Can voice corridors be used to predict MM corridors?

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Executive Summary

- This deck is part of a series exploring the use of data analytics to drive the take-up of mobile money (MM). Specifically, this paper focuses on **analyzing voice and MM data** to better understand the characteristics of MM **corridors**, and whether voice corridors are of use to MM providers.
- The approach involved analyzing a data set of billions of calls and MM transactions performed by over 10 million **MTN customers across Cote d'Ivoire, Rwanda and Zambia**.
- The top **voice corridors are mostly over short distances** (76% < 100km) whereas the top **MM corridors are mostly over longer distances** (67% > 100KM). MM providers looking to use voice corridors should therefore focus on calls at the national level (i.e. between cities/towns in different regions).
- **45% – 60% of the top national voice corridors are also top MM corridors.** The remaining top national voice corridors (those that are not currently top MM corridors) may represent an underpenetrated opportunity for providers (more research is required to test this).
- Overlap between voice and MM corridors is **higher in the lower activity rate country**. A potential explanation is that as MM gets more widely adopted, customers are more inclined to use MM to pay a broader range of people beyond their immediate friends and family, thereby decreasing the overlap with top voice corridors.
- Other noteworthy, albeit expected, findings include:
  i. The **importance of the economic capital** - over 95% of the top 200 net MM corridors involve money sent from the country's economic capital; and
  ii. Analyzing the net flow of funds between towns, and overlaying agent density data, highlights the relatively low number of agents per 1,000 MM users in secondary* areas with large cash deficits. MM providers can use this type of **analysis to identify weaknesses in the agent** network.

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* For the purposes of this paper all cities and towns outside of the economic capital are referred to as secondary.

This research analyzes voice and mobile money corridors* with the aim of providing actionable insights for mobile money providers

Objective and methodology

Objective

- This deck is part of a series exploring the use of data analytics to drive the take-up of mobile money (MM). A paper exploring the "Power of Social Networks to Drive Mobile Money Adoption" is available here.
- Specifically, this paper focuses on **analyzing voice and MM data to better understand the characteristics of MM corridors*** in order to drive the adoption of MM.
- The main research question is **whether voice corridors can be used to predict MM corridors**?
  - We also i) analyze how MM flows across geographies, ii) explore the implications of these flows on cash availability at the town-level, and iii) overlay the existing agent network to highlight discrepancies.

Methodology

- For this research, we analyzed 7 months of telecom and MM data from MTN in **Cote d'Ivoire, Rwanda and Zambia.**
- In order to perform the analysis we i) enriched each transaction with **geo-information** (sender and recipients' town); ii) **aggregated information** (such as amounts sent and received) **at the town-level** (which allowed us to estimate the level of cash at the town level)**; and iii) computed voice and MM **corridors**
  - **Local** corridors exist within a city, **regional** corridors link two cities in the same region, while **national** corridors link cities in different regions.

Note: All the data is **anonymized to ensure subscriber privacy**. Each transaction is tied to a unique identifier, independent from the phone number, that protects the end-users' identity.

* Corridors are defined as the path taken by a transaction (voice or MM) from its point of origin to its destination.
** This analysis focuses on P2P transfers. However given that over 90% of P2P transfers are currently cashed out in these markets, P2P flows provide a good estimation of cash levels at the town level. As electronic usage increases, the analysis on cash levels would need to be expanded to incorporate other types of electronic transactions (such as airtime purchases and bill payments) and electronic storage.

Outline of deck

1. Voice vs. MM corridors
2. The capital city
3. Cash imbalances
4. Summary and recommendations
5. Appendix

- Slide 5 – 8: highlight the overlap between national voice and MM corridors
- Slide 9 – 11: highlight the importance of national corridors, and the country's economic capital
- Slide 12 – 14: highlight the limited agent networks in certain towns and cities with severe cash deficits
- Slide 15 – 16: highlight the key findings from the analysis
- Slide 17 – 18: discusses border towns and the potential use of domestic MM systems to facilitate cross border payments

Main findings: Voice vs. MM corridors

1. Voice vs. MM corridors

2. The capital city

3. Cash imbalances

4. Summary and recommendations

- The top 200 voice and MM corridors have very little overlap as the top voice corridors are mostly over **short distances** (76% < 100km) whereas the top MM corridors are mostly over **longer distances** (67% > 100KM).
- However, restricting the analysis to **national** voice corridors reveals a strong overlap with MM corridors.
- Across the 3 countries, between 45% and 60% of the top 200 **national** voice corridors are also top MM corridors.
- Overlap between voice and MM corridors is **higher in the lower activity rate country**, presumably because customers only use MM for payments beyond close friends and family once MM gets more widely adopted (thus decreasing the overlap with calls).
- The remaining top national voice corridors could represent an underpenetrated opportunity for providers, however this would need to be tested.

