# Increasing Digital Savings and Borrowing Activity with Interactive SMS: Evidence from an experiment with the M-PAWA savings and loan mobile money product in Tanzania

May 2017

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# DISCLAIMER

**Executive Summary**

This working paper describes an experiment that leveraged interactive SMS and behavioral economics principles to develop and test new learning content designed to encourage account activity by Tanzanian farmers using M-PAWA. M-PAWA is a savings and credit product provided by Commercial Bank of Africa and Vodacom Tanzania on the M-Pesa mobile money platform.

The project utilized direct consumer research, transactional data analysis and human-centered design principles to develop educational content that can be delivered to the participants in the Connected Farmer's Alliance program of TechnoServe, with the goal of increasing understanding of M-PAWA, activity levels in the accounts, informing consumers with educational content, and encouraging responsible financial behavior of consumers.

Following field research and user testing, content targeted at financial literacy via SMS for rural Tanzania farmers was prepared. This included several different learning tracks for farmers on savings, loans, Kilimo Klub, and how to use M-Pawa; as well as a separate program for CFA trainers to review and memorize basic facts around M-PAWA to ensure accuracy of the information they presented during the trainings of farmers. Trainers were also provided an attendance taking function via the Arifu platform that replaced the prior manual attendance taking and record-keeping approach, so as to ensure more accurate accounting of CFA training attendees For the content delivered to trainees, the content was varied along several different pedagogic and behavioral concepts to compare different teaching methods' impacts on usage of the content and transactional activity.

The content was delivered via Arifu, a mobile learning platform, and integrated into Vodacom's existing messaging for M-PAWA customers. The content developed included several different types of behavioral variations to test the relative impact each intervention has on the likelihood the consumer uses the Arifu platform to learn about M-PAWA, and any impact on their use of the M-PAWA product.

The live testing of the SMS content ran from September 7th 2015 to March 31st 2016. During this period, 2,862 farmers engaged with the financial literacy content and accessed 10 messages on average. 50% (1,445) of farmers that engaged with content also completed at least one M-Pawa transaction during the project period. These farmers deposited an amount into their savings, took out a loan, and/or made a loan repayment.

Transaction data on M-Pawa was analysed for farmers who received an SMS invitation to the learning content, attended the CFA in-person training session and whose numbers were recorded, and who were part of the control group receiving no invitation either by SMS or at a training. Those whose numbers were recorded were a subset of all the farmers who undertook the training, but provide a large enough sample size for detailed analysis. Given that no initial invite messages were significantly better at uptake and onboarding, there exists a selection bias in those who opted-in to learning on Arifu. We control for this selection effect in our analysis by observing learner financial behavior both pre- and post-interaction with Arifu,

controlling for time-trends non parametrically using fixed effects at the month-year level. Our analysis shows several positive impacts for Arifu learners:

- Compared to non-Arifu users, Arifu users take Tsh1,666 larger loans, have Tsh2,654 lower amounts outstanding, and make loan payments 3.42 days sooner.
- Arifu users change their activity levels after interaction with the SMS learning content. After interaction with the learning content, Arifu users take Tsh1,017 larger loans, repay these loans 5.46 day sooner, and make Tsh1,730 larger first payments compared to their behavior prior to interacting with Arifu learning content.
- After correcting for outliers at the 95 percentile level through top-coding, we find that interaction with Arifu increases account activity. Arifu users have Tsh4,447 larger running balances than before interaction; and make .12 more transactions in their M-Pawa account than before interaction. If an M-PAWA customer ever interacted with Arifu, they have .64 more transactions compared to non-Arifu customers.

**Abstract**

Financial literacy programs have focused on improving customer comprehension and awareness of existing financial products. However most financial literacy programs stop short of measuring how training programs impact actual financial product interactions. To improve financial access, assess ways to increase effectiveness of in-person financial literacy training, and measure financial product interactions, a heuristics-based mobile learning and interactive communication SMS system (developed by the firm Arifu) was deployed in Tanzania connected to M-Pawa, a mobile phone-based savings and loan product (that leverages M-Pesa mobile money for 100% remote banking). Between September 7th 2015 and March 31st 2016, a total of 70,000 farmers took part in the in-person training sessions, with 21,290 farmers being invited to the SMS training platform in early November 2015. Transactional M-PAWA data (savings deposits, loan disbursements and loan repayments) was analysed before and after the intervention to assess the effect of interaction with the interactive SMS system on financial behavior. We find that Arifu users take larger loans, have lower amounts outstanding, and make payments sooner. After Arifu interaction, users take larger loans, repay sooner, and have larger first payments. Finally, after top-coding to control for very large outliers, we find that Arifu users have larger running balances and make more transactions. These findings point to the potential of user-guided digital learning content to enhance the understanding, usage and overall experience of innovative digital financial services like M-PAWA. These products are rapidly expanding access to formal financial services in emerging markets such as Tanzania, making these findings important for the goals of financial inclusion, financial sector development, and financial capability.

