Savings at the Frontier

The role of data analytics in business development in low-income markets

A focus note

Hanna Laufer, February 2022

mastercard foundation

Oxford Policy Management

Introduction

Exciting possibilities for business development are offered by the abundance of internal and external data available to financial service providers (FSPs) – the potential of which is only just beginning to be realised, particularly in relation to millions of customers who are currently under-served. Simple data analytics tools can yield a better understanding of the existing and potential new customers, and can bring profitable business to the FSPs while offering valuable services to low-income market segments.

Savings at the Frontier (SatF) is working in partnership with ten FSPs in Ghana, Tanzania, and Zambia to find ways to improve the financial inclusion of low-income individuals and communities in sub-Saharan Africa.

The programme aims to encourage FSPs to experiment and innovate to develop financial services for informal savings mechanisms, such as savings groups and their members, smallholder collectives, or susu customers in urban markets. It is expected that the resulting value offers will allow low-income customers to renew and deepen their engagement with formal finance and to expand their financial portfolios.[1] To support the design and scale-up of such services, SatF's partners are finding new ways of combining publicly available data (census data, demographic and health survey data, financial access data, etc.) with the data available from their own internal systems.

The SatF team has worked in collaboration with commercial banks, fintechs, and lower-tier FSPs to develop tools that support data-driven decision-making regardless of the organisational capacity and systems available for supporting data analytics. These simple, project-specific tools can reduce bias and uncertainty, help identify and quantify opportunities, help overcome operational challenges (such as the proximity gap), and help understand customer behaviour better. This improved understanding can support the development of profitable, innovative business models to serve low-income customers.

The tools that were developed include the *proximity tool*, *data-driven personas*, as well as a *proxy data warehouse* (PDW).

Photo: FSP partner teams working on the proximity challenge of delivering financial services, at a workshop in 2019.

[1] To learn more about the financial portfolios of low-income market segments, visit this summary by CGAP of how the poor manage their money, or browse CGAP's research on smallholder financial management .

In this focus note we discuss the principles of working with data within project or product teams, present tested tools, and share how our partners are benefitting from their deployment. It should be noted that when we refer to data-driven decision-making we are not talking about elaborate models for interpreting customer preferences or predicting financial needs. Rather, we focus on the integration of simple analytical tools into existing organisational structures and processes to support financial sector professionals seeking to serve new market segments and support innovation.

What data are available?

Both internal and external data are available that enable FSPs to better understand their customers and potential customers:

Internal: FSPs generate a significant amount of customer data that they can explore. The availability of data differs across types of FSPs and can depend on the strategy or history of the organisation. In general, such data include:

- demographic and socio-economic data (such as age, gender, location, marital status, or occupation), usually captured at account opening;
- transaction data (deposits, repayments, and other transactions), usually captured over time, once the account is in active use; and
- engagement data (such as messages, requests, or complaints), usually registered at the time of messages, calls, or visits to and from customers.

External: In many economies, statistics agencies and development institutions generate public datasets through regular demographic, health, and financial access surveys. These surveys offer information on the business-critical parameters (such as livelihoods, income, financial services use, and mobile phone ownership) of existing or potential customer segments.

Why are these data underutilised?

In a market study conducted by McKinsey in 2018, only 7 per cent of the surveyed commercial banks in the Europe, Middle East and Africa region reported a complete incorporation of data-driven business models. The majority indicated that they were in the initial stages of translating data-centric strategies into organisational systems, structures, and capacity.

In many African financial sectors, data are playing an increasingly central role as fintech companies and mobile network operators compete with traditional FSPs. While data-driven models are a strategic priority for larger commercial banks, their operationalisation has proved to be difficult. Lower-tier FSPs, such as rural banks, microfinance institutions, and cooperatives, tend to adapt at an even slower pace due to their limited investment capacity and the fact that their customers have less exposure to digital solutions and services.

Many studies suggest that innovation processes and decision-making in FSPs are prone to bias, especially where information constraints and uncertainty shape decision-making. Deloitte, for example, reports that financial product development is slowed down by the trade-off between an investment to unlock longer-term revenue and tangible immediate needs. Data analytics can play a useful role in quantifying the market opportunity and reducing uncertainty. It can also lessen the reliance on intuitive judgement, which is prone to cognitive errors. Confirmation and availability bias can perpetuate prejudices and cliches: for example, the assumed ineptitude of informal enterprises in regard to soundly managing money. This can adversely influence market and product development decisions.

