



# Location Matters: GIS in Financial Inclusion

## Workshop proceedings

Advancing Financial Inclusion

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# Location Matters: GIS in Financial Inclusion - Workshop Proceedings

22-23 July 2015, Johannesburg, South Africa



**Insight2impact | i2i** hosted a workshop for the FSD Network entitled Location Matters: GIS in Financial Inclusion on 22 and 23 July 2015. This two day workshop in Johannesburg, South Africa, focused on how Financial Sector Deepening Trusts (FSDs) and their partners can use geographic information systems (GIS) and geospatial data to better understand current challenges in financial inclusion. The workshop brought together a number of participants and presenters from the private sector (financial institutions), international bodies such as the World Bank Group (WBG) and the United Nations Capital Development Fund (UNCDF), development organizations, and FSDs from across Africa. This workshop also served as the initiation event for a new community of practice in financial inclusion data that promises to help build stronger data practices and greater cooperation in the future.

The following are the proceedings from the workshop:

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## Day 1: July 22, 2015

### Welcoming remarks

*Herman Smit, Cenfri*

Herman Smit, Technical Director at Cenfri, opened the workshop by introducing the new facility of FinMark Trust and Cenfri: insight2impact (i2i). Herman is the interim lead of i2i and introduced the different workstreams of the new facility and where the GIS workshop is located within them. Over the next five years, i2i will explore ways to advance the impact of data initiatives within financial inclusion. A key focal area will be the role of geographical information systems (GIS) data to make better decisions and advance financial inclusion.

Herman explained that the Financial Sector Deepening trusts (FSDs) and central banks are key stakeholders in using GIS data to advance financial inclusion and are well placed to support the wider adoption of GIS in their respective countries. The workshop set out to cover the different types of datasets used in GIS for financial inclusion and how these datasets are put together and analysed. Participants also shared case studies on how GIS can be successfully used in financial inclusion.

The workshop is the first of many engagements between i2i and FSDs to identify the GIS priorities in their countries. Herman explained that going forward i2i will facilitate dialogue between FSDs through a community of practice, where learnings in the use of GIS for financial inclusion can be shared among the FSD network and their partners.

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### **Session 1: Background of GIS, Financial Services for the Poor perspective – “Geospatial mapping”**

*Abed Mutemi, Bill & Melinda Gates Foundation (BMGF)*

Abed Mutemi provided background on the GIS mapping exercise of financial access points in six FSD countries in 2013. It was initiated under [FSP maps](#), which was created as a way to plan the expansion of digital finance via mobile money agents. The initial aim was to help identify where to recruit new mobile money agents by visually mapping where financial access points and populations of poor people were in relation to each other. However, financial service provider (FSP) maps and GIS are currently underused, undermining the important role of GIS in informing policy decisions. Going forward FSDs need to play an important role in finding other useful and available data and increasing the use of GIS among stakeholders, including central banks and FSPs.



**Keywords:** digital finance, proximity, access, distribution.

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### **Session 2: Visualising the GIS ecosystem – “GIS sustainability – what we think now”**

*Ahmed Dermish, Bankable Frontier Associates (BFA)*

Ahmed Dermish presented on how developing a GIS ecosystem can facilitate more sustainable collection of geographical information in the future. Within the ecosystem, Ahmed explained that there are discrete stages where sustainability needs to be considered. This includes collection, housing, internal analysis and public dissemination of data. Likely users were identified as FSPs, regulators and other interested



groups. As each user will have different data needs, the kind of information collected and housed would be different.

Before sustainable data collection is possible, each user needs to recognize the power that a bespoke aggregation of GIS data offers them. Users also need to be aware of the needs of other users and that all have a mutual interest in building and maintaining a shared ecosystem. In this vision of the future, steps could be taken to identify the data that needs to be collected and how to collect this data. Critical to sustainability is having an institution to coordinate this data collection and housing.

