



Scaling Big Data for Social Good: The need for sustainable business models

September 2018



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Big Data for Social Good (BD4SG). The mobile industry is harnessing big data to help public agencies and NGOs tackle infectious diseases, disasters, environmental impact and climate change. This initiative is part of the mobile industry commitment to accelerating the delivery of the United Nations' Sustainable Development Goals.

We would like to express our gratitude to the members for the BD4SG Mobile Operator Taskforce and Advisory Panel for the contributions that they have made to this report (see website below).

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Executive summary

The United Nations' Sustainable Development Goals (SDGs) aim to address a variety of environmental, social and governance (ESG) challenges across the globe. Realising the SDGs will require efficient and effective solutions, underpinned by national and regional policies informed by timely and actionable insights. In many cases, however, access to the right insights at the right time to drive change is constrained by a lack of sufficient relevant data. The private sector can help achieve the SDGs by supplying expertise and information.

The usage of mobile networks by over five billion people generates huge amounts of data about people's geographic location, calling and messaging behaviour, and other online activity. This mobile 'big data' - when aggregated, anonymised and analysed - can provide valuable and actionable insights across a wide variety of use cases. While the majority of mobile big data implementations are

commercial use cases, such as digital advertising, research and pilot projects have demonstrated that the precision and frequency of mobile big data can also add value when addressing ESG challenges, from monitoring air pollution levels and tracking disease outbreaks to improving urban planning and responding to disasters.

Pilots play a vital role in proving the feasibility of mobile big data solutions across various social good use cases. However, to deliver scale and maximise social benefit, there is a need to move from promising one-off initiatives and projects to the use of mobile big data on a continuous, efficient, predictable and practical basis. The adoption of a sustainable business model at the right point in the lifecycle of a mobile big data initiative is a key enabler to realise this objective.

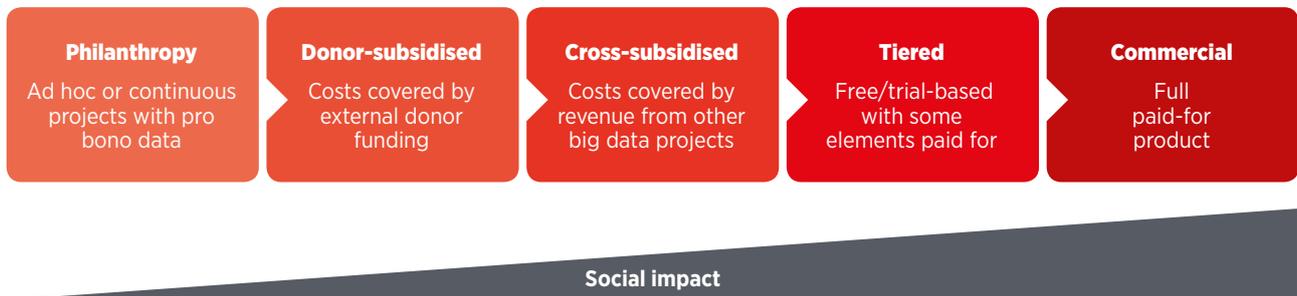
A sustainable business model for a mobile big data initiative is one that enables the transfer of intangible assets (data, insights, analysis, services) from a mobile network operator for use by a demand-side agency under mutually beneficial terms that enable an ongoing relationship between both parties.

Once an appropriate sustainable business model is in place, long-term investment decisions can be made. Proven solutions can be scaled up (more deployments of mobile big data, in more places, with more beneficiaries); stakeholders can have an incentive to invest in new technical capabilities (that may not be viable to develop solely for a pilot project); and data-driven solutions can be enhanced over time (to deliver better and faster insights, resulting in more benefit to the social challenge being tackled). A sustainable business model also encourages closer, long-term working relationships between the mobile operator and the demand-side customers, resulting in better knowledge sharing,

improved efficiencies, and a positive net economic value. This, in turn, can increase the social and reputational value of all parties and deliver better outcomes for the beneficiaries.

The primary research conducted for this paper identified five main types of business model (see graphic), with varying levels of sustainability, scalability, and potential to deliver long-term social impact. An assessment of the five types of business model against a set of sustainability criteria highlights the need for partners in a mobile big data initiative to select a sustainable model that is appropriate for a specific use case.

BD4SG business models



To realise the potential of mobile big data, there is a need for all stakeholders in the ecosystem, including governments, mobile operators, development agencies and NGOs, and donors, to implement sustainable business models for big data for social good (BD4SG) activities. This will ensure long-term growth and enable the mobile big data solution to scale, thereby delivering maximum social impact for the beneficiaries.

The following recommendations highlight the specific actions stakeholders on any given BD4SG project should take to facilitate the process of selecting and implementing a suitable and sustainable business model:

- **Run pilots with a clear pathway to sustainability** to reduce the incidence of one-off projects and enable all parties to share learnings and best practices
- **Ascertain the economic value of BD4SG activities** by investigating the positive economic benefits to the DSA, beneficiaries and other relevant stakeholders. The economic benefit is derived both from the delivery of social value and from efficiency gains from deploying a mobile big data solution.
- **Demonstrate shared value** by considering the long-term objectives and capabilities of the partners in order to select and implement a business model that delivers sustainable benefits for all parties.



Introduction

The mobile industry is harnessing big data to help public agencies and non-governmental organisations (NGOs) tackle infectious diseases, disasters, environmental impact and climate change. This report defines sustainability in the context of these Big Data for Social Good (BD4SG) initiatives, and describes why a sustainable business model should underpin these activities.

A number of studies and pilots around the world are using the big data generated by mobile networks to address a wide range of environmental, social and governance (ESG) challenges, from preventing the spread of diseases and responding to disasters to improving urban planning and reducing air pollution. These initiatives are demonstrating the potential for mobile big data to add a new and constructive dimension to problem solving. Actionable insights from mobile data can drive more effective and efficient solutions to tackle a wide range of ESG challenges, in line with the UN Sustainable Development Goals (SDGs).

However, mobile operators, demand-side agencies (DSAs), governments and other stakeholders in the BD4SG ecosystem vary widely in their experience and expertise with mobile big data. To support this ecosystem, GSMA Intelligence studied how mobile big data can create value, and identified the

opportunities and barriers to scaling mobile big data for social good activities. In particular, the research reviewed the business models that are emerging to support the maturing mobile big data landscape; and how sustainable business models can encourage long-term planning and development of social good programmes.

A sustainable solution requires several things to be in place; an appropriate business model is only one part of the solution. Other components include the policy framework, capacity building to ensure that the right skills are in place, and a process for governing and learning from each implementation and, therefore, improving the effectiveness and efficiency of the solution over time.

This document is part of a series of papers outlining the enablers required to achieve scale and impact for mobile BD4SG initiatives.

1. Context: SDGs and big data

1.1 The importance of the SDGs

Adopted by all member states of the United Nations in September 2015, the 17 Sustainable Development Goals (SDGs) encompass environmental, social and governance (ESG) challenges around the globe. Each goal consists of a number of targets and indicators that define clear measurable objectives to be achieved by a specific date. Governments have made commitments to work together with stakeholders from both the public and private sector to deliver these ambitious targets.

Now, governments, humanitarian and development organisations, NGOs and private sector players are seeking efficient and effective ways to solve the various challenges inherent in meeting the SDGs. However, in many cases, they lack the data required to shape national or regional policies to address these goals.

1.2 The emergence of big data

The increase in connectivity, the adoption of digital technologies, the rising levels of internet access and the use of social media, cloud computing and mobile devices are combining to drive exponential growth in the amount of data generated across the world. This phenomenon is referred to as big data, which research firm Gartner has defined as *“high-volume, high-velocity and high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision-making”*.

However, the value is not in the volume of data that mobile networks generate, but rather in operators' ability to extract relevant information and metrics ('mobile indicators'), which can be analysed to

extract meaningful insights to inform decision-making. A number of industries already use big data, demonstrating how valuable it can be as an aid to problem solving. One of the clearest examples is healthcare, where big data is transforming how illnesses are identified and treated, helping to improve quality of life and patient outcomes. In retail, big data helps retailers better understand their customers and ensures that products are available at a competitive price. Similarly, modern manufacturing increasingly involves the monitoring and analysis of huge amounts of data to enable high levels of automation through robotics.