Regardless of organisational strategy and capacity, data analytics can add significant value within the scope of specific projects in the areas of product and market development. The use of external data can support innovation processes, and simple data analytics tools can offer emerging customer insights. This is valuable

when seeking to serve previously under-served markets, such as low-income households or enterprises operating in the informal sector, whose cash flow patterns, financial needs, risk parameters, and exposure can differ significantly from those of existing customer segments, and are often less well understood.

What data are required?

While some internal data are difficult to locate or use, due to storage or format issues, other data are simply not available. SatF's FSP partners have identified certain data as critical to enhancing the customer value proposition, or reducing delivery costs, which is an important driver of business cases.

Data on customers' location and proximity to access points: Historically, most FSPs relied on the customers to visit the bank branch in order to serve them. A customer's address was only relevant in the context of KYC (Know Your Customer) policy. However, in sparsely populated rural areas or less structured urban areas, such as informal settlements, it is important to know where customers are and where they can deposit or withdraw money, or make transactions. An accurate measure of the distance a customer has to travel, or that agents or field officers have to travel to reach customers, is a critical ingredient for delivering financial and non-financial services in an efficient and commercially viable manner.

These data are difficult to collect and maintain in the absence of universal address systems, and in the context of informal housing solutions. Customer location data often consists of towns, communities, or streets, and are captured at the point of account opening, but do not allow FSPs to use these data for analysis, and to improve delivery models. Similarly, access point locations (such as active mobile money agents, bank agents, main transport routes, or off-take points for agricultural produce) are not captured in a systematic manner.

Data on network coverage: The delivery of digital financial services, digital marketplaces, or platforms for smallholder farmers depends on the use of mobile phones. Mobile network connectivity is continuously expanding into rural areas, but FSPs find it difficult to anticipate the quality of network coverage, and therefore to plan outreach. In the absence of reliable consistent information on where 4G changes to lower-speed connectivity, or where communities have no signal at all, it is difficult to predict uptake and scale. These data are not publicly available and connectivity maps offered for a fee can be inaccurate because they do not take the topography of an area into consideration. Understanding how far potential customers have to travel to use an app, receive a transaction confirmation via SMS, or use a USSD menu without interruptions is key to developing relevant services for rural customers.

Data on decision points: Where partner FSPs offer digital financial and non-financial services to smallholder communities and agricultural value chain actors it is clear that the timing of the value proposition is an important driver of the business case. Smallholder farmers need certain financial and non-financial services at specific points in time. Understanding local agricultural production cycles and locating the main decision points in these production cycles, such as the first rainfall of the season, is crucial to matching the value proposition to the needs of customers.

Household data: Public datasets often contain some household-level data and more detailed individual data. Studies suggest that financial decision-making is a collective process, and that the opinion of household or community members significantly shapes decision outcomes. This is particularly important in the context of technology or product adoption, and in the development of use cases. Livelihood strategies in lower-income contexts are often diversified, and the level and frequency of household income may significantly differ from that of individuals. It is therefore important to understand the household configuration in order to respond to the potential needs of individual customers.

These are just a few examples of data that can support the development of adequate value propositions and delivery models for low-income customers. SatF's FSP partners have started to gather and test data in different applications.

What can the data help with?

The SatF partners who have succeeded in accessing and using these types of data suggest that their use can help address several business challenges. These include low services uptake, high dormancy rates, inefficient agent routes, and inadequate service locations. Data help them to understand whether these challenges are specific to a region or to a particular customer segment. Data can help identify bottlenecks along the steps of the customer journey, and can provide a starting point for further research. Data analysis helped SatF's FSP partners to test commercial hypotheses: for example, that customers are more likely to open a new group account via a USSD menu in order to start a new savings cycle than they are to reconfigure an existing one. Through data analytics, FSP partners have learned that customers test savings accounts by repeatedly depositing small amounts and then withdrawing them. SatF's qualitative impact assessment confirmed these patterns, and emphasised the importance of a swift response: where customers face difficulties with initial withdrawals, or do not receive immediate support to resolve them, they are likely to stop their engagement altogether.