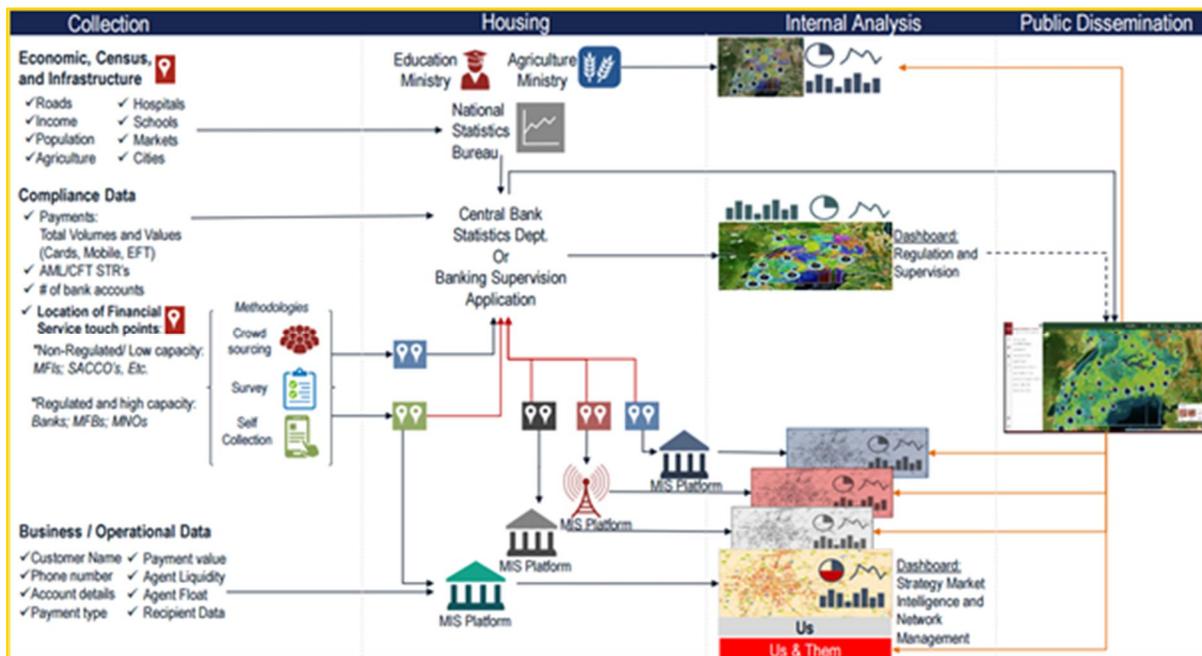


Figure 1: GIS ecosystem

Figure 1 above illustrates the interlinkages of the four stages of the ecosystem, the relationships between stakeholders and how they benefit from the system.

**Keywords:** sustainability, ecosystem, usage, compliance.

### Session 3: Private sector use cases of financial access maps

#### Case study 1: “Metropolitan Retail Geographic Reporting”

Gavin Aspeling, Metropolitan

Gavin Aspeling, from Metropolitan, a South African insurance provider, demonstrated how they use geospatial data to inform decisions for compliance and locating retail hubs. Metropolitan has mapped at least 50% of its customers and over 400 branches in 40 regions of service. This information enabled them to calculate penetration scores and to drill down on their customer locations.



Gavin presented on how Metropolitan undertakes analysis by emphasizing how geospatial data is used to calculate penetration scores. Equal-sized regular polygons of 40km in diameter were overlaid on a socio-economic map of the country, indicating where 80% of the adult population of the target market spends most of their time living and/or working.

As shown in **Figure 2**, the grids are used to map the locations of Metropolitan clients and potential clients in each grid/polygon. Using this scoring, Metropolitan found that they have 81% penetration in the country.

**Keywords:** scoring, customers, penetration.

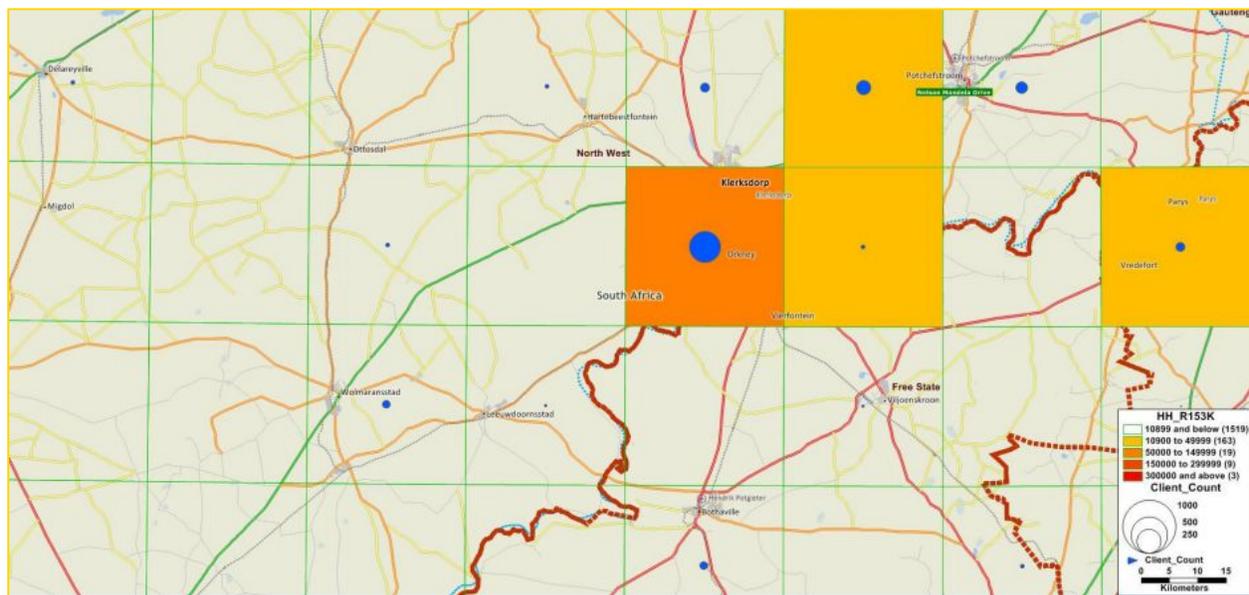


Figure 2: Location of actual and potential clients. The darker the colour of the block, the higher the concentration of people; the size of the circle reflects potential clients.