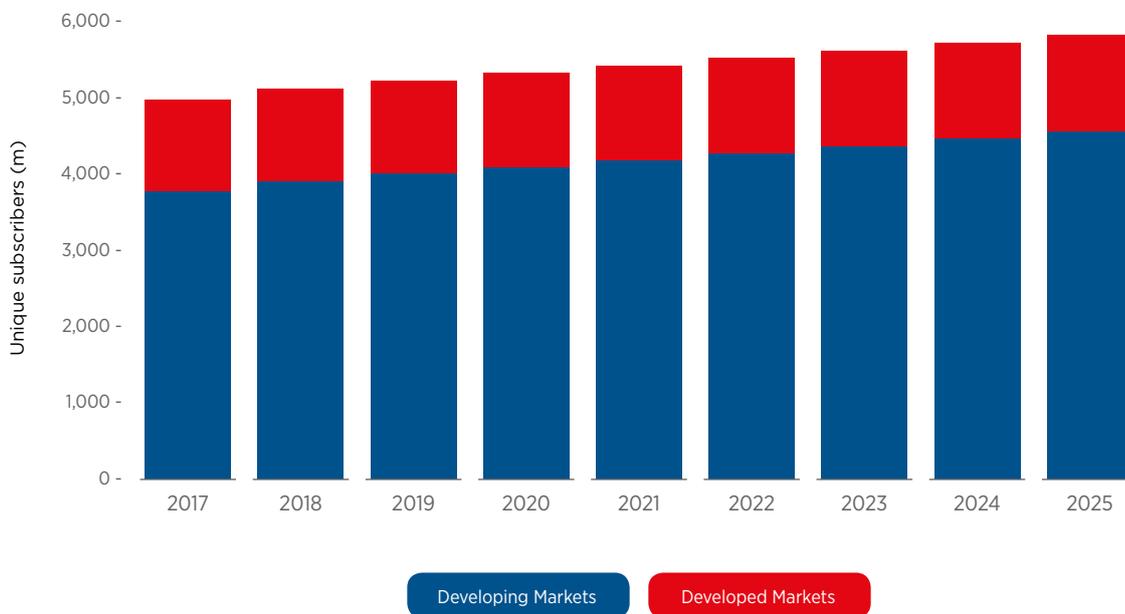
1.3 Growing adoption of mobile technologies driving mobile big data

Mobile technologies and devices are bringing connectivity and new services to previously unconnected populations across the world. As a result, mobile technology is a catalyst for both economic and social development, particularly in some of the poorest countries. The number of unique mobile subscribers¹ reached five billion towards the end of 2017, equivalent to around two-thirds of the global population (see Figure 1).

Figure 1

Source: GSMA Intelligence

The growth in mobile subscribers around the world



GSMA Intelligence forecasts the total mobile subscriber base will grow further to reach around 5.9 billion by 2025, taking the global penetration rate to 71%. On average, mobile penetration across developed regions is about 85%. In developing regions, the proportion of people with a mobile subscription will increase from 62% today to 68% by 2025.

Mobile networks and the devices connected to them produce huge amounts of data as a result of the daily use of mobile services. This mobile big data - anonymised customer data on user locations, behaviours, social networks, usage, spend etc. - is potentially a highly valuable source of information and insights, whether used in isolation or in combination with other data sets from different sources.

¹ A unique subscriber is defined as a unique user (a person) who is subscribed to mobile services at the end of the period. Subscribers differ from connections such that a unique user can have multiple connections

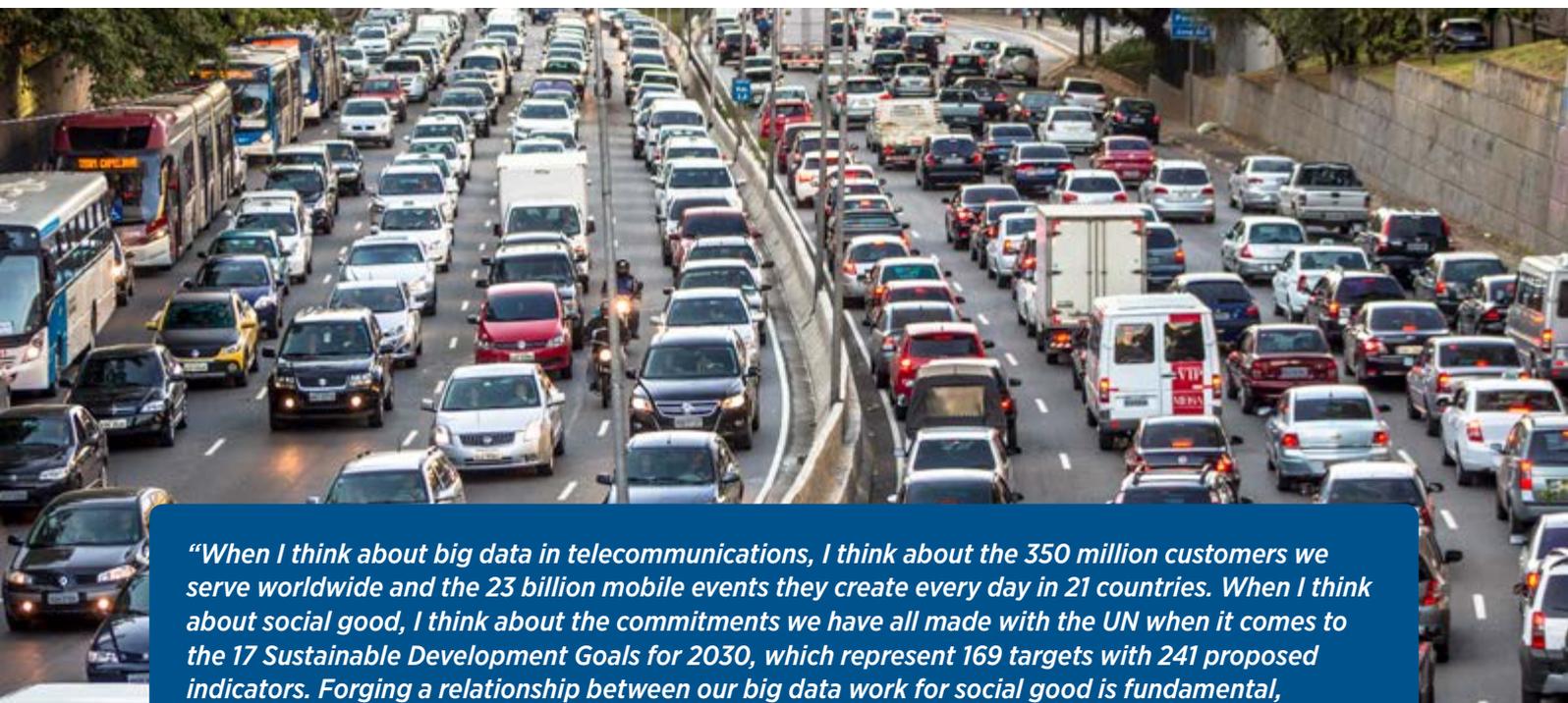
1.4 Social good as an important use case for mobile big data

Mobile ‘indicators’ can be derived from phone usage data, providing useful demographic, location and time information. When anonymised, aggregated and analysed in a given context, this data can provide valuable insights to guide decision-making. Mobile operator data has been used to support business decisions and strategies across multiple industries, such as financial services and digital advertising, as well as supporting the development of the Internet of Things. The insights derived from the data enable enterprises to optimise business operations and services, launch new products or define new business models.

Beyond established commercial use cases, mobile big data has the potential to be a transformative resource for good, addressing a range of economic, social and governance challenges. To deliver more effective policies and services, and to achieve the SDG targets, there is a pressing need to provide data and insights to key decision makers.

Numerous pilot and research projects have shown the feasibility of using mobile data to monitor air pollution levels, predict or track disease outbreaks, improve transportation flows, and respond more effectively in humanitarian crises.

Indeed, governments, humanitarian and development organisations and NGOs are showing increasing interest in applying mobile big data to a range of challenges, extending the relevance of mobile data beyond SDG monitoring. A list of current and future use cases was compiled from the responses to a research study, which was commissioned to inform this report (details of this research study are included in the Appendix). These use cases include time-critical humanitarian problems, such as disaster response and risk management; and the containment of infectious diseases.



