A Roadmap to Accessing Mobile Network Data for Statistics

Produced by Positium for the Global Partnership for Sustainable Development Data

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Global Partnership for Sustainable Development Data

"Countries are facing enormous pressure to modernize statistics. Meeting the needs of users requires looking at non-traditional sources of data for statistics, including mobile network information. By forming partnerships with mobile phone companies, NSOs develop a range of new skills and technical capabilities that can be applied to new data sharing partnerships. That's why this type of data sharing work is so important to our mission to improve the use of data for sustainable development."

- Claire Melamed, CEO at the Global Partnership for Sustainable Development Data

"From COVID-19 mobility analyses to displacement estimates following flooding, we've seen multiple examples of the value of using mobile operator data for decision-making in Ghana, but it took time to get there. Clearly, more guidance on starting data partnerships with mobile network operators is needed. An objective of our Data for Good partnership with Ghana Statistical Service and Telecel Ghana (previously Vodafone Ghana) is to share our learnings with other statistical bodies and operators—please reach out to us and we'd happily discuss or advise."

- Cathy Riley, Strategic Partnerships Director at Flowminder

"This Roadmap is an invaluable resource designed to streamline the integration of mobile network data into statistical processes. For Uruguay's National Institute of Statistics (INE), having access to this roadmap from the beginning of its journey could have significantly improved efficiency, minimized mistakes, and accelerated progress.

The roadmap compiles global expertise into a step-by-step guide, enabling organizations to bypass trial-and-error phases. It offers proven strategies to save time and resources while avoiding common pitfalls, such as unclear data requests, poor stakeholder engagement, and overlooked privacy issues. By addressing these challenges upfront, the roadmap fosters smoother collaboration and builds trust with partners.

Collaboration with operators and regulators is often complex. The roadmap provides practical guidance for aligning stakeholders, streamlining negotiations, and ensuring clear and precise data requests. This structure would have allowed INE of Uruguay to secure agreements and establish productive partnerships more quickly and with fewer disruptions.

In essence, the roadmap is a transformative tool that minimizes errors and maximizes impact. It offers NSOs a clear path to leveraging innovative data sources, allowing them to focus on achieving their statistical goals rather than managing preventable obstacles."

- Federico Segui, Deputy Director General of INE of Uruguay

''This guide is more than just a reference, but an instructive blueprint for a successful implementation of an MPD initiative, very vital for entities with little or no experience in the access and use of the alternative data source for official statistics. Particularly those at pre-foundational or foundational stages.'.

- Potlako C. Kgari, Senior Statistician, MPD Project Manager, Statistics Botswana

Authors and Acknowledgements

Global Partnership for Sustainable Development Data (Global Partnership)

The Global Partnership is a network of over 700 private sector, academic and civil society organizations, and governments, with a Secretariat based across eight countries. We work across more than 35 countries and convene a network based in over 80 countries. We leverage the power of data to change minds, policies, and lives for the better. Our aim is to ensure that data can be put to good use to achieve the Sustainable Development Goals.

Siim Esko, Positium

Siim is one of the world's experts on mobile phone data use for statistics. Since 2014, Siim has been working in the data analytics sector at Positium, where he manages the development of international projects in the fields of tourism, mobility, and population statistics based on mobile positioning data.

With his colleagues at Positium, Siim has had a hand in some of the notable projects in the field, including:

1. In 2014, the launch of the European Commission's Feasibility Study for the Use of Mobile Positioning Data for Tourism Statistics.
2. In Oman, since 2016, working with the National Centre for Statistics and Information on their big data pilot project with two mobile network operators.
3. In Indonesia, since 2017, working with BPS Statistics Indonesia and the Ministry of Tourism to launch regular production of tourism statistics with the largest mobile network operator in Indonesia.
4. Being a core member of the Mobile Phone Data Task Team at the United Nation's Committee of Experts on Big Data and Data Science for Official Statistics, and leading the subgroup of population statistics.

5. In 2023, working with the Global Partnership to conduct an online training course with 18 NSOs on mobile phone data access and use, leading many of the countries to follow up with national projects.

Siim continues to work in the field, and will be part of the training team of the World Bank-ITU Global Data Facility's Putting Mobile Phone Data to Work for Policy program, as well as assisting countries around the world to gain access to and benefit from the data held by mobile network operators.

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- Esperanza Magpantay, Senior Statistician | International Telecommunications Union
- Titi Kanti Lestari, Director previously in charge of MPD projects in BPS Statistics Indonesia, current consultant and member of the MPD Task Team of the UN Committee of Experts on Big Data and Data Science in Official Statistics

Introduction

The Benefits of Mobile Network Data for Statistics

Data from mobile network operators (MNOs) holds immense potential to revolutionize statistics, making them more accurate, timely, and useful. Traditional methods of data collection by National Statistical Offices (NSOs), such as household surveys, census data, and administrative records, are comparatively more costly and time-consuming to produce than the granular data that is generated by mobile phones. It is no wonder that according to the World Bank[1], 78 percent of NSOs focus on this over any other new data source as a complement to traditional methods of data collection.

The potential benefits of using mobile network data as part of statistics production include:

- higher overall quality
- better timeliness
- better geographical granularity
- new, previously unavailable indicators
- synergies with other areas of statistics, leading to better coherence and comparability.

National data systems have already benefited from the use of mobile network data in several domains of official statistics[2], including:

- population statistics, dynamics and census
- tourism statistics
- migration statistics
- disaster and displacement statistics
- transport and commuting statistics
- measurement of information society.

Yet, for NSOs, challenges to accessing this data come up over and over again creating hurdles that cause projects to stall. Many partnerships take years to plan and launch even as barriers remain consistent across national contexts.

[1] https://unstats.un.org/unsd/undataforum/blog/putting-mobile-phone-big-data-to-work/

[2]The Mobile Phone Data Task Team of the UN Committee of Experts on Big Data and Data Science for Official Statistics has created guides for use of mobile phone data in six domains of statistics.

The Challenges of Accessing Mobile Network Data

Gaining access to privately-held data from mobile networks is often assumed to be a technical issue, but the reality is more complex. Key challenges of accessing privately-held data that statistical offices often encounter include:

1. Lack of required skill sets – Technical skills to access, process, integrate and analyze Big Data are often lacking among data -sharing partners; for example, most NSO staff do not have the needed skill sets to access and integrate huge datasets. On both sides, partners may lack necessary data science and machine learning skills and experience.
2. Limited experience with privately-held data – NSOs are typically focused on data from traditional sources, such as surveys and censuses, and may lack insight into privately-held data, putting them at a disadvantage in technical conversations with mobile network operators.
3. Limited experience with the private sector – NSOs are accustomed to working with government and public entities. Engaging with private companies, especially to access sensitive data about their customers, presents a significant learning curve.
4. Lack of clarity around incentives and costs – NSOs and mobile network operators often think differently about incentives for partners who are contributing to data sharing. Because costs are associated with such partnerships, all stakeholders need to present ways to cover the costs of the project.
5. Limited insight into the statistical system by the private sector – Many private companies are unfamiliar with the role and mandate of NSOs, leading to confusion and delays in starting negotiations. As most data-sharing arrangements of this type are driven by NSOs, it's also on them to address this challenge by providing knowledge and education.
6. Outdated legislation – Statistical and telecommunications laws might be unclear or outdated around new opportunities and expanding the scope and reach of the NSO in requesting data from private data holders like operators, requiring all parties to find common ground to proceed.
7. Privacy concerns – Very granular mobile network data is sensitive. Discussions between statistical and private sector parties often get stuck on privacy and data protection issues. While both prioritize privacy, they may focus more on their differences than on finding common ground.
8. Complex stakeholder engagement – Multiple parties need to be consulted, including citizens, regulators, scientific communities, civil society, and data protection authorities. This can overwhelm organizations already stretched by their regular duties in creating a clear governance mechanism.

Many statistical offices find themselves in a situation where they have identified a data source that has the potential to significantly increase the availability and quality of statistics but are unable to move forward with data access discussions due to the above challenges, even before they enter technical discussions. Understanding these challenges, from the perspective of operators and the NSO, is critical. This guide was written to address the challenges of mobile network data access based on successful examples.

Understanding Stakeholders in Data Sharing Projects

This publication is written primarily from the perspective of National Statistical Offices in countries that stand to benefit from accessing mobile network data for statistics. But data sharing projects by definition include multiple stakeholders. In the context of this publication, primary stakeholders include most, if not all, of the following agencies or groups:

- National Statistical Offices (NSOs) are responsible for collecting, analyzing, and disseminating statistical data on a country's economy, population, and society.
- Mobile network operators (MNOs), or operators, may be private or quasi-public and collect and store (often temporarily) data that is generated by mobile phone use of their customers.
- Data protection authorities are public entities that exist in most countries to ensure that data protection legislation is enforced.
- Telecommunications regulatory authorities (TRAs), or regulators, are independent government bodies that oversee the telecommunications industry, including licensing and activities of operators.

Two other groups have interests that must be considered in these projects: (1) The people in a country who use mobile phones and whose data is being accessed for official statistics and (2) the policymakers and "end users" of the statistical products created by NSOs with operator data. Ensuring that the public understands the benefits of the project, and that their privacy is protected and their data security is not compromised by data sharing, is critical to gaining public trust in government use of personal data. On the other side, the end users of statistical products who stand to benefit from the NSO's access to mobile network data can be important champions of the process and smooth the way for data sharing.