### Case study 2: “Use of geographical data within Nedbank”

Katy Bariamis, Nedbank

Katy Bariamis, a GIS specialist from Nedbank in South Africa, introduced GIS as much more than a point on a map. Potential uses of GIS include identifying branch locations, projecting sales per branch, understanding customer locations, determining customer to branch optimal routes and distance, to using it for staff impact analysis and staff resource allocation.

Katy mentioned that Nedbank’s GIS department has access to a significant amount of customer information within the business intelligence unit servicing various business departments, e.g. home loans and retail, and these datasets are used as an input for analysis. For example, Nedbank is interested in identifying customer catchment areas<sup>1</sup> and assessing if the conditions are what were initially thought, as shown in **Figure 3** below. Katy stated that in order to effectively communicate the benefits of the geospatial data, the GIS team needs to be positioned within the bank in a way that makes the most of its potential to influence business strategy.

<sup>1</sup> A catchment area is the area from which a city, service or institution attracts a population that use their services.

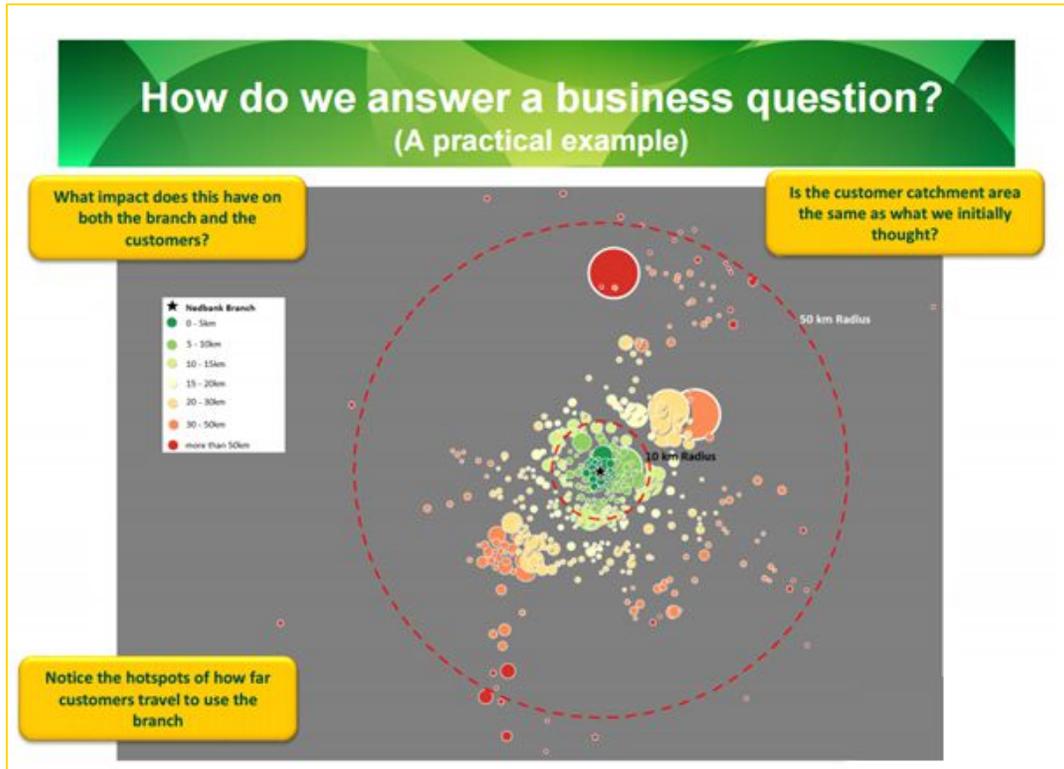


Figure 3: Identifying catchment areas

### Session Q&A

Participants noted that in other African markets the private sector is still trying to understand use cases for GIS data. Katy noted that more time is spent sourcing, cleaning and preparing the data than analysing it. For example, Nedbank GIS staff spend 70-80% of their time on data management (collecting, cleaning, re-formatting) because the data comes from different sources with different data types and formats.



Another question from the participants was on how to effectively communicate the return on investments to the private sector and potential users in order to encourage their investment in GIS data. Katy suggested that the solution lies in demonstrating the results of using the data i.e. what decisions were made with that data. The suggestion was for FSDs to try one use case and prove its business case, thereby building trust in the data.

