



ANALYSIS

Scaling Mobile for Development

August 2013

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Overview

The mobile phone holds the power of ubiquity. Across the developing world, around 40% of people now actively subscribe to mobile services. Well over 50% have access to a mobile, despite not owning one. Access to mobile services in the developing world has outpaced the rate at which much of the population is gaining access to basic services such as electricity, sanitation, and banking.

As the one technology that is becoming widely accessible to all populations, including those at the bottom of the economic pyramid (BOP), there has been increased focus on the invaluable role mobile technology can play in improving social, economic and environmental development in emerging markets. As the remaining unconnected populations get access to mobile technology and the capabilities it provides, the lives of these populations will fundamentally shift. The simple increase in access to information at a faster pace, from new sources, will influence everything. Affordable mobile phones and the opportunities they usher in for the poor will be one of the most dramatic game-changing technologies the world has ever seen. Industry growth will happen with or without our intervention; the role of MDI will be to *educate all those interested in harnessing the power of mobile for good*.

This confluence underlines the opportunity held by Mobile for Development, which seeks to draw investment and partnership to scale mobile-enabled services that can help to facilitate service delivery in the absence of traditional modes of infrastructure that would otherwise do this. Indeed, Mobile for Development is a growing sector, with well over 1,000 live services now tracked by the GSMA across the developing world in verticals such as money, health, education and entrepreneurship. The problem is that while the sector has enjoyed continued growth in the number of services over the last 5-7 years, scaling up services still proves to be a challenge and sustainable business models continue to be elusive.

This work is designed to inform and add insight to help address these challenges. It has been developed by Mobile for Development Intelligence with support from the Rockefeller Foundation. Our inclusive approach included a research process and production of an interim and final report in April and May 2013 respectively, with a series of peer review workshops held in Nairobi, Kenya and Washington DC to drive collaboration and thought leadership across stakeholder groups.

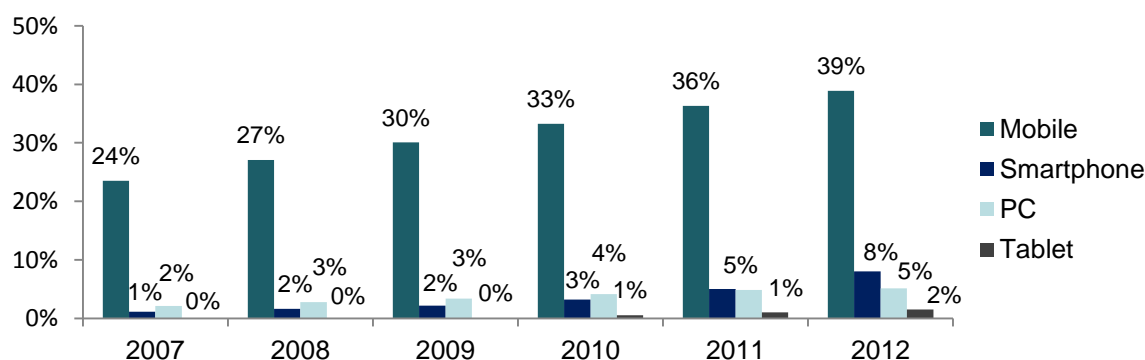
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1. Mobile sector: evolution and outlook

A unique opportunity

The mobile device category is the nearest to ubiquity in ownership. Penetration has increased steadily over the last 5 years, with ownership between 40-50% on average across the developing world (see Figure 1). By contrast, ownership of PCs remains much lower (under 10%) given the widespread lack of fixed broadband infrastructure across many emerging markets. Of course, households that own a computer are likely to share it amongst several members, implying that *access* to a PC will be higher than that shown. However, the same is true of mobile (with increasingly innovative solutions which encourage this behaviour), so the gap between the two is unlikely to change.

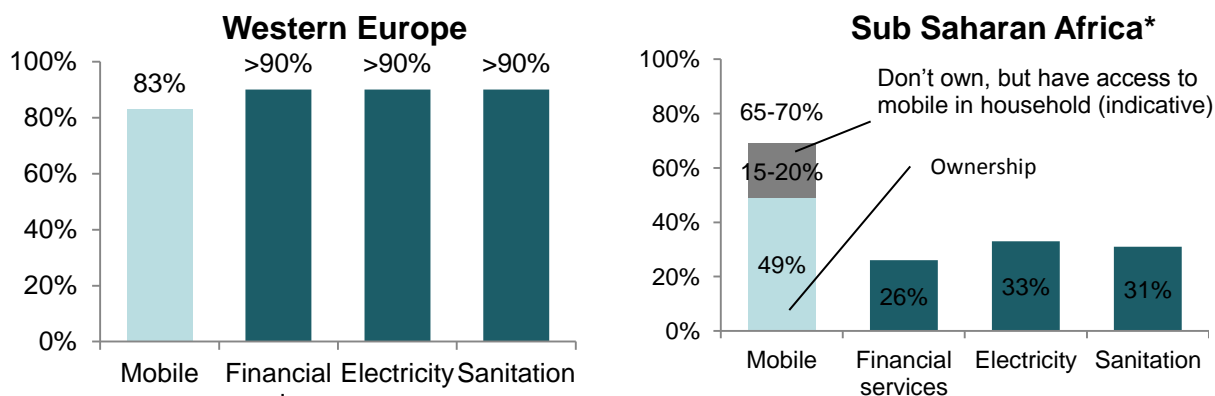
Figure 1. Penetration of population (developing world)



Note: mobile is proportion of people that subscribe to mobile services
 Source: MDI estimates based on GSMA Intelligence, Strategy Analytics, Telegeography

In mature markets such as Europe and the United States, the barriers to access of mobile communications (e.g. political stability, defined and stable state funding regimes, economic growth to drive formation of a middle class, infrastructure rollout, and technological advances) were gradually overcome by the 1980s. While mobile penetration rates continue to rise in the developing world, access to basic services in banking, utilities and education continue to fall short. The lack of access to these services in the developing world means that mobile can act as an enabler in the absence of traditional delivery modes (see Figure 2).

Figure 2. Access to basic services



*Mobile and financial services includes select countries
 Source: GSMA Intelligence, GSMA Mobile Money program, IEA, World Bank, MDI Analysis

Healthy economic growth, even better in mobile

Growth in the actual number of people subscribed to mobile services has averaged over 10% across the developing world since 2008, with these countries still firmly on the upward slope of a classic technology adoption curve. At a regional level, the markets in South Asia (e.g. India, Bangladesh) and Africa have experienced the headiest pace, with user growth at nearly 20% a year (see Figure 3). The subscriber growth in these regions has buttressed several global operator groups otherwise hurt by weak macro environments and stiff regulation in Europe, with mobile revenue growth in the BRICs and key African markets outpacing the wider economy despite airtime prices declining (see Figure 4).

Figure 3. Mobile user growth

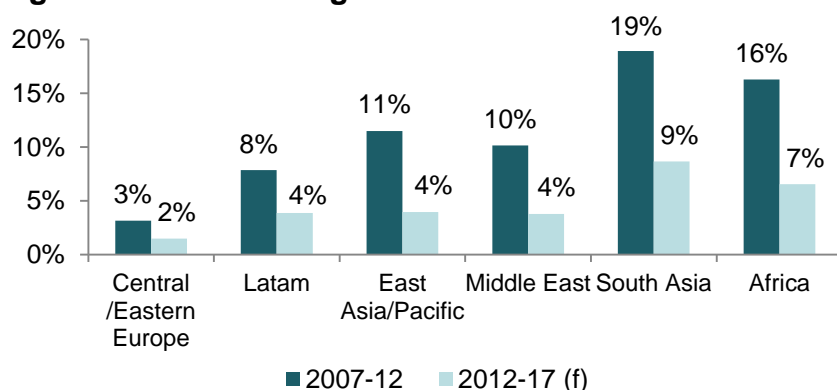
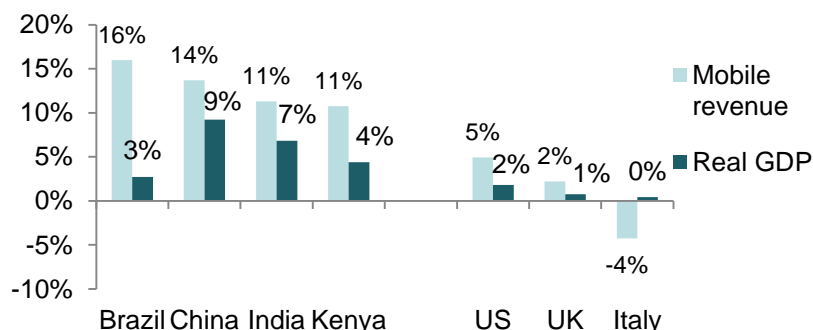


Figure 4. Mobile vs. economic growth



Note: Growth is for 2011
Source: GSMA Intelligence, IMF

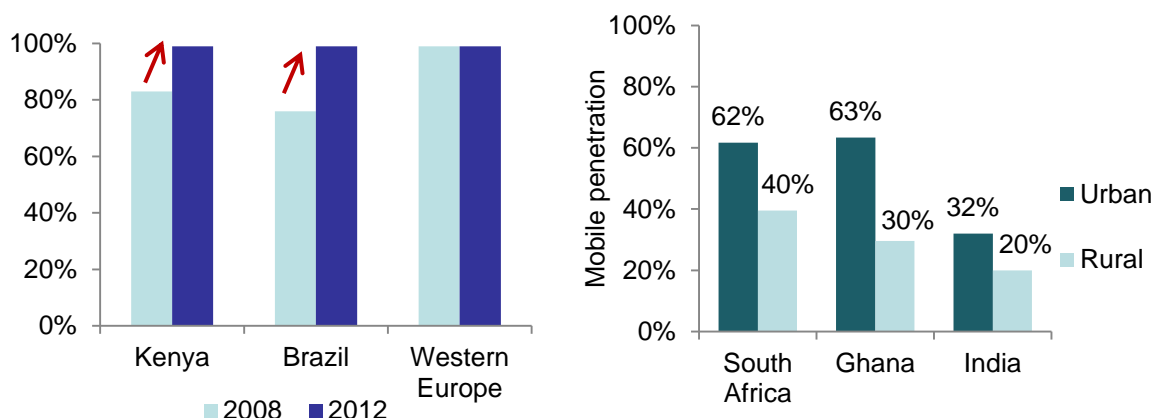
Mobile market growth has been driven by improvements in network coverage, competition (with falling prices), and personal income growth.

Spectrum acquired by the mobile operators carries coverage conditions over a set period of time (e.g. 98% population coverage 5 years after acquiring spectrum), placing an obligation on coverage rollout. As a result, coverage for basic mobile services (voice and text) has increased from around 80% to near universal availability over the last 4-5 years (although it remains lower in some countries).

Despite this rise, there remains a persistent demographic gap, with mobile ownership levels in rural areas well below those of cities (see Figure 5). While this has been limited by a lack of coverage for rural communities off national electricity grids, a combination of continued

rollout led by operators and supported by Universal Service Funds¹, and cheaper power sources (including switching from dependence on diesel fuel to renewable energy sources) for off-grid base stations has mitigated this factor. Other factors such as distribution networks and education (both language and technological literacy) are likely to impact mobile take up in this regard over the next 3-5 years.

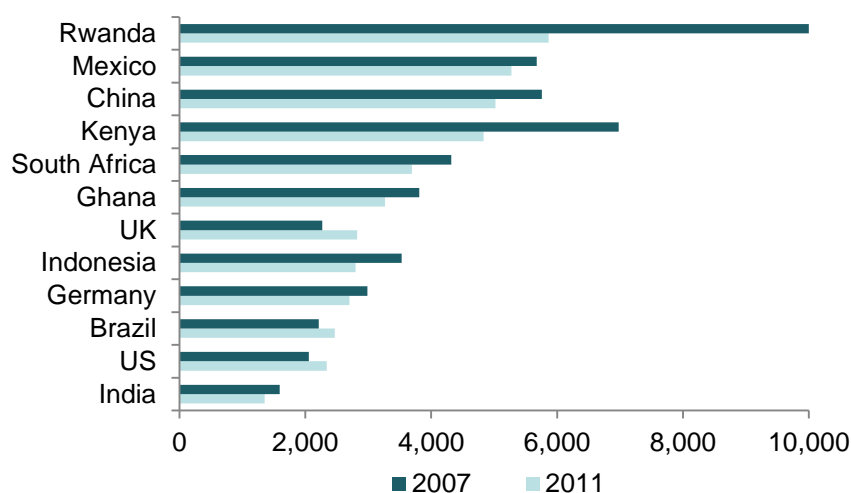
Figure 5. Population with access to 2G (GSM) coverage



Source: GSMA Intelligence, regulators, MDI analysis

Competition has improved over the last 5 years (see figure 6) due to the establishment of new entrants as opposed to markets dominated by former state monopolies. The principal impact of this has been falling prices, mainly voice and SMS, with handset prices also declining. Individual wealth in emerging markets has grown healthily (see Figure 7; China at nearly 10% per year since 2007), and while owning a mobile still eats up a higher proportion of income, the ratio has fallen (less so for the lowest income groups, suggesting mobile is seen more as a utility as opposed to a luxury).

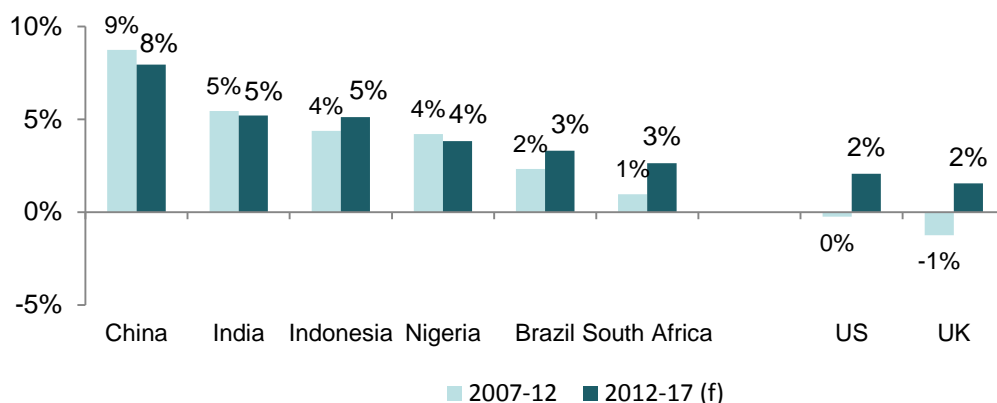
Figure 6. Mobile operator competition (HHI)*



Source: GSMA Intelligence, MDI Analysis

¹ USFs – a tax administered on mobile operators by national governments or regulators to fund coverage rollout to rural regions

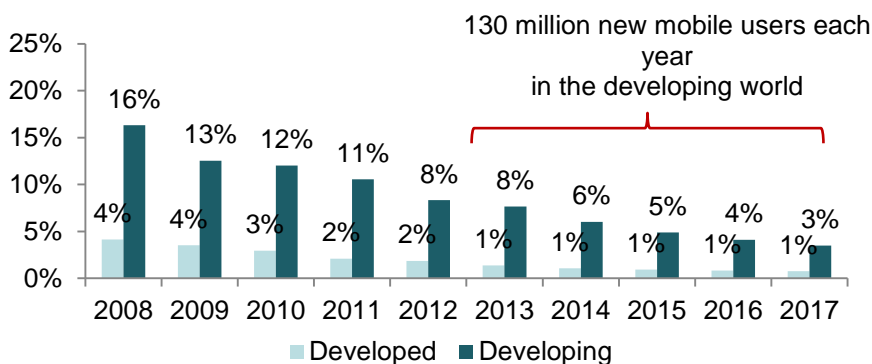
Figure 7. Income per capita growth (CAGR)**



*Herfindahl Hirschman Index – measured as the sum of the square of market share for each operator in a country. Higher HHI's suggest weaker competitiveness
 **Compound Annual Growth Rate
 Source: GSMA Intelligence, IMF, MDI analysis

As adoption approaches a natural ceiling (around 80-90% on a human user basis), growth will inevitably decline. This has already happened in most mature markets (e.g. Europe, Japan, United States), where saturation was reached by the late 2000s, with the remaining growth since then largely driven by connecting older age groups (e.g. over 65s) (see Figure 8). The same will occur in developing markets, although their relatively large populations mean that even with growth of 3-5% over the next 5 years, an incremental 130 million people will adopt mobile *each year* across the developing world through to 2017.

Figure 8. Mobile user growth



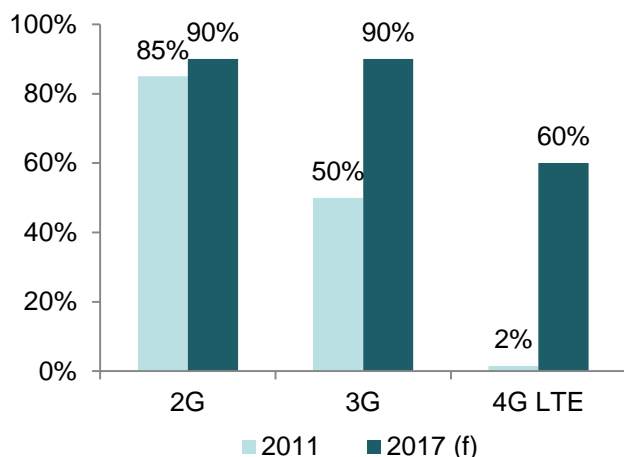
Source: GSMA Intelligence, MDI analysis

Outlook: moving to a data world

If the last 5 years were about getting people connected, the next 5 years are likely to focus augmenting the user experience with mobile. Whilst basic voice and text services can be handled through GSM coverage, the use of data services and access to the mobile internet necessitates further rollout of 3G equipment (operators can run these services using 2G/GPRS, but speeds are slower and will deteriorate as more people use the network).

Operators are well aware of this, with investment in networks designated to expand 3G coverage to a firm majority of the population (see Figure 9).