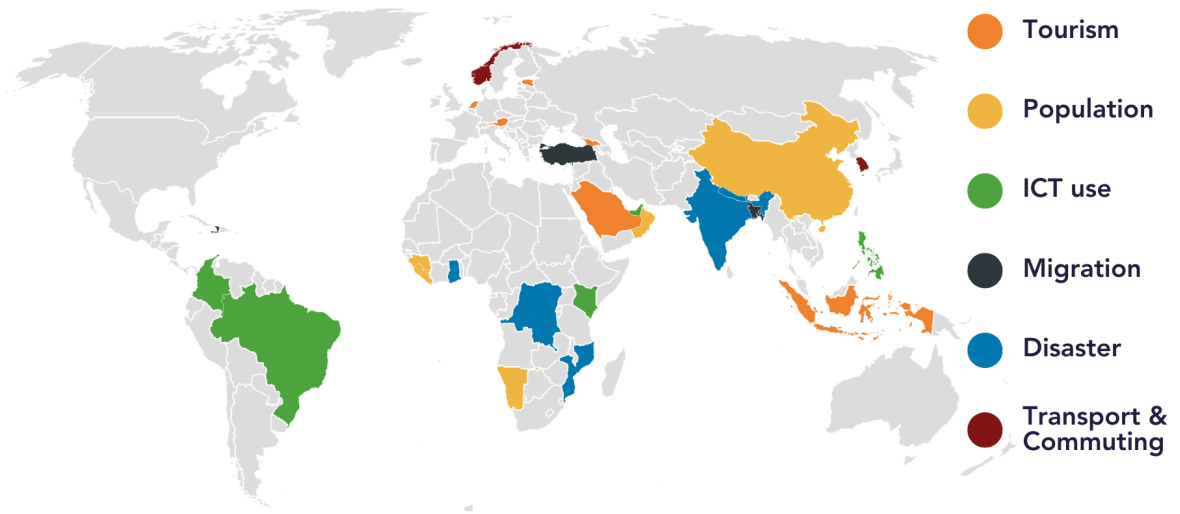
Success Stories

There are already many successful cases of countries accessing mobile phone data to produce or improve official statistics. One useful source for these examples is the UN's Mobile Phone Data (MPD) Task Team. In 2023-24, the MPD Task Team of the Committee of Experts on Big Data and Data Science in Official Statistics published Methodological Guides that included many successful cases in areas of statistics ranging from tourism to transport. See the 📖 Resources at the end of this section for more information.

The projects in the UN's MPD Methodological Guides cover:

- 29 percent of the world's land area
- 50 percent of the world's population
- The world's biggest (China, India, Indonesia) and smallest (Cabo Verde) countries.

The map below shows the countries in the guide and the domain of statistics that were produced or improved using mobile phone data.



Source: MPD Task Team https://unstats.un.org/bigdata/task-teams/mobile-phone/index.cshtml

These projects range in maturity and sustainability. Most projects start with some sort of proof of concept to demonstrate the benefits of using a new data source. Depending on factors such as the nature of data access and funding, some projects progress to the next stage, i.e. to a pilot project or to regular, ongoing publication of experimental/complementary data products, and up to using mobile phone data as a primary or secondary data source for official statistics.

The chart below lists countries and existing projects in each, by the level of statistical maturity of those projects, along with the domain of statistics addressed. This roadmap draws on these examples to show how data -sharing partners have managed to successfully navigate steps in mobile network data access discussions.[3]

[3] The World Bank's GDF-MPD program has designed a maturity framework with levels that do not correspond to this chart directly but are a useful way to analyze a country's level of readiness to publish statistics using mobile network operator data. Find more on the World Bank's framework here: https://github.com/worldbank/GDF-MPD/blob/main/GDF-MPD_Maturity%20Framework_DimensionsSummary_v2.1.pdf

Chart title: Countries with mobile network data sharing projects by stage of statistical maturity

Stage of statistical production maturity	Examples of mobile network data projects
Proof of concept (PoC)	Some COVID-19 analytics Most volunteer experiments with mobile network operators
Pilot project	Oman – National Center for Statistics and Information – inbound and domestic tourism, commuting, population France – Central Bank of France – inbound and outbound travel Italy – IStat – inbound and outbound travel Colombia, Brazil, Indonesia, Philippines, United Arab Emirates, Georgia, Kenya – ITU with the NSOs – ICT Statistics The Gambia – Gambia Bureau of Statistics – migration United Kingdom – Office for National Statistics – population, mobility
Experimental statistics / complementary data products	Most COVID-19 analytics Germany – DEStatis – mobility, population Ghana – Ghana Statistical Service – mobility, migration, displacement
Official statistics: calibration	Finland – Statistics Finland – inbound/outbound travel Austria – inbound/outbound travel Spain – domestic tourism
Official statistics: main source	Estonia – Central Bank of Estonia – inbound/outbound tourism and travel Indonesia – BPS Statistics Indonesia – inbound/outbound/domestic tourism and travel, commuting Saudi Arabia – Ministry of Tourism – domestic tourism

📖 Resources

Access the Methodological Guides on the use of mobile phone data and more information on the case studies on the MPD Task Team website:
https://unstats.un.org/bigdata/task-teams/mobile-phone

About this Publication as a Guide to Practitioners

This guide provides practical guidance to stakeholders, primarily within NSOs, who are seeking to access privately-held mobile network data for producing or improving the quality of official statistics. This guide will be of particular interest to designated project managers within statistical offices who may read the roadmap in full, using the steps as a practical guide, and share relevant information with decision-makers throughout the process of accessing privately-held data.

Extensive materials in this field have explored how mobile network data can be used, focusing on the technical and methodological aspects of data sharing. One such example is the 2019 Handbook on the Use of Mobile Phone Data for Official Statistics by the UN's Global Working Group on Big Data for Official Statistics (PDF) and subsequent guides on the use of mobile phone data for statistical fields such as tourism, population, migration, information society, transport, and disaster response. Eurostat has published extensive guidance material for tourism statistics as well as now developing an open-source pipeline. Another is the FlowKit platform, developed to guide governments in responding to COVID-19. These resources, to different degrees, focus on the necessary technical aspects of data sharing. However, few existing resources address as their primary focus the non-technical aspects of setting up data sharing projects—or the barriers at this point which cause many projects to stall or fail to get off the ground.

This publication was prompted by demand from national stakeholders for straightforward guidance on embarking on the initial steps of discussions to use privately-held mobile network data for statistics. The format follows a roadmap across a series of steps on the route to data access. While there is no right path to accessing data, this guide lays out a streamlined and efficient route.

The guide features case studies of countries that have seen success in their path to accessing data. It builds on the questions raised and information elicited from the combined years of experience of the Global Partnership for Sustainable Development Data (Global Partnership) and Positium working with countries on gaining access to privately-held mobile network data, including online and in-country trainings, workshops, and consultations. The guide benefits from a series of virtual trainings on mobile network data access, organized by the Global Partnership and led by Positium, with 18 countries in 2023. This guide uses information from

these trainings as reference points for a readiness assessment (laws, capacity, collaborations etc) of countries when it comes to accessing mobile network operator data.

The guide compares and contrasts the routes that countries have taken to access privately-held mobile network data, explores the incentives in each case for private companies to engage with governments, and poses questions and challenges for countries interested in embarking on this path with novel sources of privately-held mobile network data. It explores the opportunities and challenges introduced by new technologies, including artificial intelligence (AI), with a focus on new sources of data through innovative models of access and sharing.

Core resources for the publication:

1. The Global Partnership for Sustainable Development Data's training program, "Mobile Network Operator Data: Effective and ethical access and use" for NSOs, telecom regulators, and mobile network operators in 18 countries, held remotely in 2023.
2. The Global Partnership's engagement in countries to develop capacity for data sharing among public stakeholders.
3. World Bank-ITU Global Data Facility Mobile Phone Data for Policy Program's Theory of Change and Maturity Framework, whose development was supported by Flowminder, setting the scene for the program applicant countries starting to access and use mobile phone data to improve national data systems.[4]
4. Mobile data analytics company Positium's 20 years of work in the field of MPD for statistics.

[4] Both are available on GitHub for free at the following link: https://github.com/worldbank/GDF-MPD/blob/main/GDF-MPD_Maturity%20Framework_DimensionsSummary_v2.1.pdf

How to Read this Guide

This guide introduces milestones on the path to mobile network data access. While it is aimed at stakeholders in national statistical systems and across national governments in general, the lessons should resonate with others seeking to take this route. The steps in this guide are written in the order in which they should be taken, and some readers who have already embarked on this journey may find they have completed some of these steps. This roadmap is meant to be followed in steps, and readers may start, stop, and return to points on the path at any point.

The path to mobile network data access has three milestones:

1. Evaluating the opportunity – setting clear goals for the desired impact of data innovation.
2. Engaging with stakeholders – getting critical stakeholders to support your cause.
3. Executing collaboration agreements – signing a written agreement among partners.

The steps to reach each milestone are laid out in the corresponding chapters, along with the following information:

🌐 Global benchmarks or success stories of others with a relevant story or example.

❗ Tips and lessons to note during this step.

📖 Resources for reference and further information.

⏩ Next actions to take.

💡 Important notes are sidenotes that might bring up key considerations regardless of the current stage of discussions.

Glossary

DPA = Data protection authority

Operator or MNO = Mobile network operator, (also known as a mobile network provider or carrier, wireless service provider or carrier, cellular or telco company) a company that provides wireless communications services to customers. Mobile network operators own a license to use a swath of the mobile spectrum exclusively, as designated by a regulatory agency (see regulator) and own or control the cellular network infrastructure to provide service.