**Keywords:** intelligence, strategy, collection, cleaning.



**Session 4: Public sector and FSD use cases of financial access maps – “Regulator and FSD use cases: Experience from Tanzania”**

*Irene Mlola, Financial Sector Deepening Trust, Tanzania*

Irene Mlola from Financial Sector Deepening Trust Tanzania (FSDT) introduced the activities of FSDT thus far and reported that FSDT has completed the second round of financial access point data collection and mapping. FSDT uses financial access maps to monitor national targets, such as the percentage of the population who live within 5 kilometres of a financial access point. Tanzania has seen significant growth in the non-banking sector, especially since the introduction of mobile money, which has been a critical driver in the growth of financial inclusion. GIS is critical in understanding the growth in infrastructure that underpins the rollout of mobile money services.

In Tanzania there are over 55 000 financial access points; 81% are mobile money agents, followed by third party providers and point of sale devices which collectively account for 12% of financial access points. Mapping financial access points allows users to view changes over time. This also enables measurement of improvements at a more granular level than at regional, state or district.

**Figure 4** Provides a snapshot of the granularity with which access to different types of points can be measured.

5km Access Areas		2012	2013
<b>Bank Branches, ATMs, Bank Agents</b>	%Population Served	10,981,535	11,795,843
	% of Population Served	24%	26%
<b>Bank Branches, ATMs, Bank Agents, MFIs, SACCOS</b>	Population Served	12,771,712	13,975,928
	% of Population Served	28%	30%
<b>POS (including 3rd Party Payment)</b>	Population Served		12,017,381
	% of Population Served		26%
<b>Mobile Money</b>	Population Served	15,458,222	20,649,397
	% of Population Served	35%	45%
<b>All (Excluding Mobile Money)</b>	Population Served	13,193,004	15,213,633
	% of Population Served	29%	33%
<b>All (Including Mobile Money)</b>	Population Served	15,706,061	20,912,663
	% of Population Served	35%	45%

**Figure 4:** Financial access points developments over time

Irene provided the example of the National Financial Inclusion Framework in Tanzania to illustrate the value of GIS. The National Financial Inclusion Framework has a target that at least 25% of Tanzanians should live within 5km of a financial access point. The results from the access map and FinScope 2013 reflected that 45% of Tanzanians lived within 5km of a financial access point. This result motivated the government to revise the target and set a new target of 65% by 2016.



## Session Q&A

Participants noted the high cost of access mapping exercises as a key challenge for its implementation. Finding sustainable ways to collect GIS data is thus a key focus going forward. Other key challenges identified are the limited pool of people that have the expertise to combine geospatial layers and analysis to make the data more meaningful. Driving adoption amongst stakeholders is expensive as it requires time and money.

FSDs are strategically positioned to help stakeholders understand the applications of geospatial data in the implementation of financial inclusion strategies. Ahmed from BFA said that the idea is to incentivise industry-wide usage by recognising the value of geospatial data and finding the right model to match the value; this will simultaneously address the issue of sustainability.

**Keywords:** proximity, target, expertise.

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## Session 5: Dissemination considerations – “Focused, strategic dissemination”

*Brian Loeb, Bankable Frontier Associates*

Brian Loeb of Bankable Frontier Associates led a session on dissemination strategies pointing out that each dissemination strategy has a goal to change behaviour. However, the execution of the strategy varies by scope, format and frequency. Brian urged that dissemination considerations are important to effectively reach the target audiences and subsequently change behaviour, thus geospatial data dissemination would be different to that of demand side surveys like FinScope.

Participants from FSDs in Tanzania (FSDT), Kenya (FSDK) and Zambia (FSDZ) indicated that different contexts inform what behaviour is trying to be changed. For example, in Kenya, FSDK is trying to incentivise banks and SACCOs<sup>2</sup> to reach out to low income groups and provide appropriate products at both low cost and good quality.

Brian continued the session to highlight the importance of strategic dissemination by comparing how FinScope is disseminated with FSP maps. This is illustrated in **Figure 5** below.

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<sup>2</sup> Savings and Credit Co-operative (SACCO)

