronic payments and digital monetary transactions between two parties offer several advantages and benefits, including cost, minimized delay in payments, time savings, decreased payment processing errors, and reduced transaction costs. The newest figures from the Bank of Uganda (BOU) show that following a sluggish rise in 2018 and 2019, respectively, of 12% and 6%, growth in electronic payments, including mobile money

and Real Time Gross Settlement (RTGS) transfers, recovered rapidly in 2020 and 2021, at 18% and 26%. This recovery is the result of the limitations imposed during lockdowns connected to COVID-19 and legal/regulatory reforms intended to lessen the reliance on cash in the Ugandan economy (UBOS, 2014).

According to PricewaterhouseCoopers notes that while the World Bank indicated that only 33% of Ugandans had access to a bank account or other type of financial institution account as of 2017, the government of Uganda intimated that over 80% of payments made during the period, were by way of cash. To this end, the estimated value of cash transactions in the economy for the year 2017, alone stagnated at around Ugx.Shs 1,600 trillion based on Bank of Uganda records of RTGS processed and mobile money payments, also alone, to Ugx. Shs 400 trillion. This paints a picture of the enormous potential for future payment digitization in Uganda PwC (2022). The Central Bank's decision to reduce the upper limits for cheque values also accessioned fertile grounds for increasing the scope for electronic payments.

Progressively, as of May 2022, the number of registered mobile money customers in Uganda had shot up to over 34 million, and to amplify this further, the value of mobile money transactions in Uganda during the first quarter of F/Y 2021/2022, alone, corresponded to 8.2 billion U.S. dollars. This is buttressed by findings by Finscope (2018) which noted that half (47%) of young adults in Uganda have a digital payment account. Just over half, use a digital system for remittances, 31% for the payment of goods and services while 7% use a digital account for bill payments. To date, the processing time for the electronic interbank has substantially been reduced from 5 days to 2 hours with the introduction of RTGS. One can initiate RTGS payments on a phone, tablet, or computer from any location, authorize the payment, and confirm the transaction on their bank account or via text message using the internet and mobile banking.

In many situations, especially for commercial customers, it is also clearly less expensive than using

cash. Mobile money offers comparable advantages, with the bonus that users don't require bank accounts to make payments to people, organizations, and governmental entities. Whereas there is an ardent need for more innovations to keep the use of mobile money very competitive with cash transactions, there is a corresponding need to lower mobile money tax rates as it still appears as obviously high. Cash payments are risky and costly for agribusinesses and farmers. A cash economy also prevents farmers from accessing credit savings and insurance GSMA (2017). Kayonza Growers Tea Factory is one of the smallholder tea factories in Southwestern Uganda and in Kanungu District, established under the Act of Government in 1966. Tea in Kanungu District is grown on a smallholding basis with the majority of smallholders, farming less than 2 Hactres of due limited land, and its growing dates way back to the mid-1960s. To date, there are approximately 16,300 smallholder tea farmers in the area, whose only source of income for a livelihood, is majorly from tea earnings. Kanungu District is one of the hard-to-reach districts in Uganda and with limited financial services (Turyasingura *et al.*, 2023), with a population of approximately 283,000 served by only three commercial banks, (Centenary, Stanbic, and Postbank and one strong Savings and Credit financial institution. The majority of smallholder tea farmers are scattered in 9 sub-counties that grow tea out of 17 sub-counties. Interestingly for the last 54 years of tea growing in the Kanungu district, Kayonza Growers tea factory has employed direct cash payments to smallholder farmers as conventional means of payment for green leaf deliveries from 1966 to mid-2019. For over 5 decades, smallholders have rejected and protested over every effort that would attempt to pay all farmers through the bank.

The study aims to reflect on the promotion of digital payments among smallholder tea farmers

in Kanungu District, Uganda. The study was guided by specific objectives, namely, investigating the effect of digital payments on financial deepening, assessing the effect of inflation rates on Uganda's economic literacy, determining the influence of per capita income on Uganda's economic literacy, and evaluating the effect of foreign direct investment on Uganda's economic literacy.