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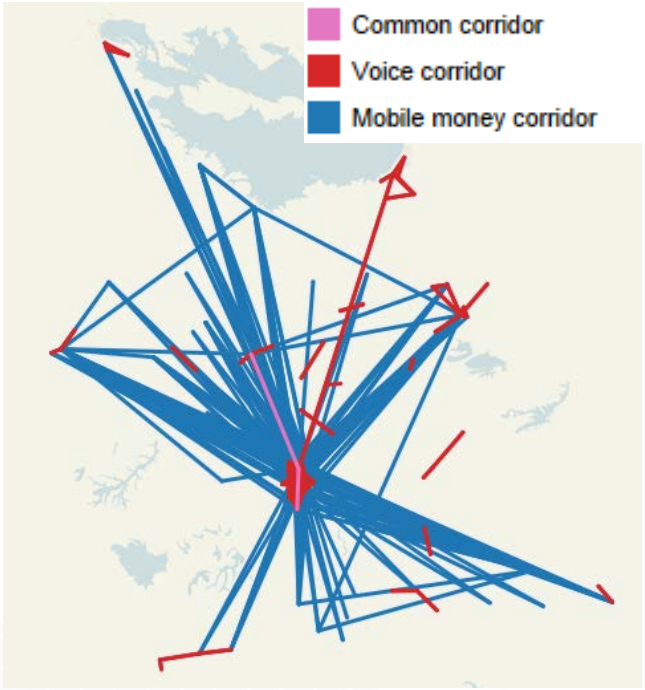
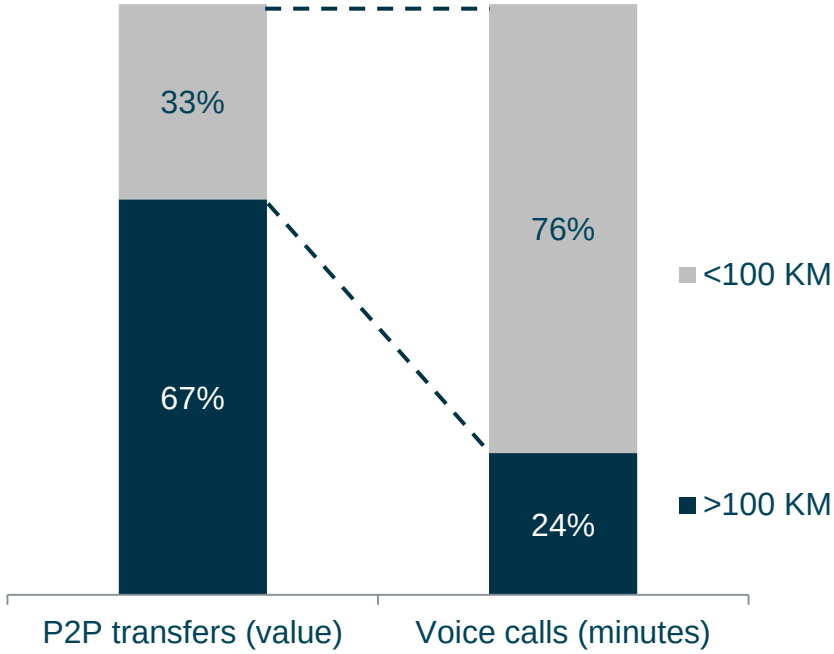
The top voice and MM corridors have very little overlap as the top voice corridors are local whereas the top MM corridors are national

Top 200 voice and MM corridors, over 7 months — country with high activity rate (LHS)

There is very little overlap between the top voice and MM corridors



Voice calls are mostly short-distance while MM transactions are mostly long-distance*



- Without applying filters, the top voice and MM corridors (based on the number of transactions or calls made between two areas) have very little overlap (purple lines). The top voice corridors (red lines) are mostly local while the top MM corridors (blue lines) are national.
- Comparing distances of all voice and MM transactions across all 3 countries confirms this. Calls are mostly over short distances (76% < 100km), while P2P transfers are mostly over long distances (67% > 100km).
- This pattern holds across all 3 countries.