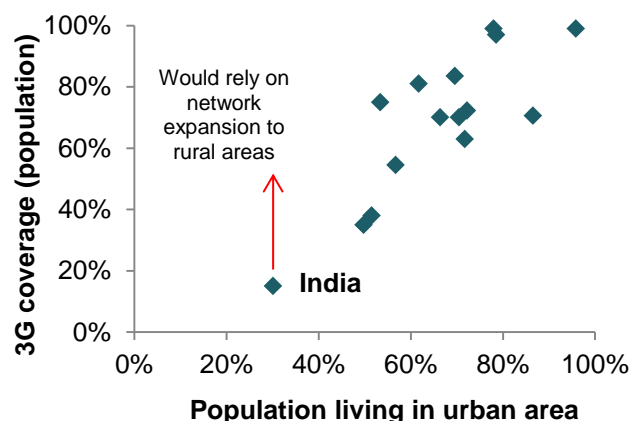
Figure 9. Network coverage forecast – APAC



Source: Ericsson

While 3G coverage will expand to cover a higher proportion of emerging market populations, the pace of rollout is likely to be much slower for rural areas. Network economics are more challenging in rural areas given the harsher nature of the terrain and lack of power sources for base station sites. As a result, even countries with high numbers of their potential customer base in rural areas still have lower 3G coverage rates, with some considerably lower (e.g. India, see Figure 10). Rural dwelling rates will likely lessen, but this will take several years (China-like mass migrations from rural to urban areas at a rapid pace are unique), implying the need for either increased operator investment in rural networks, some form of subsidy to enhance operators to do this, or both. We believe the latter is the most likely outcome, based on a prospective virtuous circle of enhanced mobile access driving increases in economic growth, in turn driving increases in consumer spend on mobile (and in turn operator returns from network rollout).

Figure 10. 3G coverage – a rural problem



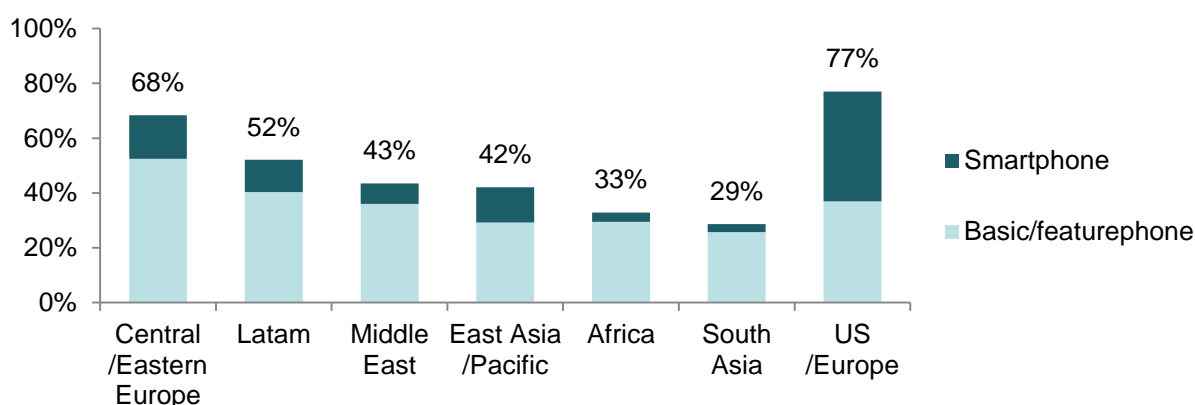
Source: Ericsson (coverage), Enders Analysis (data economics), MDI Analysis

Perhaps most interesting is the battle emerging to connect customers to the internet though mobile. In the developed world, smartphones now account for over 50% of handset sales,

with the numbers closer to 80-90% for contract customers (actual smartphone penetration in the base is lower at around 45-50%). This will continue to rise, with the priority for mobile operators shifting from acquiring smartphone customers to *retaining* them – both against direct competitors and, increasingly, internet players.

The situation is significantly different in developing markets. Smartphones are owned by less than 10% of people (with some, but not appreciable regional variation), making them still niche and the preserve of mid and high income groups, not a mass market device (see Figure 11).

Figure 11. Smartphone penetration in emerging markets



Source: GSMA Intelligence, Strategy Analytics, MDI analysis

It is not contentious to suggest smartphone ownership will continue to grow in the developing world over the next 5 to 10 years. The fact that technology adoption tends to follow by region, that many global handset vendors have steered their new product portfolio towards smartphones and that prices continue to decline (the iPhone being an exception), and the paucity of traditional fixed-line infrastructure to connect to the internet all make continued smartphone adoption predictable.

However, there are several reasons to suggest that the *implications* of a smartphone revolution will be different in the developing as compared to the developed world.

The first involves demographics. Despite heady economic growth over the last decade, many developing world countries still have large sections of their populations in lower income groups (often earning less than \$2/day). As with coverage, the pace of this adoption is likely to be uneven, with lower income groups lagging behind the mid and upper brackets (even with falling device prices), creating a massive, yet latent, market for mobile-enabled services using apps and the mobile internet.

On the face of it, this would suggest the more enhanced features available through IP-based mobile telephony would be out of reach of lower income populations. However, there is an increasing convergence in functionality and price between higher end feature phones and lower end smartphones, implying the distinction between these categories matters less in what they are called, and more around what they can do (see Figure 12).

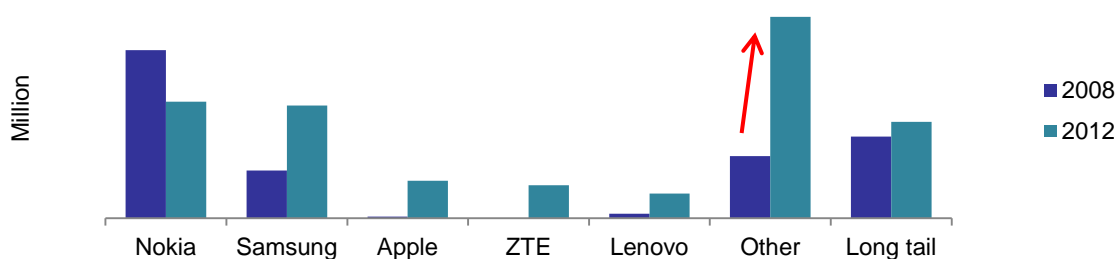
Figure 12. Convergence between low end smartphones and featurephones?

	iPhone 4S (smartphone)	X100 (China) (smartphone)	Nokia Asha 305 (featurephone)
OS	iOS 5	Android 2.3	Series 40
Screen	Touch	Touch	Touch
Price (\$, wholesale)	>\$500	\$99	\$60-90
Camera (MP)	8	5	2
Processing power (MHz)	1,000	650	1,000

Note: prices indicative, as of January 2013

Source: Strategy Analytics, company websites, MDI Analysis

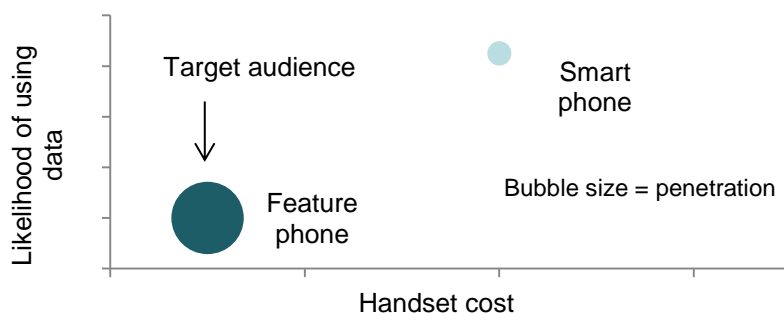
Handsets running Android make up the majority of smartphones in use in the developing world (around 50%, led by Samsung, but with an increasing number of these likely to be coming from lesser known manufacturers based in China – see Figure 13) (Apple, by contrast, has a much smaller presence in emerging markets relative to its US and European businesses, largely as its flagship device has remained around \$600, placing it far out of reach of the average income in the developing world – and much of the developed world market relying on operator subsidisation).

Figure 13. Handset sales in Asia-Pacific

Source: Strategy Analytics, MDI analysis

But are lower smartphone prices an out and out boon? In the sense that access to the internet is brought to a larger audience – yes. However, in order to drive price down, the build quality will likely weaken. Specifically, the battery life of low-end smartphones is likely to be sacrificed, which means they are of less use to populations that struggle to pay for or access electricity (especially those off the electricity grid and therefore requiring alternate charging sources). The other place where handset specifications may have a lower quality will be in operating systems and data compression standards, all of which contribute to a less impressive experience for the end user, potentially decreasing the perceived value of gaining access to the internet through mobile.

Of more importance is access to mobile data, on a smartphone *or* featurephone. Indeed, even as smartphone sales continue to increase (and with significant turnover in the secondary market), these take time to distil into the user base, meaning featurephones will continue to make up well over 50% of handsets in use for the next 2-3 years. This presents a large, as yet underserved target market for mobile data access, and the downstream services enabled therefrom (see Figure 14).

Figure 14. Data democratisation

Source: Google, Opera Software, Facebook, Wikipedia, mobile operator websites, MDI Analysis

It is this democratisation of data that marks an important aim, namely in defining, shaping and ultimately owning the user experience on mobile. Both protagonists – the mobile operators and internet players providing services over the top – are well aware of this. As such, new and innovative ways of getting lower income customers onto the mobile internet have come into play.

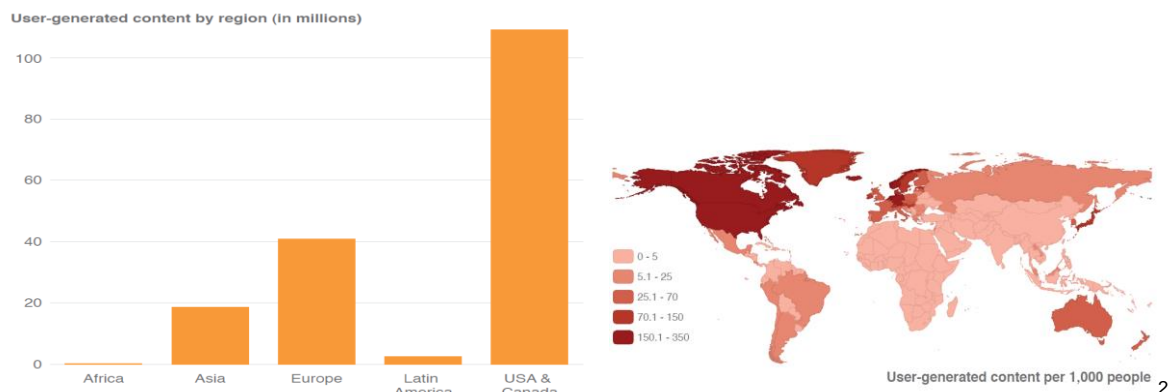
Zero-rated data offers are perhaps most notable, with consumers getting (limited) access to the mobile internet for free. For instance, Google has partnered with mobile operators in the Philippines, South Africa and Indonesia to offer the Google Free Zone, which gives the customer access to Google's web properties (search engine, Gmail, etc.) for free, but any browsing or access to other parts of the web are charged. Facebook, Twitter and Wikipedia have all launched similar offers. On the face of it, this bears resemblance to the walled garden approach used by several mobile operators in the 2000s, pre iPhone (2007), as they attempted (and largely failed) to realise the 3G opportunity through own-brand content portals. However, we believe these models represent a fundamental recognition that it is worth subsidising data for low income customers in the developing world on the logic that collectively, this is a vast market opportunity (several times that of the US and western Europe markets), and as they grow richer and more aware of the utility afforded by the internet, that investment will more than be repaid through higher spend and customer loyalty down the road.

From the operator perspective, the approaches are different in emerging markets because most customers are on a prepaid as opposed to contractual agreement – meaning that data must be sold as an add-on as opposed to another component of a bundle (on the flip side, this is also a key opportunity for the operators as including it makes it easier to justify higher bundle prices). As a result, hybrid data plans (with a commitment term in length, but not spend) and flexi data access plans (e.g. pay to access the internet for an hour) have become increasingly common.

Operators have come under threat in mature markets given the ubiquitous presence of over-the-top (OTT) services with the capability to substitute traditional operator-enabled modes of communication (e.g. voice). While the true impact of this is debateable and largely still being assessed, emerging markets represent the next frontier of growth for all players, with much of that likely to be driven by communication over the internet. The implications are that lines between the perceived role (and incentives) of operator and internet players are likely to become increasingly blurred. Increased access to various methods of customer self-expression is one area of interest. Historically, in the absence of internet connectivity,

countries in the developing world have largely been on the receiving end of most content and lacking in the tools and infrastructure to support local content generation (see Figure 15).

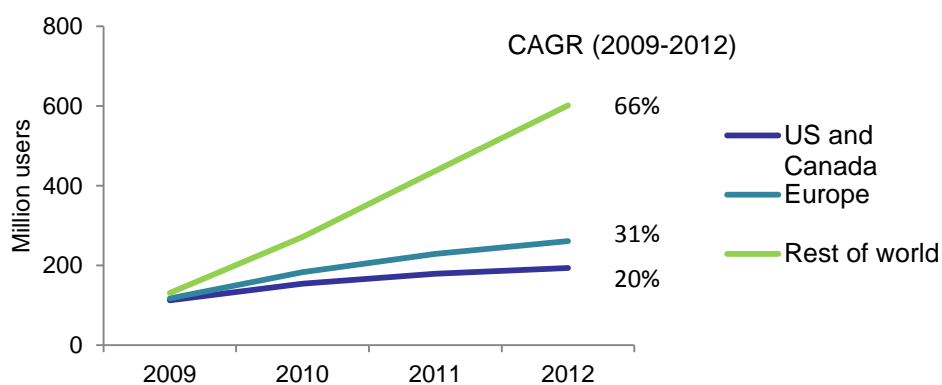
Figure 15. Where does Google-indexed user generated content from?



Source: Convoco report, Matthew Zook

This has slowly started to change, driven by increasing mobile penetration, access to the internet and, in turn, social networks. Facebook’s growth over the last 3 years has largely been driven by developing world markets (see Figure 16), with the US/European PC-led boom of its early years slowly decelerating as these countries approach saturation.

Figure 16. Facebook: expanding to emerging markets



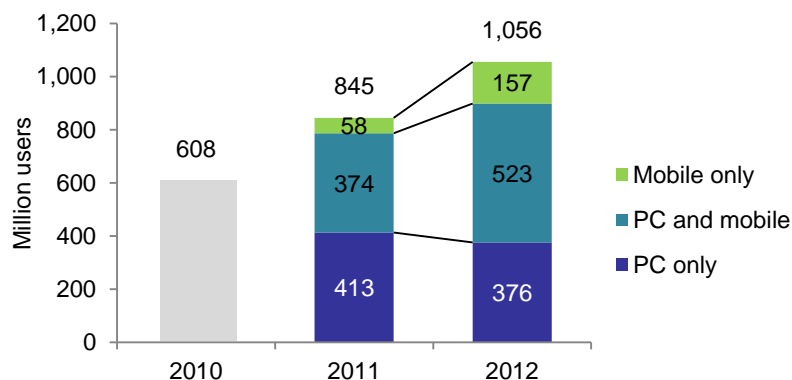
Note: monthly active users. CAGR is Compound Annual Growth Rate
Source: Facebook, MDI Analysis

The key implication of this is not that more people are using social networks, it is that they are doing so through mobile, many *only* through mobile (see Figure 17). We believe this mobile-only wave is primarily coming through emerging markets, such as in sub-Saharan Africa, where estimates suggest that in many markets around 70-80% of Facebook users are mobile-only, much higher than in the US or Europe. This is not surprising given the low PC penetration in these markets, increasing availability of mobile data, and a range of products that explicitly target low income customers on featurephones (e.g. Facebook for USSD, Facebook SMS, Facebook for Every Phone) which do not require access to a data plan. There are also a range of Facebook products that allow the customer to have a more

² User Generated Content in Google, Oxford Internet Institute, June 2011
<http://www.oii.ox.ac.uk/vis/?id=4e3c030d>

heightened experience through their featurephone but that limit the offer to reduce the amount of data consumed (e.g. Facebook Zero). All of these are all separate from the vanilla mobile versions optimised for a smartphone app or browser. The multiplicity of products that address the different mobile use cases speaks to Facebook's recognition of the opportunity to reach scale in the developing world with an entire consumer base that is not currently online.

Figure 17. Facebook users



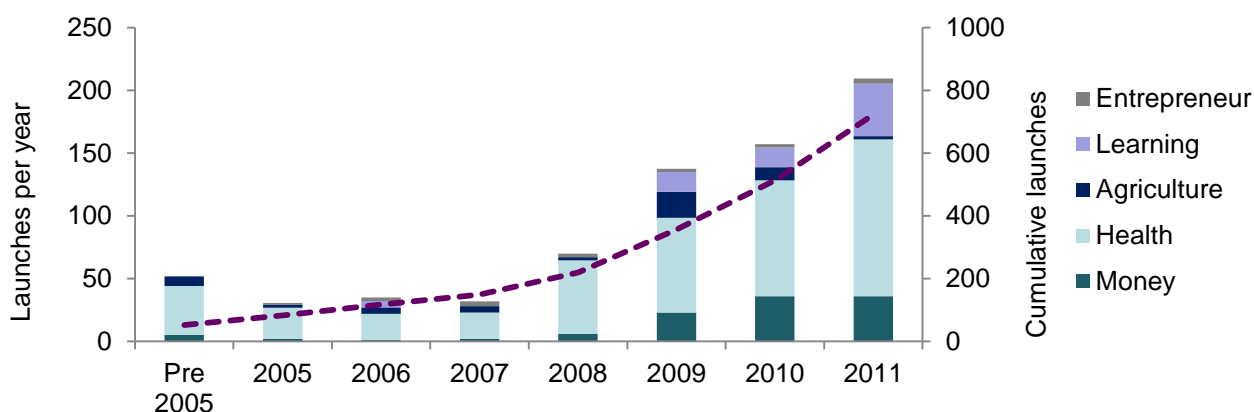
Note: monthly active users. Disclosure of mobile-only users not available before 2011
Source: Facebook, MDI analysis

Facebook, of course, is the poster child of the social network generation. However, there are others, some large and some more niche services in emerging markets with similar mobile-oriented approaches. All of these provide a platform for others to interact, with a multiplicative effect on content creation as penetration rises. Vanity and gossip aside, the potential for use as a medium for news creation and consumption, particularly in rural areas, is real. Brands (including M4D services) can also use this as a customer feedback mechanism in aiding user-centric design (see [section 4: user-centric innovation](#)). The wants, needs, and behaviours of low-end consumers in the developing world is an area of understanding that has previously eluded the companies that deliver products to them. Increased use of social networks will contribute to creating a voice for a consumer segment that previously did not have a public persona that they controlled.

