

The Monetary Economics of E-Money in East Africa

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In this paper, we re-examine several of the questions about the monetary economics of e-money that were addressed in previous research, including our own. Several considerations motivate this effort. The first is simply the passage of time. The data used in Mbiti and Weil (2016), for example, ran only through 2011. As with any new product or service, we would expect that over time, as people became accustomed to e-money's functioning, their manner or interacting with the system would naturally change. Beyond this, e-money systems have themselves evolved considerably since their initial roll-out, with a host of new services being added. These included business payment services that allow merchants (including utilities) to easily accept e-money payments, the ability to obtain short term loans, and a simple bank account that operates in tandem with mobile money. We would expect that because of the addition of these services, there would be further changes in how customers interacted with e-cash. Finally, much of the initial research on the monetary economics of e-money used data from the period of ultra-rapid growth in these products. Studying these systems while they were expanding so quickly raised additional obstacles in terms of understanding their properties.

The second consideration motivating our current effort is access to better data. In our own previous work, we had only partial access to the information we needed in order to calculate several key magnitudes describing M-Pesa. We often had to draw together fragments of information from different sources and do our best to parse variable definitions. We have come to understand that several of the inferences that we made about magnitudes were in fact wrong (these are discussed below). For the current paper, we have been granted far better access to aggregate information on e-money in several countries.

Our third consideration is the opportunity to establish a framework for studying e-money systematically for the group of East African countries taken together. East Africa remains at the forefront of the global expansion of e-money. Although at this point we do not have complete data for all of the relevant countries, we view the work in this paper as a step toward undertaking fully parallel analyses in all of the relevant countries.

1. The Growth of E-Money in East Africa

The first e-money mechanism in East Africa, M-Pesa, was introduced in Kenya in 2007. Similar programs arrived in Tanzania in 2008, Uganda in 2009, and Rwanda in 2010. Our paper focuses on these four countries.

The appendix to this paper presents a detailed narrative pulling together information on the growth of e-money in the countries that we study. This includes whatever data we could find on market shares of mobile network operators and mobile money operators (as well as their dates of entry), the size of the mobile money market in terms of users (people or phones), transactions, and agents; the regulatory environment (including interoperability, taxes, policy with regard to MNO trust funds, and rules pertaining to agent exclusivity); changes in the fee structure over time; and changes in fees that were implemented in the face of the COVID pandemic. This information was pulled from a very wide variety of sources, and while it is still incomplete, we think that it represents a useful resource for future investigators.

2. Framework

Among the topics on which we focus are the transactions velocity of e-money (the number of times per month that average unit of e-money is transferred among customers); the length of the “e-money loop” (the number of transfer transactions that the average unit of e-money goes through between creation and being extinguished); average customer balances held in e-money accounts; and the outstanding balance of e-float; and the total value of customer-to-customer transfers.

Velocity

The first monetary measure on which we focus is the velocity of e-money. In standard monetary economics, there are two different definitions of velocity that are used. “Income velocity” is the nominal GDP divided by the relevant money stock. “Transactions velocity” is defined as the frequency with which the average unit of money is used in transactions. Although in some ways more fundamental than income velocity, transactions velocity is much harder to measure, because doing so requires being able to observe actual transactions. In the case of e-money, however, we have the advantage of being able to observe all transactions. Further, for our purposes, transactions velocity is the more relevant measure, since it bears directly on the role the e-money is playing in the economy. As discussed in Weil, Mbiti, and Mwega (2011), at this point in time the stock of e-money relative to other monetary aggregates is sufficiently small that we would not expect it to affect the price level, and thus its income velocity is of limited interest.

The potentially relevant transactions for measuring velocity in the case of e-money are “cash-in” transactions (the creation of a new unit of e-money), “cash-out” transactions (extinguishing a unit of e-money), and the transfer of e-money from one user to another. As our measure of e-money velocity, we focus only on transfers, which are the closest analogue to purchases using money in a simple monetary system.

One issue of nomenclature arises regarding these transactions. When the e-money systems in Africa were first rolled out, all e-float that was not held on the phones of agents was held on the phones of individuals. Thus the transactions that we were interested in could all be classified as “person-to-person.” However, as e-money has evolved, an increasing number of transactions take place among accounts held by businesses or other institutions, such as churches or government entities. These accounts typically operate through a separate, parallel, “pay bill” system that is designed to help businesses (and other entities) easily collect mobile payments from customers. For a given transfer size, the transaction cost for customers using the pay bill system is typically lower than the cost associated with the person-to-person mobile money transfer. The e-money collected through this system can then be channeled to a bank account or to an M-Pesa account. For the purposes of measuring velocity (and also the length of the e-money loop, which we describe below) we consider all of the entities that are not agents simply as “customers,” and correspondingly calculate our magnitudes in terms of

“customer-to-customer” transfers. In the various data sources that we have access to, the different types of transfers (i.e. person to person, person to business, etc.) are sometimes broken out separately, in which case we simply aggregate them. In other cases, we believe that what is described in the data as the total value of person-to-person transfers actually includes transfers among entities like businesses and churches that are not actually people.

Our measure of velocity is thus the total value of customer-to-customer transfers (per unit time) divided by the average outstanding balance of e-float. For example, if 100 units of e-float are created at the beginning of the month, transferred from person to person five times in the month, and extinguished at the end of the month, then monthly velocity will be five. Notice that having 100 units of e-float transferred from person to person five times in the month could happen either because the people receiving transfers then transferred the e-float to someone else or because each time a transfer was received, the recipient withdrew his cash and a new user deposited cash and received e-float. We discuss this issue in the next section.

The E-Money Loop

Irving Fisher defined the “cash loop” as the number of transactions that a unit of currency goes through between being withdrawn from a bank and returning to a bank. Analogously, we can think of the “e-money loop” as the number of transfer transactions that the average unit of e-money goes through between being transferred onto a customer phone or account and being transferred back from a customer to an M-Pesa agent.

As Mbiti and Weil (2016) discuss, the length of the e-money loop is not necessarily related to the velocity of e-money. For example, an e-money loop of any given length could be consistent with low velocity if the same unit of e-money was transferred from person to person only infrequently (without ever being transferred to or from an agent), or with high velocity if the same transfers took place quickly. Similarly, a given velocity could be consistent with different lengths of the e-money loop, depending on whether money was being transferred to and from agents in between customer-to-customer transfers.

For an e-money system that is fully stable, that is, it is not growing over time and transfers per month are constant, the length of the e-money loop is given by the following equation

$$(1) \quad \text{loop length} = \frac{\text{transfers}}{\text{cash in}}$$

where *transfers* are customer-to-customer transfers per unit time and *cash in* represents the value of e-money created per unit time. Transfers made in a given month would be equal to transfers that would eventually be made with the e-money created in a given month.

Of course the e-money systems that we examine have not reached this sort of steady state. The stock of e-money is growing over time, and there is a good deal of month to month variation in the creation and destruction of e-money. Although we cannot make any adjustment for trend

growth, we modify the above formula slightly to deal with variability in money creation and destruction:

$$(2) \quad \text{loop length} = \frac{2 \times \text{transfers}}{\text{cash in} + \text{cash out}}$$

where *cash out* is the quantity of e-money extinguished per month. Having the sum of cash in and cash out transfers in the denominator of Equation (2) is also useful because in some cases we are only given this total, rather than its individual components.

Other Measures

Beyond velocity and the length of the e-money loop, we look at several other measures of the development of electronic money system. These vary from country to country depending on data availability. For several countries we can look at average transaction sizes which we take as an indicator of the extent to which e-money is being used for small transactions, that is to say, in a cash-like fashion. The average transaction size is a very imperfect indicator of this dimension of e-money's use, however. It would be far better to get data on the distribution of transaction sizes. We also look at the size of outstanding e-float balances and the volume of customer-to-customer transfers as indicators of the speed with which e-money systems are growing.

3. Data

For this project, we were given access to aggregate data from the central banks of Kenya and Tanzania. Central bank staff were also able to help us by clarifying the definitions of several items. With these data we are able to paint a relatively detailed picture of how the system is functioning in these two countries. In the case of other East African countries, we were able to find fragmentary data on the internet, and we report some scattered results from this. However, the publicly available data has several ambiguities in definitions that we would need to clarify before putting much stock in these results.

4. Country-by-Country Application

As mentioned above, our eventual goal is to be able to do parallel analyses in the countries of East Africa. At this point, however, we don't have sufficient data to reach this goal. Our best data are for Kenya and Tanzania, with less data from Uganda and Rwanda. Our hope is that the analysis here can serve as a template for future work.

4.1 Kenya

The calculation of e-money velocity requires information on outstanding e-float and monthly customer-to-customer transactions.

The data analyzed by Mbiti and Weil (2016) was drawn from a period in which corresponding to each outstanding shilling of e-float, there was a corresponding shilling in a trust account, with the entirety of the trust account held in the form of deposits in commercial banks. Thus knowing the size of these bank deposits gave a perfect measure of the amount of e-float in existence. Since that time, however, the regulation of e-money in Kenya has changed so that trust account balances can be held in either commercial bank accounts or in the form of short-term government debt. To know the value of outstanding e-float, then, we have to know both of these balances.

We have access to data on the balance in commercial bank accounts from January, 2013, through August of 2021. However, we only have data on holdings of t-bills from February of 2019 onward. Figure 1 shows the two balances and their sum for the period in which we have complete data. Holdings in the two asset classes are of roughly equal magnitude. Clearly, there are large movements in the commercial bank account balance that are offset by movements in value of t-bills, representing purchases or redemptions of t-bills. The total of the two series is more stable than either one separately. This indicates to us that it would be unwise to do any calculations for the period in which data for both series are not available. We thus restrict our analysis of velocity in Kenya to the period February, 2019 to August of 2021. Figure 1 also shows evidence of a strong seasonal in the demand for e-float: there is a large spike associated with holdings in December of 2019 and a smaller one associated with December of 2020, which was during the COVID pandemic. Our presumption is that with a longer time series we would reliably see this seasonal pattern, but at this point we don't have sufficient data to pursue the issue.

A second complication in calculating outstanding e-float is how to think about balances held in the accounts of agents (including super-agents). Conceptually, since our interest is in how customers (that is, individuals, businesses, and institutions) are behaving, our measure of outstanding e-float should subtract from the total just derived the balances held by non-customers, that is, by agents.

Mbiti and Weil (2016) attempted to estimate the fraction of outstanding e-float held by agents. The starting point for these calculations was data from Eijkman, Kendall, and Mas (2010) that reported end of day e-float for different types of M-Pesa outlets. Mbiti and Weil estimated that average holdings of e-float were Ksh. 50,000 per agent around 2010. Combining this estimate with information on the number of agents and the level of outstanding e-float, Mbiti and Weil concluded that the fraction of e-float held on agent phones was in the range of 10-12%, with no discernable trend.

Even at the time, the above calculation was worryingly imprecise, in part because the information on e-float held by agents was an extremely rough approximation. At this point we don't think that the estimate is useful. Unfortunately, we don't have any alternative data for Kenya on the fraction of e-float that is held on agent phones. We do have such data for Tanzania, however: Specifically, our data from that country breaks down the end-of-year value of e-float outstanding into the amounts held on customer phones, agent phones, and "other,"

which includes businesses and institutions. For the period 2013-2020, the fraction held on agent phones ranges between 14.5% and 16.7%, with no discernable time trend. In the calculations that follow, we apply the figure 14.9%, which is the value for the end of 2020. We also have publicly available data from the Bank of Uganda which, like the Tanzanian data, breaks down the total escrow balance into the balance on customer phones, the balance on agent phones, and an “other” category.¹ This breakdown is only available from August, 2018, to December, 2019. In the last month of the data, e-float on agent phones constituted 28% of the total escrow balance.

Our data on customer-to-customer transfers comes from the Central Bank of Kenya. In the data we received, it is labeled as “P2P value (KES millions),” and it is available for the period January 2013 to June 2021. Figure 2 shows that there was a fairly linear rise in the value of transfers from the beginning of the data up through early 2020, following with person to person transfers rose sharply, presumably as a result of the COVID pandemic. Looking at the period before the pandemic, the value of P2P transfers grew at a rate of 16.9% per year between January 2013 and January 2020, while the annual rate of inflation in Kenya over this period was approximately 5.5% per year, and relatively stable. This indicates that the real value of transfers was growing at a bit more than 10% per year. There is modest seasonality in the value of P2P transfers, with a small peak in December, but this peak is much smaller than the peak in the value of outstanding e-float that we see in the short time series that is available.

Figure 3 shows the average size of customer-to-customer transfers, calculated using data provided on the value and volume of such transfers (labeled “person to person” in the dataset). Although we only have data for 27 months, there is a pronounced downward trend, with the average size of transfers falling by almost a quarter. There is no evidence of a trend break due to COVID. As of June 2021, the average transfer size of 1,175 KSh, corresponding to \$10.57, using the market exchange rate. The decline in the average size of transfers suggests that e-money was moving closer to being a medium of exchange during this period, but of course such evidence has to be viewed as extremely tentative.

Figure 4 shows our calculation of monthly e-money velocity for Kenya. For the most part, velocity stays in a narrow window between 2.5 and 3.0. The biggest exception is the large decline in velocity (to 1.73) in December of 2020, corresponding to the large increase in outstanding e-float in that month, as shown in Figure 1. We do not have any explanation for this outlier: it is too early to reflect the effects of COVID, and unfortunately we don’t have any other observations of December velocity before this one. It would be useful to get more data from the pre-pandemic period to see if there is indeed a seasonal in velocity.