## I. Introduction

Financial literacy has been noted to be a significant barrier towards meeting financial inclusion and wellbeing goals (Refera, Dhaliwal and Kaur, 2015) in both developing and developed contexts. Numerous attempts have been conducted to run expensive in-person training sessions to improve financial literacy in Africa (Xu and Zia, 2012; Hung and Yoong, 2010). Though in many of these studies it has been hard to clearly link the impact of financial literacy on actual behaviors on financial products themselves.

In general, studies find a positive impact of financial literacy on outcomes (Xu and Zia, 2012), although this has been disputed in recent meta-reviews of financial literacy programs (Fernandes, et al 2014). The positive benefits primarily stem from consumers being able to make informed financial choices, relevant information being provided to consumers to facilitate product use, and as a result, increased interaction with appropriate financial products. Further, in the case of Kenya, representative surveys suggest that financially illiterate individuals have a significantly high likelihood of remaining financially excluded (Wachira and Kihiu, 2012).

Given the innovation of mobile money products, and SMS being the most accessible channel of communication with the vast majority of financially excluded populations, SMS interventions offer an exciting avenue to improve the effectiveness of financial literacy programs. Many studies show the value of SMS systems in improving learning outcomes (Valk, Rashid, and Elder, 2010), product activity levels (Ismail and Azizan, 2012), and optimization through testing (Reimers and Stewart, 2009), and account opening and savings balances (Valenzuela, Holle and Noor, 2015).

In East Africa there has been a rapid expansion of digitally-delivered credit products that are allowing consumers to access financial services from banks and other financial service providers via e-money wallets on their mobile phones (Vidal, Hwang 2017). There has also been an increase—albeit smaller—of digital savings accounts, often linked to these digital credit products. While digital savings has received less attention than digital credit, the combination of the ability to "save up" and "borrow down" provides consumers with a more complete set of financial tools than stand-alone digital credit (Mazer, Ravichandar, Dyer 2017). This disparity in digital credit and digital savings accounts and produccts could be attributed to the fact that access to credit is the main driver for many users and a source of revenue to the lender, while digital savings accounts traditionally see smaller balances and might be a money-losing product for the provider. Further, often savings accounts have high rates of account dormancy that potentially inhibit access to credit due to less available data on which credit scores can be built. In the case of this experiment, the product used, M-PAWA does offer both digital credit and savings products in a single mobile money wallet.

There exists scope to examine the effects of SMS-based mobile learning platforms to improve outcomes for users of digital savings and credit products that participate in an ongoing in-person financial literacy program for adults, as this study did.

However it is essential that content and system design of such 'm-learning' platforms are research and data driven, with a clear focus on understanding existing barriers to

adoption, and ensuring all content is easily comprehensible for the target population. This type of research can be facilitated through Human-Centered Design techniques for product development, and qualitative interviews and focus groups for contextualization of relevant content. Once launched, user interaction data can be monitored to identify bottleneck screens with high attrition rates.

The ability to monitor interaction with the platform gives us a new perspective on how learners self-select content, as well as link interaction data on the platform with transaction data on the financial product. This allows us to clearly test the impact of such SMS-based learning platforms on actual financial product behavior if such data is available as well as compare the relative impact of different types of learning content to determine which content is most effective and should be scaled up to a broader population of digital savers and borrowers.

This study investigates the effect of SMS-based learning coupled with in-person financial literacy sessions on savings and loans behaviors of customers. CGAP, in partnership with Vodacom Tanzania, Arifu, Busara Center for Behavioral Economics and TechnoServe (TNS), integrated heuristics-based mobile learning and interactive communications over SMS into the Connected Farmer Alliance's (CFA) in-person training of 70,000 rural Tanzanians on the benefits of M-PAWA. M-PAWA is a savings and loans account with Commercial Bank of Africa that is accessed via the Vodacom Tanzania M-Pesa menu.

The next section describes the implementation of research-driven development of content, following which we outline the main summary statistics and results from the live testing. We conclude with a discussion around the implications of the results, limitations of the study, and areas for future research given the results.

## II. Implementation

The project objectives were to ensure customers are educated about the M-PAWA product and relevant information to facilitate the product's use, to boost product registration, to boost product activity levels through stimulating increased savings and borrowings, and understand the implications of interactive financial education-based SMS on responsible financial activity. To achieve these objectives, the project utilized direct consumer research, transactional data analysis, and human-centered design principles to develop educational content that can be delivered to the participants in the Connected Farmer's Alliance.

The content was delivered via Arifu, a mobile learning platform (www.arifu.com). The content developed included several different types of behavioral variations to test the relative impact each variation has on interaction with Arifu, and any impact on their use of the M-PAWA product.