2. Impact of mobile on development

The mobile for development sector has enjoyed strong growth over the last 3 years, with over 1,300 services run by 600 separate organisations. While the health sector still accounts for the majority of services overall, recent growth has been driven by financial services, learning and entrepreneurship/employment (see Figure 18).

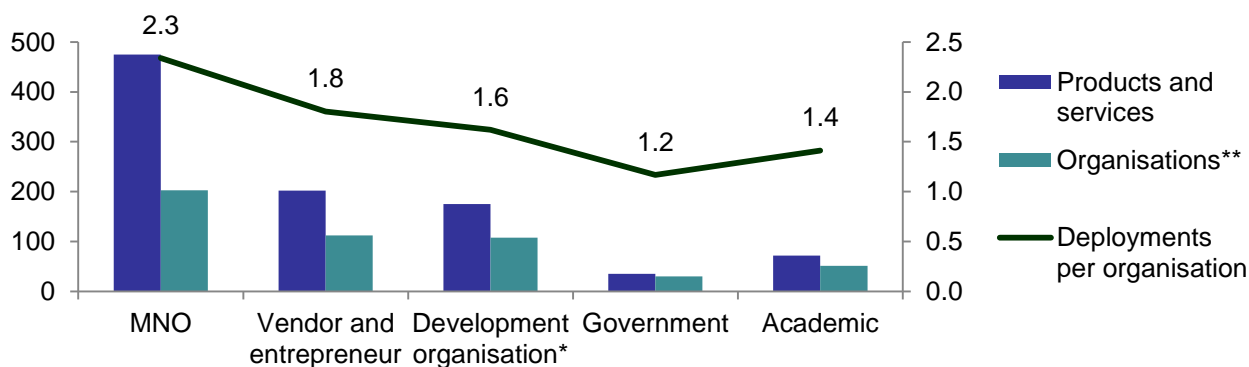
Figure 18. Timeline of launches



Note: figures based only on mobile-enabled products and services in developing world tracked by GSMA (including those merged/closed)
 Excludes services in pipeline with an impending launch
 Source: MDI Analysis

Mobile operators are most active in the space, with the average country operating company running around two services, most of which fall under the Value Added Services (VAS) line of business (see figure 19). Governments have the lowest direct involvement in volume terms, with influence primarily focused on regulation and promoting a friendly investment climate (see [M4D stakeholders: a diverse mix](#))

Figure 19. Stakeholder investments in M4D



*Includes donors, NGOs and other development groups
 **Number of unique organisations (country operating companies of MNOs each count as a unique organisation)
 Source: MDI analysis

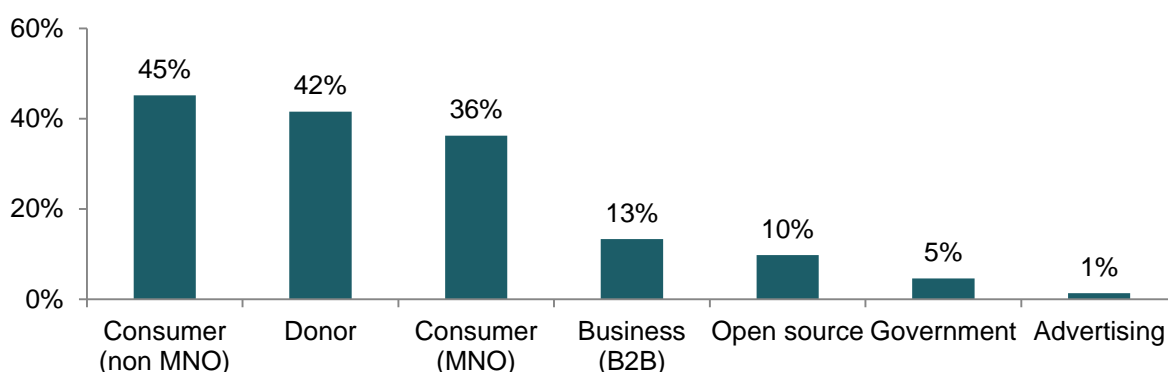
Despite growth in the market and a rising tide of interest from a range of stakeholders, there has been a general failure to achieve scale on sustainable basis. We believe this is broadly a result of three general factors – lack of defined value chains, sustainable business models, and market visibility (discussed in [section 3: platforms, multiplicity and the drive for scale](#)). Part of the scale challenge is rooted in a historical paradigm with mobile for development primarily a social cause as opposed to business opportunity. However, this is not a static environment and perhaps most interesting is to understand how the changes in technology and new emerging business models are currently rebalancing this perception.

How are mobile services changing?

Business models

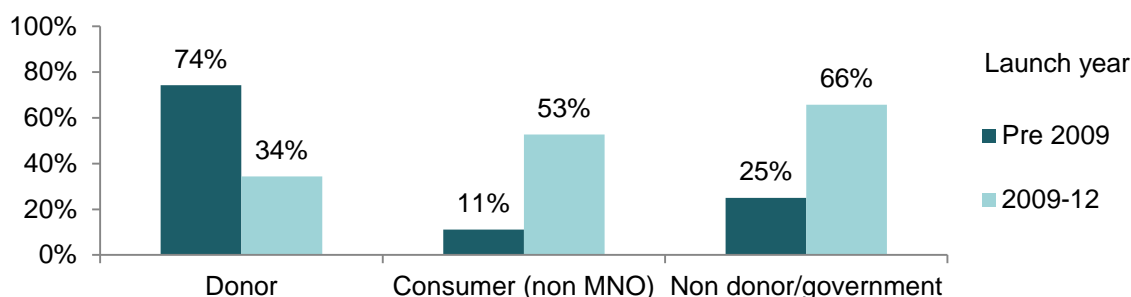
Around half of M4D solutions we track sell a product or service directly to consumers (see figure 20). Models that rely on donor funding to supplement or replace revenue account for a similar share, but this is heavily skewed by the mHealth sector and the decided shift over the last 3 years is that away from donor funding and towards consumer-pay business models (see figure 21). This could be a reflection of specific consumer driven business models in various sectors (e.g. mobile money), but is also likely due to a greater awareness throughout the industry that purely donor funded models should be phased out where commercially viable and sustainable business models can be deployed.

Figure 20. Business models of M4D services³



³ See companion slide presentation for an explanation of our methodology for analysing the sector

Figure 21. The rise of commercial models over donor-dependent ones



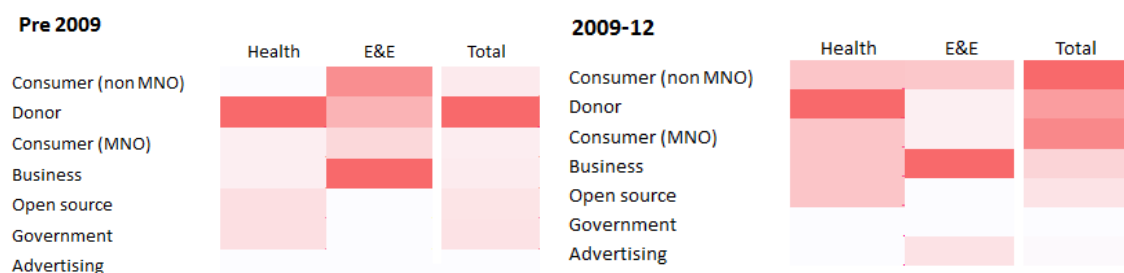
Note: services can have more than one business model (e.g. receive donor funding and charge consumers), so percentages will add up to more than 100%

Note: figures in this section are for mobile-enabled services in the developing world tracked by GSMA

For definitions of business models, see [glossary](#)
Source: MDI Analysis

Looking more closely at specific sectors, business models are converging in different ways. In the health sector an early dependence on donor funding is becoming diffused to include both end user and B2B revenue models (see Figure 22). For example, [Changamka](#) builds its business model on M-Pesa’s mobile money system to create pre-paid health cards, while [CommCare](#) create data collection tools for community health workers built on per user subscriptions. In the entrepreneurship sector there has been a consolidation of B2B models in the last 3 years, with products increasingly targeting payments in the Small and Medium size Enterprises (SMEs) market. These provide good examples of how the entrepreneurship sector is well positioned to take advantage of markets with maturing mobile money services.

Figure 22. Business model heatmap by sector

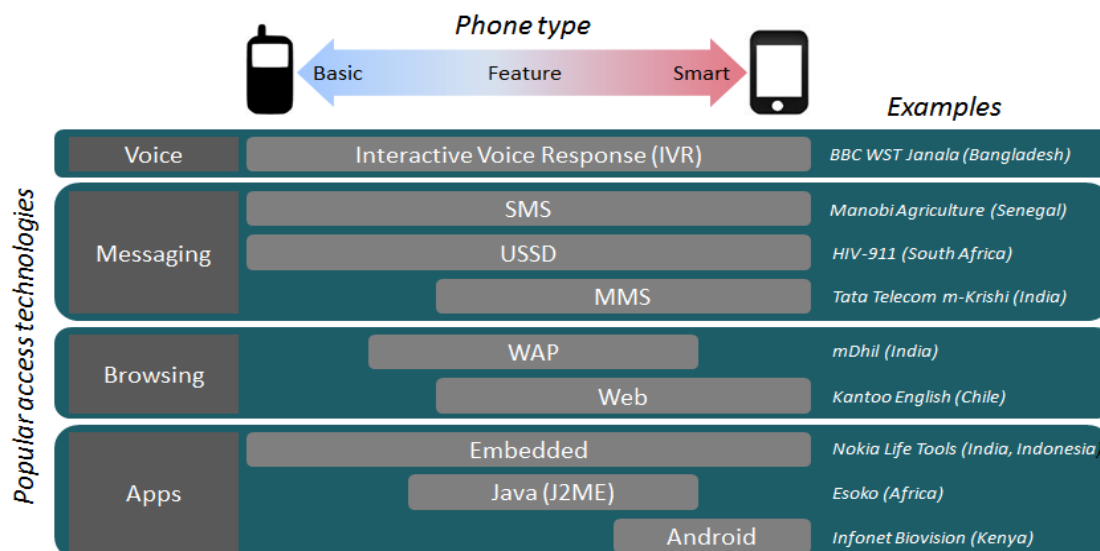


Note: business models with the highest use across multiple sectors have deeper shades of red
Source: MDI Analysis

Devices – smartphones on the rise?

Given the mobile focus of this work, it is helpful to give some context around the continuum of mobile handsets currently on offer to better understand the difference in technology and how it relates to the types of products and services they enable. In the graphic below various delivery technologies like SMS, WAP and voice are mapped to range of handset types. While core mobile services like voice and SMS work on any phone, others – including data-based protocols and the mobile web - are generally optimised for higher-end featurephones or smartphones (see Figure 23).

Figure 23. What works on different handsets?

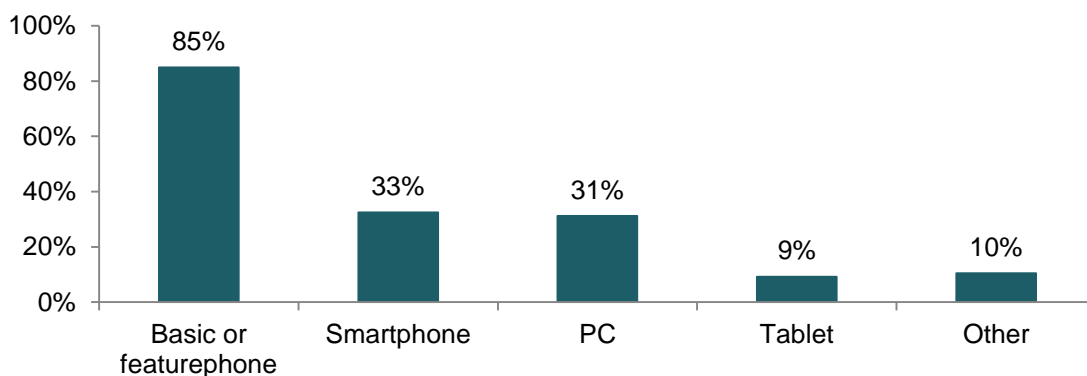


Note: for definitions of technologies (e.g. SMS, USSD), see [glossary](#)
 Source: MDI Analysis

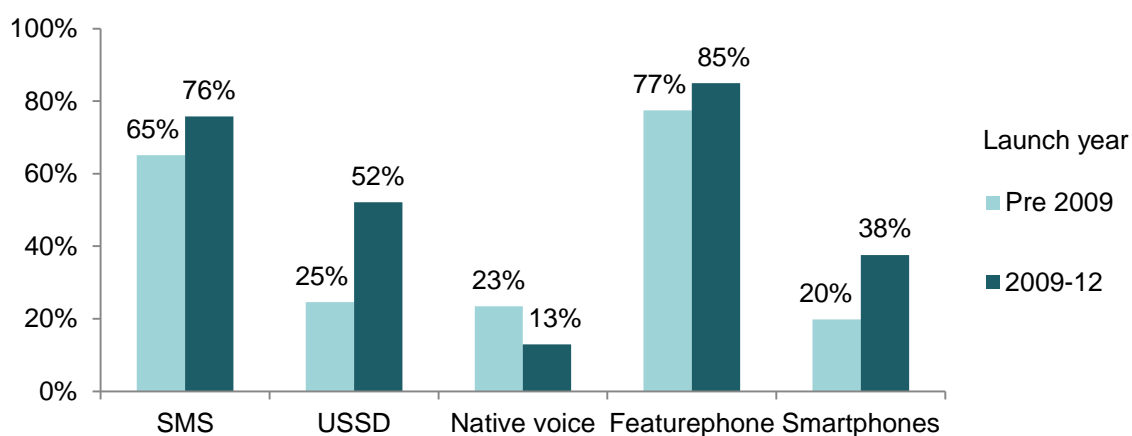
Despite smartphones continuing to take a larger share of sales, the vast majority of handsets in use in the developing world are basic or featurephones. This is reflected in the marketplace, with over 80% of mobile-enabled services targeting this handset class (see Figure 24). SMS and USSD are the most widely used form of mobile technology leveraged to deliver a product or service (see figure 25).

Smartphones are targeted less (partly since there aren't as many of them in circulation due to price, partly due to technological and language literacy barriers). However, this has started to change – particularly in the education and small business sectors (where owners are more likely to own higher end devices) – and we expect a continued rise over the next 2-3 years as these barriers are gradually overcome.

Figure 24. What devices are services designed for?



Source: MDI Analysis

Figure 25. SMS still most popular

Note: services can be designed for multiple devices or technologies, so percentages will add up to more than 100%

For definitions of devices and network technologies, see [glossary](#)

Source: MDI Analysis

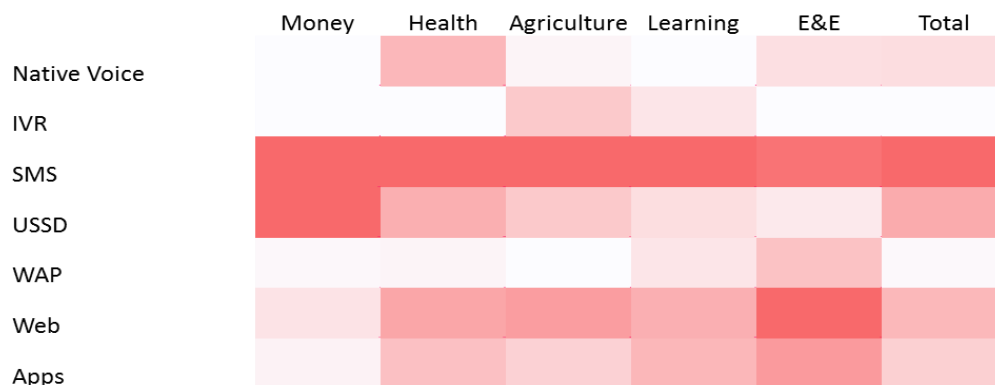
While these trends are occurring at the market level across the developing world, it is also useful to look at individual sectors (see Figure 26), from which we observe two interesting points.

First, despite the dominance of SMS and USSD as preferred modes of delivery for Value Added Services (VAS) in the developing world, there remain relatively unexplored opportunities for growth through integration of existing solutions. For example, combining mobile banking and agricultural information services for small-holder farmers globally could tap into a market estimated at \$450 billion⁴. While SMS/USSD based information services in agriculture, and transactional systems within mobile money are well established, services that combine these solutions are less prevalent, providing further headroom for growth.

The second concerns voice. Voice is a surprisingly underutilised technology in mobile services, with its popularity primarily in health and agricultural applications. Indeed, it has been declining over the last 3 years due to high up-front investment costs for voice-based business models such as call-centres and Interactive Voice Response (IVR) systems as compared to the lower cost of text-based communication methods, both telephony (SMS/USSD) and IP-based models (mobile internet). However, we believe this represents a missed opportunity given the advantages for voice-based solutions to avoid literacy barriers and the potential to generate cost efficiencies with increased scale, unlike SMS (see Figure 27).