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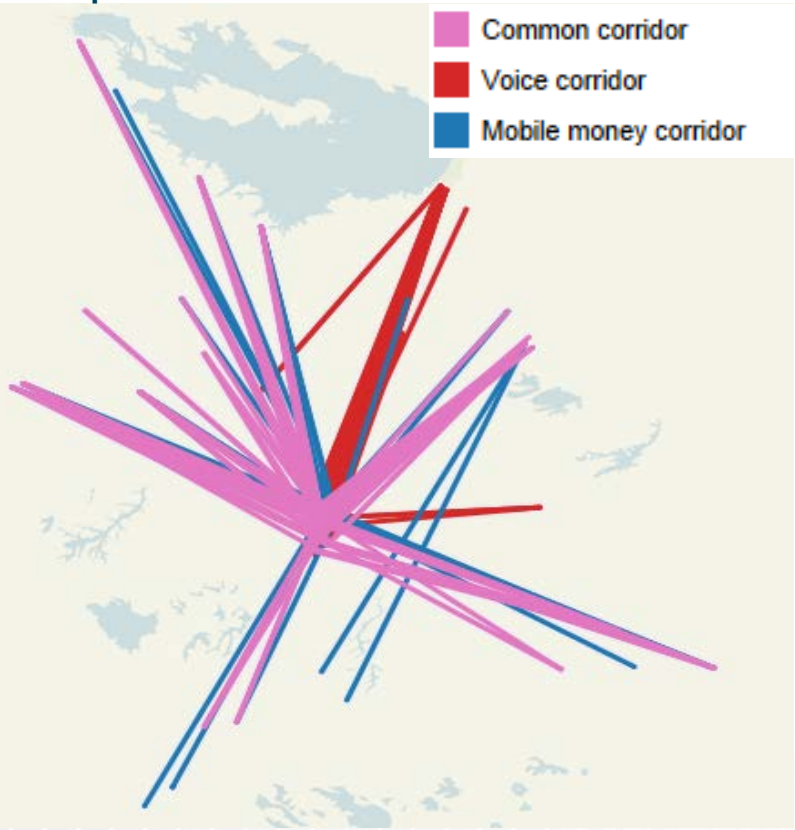
* Voice and MM transactions across all 3 countries.

However, **national** voice and MM corridors strongly overlap

Top 200 national voice and MM corridors (i.e. inter-region transactions), over 7 months

Restricting the analysis to the top national voice corridors results in significant levels of overlap with the top MM corridors



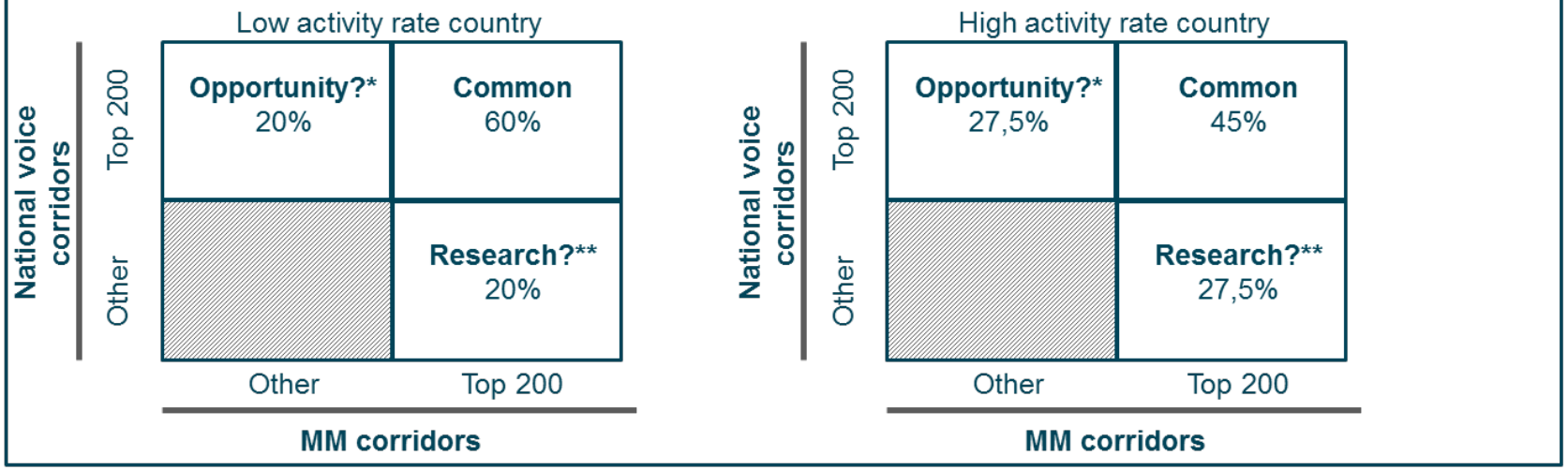
High activity rate country (>25%)