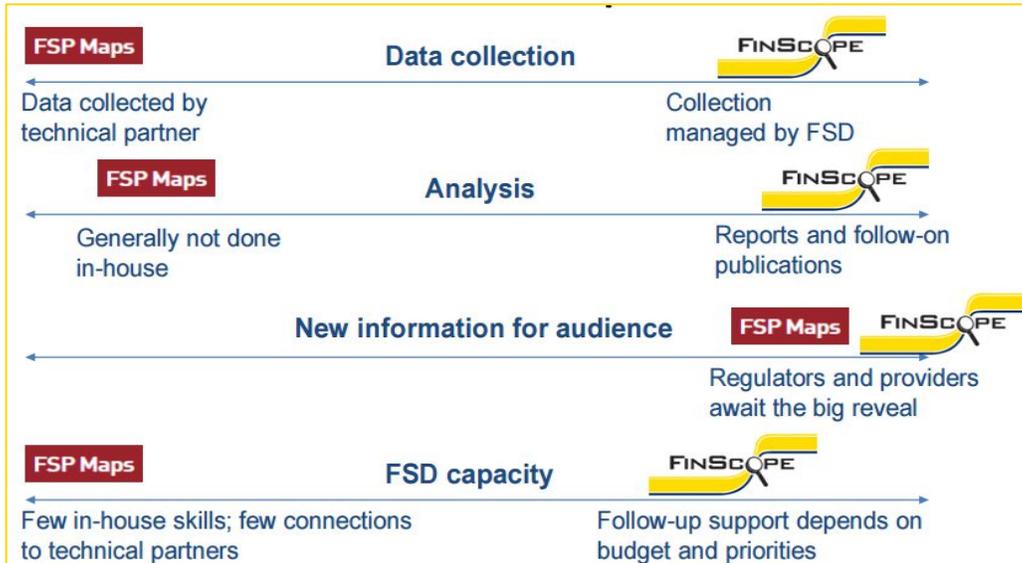


Figure 5: Comparison between FinScope and FSP maps

Brian concluded by saying that there is a need for FSDs and central banks to consider how to create a sustainable model to optimize dissemination. FSDs should not just release reports and hold workshops, they should also engage with regulators and financial providers to help them see the solutions suggested by the data.

**Keywords:** dissemination, FinScope, FSP maps, behaviour.

### Closing remarks: Day 1

Herman Smit ended the first day noting how the private sector and public sector use geospatial data. Ahmed Dermish gave the workshop participants questions as ‘homework’ to consider for the next day:

- What are the use cases for the private sector, public sector and FSDs?
- What is the value proposition for GIS?
- Where are the bottlenecks for the value proposition of GIS to be recognized?
- Can participants influence these bottlenecks in their local contexts?



## Day 2: July 23, 2015

### Welcoming remarks

*Herman Smit, Cenfri*

Herman opened the second day of the workshop by emphasizing that by the end of the day each representative should be able to work on a GIS strategy for their respective country.

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### Session 6: GIS data collection, Financial access point mapping – “Geo-spatial mapping initiatives”

*Garth Lawless, Brand Fusion*

Garth Lawless explained Brand Fusion’s methodology for implementing geospatial data collection. Preparation for fieldwork is critical and involves an extensive training exercise especially on troubleshooting and route planning (for a marked route that enumerators<sup>3</sup> would follow). Enumerators are locally recruited as they have the best understanding of the local context and terrain.

Brand Fusion currently validates at least 20% of points captured. A further check on data validation (“a penetration test”) involves a second team walking the same route and re-interviewing the respondents to check if information is correct. Some data collection considerations that should be noted include: the data collection only reflects the status at that moment in time (as for points like mobile money agents, information may quickly become dated) and the need for ways to counteract fieldwork difficulties, such as the suspicion by mobile money agent of enumerators. Garth noted that a letter of authorisation from the specific operator and/or the central bank is needed to confirm the legitimacy of the fieldwork.

Garth noted network coverage as another consideration, however most applications allow for submissions to be captured even if there is no network. It will simply upload data once the device reaches an area with network coverage. On average GPS accuracy in rural areas is 10m to 15m, whereas in urban areas it is less than 10m.

In **Figure 6** a screenshot of FSP maps shows how capturing an individual physical point is translated into one of many within the universe of financial access points. A photo taken of this particular offsite ATM is also shown.

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<sup>3</sup> A person employed in taking a census of the action points