The estimate of velocity being in the range of 2.5-3.0 transactions per month compares to our earlier estimate of 4.0 in the last month of our sample, which was April of 2010. Specifically, the velocity of 4.0 was what we called “adjusted velocity” in that paper, which reflected the

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<https://www.bou.or.ug/bou/bouwebsite/bouwebsitecontent/PaymentSystems/DataStatistics-/Mobile-Money-Statistics-2021.xlsx> accessed 11 Oct. 2021.

adjustment of outstanding e-float to subtract the amount held on agent phones. Our earlier calculation showed a significant upward trend between 2007 and 2011, while the one presented here has no such trend, although it is for a shorter period.

While our current estimate of velocity is not far from our old one, we consider the current one to be far more credible, since we have much more confidence in the quality of the underlying data. That being said, the conclusion that we drew regarding how e-money was functioning in Kenya previously seems to be unchanged: that it is functioning as a hybrid of a money transfer system, on the one hand, and a means for storing value, on the other. We discuss this point more extensively below.

Turning to the length of the e-money loop, the data that we were provided with has an entry for the total value of agent cash-in plus cash-out transactions monthly at mobile payment service providers (Safaricom, Airtel and Telkom) going back all the way to late 2006. However, starting in March of 2019, there is also data on the monthly value of bank account to e-wallet and e-wallet to bank account transfers. In the first month for which data are available, the sum of transfers to and from bank accounts was KES 119 billion, while the value of cash-in and cash-out via agents was KES 368 billion. In the last month for which we have data, June of 2021, the sum of transfers to and from bank accounts was KES 455 billion, while the value of cash-in and cash-out transfers at agents was KES 533 billion. In other words the two channels were of roughly similar size. The relative importance of transfer into and out of bank accounts thus grew rapidly in the period for which we have data.

In applying equation (2), we use the sum of cash-in and cash-out transfers via agents and banks. The other data required for calculating the loop length is the value of customer-to-customer transfers per unit time. In the data that we received from Kenya, there is an entry for the monthly value of person-to-person transfers. We assume that this includes transfers among all non-agent entities (i.e. businesses and institutions) as well.

Figure 5 shows our calculation of the e-money loop length for the period in which we have all of the necessary data. The value of the loop length is stable between 0.85 and 0.90 through May of 2020, after which it falls precipitously, reaching a low of 0.59 in April 2021. This decline presumably reflects the effects of the COVID pandemic, a period in which the system was not anywhere close to matching the steady state conditions under which equation (2) was derived. We thus rely on the earlier data to assess how e-money was being used in Kenya.

The loop length estimate of 0.85-0.90 is surprisingly consistent with Mbiti and Weil's (2016) estimate that the loop length was 1.0 in their data, which went up through July of 2009.

As Mbiti and Weil (2016) argue, the average loop length reflects the extent to which emoney is being used in different modalities. To the extent that units of e-money are created (via a cash-in transaction) and then passed from customer to customer many times before being extinguished, the loop length would be greater than one. On the other hand, Mbiti and Weil report anecdotal evidence that some people use their phones to store money without

transferring it. E-money used this way has a loop length of zero. Finally, if all use of e-money was in a context where it was created in a cash-in transaction, transferred from customer to customer once, and then extinguished, that would lead to a loop length of exactly one. Presumably all three of these things happen to at least some extent, but our belief is that the fact that the loop length is so close to one primarily reflects the deposit-transfer-withdraw modality as being the dominant way in which e-money is used.

4.2 Tanzania

Our data from Tanzania are annual, running from 2013 to 2020. Stock values refer to the end of the year, while flow values are annual averages.

Figure 6 shows outstanding e-float held outside of agent phones. Over the seven year period, the quantity of outstanding e-float increased by a factor of 3.6, an annual growth rate of 20%. Figure 7 shows the value of customer-to-customer transfers, which grew by a factor of 1.76 over these seven years (8.4% per year). It is notable that the growth of transfers is so much lower than the growth of e-float, with the one showing rapid expansion of the e-money system and the other showing only modest growth. We do not have a good explanation for this discrepancy. Over these seven years, the annual rate of inflation averaged roughly 4.5%.

Figure 8 shows the average size of customer-to-customer transfers. As in Kenya, there is a downward trend in the second part of the time series, with the average value of transfers falling by 30% between their peak in 2015 and the last data point in 2020. However, as the Tanzanian data cover a longer period than the Kenyan data, the speed of decline in Tanzania is not as great as in Kenya. The mean transfer size in 2020 is 38,809 Tanzanian Shillings which, translated into dollars using the market exchange rate from the middle of 2020 comes to \$16.76. This is about 50% larger than the average transfer in Kenya.

Calculation of velocity is made slightly more complicated because our data are annual and because the outstanding stock of e-money is growing at an appreciable rate. Since our figures for outstanding e-money are for the last day of the year, we use the average of the values for years $t-1$ and t as the denominator, where the total flow of transfers in year t is the numerator. Further, we divide the resulting annual velocity by 12 to convert it to a monthly number. Figure 9 shows the resulting series for monthly velocity in Tanzania. Unlike the data for Kenya, there is a notable trend decline over the period 2014-2020. Further, the calculated level of velocity in 2020, 1.4 transactions per month, is a little less than half the corresponding value for Kenya. (It is possible that this result is due to a data problem: specifically that we are not getting data on all transactions among customers. This issue should be pursued in future work.)

Figure 10 shows our calculation of the length of the e-money loop in Tanzania. The annual data that we obtained has an item for the sum of cash in and cash out transfers, but does not record totals for these items separately. In contrast to the case of Kenya, there is a marked

trend in the loop length in Tanzania in the period preceding the COVID pandemic. The loop length starts at 1.36 in 2013, and trends down in fairly linear fashion to reach 0.75 in 2020. As with the anomalous finding of declining velocity in Tanzania, a possibility is that not all customer-to-customer transactions that took place in Tanzania were recorded in our dataset. Again, this issue should be pursued in future work.

4.3 Uganda

Our primary source of information for Uganda is a spreadsheet entitled “Mobile Money Statistics 2021” that can be downloaded from the Bank of Uganda.² The sheet has both annual data and separate tabs of monthly data, with information on some aggregates going back as far as 2009.

Unfortunately, there are some large ambiguities in this data that have to be resolved before it can be used for further analysis.

The spreadsheet has categories for “number of transactions” and “value of transactions” going all the way back to 2009. However, it is not clear if these transactions are solely customer-to-customer transfers, or if they also include cash-in and cash-out transactions. In data for Kenya and Tanzania, the volume and value of cash-in and cash-out transactions are reported separately. Our preliminary analysis of the data suggests that all the different types of transactions are included in this single category in Uganda.³

The spreadsheet has data on “balance on customer accounts” going back to 2009. Starting in January of 2018 there is also data on “agent balances.” However, there is a large decline in the data series for “balance on customer accounts” in that same month, and so it appears that prior to January 2018 that data may have included agent balances. This would have to be confirmed, however. Starting in August of 2018 there is also a category for “other balances.” This series starts off with small values, so it is reasonable to conclude that it represents a new feature of the mobile money system rather than an aggregate that previously existed but was unmeasured.

For December 2019, the last month with full data, the total of balances held by customers and “other” was 546 billion Ugandan shillings.

4.4 Rwanda

² Linked [here](#).

³ Our reasoning in drawing this tentative conclusion is as follows: we attempted to calculate e-money velocity in Uganda under the assumption that the reported transactions were only customer-to-customer, but the number we came up with was roughly three times as high as the velocity that we observe in Kenya. Given a length of the e-money loop that is near one (as we observe in Kenya), a measure of total transactions that included cash-in and cash-out transfers would be three times as high as a measure that included only customer-to-customer transfers. Thus it seems likely to us that properly measured velocity in Uganda is roughly the same as in Kenya, and that the measure of transactions that we have included cash-in and cash-out transfers.

The only data that we have for the stock of e-money in Rwanda is from the database of the IMF Finaccess survey, specifically, an entry for “Outstanding Balances on Active Mobile Money Accounts, Domestic Currency.” For Rwanda the figure given is 67.2 billion in 2020.

Two other East African countries have data for this item in the database. For Uganda the entry is 571.4 billion in 2020. This matches relatively closely the figure of 546 billion shillings that we have from the spreadsheet downloaded from the Bank of Uganda. For Tanzania, the latest entry is for 2015, and is 583.8 billion. This is not a great match to the data we have from the central bank of Uganda, which gives outstanding e-float at the end of 2015 as 487 billion, of which 411 billion was held by non-agents (customers or “other”).

The Finaccess database also has information on the value e-money transactions. For Rwanda, the figure given for 2020 is 7.18 trillion. However, it is not clear what this refers to. For Uganda, the figure of 93.7 trillion for 2020 in the IMF data exactly matches the data in the spreadsheet downloaded from the Ugandan central bank. However, as we noted above, we are not sure whether this is customer-to-customer transactions, or whether it also includes cash-in and cash-out. For Kenya, the figure for 2020 in the IMF data is 5.21 trillion. This exactly corresponds to the total of cash-in and cash-out transfers in Kenya in 2020 in the data that was supplied to us by the CBK (there is no data in the IMF database for Burundi or Tanzania) . It is thus possible, and maybe even likely, that the IMF number for Rwanda is the value of cash-in plus cash-out transfers. In any case, we certainly cannot assume that it is the value of customer-to-customer transfers, which is what we were looking for.

5. Discussion

In our previous work, we concluded that M-Pesa mixed components of a low-cost money transfer system, a nascent transaction medium that shares characteristics with cash, and a savings vehicle.

To assess the role that e-money plays today, we start by pulling together information on the size of e-money operations relative to GDP. The information is presented in Table 1.⁴ We use two different measures of size: E-float held on customer phones and the value of monthly customer-to-customer transactions. In both cases, we look at both the absolute magnitude and this magnitude scaled by GDP

⁴ Data on GDP in local currency units is from the World Bank. Information in Column (2) is as follows. Kenya: e-float not held on agent phones for December 2020. Tanzania: money held in customer accounts at the end of 2020. Uganda: total of balances held by customers and “other” in December 2019. Rwanda: e-money on customer phones from IMF data. Data in Column (4) are as follows. Kenya: person-to-person transfers for December 2020. Tanzania: annual customer to customer transfers for 2020 divided by 12. We do not present data from Uganda because we think that the measure of transactions that we have available to us includes cash-in and cash-out transfers.

Table 1: Aggregate Data on the Size of E-Money

	GDP in Local Currency Units (trillions)	E-float held on customer phones (billions)	E-float as a percentage of GDP	Monthly Customer-to-customer transactions (billions)	Transactions as percentage of GDP
Kenya	2.76	135.9	4.9	374.1	13.6
Tanzania	155	918.4	0.59	1,118	0.72
Uganda	129	546	0.42		
Rwanda	10.4	67.2	0.64		

These two exercises paint a somewhat similar picture, in that they show that by either measure, e-money is far less developed in Tanzania than in Kenya. For the stock of e-money outstanding relative to GDP, the difference is a factor of 8.3, while for the number of transfers, it is a factor of 19. The difference between these two ratios is a result of velocity in Tanzania being notably lower than in Kenya, as we noted above. Although we have less data for Rwanda and Uganda, their levels of e-money relative to GDP look quite similar to that in Tanzania.

In principle, we could compare the development of e-money in the other EAC countries to levels of development in Kenya in the past. Unfortunately, our data on the stock of e-money in Kenya only goes back to 2018, so this is not feasible.

References

Mbiti, Isaac, and David N. Weil. "The Home Economics of E-Money: Velocity, Cash Management, and Discount Rates of M-Pesa Users." *The American Economic Review*, vol. 103, no. 3, American Economic Association, 2013, pp. 369–74.

Mbiti, Isaac, and David N. Weil, "Mobile Banking: The Impact of M-Pesa in Kenya," in Sebastian Edwards, Simon Johnson, and David N. Weil, editors, *African Successes, Volume III: Modernization and Development*, University of Chicago Press, 2016.

Weil, David N., Isaac Mbiti, and Francis Mwega. 2011. "The Implications of Innovations in the Financial Sector on the Conduct of Monetary Policy in East Africa." Report submitted to the International Growth Centre Tanzania Country Programme.

