The Mobile Money Prevalence Index (MMPI)

A Country-Level Indicator for Assessing the Adoption, Activity and Accessibility of Mobile Money

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GSMA Mobile Money Research Working Paper[1]
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Abstract

This paper presents a new index for the global mobile money industry – the Mobile Money Prevalence Index (MMPI). It is the first time a global index has been created with the purpose of measuring the prevalence of mobile money at country level. The MMPI considers a set of mobile money metrics in order to facilitate comparisons between markets, thereby enabling third parties to gauge whether engagement would lead to expected impact. The purpose of the index is to support decision making for public and private stakeholders alike.

Contents

1. INTRODUCTION

The use of mobile money differs significantly between regions, sub-regions and countries. Since 2011, the GSMA Mobile Money programme has collected and analysed data from mobile money services worldwide. Due to increasingly complex market dynamics and growing demand for country-level information, the GSMA has decided to develop this index in order to further inform the wider industry, academia and international organisations of the state of the mobile money industry.

1.1   Mobile Money Prevalence Index: Basic Overview

The Mobile Money Prevalence Index (MMPI) aims to measure the level of mobile-led financial inclusion at country level. It does this by measuring the prevalence of active mobile money accounts and the accessibility of mobile money agent networks. The MMPI does not take into consideration the number of mobile money providers in a market.

The MMPI is a composite index consisting of three main dimensions;
   a) **Adoption**: the number of mobile money account per adult, described as the adult penetration rate [APR];
   b) **Activity**: the share of registered accounts that are active on a 90-day basis, using the Activity Rate Index [ARI]; and
   c) **Accessibility**: the number of agents per 100,000 adults, using the Agent Distribution Index [ADI].

Together these components produce the MMPI. Structurally, the MMPI is modelled on the UNDP's Human Development Index.[3]

1.2   Demand for country-level data

Since the launch of mobile money in the 2000s, the GSMA has received hundreds of requests for country-level insights into the industry. These requests have come from multilateral institutions, national and regional central banks, academia, management consultants, fast-moving consumer goods (FMCG) enterprises, and from mobile money providers themselves, as well as, from other financial service providers.

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[3] UNDP, Human Development Index, 04/08/2021

1.3   Purpose

The purpose of the index is to provide a country-level metric to facilitate comparisons between markets, thereby enabling third parties to gauge whether engagement would lead to expected impact. In short, the index aims to support the decision making of public and private stakeholders alike.

The GSMA believes that mobile money ecosystem development is crucial in advancing and deepening financial inclusion. Ecosystem transactions include but are not limited to bill payments, bulk disbursements, international remittances, and merchant payments.[4,5] There are also key aspects of financial inclusion beyond payments, these include the ability to save money, access credit and manage financial risk.[6]

Despite the accomplishments of the mobile money industry in providing financial access to hundreds of millions of people over the last 15 years[7], the share of customers performing ecosystem transactions on a monthly basis still remains relatively low. In 2020 in Sub-Saharan Africa, on average, 19 per cent of all monthly active accounts made a bill payment and 13 per cent received a bulk disbursement. Meanwhile, just over 10 per cent of monthly active accounts made a merchant payment and one percent of accounts sent or received an international remittance.[8]

By publishing a metric at country-level the GSMA Mobile Money programme looks to encourage further ecosystem development. A multifaceted and extensive mobile money ecosystem will allow for providers to diversify revenues and so increase the sustainability of the industry. The aspect of service profitability has been and continues to be crucial in mobile-led financial inclusion work.[9]

Mobile money is also increasingly being used by national and international non-governmental organisations (NGOs) to distribute cash and voucher assistance (CVA). For example, in 2020, the World Food Programme (WFP) disbursed US$192 million in cash assistance via mobile money.[10]

In 2020, the WFP made use of cash transfers in 67 countries, with 25 of these leveraging mobile money. Additionally, UNHCR has set up digital payment programmes in 47