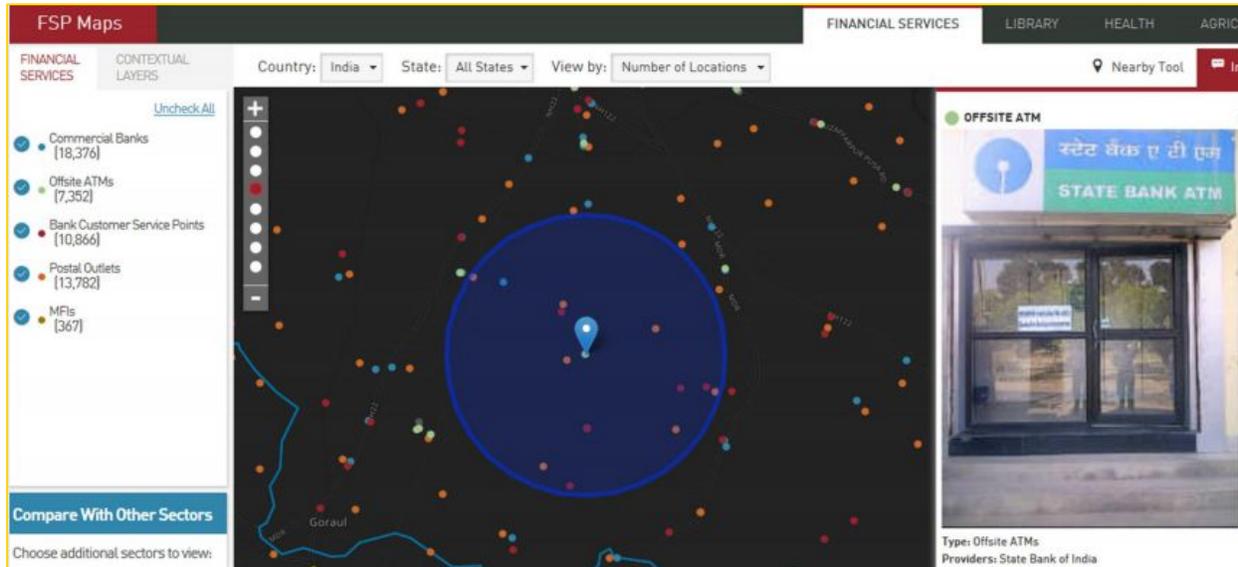


Figure 6: Screenshot of FSP maps portal

**Keywords:** validation, accuracy, authorisation, coverage, collection methods.

### Session 7: GIS data collection, Financial access point mapping – “MIX – our platforms”

Lara Storm, Microfinance Information Exchange (MIX)

Lara Storm provided a brief background on MIX’s origins and its current footprint in 20 countries. Lara introduced the supply- and demand-side sources they used to obtain geospatial data:

Demand	Supply
Demand side depends on the type of country; availability of data (e.g. FinScope), the census, WorldPop, infrastructure, as well as the availability of mobile coverage and other sub-national surveys	Supply-side includes central banks, regulators, company websites, network member associates and FSP maps

MIX is compiling a “[state of the data report](#)” for all the countries they have mapped. The main data quality problems identified include: lack of standardisation, availability and timeliness; inconsistency between providers and over time. It is also problematic when some of the data cannot be geocoded. Lara elaborated that the data scorecard was used as a criterion to evaluate the input data for MIX platforms. **Figure 7** shows an example of the data quality matrix as it was compiled for Malawi. Lara shared insights from the supply side data assessment project that MIX is currently working on in Rwanda with the National Bank of Rwanda. The project seeks to realign financial inclusion indicators, improve the quality and consistency of data and reduce the overall reporting burden. MIX is also working on a four year, four country project with UNCDF Mobile Money for the Poor (MM4P) to build systems to regularly track the geolocation of financial access points (FAPs). MIX is currently identifying sustainable data gathering models.



Data Source	Market Coverage	Timeliness	Geographic Precision	Geocoding Accuracy	# Access Points
COMMERCIAL BANKS	★★★★	★★★☆☆	★★★☆☆	★★★★☆	210
SACCOs	★★★★	★★★☆☆	★★★☆☆	★★★★☆	55
SACCOs MUSCCO	★★★★	★★★☆☆	★★★☆☆	★★★★☆	26
MFIs	★★★★	★★★☆☆	★★★☆☆	★★★★☆	155
CENSUS DATA	★★★★	★★★☆☆	★★★☆☆	★★★★☆	N/A

Figure 7: Example data quality matrix for Malawi

### Session Q&A

Lara emphasized that one of the challenges in the data collection is the discrepancy between what is known and what is collected. For example missing mobile money agents. Garth Lawless suggested overcoming this challenge by applying the penetration test. The penetration test is when a second round of enumerators walk the same route and re-interview respondents to validate the data and also identify and/or address missing data points. Another approach is to cross-reference data collected with numbers sourced from the providers to identify any discrepancies. For example if one area is supposed to have 1000 touch points and only 600 are found, then another team is sent to investigate. Gareth shared that at Brand Fusion they hire local people who understand the context for fieldwork. They are entrenched in the area and can, for example, identify missing mobile money agents more easily than a non-local.

**Keywords:** self-reporting, missing data, restricted access, integrated, platforms.

### Session 8: GIS data collection, Overcoming limited data – [“How to overcome limited data”](#)

*Bob Currin & Craig Schwabe, AfricaScope*

Bob Currin and Craig Schwabe stated that AfricaScope seeks to improve the understanding of financial inclusion in urban and deep rural areas through the collection of robust data that policy makers can use. In environments with limited data, Bob argued that alternative data sources could be used to improve the data available for analysis. These include indicators such as employment and income, poverty, mobile coverage, financial literacy, disposable income, financial vulnerability, living standards and economic indicators such as GDP and GNI.

Craig explained that census data is core to making financial access mapping meaningful. Craig explained how AfricaScope helped digitise census data in Tanzania that was previously only available in hard copy to enable the data to be mapped spatially. This allowed for a greater integration across different data sources.

**Keywords:** census, limited data, income, economic indicators.



### Session 9: Understanding the geographic context of poor households – “Predicting poverty in relation to financial services access and uptake”

Tomas Bird, Southampton University – WorldPop Project, Flowminder.org

Tomas Bird shared that his interest in GIS is to map poverty, namely, to highlight geographic variations, understand determinants and select and design appropriate interventions. Tomas explained that poverty maps are used for monitoring change over time, targeting interventions or products, integrating other data sources and including future datasets. Tomas mentioned that better GIS layers can help build better predictive models. See [www.worldpop.org](http://www.worldpop.org) for more details on their specific predictive models.