## 2. Material and methods

### 2.1. Research design

The analysis in Uganda employed annual time series secondary data for the years 2000–2022. Information from the World Development Indicators (2019) and cash and digital payments from the Kayonza Growers Tea Factory are also included in the secondary data collection (Benson and Ayiga, 2022). Additionally, it includes information from 2017 on the gross domestic product (GDP), inflation rates, per-capita income, digital payments, and foreign direct investment (Wijaya and Dewi, 2022).

### 2.2. Economical modeling

GDP=f is the econometric model used in this specific investigation (inflation rates, digital payments, Per-capita income, and growth domestic product).

This can be expressed in linear form as;

$$GDP_t = \beta_1 INFLA_t + \beta_2 DPAY_t + \beta_3 FDI_t + u_t$$

Where: GDP= Gross Domestic Product, INFLA= Inflation rate.

DPAY= Digital payments, FDI= Foreign Direct Investment, Ui= Error term.

### 2.3. Descriptive research

In a descriptive study of the time series data, kurtosis and skewness were employed to confirm the distribution's normality (Demir, 2022). The average, median, standard deviation, variance, and mode are examples of measures of central tendency (Choi *et al.*, 2020). The GDP, rates of

inflation, foreign direct investment, as well as digital payments were all subjected to correlation coefficient tests to ascertain whether there is a statistically significant and insignificant relationship between the variables along with whether one variable can be predicted from another.

**3. Results**

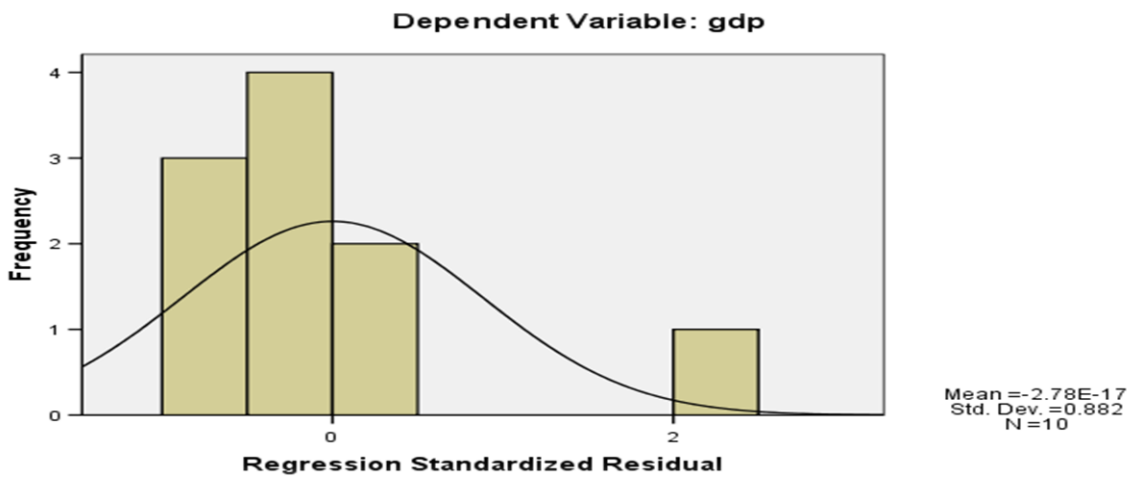
Table 1 and Figure 1 present the summary statistics of the information used in this study, including measures of central tendency and measures of variation. Growth rates on average were computed to be 2.3316, 5340144, 4.7160, and 4.7160 for the variables GDP, inflation rate, digital payment, and FDI, respectively.

Because the standard deviations are within the greatest (8593951) and lowest (-6.47) values, the study fulfills measures of central tendency and variation. The average growth rates for GDP, inflation rate, digital payment, and FDI were calculated to be 2.3316, 5340144, 4.7160, and 4.7160, respectively. As a result, the normal curve has a total probability of one and can never be negative since it is bell-shaped. Probability is represented by the area under the normal distribution curve, and the entire area under the curve equals one. Therefore, the data is continuous because values in a normal distribution tend to cluster around the mean, and the farther a value is from the mean, the less likely it is to be continuous.