MPD = Mobile phone data, referring to the positioning data gathered and held by mobile network operators. Also referred to as mobile positioning data or mobile network data or MNO data, inclusive of CDR (call detail records) and signaling data.

NSO = National Statistical Office, a government agency responsible for collecting, analyzing, and disseminating statistical data on a country's economy, population, and society, providing crucial information for policy-making and public understanding.

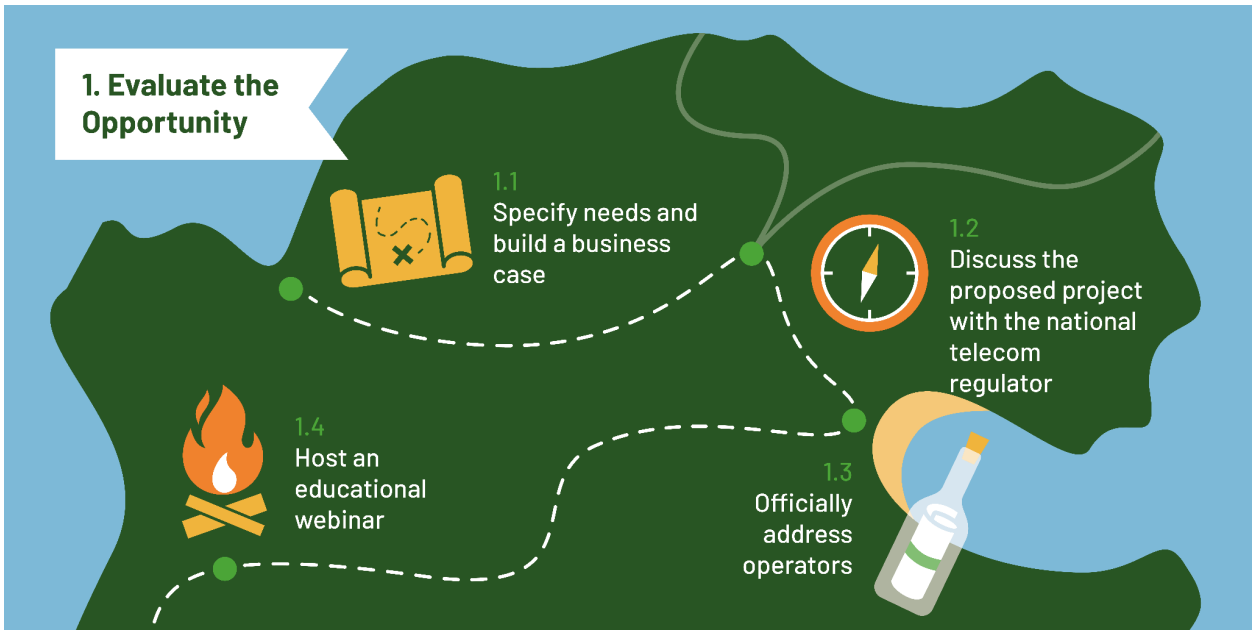
NSS = National statistical system, a network of government and quasi-government agencies and organizations that coordinate to produce official statistics.

Regulator or TRA = Telecommunications regulatory authority, an independent government body that oversees and regulates the telecommunications industry, issuing licenses and ensuring fair competition among licensed operators (see MNO) and protecting the interests of consumers.

Users = In data science and statistics, end users are the entities that use data or statistical products. In this text, “users” refers to the ministries, departments, and agencies of the government and others who benefit from and can sponsor the production of higher-quality statistical products produced as a result of partnerships that provide access to mobile phone data (see MPD).

Pathways to Mobile Data Access

1. Evaluate the Opportunity



1.1 Specify Needs and Build a Business Case

Official statistics play a pivotal role in informing government policies, and so NSOs are compelled to seek the best source of data for statistics to support evidence-based decision-making.

The request for data from a mobile network operator must be specific, and its benefits must be tangible.

In statistics, specifying needs is the first step to bringing in new data for the statistical business process[5]. This step (1) determines the need for statistical products and statistical needs of national stakeholders, (2) establishes the high-level objectives of the statistical outputs, (3) identifies the relevant concepts and variables for which data are required, (4) checks if current collections and/or methodologies can meet these needs, and (5) prepares the business case to get approval to produce the statistics.

Consider the following questions to address how the new data source would impact statistical production processes:

[5] Generic Statistical Business Process Model as the model of the statistical business process on how new data sources like mobile network data can be integrated into the production of statistics. https://unece.org/statistics/documents/2019/01/standards/gsbpm-v51

- Which statistical domain that corresponds to a significant gap in statistics would mobile network data have the largest possible impact on?
- Would accessing mobile network data enable statistical outputs in areas that are currently not covered but are requested by users?
- Do users request data with frequency not currently available via survey data?
- What level of granularity in geography or time is needed but not available via current data sources?
- Would mobile network data complement existing data sources by adding new information or details that would increase the quality of statistics?
- What are the different statistical domains that mobile network data access would impact in the short and long term, both in terms of creating new information and in improving the quality, frequency, or cost efficiency of existing statistics?

Once the answers to these questions are clear, you have a business case for leveraging operator data to support better evidence-based decision-making. At this point, you can move on to the next step and start requesting support.

🌐 Examples

The Directorate of BPS (Badan Pusat Statistik) Statistics Indonesia, which manages tourism statistics, was able to convince its leadership to invest half of the domestic tourism survey budget into a collaboration project with the operator, with a plan to replace existing surveys in two years. The project paid off in terms of cost savings and quality improvements.

Indonesia is one of the largest countries in the world (in terms of population) to demonstrate the power of mobile network data for statistical practices. Previously, the domestic tourism survey of BPS Statistics Indonesia was a massive undertaking, involving thousands of enumerators—around 8,000 per year—covering the vast country door-to-door.

By replacing annual household surveys with operator data and a digital survey, Indonesia has achieved increased levels of detail and quality with significantly fewer resources. A small team of data scientists has successfully implemented and is managing this innovative approach along with other big data projects. Cost-savings reach 50 percent annually while at the same time producing domestic tourism outputs of a higher detail than before.

Uruguay's National Statistical Office (INE) has found that a consultation on data needs could be organized as an event with stakeholders, excluding mobile network operators initially. The objective of this preliminary gathering would be to align government ministries on potential statistical applications and their specific data requirements, while strategizing with regulators on accessing mobile network data. Engaging a strong ally, such as a Ministry of Planning, could bolster the initiative, as the NSO alone may struggle to drive this effort.

❗ Tips

❌ Broad or generic data requests without specific linkages to statistical objectives will raise doubts about the purposes of data access.
✅ Clearly define specific statistical objectives and corresponding data requirements.

❌ Not connecting data needs to the country's development goals will make it harder to garner broad stakeholder support for the project.
✅ Link data needs explicitly to the country's development programs and priorities.

❌ Presenting operator data as "just another data source" underrepresents its unique value to national statistics.
✅ Highlight the benefits of using mobile network data compared to traditional methods of collecting data for statistics, like surveys, emphasizing cost, timeliness, and granularity.

📖 Resources

The Generic Statistical Business Process Model (GSBPM) is the tool to create a detailed plan for how new data sources such as mobile network data can be integrated into the production of statistics. Creating a GSBPM is a helpful way to navigate building a business case for data.
https://unece.org/statistics/documents/2019/01/standards/gsbpm-v51

⏩ Next Actions

- ☐ Spend time identifying user needs and understanding how the operator solves these needs and increases the efficiency of public decision-making.
- ☐ Match the objective of the project to national development goals.
- ☐ Estimate the potential impact on statistical processes, quality, and results.
- ☐ Use this preparation work to get the full backing for the project from leadership and supervising ministries or central government authority.

1.2 Discuss the Proposed Project with the National Telecom Regulator

Next in a series of steps to access mobile positioning data (MPD) for statistics, engaging telecommunications regulatory authorities (TRAs or regulators) early can be pivotal. Even though regulators play diverse roles in such projects—they can bridge discussions with operators, guide the regulatory framework, or not be involved at all—a consultation with regulators is an essential step.

Here's how to get started:

1. Identify the role of the national/relevant regulator or TRA.

- The regulator often has regular contact with mobile network operators (MNOs).
- The regulator usually has a development agenda aligning with national goals.
- The regulator may already have the mandate to collect records from mobile network operators.

  Refer to 🌐 the examples below to learn more about how the role of the regulator has differed in countries.

2. Establish collaboration.

- Initiate discussions with the regulator to leverage their existing relationships with operators.
- Explore how the regulator can facilitate partnerships and data sharing agreements.

3. Determine a plan of action.

- Establish how existing inter-agency agreements apply to the collaboration or the need for a new agreement between the NSO and regulator.
- Outline the roles and responsibilities of the NSO and regulator.
- Develop a clear plan for reaching out to operators and securing data access.

4. Outline a vision for cooperation.

- The regulator may play one or more roles, which might shift as the project develops. These roles include merely lending support to the idea. Regulators can also facilitate the partnership in the initial phases, up to when regular statistical production is established, or act as the data collecting party, ensuring data is received from the operator and de-identified (to protect privacy) before sharing with the NSO.

🌐 Examples

In countries like Rwanda, Mozambique, and The Gambia, telecom regulatory authorities collect data from operators to enact their mandate as a regulator. The collaboration can extend to research, policy applications, and statistics production. Mostly, this data collection takes place for purposes such as knowing your customer, service quality assurance, fraud detection, or revenue assurance, but the data sharing arrangements and data management policies can be repurposed.