- Comparing the top national voice corridors (i.e. calls between cities in different regions) with the top MM corridors, results in a completely different conclusion.
- As can be seen in this high activity rate country, there is significant overlap between national voice corridors and MM corridors (purple lines).
- This result holds for all three countries. In fact there is even more overlap in the low activity rate country.

The top 200 national voice corridors can help predict over half of the top MM corridors, and identify potentially underpenetrated corridors

Distribution of the top 200 corridors

The corridor analysis identifies 3 segments: common top corridors, top voice but not MM corridors (signaling a potential opportunity) and top MM but not voice corridors (signaling potentially interesting insights for providers)



- 45% – 60% of the top national voice corridors and top MM corridors overlap. Half of the remaining corridors are voice specific and could potentially highlight opportunities for MM expansion (i.e. **underpenetrated corridors**). The other half are MM specific, and may require **additional market research** to better understand (e.g. see appendix which highlights potential use of border cities as an informal alternative for cross border payments).
- This confirms that voice corridors can be used to predict the top MM corridors (as part of a broader strategy). This is particularly useful for MNOs launching MM services, and those existing providers looking to focus investment (agent roll-out, marketing and education campaigns) on high potential areas.***
- Interestingly, the low activity rate country experienced 60% overlap compared to 45% in the high activity rate country. A potential explanation is that transfers are initially in line with dominant call patterns (i.e. close friends and family) but over time diverge to broader use cases thus decreasing the overlap with call patterns.

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* Top national voice corridor but not currently a top MM corridor. ** Top MM corridor but not a top voice corridor – potentially revealing an interesting use case for MM. *** The importance of this finding depends in part on whether the remaining top voice corridors are underpenetrated opportunities or not – which requires further testing.