Table 1. present the summary statistics of the information used in this study

	N	Minimum	Maximum	Mean	STD Deviation
GDP	38	-6.47	8.14	2.3316	2.91092
Inflation	10	2626590	8593951	5340144	1879166.389
Digital payment	40	-4.47	15.13	4.7160	4.61812
FDI	40	-4.47	15.13	4.7160	4.61812
Valid N	10				

Source: Authors 2023



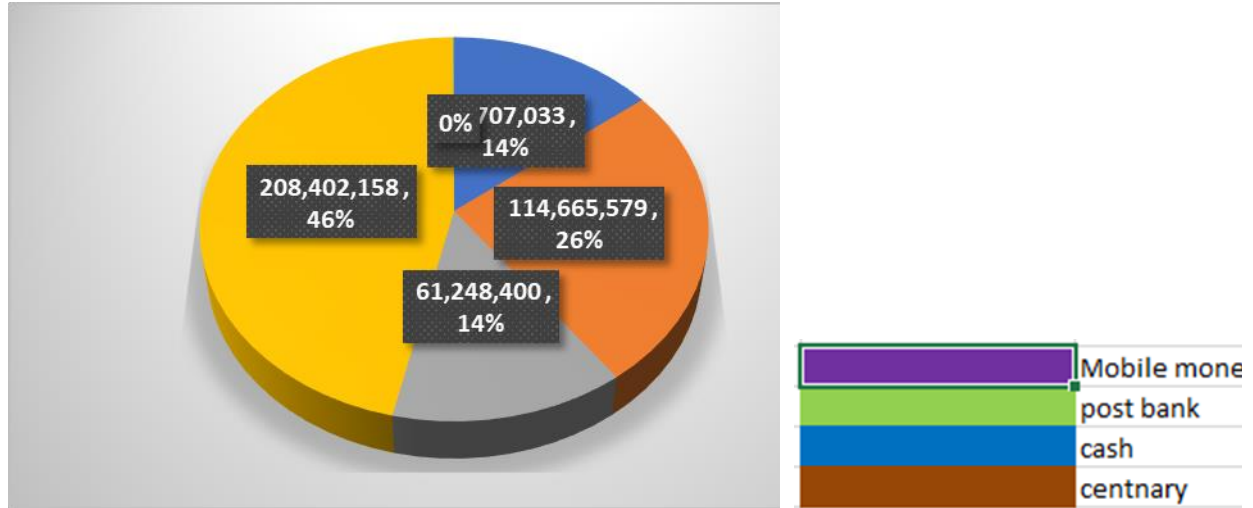
**Figure 1.** Measures of central tendency and measures of variation.

From Figure 2 above, payment trends on average were computed to be 208402158, 114665579, 61,248400, and 64707033 for the variable’s mobile money, post bank, centenary bank, Stanbic bank, and cash in hand respectively. This

shows that due to technological advancement in the year 2017, there has been a total decrease in payments made to farmers via cash as well as a significant increase in the payments made to farmers through technological advancement like

through post bank, centenary bank, Stanbic bank as well as mobile money through using the merchant code technology. However, the factory pays its workers majorly in mobile money, followed by post bank, Stanbic bank, and centenary bank, and therefore a conclusion is reached by saying that the factory should advance its technology further to attract foreign