“When I think about big data in telecommunications, I think about the 350 million customers we serve worldwide and the 23 billion mobile events they create every day in 21 countries. When I think about social good, I think about the commitments we have all made with the UN when it comes to the 17 Sustainable Development Goals for 2030, which represent 169 targets with 241 proposed indicators. Forging a relationship between our big data work for social good is fundamental, especially as 80% of the 6 billion mobile phones in the world are in developing countries, which is where we can have the greatest impact.”

—Jose Maria Alvarez Pallete, Chairman of Telefónica



Figure 2

Examples of applications of mobile big data



Finland:

Telia's 'Crowd Insights' tracks commuter travel patterns to improve transport and urban planning.



Ghana:

Vodafone is working with the Ghana Statistical Service to track population movements in order to prevent widespread outbreaks of infectious diseases.



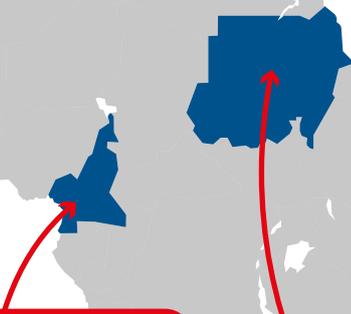
Brazil:

In Sao Paulo, data collected by Telefónica can help predict air quality up to 40 hours in advance and help the city's traffic management and urban planning.



Cameroon:

Orange is working with local partners to measure the fluctuations in signal between cell towers during rainfall. Estimates on rainfall intensity help with flood predictions and urban planning.





Pakistan:
Telenor is developing 'risk maps' to show the likely introduction of dengue fever from population mobility.



South Korea:
KT's Air Map Korea project is helping the government set up anti-micro dust policies based on an air quality monitoring network in 1,500 locations in Seoul and six metropolitan cities.

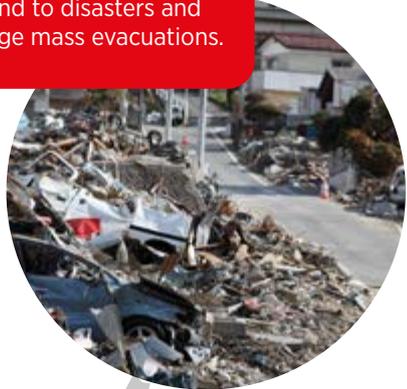


Japan:
NTT DOCOMO is developing population flow statistics for use in urban planning.



India:
Bharti Airtel and the GSMA are looking at how understanding population movement patterns can improve efforts to end tuberculosis (TB).

Japan:
KDDI is developing demographic movement analysis / forecasting technology in order to respond to disasters and manage mass evacuations.



Sudan:
The UNDP is collaborating with Zain Telecom, Sudan Telecom and NTC to use mobile big data to measure progress on addressing poverty across multiple dimensions.





Respecting and protecting mobile customers' data

Network operators in the mobile industry have almost three decades of experience of managing large volumes of consumer data. As responsible stewards of that data, they could potentially act as facilitators in a future marketplace for access to this type of data. To help realise the economic and social benefits of big data analytics, the mobile industry is determined to employ good digital responsibility practices that respect well-established privacy principles and foster an environment of trust. In collaboration with representatives from the mobile ecosystem, the GSMA has worked on the privacy aspects of big data analytics², which are underpinned by the GSMA Mobile Privacy Principles.

Mobile big data is generated by the use of mobile services by customers of mobile operators: records are produced for billing purposes each time a customer interacts with the network to send or receive a call or text message or use a data service. These records can be harnessed by the mobile BD4SG initiatives described in this report. In

addition, the network keeps track of the locations and statuses of devices within its coverage area in order to route traffic correctly.

There are a number of ways in which government departments and policymakers can help establish the optimum environment for this type of data-driven planning and decision-making to flourish. For example:

- Governments can ensure privacy protection while allowing for the flexibility needed for innovation, by adopting risk-based frameworks to safeguard private data and encouraging responsible governance practices aligned to local regulation.
- Mobile big data has relevance for a range of government departments – from healthcare to agriculture, environment and statistics. As these departments are likely to use mobile big data, they need to build an understanding of the benefits that it could bring and how to harness this new source of information and insight.

2. Data Privacy and Mobile Big Data Analytics, GSMA, 2017



Expert data management practices

Many millions of data records are generated each day on even the smallest operator's network. The operator needs to process the data before it can be used in any mobile BD4SG good application. There are three main reasons why this is the case:

- I. Data privacy:** the mobile operator is accountable for upholding data protection and privacy laws relating to that data about their customers. It is, therefore, the only party that can process this information and transform it into anonymised and aggregated big data sets that can be used in other analysis.
- II. Data validation:** the validation of the level of completeness/ representativeness of the data also needs to be done by the mobile operator because this is where the metadata and network expertise lies. Only those that have access to the source data concerning the data records and network status are in a position to validate whether the data is fit for purpose in the use case it will be applied to.
- III. Extraction of relevant indicators and analysis:** the data experts in the mobile operator are the people best qualified to prepare the data for use in data-driven models. When briefed on the data-driven problem, they will be able to summarise

the data into the appropriate mobile indicators, at the most useful granularity (by geography and by time), and through analysis can generate other mobility data, such as matrices of movement from location A to location B. They can also ensure that this data is presented in such a way that the anonymity of the customers (whose phone usage generated the data) is protected.

Mobile network operators have decades of experience in analysing this type of mobile data and applying it to answer questions pertinent to their own organisations (internal use cases include planning network coverage expansion; predicting usage and delivering network capacity at major sporting or music events; deciding upon optimal placement of retail stores). Therefore, operators have a deep understanding of this type of data set; expertise in extracting insightful information from it; and applying it to make data-driven decisions.

To take this data expertise and apply it to new challenges outside of the mobile operator's sphere of influence requires the right environment. Although this paper focuses on the business model as a key enabler, there also needs to be the right policy and regulatory environment to allow for responsible data sharing.



2. The BD4SG ecosystem

The BD4SG ecosystem comprises many different stakeholders, some of which play a primary role in the flow of data within the ecosystem. The table below identifies the stakeholders and their roles.

Stakeholder	Function
Mobile operators	<p>Mobile operators play multiple roles in the BD4SG ecosystem.</p> <p>Mobile operators collect, store and process the data from approximately 10 billion calls made daily in a way that protects the privacy of individuals and groups, to create key indicators such as location, mobility, usage and demographic information.</p> <p>Mobile operators' distinct understanding of the indicators extracted from mobile big data puts them in a unique position to further analyse the indicators, along with contextual data where relevant, to produce actionable insights and other mobile big data services for end users.</p>
Demand-side agencies	<p>Demand-side agencies (DSAs) are institutions and organisations that use insights from the analysis of mobile big data for their activities. They may include research institutions, social impact organisations, data analytics providers, governments departments and agencies, international development and humanitarian agencies, and NGOs, which use data to plan interventions, programmes, policies and strategies. As they have a specialised knowledge of the challenges they are trying to address, DSAs play an important role in articulating the problem statement to enable the identification of the relevant indicators and solutions to address it.</p>