Box 1: Using data analytics to adapt the service offer

One SatF-supported product, m-koba, is a group savings account delivered by Tanzania Commercial Bank (TCB) in partnership with Vodacom Tanzania. Savings groups, and customers who want to save collectively with family members or friends, can now use the m-pesa USSD menu to set up a TCB group account, and can interact with it via their mobile money wallets. This is free of charge but standard mobile money transaction fees apply.

The use of data analytics has helped the partners to understand m-koba customer behaviour and consequently to adapt the service offer, including the following:

- An analysis of use patterns and activity rates of m-koba accounts showed that m-koba group savers are more likely to open new accounts for different collective savings projects, or new savings cycles, than to modify or re-use an already opened account;
- An analysis of transaction data, specifically from individual wallets to group accounts, confirmed improvements in customer confidence through gradually increasing the frequency and size of transactions; and
- Locating data points along the customer journey allowed the project team to review the existing customer offer and to modify it, where required.

Digital value offers rely on large volumes of small transactions, which requires sustained engagement of customers. Tools to monitor account activity and channel use allow FSPs to identify early signs of reduced activity. In the initial stages of testing a new product, customer-centred data analytics can help explore differences in access and use patterns across groups of users. FSPs can identify primary users and more reluctant customers, and can design efficient customer journeys and support services for those who need them.

For many SatF-supported savings accounts, deposit and withdrawal patterns differ from those of traditional customer segments. In order to accurately label the accounts of smallholder farmers as active or inactive, data are required to understand production processes, deposit patterns, and savings cycles. This can offer a starting point when seeking to expand the value offer to better match financial habits and behaviours.

As discussed previously, efficient services delivery requires field resources and physical access points to be in relevant and close by locations.

Lastly, data can improve transparency, where FSPs rely on agents or third-party field officers to conduct cash-in and cash-out transactions. Location data for the transactions, in addition to the amount and time of transactions, can help to alert project managers to unusual patterns and mitigate the risk of fraud.

At organisational level data can help to reduce bias and uncertainty, and prevent over-reliance on anecdotal evidence. Data can support communication to moderate perceived risk, and therefore to encourage buy-in from management or governance structures for projects that target new customer types or segments, such as

savings groups and their users, or susu enterprises and their customers. The use of external data can shift innovation processes from incremental improvements or tweaking of existing products to developing value propositions and delivery models which are based on customer characteristics.

What makes the use of data difficult?

There are several challenges that make it difficult for teams to gather and use data for strategic or operational decision-making:

- Data are often stored in disparate components (or silos) that constitute the internal data landscape of the FSP (such as the core banking system, middleware, and discrete repositories). This can make it difficult to find and combine relevant customer data;
- Data can also be stored in formats that require changes in structure for analysis;
- Data quality can negatively affect usability. The time available to enter information at the point of account opening or transaction processing is limited, and systems and processes are often not standardised and/or not sufficient to ensure consistency and reliability of the entered information. In Tanzania, for example, customers without national identification cards tend to use the cards of relatives or friends to register SIM cards. Demographic customer information for mobile savings accounts can therefore be misleading for analysis; and
- Due to the sensitivity of financial data, access to and use of these data is often restricted to IT or business intelligence teams, who have to prioritise requests and fulfil their compliance role before servicing *ad hoc* or exploratory data requests. Where account architecture or customers are new to an organisation – e.g. where FSPs are serving collectives rather than individual customers – the process of locating the relevant data and ensuring the validity and consistency of reporting requires diligent processes and additional staff capacity. IT teams are traditionally not directly involved in product innovation projects, which can reduce the organisation's scope for data-driven product development.

In the context of SatF, for example, it became evident that the IT systems of commercial banks were not set up to link individual savings accounts to the respective group accounts. Initially, it was not possible to track the transactions between savings groups and members, which constitute a key component in accurately describing the business case for serving this market segment.

While existing IT systems can limit the availability or usability of customer data for the FSPs, they can also affect the customer experience. After developing a solution to link group and individual accounts and adding functionalities to mirror the tripartite authorisation of transactions of savings group signatories, one SatF partner decided that the technology was still unable to offer the usability and simplicity the informal savings mechanisms' customers needed. The team developed an alternative savings product with a technology-centred partner organisation. The uptake of the new product confirmed this strategy. At the same time, the SatF team learned that data governance and sharing are key elements of partnership agreements and require careful design.

