



Partnership for **FINANCE**
in a **DIGITAL AFRICA**

Digital Financial Services Evidence Gap Map

Methodology



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The views presented in this paper are those of the authors and the Partnership, and do not necessarily represent the views of the Mastercard Foundation or Caribou Digital.

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ABOUT THE PARTNERSHIP

The Mastercard Foundation Partnership for Finance in a Digital Africa (the "Partnership"), an initiative of the Foundation's Financial Inclusion Program, catalyzes knowledge and insights to promote meaningful financial inclusion in an increasingly digital world. Led and hosted by Caribou Digital, the Partnership works closely with leading organizations and companies across the digital finance space. By aggregating and synthesizing knowledge, conducting research to address key gaps, and identifying implications for the diverse actors working in the space, the Partnership strives to inform decisions with facts, and to accelerate meaningful financial inclusion for people across sub-Saharan Africa.

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This memo is relevant for version 1.0 of the Digital Financial Services Evidence Gap Map launched in November 2017.

Introduction

The Digital Finance Evidence Gap Map (EGM) serves as the inventory of client-level impact. The interactive EGM and supporting narratives provide an overview of the evidence of the effects of Digital Finance on various clients, their households, and communities. Broadly, the Digital Finance EGM intends to:

- Empower practitioners, donors, and policy makers with the ability to perform evidence-based decision-making by providing a user-friendly tool that allows the user to access evidence quickly and efficiently.
- Facilitate the strategic use of research funding and enhance the potential for future evidence synthesis by identifying key “gaps” in the available evidence, thus directing future research.

In this memo, we discuss the EGM methodology and elaborate on how we refined the EGM scope, established the screening criteria, developed the coding framework, and produced the EGM.

The case for assessing the effect of financial services delivered digitally

The Digital Finance community rests on and is many ways an extension of the knowledge, practices, and evidence around how traditional (analog) financial services products and services have affected resource-constrained clients. Numerous studies and systematic reviews have explored the effects of traditional credit, savings, and insurance products.¹ From these studies, we understand that the effect of credit on welfare is mixed while it is broadly positive for savings and promising for insurance. The benefits to be gained

are highly dependent on the product, its design and delivery, and the demographics of those receiving it.

Despite this growing evidence base, less systematic attention has been paid to the ways in which the digitization of these products and services (against a background of economies, which themselves are becoming more digitized) may alter or improve the prospects of the effects at low cost and/or broad scale. Our evidence mapping exercise is intended to scan and assess the state of knowledge of digital finance products and services, beyond those available through traditional or analogue channels and business models. We focus on understanding whether the digital design and/or delivery of these products has an incremental benefit for the client. In some cases, digitization makes the inconvenient and expensive convenient and cheap. In other cases, it makes the impossible possible (scalable, accessible, and cost effective).