Main findings: The capital city

1. Voice vs. MM corridors

2. The capital city

3. Cash imbalances

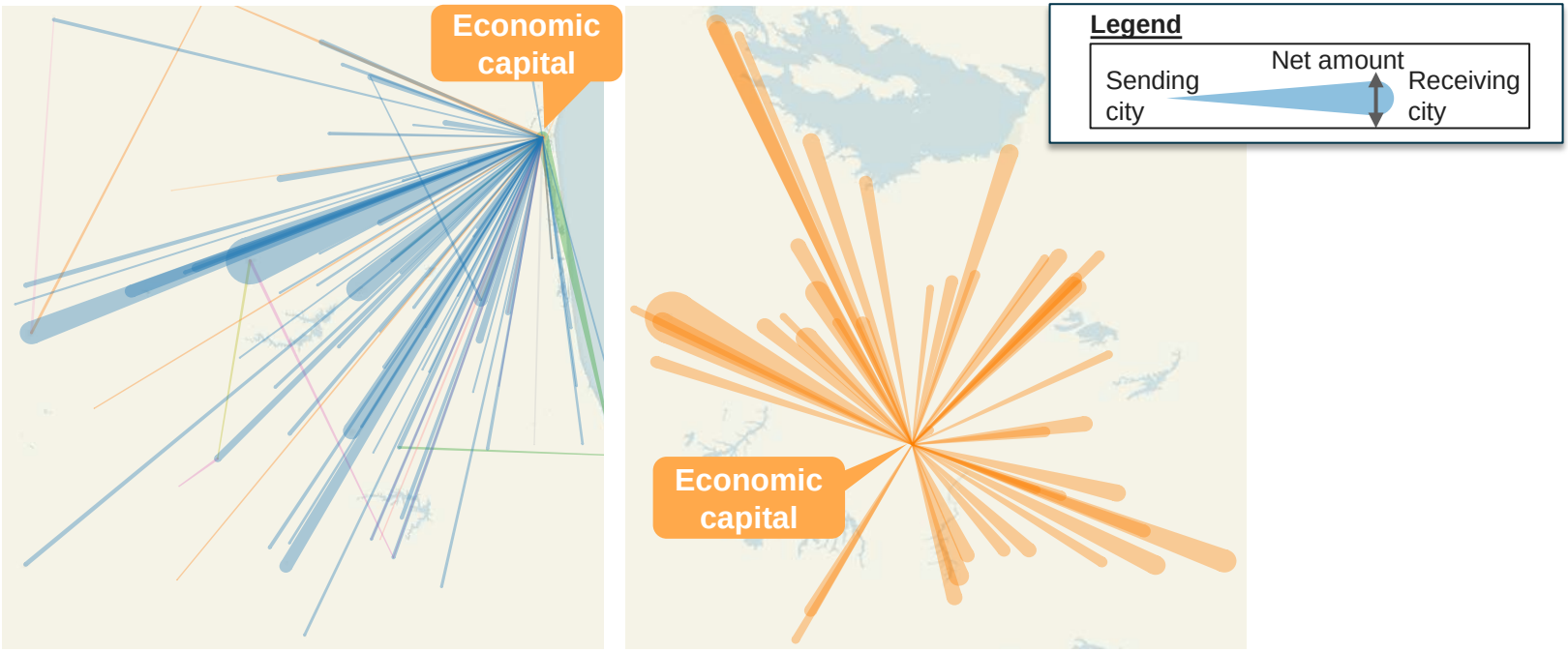
4. Summary and recommendations

- 60% - 80% of transfers are national, and flow predominantly from the economic capital (over 95% of the top 200 net MM corridors involve money sent from the country's economic capital).
- Top national voice corridors involving the economic capital can be used to identify target locations for MM agent roll-out, marketing and education campaigns.

The fact that money predominantly flows from the country's capital is not surprising, however the extent to which this occurs is remarkably high

Top 200 net MM corridors, over 4 months*

The country's economic capital is involved in the vast majority of the top net MM corridors



Low activity rate country (<5%)

High activity rate country (>25%)

- The charts illustrate the importance of the country's economic capital - over 95% of the top 200 net MM corridors involve money sent from the country's economic capital.
- Overall the economic capital is involved in approximately 50% of transactions by volume and value.
- While this pattern is expected, it is useful to understand the extent to which these flows dominate.

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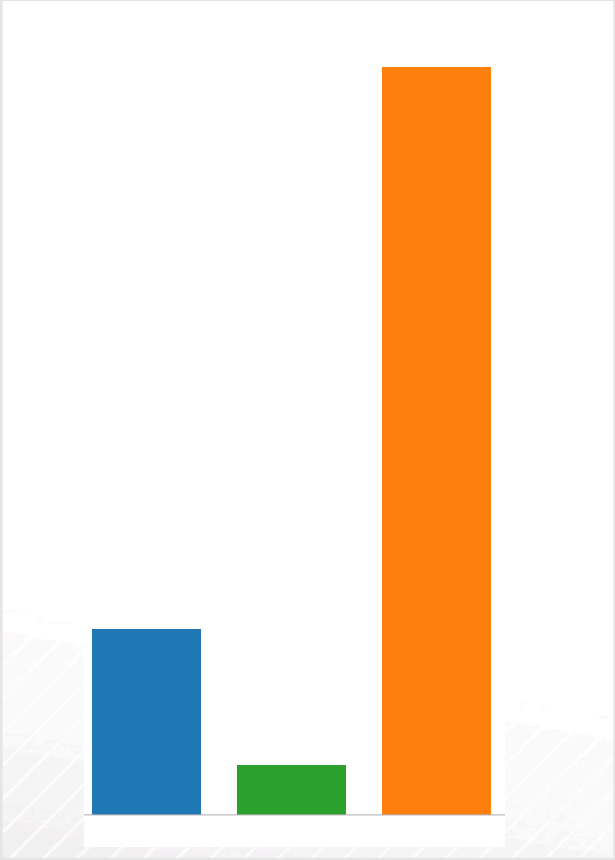
* Gross corridors are the actual amounts transferred between two points. Net corridors net the amount sent with the amount received to determine the net flow and direction between cities.