Tomas shared how he extrapolated FinScope data which is representative at the district level down to 1km blocks by extrapolating characteristics from sampled enumerator areas (EAs) to those not sampled. By doing this he was able to replace the missing data where they were not sampled and predict various measures across the whole country. **Figure 8** below shows an example of this for predicting the Progress out of Poverty Index (PPI) scores for the country.

Following the extrapolation process, data validations and verifications are needed to understand the level of inaccuracy. There are statistical techniques that are used to check the generalisability of the data. For example, they check if: (i) there are sufficient enumerator areas to provide the required accuracy, and (ii) the number of respondents per enumerator area is adequate.

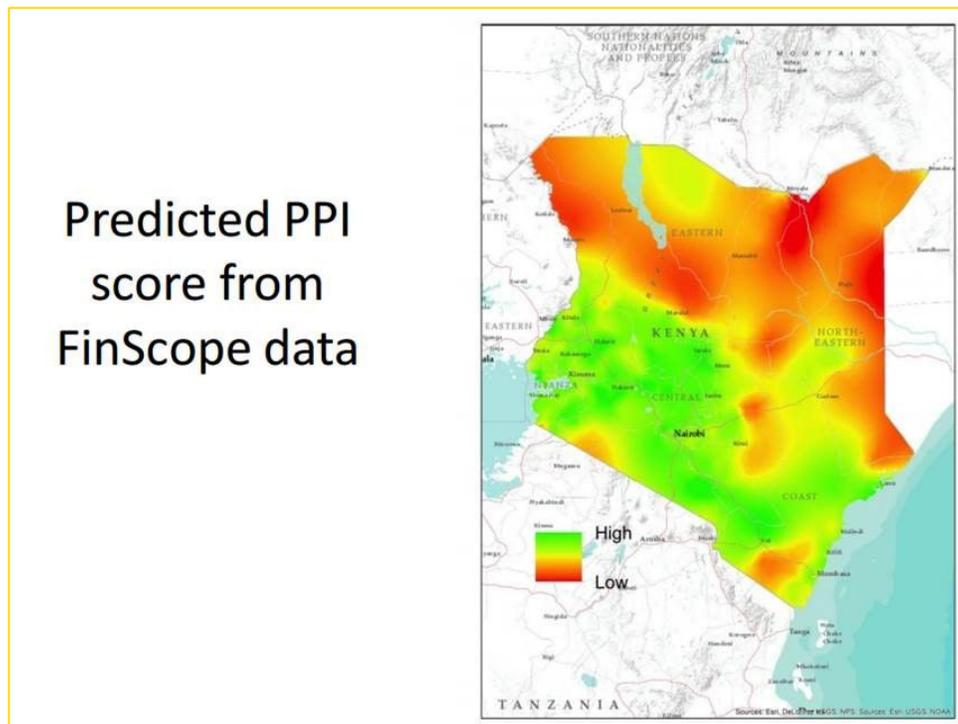


Figure 8: Example of using survey data (FinScope) to map poverty levels across a whole country

However, there are limitations to the model that need to be considered. For example, in cases where there is very high-income and very low-income households close to each other the model does not make a distinction between these two areas. This highlights the need to clarify the interpretation of the results



and models used. For example, predictions are based on averages and may not represent fine-scale variations.

Going forward, FSDs have a key role to drive in-country processes. Suggestions include that FSDs need to: (i) start lobbying with central statistics offices in order for accurate data to be collected, (ii) start involving the private sector, (iii) look at ways to make information available locally, in-country, and (iv) be the champion of GIS data use.

**Keywords:** poverty, extrapolation, estimates, sampled EAs.

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### Session 10: Mobile money: Decision-making case studies – “Tanzania’s use of spatial data to increase financial inclusion since 2012”

David Taylor, usableDATA

David Taylor noted that to drive active engagement with geospatial data, stakeholders need to recognise the value that it provides. This requires market facilitators to demonstrate the possibilities that data can reveal, as well as to capacitate stakeholders to engage with the data themselves and show how they can select and create tailored analytics for their unique needs. For example in Tanzania, the Bank of Tanzania and FSD Tanzania held workshops and presentations for financial sector stakeholders highlighting how spatial data can be used to increase financial access.

David helped develop [Financial Access Map Tanzania](#), an open, public website to show the value of insights that can be generated through using GIS data. David presented a test case on *why markets expansion does not always lead to financial benefits*. This case study focused in on a particular low income area in Tanzania. Within this area the location of mobile money agents was shown at various levels of daily transactions processed. By filtering on mobile money agents that report more than 25 transactions per day, David suggested that almost 50% of mobile money agents in this area are not breaking even. Mobile money agents typically continue operating despite not breaking even from their mobile money business because the initial upfront investment has been made and they only need to cover their operating costs. However there were some agents with over 50 deposits – and therefore profitable – just outside of this area. While it was unclear what was driving this phenomenon, it highlighted the value of GIS in identifying where phenomena’s like this occur.