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[4] Definitions of these metrics can be found here: https://www.gsma.com/mobilemoneymetrics/
[5] Williamson, C., Vonthron, S., GSMA (2015). Understanding the potential of the mobile money ecosystem, 26/07/2021
[6] Naghavi, N. (2019). Embracing payments as a platform for the future of mobile money. GSMA. 26/07/2021
[7] GSMA, Mobile Money Metrics. https://www.gsma.com/mobilemoneymetrics/. 30/07/2021
[8] GSMA (2021). State of the Industry Report on Mobile Money. p18
[9] Awanis, A., Grasser, M., Hernández, J., Ashirul, A., (2021). Profitability 2.0: Ecosystem-driven business modelling & the future of mobile money margins
[10] GSMA (2021). State of the Industry Report on Mobile Money

countries, a third of which are using some form of mobile money programme.[11] Enabling third parties, such as the WFP or UNHCR, to more easily identify whether the prevalence of mobile money in a country is a high or low may allow for more people to receive potentially life-saving payments more quickly. The GSMA hopes that having more country-level information in this field can also lead to resources to being allocated more efficiently.

For the private sector, having a uniform country-level metric such as the MMPI may allow for international companies to consider the leveraging of mobile money infrastructure, or 'rails', in new markets – and so, increase overall investment flows. These companies might be international money transfer organisations (MTOs), fintechs, digital service providers or even e-commerce platforms. Helping to provide more information about the state of mobile money in a particular country should make it easier for some countries to attract ecosystem-related foreign investment. As the industry continues to grow, new countries have and will come to be considered as having reached similar levels of mobile money prevalence as some of the early pioneers, such as Kenya and Tanzania. The MMPI will help to identify those new countries.

In summary, the purpose of the index is to allow for new stakeholders, across the board, to consider leveraging mobile money for the direct or indirect benefit of financially excluded people.

1.4   Definition of a mobile money provider

There are many different digital financial services that can be accessed via a mobile phone. For the GSMA Mobile Money Programme to count a mobile money service, it needs to meet the following criteria as described in the GSMA Mobile Money Deployment Tracker[12]:

- A mobile money service should allow sending and receiving payments using a mobile phone interface

- The service must be available to the unbanked, for example, people who do not have access to a formal account at a financial institution

- The service must offer a network of physical transactional points which can include agents, outside of bank branches and ATMs, that make the service widely accessible

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[11] UNHCR (2021). UNHCR and Cash Assistance: 2020 Annual Report. 26/07/2021
[12] GSMA Mobile Money Metrics, Deployment tracker. https://www.gsma.com/mobilemoneymetrics/#deployment-tracker. 22/07/2021

to everyone. The agent network must be significantly larger than the service's formal 'brick and mortar' outlets.

- Mobile banking or payment services (such as Apple Pay and Google Pay) that offer the mobile phone as just another channel to access a traditional banking product(s) are not included in the GSMA definition.

2. UNDERLYING DATA

The MMPI is based on primary and secondary data collected since 2011 in order to inform the annual writing of the GSMA Mobile Money Programme's State of the Industry report. The data is also used to provide mobile money providers with regional and global averages for a multitude of key performance indicators (KPIs), allowing them to benchmark their own performance against that of the wider industry.

2.1 Primary research

2.1.1 The GSMA Global Adoption Survey on Mobile Money

The GSMA Global Adoption Survey on Mobile Money is an annual survey designed to capture quantitative information about the performance of mobile financial services around the world. The GSMA Mobile Money programme tracks live mobile money deployments globally and on a monthly basis. (See criteria in section 1.3)

Once a year these mobile money deployments are invited to participate in the annual survey. Respondent supply standardised operational metrics about their services for the months of September, December, March, and June on a confidential basis.

In 2020, 116 services participated.[13] These services accounted for 68 per cent of all mobile money value transacted globally.

2.1.2 The GSMA Consumer Survey

This survey is being carried out amongst the general population and is looking to understand consumers' relationships with mobile phones and other devices. A key objective is to understand how many devices consumers use and the extent to which they conduct specific activities on those devices.