Based on these findings new providers should initially target national voice corridors emanating from the economic capital

*Share of total amount transferred via MM, over 4 months**

Large majority of transfers are national



High activity rate country (>25%)

- In all 3 countries, national transfers represent 60% - 80% of amounts transferred. Voice patterns are fundamentally different with only 10% – 25% of calls national.
- The dominance of national transfers demonstrates the attractiveness of the send money home offering in these markets.

Implications for providers

- Top national voice corridors involving the economic capital can be used to identify target locations for agent roll-out, marketing and education campaigns.
- For new providers, the dominance of national transfers suggests that the send money home proposition is a useful initial use case to test with customers in the product development phase**.
- Established MNOs with successful send money home type businesses could consider testing actions that stimulate local payments***. For example, testing a differentiated pricing strategy where local transfers are significantly cheaper. This could test whether people are price sensitive, without jeopardizing revenue from the national transfers.

* The findings are the same for the share of total transactions. ** Bearing in mind that it may not be the “killer app” in every market. See CGAP lessons from our Applied Product Innovation work, available at http://www.slideshare.net/CGAP/api-better-insights-for-better-products. *** That is, payments that are intra city, including but not limited to, face to face.

Main findings: Cash imbalances

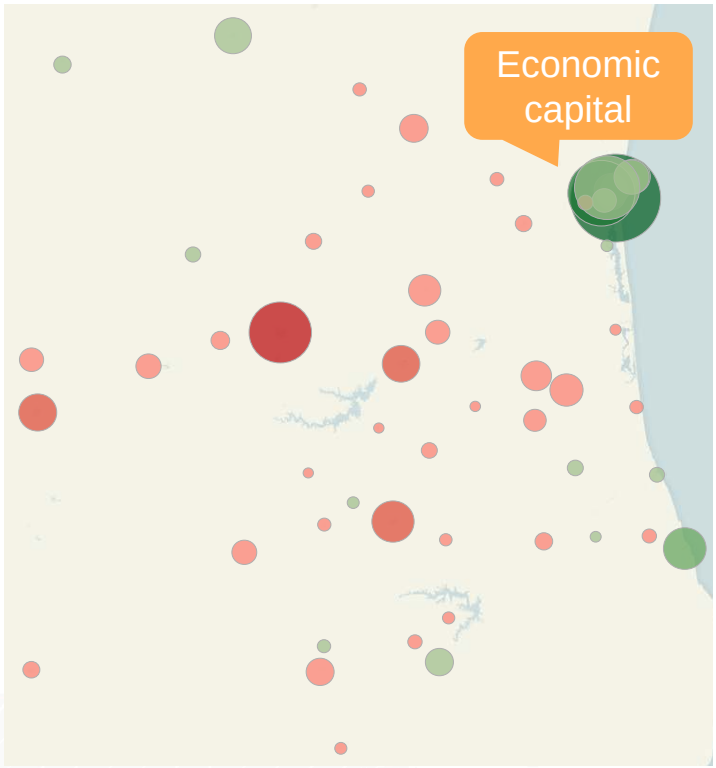
1. Voice vs. MM corridors
2. The capital city
3. **Cash imbalances**
4. Summary and recommendations

- Existing MM providers can analyze the net flow of funds at the town-level to identify towns with significant cash imbalances.
- Outside of the economic capital, 75% of cities and towns are net receivers of electronic funds which mostly get cashed out. These areas, therefore, often experience a shortage of physical cash.
- By overlaying agent coverage to net receiving cities and towns, we observe that a number of the areas in most need of cash often have less agents per 1,000 MM users.