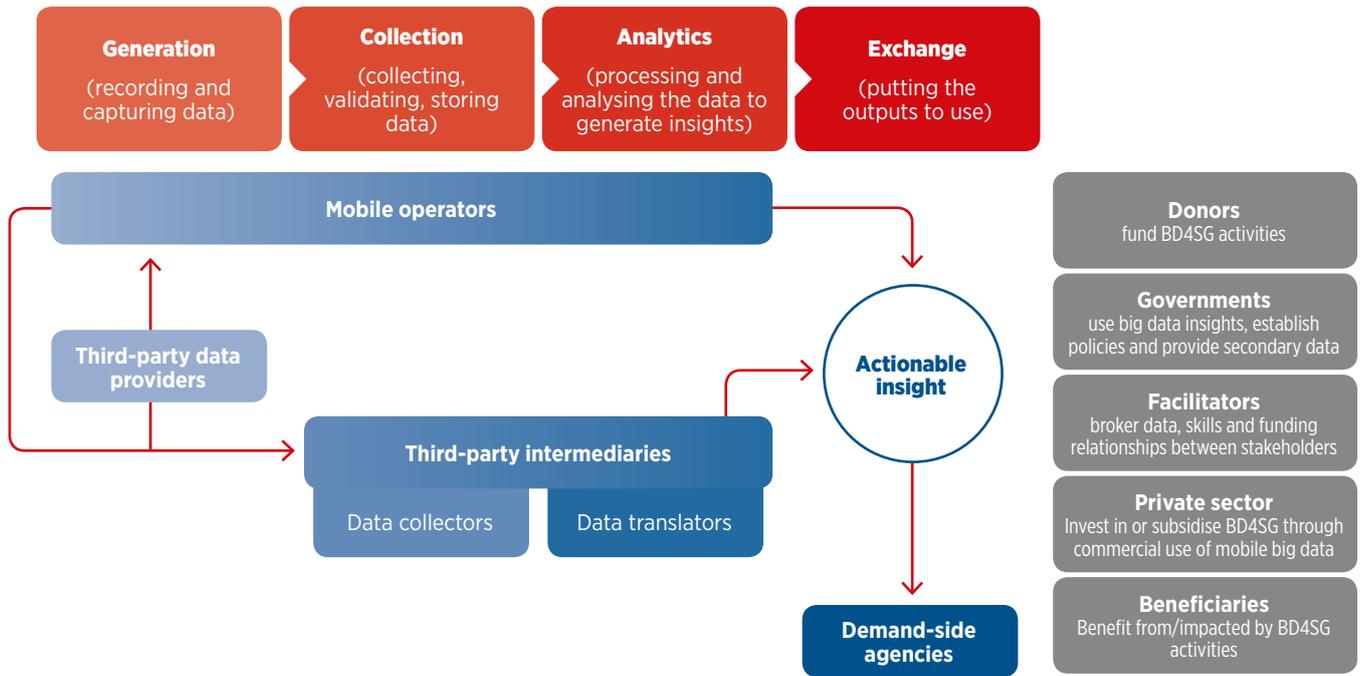
Stakeholder	Function
Third-party data providers	<p>Third-party data providers are organisations across different industries with complementary datasets that can be combined with mobile big data to provide context and enhance insights. They include:</p> <ul style="list-style-type: none"> • Satellites and drone companies for geospatial data • Earth observing institutions • Social networks and sharing economy firms • Open data platforms • National statistics agencies • Meteorological agencies for weather information • Public sector agencies for specialist data, such as medical and health, education, tourism, utilities, agriculture, transportation and immigration data • Other industries, such as retail
Third-party intermediaries	<p>Third-party intermediaries are organisations that perform two distinct functions: data aggregation and data translation. Data aggregation is the collection and storage of data from multiple sources that can provide insights for a relevant use case, while data translation relates to the analysis of big data to produce actionable insights for the end user. Any given third party intermediary may perform one or both functions, based on their capability and requirement from the end user. Examples include UN agencies, not-for profit organisations and private sector companies.</p>
Donors	<p>Donors provide funding at various stages of a BD4SG project, from early innovation for proof-of-concept to long-term sustainability. Examples of donors include philanthropic foundations and other grant-giving organisations.</p>
Governments	<p>Governments are a central stakeholder and play multiple roles in the ecosystem including as a:</p> <ul style="list-style-type: none"> • demand-side agency: using insights from mobile big data solutions to plan expenditure, build policy frameworks, and allocate resources across projects • regulator: implementing and enforcing data protection legislation which can impact the sharing of data across the ecosystem • data provider: providing secondary data, through various agencies and public institutions, which can provide relevant context for mobile big data • beneficiary: benefiting from efficiency savings and/or productivity gains generated by the application of a mobile big data solution.
Facilitators	<p>These are mostly international organisations and/or NGOs that explore opportunities to address environmental, social and governance challenges with big data, and aim to broker data, skills and funding relationships between other stakeholders in the ecosystem.</p>
Beneficiaries	<p>These are individuals, a target population, or a government whose needs and circumstances define the problem statement for a BD4SG initiative.</p>

Figure 3 shows the flow of data, the ‘value adding’ analysis and how this can be delivered by the players involved in a specific project in a specific country.

Figure 3

Source: GSMA Intelligence

Mapping the flow of data in the BD4SG ecosystem



The importance of governance and local input in mobile big data initiatives

To set up a BD4SG initiative for sustainable success from the start requires close collaboration between stakeholders. This should include:

- the **problem definition/set up** – all relevant players should be involved in the design of the solution, and agree how to manage its delivery and measure the success and benefits it delivers
- the **principles** that will be applied to ensure that the data being extracted, analysed and applied is managed securely, and used ethically in a responsible way, such that privacy is respected

- investment in the **capacity-building and skills** required for the activity to be owned locally and run in a sustainable way in the long term.

The business model needs to account for an appropriate amount of investment of time and money in these governance elements. The success of mobile big data initiatives depends partly upon the technology solution, but also upon the process and the governance that is wrapped around it – all of which need to be reflected in the business model.

3. Sustainable business models

3.1 Existing and potential types of BD4SG business model

A key objective of the research undertaken for this report was to understand the types of business model that the demand side agencies (DSAs) and the supply side (mobile operators) have adopted, or are considering, to support mobile big data projects. The research surveys and interviews identified five main types of model, which are summarised in Figure 4.

Figure 4

Source: GSMA Intelligence

The five main types of business model



The characteristics of each of these business models is as follows:

Philanthropy: Under a philanthropy model, the mobile operator does not charge for the big data solution (mobile indicators, analysis or insights) it provides to the DSA. The necessary mobile data, and associated analytic expertise are 'donated' to the project.

The philanthropic model could be used in several scenarios, including as an entry point to BD4SG activities for a mobile operator new to this type of big data application. Philanthropy could also be applied when a project is exploring a new use case; in this situation both the demand side agency and the operator are trying to understand the relevance and impact of applying mobile data to the problem. This is often the case during a pilot. A philanthropic approach could be applied in other situations.

One example is as part of a reactive response to a disaster. A second example is where other indirect benefits are generated which have a value to the parties involved in the project (high reputational value, increased customer usage).

Donor-subsidised: This describes the situation in which an external donor, such as a charitable foundation, provides funding for the project. The DSA and mobile operator obtain funding from donors to implement the BD4SG solution. The donor may require a joint submission from the DSA and the mobile operator that describes the expected outcome of the solution and investment required to deliver these benefits. Or the donor may proactively approach the DSA or mobile operator.

In some situations, where no viable commercial model emerges, a donor subsidy may be the long-term solution to funding a project with a socially beneficial outcome. However, in many cases, the donor funding will have a defined end-date and a requirement to demonstrate the way in which this initiative will become self-sustaining in future. Consequently, donor funding may only be an initial step towards establishing the long-term, target business model.



Cross-subsidised: Under this model, the mobile operator covers part or all the costs associated with a mobile big data initiative using cross-subsidies obtained from the profits of other commercial big data initiatives (for private sector firms). This will depend on the mobile operator having sufficient commercial big data opportunities to subsidise social good use cases.

Tiered: Under the tiered model, the mobile operator provides certain services at no cost to the end user (such as a government department or humanitarian agency), but charges for more costly/valuable services. The structure of the tiered model could

take several forms, such as real time versus historical data; the granularities of data (by geography and time); and the delivery format (APIs, live dashboard, visual maps etc.) The structure chosen will depend upon the use case and requirements of the end user.

Commercial: Under a commercial model, the mobile operator provides scalable and replicable services to the end user under commercial terms. The customer will be paying for the solution, and there will be enough mutual understanding of the value for a contract to be agreed between the two parties.

3.2 The pivotal role of sustainable business models

A **sustainable solution** is one which allows for the robust, repeatable and replicable use of mobile big data across different geographies and use cases, underpinned by a secure source of funding which enables continuity in the supply and analysis of the data, to generate actionable insights.

A sustainable solution requires several things to be in place – an appropriate business model is only one part of any solution. Other components include the policy framework, capacity building to ensure that the right skills are in place, and a process for governing and learning from each implementation and, therefore, improving the effectiveness and efficiency of the solution over time. These topics are not the focus of this document, but are being addressed in the GSMA's wider BD4SG programme.