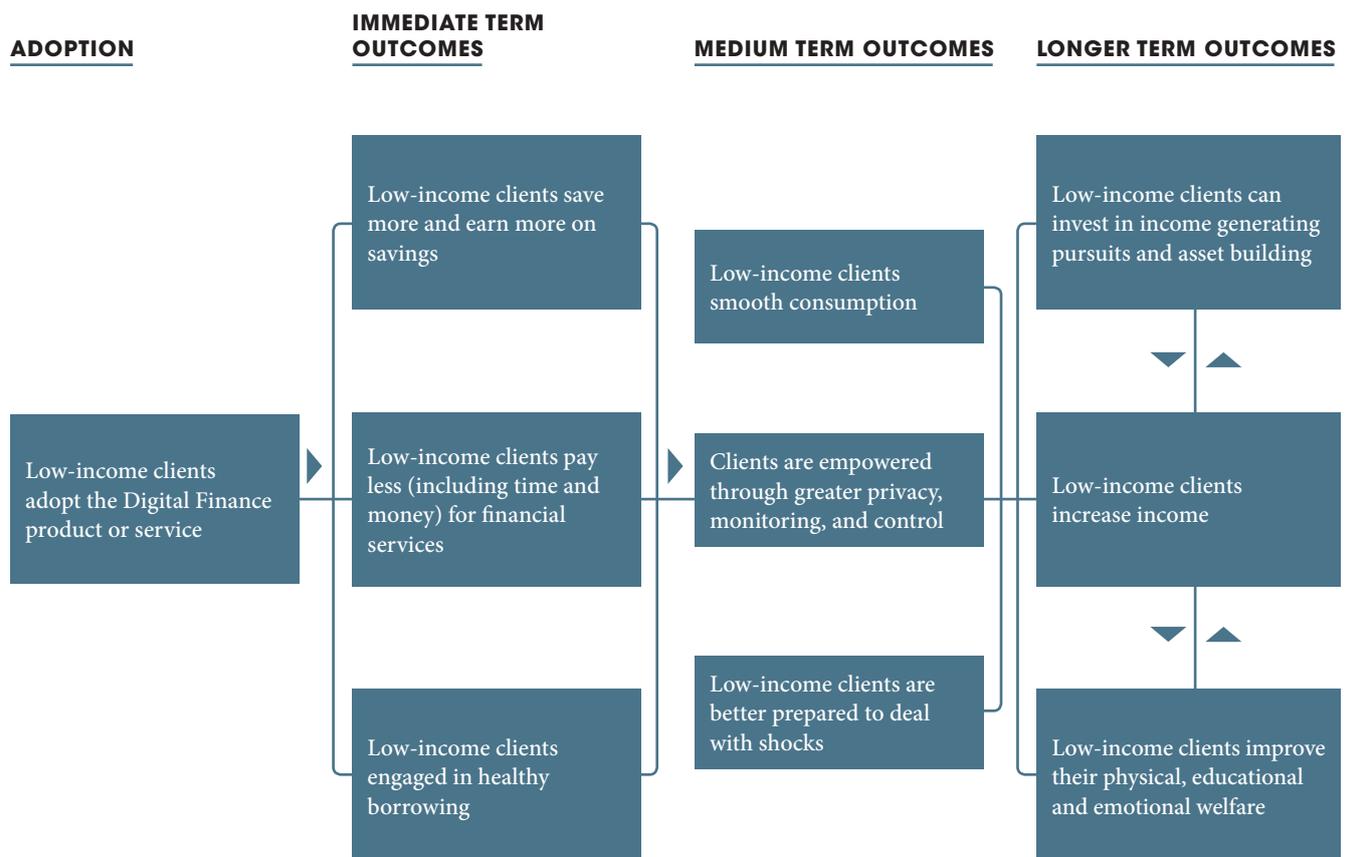
The delivery and design of digital products is different, and we cannot assume standardized effects of digital products, just as we cannot assume standardized effects of a combination of two savings products. We recognize concerns about the design of digital credit solutions in terms of not only high interest rates,² but also the growing number of clients who are being blacklisted by credit bureaus for outstanding loans³ due to either gaming the system or a lack of understanding of the system. Additionally, we are aware that many Financial Services for low income and rural populations are delivered in a group setting and digitization may disrupt the existing social architecture, leaving its overall effect uncertain.⁴

Our attention is on the Next Generation of Financial Services. We see the future of financial services as increasingly digital; thus, over time, our analysis will encompass more of the total evaluation space.

1 Karlan et al., “Research and Impacts of Digital Financial Services”; Cull, Ehrbeck, and Holle, “Financial Inclusion and Development: Recent Impact Evidence.”
2 Tamara Cook and Claudia McKay, “How M-Shwari Works: The Story So Far.”
3 Wright et al., “Where Credit Is Due – Customer Experience of Digital Credit in Kenya.”
4 Harigaya, “Effects of Digitization on Financial Behaviors.”

Theory and impact: The heterogeneous nature of Digital Finance

While we classify various digital credit, savings, insurance, payment, and transfer products in the category of Digital Finance, we also recognize that Digital Finance is not a homogeneous category. We have developed a broad client impact pathway within our Theory of Change (TOC)—see diagram below on client impact—that speaks to the theorized combined effect of the diverse Digital Finance products rather than the effect of each individual Digital Finance product. There is value in untangling each Digital Finance product from the broad category and deepening our understanding of not only the changes in the lives of low-income users that each of these products can catalyze, but also how this change was experienced by the users.



The impact pathway for an insurance product is likely to be different compared to that of a savings product. They *may* arrive at similar outcomes but take different paths to the destination.

Delving deeper into the myriad of impact pathways that each Digital Finance product may take, we recognize that the nuanced ways in which each product may be designed and delivered can alter the path. A default contribution savings product using mobile money and an agent assisted wireless deposit at a Point of Service (POS) may produce different results. Adding client training or bundling the product with other Digital Finance products or a digital information system (DIS) may significantly alter how change is experienced.

We also consider the markets in which these Digital Finance products are offered. Beyond the ecosystem environments, which can support innovation or create barriers, we must consider other factors that challenge the impact pathway. Heeks and Baliur⁵ highlighted a few of them, but most pressing in our context are 1) the social systems, which are concerned with underlying socio-economic and cultural factors, such as

those that affect the financial needs of the poor and 2) the socio-technical systems, which are concerned with understanding the interrelationships between social systems and technologies. This would include examining the organizational and institutional factors that act as intermediaries between the technologies and users.