In a second case study, David identified 11 agents within a 100m radius of an industrial area who have the highest transaction rates in the city (see **Figure 9** below). An MNO had developed an application to meet B2B transaction needs through digital financial services. However, the application was not being used. David suggested that this is because the agents were serving businesses and business owners around them who still prefer cash transactions. This highlighted the potential for GIS to identify existing systems that are already established that FSPs can leverage rather than developing their own.

These insights highlighted the value of identifying outliers for follow-up research. This was further evident in the third case study David shared on *the power of outliers, why we should love outliers instead of throwing them out*. In the study mobile money agents located up to 80 kilometres away from a bank were breaking even. This defied the general rule that agents need to be within 10km to 20km of a bank to enable the agent to keep a reasonable float on hand. In such instances it will be valuable for MNO’s to interview these special cases to learn from their success to see if there are lessons that can be transferred to other operators in similar circumstances.

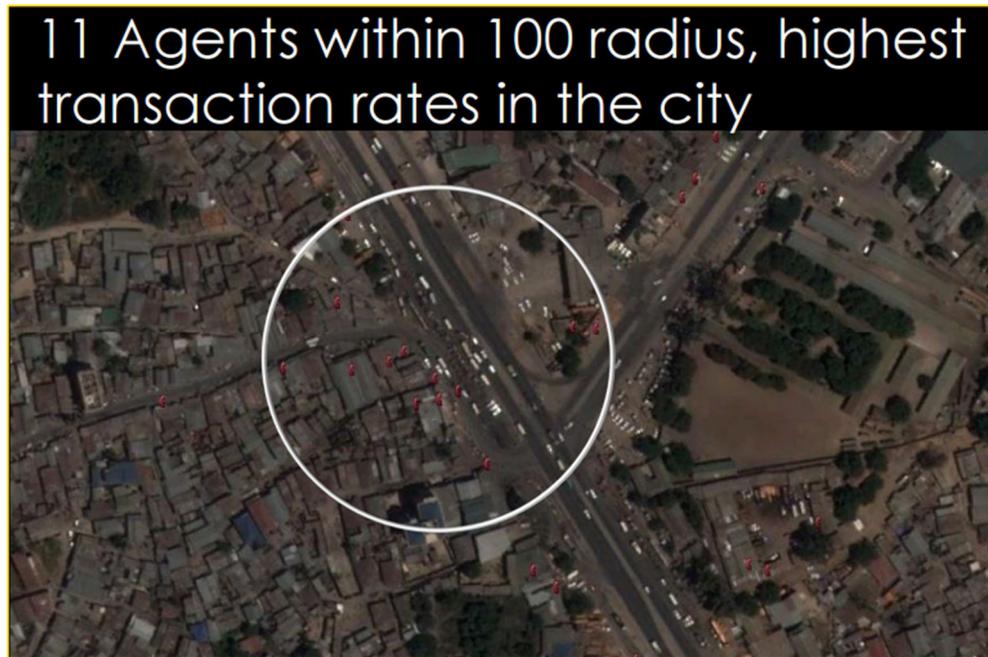


Figure 9: The agents with highest transactions rates. Transaction data provides another layer to view FAPs productivity and enable comparisons with respect to their locations

**Keywords:** outliers, opportunity costs, address.

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### Session 11: Working group sessions

Following the presentations the participants broke out into three facilitated working groups. The purpose of the breakout sessions were to assist FSDs and central banks in scoring the data sophistication of their respective countries. Data sophistication is defined as a combination of the amount of data available and its quality. The participants were then challenged to imagine an ideal future of data sophistication for their country within the next three to five years. Finally, they were tasked to identify the actions and changes that would be required to take them from their current level of sophistication to their ideal level.



**Keywords:** data quantity, data quality, data sophistication, future.

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## Workshop closing remarks: Day 2

*Herman Smit, Cenfri*

Herman closed the two-day workshop by introducing the next steps: i2i will establish a community of practice that will continuously seek to find innovative and sustainable ways of collecting, housing and disseminating GIS data. Going forward, FSDs need to identify what capacity they need to navigate the local stakeholder environment and how they can effectively demonstrate and document the value of GIS data for different stakeholders to encourage further adoption. Herman concluded by highlighting that the workshop created an opportunity for i2i to identify common challenges in rolling out GIS surveys and identify needs for each FSD and central bank partners in order to accurately support their data interventions over the next five years.

For more information and links to the presentations see:

- <http://www.finmark.org.za/publication/location-matters-gis-in-financial-inclusion>
- <http://cenfri.org/events/location-matters-gis-in-financial-inclusion>



## Get involved, contact us

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