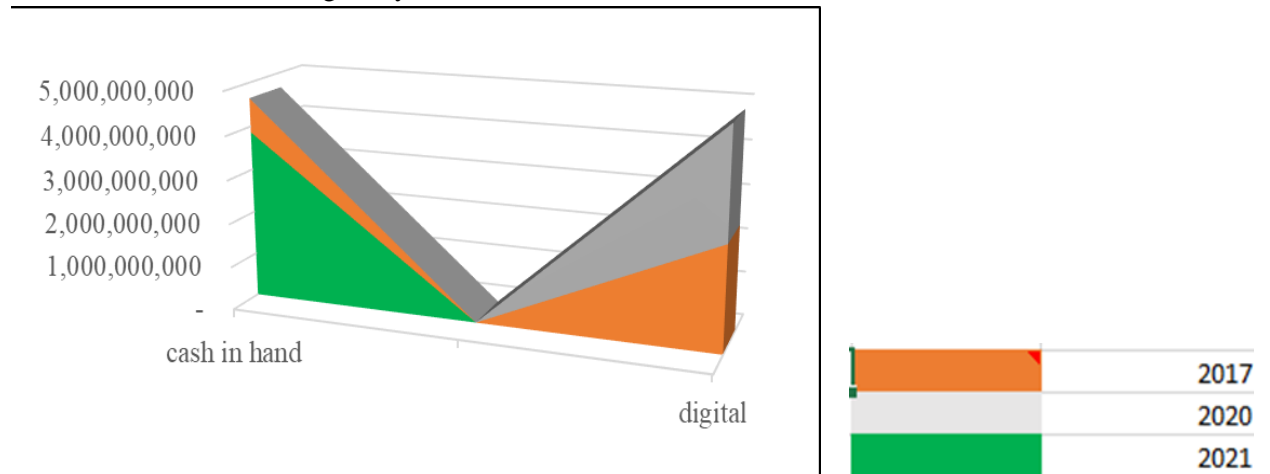
investment. On average the highest pay was made through mobile money which was about 208,402,158 shillings per year and the least was made through cash to farmers which was about 64,707,033 shillings but on average digital technology constitutes the highest percentage in affecting the financial deepening of the country.



**Figure 2.** Represents the payment trends of the Kayonza tea farmer’s factory.

From Fig 3 above, a significant increase in digital payments of Kayonza tea factory results in a significant decrease in cash payments of smallholder farmers leaving another factor constant. On average cash payment was 3,862,241,831 before the introduction of digital payments such as mobile money and banks and after the introduction of digital systems, the cash

payment decreased significantly to 3,895,754 however after introducing digital systems, the payment of smallholder farmers increased significantly from 2,379,988,876 to 2,500,825,890 which implies that there was a huge improvement as well as an increase in the profitability rate of the factory.



**Figure 3.** Significant increase in digital payments of Kayonza tea factory.

**Correlation analysis**

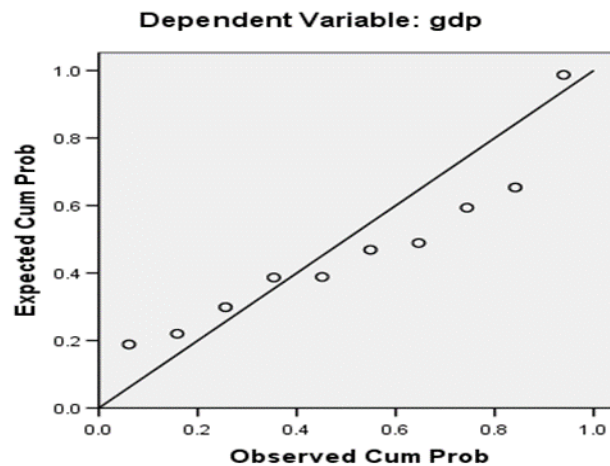
To ascertain the link between the dependent and independent variables, particularly quantitative data, correlation coefficient tests are used. The

correlation matrix for the study's variables, with GDP as the dependent variable, is shown in table 2 and Figure 4.