This project had four main stages of developing final designs for teaching content and evaluation:

Stage 1: Field-testing
Stage 2: Content development
Stage 3: Technical integration (not discussed herein)
Stage 4: Live testing

### Stage 1: Field testing of interactive messaging prototypes (January, 2015)

The CGAP and Arifu research teams spent several weeks in Tanzania conducting field research in Mbeya and urban coastal towns. The research consisted of qualitative interviews and interactive platform testing to inform the design of interactive financial literacy content and were used to develop SMS invitations, content messaging and financial application tools to assist farmers to take advantage of the financial services M-PAWA offers them.

Qualitative Interviews: In-person interviews were conducted to elicit information about smallholder farmer's financial behaviors and their understanding of the M-Pawa product. This included farmers who had received M-Pawa training, farmers who had not received M-Pawa training, and non-farmer customers who had not received M-Pawa training. Interviews were also conducted with M-Pawa Brand Ambassadors, Vodacom MPESA Agents, and Current and Potential Vodacom Customers.

Interactive Platform Testing: Learning content was piloted on paper and SMS with prospective learners to gain insights on how to tailor platform features and financial literacy content for farmers. The sample for this testing included small-holder farmers with varying ages and literacy levels. Content was also reviewed with farmers on various mobile phone types to understand the possible learner experience on a range of handsets.

Insights from this stage included:

1. Farmers preferred to interact with SMS messages in the evening because that was the time of day they weren't busy.

*Design impact:* Invitation messages were delivered at different time of day to measure any impact in response rates.

2. Interviewees wanted to know what the outcome or purpose of the training was in the first message or they lost interest.

*Design impact***:** The first message was designed as a Menu, which allows learners to view summary of the main topics covered in the training and select the information most relevant to their situation, either how to use M-PAWA, the savings component of M-PAWA, the credit components of M-PAWA, or a track promoting Vodacom's Kilimo Klub farmer program

3. The most important information interviewees wanted to access on the SMS platform was: How to access a loan; How to repay a loan; Interest paid on loans and charge; Consequences of not repaying a loan; Reason for being rejected for a loan and/or requirements to qualify; How much interest will be earned on savings; How to access your savings; If there are charges for accessing savings.

*Design impact:* Content was designed to include the information learners reported wanting to know about M-Pawa savings and loan features. The trainings focused on how to use M-Pawa, the benefits of savings and how to access a loan and its terms and features.

4. The most common points of misinformation for interviewees were: Not understanding the difference between M-Pesa and M-Pawa; Not realizing interest is earned on savings in M-Pawa; Thinking interest on savings is earned immediately with M-Pawa; Thinking the interest rate on loans was only 2%; thinking it is a requirement to be saving in M-Pawa for 6 months prior to requesting a loan; Not knowing the reason for being rejected for a loan.

*Design impact:* Content was designed to include succinct accurate information on savings accounts and loan terms and requirements.

5. Many interviewees were excited to hear that they could earn interest on their savings with M-Pawa and wanted help calculating the interest they would earn if they moved their money from M-Pesa to M-Pawa. Additionally, many participants thought that the interest rate on loans was only 2%. As such, calculating interest both for savings and loans would increase transparency and empower customers to make more informed decisions.

*Design impact***:** Two tools were built into the content:  A *Loan Interest Calculator,* where learners could enter the value of any loan amount they were interested in borrowing and receive a message of the full amount, including interest they would pay. And a *Savings Interest Calculator,* where learners could enter the value of their

savings and find out the amount of interest their money could earn after three months in a savings account.

6. Many interviewees had savings goals they were working towards. Personalizing content by allowing them to enter their personal savings goals and sending them reminders based on self-selected deadlines could help learners reach their goals and increase M-Pawa account activity.

*Design impact:* A goal setting application tool was built into the content that allows learners to create a personal savings goal and then sends them reminders every two weeks to deposit a certain amount (calculated based on their goal due date and amount).

7. From interviews with Brand Ambassadors it was clear that CFA trainers had a difficult time taking attendance for all the participants in the training. Often farmers joined midway through the training and the trainer gave an estimation of how many people attended instead of accurate attendance figures.

*Design impact:* An attendance feature was added for CFA trainers that they could utilize during trainings. Farmers were instructed to take out their phones and SMS a special code matched to each trainer to the Arifu shortcode, creating a digital attendance record for the trainings. This tool also was used to increase engagement with the learning content, as each farmer who sent the trainer's code to Arifu then received an SMS invitations to try the SMS content following in-person trainings. This had a strong impact on learner engagement, as 47% of invite recipients at trainings opted into the learning content, compared to just under 5% across the entire sample of invitees.