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[13] GSMA (2021). State of the Industry Report on Mobile Money

The research is also used to estimate the number of adults that do not have access to a mobile phone or handset and what is stopping them from gaining access. The GSMA aims to develop innovative methods of using mobile technology to positively impact lives, so understanding the views of this currently 'unconnected' group is of particular importance.

2.2 GSMA Mobile Money Estimates & Forecasts[14]

The GSMA Mobile Money programme uses a proprietary modelling approach to estimate mobile money indicators at a global, regional and national level.[15] This allows the GSMA to fill gaps in participation in the annual Global Adoption Survey and generate aggregate numbers primarily used in the State of the Industry reports. The estimating and forecasting methodology was developed in partnership with the GSMA Intelligence[16] team, combining both GSMA Intelligence's analytical and telecoms expertise as well as the Mobile Money Programme's industry knowledge.

The core mobile money dataset covers 23 metrics across three main categories for all providers that offer or have offered mobile money services. The categories within the dataset are as follows:

- Mobile money accounts (registered accounts, active 90 days, active 30 days)
- Mobile money agents (registered agents, active agents), and;
- Mobile money transactions (volume and value of mobile money transactions processed via the following products: airtime top-ups, bill payments, bulk disbursements, cash-ins, cash-outs, international remittances, merchant payments and on-net, as well as, interoperable[17] person-to-person [P2P] transfers).

Due to potential commercial sensitivities around country-level transactional data, this data category is not used in the composition of the MMPI.

The estimating and forecasting methodology combines multiple approaches to market sizing, following the below five main steps:

I. Consolidation of primary and secondary research

This step involves creating a pool of industry data at country level from publicly available data, such as service provider and regulator reports. This is done in order

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[14] Ibid.
[15] GSMA (2018). Introducing new mobile money estimates to capture the rapid transformation of the global industry. 02/08/2021
[16] https://www.gsmaintelligence.com/
[17] Account-to-account transactions between mobile money providers as well as bank-to-wallet and wallet-to-bank transactions

to complement the data collected via our primary research (Global Adoption Surveys and Consumer survey). Other industry sources include The World Bank's Global Findex dataset[18] and the International Monetary Fund's (IMF) Financial Access Survey[19] (FAS) dataset.

After reconciling this pool of data with in-house definitions, the GSMA has created a comprehensive historical dataset reflecting the growth of the mobile money industry.

II.   Country-clustering

Countries have been clustered based on fundamental conditions of mobile and banking adoption in each country, as well as criteria for mobile money success identified through a joint study with Harvard Business School.[20] The clusters were then further shaped by the Mobile Money Programme's market knowledge. As a result, countries have been divided into four distinct clusters, based on how compelling mobile money proposition is for that group of countries.

Figure 1

III.   Formulation of guiding principles

Based on the country-clustering above the GSMA has developed guiding principles with the purpose to determine how a given metric is expected to evolve under different conditions.
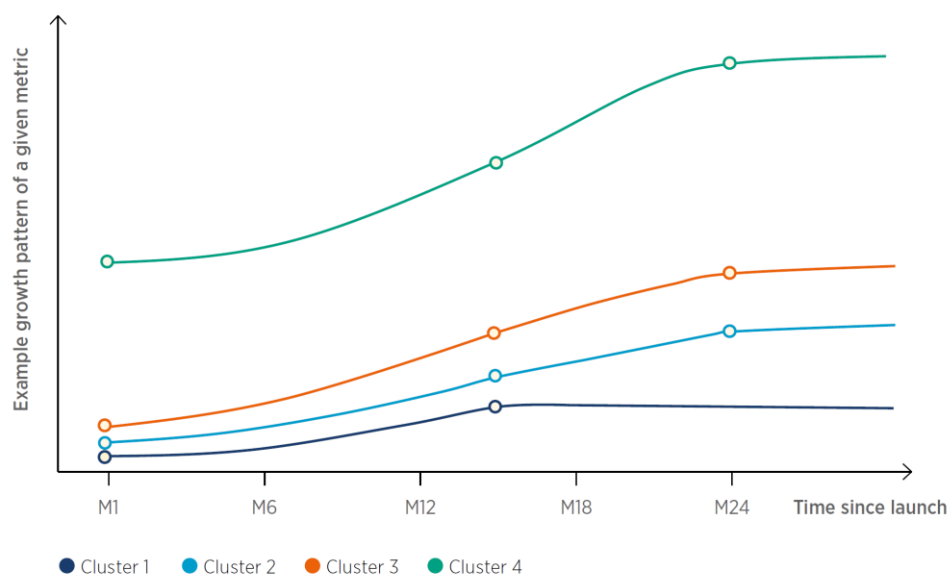
An example set of guiding principles for growth patterns of a given metric:

[18] World Bank. Global Findex database. 02/08/2021
[19] IMF. Financial Access Survey. 02/08/2021
[20] Naghavi, N., Shulist, J., Cole, S., Kendall, J. and Xiong, W. (2016). Success factors for mobile money services: A quantitative assessment of success factors. GSMA.

Figure 2

The guiding principles are informed by observational ("real world") data and have been developed separately for all core metrics (i.e. accounts, agents, cash-in, cash-out, airtime, P2P, international remittances, bulk disbursements, bill payments and merchant payments.)

IV.   Modelling

The fourth step is about producing the country estimates, which are built using a 'bottom- up' approach, i.e. starting at the service-level. Each country has a data model prepared using compiled industry data (from step 1 of the estimating and forecasting methodology) and for each service in the market (updated from the Mobile Money Deployment Tracker). Modelling assumptions to estimate missing historical data and to produce a forecast, are informed by the guiding principles, the latest secondary research and GSMA market knowledge.

V.   Validation

Once the modelling is complete, the output is review at service, country, regional and global level. At this step, any outliers are identified, to which further explanations are sought. This validation process often relies on close collaboration between GSMA Intelligence and Mobile Money Programme's market experts.

3. INDEX METHODOLOGY

The MMPI is based on the GSMA's country-level estimates informed by publicly available data from regulators as well as mobile money service-level data collected by the GSMA since 2011. As a composite index, the MMPI consists of three components; the Adult Penetration Rate; the Activity Rate Index and the Agent Distribution Index.

The MMPI uses the **geometric mean** in order to ensure that poor performance in one component cannot be compensated by movement in another component.

$$MMPI = \sqrt[3]{APR * ARI * ADI}$$

APR = Adult Penetration Rate
ARI = Activity Rate Index
ADI = Agent Distribution Index

The core component of the MMPI is the **Adult Penetration Rate [APR]**, which is calculated by dividing the number of active (90-day) mobile money accounts in a country or region by the number of adults in the same country or region.

$$APR = \frac{Active\ accounts}{Adult\ population}$$

The purpose of the MMPI is to gauge the prevalence of mobile money, using it as a proxy for the level of mobile-led financial inclusion in a country. As such, the index is meant for use in countries where there are *fewer* active mobile money accounts than adults.[21] For this reason the APR is a bound variable and capped at 1, as increases above full adult population penetration of active accounts are considered immaterial to the furthering of financial inclusion. This means that any country that has an APR above 1, should be considered as having an APR of 1.

The MMPI uses 90-day active accounts rather than monthly or 30-day active accounts. This is because the MMPI looks to establish what share of a population is reachable via mobile money. Therefore, the index does not attempt to segregate accounts with high frequency usage from those with lower frequency usage.

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[21] At the time of writing this applies to *all* mobile money markets globally.