**Table 2.** The correlation matrix for the study's variables, with GDP as the dependent variable.

	GDP	Inflation	Digital payment	FDI
GDP	1.0000	0.523	-0.768	0.678
inflation	0.222	1.000000		
Digital payment	-0.768		1.0000	
FDI	0.678			1.00000

**Normal P-P Plot of Regression Standardized Residual**



**Figure 4.** The correlation coefficient between GDP and the inflation rate.

Given that the correlation coefficient between GDP and the inflation rate is 0.523, it is clear that there is a moderate and significant positive relationship between the two. Similar to this, the correlation coefficient of 0.678 suggests that GDP and FDI have a moderate, positive, and significant link. The correlation coefficient (-0.768) shows that there is a strong significant negative relationship between digital payments and gross domestic product since the probability of 0.004 is less than 0.05. This suggests that the

study's control variables, inflation, and inflows of foreign direct investment have a strong positive connection with the dependent variable (GDP), making them strongly linked with economic growth. Therefore Figure 4 shows that there is a strong partial correlation coefficient between the dependent variable and the independent variables. Since the points of both dependent and independent variables are along the line of the best fit, the variables are correlated.

**Table 3.** Regression estimation results with DLNGDP as the dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002735	0.015299	-0.178751	0.8596
GDP	0.209247	0.095278	2.196177	0.0376
inflation	0.496501	0.150707	3.294485	0.0029
FDI)	0.006429	0.021424	0.300060	0.7666
Digital payment	-0.570101	0.190878	-2.986735	0.0062
R-squared	0.767088	Mean dependent var		0.047987
Adjusted R-squared	0.729822	S.D. dependent var		0.142963
S.E. of regression	0.074310	Akaike info criterion		-2.210131
Sum squared resid	0.138049	Schwarz criterion		-1.976599
Log-likelihood	38.15197	F-statistic		20.58420
Durbin-Watson stat	1.822109	Prob(F-statistic)		0.000000

*Source: Author's computation.*

Ho: The financial deepening is not significantly determined by digital payments.

Ha: The financial deepening process is strongly influenced by digital payments.

Ho: The rate of inflation has little relation to the depth of the financial system.

Ha: The degree of financial deepening is greatly affected by inflation rates.

Ho: Per-capita income has no noticeable effect on the financial crisis.

Ha: Financial deepening is greatly affected by per-capita income.

Ho: Foreign direct investment has no discernible impact on the deepening of the financial system

Ho: Foreign direct investment has no discernible impact on the deepening of the financial system

A 1% increase in GDP causes a 0.21% increase in financial deepening, all other factors being equal. The p-value of 0.0376, which is less than 0.05, demonstrates that GDP has a significant positive impact on financial deepening, in line with the findings of Romanus & Dickson (2019) in Tanzania.

A 1 percent rise in digital payments causes a 0.57 decrease in the financial deepening rate, assuming all other variables remain constant. The p-value (0.0062) is less than 0.05, indicating that, when other factors are held constant, the payment system has a strong negative impact on financial deepening.

A 1 percent increase in foreign direct investment delivers a 0.006 percent rise in economic growth, assuming all other variables remain constant. The fact that the p-value (0.766) is greater than 0.05 suggests that foreign direct investment contributes to financial deepening in a positive but marginal way. Along with findings by Okonkwo *et al.* (2015) and Masipa (2018) for the contexts of Nigeria and South Africa, respectively.

R<sup>2</sup> is 0.76708, which means that the inflation rate, digital performance, and foreign direct investment all work together to explain 77% of the changes in financial deepening. Other factors in the error term account for 23% of the explanation, thus they are left out of the model. The data is well-fitted and consequently, a good fit because the R<sup>2</sup> is high. The adjusted R-squared is lower than the R-squared value because it considers degrees of freedom.

The statistically significant negative error correction term reveals that 57% of the disequilibrium adjusts with a one-year lag while controlling for other variables.

The fact that the F statistic is 20.58420 and the p-value is 0.000, which is less than 0.05, suggests that all of the variables collectively have a significant short-term effect on economic growth.