8. Using the name Arifu in the first few messages led some users to believe they were interacting with a person.

*Design impact:* We created two versions of content that learners were randomly distributed into no matter what treatment they entered. One version had Arifu introduced upfront as a trainer and one version had Arifu introduced at the end of the training as a mobile learning tool.

9. After about 5-7 messages, learners were ready to act. They wanted to know what they needed to do to transfer their money, save, take out a loan, etc.

*Design impact:* Topics were broken into short trainings that have 5-8 messages and all trainings end in an instruction screen that advises learners on how to go onto the M-Pawa platform and complete the action they were just trained on.

10. There was a diverse range of phone literacy across the learners. Some read through the messages and responded very easily and others needed help with basic things such as replying. Most, however, said they go to an agent or Brand Ambassador if they need help resolving issues with M-Pesa or M-Pawa.

***Design impact:*** A training was created specifically for Brand Ambassadors that gave them general information on M-Pawa and instructed them to introduce the Arifu platform during in-person trainings.

## Stage 2: Content Development (February – April, 2015)

Following field research and user testing, content targeted at financial literacy via SMS for rural Tanzania farmers was prepared. This included several different learning tracks for farmers on savings, loans, and how to use M-Pawa; as well as a separate program for CFA trainers to review and memorize basic facts around M-PAWA to ensure accuracy of the information they presented during the trainings of farmers.

For the content delivered to trainees, the content was varied along several different pedagogic and behavioral concepts to compare different teaching methods' impacts on usage of the content and transactional activity. Multiple learner pathways were developed to leverage the self-guided learning potential of Arifu's interactive SMS platform, allowing users to prioritize content based on what they were keen to learn. Additionally, some savings and loan content within the platform varied along different types of educational and behavioral approaches:
1. Fact-Based Training,
2. Narrative Training, and
3. Social Norms Training.

## Stage 3. Technical Integration (not discussed in this report)

## Stage 4. Live Testing of SMS Invites and Learning Content (September, 2015 – March, 2016)

Farmers accessed the M-PAWA learning content via blind SMS invitations with phrasing informed by behavioral design. Farmers were invited to the learning content either through theirattendance registration at CFA trainings, push SMS invitations sent by Arifu to CFA farmers who were trained before this experiment began, or, for non-invited learners, though sending "mpawa" to the Arifu short code. To maximize uptake of the content, reminder messages were sent out in case there was no response to the first invite message received by a farmer.

The sample for this study included SMS-invited CFA farmers. These messages were sent out in two phases:
Phase 1 messages (~21,000 CFA farmers) were sent out early November 2015; and
Phase 2 messages (~12,000 CFA farmers) were sent out mid-January 2016.

The structure of the evaluation stayed largely the same across the two phases, with two modifications. The first modification included varying invite messages to utilize the best performing invites from Phase 1 for Phase 2. The second modification included simplifying the first menu screen that had a high drop off rate (16%) in Phase 1. In Phase 2 a new introductory screen was also tested where consumers did not have to choose learning tracks and instead viewed a six-screen learning about loans on M-PAWA before being led to the main menu where they could choose which content they wanted to learn about. This modification did reduce attrition on

the Arifu platform, although overall number of screens viewed per user was lower than with the original menu design so there appears to be a trade-off of uptake and depth of learning between using a menu or a single-track learning approach to the introductory message screen.

### III. Summary Statistics

The live testing of the SMS content ran from September 7th 2015 to March 31st 2016. During this period, 33,782 farmers who had participated in a CFA training were invited onto the Arifu platform via blind SMS invitations. 2,862 farmers engaged with the financial literacy content and accessed 10 messages on average. Overall, 4.8% of invited farmers engaged with the platform

50% (1,445) of farmers that engaged with content also completed at least one M-Pawa transaction during the project period. These farmers could deposit an amount into their savings, take out a loan, and/or make a loan repayment.

Our analysis utilized M-PAWA account transactional data for learners over a 24-month period from July 2014 – May 2016, which means there were up to 14 months of account activity data available for learners prior to the launch of the interactive SMS content. This analysis founds several important impacts on savings and borrowing behavior of those who accessed the interactive SMS content.

The savings rate of those accessing the financial literacy content was more than 5 times greater than those not accessing the content. This difference is even higher when looking only at customers who have saved at least some amount of money on M-PAWA during the project period.