We have much to learn as a sector, and the Digital Finance EGM represents our efforts to build the foundations of this learning to gather the evidence, to build an EGM for Digital Finance, to call for more evidence to fill the gaps, and to call for a reallocation of resources when we are overflowing.

This will permit us to begin to form the impact pathways for each Digital Finance product, as evidence emerges, and provide the sector with the capacity to delve into the details on the market and social conditions in which the Digital Finance product was or was not successful in catalyzing change.

EGM methodology

Our EGM method is broadly based on the approach outlined by Snilstveit et al.⁶ Below, we discuss the different stages in the development of the EGM. These were:

- Refining the scope of EGM
- Setting screening criteria
- Developing the coding framework
- Building out the EGM

Scope of the EGM

We used an iterative process to develop the framework for inputs and outcomes. We initially developed a basic framework, which evolved during the literature review process. If future research incorporated other outcomes not outlined here, the EGM would evolve to include them.

The EGM identifies inputs (independent variables) in the rows and outcomes (dependent variables) in the columns.

— Inputs—Independent variables

The input variables have been organized into "Digital Finance" and "Design and Delivery." The Digital Finance element highlights the effect of various Digital Finance products, and the "Design and Delivery" element enables us to highlight the effect of interventions to drive further usage of these services, for example, a digital savings product that uses two-way SMS to improve savings behavior. The two are often combined. Some studies test a Digital Finance product against a different Digital Finance product or no Digital Finance product at all while others may test a training

on a Digital Finance product against no training on a Digital Finance product. Each study reports on a Digital Finance product, with several studies also adding an additional design and delivery mechanisms into the review. In version one of the EGM, 22 out of 40 studies referenced both a Digital Finance product and a design and delivery mechanism. The remainder discussed only the Digital Finance product.

These two elements are layered to see the interplay between the two. Our objective is to show the Digital Finance product that was studied, the level of evidence, and in some cases, a design and delivery mechanism intended to deepen its effect.

— Outcomes—Dependent variables

The outcomes in the columns highlight the effect of the various inputs. These outcomes are aligned with the ROC. The client or household level effects in the ROC are based on a review of various impact studies and theoretical impact pathways. It represents what we as an industry have learned or hypothesized to date. It will be updated with additional outcomes in the future if new client outcomes are measured.

We have added "Digital Finance Adoption" as an outcome to highlight the uptake and usage of various Digital Finance products, particularly when using more nuanced design and delivery mechanisms. However, Duncombe and Boateng⁷ discussed, and we concur, that the process of adoption is the linking mechanism between the functionality of the technology and the needs of the users. It can only highlight potential but not actual effect on the lives of the clients.

6 Snilstveit et al., "Evidence Gap Maps – A Tool for Promoting Evidence-Informed Policy and Prioritizing Future Research."

7 Duncombe and Boateng, "Mobile Phones and Financial Services in Developing Countries."

— Screening criteria

In establishing the inclusion framework, we developed both a Digital Finance glossary and a set of screening criteria. We developed a glossary of Digital Finance to identify and classify Digital Finance studies before screening them against our inclusion criteria. The glossary of various Digital Finance products can be seen in the box below.

Digital Finance

The provision of a range of financial services, including payments, credit, savings, and insurance, which the client can access and receive through digital channels. Digital Finance models usually employ agents or intermediaries to assist with cash-in and out of the system. We include over-the-counter (OTC) transactions and direct deposit within the realm of digital financial services.

Digital Channel

Internet, mobile phone (smartphone and feature), ATMs, POS terminals, NFC-enabled devices, chips, electronically enabled cards, biometric devices, tablets, phablets, and any other digital system. Adapted from AFI Global guidelines on Digital Finance Terminology.⁸

Mobile Money

A range of digital financial services accessible via a mobile phone. Funds are loaded into, withdrawn from, and stored in an electronic wallet, rather than a bank account. Depending on the local law, the issuer may be a third-party mobile network operator (MNO) or financial institution.

Mobile Banking

A range of banking services accessible via a mobile phone. Funds are loaded into, withdrawn from, and stored in a bank account. The issuer of these services is a licensed financial institution.

Over-the-Counter (OTC) Transactions

A transaction that the agent conducts on behalf of a customer from either the customer's or agent's digital account.