For example, in The Gambia, the regulator collaborates with the NSO to produce detailed statistics on migration, supported by the World Bank. Deidentified data from mobile networks is shared with the regulator, which then aggregates it for statistical use.

On the other hand, in several countries, the regulator does not take any role in discussions related to the data that operators collect in providing their services. BPS Statistics Indonesia consulted with the regulator of Indonesia and, after not receiving helpful feedback, proceeded to have bilateral discussions with the operators without the regulator. Nonetheless, consulting with the regulator is necessary and can often be helpful to the project.

❗ Tips

✅ Stay open to the possibility that the regulator can help open the door to discussions with operators but not take a more active role. In some countries, the regulator has no role in projects involving mobile phone data, which is not a barrier to data sharing as long as all parties agree on the way forward.

✅ The regulator might already be a stakeholder in the national statistical system, with interest in receiving more detailed statistics on the mobile telecommunications sector. In these cases, there may be an opportunity to add improvements in sectoral statistics to existing projects.

✅ If collaboration with the regulator is challenging, reach out to the Big Data project team at the International Telecommunication Union (ITU) for guidance. Experience from ITU indicates that proposing a use case that has relevance to regulators (such as information society indicators) may convince regulators to take part in a project they otherwise may not see the benefits of engaging in.

📖 Resources

International Telecommunication Union's Big Data project:
https://www.itu.int/en/ITU-D/Statistics/Pages/bigdata/default.aspx

⏩ Next Actions

- ☐ Identify the role of the regulator in the country.
- ☐ Establish discussions.
- ☐ Determine a plan of action.
- ☐ Outline a vision for cooperation with the regulator.

💡 Important Note: Global (UN Agency) Support

Engaging global experts and organizations like the UN, ITU, and World Bank can provide valuable support. For example, as a result of the ITU's Big Data project in 2016, five countries accessed data from mobile network operators for statistical purposes, followed by another two in 2020. The project started with no countries having access to data. At the end of two years, 10 mobile network operators were sharing their data for analysis into statistical products.

Currently, ITU supports several key initiatives on mobile phone data for statistics, including the World Bank-ITU Global Data Facility's "Mobile Phone Data for Policy" and the UN Big Data's Mobile Phone Data Task Team.

Here's a list of international agencies that can provide support—and how:

- Eurostat (European Commission) has had projects with operator data since 2013, when the Scheveningen Memorandum was signed. The organization currently provides support in all areas: legislation, methodology, privacy-enhancing technologies, and data fusion, and has published several guidance documents.
- UN Statistics Division (UNSD) hosts the UN Committee of Experts on Big Data and Data Science, where the task team on mobile phone data works on guidance, training, and awareness-raising. UNSD has also published guides on the use of mobile phone data in six domains of statistics.
- World Bank hosts a window and support program under the Global Data Facility (GDF) that delivers essential resources, programmatic support, and knowledge to help countries develop capacity to put MPD to work for policy and statistics.
- UN Tourism engages in capacity building to enable more countries to contribute complete tourism statistics to the global database.
- UN Population Fund (UNFPA) supports countries where mobile phone data can contribute to better common operational datasets on population dynamics.
- UN regional commissions (UNECE, UNESCAP, UNECLAC, UNESCWA, UNECA) provide capacity building through the Regional Hubs of Big Data for Official Statistics.
- UN International Telecommunication Union (ITU) engages in capacity building and aids in data access discussions with telecommunication regulatory bodies.
- International Organization for Migration (IOM) supports capacity building in the area and invests in pilot projects to prove the concept of the use of alternative data sources for migration studies. IOM released the Practitioners' Guide to Data Innovation in Migration, including a chapter on mobile phone data.
- GSMA is a mobile network operator umbrella body that runs an 'AI for Impact' initiative, to support countries to accelerate action toward the use of mobile data for positive societal impact.

1.3 Officially Address Operators

Mobile network operators (operators) collect data about subscriber activities in their network and are a key stakeholder in the project. Sending an official letter to operator leadership can:

- Establish a formal channel of communication with key decision-makers.
- Assign a dedicated focal point within the operator responsible for data sharing. This person is usually somebody with regulatory or analytical expertise.
- Signal the importance of collaboration in data partnerships.

The contents of the letter should be aimed at leveraging the keys to engagement established in previous steps, namely:

1. Explain the rationale for how using mobile phone data helps to achieve national societal impact.
2. Indicate existing collaboration with the telecom regulatory authority and, if applicable, support from international organizations.
3. List examples of successful mobile network data initiatives in other countries.
4. Request to establish communication, assign a focal point, and be prepared to engage in the next steps.

In some cases, NSOs have opted for an indirect approach with operators, through introductory meetings and slowly developing personal contacts. This has led to some success. However, based on feedback from operators in data access projects, what works best is a more direct approach—one where the project's rationale is well-developed and based on examples from other countries and where support from the regulator and the expectations for operators are clearly explained.

🌐 Examples

In October 2024, the World Bank convened national stakeholders in statistics and data at a Mobile Phone Data for Policy workshop in Washington D.C. The workshop included representatives from 18 countries, most of which had operator focal points present, including operators like Telefónica, Orange, and MTN. The objective was to create an action plan for the country to start using mobile phone data for policy. The high levels of engagement were indicative of the excitement around the quality of discussions and outputs this workshop produced.

The mobile network operators were engaged because they were officially approached by World Bank staff, to be part of an initiative with the potential to benefit the country. They assigned a focal point to lead the discussions on behalf of the operator and were given opportunities to shape the collaboration. The workshop provided a perfect basis for in-country discussions to continue between NSO and mobile network operator focal points.

❗ Tips

✅ Depending on the advice of the regulator, let the regulator facilitate the approach or send the letter directly to mobile network operator leadership.

✅ If a positive relationship exists between the NSO and at least one of the operators, you may have an introductory meeting before sending the official letter. This is not necessary in most cases, however, as most operators appreciate a direct approach where the justification, stakeholder support, and expectations for next steps are clear.

📖 Resources

Information on the Global Data Facility Mobile Phone Data Program for Policy, Cohort 1 Launch Workshop (7-10 October 2024): https://www.worldbank.org/en/events/2024/09/25/global-data-facility-mobile-phone-data-program-for-policy-cohort-1-launch-workshop

⏩ Next Actions

- ☐ Draft a letter to the leadership of the mobile network operators, including the rationale, support, and benchmarks of the project and your request.
- ☐ Send as official communication.
- ☐ Establish a focal point within each mobile network operator in the country.
- ☐ Once operator focal points have been established, invite them for a discussion on how mobile positioning data (MPD) can meet statistical needs and outline next steps for technical workshops. Clearly outline how the process will unfold from this point, how you plan to implement it, and where you expect the operator to contribute.

💡 Important Note: What's in it for Mobile Operators?

Engaging private sector partners in a project that requires resources but does not directly generate revenue requires highlighting incentives for their engagement. While regulatory compliance is a key factor (many statistical offices require operators to contribute data), operators may benefit from engaging in data sharing for a variety of reasons.

Here are five key motivations mobile network operators will be able to realize when collaborating on a project for statistics:

1. Monetization – Beyond official statistics, explore potential revenue streams from data-driven products and services. By sharing data freely for statistics, operators can discover new use cases—and revenue opportunities.
2. Social responsibility – Give back by helping to develop accurate and reliable statistics.
3. Capacity building – Build internal expertise and infrastructure for data analysis.

4. Reciprocity – Receive data from statistical offices and insights that were not available before.
5. Higher quality data products – Join efforts in R&D to add quality and robustness to the operator's data-driven solutions.

This webinar, hosted by the Global Partnership, features public and private partners from three countries discussing their incentives for engaging in existing data sharing initiatives: Accessing mobile data: National strategies and challenges

Alfian Manullang, VP of Data Solutions and Digital Financial Services at Telkomsel, shared lessons from their eight years of experience providing data to BPS Statistics Indonesia, and the benefits Telkomsel sees from the collaboration.

1.4 Host an Educational Webinar

How do you ramp up support for your mobile network data project? Several organizations have used webinars to convene and educate the stakeholders for the project, especially operators and users of the statistical products that stand to benefit from the project. (See Glossary for a definition of "users" in this context.) Hosting a webinar—as opposed to an in-person meeting—means you can get something on the schedule quickly, bring in high-level international experts, invite a broad audience, and drum up interest in the project early.

To effectively engage stakeholders and advance MPD initiatives, consider hosting webinars that:

- Educate on the benefits of mobile network data and dispel misconceptions.
- Showcase best practices by highlighting successful MPD projects globally.
- Leverage support from international organizations like the ITU, the World Bank, and several UN organizations who support mobile network data projects for statistics.

🌐 Examples

When Tunisia's Institute of National Statistics (INS) decided to explore mobile phone data for statistical needs in migration, they collaborated with the regulator to hold an educational webinar. The objective was to arrange a meeting with all operators to present and discuss the statistical needs and data requirements and then to invite the mobile network operators to a future in-person workshop.

INS Tunisia managed to invite all the operators and researchers in the field to participate to hear why the country was looking at data from mobile networks, how other countries had approached this topic successfully, and key methods behind using such data for statistics. The webinar was a success as all the operators attended the next meetings in person.

❗ Tips

✅ Partner in planning the webinar with experts like those from the MPD Task Team of the United Nations Committee of Experts on Big Data in Official Statistics. Several NSOs and international organizations have found relevant speakers for their events through the MPD Task Team.