<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.259.7015&rep=rep1&type=pdf>

Figure 1: Outstanding E-Float and Components in Kenya

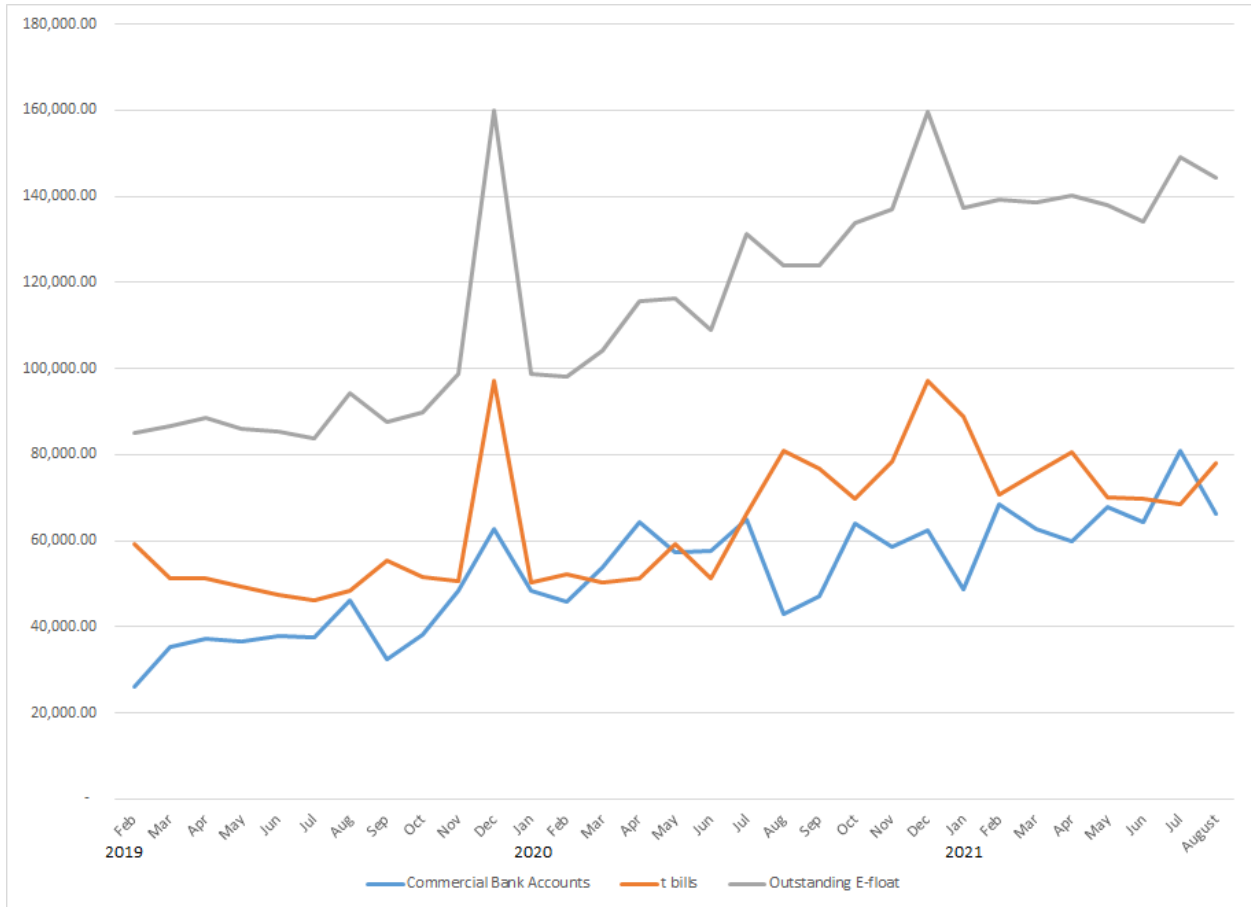


Figure 2: Monthly P2P Value in Kenya

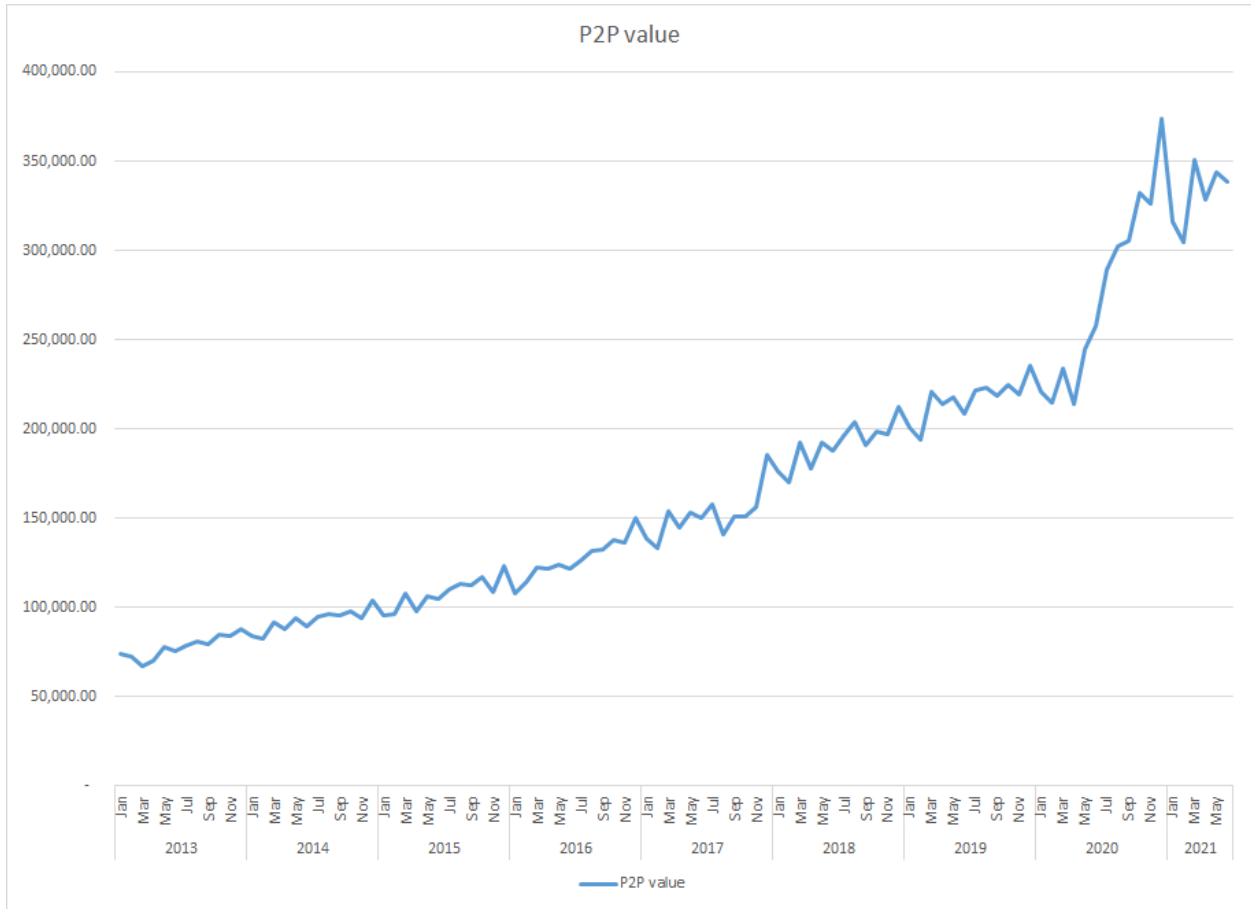


Figure 3: Average Value of Customer-to-Customer Transfers in Kenya

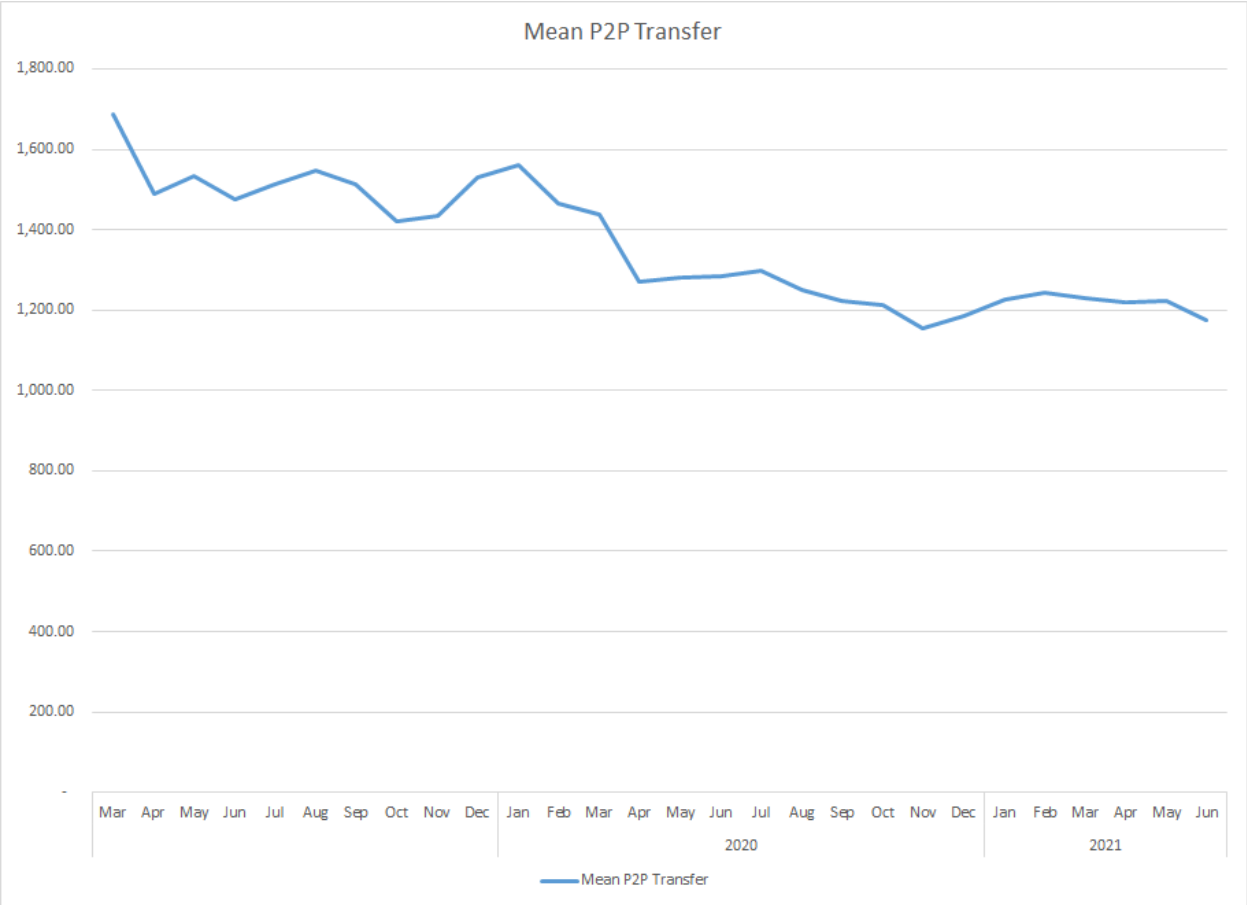


Figure 4: Monthly E-Money Velocity in Kenya

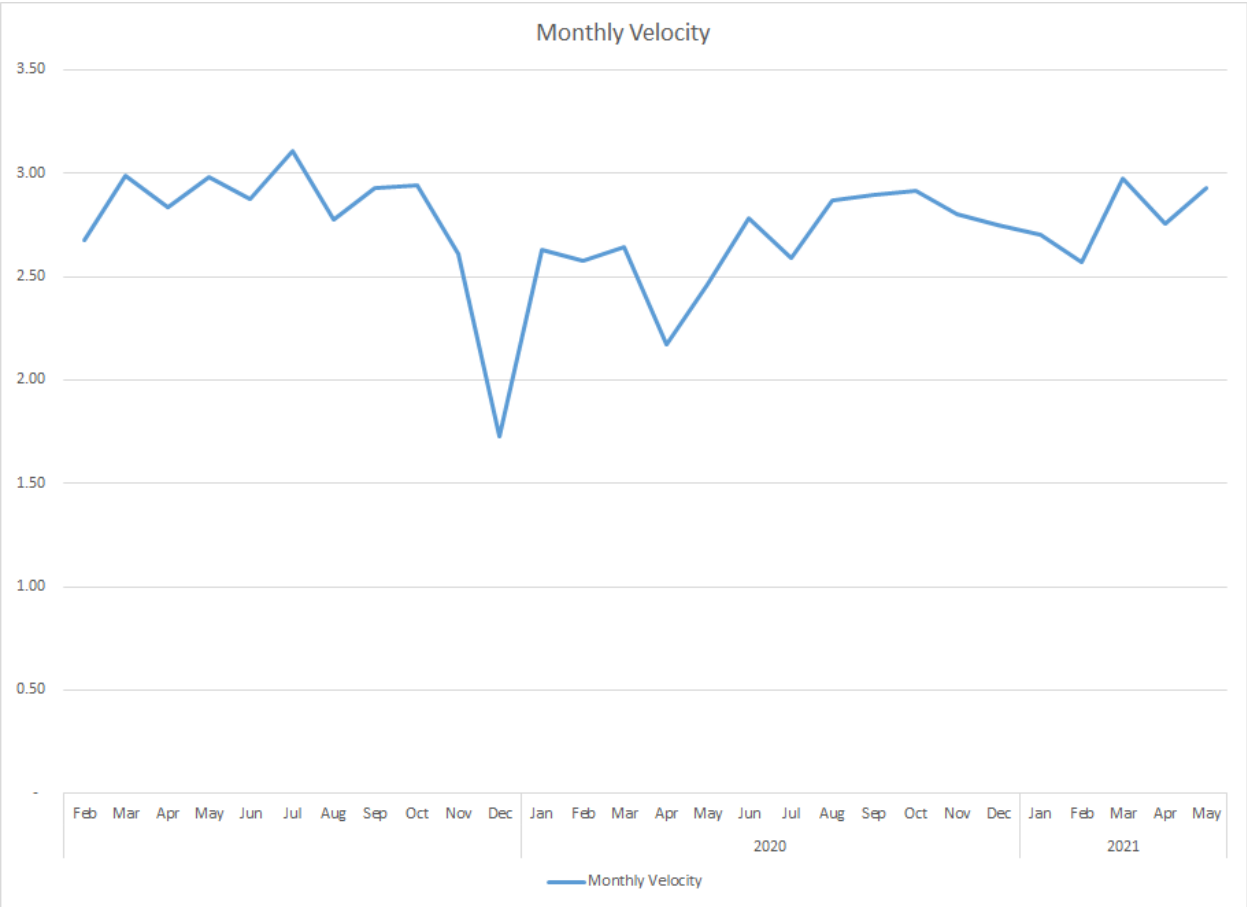


Figure 5: Length of the E-Money Loop in Kenya

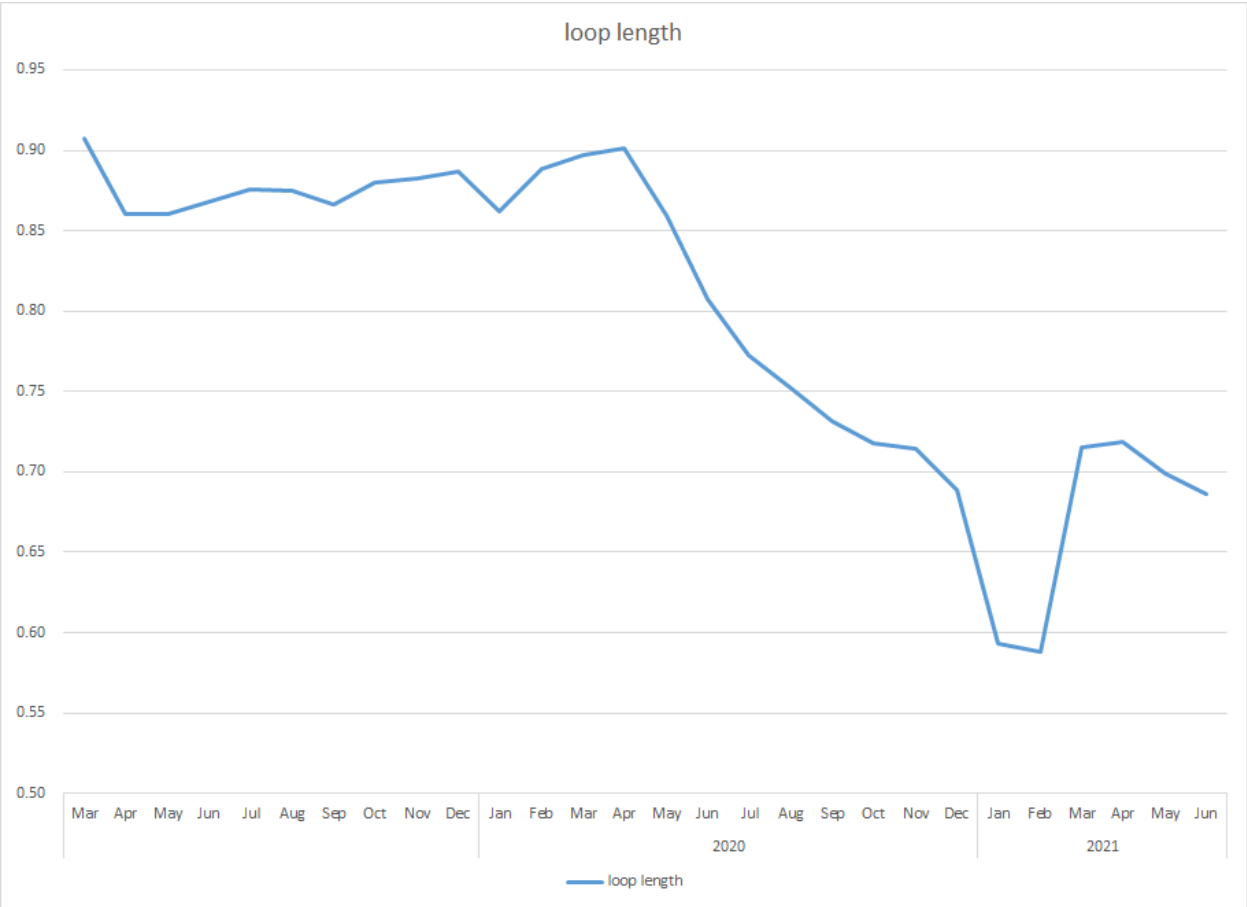


Figure 6: E-Float in Customer Accounts in Tanzania

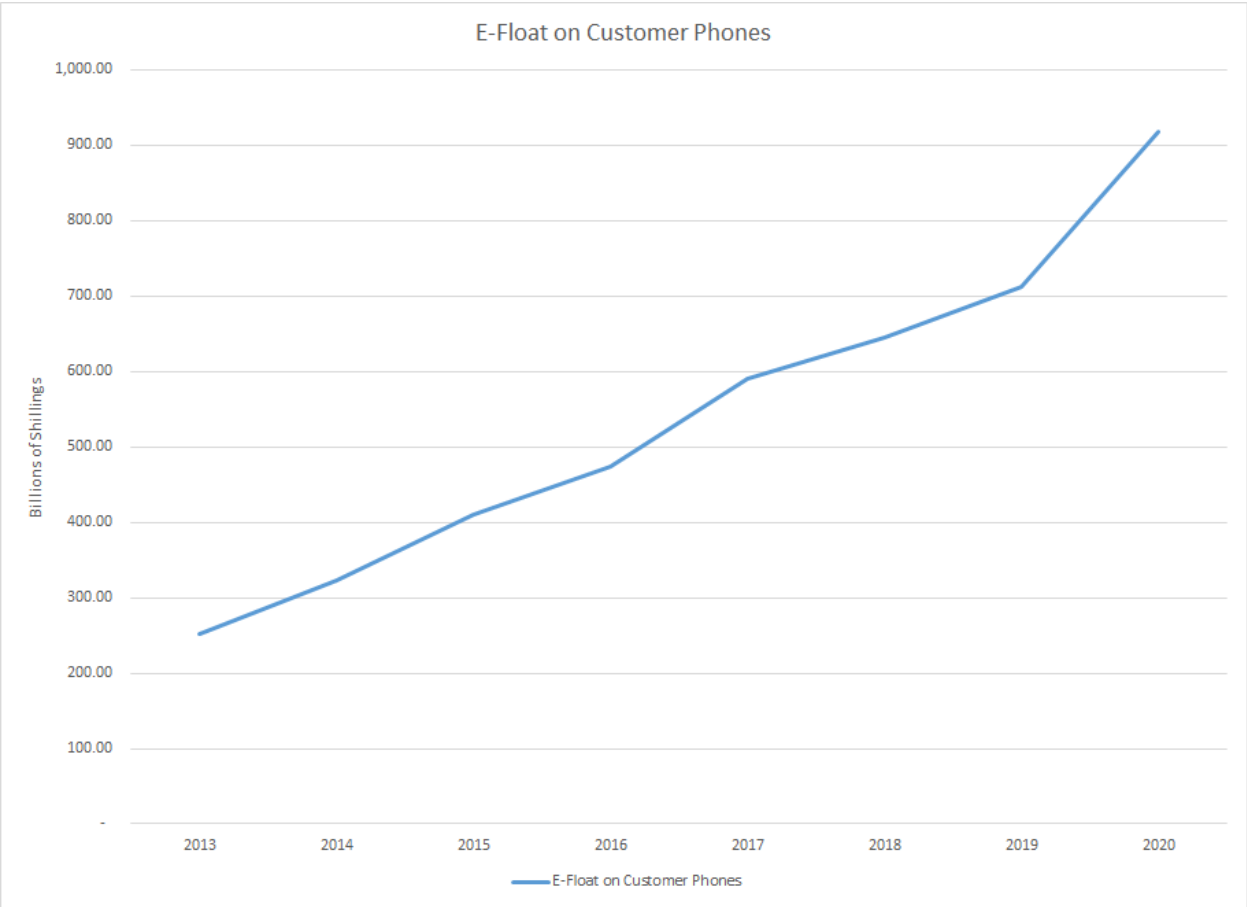


Figure 7: Total Value of Customer-to-Customer Transfers in Tanzania

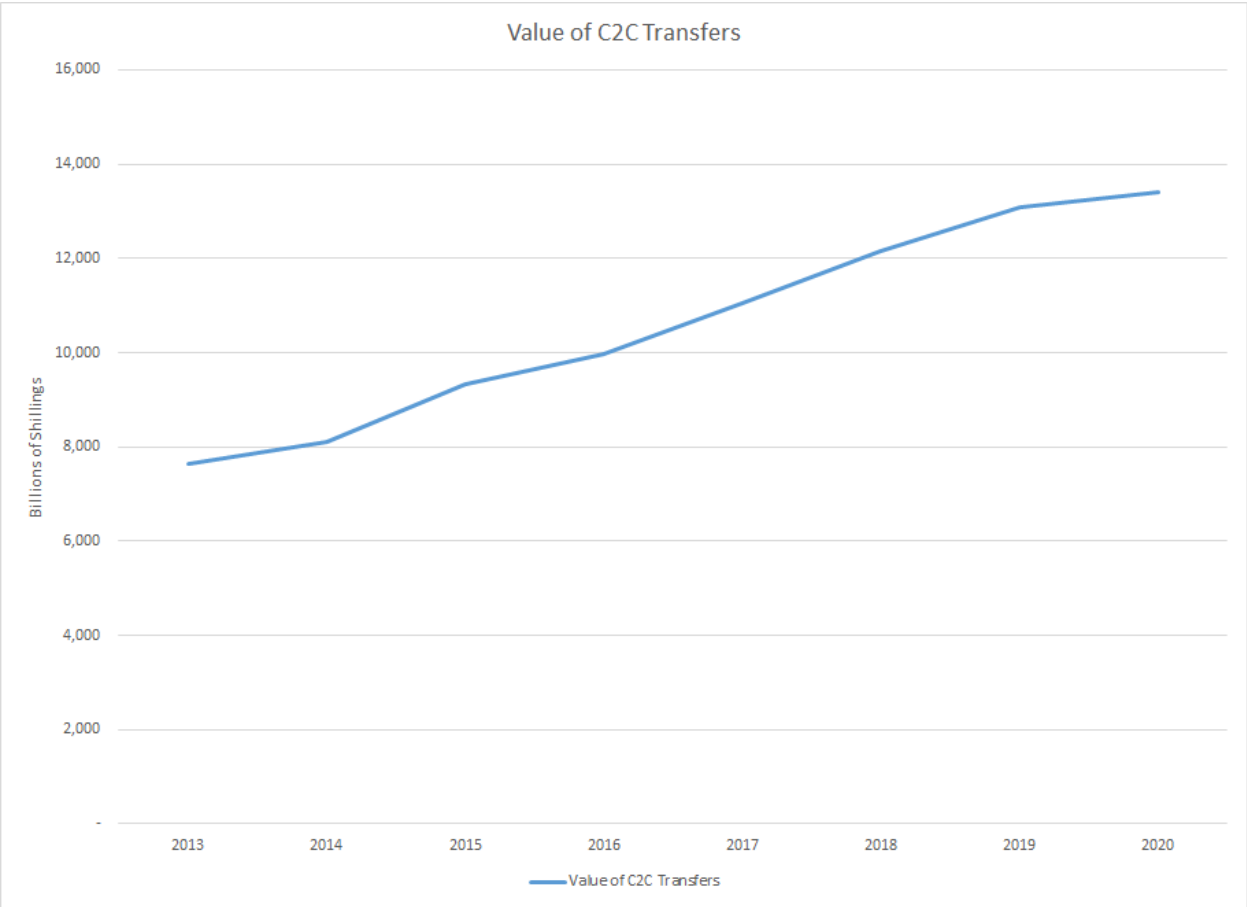


Figure 8: Average Customer to Customer Transfers in Tanzania

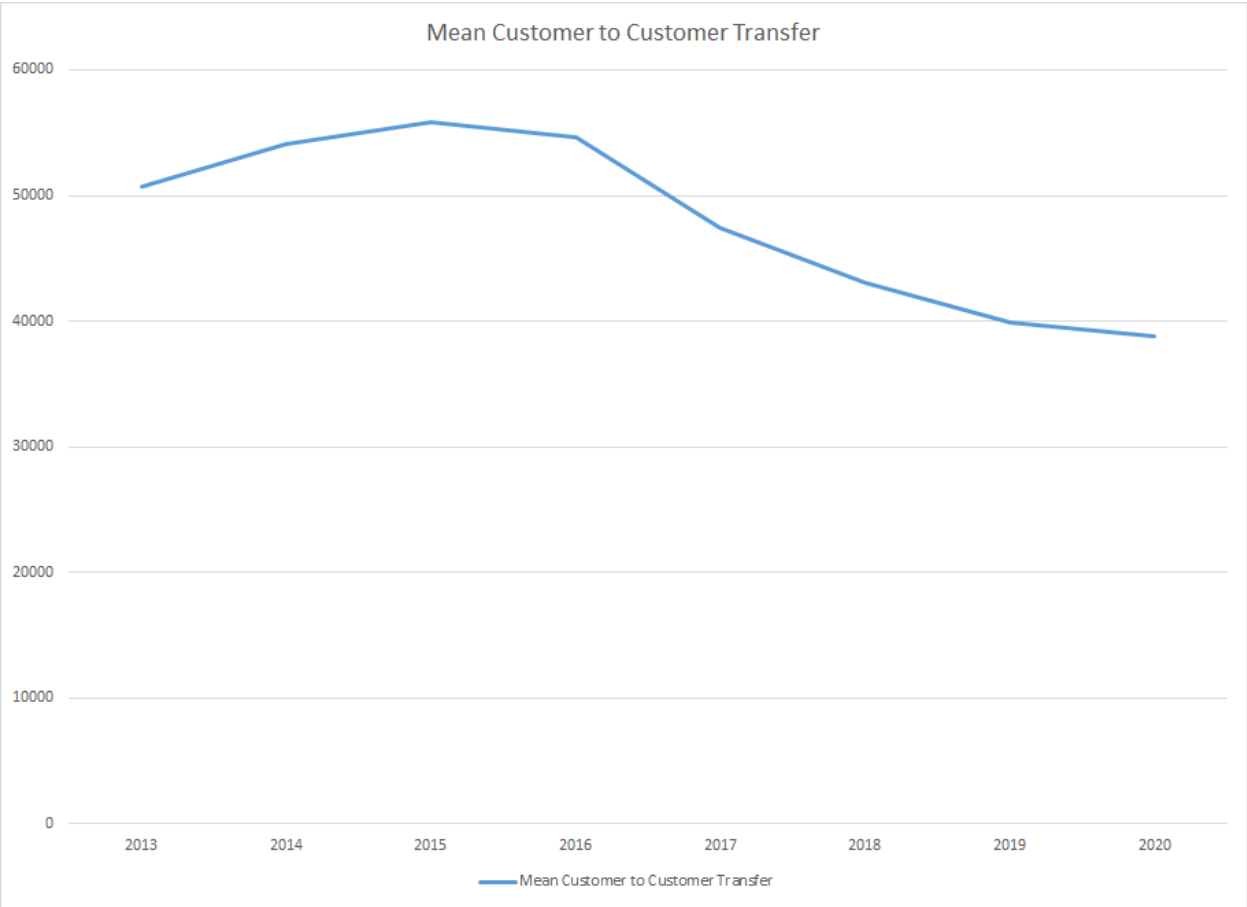


Figure 9: Velocity of E-Money in Tanzania

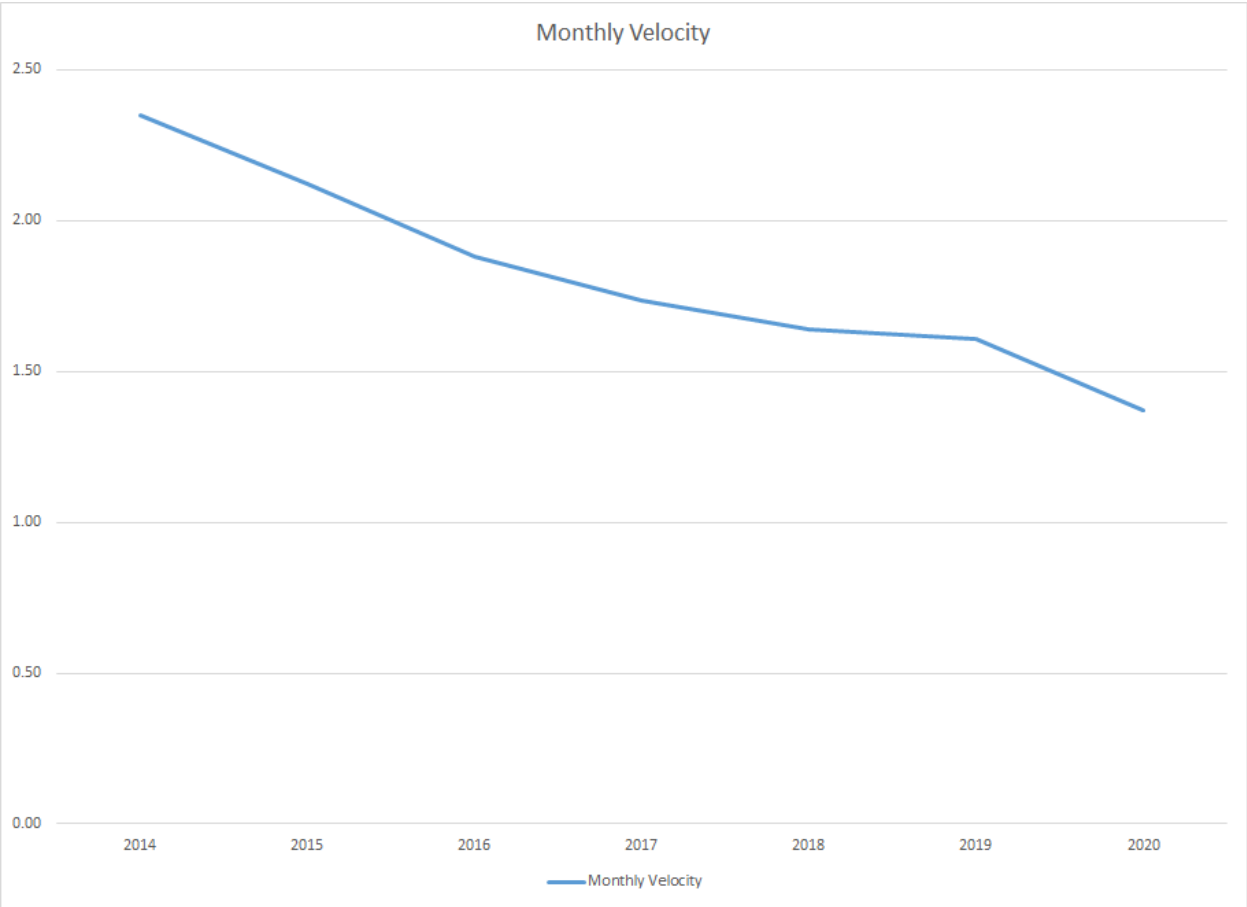
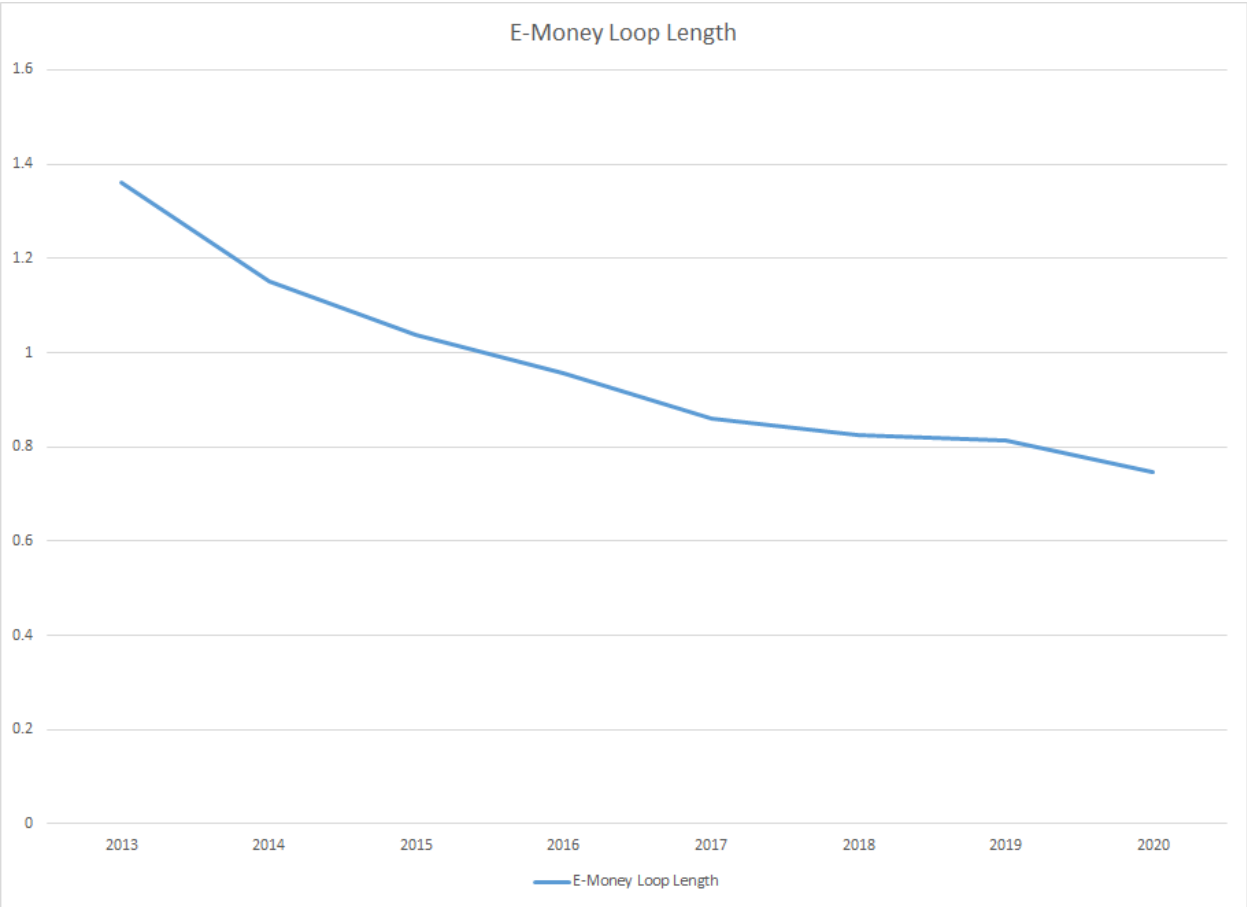


Figure 10: Length of the E-Money Loop in Tanzania



Appendix: Detailed Information by Country

Kenya

As one of the first African countries to develop nationwide mobile money services and corresponding regulation, Kenya has become one of Africa's largest markets and networks for mobile money operations. This has been in part due to the high level of cell phone ownership in the country. A study conducted by the Kenyan government's Communication Authority in June 2020, where mobile phone ownership was defined as owning a SIM card, found a 119.9% mobile phone ownership rate. Researchers have attributed this value to individuals owning multiple SIM cards in an effort to take advantage of the most cost-effective mobile subscription options offered by providers⁵. Other studies