Payments and transfers

Enable clients to send or receive money via a digital channel. We have defined 10 variations of payments and transfers below:

- 1 **Person-to-person (P2P):** Any transfer of funds from one individual's account to another's.
- 2 **Person-to-Government (P2G):** Any transfer of funds from an individual's account to a government held account, including the paying of taxes and fees.
- 3 **Business-to-Government (B2G):** Any transfer of funds from a business account to a government held account, including the paying of taxes and fees.
- 4 **Business-to-Business (B2B):** These include the transfer of funds between two organizations engaged in commercial activities.
- 5 **Bill Payment:** These include payments made by a biller of billing organization in exchange for services provided.
- 6 **Merchant Payment:** These include payments made from an individual to a retailer, or online merchant, in exchange for goods or services.
- 7 **International Remittances:** These include cross-border transfers of funds from one individual's digital account to another. These include direct account-to-account remittances as well as those completed through an intermediary MTO (money transfer organization).
- **Bulk Disbursement/High Volume Payments:** A payment made into an individual's Digital Finance account. These are one-to-many transactions and include:
 - 8 **Government-to-person (G2P):** Including disbursement of government benefits and salary payments.
 - 9 **Business-to-person (B2P):** Including salary and business payments.
 - 10 **Donor-to-person (D2P):** Including cash transfers.

Sophisticated Financial Services

Adapted from GSMA definitions. Sophisticated Financial Services include credit, savings, and insurance products.⁹

Digital Credit

For credit to be classified as digital, the client must use a digital channel to receive and repay the loan. Intermediaries, such as loan officers or agents of the credit providing institution, may also be used.

Digital Savings

To be defined as savings, the service must enable clients to save money in a dedicated account that provides principal security and in some cases an interest rate. To be classified as digital, the client must use a digital channel to deposit and withdraw from the savings account. The client should be able to store value electronically in the savings account. Intermediaries, such as loan officers or agents of the savings account providing institution, may also be used.

Digital Insurance

The service must allow the client to manage risks by providing a guarantee of compensation for specified loss, damage, illness, or death. The client should be able to pay the premium using a digital channel and receive the claim using a digital channel.

After comparing studies against the glossary, we used screening criteria to help us further refine and exclude unrelated studies.

First, as per the glossary, the input is a Digital Finance product or a Digital Finance intervention.

Second, studies address the Digital Finance as the defined research area. Only studies dealing with Digital Finance as a core issue were included in the review.

Third, the outcome had to consider client level impacts and the effect of Digital Finance on at least one of the following had to be tested:

- 1 Client adoption
- 2 Savings behavior and value
- 3 Engaging in healthy borrowing
- 4 Paying less (money and time) for financial services
- 5 Empowerment through greater privacy, monitoring, and control
- 6 Consumption smoothing¹⁰
- 7 Shock preparedness, response
- 8 Physical, educational, and emotional welfare
- 9 Investment in income-generating pursuits and asset building
- 10 Income

Fourth, the client outcomes must be either directly or at least indirectly applied to the un/under-banked users in the global south.

It is important to note that the scope of the review crossed academic boundaries. We have included studies with and without counterfactual evidence. Given the complexity of the Digital Finance space, a single “meta-analysis” of Digital Finance interventions may disregard useful signals from the research literature. We believe that this mixture of studies will provide more in-depth information concerning the processes of change and contribute more to the theory of impact pathways.

⁹ Hege Aschim, “Revising Our Definitions for Credit, Savings and Insurance Enabled by Mobile Money.”

¹⁰ Researchers often use consumption smoothing and improved resilience interchangeably. We have defined these separately.

EGM coding framework

After screening, studies were coded into various categories of interest. Beyond basic information on authors, publication dates, and study location, the main coding categories were 1) the study methodology, 2) the client level outcome(s) on which the study reported, and 3) the impact level. We outline the coding framework for these three main categories in this section.

We included within our framework all research methods that met the screening criteria. Using the table below as an overarching heuristic to frame impact measurement approaches, we coded various studies as I, II, III, or IV. Our goal was to convey that while box I is the easiest fit, boxes II, III, and IV can all inform our understanding of the effect if we are careful about linking the studies, avoiding overweighing with studies from boxes II and IV. A good theory of change (in a world of sparse evidence) can and should carefully draw from all four boxes.