✅ Leverage global webinars happening on this topic to invite your stakeholders to participate.

✅ Reach out to mobile network operator focal points to explain which expected telecom sector participants are expected and how operators will benefit from attending the webinar before the next steps commence.

📖 Resources

The UN Regional Hub for Big Data in Africa Events page includes a number of webinar recordings focused on mobile phone data: https://ecastats.uneca.org/regionalhub/Events

⏩ Next Actions

- ☐ Decide on a topic for a webinar on mobile phone data.
- ☐ Engage international partners and national stakeholders to help to organize the webinar.
- ☐ Invite all country stakeholders to attend, explaining the rationale and timing of the webinar.

2. Engage Stakeholders

2.1 Engage Stakeholders Through a High-level Event and Technical Workshops

An in-person meeting is the best way to gain high-level support for the mobile network data project as well as discuss data governance issues directly with the stakeholders in an open environment. A combination of a high-level event and technical workshop should be geared towards addressing the challenges of accessing operator data outlined in this roadmap. These meetings help create clarity around incentives and costs. They should also educate the private sector stakeholders about the role and mandate of the NSO, and the data governance objectives laid out to the NSO in terms of ensuring quality, protecting privacy of data, and utilizing the best data for statistics. These meetings allow for stakeholder engagement to take place in a transparent setting that fosters discussion. However, this doesn't mean that these meetings should be publicized widely or open to the public. Raising concerns and addressing barriers to the projects necessitates creating an environment of trust and, often, confidentiality in early stages of discussions.

Engage Senior stakeholders with a High-level Event

Hold an event on operator data for statistics with key decision-makers from the regulator, the NSO, the national data protection authority, the mobile network operators and key government ministries, helping to build consensus and align expectations to provide broad direction for the project in light of international benchmarks and local stakeholder feedback.

The event should aim to validate the buy-in of decision-makers for use of operator data for statistics. Consider also inviting the users of statistical products in relevant domains who may lend support to the NSO in making a case for data sharing by articulating the benefits of and need for this data.

It is likely that executives at mobile network operators will praise a project initiative that is well prepared and founded on international benchmarks of success. Final decisions are not necessary at this point. Reaching high-level agreement that allows for follow-up technical discussions is important in order to progress to detailed discussions.

Host Technical Workshops

Technical workshops will encourage in-depth discussion with technical stakeholders. Each major stakeholder should be represented, specifically the managers and senior analytical staff of the operators, the regulator, and the NSO; this meeting should provide ample opportunity for the technical staff to share information with colleagues who may not be familiar with the technical requirements of each organization's participation in the project. The objective is to reach a consensus on the technical aspects of the use of MPD for statistical purposes, such as statistical needs, stakeholder motivation, data requirements, data processing modalities, quality criteria, and next steps for project planning.

The workshop discussions should lead to drafting a concept note for the project. See the next step for a full list of topics that make up the concept note. Go through all topics and focus on those that elicit concern or debate.

🌐 Examples

Botswana and Tunisia both decided to invite major stakeholders to workshops in 2024. In each country, the mobile network operators, the regulator, the data protection authority, and the NSO took part in high-level and technical workshops.

- The high-level workshops, which lasted for a half-day, worked well to set the stage for the more technical workshops to be fruitful. Decision-makers were able to offer support to the project and offer guidance on topics that should be developed more fully before data sharing decisions could be made.
- During the technical workshops, the business questions of data sharing arrangements were discussed extensively, allowing the NSO to prepare a fully developed project concept note.

The Dominican Republic and Uruguay have also convened all major stakeholder groups to one room to discuss the rationale, global examples, support, and business technical questions. In all of the countries, the workshops had a positive impact on the project.

- On May 27, 2022, an international workshop titled "Use of Mobile Phone Data" was held in Montevideo, Uruguay, organized by the Regulatory Unit of Communications Services (URSEC), the Global Partnership for Sustainable Development Data, and the National Institute of Statistics (INE).
- The workshop aimed to showcase the opportunities in using mobile network data for policy and national development, and discuss the potential of collaborations with mobile network operators, INE, and URSEC in Uruguay. International representatives from **Estonia** and **Spain** shared their experiences.
- The workshop concluded by emphasizing the importance of collaboration among various stakeholders to leverage the data for official statistics and for formulating effective public policies.

❗ Tips

✅ Aim to get a clear RSVP to the workshop from main stakeholders ahead of time. Note that invitations can get misplaced, and the parties don't want to find out they are invited at the last minute.

✅ Start the workshop with an overview of the potential applications, methods, data sources, and data sharing models of other countries before discussions start.

✅ While some international speakers can make online statements (e.g. other country representatives and international organizations), there should be enough outside expertise in the room with knowledge of successful country practices to validate discussions.

✅ Lay the foundation by conducting risk mapping with the stakeholders (brainstorming methods are useful here[6]). The objective of risk mapping with stakeholders is to map out major concerns and rank them by order of importance. The main identified risks are then used as the basis for discussing solutions.

✅ Always address and fully discuss the main risks that stakeholders identify. Although decision-makers might not be in the room, collaborative problem-solving can often come to the right conclusions regarding solutions.

📖 Resources

[6] Brainstorming ideas via the K-J Method (or Affinity Mapping) is a simple and effective way to surface top concerns. Simple explanations of this method for risk mapping are widely available online. For more details on how the K-J Method was developed, see: https://www.researchgate.net/publication/243785588_The_KJ_Method_A_Technique_for_Analyzing_Data_Derived_from_Japanese_Ethnology.

See an overview and documents linked to the event and workshop held by Tunisia here: https://unstats.un.org/UNSDWebsite/capacity-development/events-details/D4N-HLE-WKS-mobile-network-operator-mno-data

⏩ Next Actions

- ☐ Identify the expertise to prepare the content for the high-level and technical workshops.
- ☐ Create a workshop concept note and invite relevant speakers.
- ☐ Settle the workshop venue, timings, content, and roles.
- ☐ Distribute pre-event materials, including workshop agenda, background material, and, if relevant, a survey.
- ☐ Prepare workshop content with team members including presentations and case studies.
- ☐ Elicit RSVP from each invited stakeholder.
- ☐ Hold the high-level workshop.
- ☐ Hold the technical workshop.
- ☐ Create a detailed project concept note based on the discussions.

2.2 Send a Detailed Project Concept Note to Operators

Based on the steps up to this point, a project concept note can be created with inputs from the workshop. If the discussions have been fruitful and transparent, the main topics to include in the concept note should have been addressed. Importantly, the sections of the concept note should include:

- Background – Describing the mandate and objective of the NSO to start the project.
- Objectives – Purpose of the document.
- Stakeholders and roles – Lead partner (e.g. the NSO), technical partners (e.g. mobile network operator and regulator), accountable partners to be consulted (e.g. offices of data protection and cybersecurity), users, supporting organizations, and any other stakeholders.
- Governance structure – Organization of stakeholders, e.g. into technical and steering committees.
- Specified needs – National statistical and development programs and users to benefit from the project.
- Benefits for users, technical partners, and other stakeholders – Incentives structure proposed to stakeholders in the project.

- Raw data requirements – Description of data requirements, following the principle of data minimization.[7]
- Location of data storage – Description of where the data storage and processing capabilities will be set up.
- Data sharing scenarios – Discussed scenarios for data sharing, including who will become the data controller under each scenario.[8]
- Communication and publication – When and how the project will be communicated to the public, or the means to decide on communication.
- Costs – Costs identified and the potential sources for covering such costs.
- Identified risks in project initiation – Identified risks and mitigation strategies.
- Next steps and timeline – A list of the next steps in the process, who is responsible, and when they should be completed.

This concept note is an important milestone in reaching consensus among major stakeholders, including the regulator and mobile network operators, and should be sent to them as a draft proposal for input. For the operators, the proposal draft should be accompanied by a letter addressed to the CEO that includes:

- The objective of the project
- Data requirements
- Data sharing scenarios
- Proposed immediate next activities.

🌐 Examples

Following productive workshops with mobile network operators and the Botswana Communications Regulatory Authority, Statistics Botswana was able to develop a detailed project concept note outlining a collaborative framework for utilizing operator data. This concept note, informed by stakeholder feedback, addresses critical aspects such as data needs, benefits for all parties, data governance, and security measures, and proposes a timeline for project implementation. The note serves as a transparent foundation for further discussions and the development of formal data sharing agreements for the partnership between Statistics Botswana and the operators.

[7] Data minimization is a principle that limits the amount of personal data that is collected, processed, and stored. It's a key part of data privacy and protection.

[8] For more on arrangements related to data sharing, storage, and management, see information presented during this World Bank GDF-MPD event: https://www.worldbank.org/en/events/2024/09/25/global-data-facility-mobile-phone-data-program-for-policy-cohort-1-launch-workshop#3

❗ Tips

✅ Clearly mark the project proposal as a draft, to be agreed upon by all parties, and provide opportunities for feedback and suggestions.

✅ If discussions at the technical workshop addressed all topics in the project proposal, you should have a clear idea of which points are in agreement and which ones require more consideration.

📖 Resources

[Option to upload a template of a concept note - To be added during the DESIGN phase]

⏩ Next Actions

- ☐ Prepare the concept note immediately after the workshops with mobile network operators.
- ☐ Prepare the accompanying letter to mobile network operators.
- ☐ Arrange the concept note to be sent by the head of the NSO to the executives of the major stakeholders, most importantly the mobile network operators.
- ☐ Identify the critical points in the concept note that require further discussion as agenda items for the meeting between the NSO and mobile network operators in the next step (See Section 2.3).