have counted the number of unique subscribers and proportion of individuals who own a physical mobile phone, figures that stood at 59% and 80% in 2017⁶. Kenya has five mobile network operators with two dominant companies. In March 2020, Safaricom PLC and Airtel Networks Limited controlled 64.5% and 26.6% of the market, respectively. Other operators include Telkom Kenya Limited with 5.8% of subscriptions, Equitel with 3.1% of subscriptions, and Mobile Pay Limited with a negligible number of subscribers⁷. Kenya has maintained high levels of mobile phone ownership and accessibility compared to other African countries, allowing for a robust mobile money network.

Mobile money began in Kenya in March 2007 with Safaricom's M-Pesa, the dominant mobile money service in 2021 boasting 98.8% of mobile money subscriptions in the country⁸. Other mobile money services in Kenya include Airtel Money, which launched in Kenya in 2009 and claims 1.1% of subscriptions, and T-Cash, which launched in 2018 and claims 0.05% of subscriptions. Tangaza Pesa, which launched in 2011, and Equitel, which launched in 2014, hold a negligible amount of subscriptions in Kenya. M-Pesa became the dominant mobile money service soon after its creation by providing traditional banking services to people all over the country, especially in more rural areas. M-Pesa created a fast and convenient money transfer service with low fees, adequate consumer protection, and a network that was accessible anywhere from a cell phone.⁹ M-Pesa has continued to expand in Kenya, as evidenced by an

⁵ Frankline Kibuacha, "Mobile Penetration and Growth in Kenya," *GeoPoll* (blog), January 13, 2021, <https://www.geopoll.com/blog/mobile-penetration-kenya/>.