Customer data analytics, their roles, and their organisational requirements, evolve over time. Even for SatF's fintech partners, the framework and applications for data analytics were not entirely clear *ex ante* but were adapted during value proposition development, delivery, and, at a later stage, during the deepening of financial and non-financial services offers. Certain questions, such as which information on a farmer profile was most relevant for creating a platform with the best possible technology-farmer fit, or whether data on input orders could predict the farmers' ability to pay off top-up loans, had to be tested and reviewed.

How to make better use of internal data?

To benefit from the use of data, FSPs – and those that support FSPs to develop financial services innovation – can deploy simple tools that do not require fully digitised organisations or elaborate data analytics

capabilities. The SatF team developed such tools in collaboration with the partners in order to simplify the analysis of existing public datasets and overcome the limitations of fragmented data systems in the organisations.

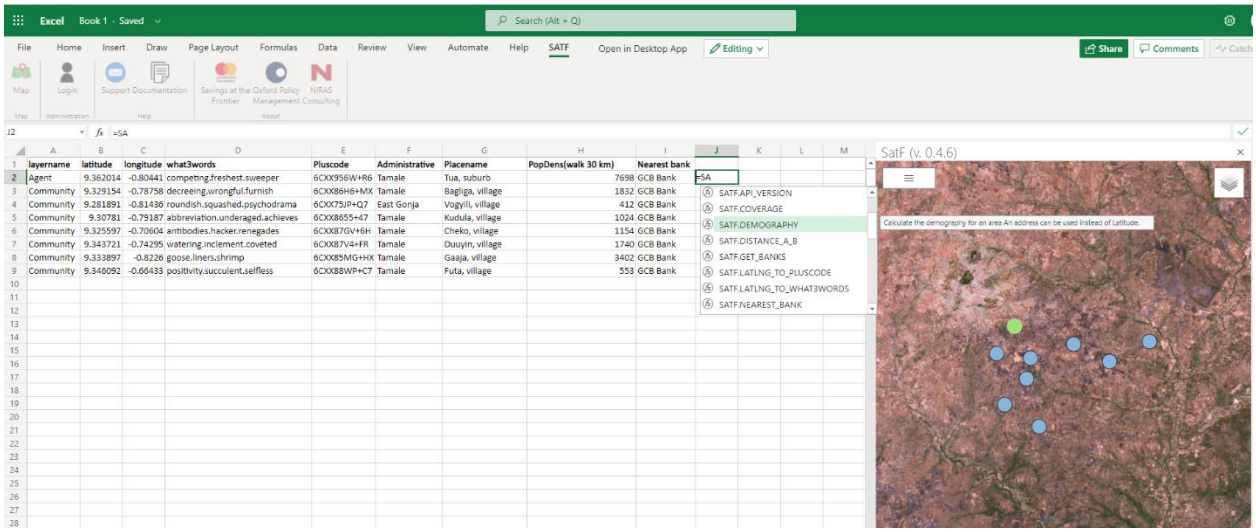
In this section, we describe three tools that have proved useful to the SatF partners in achieving access to customer data, facing the proximity challenge of delivering digital financial services, and using public data to quantify market opportunities. The tools are the **proximity tool, data-driven personas**, and **Proxy Data Warehouses (PDWs).**

The proximity tool

The proximity tool supports the development of new markets, and the design of efficient delivery models for digital financial services: for example, by identifying viable catchment areas and locations of agents to serve peri-urban and rural areas. It is a tool that can be used to specifically support the expansion of financial inclusion in remote rural areas or previously under-served peri-urban and urban areas.

As mentioned above, FSPs traditionally did not have to know where their customers lived or worked, and therefore did not have standardised tools to record or use geolocation data. The address data stored on customer information files can also be inaccurate, and difficult to keep up to date. Similarly, FSPs do not have systematic processes for mapping active agent locations, or other physical access points, where customers can perform cash-in or cash-out transactions. To close these gaps, experts from NIRAS, in collaboration with the SatF team, developed the **proximity tool**, an Excel plug-in and application programming interface (API) that project teams can use to map and measure the proximity gap between the customers and the physical touch points of FSPs. The tool combines satellite imagery with relevant public data layers: for example, road networks, population density, infrastructure, and network connectivity. The tool also offers basic insights into the agricultural activity of existing customers to support FSP partners in delivering relevant and effective financial value propositions in smallholder value chains.