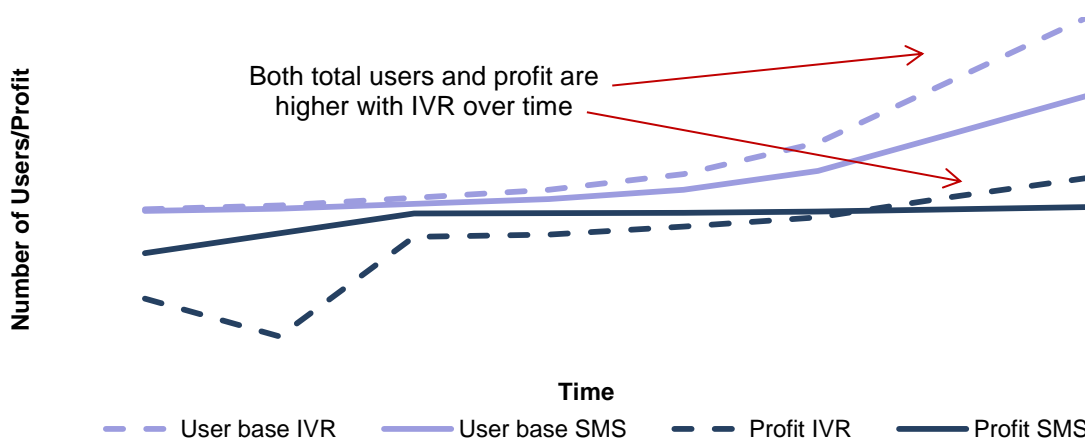
⁴ http://dalberg.com/documents/Catalyzing_Smallholder_Ag_Finance.pdf

Figure 26. Delivery technology heatmap by sector



Note: technologies with the highest use across multiple sectors have deeper shades of red
 Source: MDI Analysis

Figure 27. Cost benefits of using voice



Source: GSMA – MDI analysis

ASSUMPTIONS:

IVR

- There are high upfront costs because IVR services are built from the start to accommodate a large user base
- After the initial setup costs, the cost of scaling hardware and licences is absorbed by MNOs, as the service generates revenues for them
- IVR services are pull oriented (i.e. users dial in)
- No marketing costs have been considered

SMS

- User base is typically smaller compared to IVR services due to literacy rates
- Mobile Originated (MO) is 60% of Mobile Terminated (MT)⁵; in SMS solutions the number of messages sent by the server is higher than the messages sent back by the user. In this case, for all messages sent by the service provider, 60% return from users. The service provider is charged for every message sent, in the majority of markets, it can only recoup revenue from messages sent back from users at a rate of 60% of the MT; there is a higher cost for the business and for the user, if the business has to recover SMS costs

⁵ "Mobile (Handset) Originated" (MO) means an SMS was created and sent by a mobile user, "Mobile (Handset) Terminated" (MT) means a message which is terminated on a user's mobile handset

The cross sector view

Sectors such as mobile money, agriculture, and health represent unique opportunities in terms of the addressable markets they serve, their potential for re-use and recombination with other services, and their potential to achieve socio-economic impact. They each also face distinctive challenges (e.g. regulation, sourcing appropriate content providers). While accounting for the uniqueness of each sector, we can nevertheless take a view across all sectors to come to a more holistic view of common challenges and opportunities. Uncovering opportunities for leveraging existing technologies for more than their originally intended purpose and uncovering new efficiencies to ultimately increase the ability to achieve scale is the intended purpose of taking a 'cross sector' view.

Another way of describing the situation is to say one – vertical – way of looking at the market partitions themes by sector (money, health, small business etc), while another – horizontal – view categorises services based on business model and underlying technology. Such a framework was earlier developed by MDI (published in [MIT Innovations](#)) to map out mobile services horizontally, looking at the potential for revenue generation and hence financial sustainability. The advantage of this horizontal (or cross sector) view is to reveal patterns and opportunities across sectors where services can be developed to serve multiple use cases.

Opportunities

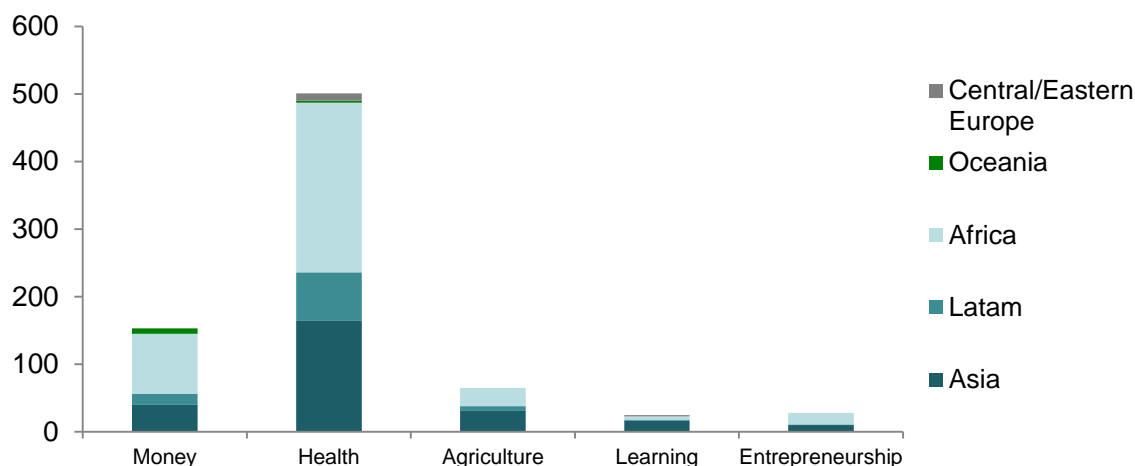
On this cross-sector view we don't think about interactive information content systems *for* agriculture or health, but simply as interactive content services. By considering a platform that is useable across multiple countries and sectors (e.g. agriculture and money), the scaling potential becomes clearer. Moreover, while the distinctive challenges of each sector must be considered and overcome, some of these challenges may be better addressed when looking across sectors, as knowledge gained in one sector can be utilised by another (e.g. knowledge built from content delivery in the agricultural sector, rolling out distribution networks in the mobile money sector). Ultimately, this vantage is helpful in identifying missed or future opportunities for achieving synergies in the design and roll-out of services – from the supply side, requisites for sustainable business models.

Challenges

As each sector represents a distinct range of use-cases (end users of information services in health and agriculture will have very different requirements), cross-sector tools must be adaptable and flexible. In particular, those who use the services to implement specific sector solutions must be able to do so easily. The value of cross sector tools will also take longer to demonstrate, as multiple implementations across different verticals will be required. Additionally, initial required investment in these tools is higher than in designing a bespoke service to serve a specific market in a specific country, and driving sufficient investment at an early stage represents a challenge for the mobile sector as a whole.

Regardless of sector, what are services doing?

MDI provides an extensive database of [M4D products and services](#) across the developing world, with 1320 live products and services as of May 2013. Africa remains one of the prominent areas of activity, with mobile money in particular concentrated in this region. Asia (particularly China) has also emerged as a key region, with mobile-based education applications driving growth (see Figure 28).

Figure 28. Live M4D deployments by region

Note: figures based on mobile-enabled products and services in the developing world tracked by GSMA
As of September 2012; excludes services in pipeline with impending launch
Source: MDI analysis

Different services are developed in different geographic regions, and across different sectors. This means such services may appear – at a surface level – quite unrelated to each other aside from the fact that they use mobile to provide a development focused service of some kind. Despite this, services invariably share similar features in their underlying technology. To motivate this, consider the example of three different organisations below.

YoungAfricaLive is a mobile community platform that engages young people around the topics of love, sex and relationships, and aims to promote healthy sexual behaviour in its users. It uses a peer to peer model, where users can seek each other out within a community, as well as engage with interactive content that includes daily news and celebrity stories. The service utilises a mixture of WAP and web technology, and targets users with basic or featurephone handsets⁶. The service was conceived and funded by the **Prækelt Foundation**, and is geographically concentrated around southern and eastern Africa.

Esoko started in West Africa as a piece of software to push market prices out to farmers via SMS alerts. It has now evolved into an agricultural mobile service that provides a suite of applications that any business or organisation (including agribusinesses, smallholder farmers, mobile operators, NGOs, and ministries) can use to push and pull information to targeted and profiled users. Esoko aims at users with basic or featurephone handsets, and uses a range of underlying delivery technologies including SMS, WAP, and voice.

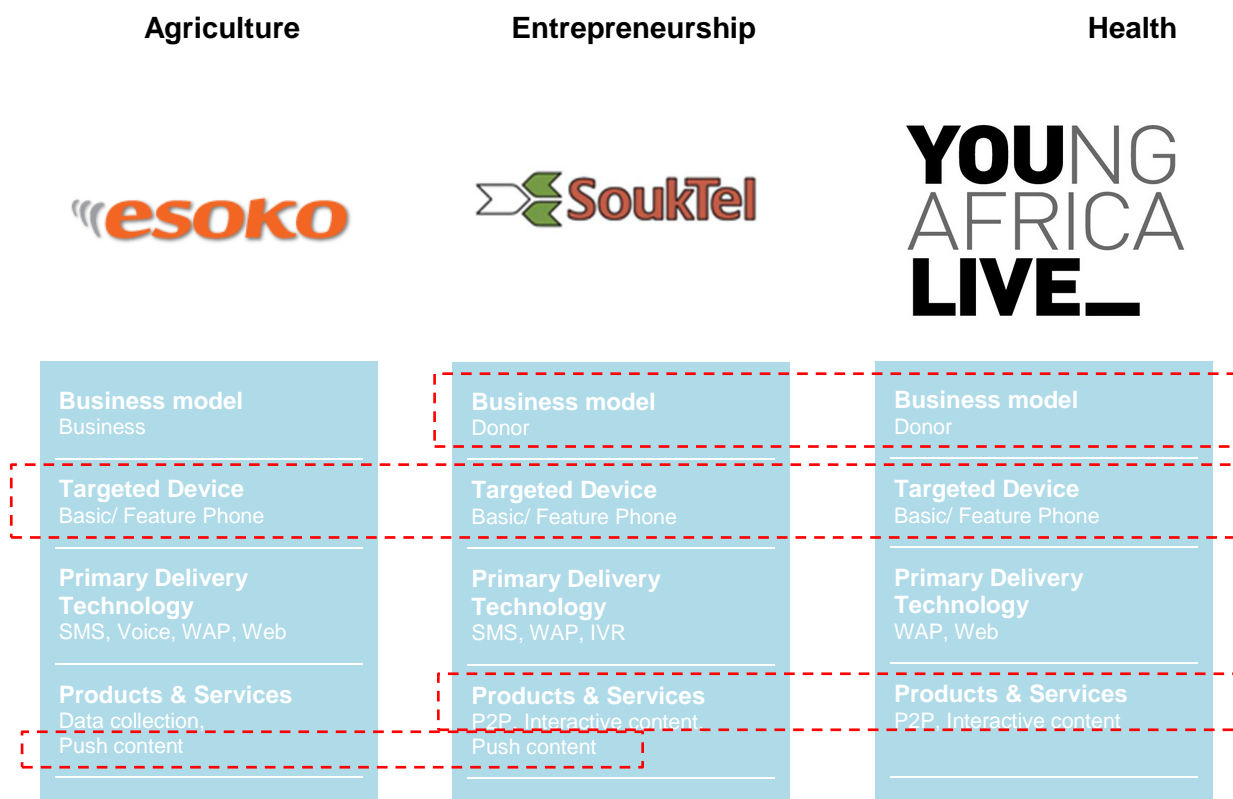
SoukTel is a service connecting job seekers with employers via mobile in the Middle East. Job seekers can upload their CV via a basic phone, employers can create job adverts, and the two can connect using SoukTel's peer to peer platform. In addition, SoukTel offers another service (AidLink) to get key information to and from communities in crisis. The service uses a range of delivery technologies including SMS, IVR and WAP.

These three services span across Africa to the Middle East, and across areas of health, agriculture, and job creation. The interest is in the fact that seemingly disparate services use the same underlying delivery technology (e.g. SMS), and are based on a similar underlying

⁶ See [glossary](#) for MDI definitions

framework (YoungAfricaLive and SoukTel essentially provide peer-to-peer networks)(see figure 29).

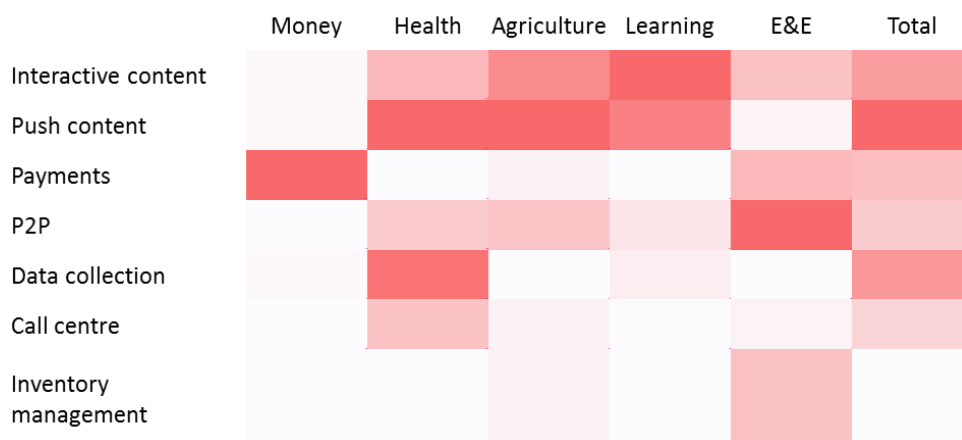
Figure 29. Hidden similarities in what lies beneath



Source: MDI analysis

The full cross sector view is shown below (see Figure 30). Content-based services (either pushed or by hosting content that is accessible by users) currently have the greatest range. Moving forwards, we believe this will shift to payments as mobile money services increasingly take on re-use in adjacent sectors, with micro-insurance and utility access (water and electricity) well positioned.

Figure 30. Type of technology used by sector



Note: functionalities with the highest use across multiple sectors have deeper shades of red
Source: MDI Analysis

Investment over the last 5-7 years has largely been built on a bespoke service model (see [section 3: platforms, multiplicity and the drive for scale](#)). This is not unlike the journey other technology markets took before reaching mass adoption – the PC industry of the late 1970s in Silicon Valley is a germane example. As such, examples of technology frameworks in use that span across mobile verticals are rare, but increasing – Frontline SMS (featured below), [Ushahidi](#), [Freedomfone](#), and [Motech](#) provide good examples. It is this space of designing (and re-using existing) solutions across sectors that we believe offers the greatest potential for scale as mobile penetration continues to rise (providing demand-side stimulus) and investment providers seek business models that drive innovation but do not reinvent the wheel in underlying technology.

Spotlight



FRONTLINE SMS



[FrontlineSMS](#) (initially set up by Ken Banks in 2004) builds and distributes free open-source software, helping organisations in both economically developed and under-developed countries to overcome communication barriers they face. Their users have interests spanning healthcare to election monitoring, with a bottom line to drive transformative social change. In each case the software allows users to send, manage and receive text message interactions with communities of people.

3. Platforms, multiplicity and the drive for scale

The cross sector view and the concept of re-use

The advantage of the cross sector view is to reveal patterns and opportunities across sectors where services can be developed to serve multiple use cases. These multiple use cases are valuable in the context of a service's revenue generating potential and hence financial sustainability. This value can be described by the concept of 're-use' – those solutions that are more re-useable and adaptable in catering for a wider range of end-user cases, which has emerged as a key driver to reaching scale.

The concept of re-use and a platform

Part of the problem is the language we all use to discuss mobile technology. In the mobile space the term "platform" can mean a range of things to different people: an operating system such as iOS, Android, or Linux; pieces of open source software with public APIs; a network technology like SMS; or simply a mobile service that scales to reach a large user base. In this way, the term doesn't sufficiently indicate what can be re-used, and in what sorts of ways.

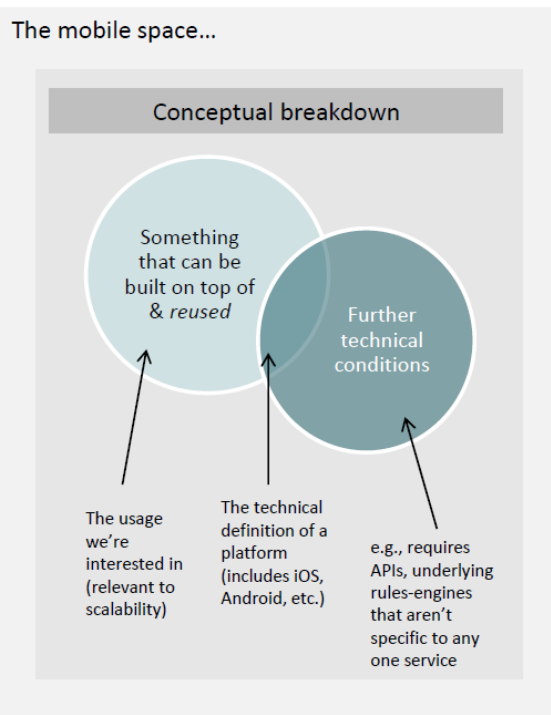
The "platform" problem

Problem

- This use of the term doesn't sufficiently indicate what can be *reused*, and in what sorts of ways

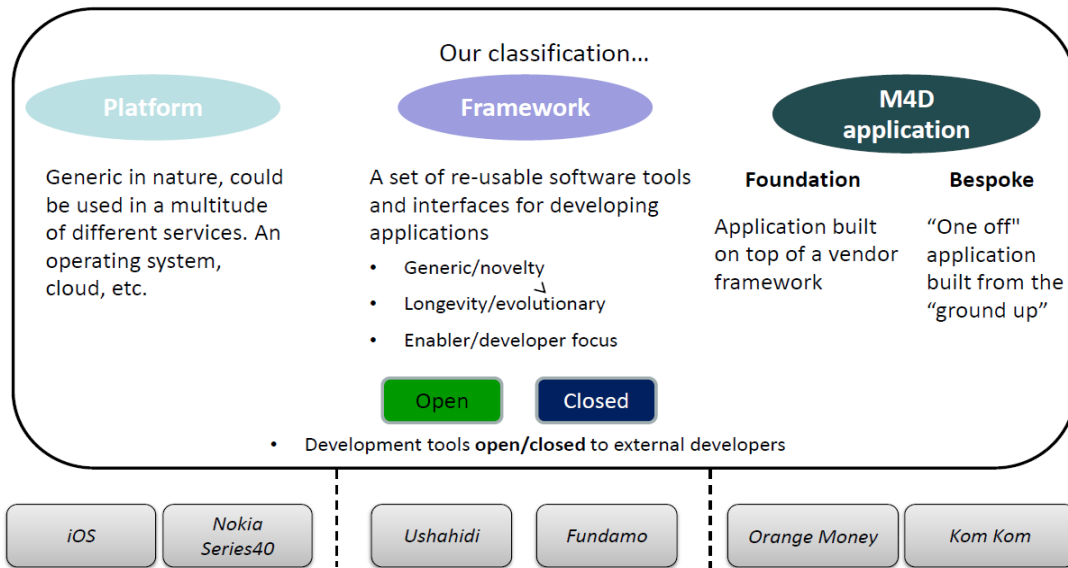
Solution

- We propose to make the issue of reuse more transparent by drawing a clear distinction between platforms, frameworks, and M4D applications