💡 Important Note: Data and Server Requirements

The mobile network operator knows best the extent, nature, and potential of its data. Operator staff are also aware of how much data is generated in the networks, though not all of it is useful for statistical purposes, and so discussing the data and server requirements for a partnership is best addressed as an iterative process, with broad outlines leading to technical discussions of greater details.

The project lead, in this case the NSO, should have some technical level of understanding of the data, which data fields and what to request, as well as how much infrastructure is needed to process it.

The UN Mobile Phone Data Task Team has developed two resources that provide enough technical information to reach the necessary level of understanding, a Handbook on the use of Mobile Phone data for Official Statistics (2019) available as a PDF and an awareness-raising course (2023) available through the ITU Academy. The most common types of MPD that are used for official statistics are call detail records (CDRs), internet protocol detail records (IPDRs) and signalling data. The UN resources explain technical details of the data sources and how to put in a request following the principle of data minimization. As indicated in the Introduction,

organizations such as the World Bank's GDF-MPD program or ITU are helpful resources for support in developing data and server requirements.

Two documents underpin the discussions surrounding the required data and infrastructure:

A data requirements document includes the minimum requirements for data according to the project objective and chosen data sharing modality. The data requirements document includes technical details on:

- Data source
- Expected data period
- File format
- Necessary data fields.

A server requirements specification document includes the minimum requirements for the infrastructure necessary to receive and process data. This document specifies the expected infrastructure needs regardless of data processing location and guides expectations on infrastructure costs (to be borne or compensated). The server requirements document specifies:

- Specifications of the processing server
- Specifications of the storage/archive server
- Specifications for the application server (optional)
- Main principles for server setup.

2.3 Executive Meeting Between the NSO and Mobile Network Operators

A critical juncture in this process is convening a formal meeting between the heads of the NSO and participating mobile network operators. This high-level meeting, conducted through established formal channels and procedures, serves as a pivotal moment for finalizing the collaboration and moving the project forward. With the regulator either present or duly informed, the meeting provides a platform to secure executive-level buy-in, address any remaining concerns, and formally establish the governance structures necessary for successful project implementation.

🌐 Examples

In 2016, Ghana's Statistical Service (GSS) developed a national data roadmap, which underscored three priorities: addressing data gaps, encouraging data use, and strengthening the data ecosystem. A meeting was convened at the sidelines of the Data Roadmap Forum in April 2017 to bring together GSS, the National Communications Authority, and Flowminder. A follow-up meeting between GSS, Flowminder, and Vodafone Group Foundation was then arranged in the UK in June 2017. This resulted in bringing Vodafone Ghana on board in July

2017 and the launch of a collaborative data partnership, the Data for Good Project. The project's starting phase focused on strong organizational engagement, facilitated by technical managers to secure executive mandates following an established business case. This was followed by the development of technical and legal frameworks, enabling the successful implementation of the first phase (2019-2021) and leading to a second phase (2021-2023), while a sustainability plan to ensure continued impact is now being established.

❗ Tips

✅ If international agencies have played a role in previous steps, they can also assist here. However, it is best for national organizations to make the necessary arrangements and call in support from international stakeholders merely as a supporting expert body.

✅ The NSO should lead this process on behalf of the other public sector stakeholders involved, including the regulator, end users, and data protection authority. As part of its remit, the NSO should consult with all stakeholders, ensure their interests and concerns are represented in conversations with operators, and bring them into the process as needed—either to address concerns or provide support for the project.

✅ While a bilateral meeting is easier to set up, a multilateral meeting with all operators is the preferred choice for an open and transparent approach. Keep in mind that all operators might not have the same level of knowledge—or pre-existing support—for the project. While the discussion should address all concerns, it's important not to let the most risk-averse stakeholders dominate the conversation.

✅ Ensure all parties are well-prepared for the meeting with clear agendas, presentations, and supporting documentation. Ensure that all decisions and agreements made during the meeting are formally documented. This task falls on the project lead, i.e. the NSO.

✅ Foster a collaborative and open dialogue to address any remaining concerns and build consensus among all stakeholders.

✅ Proactively address potential roadblocks and develop contingency plans. Utilize the findings from the workshop discussions and external examples.

📖 Resources

⏩ Next Actions

- ☐ Discuss with the regulator whether a meeting should be called by the regulator or by the NSO directly.
- ☐ Call an executive meeting to agree on the remaining critical points in data sharing and agree on steps to sign a Memorandum of Understanding (MoU).
- ☐ Create an early draft of an MoU and share it in advance of the meeting.

☐ Hold the meeting.

💡 Important Note: When to Communicate the Mobile Network Data Project to the Public

Communication with outside stakeholders about the project is extremely important given the sensitive nature of operator datasets. Previous experiences in using mobile network data for national statistics have been instructive: If the project is proactively communicated at initiation, feedback from the public is more supportive. If a project that involves operator data is undertaken without public communication, the reactions from civil society and investigative media more often involve distrust and concern.

Potential first avenues for communication may include:

1. General communication with the public via traditional media or other means regarding the initiatives of the NSO to enable the modernization of statistics, mentioning the efforts to contact mobile network operators and the telecommunications and data protection regulators. When this communication happens should be determined by the national context and views of stakeholders. However, establishing ongoing and open channels of communication with the public enables the transparency necessary to gaining the public's trust in data sharing.
2. Informing the national supervising statistical council of the efforts made in modernization and accessing operator data. Such a council usually includes representatives of civil society and academia.
3. Devising a dissemination strategy for communicating the results of the work with mobile network data step-by-step as first outputs emerge and are deemed to have the potential for the country's statistics.

The NSO and ultimately the steering committee should discuss and decide on the communication strategy.

📖 Resources

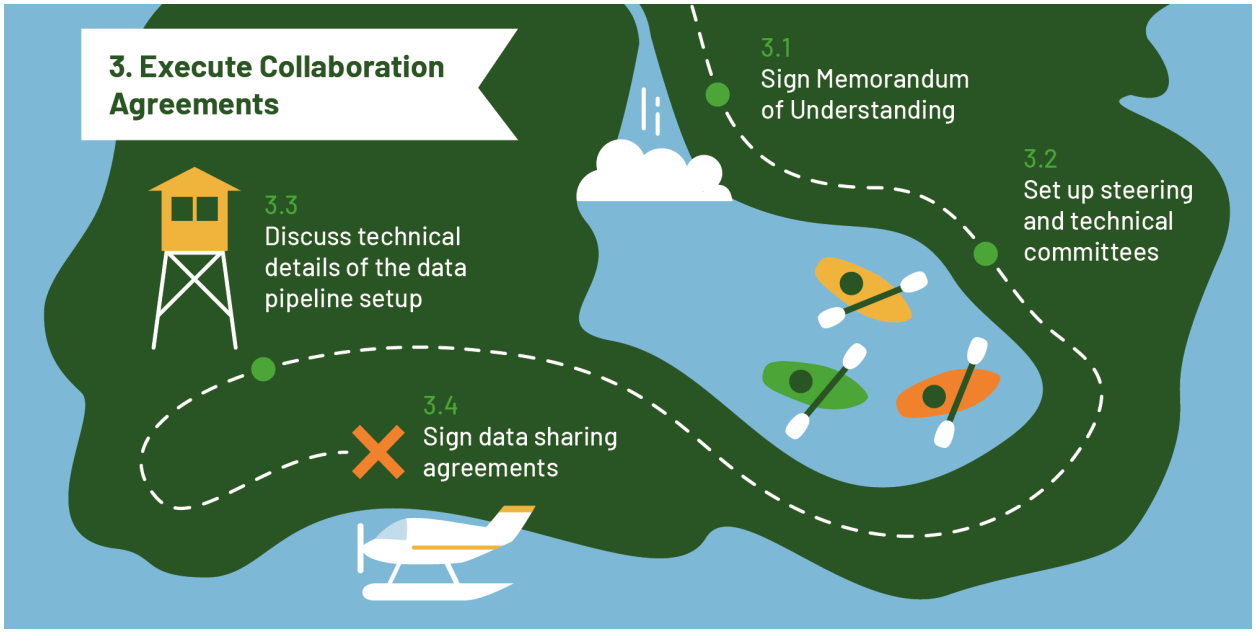
In 2014, the Eurostat commissioned a Feasibility Study on the Use of Mobile Positioning Data for Tourism Statistics, which includes a chapter on public opinion (Report 1, Chapter 5.3). The chapter provides a good overview of how public privacy concerns may manifest, and the successes and failures of communication. The guide concludes that proactive communication is key.

The Global Partnership's Cookbook on Effective and Ethical Data Sharing at Scale shares recipes for communicating with the public and stakeholders, including a multi-stakeholder

workshop that the Gambian Bureau of Statistics and the Public Utilities Regulatory Authority organized to inform wider stakeholders of the project, its merits, and methods.

Eurostat has set up an expert group on 'Facilitating the use of new data sources for official statistics' to reflect on these new opportunities and make recommendations to enhance the reuse of private sector data in official statistics under the European strategy for data. The expert group emphasized inclusive and open participatory mechanisms and formal consultation with all stakeholders (including those representing the public) when it comes to reuse of privately-held data.