Figure 1: The proximity tool can be used in the form of an Excel plugin. Data can be transferred from the sheet to the map (e.g. where customer location data are collected using what3words or other free solutions), or can be marked on the map and imported to the sheet for further analysis.



The tool can derive population estimates for a specific area: for example, within 10 minutes' walking distance from point x, or 30 minutes' driving distance from point y. It can find the nearest ATMs, bank branches, and points of interest, such as schools or clinics, and it allows FSPs to map their own data (e.g. bank agent routes, and transaction and access points). FSPs can add, validate, and change data: for example, to mark roads or areas with poor access, due to potholes or frequent flooding. The proximity tool also includes data on agricultural activities, crop growth and harvest monitoring, and weather forecasts, all of which are key parameters for smallholder decision-making.

Figure 2: The tool uses nightlights to infer urban/peri-urban economic activity. The distance between the yellow agents is estimated using different modes of transportation. Nightlight values for the three agents allow the user to infer that Agent 3 might see more frequent transactions.

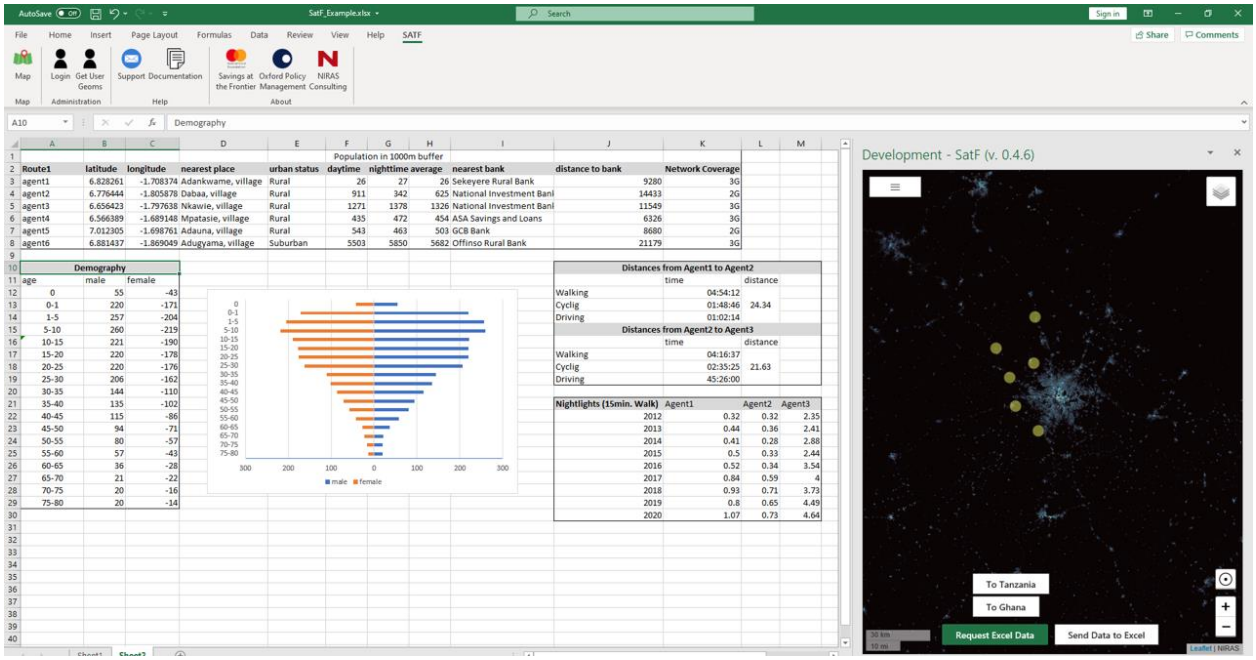
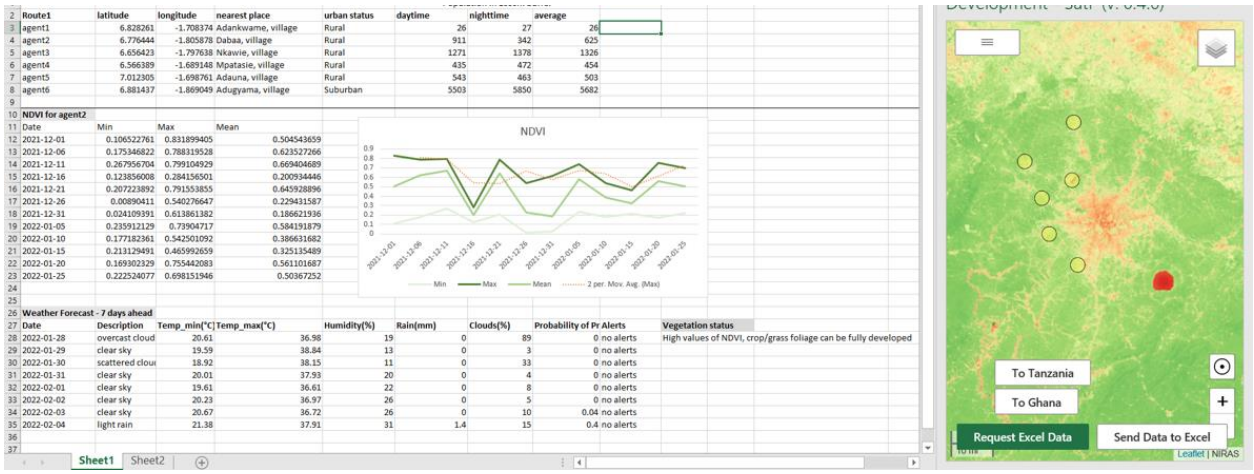