⁶ "The Mobile Money Economy: Sub-Saharan Africa 2017" (GSMA, 2017), <https://www.gsma.com/subsaharanafrica/wp-content/uploads/2018/11/2017-07-11-7bf3592e6d750144e58d9dcfac6a4dfab.pdf>.

⁷ "M-Pesa Has Almost 99% Market Share in Kenya," *Connecting Africa*, July 6, 2020, http://www.connectingafrica.com/author.asp?section_id=761&doc_id=762180.

⁸ "M-Pesa Has Almost 99% Market Share in Kenya."

⁹ Andrea Barry, "How Kenya Created the World's Most Successful Mobile-Payments Service," *Technology and Operations Management* (blog), December 9, 2015,

increasing number and overall value of transactions, due to a large network of agents. M-Pesa had 40,000 agents in 2015. The total number of mobile money agents increased to 295,105 as of October 2021, according to the Central Bank of Kenya, with the vast majority working for M-Pesa.¹⁰ For reference, the service controlled about 86% of agents in July 2020 (Connecting Africa, 2020). As of October 2021 Kenya had 66.8 million registered mobile money accounts, compared to 58 million at the beginning of 2020. The volume of mobile money payments reached 1.86 trillion in 2020, compared to 1.83 trillion in 2019. And the value of mobile money transactions in the first six months of 2021 reached Sh3.26 trillion compared to Sh3.06 trillion from July to December of 2021¹¹. Monthly transactions reached Sh532.63 billion in June of 2021 with Safaricom continuing its dominance over the market, processing 90% of transactions during the first half of 2021. Kenya has proven to be an important example of how mobile money services can reach people all across the country and facilitate the movement of money between urban and rural areas while providing banking and financial services to individuals who formerly did not have access to the traditional banking system.