3. Execute Collaboration Agreements



3.2 Sign a Memorandum of Understanding

Before delving into the intricacies of a formal data-sharing agreement, it is often good practice to first develop and sign a Memorandum of Understanding (MoU) between the National Statistical Office (NSO) and the mobile network operator. This non-binding agreement serves as a foundational step, outlining the general objective and collaboration principles of the partnership. The MoU clearly defines the roles and responsibilities of each party, acknowledges the NSO's mandate to access data for statistical purposes, and addresses concerns regarding data security, confidentiality, and technical assistance. While not legally binding, the MoU fosters a conducive environment for open communication and a shared understanding of expectations, paving the way for a more comprehensive data-sharing agreement.

The content of the MoU can vary depending on the specific needs and priorities of the NSO and the operator. However, it typically includes elements such as:

- Purpose of the collaboration – Stating the shared objective of utilizing mobile network data for statistical purposes.
- Roles of parties – Defining the scope of the responsibilities for implementing the MOU of each party.
- Data scope and access – Defining at a high level the types of data to be shared between parties and the level of access granted.
- Confidentiality and data security – Outlining measures to protect the privacy and security of sensitive data.
- Data quality and validation – Establishing procedures for data quality checks and validation.
- Communication and reporting mechanisms – Defining how the parties will set up decision-making structures (a steering and technical committee), communicate and share progress updates.
- Dispute resolution mechanisms – Outlining procedures for resolving any disagreements or disputes.
- Contact persons – Identifying designated points of contact for both parties.

By establishing a clear framework through an MoU, NSOs and the mobile network operators can build a strong foundation for a successful and mutually beneficial data-sharing partnership.

🌐 Examples

In Indonesia, BPS Statistics signed an MOU with the mobile network operator Telkomsel, which laid the foundation for discussions about ways to set up the project. Later, a public tender was conducted that resulted in a commercial data sharing agreement.

In Oman, discussions by the National Center for Statistics and Information with the regulator and operators led to the point where the legal basis for data access had to be changed. This took several years to complete. After a government decree was issued giving the NSO the right to request data, MoUs were signed with both of the mobile network operators in the country, which was enough to initiate data sharing.

In 2014, the Ebola outbreak in West Africa brought concern in Ghana. Stakeholders, including Vodafone Foundation and the Ministry of Health, initiated conversations to see if mobile phone data could be used to support decision-making. This led to the installation in 2016 of the first server at Vodafone Ghana, using Flowminder's specifications and funded by Vodafone Foundation. In 2017, the regulators of data protection and telecommunication provided a confirmation of non-objections to the Ghana Statistical Service (GSS) having access to mobile network data. That year, GSS also undertook a Data Roadmap process with the Global

Partnership. As a case study on the matter notes,[9] initially the parties had planned to form a non-binding agreement, but the national regulators requested a formal agreement that addressed various data concerns. After 13 months of discussions, the NSO signed a data sharing agreement with Vodafone (now Telecel), Flowminder, and the funder, Vodafone Foundation.

In Uruguay, the regulator issued a resolution to oblige the mobile network operators to share data. This kind of legislative or regulatory mandate is not uncommon and can pave the way for operators to share data for statistics. Under the requirements of such a mandate, the operator then shares the data with the NSO, based on a Memorandum of Understanding. In Uruguay's case, the NSO signed a collaboration agreement with the regulator to receive the data.

❗ Tips

✅ Decide, depending on the level of cooperation between the NSO and operators, if signing an MoU is necessary at this point. Signing one might be more important if you plan on engaging several operators, as coordinating a detailed data sharing agreement will take time. If the operators don't deem an MoU important, you might save time by moving directly forward to setting up the committees to steer the process and discuss technical details (see next step in Section 3.3).

✅ Use the guides listed in Resources in this section to develop a draft of the MoU that lists all of the points deemed important at this stage.

✅ Prepare the draft MoU ahead of the previous step, executive meeting.

📖 Resources

This guide has been produced as one of the outputs from the Collaborative on Administrative Data (CAD) and can be instructive for thinking about the terms and conditions to include. A guide and template for improving coordination and cooperation within the national statistical system and increasing access to administrative data for statistics production.

An example MoU has been shared openly by BPS Statistics Indonesia in the Contracts for Data Collaboration database:
https://contractsfordatacollaboration.org/library/#advanced/advanced-details/5eb53bf7b8d84806c6c885f3/

Another example can be found here:
https://www.flowgeek.org/media/vb2jtv3f/partnership_agreement_data4good_example-template_final.docx

[9] A Case Study of Data Sharing Between Ghana Statistical Service, Vodafone Ghana, and Flowminder Foundation. A Case Study by SDSN TReNDS for C4DC.

⏩ Next Actions

- ☐ Decide whether an MoU is critical to establish dialogue between the parties, and whether one or more than one is needed.
- ☐ Create an early draft of the MoU(s).
- ☐ Have stakeholders (operators, NSO, and other data sharing partners) sign the MOU(s).

3.3 Set up Steering and Technical Committees

Steering Committee

The steering committee should be set up as a designated accountability board, composed of the determined key decision-making (higher management) members of each of the major stakeholder groups. It will be consulted on major developments of the project and will review, advise, and guide the process, making direct inputs to ensure that the benefits of the project to their institutions are successfully achieved. The steering committee will meet more frequently at each new stage of development, as well as at the initiation of the project, and will take a regular supervisory role post-implementation.

Example member organizations of the steering committee include: the National Statistics Office, telecom regulatory authority, mobile network operators, data protection authority, national cybersecurity authority, civil society representative organizations, and academia. Including civil society groups in the steering committee helps reassure people an independent voice is looking out for potential harms to the public from data sharing. In Ghana, for example, the African Digital Rights Hub was brought into the steering committee to mitigate risks related to public trust.

Example level of hierarchy represented: Director Generals, Vice Presidents, Data Protection Commissioner, National Cybersecurity Adviser, department heads.

Technical Committee

A technical committee should also be set up, composed of dedicated personnel from the technical partners. The main role of this committee will be to initiate and monitor the technical aspects of the project, such as the methods and processes, as well as the performance of the technical providers. Any ongoing technical blockers will be escalated to the steering committee for action. The technical committee is a subgroup of, and accountable to, the steering committee.

The member organizations of the technical committee are usually the implementing partners of the project, most notably the National Statistics Office, mobile network operator(s), possibly the telecom regulatory authority, and other members, if they have a technical role in the

project. Intermediaries, like Flowminder or Positium, may be involved in the project and advise—but not be part of—the technical committee.

Example level of hierarchy represented: Project Managers, Head of Analytics Department, Head of Business Intelligence, and Senior Analysts.

🌐 Examples

In Ghana, knowing the importance of professional independence, the data pipeline set up in agreement by the partners was one that gives GSS the ability to access the aggregated, anonymized call detail records (CDR) data for the analyses and dissemination of mobility insights. To prevent misuse of statistics on mobility, a steering committee was set up, headed by the Government Statistician at GSS, to oversee use, output, and data dissemination. The steering committee acts as a form of governance also during the project.

In Indonesia, to start the first project for utilizing mobile phone data for inbound tourism statistics, high-level meetings were held often between representatives of the Ministry of Tourism (Deputy Ministers), NSO (Deputy Director Generals of Statistics Indonesia), and operator (Executives of the subsidiary representing the Telkomsel's data business). At times, the meetings were joined by the Ministry of Communications and Information executives. The meetings, which went on for six months at the start of the project, established the principles of collaboration and the governance structure that started working during the development and production stage. The steering committee, although not called as such, was called up again whenever significant changes or challenges surfaced in the collaboration throughout later years in the long-standing collaboration.

❗ Tips

✅ The steering committee is made up of high-level officials of major stakeholders and regulators and should meet sparingly to decide and provide guidance to the technical committee, which is tasked to discuss and find solutions to most of the data sharing topics.

📖 Resources

A sample terms of reference document for a steering committee focused on mobile network operator data is available at this link: https://docs.google.com/document/d/e/2PACX-1vRk9MNnsX2XM9OV_1_mN1JbthEZ6eGY_BorkQPQhZa3akF3kgnqQSu7fylTcCPPoUii_ey3EkKez1QF/pub

⏩ Next Actions

- ☐ Set up steering and technical committees.

- ☐ Utilize the committees to discuss and decide on all topics related to data sharing collaboration.

3.4 Discuss Technical Details of the Data Pipeline Setup

Before finalizing a data sharing agreement, meticulous attention must be paid to the technical aspects of data transfer and processing. This crucial step involves a comprehensive discussion between the NSO and operators to define the parameters of the data pipeline. Key considerations include:

- Data streams and formats: Determining the specific data streams to be shared (e.g., call detail records, signaling data) and the expected file formats (e.g., .csv, Parquet).
- Data storage and retrieval: Defining the data storage location (e.g., NSO servers, operator servers, regulator servers, government cloud), storage format (e.g., structured databases, HDFS), and data retrieval methods (e.g., APIs).
- Data frequency and volume: Establishing the frequency of data delivery and estimating the expected data volumes to ensure adequate storage capacity and processing power.
- Data anonymization and encryption: Agreeing upon the anonymization techniques (e.g., ID hashing, sampling, aggregation) and encryption methods to be employed to safeguard user privacy.
- Data storage policy and business continuity plan: Defining data retention policies, backup procedures, and disaster recovery plans to ensure data integrity and availability.
- Data management policy: Establishing clear procedures for data handling, including data access controls, data quality checks, and data documentation.
- Assigning authorized data processors: Identifying and assigning specific individuals or teams within the NSO or technical providers as authorized data processors, responsible for handling and analyzing the data in accordance with agreed-upon protocols.