Figure 3: For the same area, the FSPs can track the state of plant health based on how the plant reflects light at certain frequencies – here over the months of December 2021 and January 2022. The NDVI values allow the user to infer the status of the agricultural activity in specified areas. In this example, the FSP also looks at the weather forecast for the area.



Once the tool is set up to include the functionalities relevant to our partner FSPs' business models, it can be embedded in organisational processes, and is maintained, updated, and used by FSP project team members. SatF's fintech partners are using the tool to plan input delivery to smallholder communities, communicate with customers, and monitor transaction patterns in the field.

The proximity tool is offered on a subscription model and is currently deployed by three of SatF's FSP partners. Its base layers cover Ghana and some areas of Tanzania. Functionalities can be added with advancing use cases of the organisations, e.g., agricultural layers and network connectivity were added to the tool once FSP partners decided to serve rural savings mechanisms. If several FSPs begin to use the proximity tool, a web version of an anonymised map could be made available to sector stakeholders, showing access points/agents to track the expansion of inclusive finance.

Read more here: The SatF proximity scoping study, a Mondato blog on proximity and rurality, a SatF focus note: 'Getting closer to expanding outreach', and a SatF/FinDev webinar introducing the basic tools.

Data-driven personas

The data-driven persona tool helps FSP project teams to determine the size and nature of business development opportunities in lower-income market segments, based on a constructed 'persona' (e.g. of a young farmer, or salaried woman with school children). The persona is based on data analytics using survey data, and describes the most likely attributes and characteristics of a particular customer. Creating personas can offer initial insights into the segment's characteristics, decisions, and behaviours. These insights can support product development discussions, or innovation processes. The tool can also inform the commissioning of targeted customer research by determining a particular set of customers or potential customers *ex ante*.

The Excel-based tool is based on free public data, generated by demographic, health, and financial access surveys that are conducted at regular intervals. These surveys collect a wealth of often representative household and individual data and offer insights into the livelihoods, household configuration, and financial behaviours of existing customer segments or new market segments. Data sources can include Demographic and Health Surveys, Livelihoods Surveys, FinScope, and Findex, etc.

The data-driven persona tool allows financial sector professionals to explore public datasets using a set of filters. To zoom in on a specific market segment of interest, project teams can select certain demographic, financial access, and/or geographical criteria, and can explore the livelihoods, income, and social metrices of the respondents matching these. Insights are also provided in terms of financial portfolios and behaviours, using financial access survey data.

FSP project teams can assess the size of opportunities, use insights gained in strategic and operational decision-making or product development processes, and create customer personas that can constitute starting points for commissioning targeted customer research.

Figure 4 and Figure 5: Examples of data-driven customer personas based on Findex datasets in Ghana and Tanzania, used in product reviews.