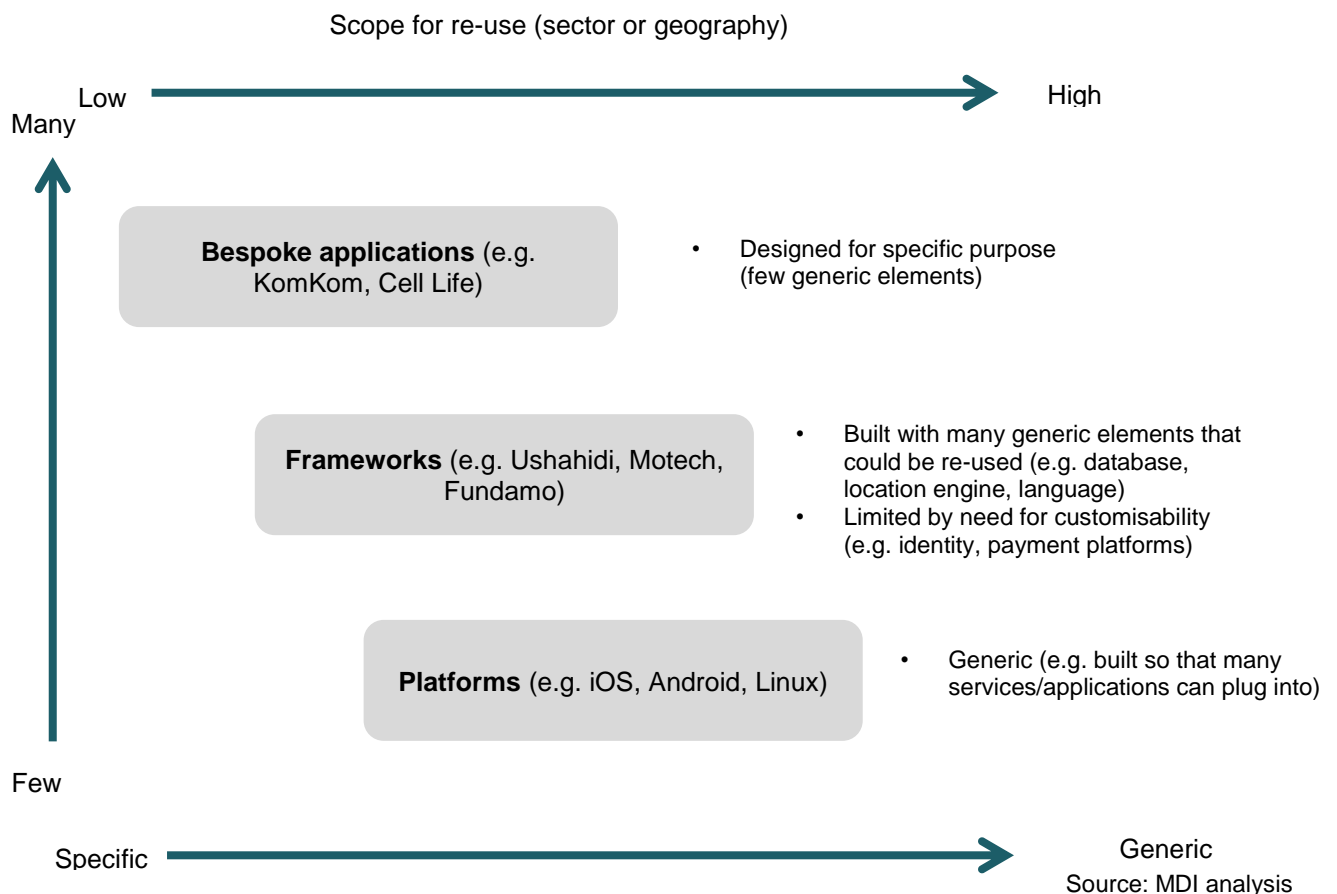
A more helpful view: frameworks

Given this lack of clarity, we want to make the issue of re-use more transparent by drawing a distinction between a platform, framework and application. Details of this distinction are outlined below.



The reason we draw this distinction is that we see frameworks as best positioned to address the lost opportunities for re-use across the M4D service space (see Figure 31) – to take two sectors, there are enough common tools at the technology level that can be plugged into by a service targeting farmers as can be by one focused on mobile money.

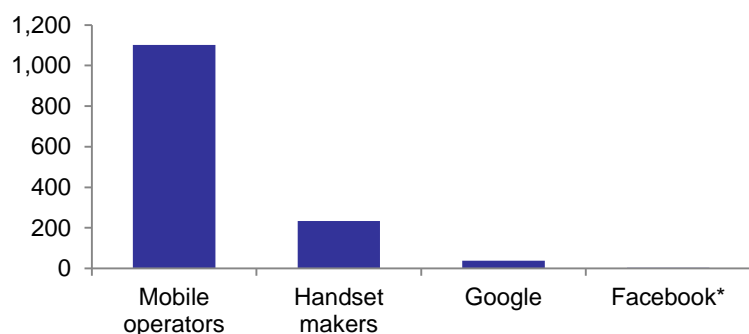
Figure 31. How re-usable are services?



What is needed to drive scale?

There is no silver bullet, but it is worth adding perspective. The scale of the global mobile sector is now around \$1.1 trillion per year, well above the handset market (around \$250 billion) and dwarfing the internet (see Figure 32 – unlike the mobile market, in which the average country supports 3-4 mobile operators, the internet business is dominated by a few players such as Google, Facebook and Amazon).

Figure 32. Global revenue (\$ billion), 2011

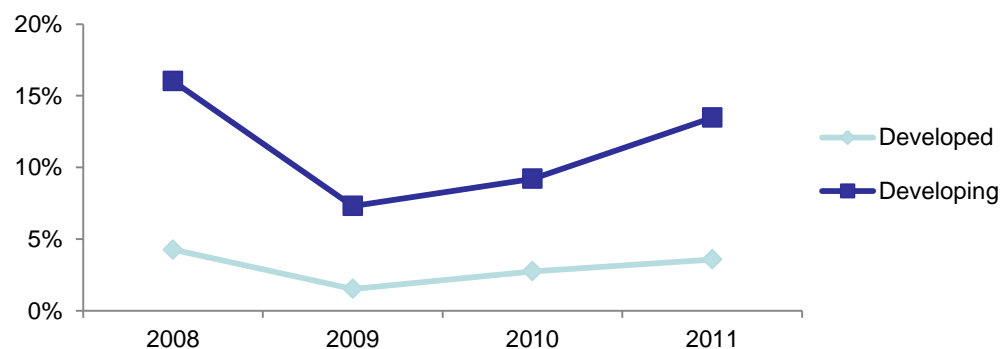


*Estimated by eMarketer

Source: GSMA Intelligence, Strategy Analytics, eMarketer, Google, MDI analysis

The global mobile market is growing at around 7% per year, with this being driven predominantly by developing markets, and the gap between these and mature countries continuing to widen (see Figure 33). This is a growth story driven by subscriber growth, with still significant headroom given that less than 50% of people actually subscribe to mobile services. Given the experience of most developed countries, we believe penetration is likely to rise to around 80% of the population before beginning to plateau.

Figure 33. Mobile revenue growth



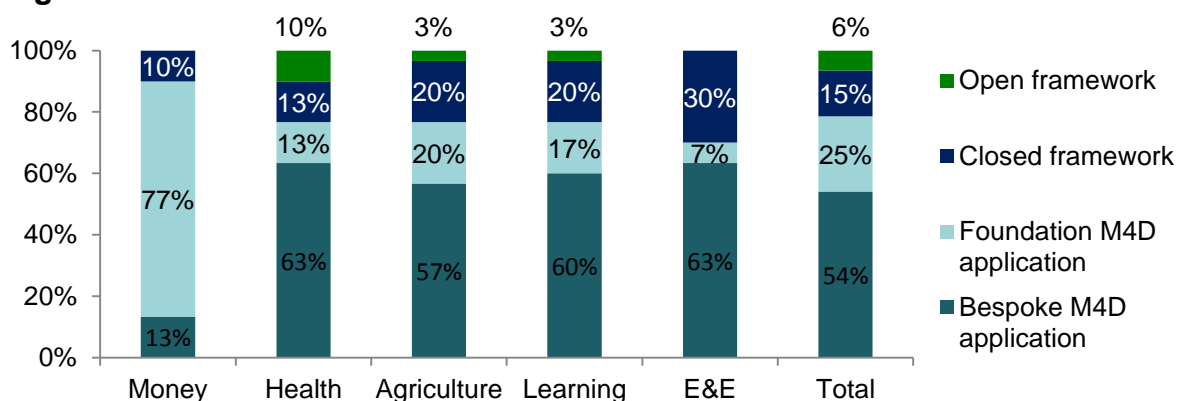
Source: GSMA Intelligence, MDI analysis

One of the key challenges is dealing with a shift in communication behaviours away from voice and towards data-based methods (e.g. email, social networking). Of course, shifts in human behaviour can rarely be predicted and almost never halted, they can only be managed. While this means services must be aligned with consumer communication behaviours, it also presents an opportunity for investment in mobile-enabled services (within the VAS line of business) to drive continued growth. However, to scale these services, three broad barriers must be overcome: cementing the value chains, driving more sustainable business models (that align entrepreneur and investor/donor interests), and increasing the visibility of players in the market so that partnerships are more easily formed.

Defined value chains

Much of the growth in the M4D sector has come from services designed to do a specific thing in a specific country (bespoke applications). Part of this is likely due to the sector being rooted in social impact, with funding of services in the early and mid 2000’s largely donor driven and with a lot of duplication across countries, particularly in the mobile health sector (see figure 34). There is, however, one notable exception in mobile money. The majority of mobile money services (around 80%) are built on top of a limited number of frameworks, often developed and owned by vendors (e.g. Fundamo, Comviva) who occupy this distinct section of the value chain between the service provider (often mobile operators) and end customers.

Figure 34. Does the mobile service use a framework?

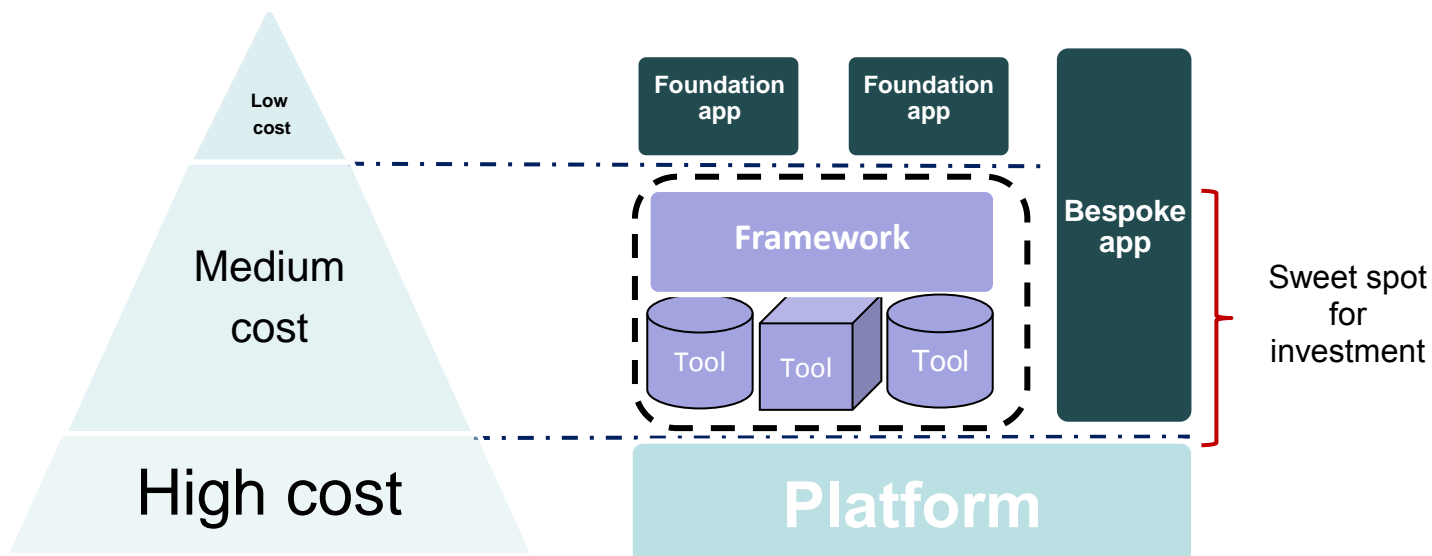


Source: MDI analysis

The value of mobile money frameworks can already be seen by their re-use in other sectors – utilities (e.g. lighting access), agriculture (micro-insurance with mobile payments), and entrepreneurship (e.g. supply chain management) are some good examples.

Due to the high upfront costs of developing frameworks, this approach is often not feasible for early-stage or even mid-size companies. However, joint investment both in financial and human capital from *different* stakeholder groups – including international development organisations, entrepreneurs, investors and mobile operators – is more viable given the shared interest, albeit with different incentives, in scaling mobile in the developing world. This is already happening – Motech (see Spotlight below) and Ushahidi are examples of this joint investment model – which we believe will be replicated as further success stories become more evident.

Figure 35. Where is investment needed?



<p>Year launched Ghana v1 – 2010; India v2 - 2012</p> <p>Business model Dependent on implementation</p> <p>Targeted Device Basic phone and featurephone</p> <p>Primary Delivery Technology IVR; SMS; Java App</p> <p>Products & Services Data Collection Inventory Management and Last-Mile Supply Chain Service support for behaviour Change & Demand Generation Managing Patient Data Agent/Worker Performance support Patient Adherence</p> <p>Markets deployed in Asia - India Africa – Ghana, Zambia (more Sub-Saharan Africa in development)</p> <p>Estimated number of users Dependent on implementation</p>	<p>Spotlight</p>
	
<p>Background and opportunity MOTECHE was developed out of frustration with an overabundance of pilot project mHealth activity that has failed to deliver sustained impact at scale, placing a burden on health workers and systems and increasing costs and inefficiencies for government ministries, donors and NGOs.</p> <p>The first phase of this initiative was led by Grameen Foundation in Ghana. That work led to the development of the MOTECHE Suite, also led by Grameen Foundation, along with a consortium of interested partners in Dimagi, InSTEDD, OnMobile, OpenMRS, ThoughtWorks, University of Southern Maine and others. The MOTECHE Suite consortium has core funding from the Bill and Melinda Gates Foundation, as well as project-specific funding from such organizations as Johnson & Johnson, USAID and the government of Norway.</p> <p>To help realize the promise of mHealth, the MOTECHE Suite delivers an integrated framework of complementary applications that are designed to be scalable, sustainable and readily deployed.</p> <p>Progress since launch MOTECHE has evolved significantly since its inception in Ghana in 2010 in its version 1 guise which focused on sending messages to pregnant parents and collecting data from community health workers. Version 2, developed for the TAMA and Ananya</p>	

initiatives in India, saw the software framework overhauled to provide for scale and easier customization for a diverse set of use cases. Currently the team is working on a cloud based implementation which will allow for rapid setup for new implementations along with an easily scalable platform.

This underlines the value of frameworks where each generation improves and learns from the last. As it goes through new implementations the framework will evolve and improve to support wider functionality, scalability and reliability.

Scalability

MOTECH has significantly changed in relation to supporting scale. The first version supported hundreds of health workers and around 25,000 patients in limited regions of Ghana with E1 connections to mobile operators. The second version has been designed to support tens of thousands of health workers and millions of patients in India. It is hosted in a commercial data centre linked into the service provider and mobile operators' infrastructure. A planned cloud version will allow the depth of implementations to grow quickly and scale with relative ease.

How does the organisation build itself around the end-user?

The individual implementations of MOTTECH will largely dictate how closely it can be aligned to end-user needs along with their ability to continue expanding coverage of mobile channels (SMS, IVR, apps etc) and devices. However, given the highly user-centric implementations such as Grameen Foundation's Mobile Midwife in Ghana and BBC Media Action's services in Bihar for Maternal Health Care, this can only help to improve MOTTECH's ability to support user needs in future implementations.

The flexibility of this framework approach allows elements to be developed which can be rapidly evolved to meet other user needs in separate implementations without the need to start from scratch again – all whilst growing the tools/features of the overall framework in a user-centric nature.

Challenges: internal and external

As the number of implementations grow (and with it their relative scale) the main challenges will be in managing the evolution of the core framework to make it sure it meets a wider set of requirements.

As services supported by MOTTECH become more prevalent and scaled there will be a greater pull on resources to give higher levels of support to commercial and NGO organisations where their users have come to rely on such services.

Value of partnerships, particularly with mobile operators?

Partnerships with implementers and supporting organisations such as NGOs, Service Providers, MNOs, etc. is a requirement to the on-going improvement of the framework, in order to push:

- New functionality
- Reliability
- Scale
- Support
- Reducing risk and cost of framework use.

An example could be in a specific implementation of MOTTECH with BBC Media Action (Bihar) – MOTTECH was used to support a number of services including a "Mobile Academy" to allow health workers take a comprehensive, interactive IVR-based course designed to increase their knowledge of life-saving maternal-and child-health (MCH) behaviours and improve their communication skills. Secondly, a health worker mobile job aid called "Mobile Kunji," where health workers can use their phone to access IVR-based messages promoting critical MCH behaviours, and play them to patients. Finally, a direct service to pregnant women and mothers of young children where they

can receive IVR calls that remind them of healthy behaviours, and encourage them during their pregnancy and baby's first year to follow the schedule of care prescribed by the Bihar government. The services were designed to be available on any handset, across all the major operators in Bihar, on a minimal or no cost basis. All content is available in the local language.

For this MOTECH was used in combination with a number of complimentary systems provided by a local service provider (OnMobile) and the Mobile Operators systems.