🌐 Examples

Several different examples exist for data pipeline setup that can be instructive:

- In Estonia, an authorized data processor is sought through an open competition that acts as a technical provider for data storage, cleaning and processing. Until 2027, this provider is Positium, which is a private company. The statistical authority and operator have agreed on sharing the data through an API in encrypted .csv format, where all subscriber identifiers have been hashed (pseudonymized).
  During the COVID-19 pandemic, Estonia implemented an emergency response model for utilizing mobile network data. Due to time constraints, instead of direct data sharing, a simplified approach was adopted. Statistics Estonia, acting as an intermediary, requested operators perform basic calculations on aggregated mobility data, based on methodology developed by Positium, and submit the results. Statistics Estonia's role as

an intermediary (between mobile network operator and the project team) was crucial as the operators did not want to show each other the regional distribution of their customer base.

- In Ghana, Telecel Ghana (previously Vodafone Ghana) provided access to pseudonymized telecommunications data free of charge. Using its open-source processing software, Flowminder aggregated and analyzed the data on behalf of Ghana Statistical Service. The technical details of data pipeline setup are outlined in the data sharing agreement.
- In Indonesia, the data remains at the mobile network operator which invests in (and is compensated for) staff time, storage, and technology. Statistics Indonesia has access to sample data, on which they are able to create and improve methodology, which the operator implements. Companies like Positium and Indonesian public research organizations assist with methodological developments, with or without access to data.
- In the Gambia, the telecommunications regulator PURA took the role of the data storage and processing party, with help from the University of Tokyo as a technical provider. A set of mobility statistics is being produced from CDR data in PURA's premises and updated as new data come. CDR data are de-identified by respective mobile network operators to ensure that no personally identifiable information is included in the data used for producing statistics by PURA, which manages all data access. The NSO receives aggregates for the production of statistics and publication.

❗ Tips

✅ Investigate the data sharing practices of other countries, through resources online, through international working groups or through direct discussions with the countries that have implemented operator data pipelines.

✅ At this point, it will be best to engage a technical provider or consultant to help with technical discussions on data pipeline setup. You should be able to find an expert with relevant technical background and experience in two or more countries.

✅ During technical discussions, make sure that the final approach for data sharing enables production of quality statistics. For that, it is important to ensure fit for purpose, data minimization, data quality checking, validated methodologies, and transparency of processing.

📖 Resources

See a description of the project setup and principles upheld in the projects of Estonia, Ghana, and the Gambia in Guiding principles to maintain public trust in the use of mobile operator data for policy purposes, Data for Policy, 2021.

See various data access options described in Chapter 3 of the UN Handbook on the use of Mobile Phone data for Official Statistics (2019).

⏩ Next Actions

- ☐ With the technical committee, schedule working meetings with the goal of agreeing on the data sharing principles and pipeline setup.
- ☐ Set a regular meeting cadence to finalize all the data sharing terms.
- ☐ Send the data sharing terms for approval to the steering committee.

💡 Important Note: Opportunities and Challenges Introduced by Artificial Intelligence

Artificial intelligence (AI) and large language models (LLMs) have the potential to revolutionize many industries, including the field of mobile positioning data analytics. However, it's crucial to approach AI applications with caution and a clear understanding of their limitations.

AI can be a valuable tool for automating routine tasks, improving data quality, and enhancing the efficiency of analysis. For instance, AI can be employed for input data quality assurance, coverage area propagation modeling, and synthetic data generation. Additionally, machine learning-based bias adjustment methods can help mitigate biases in data and improve the accuracy of estimates. Furthermore, LLMs can be useful for natural language queries on results and to provide an understanding of complex methodologies.

Nevertheless, it's important to avoid overreliance on AI. While AI can assist in various tasks, human expertise remains essential for developing sound methodologies, interpreting results, and ensuring ethical considerations are met. Using AI to directly build methodologies or draft documents can lead to unintended consequences, such as non-reproducible results or unrealistic expectations. While LLMs can develop ideas of what is possible with mobile data, care should be taken to ensure the ideas are also viable and ethical to implement. AI should be viewed as a tool to augment human capabilities, not replace them.

**This note on AI was written with the help of an open-access large language model, with human input about the main opportunities and challenges of AI in the field of mobile network data analysis for statistics.*

3.5 Sign Data Sharing Agreements

Data sharing agreements are crucial for formalizing collaborations between NSOs and mobile network operators. These agreements outline the terms and conditions for data access and use, ensuring that all parties understand their rights and responsibilities. Key aspects of these agreements include:

- Data ownership: Clearly define the roles of data controller and data processor, and establish clear rules for authorizing and governing data processors handling the shared data.
- Data anonymization and aggregation: The agreement must explicitly detail the level of data anonymization and aggregation required to protect user privacy. This includes specifying which categories of data the NSO can access and how the data will be processed to remove personally identifiable information.
- Data handling: The agreement should clearly define the responsibilities of each party in handling the data. This includes data storage, security, and analysis protocols.
- Data use limitations: The agreement should specify that the operator data can only be used for the stated statistical purposes and prohibit its use for commercial or other unauthorized purposes by the NSO.
- Data deletion: The agreement must outline procedures for the secure deletion or return of data to the mobile network operator upon completion of the project or as per agreed-upon timelines. Usually capped by regulation to two years or less.
- Publishing results: The agreement should address how research findings and publications will be disseminated, including considerations for data privacy, intellectual property rights, and attribution of the data source.
- Compliance with regulations: The agreement must ensure compliance with relevant data protection regulations, such as GDPR. This may involve establishing data processing agreements (DPAs) to further clarify data processing activities and ensure compliance with privacy laws.

🌐 Examples

A successful example of such a collaboration is the 2018 partnership between the Ghana Statistical Service (GSS), Telecel Ghana (previously Vodafone Ghana), and Flowminder, officially signed in 2018. This project enabled GSS to leverage mobile phone data for disaster management, public health, and sustainable development planning. However, the negotiation process was lengthy, spanning 13 months, due to challenges such as the absence of in-house legal counsel at GSS and the concurrent implementation of the GDPR. Despite these challenges, the agreement successfully addressed key issues such as data aggregation, data exchange parameters, data use limitations, data deletion, and publication guidelines. This collaboration has proven invaluable, particularly during the COVID-19 pandemic, where mobile network data has been instrumental in documenting the impact of restriction measures in Ghana.

The Central Bank of Estonia, a pioneer in operator data utilization since 2008, has obtained explicit authorization from the data protection authority to access inbound and outbound roaming data under its statistical mandate. Subsequently, a data sharing agreement was signed with a major operator. This agreement, recognizing the Bank's authority as the "data processor," allows for the sharing of raw data directly under the framework of the statistical law.

The Bank then announced a public competition to determine a third party authorized data processor to implement data processing. This model demonstrates how a clear legal basis and a strong data protection framework (European Union's General Data Protection Regulation, or GDPR) can facilitate the ethical and responsible use of mobile network data for statistical purposes.

❗ Tips

✅ Make sure the legal framework for entering into the data sharing agreement is clear by involving regulators early in the process. Once all the necessary discussions on the main contractual points have taken place, it can be wise to quickly circulate a draft version of the agreement.

✅ Concerns about government access to sensitive data can be addressed by having a trusted technical provider assist with the data analysis – this can be either an expert private company, academics or a research institute. Note that the third party is held to high data privacy and security standards as an authorized data processor.

✅ For products of national statistics, the terms should not limit the NSO's independence to make decisions about publishing results. At the same time, for publishing experimental and data products outside the national statistical programme, the data provider can have more say.

✅ An additional measure for protecting confidentiality is to require that individual level data can only be accessed on the data provider's or regulator's servers by approved members of staff from NSO or approved third parties.

📖 Resources

Contracts for Data Collaboration (C4DC) is an initiative that aims to improve understanding of the legal conditions that can enable effective data collaboration by doing research in the area and organizing a library of data sharing agreements between parties (often across sectors). A 'Case Study of Data Sharing Between Ghana Statistical Services, Vodafone Ghana, and Flowminder Foundation' was produced by SDSN TReNDS for C4DC: https://www.data4sdgs.org/sites/default/files/file_uploads/Ghana%2BCase%2BStudy_FINAL.pdf

⏩ Next Actions

- ☐ Based on previous technical conversations and examples of similar contracts, create and circulate a data sharing agreement draft early on in its development.
- ☐ Engage the parties that need to sign the agreement and organize signatures.
- ☐ Start planning for data transmission based on the agreement.

- ☐ Celebrate the success of having entered the ranks of countries with robust data sharing agreements in place between the NSO and mobile network operator(s).
- ☐ Communicate the successful signing to the public.

Conclusion

As national statistical systems adapt to changing technologies and needs of users, data from phone companies holds the potential to address a broad range of needs for better and more granular data to guide public policy. Pilot projects are beneficial, but they are just the beginning; the benefits of data sharing between operators and statistics offices increase as these projects mature. Fortunately, many countries around the world have established effective pathways for accessing such data, providing a blueprint for others seeking to initiate data access.

However, because many countries with interest in accessing this data are sidelined early in the process by numerous non-technical challenges that arise in the course of organizing a data sharing partnership, this guide is a roadmap to provide assistance at every step to ensure your journey starts off on the right foot. While the fundamental approach will remain the same, specific details may vary from one country to another and the steps in this roadmap can be adapted to meet local needs. The additional resources linked throughout the guide provide more information in greater detail. Finally, international organizations, experts, and experienced National Statistical Offices are well-equipped to provide support at every step of the journey, ensuring that each country can successfully leverage mobile network data to enhance its statistical capabilities.