Kenya established robust regulation of mobile money services only a few years after networks were launched, allowing for the government to aid growth by ensuring consumer confidence in the service. The National Payment Systems Act, passed in 2011, gave monitoring and regulatory power over mobile money services to the Central Bank with the ultimate goal of increasing efficiency and security on payment systems.¹²

Kenya passed additional E-Money regulations in 2013 explicitly addressing government oversight in the industry. These regulations stipulated that only banks and financial institutions may issue e-money unless authorized by the Central Bank in order to ensure that issuers have the security and financial capital to support operations¹³. In addition, regulations require that all e-money issuers have maximum monthly transaction limits on individuals, maintain accurate records of accounts and account owners, and provide adequate security for held funds which includes that issuers may not engage in lending or investing (other than what is needed to reach the amount of liquid assets equal to all outstanding e-money issued). Regulations also sought to monitor agent operations as well as improve consumer protection. E-money issuers are liable for agent conduct and must report information about agent activity to the Central Bank. In addition, adequate notice to the consumer about fees and procedures to file a complaint or receive

<https://digital.hbs.edu/platform-rectom/submission/how-kenya-created-the-worlds-most-successful-mobile-payments-service/>.

¹⁰ “Mobile Payments | CBK,” Central Bank of Kenya, accessed February 17, 2022,

<https://www.centralbank.go.ke/national-payments-system/mobile-payments/>.

¹¹ Victor Oluwole, “Kenya’s Mobile Money Transactions Surge by 52% in H1 2021 — CBK,” Business Insider Africa, 39:51 200AD,

<https://africa.businessinsider.com/local/markets/kenyas-mobile-money-transactions-surge-by-52-in-h1-2021-cbk/rr81yq4>.

¹² “The National Payment System Act, 2011” (2011),

[https://www.centralbank.go.ke/images/docs/legislation/NATIONAL%20PAYMENT%20SYSTEM%20ACT%20\(No%2039%20of%202011\)%20\(2\).pdf](https://www.centralbank.go.ke/images/docs/legislation/NATIONAL%20PAYMENT%20SYSTEM%20ACT%20(No%2039%20of%202011)%20(2).pdf).

¹³ “E-Money Regulation” (Central Bank of Kenya, 2013),

<https://www.centralbank.go.ke/images/docs/NPS/Regulations%20and%20Guidelines/Regulations%20-%20E-%20MONEY%20regulations%202013.pdf>.

customer service are required among other services aiding consumer security and confidence. Relevant statistics about E-money operations, including the number of e-money accounts, the value and volume of transactions, the total amount of outstanding/issued e-money, and incidents of fraud and customer complaints, must all be reported to the Central Bank each month.

Most recently, Kenya passed 2018 General Data Protection Regulations and the 2019 Data Protection Act. The 2018 Act identified the Communications Authority of Kenya (CA), Competition Authority of Kenya (CAK), and the Central Bank of Kenya as the major enforcers of privacy regulations. The 2019 Act prompted Safaricom to create the Office of the Data Commissioner to review how the company handles consumer data and create an internal data protection officer position. These sets of regulations significantly improved the Kenyan Government's ability to support security and consumer confidence in e-money services as the industry rapidly expanded.

Like many other countries around the world, the Kenyan Central Bank instituted a waiver on transfer fees for transactions below KSh 1,000 in March 2020 in response to the COVID-19 Pandemic. Transfer fees returned at the beginning of 2021, later than many other countries in the region. Large increases in the number of mobile money accounts and value/volume of transactions in Kenya through 2020 have been connected with the fee waiver as mobile money accounts now outnumber the country's population.¹⁴ Mobile money is now widely accepted at most businesses across the country as a form of payment, incentivizing individuals to use mobile money services. In addition to fees, Kenya includes a 12% excise duty on fees collected by operators on mobile money transactions. This value increased from 10 to 12% in 2018.¹⁵

Another important regulation to consider in Kenya is agent exclusivity, a policy that many companies historically included in agent contracts that required agents to exclusively work for one mobile money service. In 2014, the Competition Authority of Kenya ruled that Safaricom could no longer require agents to exclusively work for the company. Safaricom argued that significant investments in agent hiring, training, and connectivity meant that the company should not be required to "share agents." Airtel, a competitor to Safaricom in Kenya, argued that agent exclusivity proved a barrier to entry in Kenya essentially maintaining Safaricom's control of the market. After the 2014 ruling, the percentage of agents working for one company has steadily decreased from a high of 96% in 2013. A ban on exclusivity agreements in agent contracts was also passed by the Central Bank of Kenya in 2014.¹⁶

¹⁴ Miriam Wangui, "Kenya's Mobile Money Transactions Climb to KSh5.2 Trillion in 2020 - Kenyan Wallstreet," *The Kenyan Wall Street Journal*, February 10, 2021, sec. Kenyan News, <https://kenyanwallstreet.com/kenyas-mobile-money-transactions-climb-to-ksh5-2-trillion-in-2020/>.

¹⁵ Tarna Silue, "E-Money, Financial Inclusion and Mobile Money Tax in Sub-Saharan African Mobile Networks" (Hal Open Science, July 8, 2021), <https://hal.uca.fr/hal-03281898/document#:~:text=Note%20in%20Kenya%20that%20this,to%2012%20percent%20in%202018.>

¹⁶ Rafe Mazer, Rashmi Pillai, and Stefan Staschen, "Agents for Everyone: Removing Agent Exclusivity in Kenya & Uganda," accessed February 17, 2022, <https://www.cgap.org/blog/agents-everyone-removing-agent-exclusivity-kenya-uganda>.

Tanzania

As in other East African countries, the number of people accessing financial services through mobile phones in Tanzania has increased consistently since the launch of mobile money services. According to the Bank of Tanzania, the percentage of adults in Tanzania accessing financial services through a mobile device reached a high of 78.4% in March 2020, up 4.1% from March 2019¹⁷. The number of registered SIM cards reached 43.75 million in June 2019.¹⁸ The market for mobile phone operators in Tanzania is more competitive than other countries in Africa with three major operators as well as several smaller companies. In March 2016, Tanzania had a little over 39.5 million mobile phone subscriptions of which Vodacom controlled 31%, Tigo controlled 29%, Airtel controlled 27%, Zantel controlled 5%, Halotel controlled 4.5%, Smart controlled 3%, and TTCL controlling less than one percent.¹⁹ These companies were allowed to launch mobile money services in 2007-2008 after receiving approval from the Bank of Tanzania under the Converged Licensing Framework.²⁰ Mobile money services in Tanzania have benefitted from a close connection to mobile network operators with mobile money accounts expanding along with mobile network subscriptions.

Because of the large number of competitive mobile network operators, Tanzania has several large mobile money services. Vodacom's M-Pesa and Zantel's Z-Pesa (now Ezy Money) both launched between 2008 and 2009. Tigo Pesa launched soon after in 2010, followed by Airtel Money in 2012, HaloPesa in 2016, and TTCL's T Pesa in 2017. As of March 2019, M-Pesa controlled 40% of mobile money subscriptions. Other major competitors Tigo Pesa and Airtel money controlled 30% and 18%, respectively.²¹ Smaller firms included Halopesa which controlled 7% of subscriptions, Ezy Pesa with 2% of subscriptions, and TTCL with 2% as well. With high levels of competition the volume and value of mobile money transactions has continued to grow in Tanzania. The country reached 27.2 million active mobile money subscriptions in June 2020, up from 22.3 million at the end of June 2019.²² The Bank of Tanzania also reported a 21.8% annual growth rate in the number of transactions as well as a 8.9% growth

¹⁷ "Annual Report 2019/20" (Bank of Tanzania, December 2020),

<https://www.bot.go.tz/Publications/Regular/Annual%20Report/en/2020123112264444.pdf>.

¹⁸ Victor Nyka, "Regulatory Collaboration in Ensuring Digital Financial Inclusion in Tanzania" (Tanzania Communications Regulatory Authority (TCRA), n.d.),

https://www.itu.int/en/ITU-D/Regulatory-Market/Documents/Events2019/Togo/Ses3.1_%20Nkya_collaboration.pdf

¹⁹ Tanzania Communications Regulatory Authority, "Quarterly Communications Statistics Report," Wayback Machine, March 2016,

<https://web.archive.org/web/20190104145402/http://www.tcra.go.tz/images/documents/telecommunication/CommStatMarch16.pdf>.

²⁰ Nyka, "Regulatory Collaboration in Ensuring Digital Financial Inclusion in Tanzania."

²¹ Simon K. Andersson-Manjang and Nika Naghavi, "State of the Industry Report on Mobile Money" (GSMA, 2021),

https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/03/GSMA_State-of-the-Industry-Report-on-Mobile-Money-2021_Full-report.pdf.

²² "Annual Report 2019/20."

rate in the value of transactions between 2018 and 2019. This growth led to 1.5 trillion transactions in the first six months of 2019 with a value of 74.90 trillion Tshs. The most up to date information on the breakdown of mobile money transactions by company is from March 2020 which had a monthly total of almost 257 million transactions.²³ In that month M-Pesa made up 41% of transactions, Tigo Pesa made up 29% of transactions, Airtel Money made up 22% of transactions, Halopesa made up 5.7% of transactions, and Ezy Money along with TTCL made up about a percentage of transactions. The volume of transactions was slightly higher than February of 2020, but the breakdown by company was roughly the same. The large number of active mobile money services in Tanzania has also led to a large number of agents around the country. According to the Bank of Tanzania, the number of agents in June 2020 was 623,867.²⁴ Tanzania remains an important case study for mobile money services as its timeline of growth and regulation differ slightly from its neighbor, Kenya.

The Bank of Tanzania (BOT) and the Tanzania Communications Regulatory Authority (TCRA) are the primary regulators of the banking and mobile money industries in the country. Mobile money operators are required to obtain an Unstructured Supplementary Service Data Code from the TCRA that identifies the operator, registered businesses using the service, and a service's agents. Tanzania passed its National Payment System Act in 2015 seeking to increase consumer protections on mobile money service platforms and govern agent training and conduct by giving more concrete authority to the Bank of Tanzania. The Act outlined that mobile money services are liable for agent behavior, mandated to provide adequate training for agents and maintain accurate records of agents and their transactions, and required to take steps to prevent money laundering and the financing of terrorism. The Act also barred services from requiring that an agent exclusively work with one company. This non-exclusivity rule arose after legal challenges in Kenya and Uganda arose in 2014 in response to contracts specifying that agents were required to exclusively work with one service provider.²⁵ All of these rules sought to improve consumer security and trust in mobile money services. The Tanzania Communications Regulatory Authority (TCRA) also established the Computer Emergency Response Teams (CERTS) in 2010 to alert the government and companies of cyber-attacks in a timely manner allowing for adequate and swift corrective action.²⁶ The Financial Consumer Protection Regulations passed in 2019 also outlined rules governing personal data handling and privacy that are enforced by the Bank of Tanzania.²⁷ Tanzania regulators have worked to increase confidence and trust in mobile money services in order to support growth and greater access to financial services.

Tanzania was one of the first countries in Africa to invest and move towards interoperability between mobile money platforms. In 2013, the Bank of Tanzania began facilitating discussions around account-to-account interoperability between mobile money providers. Subsequently, Tigo

²³ "Tanzania Mobile Money Transactions by Operator 2020," Statista, September 22, 2021, <https://www.statista.com/statistics/1081846/tanzania-mobile-money-transactions-by-operator/>.

²⁴ "Annual Report 2019/20."

²⁵ Mazer, Pillai, and Staschen, "Agents for Everyone."

²⁶ "TZ-CERT Profile – Tanzania Computer Emergency Response Team," n.d., <https://www.tzcert.go.tz/about-us/tz-cert-profile/>.

²⁷ Tanzania Communications Regulatory Authority, "Quarterly Communications Statistics Report."

and Airtel signed a bilateral agreement in September 2014 that launched compatibility in February 2015. In December 2014, Tigo connected with Zantel. And finally in February 2016, Vodacom announced interoperability with Airtel and Tigo. Services only began to publicly advertise interoperability between services in 2016.²⁸ In 2016, person-to-person transfers between providers only made up 6-8% of transactions, but this amount was expected to grow in subsequent years as more consumers engaged with newly offered services. Most recently in June 2020, the Tanzanian government sought to address limitations on current interoperability with the Tanzania Instant Payment System (TIPS) allowing for convenient, low cost transfers regardless of service provider, sector, or bank or non-banking institution.

Tanzania mobile money regulatory agencies also took significant steps at the beginning of the Covid-19 Pandemic to encourage the use of mobile money platforms and sustain economic activity. In May 2020, the Bank of Tanzania increased mobile money operators' daily transaction limit to customers from TZS 3 million to TZS 5 million. The daily balance limit was also increased from TZS 5 million to TZS 10 million in an effort to encourage e-money activity and decrease physical use of banks during the pandemic.²⁹

On July 15, 2021 the Tanzanian government imposed a tax on all mobile money transactions in an effort to raise \$2.1 billion over the next five years to fund rural development and infrastructure efforts.³⁰ The original tax on transfers was set to range from 10 to 10,000 TZS (\$0.0043 to \$4.31) per transaction. But the tax was reduced by 30% to 7 to 7,000 TZS per transaction at the beginning of September following widespread protests around the country. This reduction is displayed in the chart below. For example, on transfers ranging from 5,000 to 6,999 TZS the tax amount was reduced from 100 TZS to 70 TZS. In addition to the reduction in the government tax rate, the Tanzanian government also secured a 10% reduction in mobile operator fees on money transfers.³¹ Many analysts saw these tax increases as impediments to the growing mobile money service market in Tanzania, especially as the Covid-19 Pandemic continues to be a serious problem.