**Table 4.** Kayonza Growers Tea Factory smallholder tea farmers' payments (2017) before the enhancement of digital payments through banks and the introduction of mobile money payments

Stanbic Bank	Postbank	Centenary Bank	Sub-Total Bank Payment	Sub-Total Cash Payments	Total Payments [Gross]
63,005,111	226,532,467	329,295,137	618,832,715	3,862,241,831	4,481,074,546

*Authors 2023*

In summary, in 2017, out of 4,481,074,546 bn, Kayonza Growers Tea Factory paid to smallholder farmers, direct cash payments across the counter amounted to 3,862,241,831/= and only

Ugx 618,832,715 were paid through the bank. In other words, cash payments constituted 86% of total payments.

**Table 5.** Kayonza Growers Tea Factory smallholder tea farmers payments (2020) at the initial stage of enhancement of digital payments through banks and introduction of mobile money payments.

	Centenary Bank	Stanbic	PostBank	Mobile Money	Cash	Total
1	65,930,750	42,359,000	34,200,700	34,991,000	386,914,540	
2	62,066,900	41,198,600	30,430,200	37,635,300	66,197,550	
3	52,269,900	28,193,600	21,622,000	31,557,500	56,638,800	
4	44,960,000	154,916,500	80,620,300	10,877,420	11,766,000	
5	-----	60,850,500	25,016,200	475,075,000	-----	
6	128,116,500	151,745,000	43,027,815	187,959,388	-----	
7	23,000,000	-----	42,100,000	497,543,890	262,030,753	
8	107,886,600	30,743,100	-----	198,602,710	-----	
9	105,142,000	25,679,700	19,227,000	203,132,268	-----	
10	193,978,812	27,887,000		237,553,300		
11	226,562,200	51,758,900		238,033,500		
12	221,321,500	56,472,000		227,027,600		
	1,231,235,162	671,803,900	296,244,215	2,379,988,876	783,547,643	5,362,819,796

*Authors 2023*

As you can notice, factory management enhanced the dualization of farmers' payments with a strong emphasis that farmers must be paid either through banks or mobile money, at the start of 2020. Cash payments declined from 3.86bn in 2017 to 783m

in 2020 and finally to 3,8m in 2021 as digital payments (banks and mobile money) increased from 618m in 2017 to 5,362 bn in 2020 and 5,392bn in 2021.

**Table 6.** Kayonza Growers Tea Factory smallholder tea farmers payments (2021) at the initial stage of enhancement of digital payments through banks and introduction of mobile money payments.

Centenary Bank	Stanbic	PostBank	Mobile Money	Cash	
102,193,100	179,247,600	73,986,200	228,726,800	377,354	
97,873,000	77,066,100	2,618,800	214,609,700	1,269,200	
29,109,700	61,104,100	39,231,100	210,422,300	35,000	
68,763,300	77,855,300	1,667,500	112,971,490	-	
113,043,000	46,998,300	57,600,000	257,382,300	339,100	
124,715,100	34,279,650	-	297,744,800	234,700	
72,041,700	114,243,200	478,656,700	255,415,700	66,200	
46,658,000	105,068,900	-	197,368,500	459,200	
35,512,500	121,068,900	19,246,700	245,243,000	256,000	
44,257,100	234,200,000	28,099,500	220,615,300	109,000	
-	93,264,900	-	127,350,400	750,000	
42,317,900	231,590,000	33,874,300	132,975,600	-	
776,484,400	1,375,986,950	734,980,800	2,500,825,890	3,895,754	5,392,173,794

*Authors 2023*

In 2021, payment of direct cash to farmers further declined to Ugx 3,895,754 from Ugx783,547,643 in 2020 as digital payments (banks and mobile) increased from 5,362,819,796 in 2020 to 5,392,173,794.