As Figure 1 shows, customers who choose to join Arifu have historically higher savings levels than those who do not, but they also experience a significant rise to savings during the project period, demonstrating the impact the learning content had in increasing savings activities. Even with the post new-year downturn that is common in the Tanzanian economy, we still see differences in average savings amounts of Arifu learners versus non-Arifu learners after December, 2015.
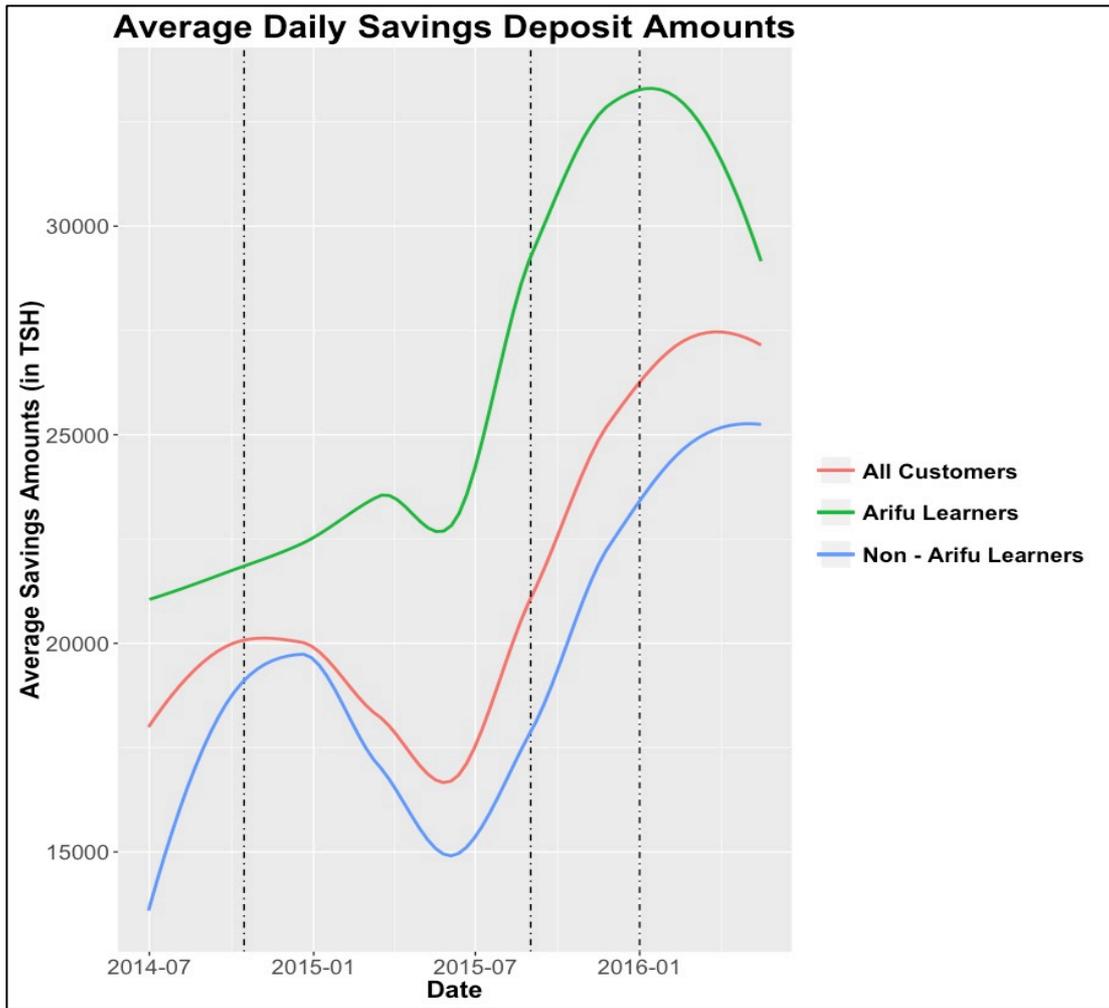
*Figure 1: Savings levels of Arifu learners and non-learners over 24 month period*

Similar to savings, there was a noticeable difference between Arifu users and non-Arifu users with regards to credit as well. Not only were Arifu users borrowing larger amounts, repayment rates were also marginally better as compared to those who did not interact with the platform. This contrasts with what would be expected—that higher loan amounts would lead to higher probability of default, and shows a clear benefit of the learning content for both borrower and lender (Figure 2).

Figure 2: Repayment rates of Arifu Learners in different learning content versus non Arifu learners