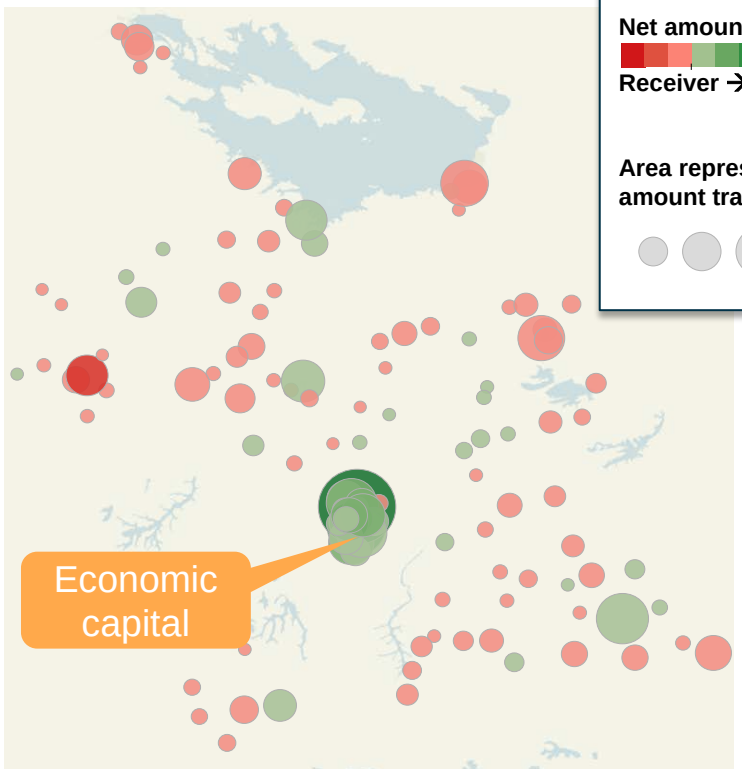
Outside of the capital, the majority of cities and towns are net receivers of electronic value, which mostly gets cashed out, resulting in cash shortages

Cumulated MM balance per town, over 4 months

Outside of the economic capital, most areas are net receivers of transfers



Low activity rate country (<5%)



High activity rate country (>25%)

- By aggregating all the transactions in a city, we can determine whether it is a net sender (green) or net receiver (red). The economic capital is the most important net sender while more than 75% of the remaining cities and towns are net receivers.
- As these secondary* areas are constantly receiving cash, and as more than 90% of transfers are currently cashed out, it is no surprise that agents in these areas often experience cash shortages.

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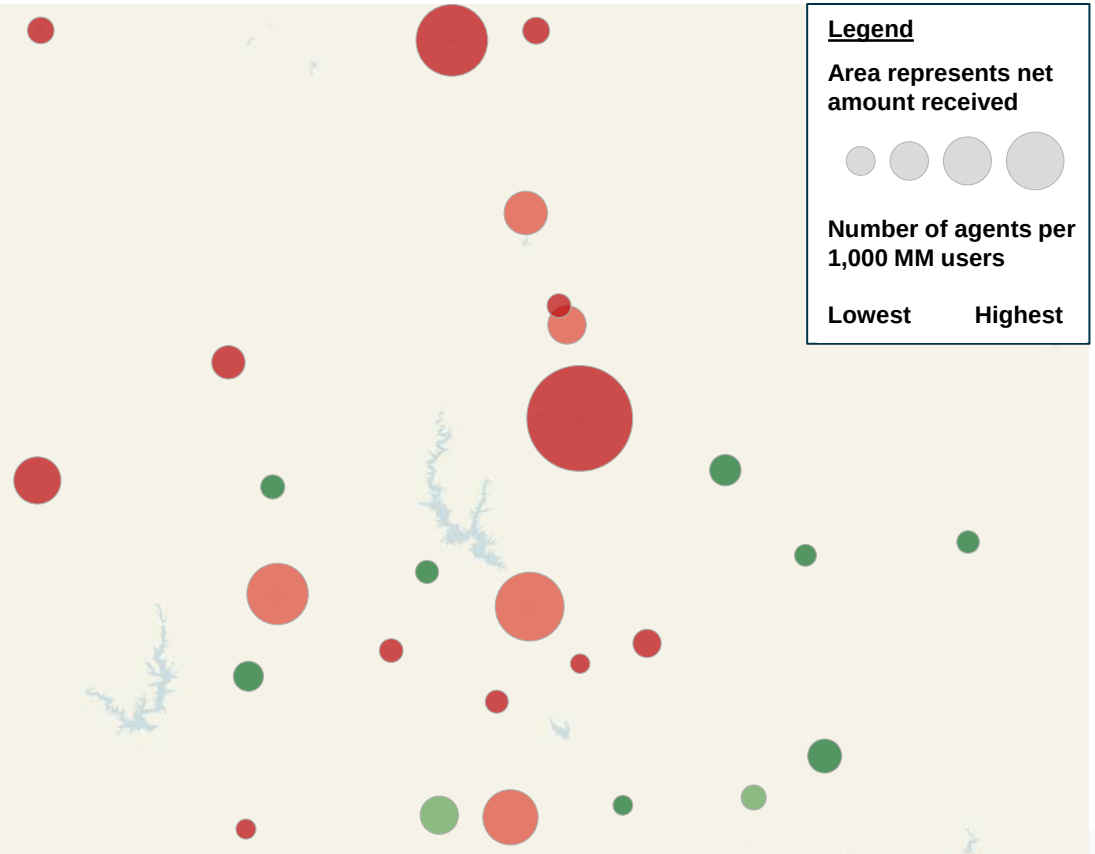
* For the purposes of this paper all cities and towns outside of the economic capital are referred to as secondary.