A sustainable funding mechanism is needed to support a mobile big data solution on an ongoing

basis. This is crucial to scaling the solution and realising its full impact on the beneficiaries. The primary research undertaken for this paper explored what sustainable business models mean to the stakeholders involved on the data supply side (mobile operators) and the demand side (DSAs). These stakeholders have direct experience of setting up and running many pilots, but relatively few of these pilots have been converted into ongoing initiatives; or have been scaled up so that more people in more locations can benefit from the impact. One of the barriers to scaling up is the lack of a business model to support the full deployment and expansion.

The following definition of a sustainable business model is based on the experiences of demand and supply side stakeholders:

A sustainable business model for a mobile big data activity is one that enables the transfer of intangible assets (data, insights, analysis, services) from a mobile operator for use by a DSA under mutually beneficial terms that enable an ongoing relationship between both parties.



The table below shows the features of a sustainable business model, which have been distilled from the research undertaken for this project (surveys, interviews, literature review). They will be used to evaluate the level of sustainability that each business model is likely to deliver.

Sustainability criteria	How can this be recognised?
Funding is not time limited	The business model is not geared to be a one-off, time-limited project. Work does not need to start again from scratch when each funding period ends, to re-confirm scope and benefits, secure resources and gain authority to proceed.
Long-term planning	There is enough certainty about the ongoing budget for expertise, tools, infrastructure and processes for a long-term plan to exist.
Mutually beneficial model	<p>There are clear incentives on an ongoing basis for all parties involved in the demand and supply sides to participate.</p> <p>It must be possible to put an economic valuation on the benefit each party is gaining, as this will form the core of the long-term sustainable business model. It will also help to identify the funding source. For example, is the mobile big data solution a brand new way of working, with a requirement for a new incremental budget to be created to support it? Or is it providing a ‘better’ way of generating information for decision making or yielding more precise or more frequent data? Could it substitute for an existing, budgeted way of working for which funds could be reallocated to support the mobile big data solution?</p>
Way of working: Commitment, partnerships	<p>The parties involved can move beyond a short-term supplier/customer contract-based relationship when there is a longer term commitment, which is partially realised through a joint financial commitment to the initiative. Such partnerships demonstrate a willingness to work to a shared longer term goal, share a degree of risk, and plan together.</p> <p>Note: The precise form that these working relationships take will be influenced by the procurement policies of the organisations involved.</p>
Funding source is clear & reliable	There is clarity on who is paying for which services on what basis. There are no dependencies on other parties outside of the ecosystem, which may have no direct commitment to the social good initiative and, therefore, add uncertainty to the funding picture.
Internal prioritisation of the initiative can take place in the DSA and mobile operator	<p>There is a clear business case for the demand and supply side players to present to their respective organisations, which will enable a suitably high priority to be allocated to the work.</p> <p>For a demand side agency, the priority will hinge on the outcome/ impact that the initiative is expected to deliver, compared to the cost of the initiative.</p> <p>For the supply side mobile operator, the social good initiatives will compete with profit-generating activities for resources, and, therefore, need to be monetisable to secure priority in the longer term.</p>



3.3 Assessing the business models against sustainability criteria

Section 3.1 identified the main categories of business model. This section assesses each model against the sustainability criteria outlined in Section 3.2, and by implication the scale of impact that can be delivered long term.



How sustainable is the PHILANTHROPY business model?

Sustainability criteria	Comply?
Funding not time-limited	No – a philanthropic ‘donation’ of prepared data and related services is very likely to have a time limit associated with it.
Long-term plan	No – there is usually a time limit applied.
Mutually beneficial	Initially, but not in the longer term.
Commitment, partnership	Limited – partnerships require long term benefits and commitments.
Funding source clear & reliable	No – relies on continued philanthropic commitment within a private revenue-driven company.
Internal prioritisation	A big challenge within a mobile operator. See comments below.

Comments:

- It requires a cash trade-off from other business areas for the mobile operator, given the inherent cost of extracting and, in some cases, analysing mobile indicators.
- This makes it the least sustainable option over the long term, as the volume and scope for mobile big data solutions increases, combined with the growing margin pressure on traditional mobile operator services. However, it may be a viable model for a new use case, or for partners in the early stages of exploring the use of mobile big data in solving a humanitarian problem.

Philanthropy

Donor-subsidised

Cross-subsidised

Tiered

Commercial

How sustainable is the DONOR-SUBSIDISED business model?

Sustainability criteria	Comply?
Funding not time-limited	No – funding usually allocated against a specific time-limited project or a defined period of time, as fits with the donor policy for funding projects.
Long-term plan	Not usually. However, there may be cases where the market does not deliver a commercial solution and the donor supports the initiative long term.
Mutually beneficial	Yes.
Commitment, partnership	For the period in which the donor subsidy applies only.
Funding source clear & reliable	Yes – for the duration of the donor's commitment.
Internal prioritisation	Yes. Financial backing from an external donor should help secure priority for the work within the demand and supply sides.

Comments:

- Donors' investment can be vital in early stage innovations and pilots for proof of concept and to support standardisation across geographies and use cases.
- The donor is another stakeholder, who may require additional monitoring information and reports that relate to the progress of the project and compliance with the funding conditions. They may also request visibility of long-term plans.
- However, donors can be a very helpful source of funding to build initial confidence in a data-driven mobile data solution, and the benefits it can deliver. A donor can be a financial lifeline.
- Donors could also play an important role in funding development of standardised solutions, in order to drive scale and efficiency.
- In a case where a commercial model cannot be identified, this may become a long-term solution.



How sustainable is the CROSS-SUBSIDISED model?

Sustainability criteria	Comply?
Funding not time-limited	Yes – if the commercial big data income is growing then a cross subsidy could continue indefinitely, in theory.
Long-term plan	Possible – but not secure.
Mutually beneficial	Yes – although the downsides for the mobile operator include risk to relationships with commercial big data customers (see comments below).
Commitment, partnership	Possible, but not secure long term.
Funding source clear & reliable	No – the biggest downside of this model is that the funding of the social good initiative becomes dependent on a revenue stream generated by activities of other private companies, who have no direct interest in the social good case. Therefore, the funding is not secure long term.
Internal prioritisation	Yes – although expect frequent challenges to take place within the mobile operator on the allocation of commercial profit to fund social good projects (unless this is a key plank of strategy).

Comments:

A benefit of this model is that it encourages joined-up planning of social good big data, tools and processes alongside commercial big data applications. The social good projects are fuelled by the revenue earned by the commercial mobile big data business; they are a by-product of the commercial business. This could be an efficient way of working. But it has several risks associated with it:

1. The risk of discontent among commercial clients who may be uncomfortable with the subsidy offered to DSAs.
2. The model is less viable in developing markets where the opportunities for commercial offerings are generally not sufficient to subsidise social good use cases.
3. Concerns around how to structure a social good licence relative to a commercial licence, especially where the line is blurred between what is a social good use case and what is not.

Philanthropy

Donor-subsidised

Cross-subsidised

Tiered

Commercial

How sustainable is the TIERED business model?

Sustainability criteria	Comply?
Funding not time-limited	Yes – there is no reason to apply a time limit in this model.
Long-term plan	Yes.
Mutually beneficial	Yes – once agreement has been reached about which services are free and which are charged for.
Commitment, partnership	Yes.
Funding source clear & reliable	Yes – provided enough funding is generated by the data/analysis that is paid for to at least cover costs.
Internal prioritisation	Yes. Projects and resources that generate revenue are more likely to be prioritised in a mobile operator. Functionality and resource associated with the non-revenue generating data will be harder to prioritise.

Comments:

- With a tiered model, all parties should have a clear understanding of the overall use cases and where the value lies in applying mobile data to them.
- The income-generating element to the model provides an incentive for all parties to invest and prioritise resources to the initiative.
- This model could enable mobile operators to align with open data principles (which are promoted by several multilateral organisations, including the World Bank) for some basic mobile data. But at the same time there is also a commercial incentive for the mobile operator to invest because there are other opportunities to generate income and sustain its mobile BD4SG offering.
- The main drawback of this model is that it requires upfront investment by the mobile operator – not every operator will be in a position to provide this.