**Repayment Rates**
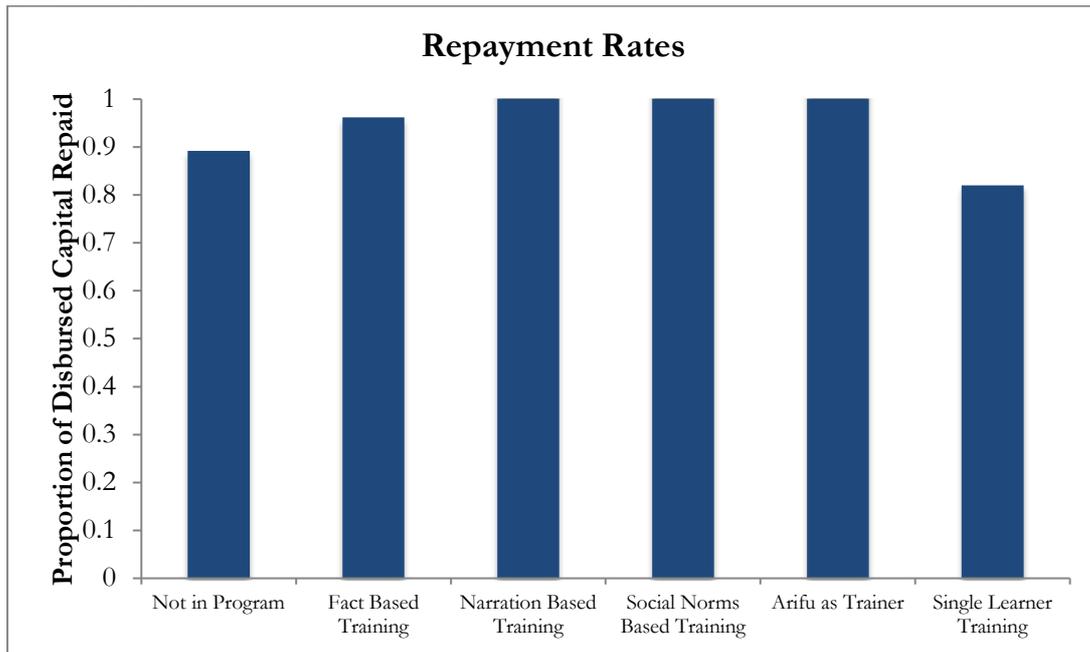


Looking at the historical activity since July, 2014, we see that loan activity on M-PAWA has been steadily increasing, with a large increase following CFA training and Arifu program launch. Improvement in loan activity has continued into 2016, in contrast to savings deposit activity, which showed more seasonal variation (Figure 3). Note: Solid lines represent scaled average loan disbursement amounts and dashed lines represent scaled average loan repayment amounts.)

Figure 3: Loan activity across Arifu learners and non-learners, scaled by number of customers in each of the respective groups (Locally Weighted Scatter Plot Smoothing; dashed lines indicate repayments)

Scaled Average Loan Amounts (Disbursements and Repayments)
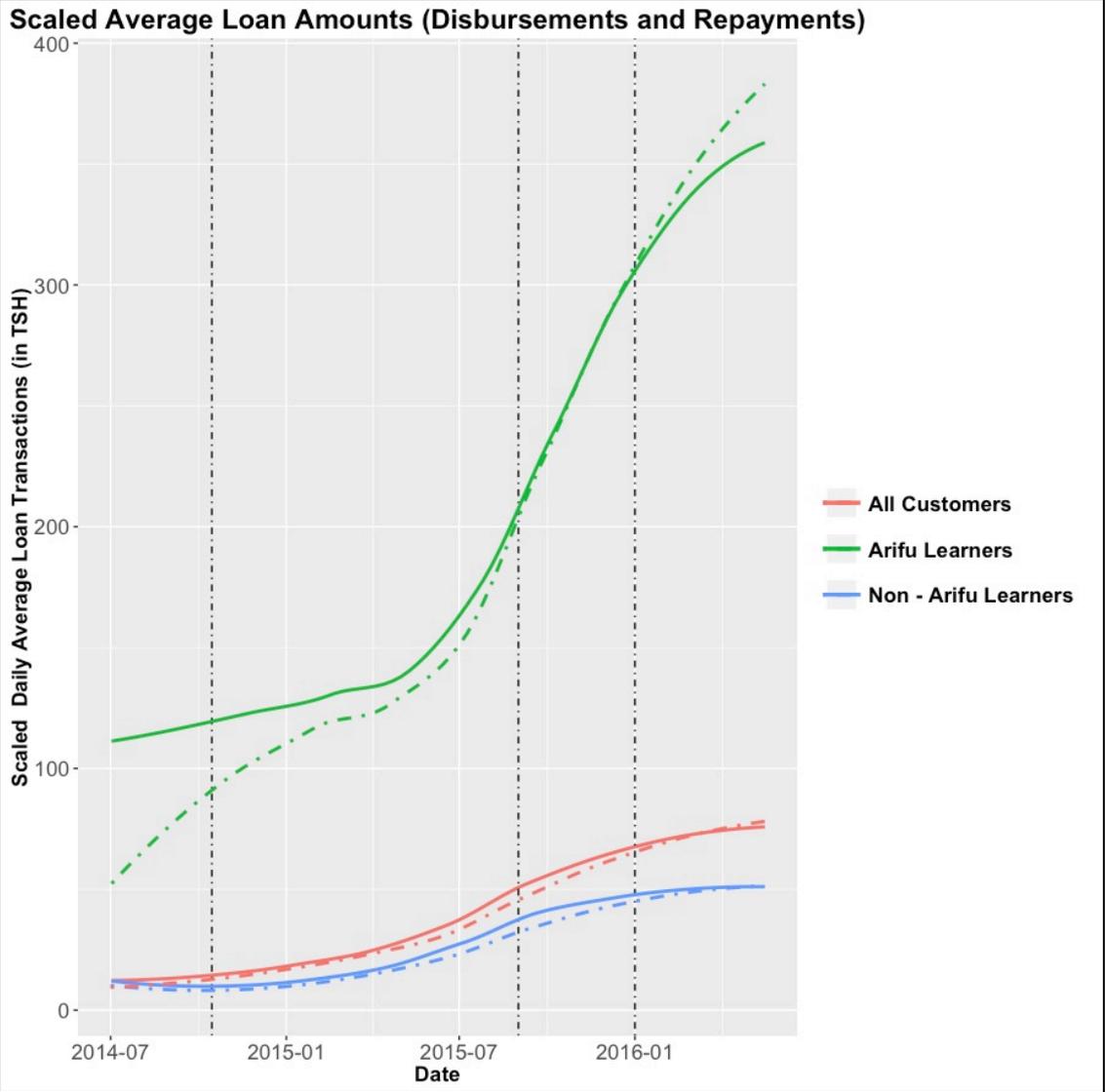
**IV. Empirical Methods to Account for Selection Bias in Learner Account Activity**