Overlaying agent density reveals that many of the areas in most need of cash have the lowest agent coverage

Cumulated net transfers per town, over 4 months, net receiving cities only

The number of agents per 1,000 MM users are lowest in the net receiving cities that are in most need of cash out infrastructure



High activity rate country (>25%)

- By overlaying agent coverage on the net amount received in net receiving cities, we observe that cities in most need of cash availability (biggest bubbles), often have less agents per 1,000 MM users (dark red colored bubbles).
- Addressing these imbalances by expanding the agent network in these areas (together with providing appropriate agent cash management services) could help improve the customer value proposition and prevent customer frustrations.
- Providers can also consider tailoring marketing messages to take these cash management challenges into account. For example, marketing for these cash deficit areas might evolve over time to focus on safe storage of funds, and direct electronic use (such as airtime purchases, and bill and merchant payments).

Main findings: Summary and recommendations

1. Voice vs. MM corridors
2. The capital city
3. Cash imbalances
4. **Summary and recommendations**

- Exploring the overlap of voice and MM corridors, as well as the net flow of funds between towns (overlaid on agent density data), can reveal actionable insights for providers.
- Most notably, the top national voice corridors can be used to identify high potential MM corridors.

Summary and conclusion

1. Analyze and act

- In line with CGAP's earlier work using data analytics, we encourage providers to analyze their own data to improve the success of MM deployments. Specifically, we propose exploring the overlap of voice and MM corridors, as well as the net flow of funds between towns (overlaid on agent density data).
- While these findings hold across the three African countries analyzed, local conditions should be taken into consideration as differences between countries and regions are likely to emerge.

2. Learning from voice corridors

- For new MM providers, and those with limited penetration, it is worth focusing agent roll out, marketing and education campaigns on the top national voice corridors emanating from the economic capital. This is particularly true in markets where customer research suggests demand for the send money home proposition.
- For providers with higher MM penetration, analyzing the overlap between voice and MM corridors can be useful to identify potentially underpenetrated MM corridors requiring additional investment. It is also useful for identifying "over penetrated" corridors which could reveal interesting customer insights (see appendix).

3. Cash imbalances

- Furthermore, the analysis highlights relatively low numbers of agents per 1,000 MM users in secondary areas with large cash deficits. MM providers can use this type of analysis to identify weaknesses in the agent network, and improve agent coverage on an ongoing basis (including by providing enhanced cash management services to agents and, wherever possible, targeting cash rich agents in these areas).

Appendix

Border points face higher transaction volumes than expected, presumably due to cross border payments. These corridors require further research

Identifying potentially "over penetrated" areas

A number of border cities experience more MM activity than expected

- The analysis identified medium-sized cities with more MM activity per person than expected.
- Additional research revealed that these cities are located along country borders or on the main roads to the border.
- Our hypothesis is that this pattern can largely be explained by cross border payments. That is, in the absence of a formal international MM transfer service between neighboring countries, people cross the border to send and receive MM.
- Local market research is required to confirm this insight, better understand the specifics of how this works*, and explore the extent to which there is a business opportunity for providers.

* A 2012 FinMark Trust report on "The South Africa – SADC remittance channel" noted a number of focus group references to the use of the retailer Shoprite's domestic money transfer service for cross border transfers. The paper, prepared by DNA Economics, suggests that family members are asked to cross the border to collect the cash.

This work was completed for CGAP by Real Impact Analytics.

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Advancing financial inclusion to improve the lives of the poor