How sustainable is the **COMMERCIAL** business model?

Sustainability criteria	Comply?
Funding not time-limited	Yes.
Long term plan	Yes.
Mutually beneficial	Yes – once agreement has been reached on a fair price for the mobile indicator data and associated services.
Commitment, partnership	Yes. This model provides a strong incentive for the mobile operator to fully commit to mobile big data for social initiatives; and to reinvest to improve solutions in the future. The end result should be better outcomes, improving the value that the demand-side customer receives and hence strengthening the partnership.
Funding source clear & reliable	Yes.
Internal prioritisation	Yes. Projects and resources that generate revenue are more likely to be prioritised in a mobile operator.

Comments:

- This model presents the best opportunity for long-term sustainability, as both the supply and demand side have incentives to continue participating and investing.
- This model generates financial returns that can be re-invested into improving the output and improving the solution as well. This includes making the solution scalable and re-usable (which can only be achieved by the knowledge gained from research, tests and pilots – a lengthy and expensive process).
- From a mobile operator perspective, the commercial model offers the opportunity to replicate a service for multiple DSAs and in multiple markets with similar use cases.
- From a DSA perspective, it could reduce the need for long negotiations and trials, and potentially offer the most cost effective solution through competitive bidding for tenders by big data solution providers.
- The key to success in setting up a commercial business model is that both sides can agree upon the economic value of the benefits that they receive.

3.4 The challenge of scaling up from pilots to ongoing solutions

As with any relatively new big data application, it takes time to identify and validate the use cases for the data and the associated analysis. A large number of research studies, pilots, proof of concept initiatives and case studies, involving subject matter experts and mobile data experts, have taken place during the past decade; and more are being planned. (Note that for the sake of brevity, these will

all be referred to as 'pilots' in the remainder of this document.)

Pilots play a valuable role. They deliver many of the foundations for successful applications of mobile big data. But they have limitations that prevent the full potential from being realised (see table).

What pilots can deliver	Constraints of pilots
<p>Establish the relevance of the mobile data to the problem/use case</p> <ul style="list-style-type: none"> Identifying in which circumstances mobile big data can fill information 'holes'. For example, mobile data about the location and movement patterns of people in remote regions can fill such a hole, as it is very difficult or very costly to gather this data in any other way. 	<p>Short term, one-off nature of pilot projects</p> <ul style="list-style-type: none"> Pilots are designed to be limited in time, scope and resources, with a defined end-date. They are designed to test out and to demonstrate potential, not to be the vehicle to deliver major sustained change.
<p>Build trust in the richness, explanatory and predictive power of mobile data</p> <ul style="list-style-type: none"> Mobile big data is more comprehensive than surveys or census data, and is constantly capturing an up-to-date picture of the location of people in a country. New mobile data is created day in, day out, for every hour of the day, in every location in the country that a mobile network signal covers. Pilot studies are opportunities to demonstrate how rich this source of data is; and confidence in it can be boosted by comparing samples of it to established, trusted forms of data and metrics. 	<p>Only illustrate the potential benefits, and are not the vehicle for delivering the full benefit/social impact</p> <ul style="list-style-type: none"> A pilot is often a proof of concept for a particular use case in a particular geography. The incorporation of the mobile data feeds, models and visualisation tools into existing processes and ways of working so that they can be applied in practice is beyond the scope of a proof of concept. Taking a promising application to the next stage requires commitment of more resources and budget. It can take several years to deliver measurable social impact results.
<p>Demonstrate the social impact and benefits it is possible to deliver, for one specific use case</p>	<p>Are at higher risk of being de-prioritised or closed early</p>



What pilots can deliver	Constraints of pilots
<p>Indicate the benefits and costs of a larger scale implementation, hence provide content for justifying a more ambitious project to ‘scale up’</p> <ul style="list-style-type: none"> If it is planned into the scope of the pilot from the start, this economic information can be used to build the investment case for harnessing and applying mobile big data in a large-scale implementation. 	<p>Built upon a funding principle that does not easily translate into a long term solution</p> <ul style="list-style-type: none"> Pilots frequently rely upon donated/pro bono assets and expertise that are available for the period of the pilot only. This means that pilots cannot easily be extended beyond the original time period.
<p>Build interest and momentum with a wide range of stakeholders, potential donors and beneficiaries</p> <ul style="list-style-type: none"> Pilots act as a showcase for what could be possible. 	<p>Pilots are primarily designed to resolve technology risk – not commercial/market risk</p>

To date, many pilots have been run using the philanthropy business model, described in section 3.1; which means that the mobile big data – and the time and expertise required to prepare, anonymise and analyse it – has been donated for free by mobile operators. All parties involved have been shouldering some of the risk by donating their resources and expertise; in this early stage, the emphasis is on exploring the contribution that mobile big data could make to improved planning and decision making. This is typical of the early stage in the life of any new untried initiative, especially one where the application has an influence on decisions affecting the lives and health of many people.

Many of these early pilots have demonstrated that mobile big data adds new information and insights, which could be translated into more informed, data-backed decision making and also lead to better outcomes. But converting the potential of a small scale pilot into a robust, full blown application that can enhance existing planning and crisis response processes requires investment of substantially more time and more money.

Large-scale, long-term mobile big data deployments have several benefits:

- Proven use cases can be expanded outside of the initial pilot area with confidence - findings from pilot studies are built upon and applied in other regions or countries without having to start from scratch each time. This in turn builds confidence that investment in mobile big data solutions will deliver positive results in a variety of locations around the world.
- The big data solutions can be refined and improved – the mobile operator increases its knowledge of how mobile big data can be applied, and which mobile indicators, analyses, visualisations of results and data-driven information tools may be of most use in solving humanitarian challenges.
- Where solutions are in place for several years and in multiple locations, more can be learnt about what works, where it works and why – improving the overall effectiveness of the way that mobile big data is harnessed across the world.

So, the main challenge remains how to scale up from a promising pilot to a long-term, self-sustaining solution. One of the key factors is the long-term business model that will fuel the ongoing investment in the data-driven tools and in the data experts that prepare and analyse the data.



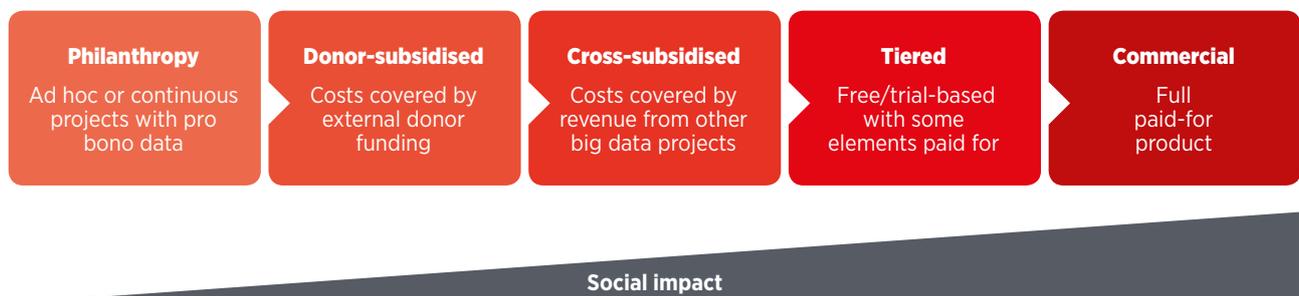
3.5 Why sustainable business models deliver greater long-term impact and better outcomes

A sustainable business model will enable all parties involved to make longer term investment decisions, which in turn enable solutions and processes to improve. As a consequence, the social impact will generally be greater (see Figure 5).