The APR is complemented by two additional components:

The **Activity Rate Index [ARI];** which is calculated by dividing the natural logarithms of the number of active (90-day) accounts and the number of registered accounts.

$$ARI = \frac{LN\ (Active\ accounts)}{LN\ (Registered\ accounts)}$$

The **Agent Distribution Index [ADI];** which is calculated by dividing the natural logarithms of the number of active agents per 100,000 adults and the constant of 3000. The figure of 3000 has been chosen to indicate the upper limit of the number of agents per 100,000 adults. This figure relates to the conditions in countries with the most widespread agent networks. Should the market foundations shift significantly in future this figure may require adjustment.

$$ADI = \frac{LN\ (Active\ agents\ per\ 100,000\ adults)}{LN\ (3000)}$$

The MMPI uses the natural logarithms in order to reflect the relative diminishing meaningfulness of increases in the ARI and ADI indices as they get higher.

In the case of ARI, the use of natural logarithms is meant to increase the binarity in the component. The argument is that once services in a given country have significant shares of registered accounts being active on a 90-day basis, these services should simply be considered as 'active'. Increasing the share of active accounts as a proportion of registered accounts beyond this point therefore only increases ARI marginally.

In regard to the Agent Distribution Index [ADI], natural logarithms have been introduced in order to account for the inherit double counting of agents in markets with several mobile money providers. This is because the higher the number of providers there are in a market the likelier it is that one agent outlet offers the services of more than one provider. If the MMPI did not use natural logarithms for the ADI a market would more easily attain a higher score merely as a result of having a higher number of money providers. Therefore, the MMPI seeks to moderate the impact of competition and market structure as these are not indicative metrics for the prevalence of mobile money in a given market.

The examples on the next two pages aim to further clarify how the MMPI functions using publicly available data.

3.1   Example 1: Kenya

By end of year 2020, the adult population of Kenya was 33.2m[22], there were 66.0m[23] registered accounts of which 32.5m were active[24]. Lastly, there were 264 thousand active agents in the country[25]. Therefore:

$$APR = \frac{Active\ accounts}{Adult\ population} = \frac{32,500,000}{33,200,000} = \mathbf{0.98}$$

$$ARI = \frac{LN\ (Active\ accounts)}{LN\ (Registered\ accounts)} = \frac{LN\ (32,500,000)}{LN\ (66,000,000)} = \frac{17.29}{18.00} = \mathbf{0.96}$$

$$ADI = \frac{LN\ (Active\ agents\ per\ 100,000\ adults)}{LN\ (3000)} = \frac{LN\ (\frac{264,000}{33,200,000/100,000})}{LN\ (3000)} = \frac{LN\ (795)}{LN\ (3000)}$$

$$= \frac{6.7}{8} = \mathbf{0.83}$$

$$\mathbf{MMPI} = \sqrt[3]{\mathbf{APR * ARI * ADI}} = \sqrt[3]{\mathbf{0.98 * 0.96 * 0.83}} = \mathbf{0.92}$$

Therefore, Kenya's MMPI is 0.92.

3.2   Example 2: Ghana

By end of year 2020, the adult population of Ghana was 19.8m[26], there were 38.5m[27] registered accounts of which 17.1m were active[28]. Lastly, there were 328 thousand active agents in the country[29]. Therefore:

$$APR = \frac{Active\ accounts}{Adult\ population} = \frac{17,100,000}{19,800,000} = \mathbf{0.86}$$

[22] GSMA Intelligence, World Bank
[23] Central Bank of Kenya (2021). https://www.centralbank.go.ke/national-payments-system/mobile-payments/. 26/07/2021
[24] Communications Authority of Kenya (2021). Second quarter sector statistics report for the financial year 2020/2021. p10. 06/08/2021
[25] Ibid.
[26] GSMA Intelligence, World Bank
[27] Bank of Ghana (2021). Summary of Economic and Financial Data, March 2021. p11. https://www.bog.gov.gh/wp-content/uploads/2021/03/Summary-of-Economic-Financial-Data-March-2021.pdf
[28] Ibid.
[29] Ibid.