#### 4. Discussions

The current findings agree with (Abdul-Rahaman and Abdulai, 2022) who found the transition to greater financial inclusion and improved use of these accounts can be facilitated by agribusinesses' digitization of payments made to farmers. When a payment is "digitalized," it is done online into a "transaction account." The expansion of farmers' access to transaction accounts may be influenced by the digitization of agribusiness payments. Globally, 13% of account holders reported opening their accounts to obtain

private-sector income, state assistance, or transfer of funds for the sale of manufactured commodities in 2017, as per the 2017 Global Fundex (Lee *et al.*, 2022). Additionally, 20% of SSA recipients of agricultural payments who have accounts report opening them for the first time just to receive agricultural payments (Panagariya, 2005). Receiving money for the sale of their produce into existing accounts gives account holders the chance to make better use of such accounts (Quayson, Bai, and Osei, 2020). Finally, the ecosystem of rural digital banking services (DFS) can be significantly supported by the digitization of agriculture payments (Turyasingura *et al.*, 2023; Turyasingura *et al.*, 2023; Turyasingura and Chavula, 2022). Lack of DFS agent demand and inadequate bill pay to merchants, which make the rural agent and vendor business unprofitable, are major barriers

to microfinance in rural areas. Innovation of agricultural business payments can help rural DFS agents who provide cash-in, cash-out (CICO) offerings and DFS merchants who endorse digital payments by growing the transaction volumes needed for rural DFS expansion. This will increase the CICO network and provide more potential to use e-money, in both (Zhao *et al.*, 2022).

Digital finance can boost efficiency by encouraging scaled funding and improved risk diversification (Hermanus Jacobus Smidt and Jokonya, 2022). This can be accomplished by producing innovative new goods, including technologies designed to decrease costs, or improving data analytics for financial products. The competition in the financial sector encourages innovation and reduces the possibility of any single institution gaining undue market power as in line with (Brooks, 2021). A strong financial infrastructure is essential for the growth of an effective financial sector. The efficacy of monetary control and regulation, which includes an integrative model for supervision, legal safeguards for supervisors, substantial crisis preparedness, resolution plans, and safety nets, is essential for the financial sector's stability.

## 5. Conclusion

Agricultural insurance products are developed and successful in large part because of digital payment options, particularly those provided by mobile money and funds transfer companies. Stakeholders that supply these kinds of products stand to gain a great deal from the digitalization of payments: among the main benefits of such transformation initiatives are the security and convenience of payment processes, support of business, and even time savings. The flexibility of the created models to satisfy the requirements of agricultural stakeholders and to react to their limits is crucial for the success of innovative tools in rural areas. The Design Thinking methodology, in particular, "user-centric

approaches," offers effective methods to deal with these issues.

The process of increasing a nation's GDP to all of its financial assets is known as financial deepening. Building up financial resources helps growth forward by funding the credit-based purchase of real assets. By analyzing the correlation between a world's monetary saving rate and its growth rate, it is possible to determine the ideal long-term ratio of capital assets to GDP. The impact that inflation has on financial deepening is considered in the current study. All asset holdings in a financial position will experience capital losses due to inflation. It has been demonstrated that inflation will drastically lower the level of fiscal depth that a nation may achieve unless more funds are saved to counter such consumer price capital losses.

The adjustments in the increase of the gross domestic, which constituted 78 percent of the changes, were calculated using the Engle-granger co-integration method. Over the long run, but not in the short run, the results of something like the autoregressive distributive lag model technique supported the inflation rate-led hypothesis. Empirical evidence from the enhanced mean group and gang estimators shows a substantial association between income per capita, mobile payment, and FDI inflows, as well as a significant positive relationship between deepening and inflation rates.

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### Author contributions

*Christopher Turyatempa and Benson Turyasingura did the structure of the manuscript, data analysis, and discussion. Prof. Natal Ayiga and Dr. Hend Ahmed: Critically revised and edited the manuscript. Prof. Joseph P. Gweyi-Onyango: provided literature.*

### Institutional Review Board Statement

*All Institutional Review Board Statements are confirmed and approved.*

### Data Availability Statement

*Data presented in this study are available on fair request from the respective author.*

### Ethics Approval and Consent to Participate

*Not applicable*

**Consent for Publication**

*Not applicable.*

**Conflicts of Interest**

*The authors disclosed no conflict of interest starting from the conduct of the study, data analysis, and writing until the publication of this research work.*

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