The main challenge to estimating causal effects of the Arifu program on saving and borrowing behaviour for M-PAWA customers is endogenous self-selection into using the learning platform as highlighted in the previous section. Simply comparing Arifu users with non-Arifu users would conflate any possible causal effect of the program with the fact that different types of users are more likely to interact with Arifu. The other major concern when estimating the effect of Arifu is to control for time trends during the study period and possible seasonal fluctuations in financial activity. We use the richness of the transaction-level data available to construct outcome measures at the monthly level. We use this detail to control as much as possible for these confounding factors.

First, we control for time trends and seasonal effects in a fully flexible, non-parametric, manner where we include a fixed effect for each year-month in our sample (i.e we include a dummy variable for September, 2015, October, 2015, etc.). This means that we control for any average differences in behavior for each individual month in our sample. The fixed effects thus included are not restricted by any parametric assumptions (such as assuming a polynomial form for the time trend or seasonal variation in outcomes) meaning that we control for time trends in a fully flexible way.

To reduce the bias introduced by self-selection into participation into the Arifu program, we use detailed data to identify precisely when the user first interacted with the Arifu platform. We incorporate this into our empirical strategy by estimating the effect of a person ever interacting with Arifu during the study period. This means that this is the average effect on outcomes of being a person who chose to interact with the Arifu platform. We interpret these coefficients as being the selection effect, which captures to what degree Arifu users are systematically different from non-Arifu users based on outcomes observed before users interacted with the platform. We separately include a term for whether the individual had interacted with Arifu before the month of the outcomes in question. We therefore interpret these coefficients as being the average difference between Arifu users overall and Arifu users *after* having interacted with the platform. We therefore cautiously interpret these expected differences in outcomes as being analogous to a treatment effect, capturing the difference in behavior resulting from interaction with Arifu.

**V. Results**

We find that Arifu users take larger loans (1,666 Tsh more than non-Arifu users; significant at the 1% level), have lower amounts outstanding (2,654 Tsh lower amount outstanding; significant at the 10% level), and make payments sooner (3.42 days sooner; significant at the 10% level) compared to non-Arifu users (Table 1).

We find that after interaction, Arifu users take larger loans (1,017 Tsh; significant at the 10% level; robust to outliers), repay sooner (5.46 days sooner; significant at the 5% level), and have larger first payments (1,730 Tsh larger; significant at the 1% level; robust to outliers) compared to their behavior prior to interacting with Arifu (Table 2).

Finally, after correcting for outliers at the 95th percentile level through top-coding,[1] we find that interaction with Arifu leads customers to have larger running balances (4,447 Tsh more than before interaction; significant at the 1% level) and make more transactions (0.12 more transactions; significant at the 10% level) in their M-Pawa account compared to the same users before their interaction with Arifu. If a customer ever interacted with Arifu, they have a larger number of transactions compared to non-Arifu customers (0.64 more transactions; significant at the 1% level; Table 3).

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[1] User removed via top-coding were comprised of 35-40% Arifu users, compared to 28% for the overall sample. This varies depending on the outcome variable in question, as it is not the same group above the 95% cutoff for each outcome, but does show that top-coding reduces the overall impact measured of opting into Arifu content and does not increase the impact of skew the results in favor of our conclusions.