$$ARI = \frac{LN\ (Active\ accounts)}{LN\ (Registered\ accounts)} = \frac{LN\ (17,100,000)}{LN\ (38,500,000)} = \frac{16.65}{17.47} = \mathbf{0.95}$$

$$ADI = \frac{LN\ (Active\ agents\ per\ 100,000\ adults)}{LN\ (3000)} = \frac{LN\ (\frac{328,000}{19,800,000/100,000})}{LN\ (3000)} = \frac{LN\ (1657)}{LN\ (3000)}$$

$$= \frac{7.4}{8} = \mathbf{0.93}$$

$$MMPI = \sqrt[3]{APR * ARI * ADI} = \sqrt[3]{0.86 * 0.95 * 0.93} = \mathbf{0.91}$$

Therefore, Ghana's MMPI is 0.91.

As stated earlier, the examples above rely on publicly available data. However, as this data is currently rarely publicly available for other countries, the MMPI country rankings in this paper rely on index bands, or intervals, to avoid the disclosure of any GSMA country-level data for markets that only have one prominent service. If an exact index figure were published for such a country one could begin to solve for any of the variables within the equation. This could then potentially expose datapoints that the GSMA has collected from mobile money providers under non-disclosure agreements. Only publishing category bands means that any sensitive data collected directly by the GSMA remains protected.

The GSMA hopes that in future all the metrics used in the MMPI will be available from public sources, as this would allow for the index to become more of a public good.

4. MMPI VIZUALISATION AND DATA

The World map and country table[30] below presents the intervals within the Mobile Money Prevalence Index in 2020. Prevalence has been segregated into quintiles (very high, high, medium, low and very low) in order to simplify both categorisation and visualisation.

Figure 3: Mobile Money Prevalence Index 2020
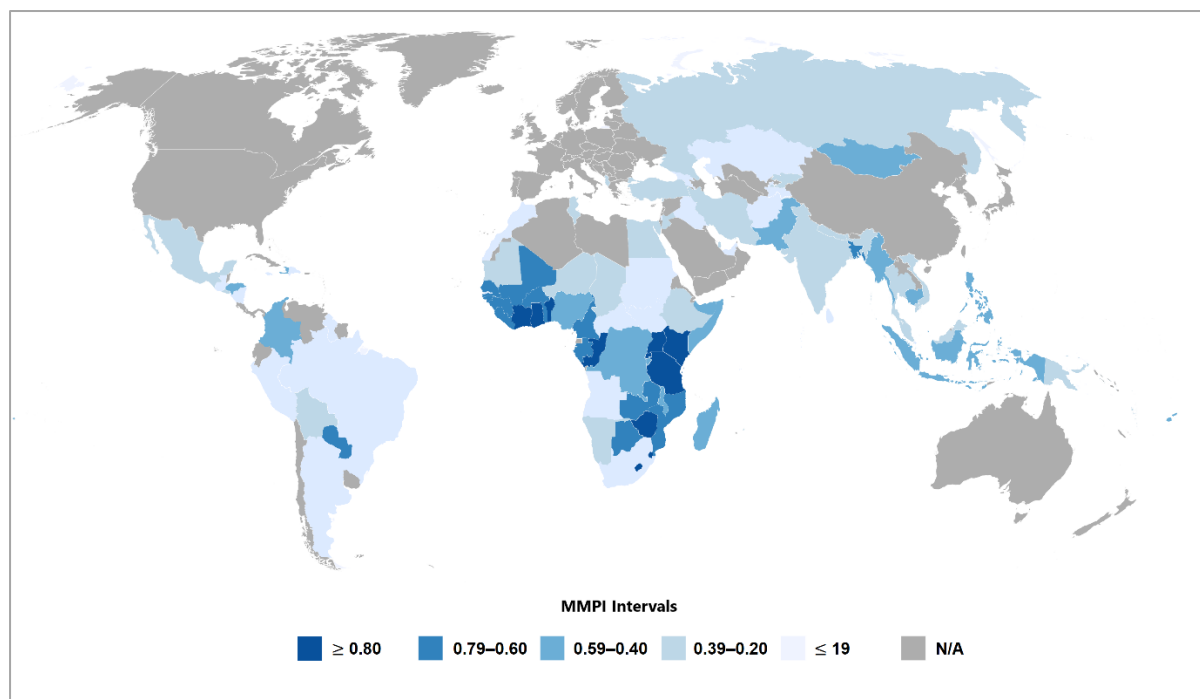
Very high	High	Medium	Low	Very low
≥ 0.80	0.79–0.60	0.59–0.40	0.39–0.20	≤ 19
Benin	Bangladesh	Somalia	Albania	Afghanistan
Congo	Botswana	Burundi	Bolivia	Angola
Côte d'Ivoire	Burkina Faso	Cambodia	Chad	Argentina
Eswatini	Cameroon	Colombia	Egypt	Armenia
Ghana	Gabon	DR Congo	El Salvador	Brazil
Kenya	Guinea	Fiji	Ethiopia	Central African Republic
Lesotho	Guinea-Bissau	Haiti	India	Dominican Republic
Rwanda	Liberia	Honduras	Iran	Gambia
Tanzania	Mali	Indonesia	Jordan	Georgia
Uganda	Mozambique	Madagascar	Kyrgyzstan	Guatemala
Zimbabwe	Paraguay	Malawi	Malaysia	Guyana
	Senegal	Mongolia	Maldives	Iraq
	Sierra Leone	Myanmar	Mauritania	Jamaica
	Togo	Nigeria	Mauritius	Kazakhstan
	Zambia	Pakistan	Mexico	Morocco
		Philippines	Namibia	Nicaragua
		Thailand	Nepal	Peru
		Tonga	Niger	Seychelles
			Papua New Guinea	Singapore
			Qatar	South Africa
			Russian Federation	South Sudan
			Samoa	Sri Lanka
			Tunisia	Sudan
			Turkey	Tajikistan
			Vanuatu	United Arab Emirates
			Vietnam	