²⁸ Lara Gilman, "The Impact of Mobile Money Interoperability in Tanzania: Early Data and Market Perspectives on Account-to-Account Interoperability" (GSMA, September 2016), https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/10/2016_GSMA_The-impact-of-mobile-money-interoperability-in-Tanzania.pdf.

²⁹ "Annual Report 2019/20."

³⁰ Alan Burkitt-Gray, "Tanzania Cuts Mobile Money Tax by 30% after Protests," Capacity, September 8, 2021, <https://www.capacitymedia.com/articles/3829560/tanzania-cuts-mobile-money-tax-by-30-after-protests>.

³¹ "Tanzania Finally Reduces Mobile Money Transaction Levy after Public Outcry," The Citizen, August 31, 2021, <https://www.thecitizen.co.tz/tanzania/news/tanzania-finally-reduces-mobile-money-transaction-levy-after-public-outcry-3533212>.

Revised rates

A comparison between the previous rates and revised rates is seen below.

S/N	Electronic Mobile Money transfer and withdrawal amount in TZS	Revised Rate in TZS	Previous rates in TZS	Difference (Reduction)	% of the lowest amount of the revised rate	% of the highest amount of the revised rates	% of the lowest amount of the previous rates	% of the highest amount of the previous rates
1.	1 to 999	NIL	NIL	-	0.00%	0.00%	0.00%	0.00%
2.	1,000 to 1,999	10	10	-	1.00%	0.50%	1.00%	0.50%
3.	2,000 to 2,999	11	16	5	0.55%	0.37%	0.80%	0.53%
4.	3,000 to 3,999	19	27	8	0.63%	0.48%	0.90%	0.68%
5.	4,000 to 4,999	39	56	17	0.98%	0.78%	1.40%	1.12%
6.	5,000 to 6,999	70	100	30	1.40%	1.00%	2.00%	1.43%
7.	7,000 to 9,999	88	125	37	1.26%	0.88%	1.79%	1.25%
8.	10,000 to 14,999	224	320	96	2.24%	1.49%	3.20%	2.13%
9.	15,000 to 19,999	427	610	183	2.85%	2.14%	4.07%	3.05%
10.	20,000 to 29,999	672	960	288	0.34%	2.24%	4.80%	3.20%
11.	30,000 to 39,999	770	1,100	330	2.57%	1.93%	3.67%	2.75%
12.	40,000 to 49,999	1,050	1,500	450	2.63%	2.10%	3.75%	3.00%
13.	50,000 to 99,999	1,435	2,050	615	2.87%	1.44%	4.10%	2.05%
14.	100,000 to 199,999	1,771	2,530	759	1.77%	0.89%	2.53%	1.27%
15.	200,000 to 299,999	2,058	2,940	882	1.03%	0.69%	1.47%	0.98%
16.	300,000 to 399,999	2,450	3,500	1,050	0.82%	0.61%	1.17%	0.88%
17.	400,000 to 499,999	2,870	4,100	1,230	0.72%	0.57%	1.03%	0.82%
18.	500,000 to 599,999	3,640	5,200	1,560	0.73%	0.61%	1.04%	0.87%
19.	600,000 to 699,999	4,480	6,400	1,920	0.75%	0.64%	1.07%	0.91%
20.	700,000 to 799,999	4,970	7,100	2,130	0.71%	0.62%	1.01%	0.89%
21.	800,000 to 899,999	5,264	7,520	2,256	0.66%	0.58%	0.94%	0.84%
22.	900,000 to 1,000,000	6,230	8,900	2,670	0.69%	0.62%	0.99%	0.89%
23.	1,000,001 to 3,000,000	6,580	9,400	2,820	0.66%	0.22%	0.94%	0.31%
24.	3,000,001 and above	7,000	10,000	3,000	0.23%		0.33%	

<https://www2.deloitte.com/content/dam/Deloitte/tz/Documents/tax/Deloitte%20Tanzania%20Tax%20alerts%20-%20Amendment%20to%20the%20mobile%20transfer%20and%20withdrawal%20levy.pdf>

Uganda

Mobile money services began operating in Uganda in 2009. As of quarter 1 of 2021, five telecom firms (MTN, Airtel, Africell, Lycamobile, and UTL) had a combined 28.3 million subscribers, roughly 62% of the total population. Large and small telecom firms operate in the country. MTN has 15 million customers (53% of total subscriber), Airtel has 10 million subscribers (35.3% of total subscribers), Africell holds 1.2 million subscribers (4.2% of total subscribers), while the remaining 7.4% are shared between Lycamobile and UTL. Africell had announced its exit from the market effective October 7, 2021.³²

Seven e-money licenses have been issued in Uganda, but two MNOs, MTN Uganda and Airtel Uganda (formerly Zain), created and currently dominate the Ugandan sector due in part to their

³² “Fears over MTN, Airtel Dominance in Uganda’s Telecom Sector,” The Independent Uganda, October 6, 2021, <https://www.independent.co.ug/fears-over-mtn-airtel-dominance-in-ugandas-telecom-sector/>.

pre-existing infrastructure which allowed them to quickly scale up operations.³³ MTN, launched in Uganda in October 2009, has a total of 10 million mobile money accounts, covering 66% of the mobile money market with a total of 20,000 agents nationwide as of 2016.³⁴ Airtel, launched in January 2009, has a total of 8 million mobile money accounts, covering 33% of the mobile money market with 47,000 agents as of 2016. Lastly, M-Sente, launched in February 2010, has 1.2 million mobile money accounts, covering only 1% of the mobile money market with 5,000 agents as of 2016. Cumulative data from 2020 shows 3,526,972,165 transactions valued at 93,728,611,507,775 Ugandan shillings (UGX) (26,152,693,339.79 USD). As of February 2021, 30,735,167 mobile money accounts have been registered.³⁵ The Bank of Uganda has reported 292,210 active agents as of September 2021. The active account to agent ratio as of September 2021 is 73 accounts per agent.

In 2020, Uganda passed the National Payments System Act in response to business integration of mobile money platforms into operations and expansion of electronic financial services in banks. The act introduced stricter regulation and monitoring of mobile money services in order to protect users and ensure the effectiveness of platforms. The Act applies to operators of payment systems, payment service providers, and issuers of payment instruments in addition to all technology that allows for electronic transferring of money. The Bank of Uganda is empowered to operate, supervise, and regulate payment systems and is able to create a licensing system for payment system providers and e-money issuers. Several other vested powers related to monitoring and investigating include gathering information, conducting site visits, appointing external auditors, overseeing insolvency proceedings, and creating regulation to combat fraud. In addition, the Act creates a regulatory sandbox framework where new technologies can be tested under adequate consumer protection.³⁶

In May 2018, Uganda proposed a 1% government tax on the value of all mobile money transactions which included mobile money deposits, withdrawals, and exchanges.³⁷ The tax was introduced in July leading to a large decrease in mobile money transfers. Many businesses with access to bank accounts began to transfer money to banks to withdraw money in order to avoid taxes on cash-out mobile money transactions. The tax was amended to 0.5% in November of 2018 following public outcry that taxes would disproportionately hurt low income and rural Ugandans.³⁸ In addition to this tax, the Ugandan government also levies a 10% excise duty tax

³³ “Mobile Money Metrics,” GSMA, <https://www.gsma.com/mobilemoneymetrics/>.

³⁴ Margarete Biallas and Alana Fook, “IFC Mobile Money Scoping Country Report: Uganda” (International Finance Corporation, World Bank Group, n.d.), <https://www.ifc.org/wps/wcm/connect/b708e5e8-25e6-49cd-98d3-9dc8a313781a/Uganda+Market+Scoping+Report.pdf?MOD=AJPERES&CVID=mk1-VKv>.

³⁵ “Bank of Uganda | Data and Statistics,” Bank of Uganda: Payment System, n.d., <https://www.bou.or.ug/bou/website/PaymentSystems/dataandstat.html>.

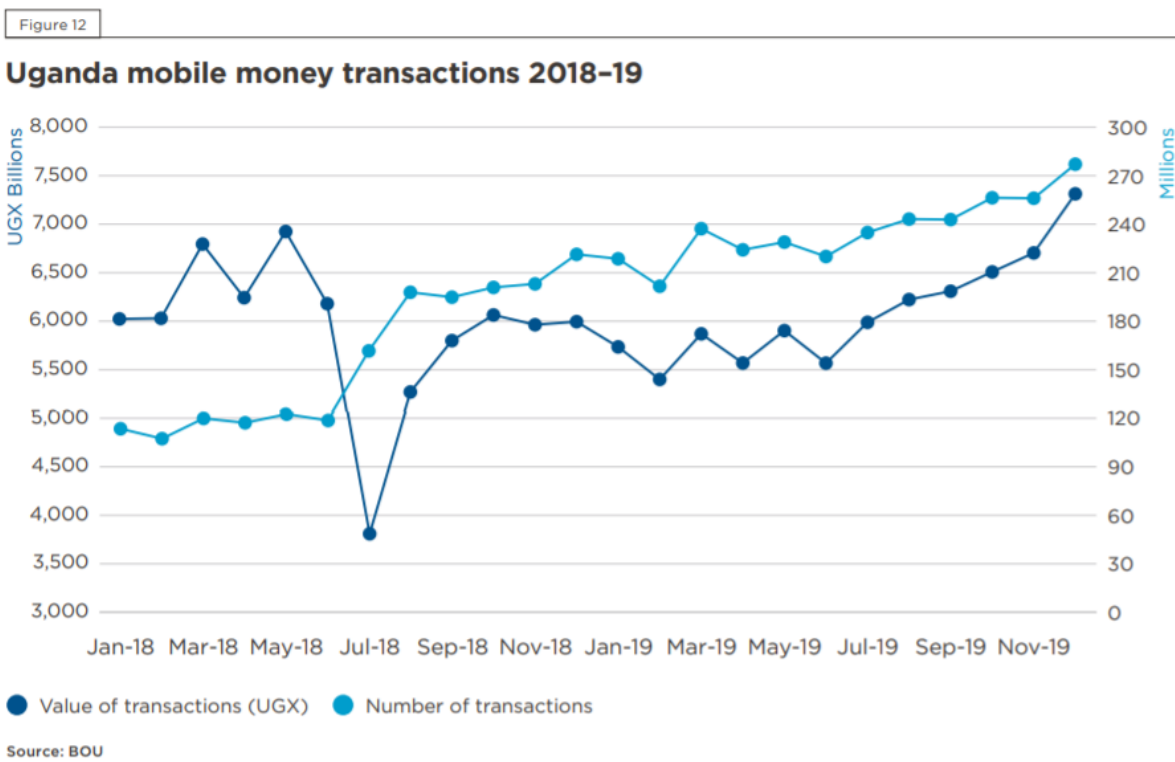
³⁶ ENSafrica-Donald Nyakairu and Tracy Kakongi, “Key Features of Uganda’s National Payment Systems Act,” Lexology, September 15, 2020, <https://www.lexology.com/library/detail.aspx?g=30e9b2e1-755f-4527-b28e-41d20a5171d1>.

³⁷ Francis Kamulegeya, “New Tax on Mobile Money Transactions,” PwC Uganda, n.d., <https://www.pwc.com/ug/en/press-room/new-tax-on-mobile-money-transactions.html>.

³⁸ Killian Clifford, “The Causes and Consequences of Mobile Money Taxation: An Examination of Mobile Money Transaction Taxes in Sub-Saharan Africa” (GSMA, June 2020),

on the fees mobile money services charge on exchanges and withdrawals. This government excise duty was increased to 15% in July 2018, but this tax is also levied on many banking services therefore not targeting the mobile money industry.³⁹

MTN and Airtel established interoperability between the two services in 2018 following a recommendation by the Central Bank. Resources for the connection were not provided by the government leading to only this two-way connection and continued dominance in the mobile money market by these two services. A 0.6% fee is paid by customers who receive money from another platform. The Ugandan government implemented a tax on these exchanges in July 2018 which many argued would drive consumers to use banking services to avoid taxes. Even with interoperability, exchanges between platforms make up only 0.21% of transactions each year.⁴⁰



https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/06/GSMA_The-causes-and-consequences-of-mobile-money-taxation.pdf

https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/06/GSMA_The-causes-and-consequences-of-mobile-money-taxation.pdf.

³⁹ “New Tax on Mobile Money Transactions.”

⁴⁰ “Tracking the Journey towards Mobile Money Interoperability: Emerging Evidence from Six Markets: Tanzania, Pakistan, Madagascar, Ghana, Jordan and Uganda,” GSMA, *Mobile for Development* (blog), June 12, 2020, <https://www.gsma.com/mobilefordevelopment/resources/tracking-the-journey-towards-mobile-money-interoperability-emerging-evidence-from-six-markets-tanzania-pakistan-madagascar-ghana-jordan-and-uganda/>.

Rwanda

Mobile money arrived in Rwanda in 2010, later than many countries in the East Africa region like Kenya and Tanzania. Mobile money services MTN arrived in 2010 followed by Tigo in 2011 and Airtel in 2013. Since its arrival, mobile phone ownership rates have increased significantly, allowing for mobile money services to spread around the country. Rwanda has two mobile network operators: MTN (on behalf of Ubank Limited) which operates 54% of active mobile phone subscriptions and Airtel-Tigo Money (Airtel Mobile Commerce [Ghana]) which operates 46%. An active mobile phone subscription is defined as a SIM card that generates revenue for an operator. As of June 2019, the number of mobile phone subscriptions had reached 9,040,327 which represented 74.8% of the population. Mobile money platforms have aided in extending financial services to individuals in rural areas disconnected from banking institutions.