## VI. Conclusion

In summary, we found that customers who chose to interact with Arifu had better financial activity on both savings and borrowing on the M-PAWA product. Additionally, Arifu users had better financial profiles with regard to credit and savings balances after interaction compared to their prior behavior. This second set of findings indicates that the Arifu content impacts financial behavior, as it accounts for the self-selection bias that could exist in the differences in activity of Arifu users and non-users.

These results suggest two broad conclusions. First, individuals with better financial profiles self-select into financial literacy training via SMS messages. Second, an interactive SMS-based financial literacy platform can increase the financial activity of its users, including those that have high savings and credit repayment levels prior to interaction. These changes in activity also show the complementary and positive interaction of savings and borrowing options on the same platform, as Arifu users increased their savings, while also qualifying for larger loans and making larger and earlier repayments on these loans. In sum, we see an increase in use of a digital savings account, which is particularly relevant for rural farmers who have limited access to branch-based banking, and increased loan amounts, which addresses a common complaint of users of digital credit products—including M-PAWA customers that we interviewed—that the loan amounts provided are too small for their needs.

Viewed together, these conclusions suggest that an in-person training program coupled with SMS-based financial training has benefits to both the consumers and financial service providers. To consumers, they are able to get just-in-time information that they value which in turn improves their financial activity and outcomes. To financial service providers, a SMS-based platform improves financial sustainability measured directly through improved financial portfolios of its high performing customers, while delivering this content at a low cost, automated and easily measurable manner.

Taking a bigger picture view, these findings hint at what we may get in digital credit if we make more effort to both understand the consumer and engage them beyond just getting them to opt into taking a loan after a few clicks on a USSD menu or pages on an app. These results invite future research questions, including, running a controlled randomized control trial to evaluate the effects of self-guided SMS-based financial literacy programs against traditional in-personal programs.

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## Appendix A: Tables

### Table 1: Borrowing Behavior

| | Mean Loan Size (1) | Number of Loans Taken (2) | Amount Outstanding (90d) (3) | Mean First Payment Days (4) | Mean First Payment Amount (5) |
|---|---|---|---|---|---|
| Arifu User Post Interaction (1/0) | 1,017 | 0.03 | -541 | -5.46 | 1,730 |
| | (576)* | (0.02) | (1,127) | (2.48)** | (504)*** |
| Arifu User (1/0) | 1,666 | 0.02 | -2,654 | -3.42 | 74 |
| | (633)*** | (0.02) | (1,382)* | (1.76)* | (534) |
| $R^2$ | 0.02 | 0.06 | 0.01 | 0.09 | 0.01 |
| $N$ | 11,974 | 17,581 | 11,720 | 9,885 | 8,522 |
| Non-Arifu User Mean | 8516 | 0.78 | 3863 | 32.05 | 6678 |
| Year-Month Fixed Effects | Yes | Yes | Yes | Yes | Yes |

$* \ p < 0.1; \ ** \ p < 0.05; \ *** \ p < 0.01$

### Table 2: Loan-level Behavior by Arifu Status and Interaction

| | Mean Loan Size (1) | Number of Loans Taken (2) | Amount Outstanding (90d) (3) | Mean First Payment Days (4) | Mean First Payment Amount (5) |
|---|---|---|---|---|---|
| Arifu User Post Interaction (1/0) | 926 | 0.04 | -237 | -2.38 | 790 |
| | (351)*** | (0.02)* | (952) | (1.78) | (301)*** |
| Arifu User (1/0) | 1,435 | 0.00 | -2,793 | -2.82 | 352 |
| | (372)*** | (0.02) | (1,263)** | (1.38)** | (321) |
| $R^2$ | 0.05 | 0.07 | 0.01 | 0.07 | 0.02 |
| $N$ | 11,974 | 17,581 | 11,720 | 9,885 | 8,522 |
| Non-Arifu User Mean | 7436 | 0.77 | 2476 | 26.70 | 5702 |
| Year-Month Fixed Effects | Yes | Yes | Yes | Yes | Yes |

$* \ p < 0.1; \ ** \ p < 0.05; \ *** \ p < 0.01$

### Table 3: Savings Behavior

| | Mean Running Balance (1) | Number of Transactions (2) |
|---|---|---|
| User had interacted with Arifu BEFORE this transaction (1/0) | 4,625 | 0.03 |
| | (11,392) | (0.16) |
| User ever interacted with Arifu (1/0) | 16,996 | 1.23 |
| | (6,070)*** | (0.18)*** |
| $R^2$ | 0.01 | 0.03 |
| $N$ | 51,830 | 51,830 |
| Non-Arifu User Mean | 12507 | 2.59 |
| Year-Month Fixed Effects | Yes | Yes |

$* \ p < 0.1; \ ** \ p < 0.05; \ *** \ p < 0.01$