Any organisation undertaking the use of MOTECH as a core component will potentially face issues around:

- Potential complexity risk – there was a risk of introducing a major component which underpinned the services which was “alien” to the contracted service provider and mobile operators. On the surface, taking a more direct approach of implementing the services entirely on the service provider and MNO platforms could be seen as less risky and potentially less costly given the lack of familiarity with the framework
- Potential scale risk – as MOTECH is continually being adapted and new implementations are being done, it is not always easy for early adopters to understand whether the design is scalable. This is particularly true given there are still relatively few large scale deployments in a commercial environment with all the support and liability issues entailed in such a system

However, in taking the above risks each implementation helps reduce them for future implementations through the improvements required in each new version.

Sustainable business models

In order to find the successful business models that are going to reach scale in the developing world we need the right kind of capital to support the development and deployment of these businesses to scale. So far, we have identified a number of barriers to success around understanding the market, the end user, and the technology. Another key area that will need to be addressed to reach scale is the behaviour of the investor.

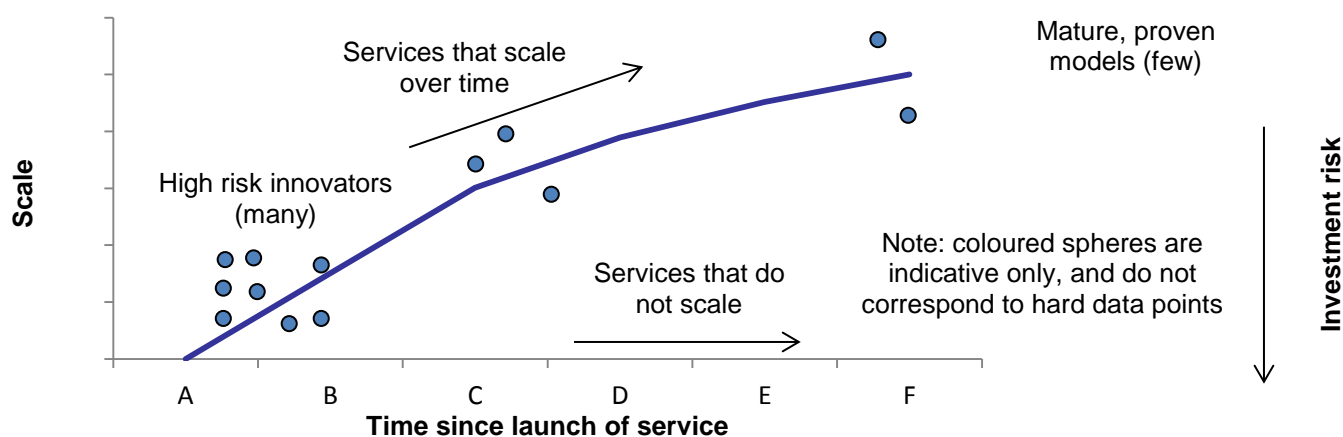
Beyond start-up funding from savings and family, much of the investment in mobile entrepreneurs and services in the developing world has come from social investors – who generally target both a financial and social return – and donor groups. The social investing market as a whole – including mobile, tech and other sectors – is still relatively small (a recent Global Impact Investing Network (GIIN)/JP Morgan survey of social investors suggested around \$8bn was invested in 2012, with an expectation for a slight rise to \$9bn in 2013⁷). While there is a general lack of disclosure in this area from private investors, we believe from discussions that much of the funding has been directed towards businesses

⁷ Perspectives on Progress: The Impact Investor Survey; GIIN and JP Morgan, January 2013. Amount invested based on sample group, and as such is not meant to be exhaustive for the entire market http://www.thegiin.org/cgi-bin/iowa/download?row=489&field=gated_download_1

that are mature and largely proven, with relatively little towards earlier stage entrepreneurs. While donors have provided funding for earlier stage ventures, relatively few have successfully transitioned to standalone, sustainable entities once funding comes to an end.

To some extent we believe this is a result of a business skills gap – mobile, particularly in emerging markets, has attracted many bright young entrepreneurs with high potential for innovation but lacking the business know-how to deliver it (innovators, see Figure 36). However, we believe this is also a consequence of developed world investors attempting to port traditional risk/return relationships established over the last 30-40 years (and now entrenched in decision making) to developing markets. In addition, some investors are seeking to make investments an order of magnitude higher than is actually needed by the entrepreneur (e.g. \$10m when \$550k would be sufficient). Some of this will be the result of being bound by a fund’s term sheet (e.g. not allowing investments below a certain size), and some will be more secular given the cost and time of running due diligence make considering smaller investments less attractive. In this investment milieu, the risk profile of start-ups in emerging markets is considerably higher than similar companies in mature markets (e.g. US, UK, Germany), with political, economic and social risks all present and real in addition to those related to executing a business model.

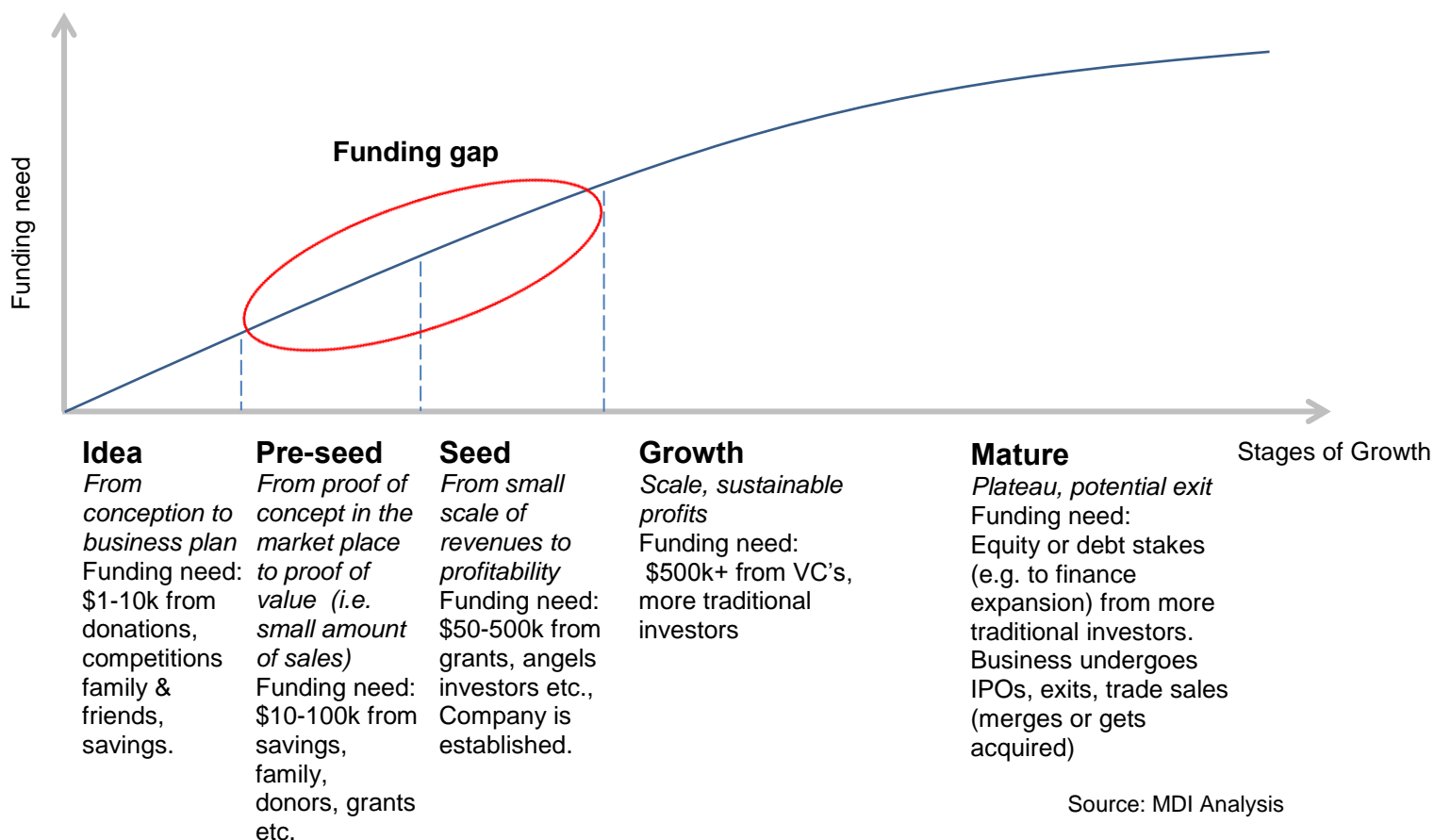
Figure 36. Reaching maturity



Source: Omidyar Network, MDI Analysis

As a result, there is a significant slice of entrepreneurial talent with the potential for delivering innovation that has gone unfunded, leaving a funding gap. Looking at the problem through a traditional funding timeline used by VCs, the gap is roughly between the start-up (or ‘idea’) and ‘growth’ phases (see figure 37) – the period where a business goes from concept to commercial operations and relatively stable revenues.

Figure 37. Financing innovation – missed opportunity?



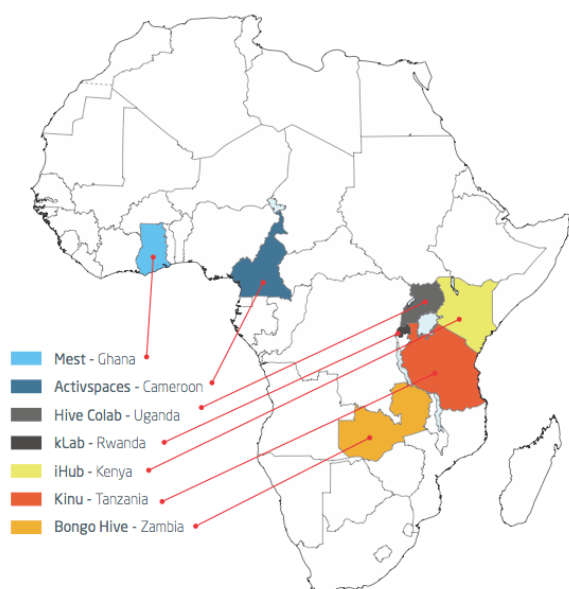
There is growing recognition that this hole in the middle (sometimes called ‘the missing middle’) is a drag on progress and a barrier to scale. Funding attitudes among donors and impact investors alike must shift in three key ways. The first is to view investments more from a risk capital, as opposed to subsistence perspective, more in line with traditional VCs that fund innovation despite the high probability of failure of many firms. The second is in understanding that a degree of flexibility in the business plan and strategies pursued by entrepreneurs must be tolerated by donors and investors given the inherently different risk profile of the environment these mobile businesses are operating in. Short term returns are less likely, with a greater need to mentor talent to drive medium and longer term returns. Finally, businesses offering mobile-enabled services must design and modify around the end customer. This user-centric innovation is not itself a new concept but one of importance given the rapidly changing economic and social environment in many developing countries, with an opportunity for carrying this out much more efficiently using mobile than has been possible in the analogue past (see [section 4: user-centric innovation](#)). Buy-in from donors and investors of this iterative design-and-modify process is important not only in recognising this as part of operating a start-up or small business in the developing world, but also at the level of integrating it into the investment scanning and decision making process of the investing/funding organisations themselves.

Innovation centres across emerging regions (notably sub-Saharan Africa) also play a part in mitigating this gap by connecting entrepreneurs and investors, especially to provide mentorship and the ability to incubate ideas from concept through to commercial deployment (see Figure 38). Mobile operators are increasingly aware of the benefits of generating a larger ecosystem (e.g. Orange Technocentre in Cote d'Ivoire was set up in this context) and as such aiming to partner with businesses that bring both innovative services to meet the

needs of local customers beyond traditional mobile telephony services (mainly voice and SMS) (which there is no shortage of) *and* that offer sustainable business models (which there is).

One of the most interesting emerging ways to do this is by hosting test networks within innovation centres, jointly run by mobile operators, entrepreneurs and innovation labs. This would involve a sandbox of APIs⁸ that allow developers to test out how their service would work on a mobile network in a lab setting before actually entering into a partnership with an operator – essentially taking the concept of an innovation lab to the next step. While this holds obvious technical benefits in terms of testing the performance of services pre-launch (e.g. to minimise latency), we think the real value is in developing deeper partnerships between entrepreneurs and operators, especially at the regional level where a VAS business can be spread across a much larger mobile network footprint.

Figure 38. Innovation centres in Africa



Source: iHub

Market visibility

The growth in mobile-enabled services across the developing world has attracted a large and growing network of organisations. MDI now tracks over 600 different players in this space (see our [products and services tracker](#)), from operators to entrepreneurs to investors. Indeed, this is in many ways representative of the value offered through mobile, particularly for a sector whose growth potential has only partly been realised. However, it also raises a challenge in the form of visibility.

Who should I partner with? Why? And, how should I go about this?

These questions become important in light of the sheer number of potential partners an entrepreneur (or investor, or operator) faces. Take an entrepreneur in the health sector whose service allows health workers on the front line to collect, upload and send data to a central location (e.g. laboratory of a university or private firm). The business first needs to

⁸ Application Programming Interfaces (APIs) – these are specifications for how software should interact with other software

have a good view of the competitive landscape and of customer needs ([see section 4: user-centric innovation](#)). It also needs to determine the level of mobile coverage in the areas the business operates in to ensure reliability of service. This type of service could feasibly be run either through SMS/USSD or through an app with the data hosted in the cloud. If run over the mobile network, an operator partner would need to be selected. A business would need to approach an operator either at the country (op-co) or regional level. Following a successful business pitch (a milestone in it of itself), the question then becomes what type of financial agreement is made – most often this comes as a revenue share agreement – and for how long (if the business model changes from a margin play to, say, subscription revenue, an entrepreneur may wish to negotiate a shorter term agreement).

This set of decisions is helped through experience and by an increasing presence and contact base in the mobile sector – as borne out by leading firms in the sector (see below). The big challenge is in the early stages.

Spotlight: Attitudes to partnerships, especially with mobile operators?



[See full case study](#)

Sector: mAgri
Region: East & West
Africa
Launch: 2008

Enterprise partners are integral to Esoko's business model, and are therefore of the highest value. All partners come with their specific set of needs and requirements, whether corporates, development projects, MNOs, or ministries. "They're all potentially very exciting." Esoko have found it difficult to work with MNOs to date because their terms of revenue share haven't yet been economically viable. They have also struggled to communicate the value of their agri service to MNOs, "it's not a sector that's represented real value to them in the past. You need to approach them in such a way as meets their business objectives, which is client acquisition and declining ARPUs." Even now, Esoko feel that because models aren't yet proven, it is hard to interface with MNOs on a business and technical level.



[See full case study](#)

Sector:
mEntrepreneurship
Region: Mexico,
Columbia
Launch: 2008

Frogtek's project is complex enough to need collaboration of many different players including payment providers, mobile operators, hardware providers, integrators, banks, consumer-goods companies and shopkeeper associations. These partnerships are all clearly of value. With respect to mobile network operators, Frogtek conducted a pilot with Teléfonica in México during their trial period. This carrier now provides them with the data plans that go along with Tiendatek (flagship service). In addition, the team working on Frogtek's products have experience working in the telecoms industry. For example, David del Ser (the founder), Guillermo Caudevilla (the CTO) and some of the first engineers who worked on the prototype for Tiendatek had prior experience as Vodafone Group Research and Development employees. In addition, Frogtek's current CEO, Marcos Eshkenazi, manages the Movistar distributor leader in México. "Obviously all this prior experience does not mean we know everything we need to know about mobile carriers in a complicated market such as Latam, but we have, at least, the background."



See full case study

Sector:

mEntrepreneurship

Region: Africa, Asia,

Latin America and the

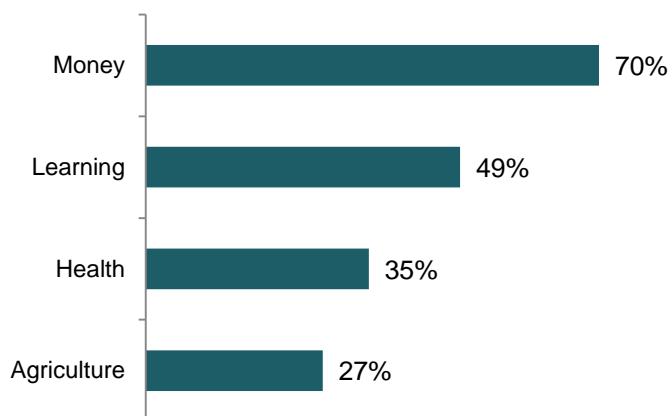
Caribbean

Launch: 2006

Souktel has core partnerships with both MNOs and aid agencies, both of which are valuable. These are clearly different in that MNOs are fundamentally commercial entities which focus on earning revenue, while non-profits have social concerns more explicitly woven into their bottom lines. As a result, Souktel’s approach to partnerships between the two is very different. Even while trying to adopt a uniform method when approaching new MNOs, the reality is that these operators can be very different. In some cases Souktel is directed to the Corporate Social Responsibility (CSR) team, in others to the VAS (Value Added Services) team of a given MNO. “This being said, once you get a handle on the way a specific MNO works then you can typically apply the same approach in multiple countries.” The interesting thing that the aid agencies bring is insight into the needs of job seekers. “These agencies provide a lot of information that helps optimise the service to meet the needs of end users.”

Mobile operators have the largest footprint in the sector, but it is not evenly spread. Mobile money services remain the most popular, with around two thirds being led by a mobile operator (as opposed to the operator partnering with another service provider and branding with the partner’s name). While this reflects the relative maturity and proven value proposition of mobile financial services in emerging markets, it underlines the as-yet unexploited opportunity in other verticals, particularly health, agriculture and small business applications. As with the challenge in bridging the funding gap for early stage entrepreneurs, scaling mobile services in these verticals will come down to an increasing focus on clear business models that are clearly communicated between potential partners – this will allow entrepreneurs, donors/investors and operators to use their comparative advantage (what they do best).

Figure 39. M4D services led by MNOs



Source: MDI analysis

4. User-centric innovation

What do we mean by user-centric design?