Prior to COVID-19, the most prevalent use of mobile money services was to purchase minutes for phone calls. Very few users were sending or receiving money through mobile money platforms. The Covid-19 lockdown and pandemic led to more users relying on mobile money services to send and receive money and users began using mobile money services to pay for goods, services, and bills. Prior to the COVID-19 pandemic, transaction costs deterred mobile money usage, especially among poorer residents, but the removal of transaction fees during the lockdown increased the number of mobile money transactions by 100%. Fees were reintroduced but had no significant effect on mobile money transaction numbers with their return.⁴¹

MTN Rwanda P2P Fees

Min	Max	Fees
	<1,000	20
1,001	10,000	100
10,001	150,000	250
150,001	2,000,000	1,500 ⁴²

(1 Rwf = 0.0097 USD as of January 2022)

According to the National Bank of Rwanda (BNR), there were 16,111,250 registered mobile money subscribers as of the second quarter of 2021 and 6,129,624 active subscribers during the same time.⁴³ BNR also tracks the number of agents at a specific time, the number of transactions in a financial quarter, and the value of transactions in a specific quarter. These respective statistics for the second quarter of 2021 are 144,250 agents, 227,107,908 transactions, and 2,728,916 Rwandan Franc (Rwf). The value of mobile money transactions has increased from a total of 2.349 billion Rwf in 2019 to 7.177 billion Rwf for 2020, a 206% increase (BNR). The

⁴¹ "Exploring the Use of Mobile Money Services among Tea SACCOs in Rwanda: Challenges and Opportunities (RESEARCH REPORT) | Digital Development | U.S. Agency for International Development," January 26, 2021, <https://www.usaid.gov/digital-development/rwanda-mobile-money-report>.

⁴² "MoMo Tariffs," *MTN Rwanda* (blog), accessed January 20, 2022, <https://www.mtn.co.rw/momo/personal/momo-tariffs/>.

⁴³ "Rwanda 2021 Mobile Payment Statistics" (National Bank of Rwanda, July 1, 2021), <https://www.bnr.rw/browse-in/statistics/payment-system-statistics/mobile-payment/>.

largest service provider is MTN mobile money services which is operated by MTN. As of December 2020, it controlled 62% of the mobile money market in Rwanda, growing from a base of 2.8 million users to 3.2 million over the course of the year.⁴⁴

Mobile money platforms are monitored by the BNR under the Payment Systems Law of 2010.⁴⁵ Over the past few years, regulations have continued to change in Rwanda in an effort to expand access and use of mobile money services. In 2019, national interoperability was fully functional allowing for users to send money to users on other platforms.⁴⁶

Geographical distance between users and agents has been cited as a hindrance to mobile money use. The lack of “float” (e-money balance, physical money, or bank account balance an agent has immediate access to for cash withdrawal or cash in demands) has caused challenges for agents dealing with higher rates of withdrawals and lower rates of deposits.⁴⁷ A concern is that mobile money platform users only use their accounts to receive money to immediately withdraw in cash. BNR requires non-exclusivity for agents, meaning agents may serve multiple mobile money platform operators simultaneously. Training and recruitment may then be enjoyed by competitors at no cost creating incentives against large agent networks which was an important factor in the success of M-PESA in Kenya.⁴⁸ Non-exclusivity has also created difficulty in monitoring fraud and agent misconduct. MNOs are responsible for agent training and agent liability.⁴⁹ The increase in mobile money platform usage has resulted in increased fraud attempts. The Director-General of Financial Stability at BNR, Peace Uwase, has declared that mobile money platforms must enhance security and increase customer awareness and recognition of fraud attempts to protect mobile money users and grow the use of mobile money services.⁵⁰

⁴⁴ “Rwanda: Mobile Payment Transactions Grow By 206%,” MFW4A - Making Finance Work for Africa, February 23, 2021, <https://www.mfw4a.org/news/rwanda-mobile-payment-transactions-grow-206>.

⁴⁵ “Exploring the Use of Mobile Money Services among Tea SACCOs in Rwanda.”

⁴⁶ “Rwanda: National Interoperability System To Be Launched Soon,” Mobile Money Africa, July 28, 2019, <https://mobilemoneyafrica.com/blog/rwanda-national-interoperability-system-to-be-launched-soon>.

⁴⁷ “Exploring the Use of Mobile Money Services among Tea SACCOs in Rwanda.”

⁴⁸ Jonathan Argent, Maria Paula Gomez Gomez, and James A. Hanson, “Regulating Mobile Money in Rwanda,” *IGC*, August 1, 2013, <https://doi.org/F-38026-RWA-1>.

⁴⁹ “Exploring the Use of Mobile Money Services among Tea SACCOs in Rwanda.”

⁵⁰ “Rwanda,” February 23, 2021.

Appendix Works Cited

- Andersson-Manjang, Simon K., and Nika Naghavi. "State of the Industry Report on Mobile Money." GSMA, 2021.
https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/03/GSMA_State-of-the-Industry-Report-on-Mobile-Money-2021_Full-report.pdf.
- "Annual Report 2019/20." Bank of Tanzania, December 2020.
<https://www.bot.go.tz/Publications/Regular/Annual%20Report/en/2020123112264444.pdf>.
- Argent, Jonathan, Maria Paula Gomez Gomez, and James A. Hanson. "Regulating Mobile Money in Rwanda." *IGC*, August 1, 2013. <https://doi.org/F-38026-RWA-1>.
- Bank of Uganda: Payment System. "Bank of Uganda | Data and Statistics," n.d.
<https://www.bou.or.ug/bou/bouwebsite/PaymentSystems/dataandstat.html>.
- Barry, Andrea. "How Kenya Created the World's Most Successful Mobile-Payments Service." *Technology and Operations Management* (blog), December 9, 2015.
<https://digital.hbs.edu/platform-rctom/submission/how-kenya-created-the-worlds-most-successful-mobile-payments-service/>.
- Biallas, Margarete, and Alana Fook. "IFC Mobile Money Scoping Country Report: Uganda." International Finance Corporation, World Bank Group, n.d.
<https://www.ifc.org/wps/wcm/connect/b708e5e8-25e6-49cd-98d3-9dc8a313781a/Uganda+Market+Scoping+Report.pdf?MOD=AJPERES&CVID=mk1-VKv>.
- Burkitt-Gray, Alan. "Tanzania Cuts Mobile Money Tax by 30% after Protests." *Capacity*, September 8, 2021.
<https://www.capacitymedia.com/articles/3829560/tanzania-cuts-mobile-money-tax-by-30-after-protests>.
- Clifford, Killian. "The Causes and Consequences of Mobile Money Taxation: An Examination of Mobile Money Transaction Taxes in Sub-Saharan Africa." GSMA, June 2020.
https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/06/GSMA_The-causes-and-consequences-of-mobile-money-taxation.pdf.
- "E-Money Regulation." Central Bank of Kenya, 2013.
<https://www.centralbank.go.ke/images/docs/NPS/Regulations%20and%20Guidelines/Regulations%20-%20E-%20Money%20regulations%202013.pdf>.
- "Exploring the Use of Mobile Money Services among Tea SACCOs in Rwanda: Challenges and Opportunities (RESEARCH REPORT) | Digital Development | U.S. Agency for International Development," January 26, 2021.
<https://www.usaid.gov/digital-development/rwanda-mobile-money-report>.
- The Independent Uganda. "Fears over MTN, Airtel Dominance in Uganda's Telecom Sector," October 6, 2021.
<https://www.independent.co.ug/fears-over-mtn-airtel-dominance-in-ugandas-telecom-sector/>.
- Gilman, Lara. "The Impact of Mobile Money Interoperability in Tanzania: Early Data and Market Perspectives on Account-to-Account Interoperability." GSMA, September 2016.
https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/10/2016_GSMA_The-impact-of-mobile-money-interoperability-in-Tanzania.pdf.
- Kamulegeya, Francis. "New Tax on Mobile Money Transactions." PwC Uganda, n.d.
<https://www.pwc.com/ug/en/press-room/new-tax-on-mobile-money-transactions.html>.
- Kibuacha, Frankline. "Mobile Penetration and Growth in Kenya." *GeoPoll* (blog), January 13, 2021. <https://www.geopoll.com/blog/mobile-penetration-kenya/>.
- Mazer, Rafe, Rashmi Pillai, and Stefan Staschen. "Agents for Everyone: Removing Agent Exclusivity in Kenya & Uganda." Accessed February 17, 2022.

<https://www.cgap.org/blog/agents-everyone-removing-agent-exclusivity-kenya-uganda>.
 GSMA. "Mobile Money Metrics." Accessed February 10, 2022.
<https://www.gsma.com/mobilemoneymetrics/>.

Central Bank of Kenya. "Mobile Payments | CBK." Accessed February 17, 2022.
<https://www.centralbank.go.ke/national-payments-system/mobile-payments/>.

MTN Rwanda. "MoMo Tariffs." Accessed January 20, 2022.
<https://www.mtn.co.rw/momo/personal/momo-tariffs/>.

Connecting Africa. "M-Pesa Has Almost 99% Market Share in Kenya," July 6, 2020.
http://www.connectingafrica.com/author.asp?section_id=761&doc_id=762180.

Nyakairu, ENSafrica-Donald, and Tracy Kakongi. "Key Features of Uganda's National Payment Systems Act." Lexology, September 15, 2020.
<https://www.lexology.com/library/detail.aspx?g=30e9b2e1-755f-4527-b28e-41d20a5171d1>.

Nyika, Victor. "Regulatory Collaboration in Ensuring Digital Financial Inclusion in Tanzania." Tanzania Communications Regulatory Authority (TCRA), n.d.
https://www.itu.int/en/ITU-D/Regulatory-Market/Documents/Events2019/Togo/Ses3.1_%20Nkya_collaboration.pdf.

Oluwole, Victor. "Kenya's Mobile Money Transactions Surge by 52% in H1 2021 — CBK." Business Insider Africa, 39:51 200AD.
<https://africa.businessinsider.com/local/markets/kenyas-mobile-money-transactions-surge-by-52-in-h1-2021-cbk/rr8lyq4>.

"Rwanda 2021 Mobile Payment Statistics." National Bank of Rwanda, July 1, 2021.
<https://www.bnr.rw/browse-in/statistics/payment-system-statistics/mobile-payment/>.

MF4A - Making Finance Work for Africa. "Rwanda: Mobile Payment Transactions Grow By 206%," February 23, 2021.
<https://www.mfw4a.org/news/rwanda-mobile-payment-transactions-grow-206>.

Mobile Money Africa. "Rwanda: National Interoperability System To Be Launched Soon," July 28, 2019.
<https://mobilemoneyafrica.com/blog/rwanda-national-interoperability-system-to-be-launched-soon>.

Silue, Tarna. "E-Money, Financial Inclusion and Mobile Money Tax in Sub-Saharan African Mobile Networks." Hal Open Science, July 8, 2021.
<https://hal.uca.fr/hal-03281898/document#:~:text=Note%20in%20Kenya%20that%20this,to%2012%20percent%20in%202018>.

Tanzania Communications Regulatory Authority. "Quarterly Communications Statistics Report." Wayback Machine, March 2016.
<https://web.archive.org/web/20190104145402/http://www.tcra.go.tz/images/documents/telecommunication/CommStatMarch16.pdf>.

The Citizen. "Tanzania Finally Reduces Mobile Money Transaction Levy after Public Outcry," August 31, 2021.
<https://www.thecitizen.co.tz/tanzania/news/tanzania-finally-reduces-mobile-money-transaction-levy-after-public-outcry-3533212>.

Statista. "Tanzania Mobile Money Transactions by Operator 2020," September 22, 2021.
<https://www.statista.com/statistics/1081846/tanzania-mobile-money-transactions-by-operator/>.

"The Mobile Money Economy: Sub-Saharan Africa 2017." GSMA, 2017.
<https://www.gsma.com/subsaharanafrika/wp-content/uploads/2018/11/2017-07-11-7bf3592e6d750144e58d9dcfac6adfab.pdf>.

The National Payment System Act, 2011 (2011).
[https://www.centralbank.go.ke/images/docs/legislation/NATIONAL%20PAYMENT%20SYSTEM%20ACT%20\(No%2039%20of%202011\)%20\(2\).pdf](https://www.centralbank.go.ke/images/docs/legislation/NATIONAL%20PAYMENT%20SYSTEM%20ACT%20(No%2039%20of%202011)%20(2).pdf).

Mobile for Development. "Tracking the Journey towards Mobile Money Interoperability: Emerging Evidence from Six Markets: Tanzania, Pakistan, Madagascar, Ghana, Jordan and Uganda." GSMA, June 12, 2020.
<https://www.gsma.com/mobilefordevelopment/resources/tracking-the-journey-towards-mobile-money-interoperability-emerging-evidence-from-six-markets-tanzania-pakistan-madagascar-ghana-jordan-and-uganda/>.

"TZ-CERT Profile – Tanzania Computer Emergency Response Team," n.d.
<https://www.tzcert.go.tz/about-us/tz-cert-profile/>.

Wangui, Miriam. "Kenya's Mobile Money Transactions Climb to KSh5.2 Trillion in 2020 - Kenyan Wallstreet." *The Kenyan Wall Street Journal*, February 10, 2021, sec. Kenyan News.
<https://kenyanwallstreet.com/kenyas-mobile-money-transactions-climb-to-ksh5-2-trillion-in-2020/>.