Figure 5

Source: GSMA Intelligence

Implementations underpinned by sustainable business models deliver a greater social impact





The improved outcomes that can be delivered when a sustainable business model underpins a mobile big data implementation include:

- **Proven solutions can be scaled up, so that more locations and more people can benefit as a result** – with a sustainable business model in place, there is an incentive for both the demand and supply side to invest in expanding the scale of activity. All parties will actively seek out more opportunities to apply their mobile big data expertise and solutions. This scaling up can take place within a country, or be replicated across several countries.
 - **Solutions can be improved** – long-term investment can improve the effectiveness of a solution and deliver greater social benefits. This can happen through several different mechanisms:
 - * A positive feedback loop can fine tune the solution – when mobile BD4SG applications are replicated and repeated, a better understanding is gained of the problem and expertise built up that can improve the data-driven tools and solution over time.
 - * Larger, more complex problems can be tackled if there is more certainty about continued investment over a longer period of time.
 - * There is an incentive to invest in better platforms and technical enablers, and expand skilled resources and training. These actions can further improve the speed, accuracy, relevance and economies of scale of the solutions deployed.
 - * New solutions can be made viable that are not possible to entertain for a one pilot project (for example, the capability to supply data in real time)
 - **Long-term partnerships can develop** – between mobile operators, governments, humanitarian agencies and other key stakeholders. These have many benefits including:
 - * Knowledge-sharing and mutual learning – the data experts learn more about the problems their data is being applied to; those accountable for delivering social and environmental benefits learn more about the ways data can inform their decisions. This will have a positive impact over time on the quality and speed of delivery of the solutions.
- * Avoiding the inefficiency inherent in having to ‘start from scratch’ each time, which can involve a learning curve that has to be climbed when understanding a new case, and working with new suppliers and customers.
 - * Mutual benefit and commitment to common goals is built in to a partnership – long-term investment plans can be put in place with greater confidence when these foundations are agreed.
 - * New use cases can be identified, assessed and tackled more effectively as the work is drawing upon the experience of working together in this multi-disciplinary partnership.
- **Increased funding can be secured** – successful outcomes can attract new funding when social impact and other net economic benefits are visible. Funding can come from a range of sources – the lower the perceived risk and the more confidence there is that real benefit can be delivered, the more likely it is that funding will be forthcoming. In particular, a wider range of funding sources may be unlocked – which may come from diverse sources such as donors, private impact investors or governments. Longer term roadmaps and funding can be justified with greater confidence.
- **The generation of greater value, which can take several forms:**
 - * **Social value** – the form that this takes will depend upon the use case – but examples include: more rapid containment of infectious diseases and fewer health issues as a result; faster and more effective crisis response with fewer people’s lives or homes at risk
 - * **Net economic benefit** – as more effective and efficient data-driven solutions are fully implemented to solve social problems, the total cost of tackling a problem can fall, ultimately generating net savings in other budgets over time.
 - * **The value of an improved reputation for stakeholders driving these initiatives** – successfully tackling humanitarian challenges by intelligently applying big data and innovative technical solutions is likely to have a positive impact on the reputations of all parties involved.

3.6 The roadmap to sustainable business models and maximum social benefit

Philanthropy/ donor-subsidised and cross-subsidised models may be the most appropriate business models to use at the start of a new initiative with a new use case and/or a new country. But for mobile BD4SG solutions to be sustainable in the longer term, and deliver the maximum social benefit, they need to be underpinned by a commercial or tiered business model where some or all of the data, data expertise and analysis is part of a commercial partnership between mobile operators and DSAs.

As interest and momentum builds, mobile big data projects will not exist in isolation. The organisations on the demand and supply sides of the BD4SG ecosystem are increasingly involved in multiple projects and are exploring a growing list of use cases. A roadmap can be built to represent this

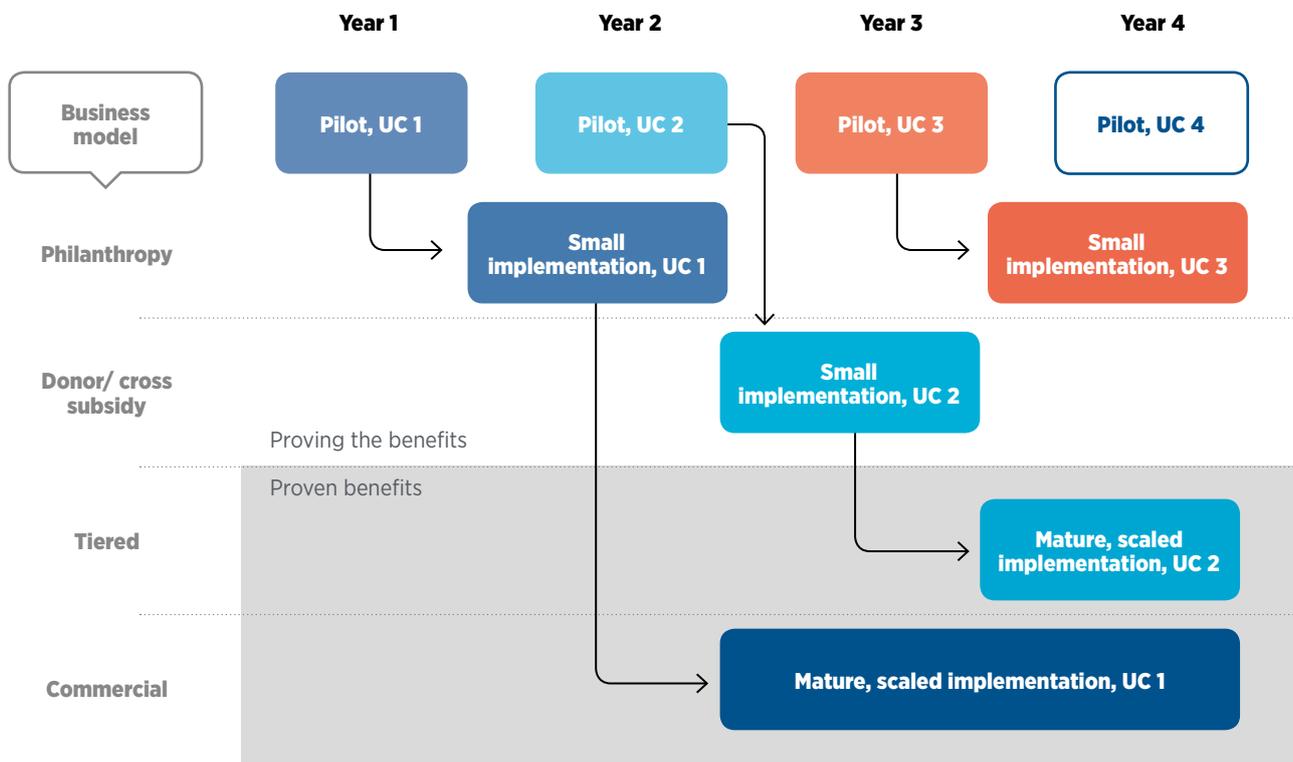
portfolio of BD4SG initiatives, depicting the stage of maturity of the project, and the most appropriate business models for each stage.

To deliver scale and maximise social benefit, emphasis needs to be placed on moving promising initiatives to a sustainable business model - rather than repeatedly allocating resources to a new pilot/use case. A healthy portfolio that fulfils the potential of mobile big data will include a significant proportion of longer term, funded, maturing implementations. As a sustainable business model is a key enabler, identifying the right form of business model, at the right point in the lifecycle of a mobile big data initiative offers the best route to success (see Figure 6).

Figure 6

Source: GSMA Intelligence

Mapping the lifecycle of social good initiatives to sustainable business models



Key : UC = use case (eg epidemic containment, natural disaster planning, pollution control)

4. Recommendations

The primary objective of the GSMA BD4SG programme is for DSAs around the world to utilise mobile big data, which will play an important role in delivering the SDGs. To realise this objective, all stakeholders in the BD4SG ecosystem need to understand the role of sustainable business models and make the necessary investment in the processes that can enable scalable and repeatable BD4SG solutions.

To this end, stakeholders should:

1. Implement sustainable business models for long-term growth and scale of BD4SG

Sustainable business models unlock the opportunity to deliver the full social benefits of BD4SG and offer the best route to realising the SDGs. By enabling ongoing, predictable, practical, efficient and consistent use of mobile data for BD4SG activities, sustainable business models maximise the social impact and economic value of the activity for the beneficiaries. Collaboration between the demand and supply sides, establishing common goals and delivering real value for all stakeholders in the ecosystem are important ingredients of a successful and sustainable business model structure.

2. Run pilots with a clear pathway to sustainability

From the outset, stakeholders should design pilots with a clear pathway to sustainability. This will:

- reduce the incidence of one-off projects
- enable all parties to scale learnings by sharing best practices
- improve co-ordination and trust around the problem statement
- increase the accuracy of insights
- create better alignment and credibility with regulators
- establish solutions that can be scaled and replicated in-country or in other markets.