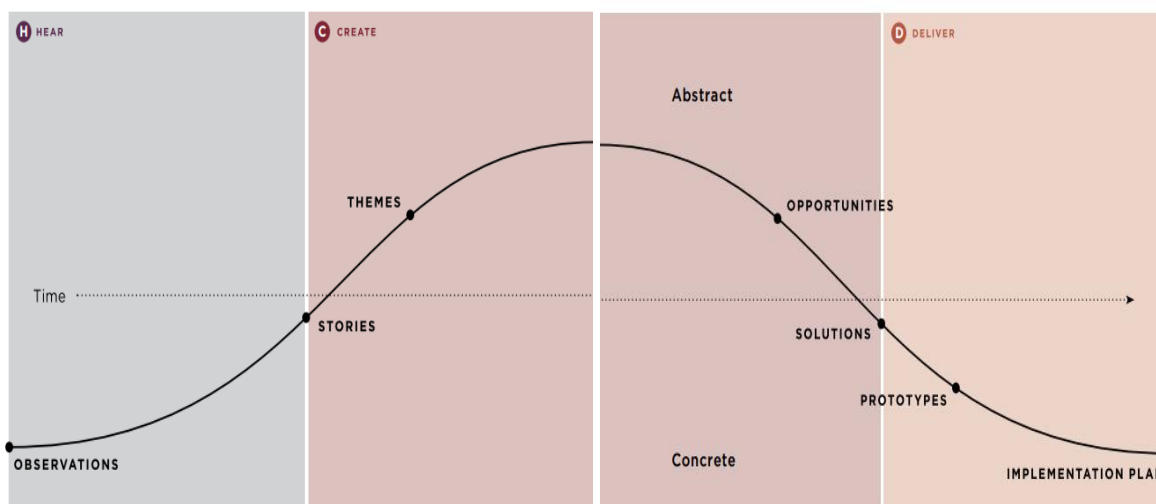
A paradigm of putting the user first in problem formulation

The basic principle underlying user-centric design is not new, and is simply stated: “the customer is the most important part of the production line” (Deming: 1982). In other words, it involves putting the user at the heart of framing problems in such a way that their needs are being served first. This can often involve the subtle restatement of a problem, such as shifting from “how can we get farmers to use our information about market prices via mobile?” to “how can we create information services for farmers through their accessible means (e.g. mobile), in such a way that serves their agricultural needs?” In other words, user-centric thinking is better represented as a general paradigm rather than a fixed set of practices. It essentially changes the focus when looking at problems and opportunities.

‘Design’ covers a wide variety of processes

We should also stress that “design” here refers to a wide range of processes. For example, it could refer to a concrete product or service solution itself, or perhaps the development of a business model, or even creating organisational culture. In the more obvious product design case designers should ask: what are the genuine problems that users face and how should we design concrete solutions that meet them? Below is a sketch of the IDEO HDC process that guides designers through the process of initially taking observations (hearing), to a phase of ideation in which stories are crafted into solutions (creating), and then a phase in which concrete solutions are prototyped and implemented (delivery; see figure 40).

Figure 40. IDEO HDC user-centric design process



Source: IDEO HCD Toolkit

Design also covers the design of strategies, business models and other business activities. For example, the ‘design’ section of *Business Model Generation* covers business model design techniques including Visual Thinking, Prototyping and Storytelling. Design can even refer to a process as broad as creating organisational culture. This may well depend on designing the entire lifecycle of a customer, from learning about an organisation to ending

the relationship with that organisation. By actively designing a customer lifecycle the organisation can align its culture, strategy and other business activities around it.⁹

A common characteristic: user first, keep learning and improving

What we here call ‘user-centric design’ goes by different names. For example, IDEO call it Human-centred design, defined as “a process and a set of techniques used to create new solutions for the world... [including] products, services, environments, organizations, and modes of interaction.” Here the process of design starts with the question ‘what do people desire?’ and moves onto explorations of technically feasible and financially viable solutions subsequently.¹⁰ Notably, IDEO’s toolkit shares many features with other widely adopted and much discussed design and business model generation tools (e.g., business model generation, or the lean startup method). Each of these emphasise their focus on end users, and the need to create a plan for on-going learning and iteration (e.g. design doesn’t cease).

Why are we interested in this with respect to scaling M4D services?

From a development perspective, mobile focused or otherwise, services should always be designed around end users. While this has always been the ‘ideal’, it has historically been very difficult to implement due to resource limitations in developing markets and the lack of an efficient process for doing it. This has been particularly difficult with respect to data collection, monitoring and evaluation. Mobile changes this. It represents an opportunity through connecting businesses to end users; enabling them to better collect, understand and utilise end user requirements. In other words, mobile helps illuminate behaviours and information about the end user that was previously unavailable. Moreover, the interest in better illuminating end user behaviour represents a key area of overlap between the mobile industry and international development organisations. Therefore the topic of user centric design provides opportunities for partnership between these larger players in the M4D ecosystem.

The basic reason that all such players are interested in user-centric design is that it reduces waste. User-centred design (UCD) is critical in unearthing genuine value propositions for M4D services and business models, which ultimately reduces the failure rate of M4D ventures, and thereby increases the overall return on investment in the sector; both socially and financially. More specifically, consider some of the cases below:

UCD can expose critical flaws early on

Such information (e.g., customer vernacular, user habits, etc.) might otherwise cause M4D services to fail, or cause severely impaired uptake. While missing critical information about customers will likely impair any product, the problem is more acute for BoP focused companies as these are not run by the individuals living at the BoP. This acts as an automatic hurdle for connecting with end users, and so increases the likelihood that basic critical information is missed.

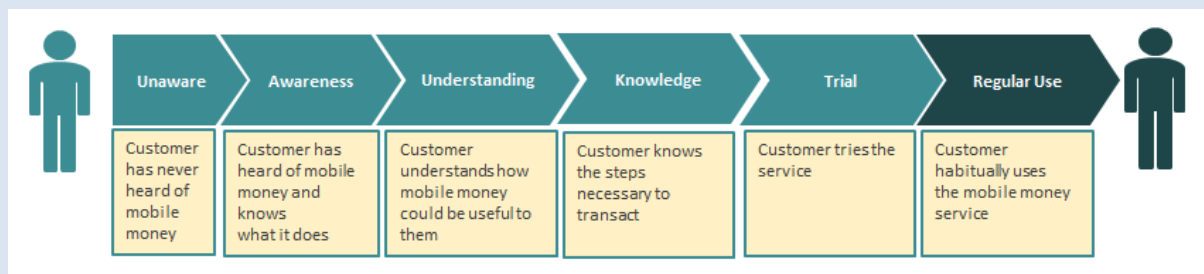
⁹ Interesting article on this topic <http://www.nextbillion.net/blogpost.aspx?blogid=3100>

¹⁰ IDEO’s Human-centred design toolkit is a great resource for further exploring these ideas on a more practical level

Spotlight

While MTN Uganda had theoretically mapped out the process of converting a customer who had never heard of mobile money to one that habitually uses the service, there were practical barriers in this journey (see figure 41).

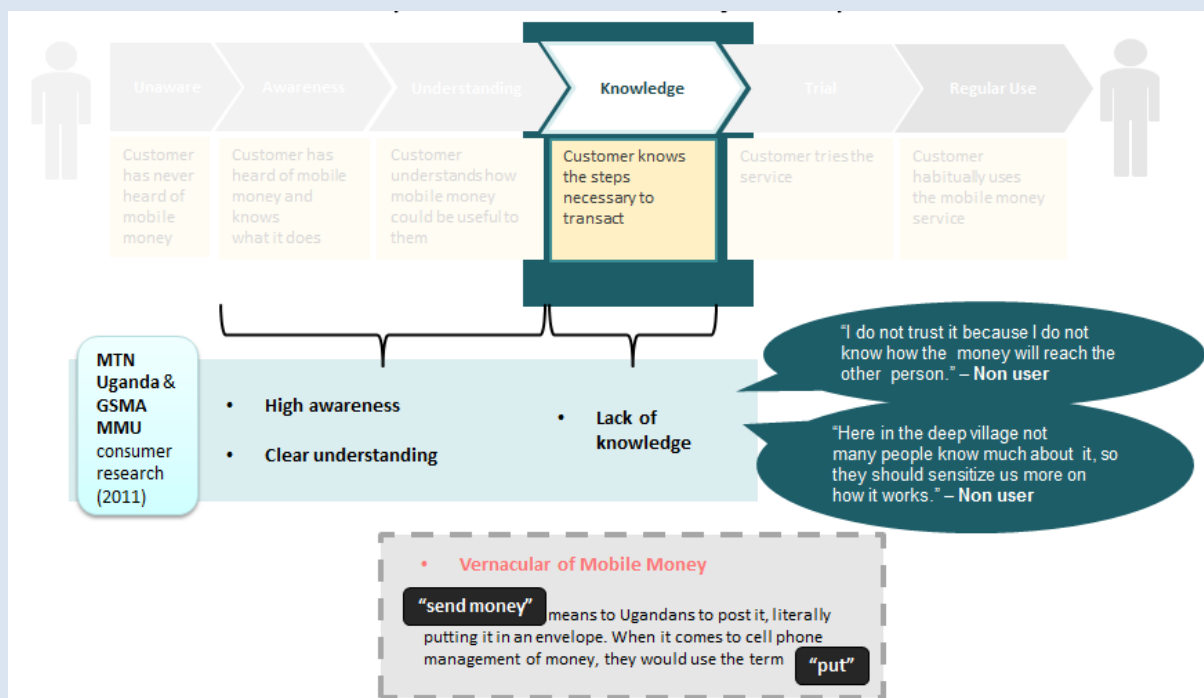
Figure 41. MTN Uganda mobile money conversion map



Note: adapted from “Marketing Mobile Money: Top 3 Challenges” - Yasmina McCarty, June 2012
 Source: GSMA Mobile Money program, MDI Analysis

The gap was caused by customers receiving insufficient training to meet their needs in using the service (at the knowledge phase; see figure 42). Drilling further into this, it transpired that a key barrier was the vernacular: the term ‘send money’, in Uganda, translates to literally posting money, and made no sense in the context of mobile money to them. A better term turned out to be ‘put’.

Figure 42. Non-users feedback regarding knowledge of MTN Uganda



Source: GSMA Mobile Money programme; MDI Analysis

UCD is a critical way to improve existing M4D services

Willingness to re-design existing M4D products according to customer needs is an important way to increase their effectiveness. By continuously talking to customers and constantly monitoring their use of the service, service providers can identify gaps in the services they provide and think of ways to address those gaps.

Spotlight

Tigo's first foray into the world of Mobile Money was in 2008 with the launch of its product Tigo Cash. Tigo Cash was an e-wallet which offered a range of products and services, but promoted merchant payments as the primary functionality. The market's reaction to the product was disappointing with low customer registration and transactions.

In July 2010, Tigo re-launched its service under the name Giros Tigo. Unlike Tigo Cash, Giros Tigo focused on one high potential customer segment with a Mobile Money product that was designed specifically to meet their needs (see figure 43).

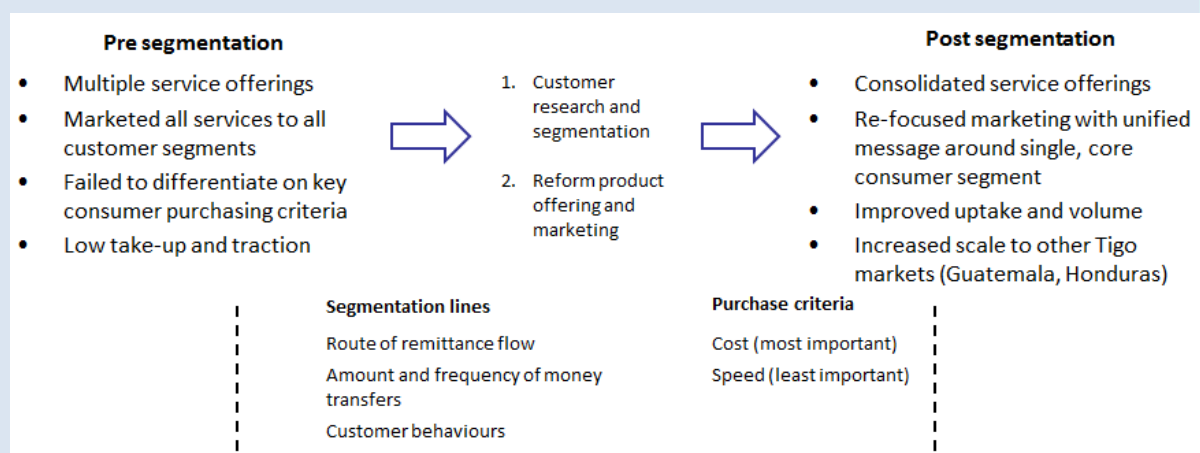
Figure 43. Tigo Paraguay mobile money service – before and after

	Tigo Cash	Giros Tigo
	Tigo (2008)	Tigo (2010)
Services	e-Wallet, merchant payments, domestic remittances via P2P transfer, top ups	e-Wallet, merchant payments, domestic remittances via OTC withdrawal, top ups
Marketing focus	All services	Domestic remittances
Registration	Application and validation at agent point	USSD (approximately 45 seconds)

Source: Tigo, GSMA Mobile Money program, MDI Analysis

Realising that the initial Tigo Cash product needed redesigning, Tigo commissioned a national quantitative study of domestic remittances and payments. The study highlighted the general payment behaviour of users, and also mapped customer preferences among other money transfer options (see figure 44). One interesting finding was that users were sending and receiving money via bus drivers. Although these money transfers often took the better part of a day, users had grown accustomed to it and were not complaining about the speed. Thanks to this insight, Tigo realised that the attribute which mattered most to the target segment was not speed but rather price. "To drive customer usage, we learned that it was necessary to compete on price. We had to demonstrate that Giros Tigo was better value for money than alternative money transfer options."

Figure 44. Pre vs. post segmentation comparison of Tigo mobile money products



Source: MMU – [A case study of Tigo Paraguay](#)

UCD and value creation incentives

Interestingly, much of the above discussion is relevant to any type of m-service in developing markets. What is the relation to M4D? As earlier highlighted, M4D products have different underlying business models – with revenue generating and donor funded models at either pole. The difference between these two models stems from their value creation incentives. While every service is built on a value proposition, a purely donor funded model runs the risk of misaligning its value creation incentives toward donors, as opposed to end users in developing countries. In other words, two sets of requirements from donors and end users (even if theoretically similar) can skew the value proposition. This is less problematic in consumer driven models, where it is clearer that value propositions are aligned to end users. While we should remember that some services are not always best delivered by consumer driven business models (examples can be found in health, education and utilities), it is nevertheless fair to say that when third parties pay for services this is more likely to produce misaligned value propositions and produce wastage. In turn, this is an argument to move – where possible – toward models that have their value creation incentives aligned primarily around end users, with business planning and execution tailored to this.

What are the attitudes of M4D organisations toward UCD?

As part of this research we asked leading service providers about their attitudes to user-centricity. Despite having very different areas of focus (from mobile money, agriculture to energy access) these mobile related services revealed common level themes. Firstly, all organisations clearly understood the value of designing services around end users, often citing this as critical to the organisation's ethos and success. Many also discussed particular means (including user surveys, analysis of product data, and focus groups) of better understanding user habits, behaviour, and needs. A high number of organisations also stressed the importance of hiring local talent, and working on the ground with end users wherever possible. Finally, and perhaps most importantly, organisations said it was crucial to constantly test their products against newly collected user requirements.

To provide greater detail, below are some of the individual responses from organisations to the question: how does the organisation build itself around the end user?

Spotlight: How does the organisation build itself around the end user?



[See full case study](#)

bKash has a core objective: to see low income users adopt electronic money as a genuine alternative of physical money. With this in mind, they understand that a key qualification needed to use bKash is confidence – “the confidence to believe that one can take control of her financial decisions, save money, spend wisely and complete transactions in a manner that was never possible before”. Achieving these levels of user confidence depends upon understanding current user requirements and habits in detail. Old habits (like keeping the money under a mattress, insecure transfers, and paying high transfer fees) need to be replaced by new habits (keeping money in a safe digital system, secure transfers, paying low fees, recognizing the importance of being part of financial inclusivity). The organisational goal of shifting these old habits to new improved habits depends upon first understanding and building around the end user.



[See full case study](#)

The Syngenta Foundation takes a hands-on-approach to helping smallholder farmers becoming more productive, getting better access to markets, and helping them manage risks. They do this through a number of projects in Asia, Africa and Latin America. The approach to designing software is informed by the Foundation’s work in the field, and they generally only design products and applications in instances where they are involved on the ground. This ensures that the team understand the use case. In the case of Farmforce, this was developed through a number of pilot projects on the ground in which the Syngenta Foundation was involved. “The team understands that it’s extremely important that the user defines what is required.” In addition, the way the team is integrated, the way requirements are communicated, and the way user requests are dealt with is all oriented around the user. “This is paramount to the organisation as a whole.”



FRONTLINE SMS

[See full case study](#)

FrontlineSMS is explicit about how the user features in its broader strategy: “user centricity isn’t just about design for us – it’s our whole business model. For example, we have a consultancy service where we do training, modification of the platform, hands on tech support, systems design and evaluation. This is all because the users asked for it, not because we thought it was simply a good idea.” Users ask the organisation about their knowledge of the platform, what other users have done with it, as well as best practice SMS use. In the same way, development of the cloud version of the software was in response user requests. “I think user centricity has always been at the heart of our organisation, and this has been one of our huge strengths.”



[See full case study](#)

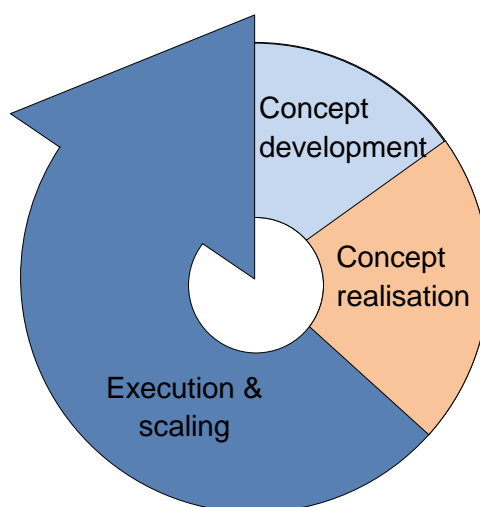
The basic need for electricity is clearly present within the rural communities. In the area in which OMC operates the average spend per household on kerosene is around 180 INR per month. With OMC's basic lantern service, these customers spend about 100 INR per month. "The value proposition to the household is clear – you reduce spend, reduce noxious fumes, and you get a much better service. One of the most important things is also going out there, demoing the equipment, and earning trust by being an active community member." OMC stress that, as an organisation, they are entirely designed and focused around their rural customers. "One of the big things that has really helped build the brand's credibility is that we do home deliveries and pickups. This means that every day we have two connection points with our customers, and we've been extremely quick to respond to customer feedback coming in." OMC appreciate the differences between communities in different localities, and therefore employ sales agents and delivery staff from the locality of each plant. They are also working with surveys to get more systematic feedback. Interestingly, when asked to indicate the customer needs identified, the company list the following in approximate order of priority: mobile phone charging, lighting, cooling, heating, cooking, entertainment, transportation, and irrigation.