Ghana: Saver 2

Established smallholder farmer
Male
Male-only ISM
Aged: 35-44
Secondary completed

Connectivity and proximity
No phone ownership
1 hour walk to nearest agent

Financial portfolio
Uses mobile money to send and receive money (P2P)
Makes agri-payments using mobile money
50:50 chance has bank/MFI account, to receive agri-payments
Saves and borrows from ISM
50:50 chance saves and borrows from bank/MFI

Income
Lives on no more than 30 GHS (USD5) a day

Cultivating own land, planting security and cash crop
Highly seasonal
Moderately predictable

Risk
Economic: price volatility for crops and produce, post-harvest loss
Climate: drought, floods, pests > crop failures
Illness or accidents: medical costs of childhood diseases, loss of labour or income, death

Household size
2 Adults, older children, Elderly dependents
Of which are working...
2

Tanzania: Saver 1

Civil servant and business owner

Male

Urban area

Aged: 45-54

Mixed ISM

Secondary completed

Income

Lives on no more than TSH 12,000(USD 5) a day

Salaried civil servant

Has a side business

Not seasonal

Highly predictable

Household size

3 adults, 3 children

Of which are working...

3

Connectivity and proximity

Has a mobile phone

Close proximity to the branch/agent

Financial portfolio

Has a bank account to receive salary

Has a mobile money wallet

Saves for business using the formal account and the ISM

Borrows for business purposes

Has taken a loan for land or housing from bank

Saves and sometimes borrows from ISM

Sends and receives P2P via mobile money

Risk

Economic: business failure, loss of employment

Illness or accidents: loss of labour or income, death

A partner programme of SatF, WSBI's Scale2Save programme, collaborates with 12 FSPs across sub-Saharan Africa and is in the process of developing a web portal to host the data-driven customer persona tool. This will make it more accessible and user-friendly, and allows the connection of survey data with more in-depth data sources, such as financial diaries. The pilot tool will be available for Nigeria. Persona characteristics and insights are provided in terms of the likelihood of customers engaging in certain types of economic activity, or with certain types of financial services. The same set of filters can be deployed across different datasets to provide different types of market insights. The tool can be adjusted based on the interests and focus of partner FSPs, and refreshed using new data, as surveys are conducted regularly.

Proxy Data Warehouse

A Proxy Data Warehouse (PDW) can be described as a half-way house between having an accessible, well-functioning business intelligence system and relying on standard reports prepared by IT teams. In the context of retail finance innovation, a PDW can be a valuable data analytics tool, where organisational systems or capacity remain constrained.

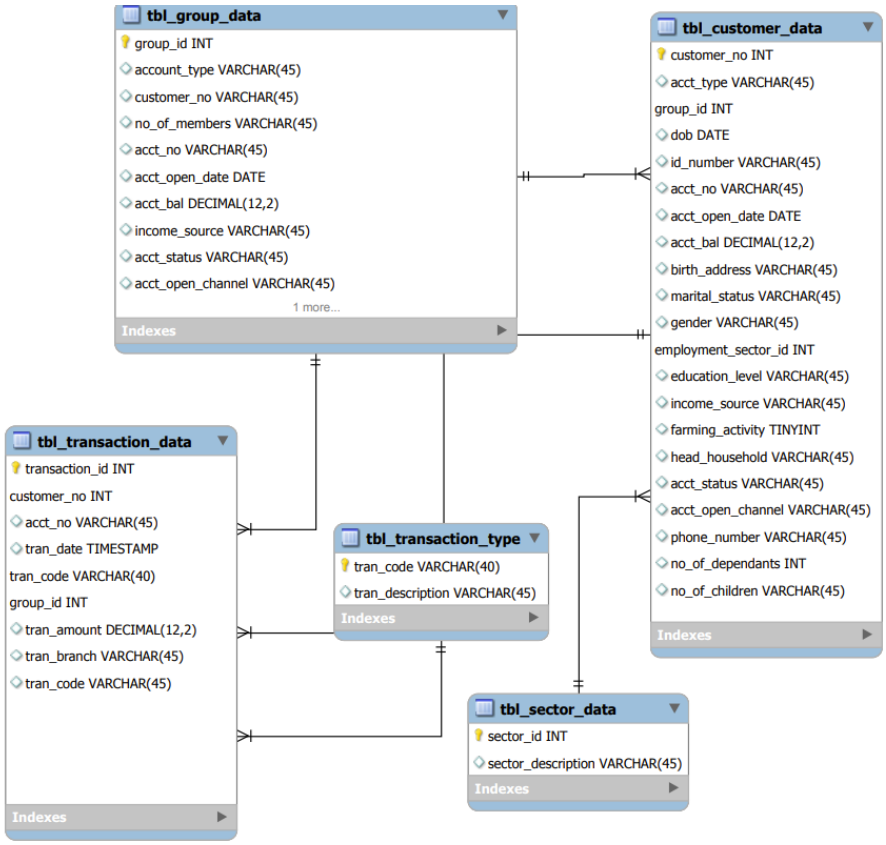
A PDW is a space that allows project teams to use project-specific data to explore patterns and trends, and to conduct performance analytics.