Pilots can also help to streamline the engagement process between stakeholders, and create joint understanding of the value and impact that can be delivered by all parties involved in an initiative.

3. Ascertain the economic value of BD4SG activities

Many pilots and studies have proven efficacy of mobile big data solutions for different use cases. Going forward, stakeholders should also investigate the positive economic benefits of a BD4SG activity for the DSA, the beneficiaries and other relevant stakeholders. This would help determine the value of the contribution of mobile big data and related insights to addressing a given problem, and support the adoption of a sustainable business model. This will also help to build trust through transparency and clarity around key elements of a data transfer agreement, such as the quality, usage and pricing of mobile indicators and other services.

The value of mobile big data is also derived from the fact that it can generally deliver more precise and more frequent data, at a lower economic cost than other data collection techniques, such as field surveys and physical measurement stations. In addition to putting a valuation on the social impact that can be delivered, an economic value should also be placed on any cost efficiencies that could be gained from deploying a mobile big data solution.

4. Demonstrate shared value in choosing a business model

There is no one-size-fits-all business model; several factors come into play in determining a suitable business model for a BD4SG activity. Some of these include the capabilities and market share of the mobile operator, the scope of the activity, type and granularity of mobile indicators, and the scale of commercial big data opportunities in a country. These factors will also determine whether the operator can deliver end-to-end solutions to the

DSA or partner with third-party intermediaries with analysis capabilities. Given the possible scenarios, it is essential for all stakeholders to consider their long-term objectives and capabilities when selecting and implementing a business model that delivers sustainable benefits for all parties.

Conclusions

This report outlines the concept of sustainability for a BD4SG initiative and the pivotal role it will play in enabling the continuous use of mobile indicators

to address ESG challenges. Long-term financial commitment and investment will help improve and scale solutions. The value of mobile big data and derived insights can be demonstrated by the positive economic value the solutions generate, especially around achieving developmental objectives, performing humanitarian activities, and realising the SDGs. Sustainable business models are a key enabler for the transfer of data assets in the BD4SG ecosystem and the ongoing use of mobile big data for social good purposes.

“The World Bank is pleased to partner with GSMA and MNOs to apply their mobile big data and analytical know-how towards reaching those most in need, gaining new insights, and designing impactful interventions that reduce poverty and boost shared prosperity. It is highly encouraging to see that MNOs all over the world are willing to use their big data for social good. The World Bank is committed to working with them to find sustainable and effective ways to realize this enormous potential.”

– Boutheina Guermazi, Director, Digital Development, World Bank

“While data philanthropy is very important to start the social good movement, in the long term, we expect progress to be much quicker if there are also commercial opportunities. Companies are simply more willing to invest in something with a business model”

– Richard Benjamins, Data & AI Ambassador, Telefónica

“Unlocking appropriate business models will require a more thoughtful exploration of reverse innovation, and this is where the impact sector can provide significant value to the private sector. Some of the most successful corporations today innovate first on pricing strategy and business model, and then cascade to product design and engineering. Data controllers at mobile operators will find that partnering with the impact sector on such a strategy can yield immediate benefits to the bottom line and stronger customer relationships”

– Syed Raza, Senior Director, Data for Development, DIAL

The GSMA plays a leading role in facilitating collaboration among stakeholders in the BD4SG ecosystem, and creating awareness of the potential of mobile big data to help public agencies and NGOs address a wide range of environmental, social and governance challenges. Through the Big Data for Social Good Programme, the GSMA shares experiences and promotes best practices among key stakeholders by:

- I. Establishing a common framework that is consistent and replicable across geographies, operators and use cases, accelerates adoption to achieve positive impact on the SDGs, and respects and protects individuals’ privacy.
- II. Validating the approach through local initiatives that show how aggregated, anonymised mobile network data is valuable and actionable for strategic planning and decision-making.

Appendix

Research methodology

This report brings together different viewpoints in the BD4SG ecosystem in exploring possible scenarios for the implementation of mobile BD4SG use cases on a sustainable basis. In addition to desk research, the report draws on interviews and questionnaire responses from the GSMA BD4SG taskforce on the supply side and members of the GSMA BD4SG advisory panel, including data partnership facilitators and data users, on the demand side.

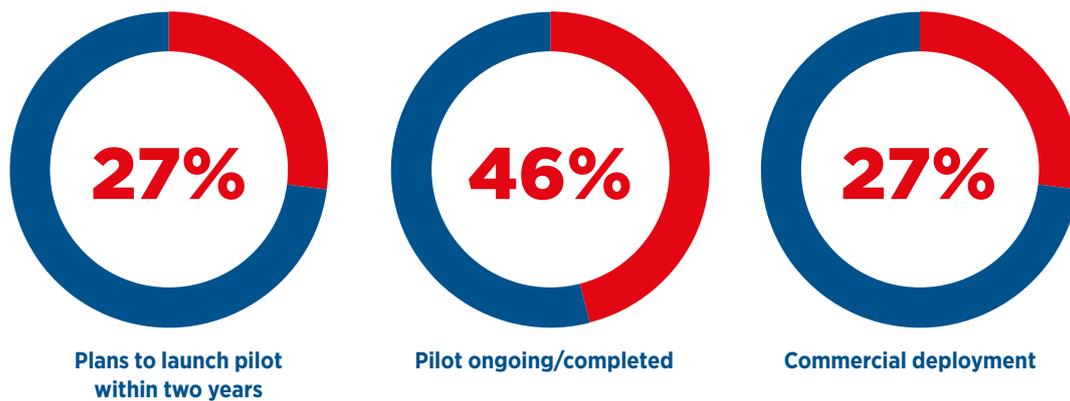
The graphics and tables below indicate the extent to which members of the taskforce and advisory panel are implementing mobile BD4SG initiatives.

Figure 7

Source: GSMA Intelligence

Mobile Operator Taskforce Members

BD4SG status, percentage of respondents



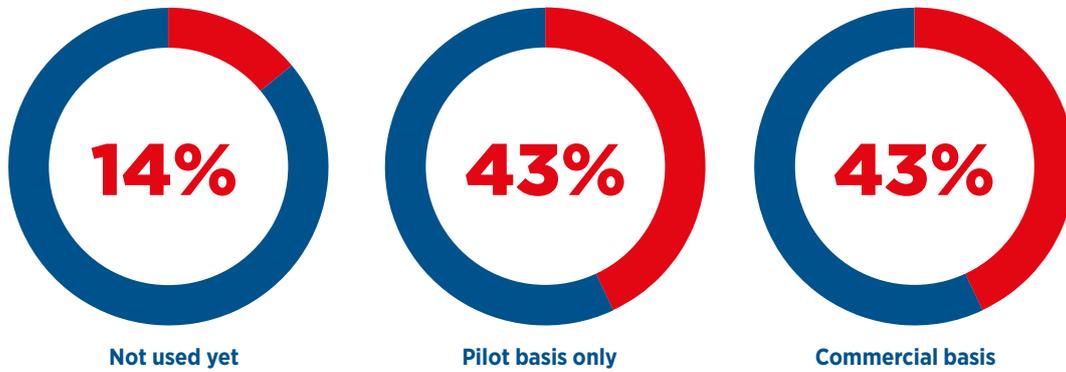
Footprints of mobile operator respondents	Current and future use cases
<ul style="list-style-type: none"> • Asia • Europe • Latin America • Sub-Saharan Africa 	<ul style="list-style-type: none"> • Epidemiology • Environmental issues • Humanitarian (e.g. disaster response) • SDG monitoring • Sectorial planning and development (e.g. health, communications, agriculture, tourism and transport) • Smart cities

Figure 8

Source: GSMA Intelligence

Advisory Panel Members

BD4SG status, percentage of respondents



Footprints of advisory panel respondents	Current and future use cases
<ul style="list-style-type: none"> • Asia • Caribbean • Europe • Latin America • Sub-Saharan Africa 	<ul style="list-style-type: none"> • Environmental issues • Epidemiology • Governance • Humanitarian (e.g. disaster response) • Gender disaggregation of development topics • Sectoral planning and development (e.g. agriculture, energy, environment, health, and transport)



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