How can we incorporate this thinking into M4D service design, and how does this impact our approach to funding M4D projects?

GSMA's Service Development Cycle

By considering how user-centric thinking impacts M4D services, a service development cycle emerges. Although developing different types of services clearly present unique challenges, meaning that the model we present here is limited in detail, we nevertheless find it helpful in illustrating a key point about M4D services at a high level: namely, that the ideal development is not necessarily matched with the way traditional funding models understand these services, particularly when funders' interests are to drive scale.

Figure 45. Service development cycle

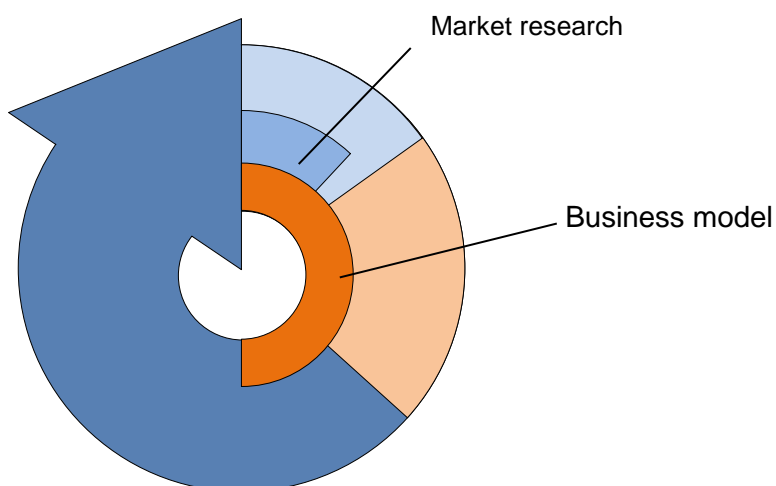


Source: MDI Analysis

To this end we first break M4D services into three key stages (see figure 45). The initial concept development phase involves requirements gathering, and a period of ideation to develop a concept. The second phase involves testing and realising concepts, where the business model, product, and content are repeatedly tested; evolving until a feasible service is established. The third phase, execution and scaling, arises only once a viable business model, product and service content have been established, and represents the stage at which significant investment is likely required.

What might these phases look like in more detail though? The initial **concept development phase** (see figure 46) will typically involve market research, and arriving at the first business model. This model must be flexible, while covering a range of basic questions about the service. Consider, for example, a basic IVR service targeted at frontline health workers (FHW), designed to deliver key medical information. Here we must ask: what is the value proposition to the FHW? What key activities and resources are required to deliver this value proposition? How is this channelled to the FHWs? Are these FHWs segmented into different user groups? What are the revenue streams? And so on. These questions should be answered by the business model, though in such a way as to be testable and alterable. Crucially, this business model should give us grounds to build our first minimal viable product (MVP). The MVP allows services to achieve a big vision in small increments, and is designed to test customer behaviour as soon as possible at minimal cost.

Figure 46. Concept development



Source: MDI Analysis

Flexibility of business model and MVP is critical at the concept realisation phase. This is because no amount of market research and ideation can substitute for actually testing whether the service works. In practice this plays out by iteratively testing the content, product, and business model against end user behavioural preferences – effectively a layered approach with multiple MVPs, each more refined than the last, which evolve and adapt by being tested against users. This is even more important for designers targeting end users in developing countries whose requirements are often harder to ‘second guess’.

Spotlight: Bihar BBC

The Ananya programme is funded by the Bill and Melinda Gates Foundation along with the Government of Bihar to help meet the Millennium Development Goals around child mortality and maternal health. As part of this the BBC is working on communicating key practices and has developed a number of mobile services (in support of a wider communication and behavioural change plan). After extensive user research they opted to focus their development around voice based services such as IVR.

One of these services is Mobile Academy, which is designed to support Frontline Health Workers (FLHWs) in the field by providing a standardised training course in key maternal and child health practices. This took the form of an IVR based training course which the FLHWs could work through at their own pace and receive recognition for completing the course by the local Government.

The BBC took a lot of care during the research and development of the service to not only identify and profile the users but also in the testing with the FLHWs as the service was developed through a number of iterations. In part, this was to make sure the service functioned in a way which was compatible with end users abilities and comprehension (e.g. navigation of the service) but also to ensure the content was clear, interesting and of value to the FLHWs.

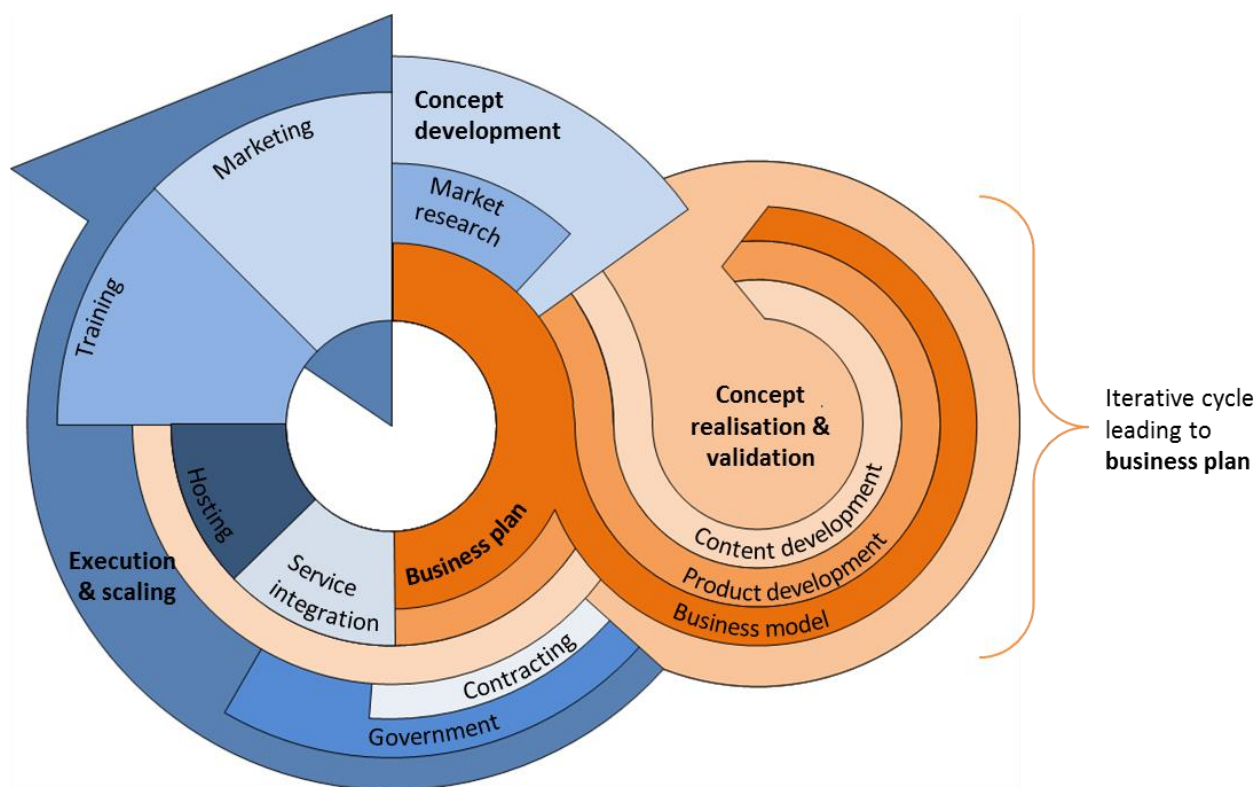
The service allowed the user to navigate through 190 minutes of material at their own pace through the use of bookmarking. The service was also paid for by the FLHW, so cost was kept to a minimum through the design of the service and low cost tariffs negotiated with the local MNOs. The BBC developed the service through a number of iterations to establish ease of use and the comprehension of the content to the FLHW.

During these development cycles the content was tested with FLHWs in the field to gauge their reaction (e.g. was the tone and gender of the voice used conducive to the FLHW learning the new practices, for example the use of rhymes and couplets to aid understanding). In doing this the BBC were able to make sure the service was not only highly usable but also provided the best chance of understanding and retaining the practices in line with their culture, nature and linguistic skills.

The iterative service testing cycle, which drives M4D services to better meet user requirements and reduces wastage across the industry, has the end goal of establishing a business plan (see figure 47). This will include a set of key performance indicators (e.g. user base, activity levels, the potential for social impact metrics), details of concrete revenue streams, estimated overall return on investment, and so on. While the specific content of a business plan may change, it must at least provide a formal statement of a set of business goals, the reasons they are believed attainable, and the plan for reaching those goals. The reasons cited must also come from the testing conducted at the concept realisation phase. In this way, creating a business plan depends upon first forming and testing a business model. A business plan is critical for the execution and scaling phase where significant investment will depend upon clearly stated business goals. This does not mean, however, that the user isn't considered at the execution and scaling stage. In fact, a business plan should include the goal of continually refining the product or service against end user requirements which are actively gathered and utilised.

This is at the heart of the sustainable business model problem highlighted earlier (see [section 3: platforms, multiplicity and the drive for scale](#)). Models drawn up by entrepreneurs must be flexible based on designing and refining products that do what the customer wants, with traditional risk/return attitudes from investors (especially those based in mature markets like the US) having to show flexibility to accommodate this. What will remain fixed, however, is the key value proposition discovered at the business model generation stage – what you do, what problem or market failure that solves, and how you make money from it.

Figure 47. Realisation, execution and scaling



Source: MDI Analysis

Two notions of success

This basic distinction between a business plan and business model has important ramifications for the way M4D service funding is conceived. A business model sets out an initial hypothesis that should be tested and validated (or invalidated as the case may be). This process of validation will require funding, where it is understood that ‘success’ will entail the discovery of content, or a product that genuinely meets users’ needs, along with a feasible business model that allows the service to sustain itself. This is quite different from ‘success’ at the execution and scale phase, in which achievement is measured in terms of the key performance indicators set out in the business plan.

In order to achieve these key performance indicators significant funding is generally required (e.g. for marketing and training users or agents to use the service). These may also include the kind of social impact targets that donor funding generally aims at. The issue, however, is that mature services eligible for the sort of funding that drives specific impact at scale are dependent upon a healthy number of viable service models already being known. Clearly then, funders must think about two kinds of success here, one (more traditional) model in which funding enables some specific sustainable impact, and another (less traditional) model

in which funding enables the *discovery* of services that achieve a less pre-determined kind of impact, and are also thoroughly designed around end users. Crucially, the latter ‘discovery’ kinds of successes feed the former ‘scaled’ kinds of successes. We believe there to be a general lack of funding and support currently provided for discovering user-centric viable services.

Application of service development cycle to frameworks

How might funders start to support the kind of ‘discovery activity’ described here? One suggestion relates to the notion of a framework already introduced. Frameworks target M4D service providers themselves as end users. By providing effective tools that enable a range of organisations across different sectors, an effective framework reduces the potential cost of MVPs, increases the speed of concept development iterations, and provides tools to test various implementations. This essentially reduces the barriers to discovery. Each use of a framework – e.g. Bihar BBC is one use of Motech’s framework – represents one iteration of that framework’s service development cycle. This means that every implementation of a framework naturally improves it, which, in turn will improve the quality of the services built using it.

Glossary

2G	The second generation of digital mobile phone technologies including GSM, CDMA IS-95 and D-AMPS IS-136
3G	The third generation of mobile phone technologies covered by the ITU IMT-2000 family
Active Mobile Connections	Active unique SIM cards (or phone numbers, where SIM cards are not used), excluding M2M, that have been used for voice, messaging or data activity on the mobile network over the operator's activity period, which can range from one to 13 months.
Advertising	Revenue generated from advertising delivered through service itself
API	An application programming interface is a protocol intended to be used as an interface by software components to communicate with each other.
Framework	A set of re-usable software tools and interfaces for developing applications
Apps	A software application designed to run on mobile devices. (typically smartphones, and tablet computers)
ARPU	Average Revenue Per User
Basic phone	Offers basic voice services (telephony/voice mail), SMS and USSD based services.
Business (B2B)	Businesses targeted by service to generate revenue. Generally supports internal business processes (e.g. Inventory management), or core business services (e.g., recruitment)
Call Centre	Simple voice call to a trained human content provider
Consumer (MNO led)	Rolled out as a value added service (VAS) by an MNO. While it may not earn revenue from customer directly, VAS designed to drive new customer uptake/ reduce customer churn.
Consumer (non MNO led)	Revenue generated directly by end user. e.g. subscription, one off mobile money payment
Data collection	Create customised surveys and send them to fieldworkers' mobiles
Donor	Primary funding comes from donor organisations, usually in a lump sum grant
Feature phone	Basic phone features plus... Internet enabled, supports transmission of picture messages downloading music, built-in camera
Foundation M4D application	Application that is designed to sit on top of a framework owned by another vendor
Government	Primary funding comes from government
GSM	Global System for Mobile communications, the second generation digital technology originally developed for Europe but which now has in excess of 71 per cent of the world

market. Initially developed for operation in the 900MHz band and subsequently modified for the 850, 1800 and 1900MHz bands. GSM originally stood for Groupe Speciale Mobile, the CEPT committee which began the GSM standardisation process

HHI	Herfindahl-Hirschman Index. A commonly accepted measure of market concentration. It is calculated by squaring the market share of each firm competing in a market, and then summing the resulting numbers
Interactive content	Content based services that users can access by querying a central database. May be delivered via IVR, SMS, USSD, app, WAP, etc.
Internet	A loose confederation of autonomous databases and networks. Originally developed for academic use the Internet is now a global structure of millions of sites accessible by anyone
Inventory management	Supply chain management and stock ordering tools. Product security / validation tools
IP	Internet Protocol
IVR	Interactive voice response, allows a computer to interact with humans through & voice recognition navigation and DTMF tones via keypad
Java	A programming language developed by Sun Microsystems Java is characterised by the fact that programs written in Java do not rely on an operating system
M2M	Machine-to-machine is a broad label that can be used to describe any technology that enables automated wired or wireless communication between mechanical or electronic device
MNO	Mobile Network Operator
Active mobile subscriber penetration	Unless otherwise specified, this is the total active subscribers in the market divided by the total population, expressed as a percentage. (It is not the more often cited penetration of total mobile connections, which will always be higher)
Bespoke M4D application	A “one off” application built from the “ground up
Open Source	Service based around open source software/framework. Value derived from external parties adopting service
Other	A “catch all” for devices not included in the above. E.g., modems, Personal digital assistance (PDA), etc.
OTT	Over the Top refers to video, television and other services provided over the internet rather than via a service provider’s own dedicated, managed IPTV network
Payments	Mobile wallets, payment gateways and a wide range of payment based services
PC/laptop	Personal desktop computer, or laptop. Typically running Windows, or maybe Linux OS.

Peer to peer content	Social networks and posting systems, users create and access content. Wide range of delivery mechanisms, even including voice
Platform	Generic in nature, could be used in a multitude of different services. An operating system, cloud, etc.
Push content	Content pushed out (one way) via voice message or SMS. May be “broadcast” or “narrowcast” (customised by location / user profile)
SIM	Subscriber Identity Module; A smart card containing the telephone number of the subscriber, encoded network identification details, the PIN and other user data such as the phone book. A user’s SIM card can be moved from phone to phone as it contains all the key information required to activate the phone
Smart phone	Feature phone features plus... graphical interfaces and touchscreen capability, built-in Wi-Fi, and GPS (global positioning system)
SMS	Short Messaging Service, allows exchange of short text messages between mobile phone devices
STK	SIM ToolKit: specified within the GSM standard, this allows operators to add additional functions to the phone menu in order to provide new services such as mobile banking or email
Tablet	Smart phone features plus... Larger screen, increased computing power, front and rear facing cameras, extra ports (e.g., USB)
TCO	Total cost of ownership
Text-to-Speech	Computer or handset based service that generates speech using text input
Total Mobile Connections	Total unique SIM cards (or phone numbers, where SIM cards are not used) that have been registered on the mobile network at the end of the period. Connections differ from subscribers such that a unique subscriber can have multiple connections.
USSD	Unstructured Supplementary Service Data. A synchronous message service creating a real-time M2P connection allowing a two-way exchange of data, mostly through menu structures
VAS	Value Added Services. Services beyond voice, SMS and mobile data access
Voice	Basic telephony services, with voice delivered over a mobile network
WAP	Wireless Application Protocol for accessing information over mobile network. WAP browsers typically found on older feature phones.
WAP	Wireless Application Protocol for accessing information over mobile network. WAP browsers typically found on older feature phones.
Web	A system of interlinked hypertext documents accessed via the Internet; also accessible via enabled mobile devices

About the authors



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Corina manages the Mobile for Development Intelligence programme. Building on ten years of international development experience across Africa and Central Asia, Corina brings a breadth of first-hand experience to the team. She joined GSMA in 2010 after completing an MBA from Cambridge University focused on Energy and Environment.



Adam Wills — Analyst

Adam joined GSMA in November 2012. His responsibilities on 'Scaling Mobile' included leading on multiple report sections, presenting work to external stakeholders in Africa, and conducting interviews to generate a range of supporting case studies. Prior to GSMA Adam conducted policy research in an MP's parliamentary office, with a focus on environment and international development.



Martin Harris — Director of Technology, GSMA Mobile for Development

Martin has been involved with the GSMA over the last three years working on various implementations in mHealth, mAgri and related programs, alongside carrying out research for the sector into the use of mobile technologies in the M4D space. Martin is also involved with a number of external companies focused around technology incubators and start-ups.

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