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[30] Please note that each column is sorted alphabetically and not according to MMPI ranking.

5. LIMITATIONS AND RISKS

The MMPI measures the prevalence of mobile money with the aim to evaluate to what extent the existing mobile money 'rails' are prepared to be leveraged by third parties. As such, it does not attempt to take into consideration the frequency of transactions nor the type of transactions being performed in a given market. Therefore the MMPI is not suitable for attempts to describe market complexity or how advanced a given mobile money ecosystem is at national level.

Similarly, the index does not consider the absolute number of mobile money providers in a market. This is important to recognise as certain engagements such as large-scale bulk disbursements might be significantly more difficult to carry out in a heavily fragmented market – as more stakeholders would have to be involved. The MMPI does not look to measure market structure or concentration as these metrics do not have an intrinsic positive or negative value. Instead these metrics will be of different, or even no importance, depending solely on the type of third party that is evaluating a given market. The number of providers per market can be found via the Deployment Tracker, see section 1.4.

Finally, it is also important to underline that the MMPI can only be as strong as its underlying data. The biggest risk regarding the quality of data lies in the number of registered accounts. It is imperative that account registries are kept clean and that long-standing dormant accounts are not included in the number of registered accounts. As mobile money as an industry is getting older, failing to keep the customer base clean might cause the number of registered accounts to 'balloon' and so suppress the activity rate index (ARI) on which the MMPI relies. It is therefore crucial that providers and regulators alike try to ensure the strongest possible integrity for any published data.

6. CONCLUSION

The GSMA has collected data on mobile money since 2011, as such the organisation has a unique overview of the global industry. It is therefore in the GSMA's opinion that this also presents the organisation with a unique responsibility to provide more detailed information whenever this can be done while still protecting sensitive data. The creation of the MMPI allows for precisely this.

Following the tragic impacts of COVID-19, the GSMA has found it more imperative than ever before to support third parties in reaching the most financially excluded. The GSMA hopes that in publishing the MMPI more stakeholders will consider leveraging existing mobile money infrastructure for the direct or indirect benefit of financially excluded people across low- and middle-income economies.

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