SatF has worked with two of its partner FSPs to build PDWs in order to demonstrate their benefits, specifically in the context of donor-funded interventions. A PDW can help to:

- bring together data from different internal systems in usable formats;
- allow project teams to explore, modify, and analyse data without the risk of changing the original data on core banking systems;
- ensure that data are anonymised, and customer privacy is guaranteed; and
- provide access permission to users in line with their needs and ability levels.

In order to achieve these advantages, PDWs link different datasets, such as demographic data (stored in customer information files), behavioural data (stored in the core banking system), and other data, through a unique identifier.

Figure 5: This entity relationship diagram shows how customer information (top right), transaction data (bottom left), as well as individual and group account data is brought together and linked in the PDW to allow project teams to explore data.



This allows FSP project teams, for example, to explore use cases of specific customers or customer segments over time. Other examples of the use of PDWs might be to understand the transaction patterns of super-users or to investigate the savings cycles of new customer segments.

The creation of a PDW initially requires project and IT teams to define the data analytic needs for business decisions and to take stock of, and map, available data. A specialist can then work with the FSP data team to restructure and link the data from different sources in the organisation. This also enables customer data to be converted into anonymised, standardised formats. Project teams can manage and maintain the PDW, and customer data can be updated following a simple process. In collaboration with a consultant who has skills in data and information management systems in the financial sector, the project teams can develop useful dashboards for different user groups.

PDWs support experimental approaches to product and customer journey design as they can support rapid testing and iterations with relevant data analytics. In the initial stages of product development, data teams would have to produce frequent reports to allow project teams to monitor early uptake and explore adaptations. With a PDW, project teams can access the data directly, and therefore reduce the tax on the capacity of data teams. This was particularly true for the SatF programme, given that the data analytics required a link to be made between individual and group account transactions. This proved to be a lengthy process in some cases, as data teams were required to identify and extract the right data, without sufficient knowledge of the new customer segment and the specific value proposition design.

Therefore, PDWs are particularly helpful tools for supporting the use of data in partnerships between donors and FSPs, which require innovation and experimentation. In the longer-term, SatF expects PDWs to support

a shift from reporting that is mainly compliance-driven, to a more proactive use of data, and to reduce the time spent on requesting, quality assuring, and submitting data to funders or management. Although PDWs require initial investments, once they are set up and managed properly, they can be maintained and used by planning and operational teams. The costs of development and maintenance are outweighed by the cost savings and expansion that come as a result of better business decisions. PDWs also promote an understanding of the value of data and incentivise better data collection.

Further reading on the use of data for decision making by FSPs: The DMAC Toolkit: Unleashing the power of data to transform your business.

About the SatF consortium

For more information – and to read the full SatF strategy – visit www.opml.co.uk/projects/savings-frontier

The Mastercard Foundation

The Mastercard Foundation works with visionary organisations to provide greater access to education, skills training and financial services for people living in poverty, primarily in Africa. As one of the largest private foundations its work is guided by its mission to advance learning and promote financial inclusion to create an inclusive and equitable world. Based in Toronto, Canada, its independence was established by Mastercard when the Foundation was created in 2006. For more information and to sign up for the Foundation's newsletter, please visit www.mastercardfdn.org. Follow the Foundation at @MastercardFdn on Twitter.

Oxford Policy Management

Oxford Policy Management is one of the world's leading international policy development and management consultancies. We enable strategic decision-makers in the public and private sectors to identify and implement sustainable solutions for reducing economic and social disadvantage in low- and middle-income countries supported by offices in the UK, Bangladesh, India, Indonesia, Nepal, Pakistan, Nigeria, Tanzania and South Africa. For further information, visit www.opml.co.uk or follow us on Twitter @OPMglobal.

Front cover image: Sam Vox/Savings at the Frontier/OPM