Classification of impact studies

		Spirit of study	
		Broadly, does it foreground programmatic evaluation or advance formal science/theory?	
Nature of evidence Does it have counterfactual evidence?	Yes	<p>More like "programmatic/product" evaluation. Inform TOCS to guide products, policy, business models, and/or investment</p> <p>I Programmatic RCTs. A/B testing. Econometric and big data approaches, (some) meta-reviews</p> <p>Example: <i>Harigaya, Tomokxo. 2016. "Effects of Digitization on Financial Behaviors: Experimental Evidence from the Philippines."</i>¹¹</p>	<p>More like "academic" theory building. Creating theory to yield generalizable models of how the physical, economic, and social world work</p> <p>II Foundational empirical social science—lab experiments, econometric model testing, etc.</p> <p>Example: <i>Sekabira, Haruna, and Martin Qaim. 2016. "Mobile Phone Technologies, Agricultural Production Patterns, and Market Access in Uganda."</i>¹²</p>
	No	<p>III Action Research, Narratives, Design thinking, Case Studies, "best practices", etc.</p> <p>Example: <i>Aker, Jenny C and Kimberley Wilson. 2013. "Can Mobile Money Be Used to Promote Savings? Evidence from Northern Ghana."</i>¹³</p>	<p>IV Ethnographies, Qualitative social science</p> <p>Example: <i>Morawczynski, Olga. 2009. "Exploring the usage and impact of "transformational" mobile financial services: The case of M-PESA in Kenya."</i>¹⁴</p>

¹¹ Harigaya, "Effects of Digitization on Financial Behaviors."
¹² Sekabira and Qaim, "Mobile Phone Technologies, Agricultural Production Patterns, and Market Access in Uganda."
¹³ Aker and Wilson, "Can Mobile Money Be Used to Promote Savings?"
¹⁴ Morawczynski, "Exploring the Usage and Impact of 'Transformational' Mobile Financial Services."

— Coding client outcomes

To code each outcome, we further classified the client outcomes into various potential measures, as shown below.

1 Client adoption

Before/after assessment of client use of various Digital Finance products.

2 Savings behavior

Example measures of improved savings are changes in savings balance and transactions frequency.

3 Healthy borrowing

Example measures of healthy borrowing are related to good terms of borrowing: Interest rates, repayment time, clients' perceptions of the credit terms as fair, defaulters, blacklisting, changes in borrowing frequency, changes in decisions on loan size and frequency.

4 Paying less (money and time) for financial services

Example measures of paying less for financial services are: clients changing the time spent to access financial services and clients changing costs associated with accessing financial services.

5 Client empowerment

Example measures of empowerment are: Changes in bargaining power and independent access to Digital Finance products, control, and privacy. Measures often focus on women but are open to other disempowered or excluded populations.

6 Consumption smoothing

Example measures of consumption smoothing: Changes in managing existing debts, changes in ability to balance income and expenses, particularly in lean periods, and the ability to financially plan for the future. It was noted that researchers often use consumption smoothing and improved resilience interchangeably. We have defined these terms separately.

7 Changes in shock preparedness, response

Example measures of being better prepared to deal with shocks: Changes in severity of coping strategies adopted, use of insurance, savings, formal credit or ePayments in times of economic stress, and ability to retain major assets following a shock.

8 Changes in physical, educational, and emotional welfare

Example measures of welfare include investment in own or children's education, reduction in household health issues, ability to obtain preventative care or seek health care when needed, general physical security, food security, nutrition, social cohesion, stress, and subjective emotional well-being.

9 Changes in investment in income generating pursuits and asset building

Example measures of investment and asset building include changes in enterprise investment, occupations, and asset acquisition.

10 Changes in income

Example measures of income include diversification of income sources, changes in income, and per capita consumption.

— Coding of impact

Impact was coded into one of the three categories:

- 1 Positive: Changes positively affected the client's outcomes.
- 2 Negative: Changes negatively affected the client's outcomes.
- 3 No effect: No clear change in the client's outcomes emerged, or the results were not significant.

This approach to coding impact is broad to accommodate the mixture of methodologies in the EGM.

A note on conflict of interest

We have noted studies that may present a conflict of interest. These studies include those that were 1) implemented by organizations evaluating their own products and/or 2) written by the organization who funded or provided technical assistance to a product. We have also noted studies that were not conducted by an independent third party. These studies account for 13 out of the 40 studies. These are available upon request.

Building out the EGM

Between November 2016 and May 2017, we screened hundreds of studies using snowballing sampling and mining bibliographies. At the time of launching version one of the Digital Finance EGM, we have identified 40 studies that looked at various client level outcomes, of which 26 (65%) offered counterfactual evidence. The remaining 14 (35%) were ethnographic, social science, action, or case studies. We are tracking several impact studies that are "in progress" and those that were released after the initial literature review. These will be added into the next version of the Digital Finance EGM, expected to come out in mid-2018.

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