Technical Training Curricula - Mobile Phone Data (GDF-MPD project)

Module	Topics	Learning objectives (After this session/module, participants will be able to...)
Introduction to MPD: What they are, how they get used and considerations for production of mobility statistics		
Mobile Phone Data (MPD) and Call Detail Record (CDR) – A basic introduction	**Why MPD?**	- Describe what Mobile Phone Data (MPD) are - Explain why MPD are a useful source of data for informing policy
	Types of MPD	- Describe the different types of MPD - Explain which type of MPD are suitable for inferring mobility, expenditure and social networks
	Strengths and limitations of different types of MPD	- Describe the advantages and disadvantages of different types of MPD
	How are CDRs generated	- Describe what Call Detail Records (CDRs) are - Describe how CDRs are generated
Introduction to CDR data quality, limitations and biases	**Overview of the limitations of CDR data**	- Identify the main limitations of CDR data
	Sampling biases	- Describe the factors the result in sampling biases in CDR data
	Considerations for spatial resolution	- Describe the factors affecting the spatial resolution of CDR data
	Considerations for temporal resolution	- Describe the factors affecting the temporal resolution of CDR data
	SIM usage and SIM sharing	- Describe how SIM usage and SIM sharing impacts the analysis of CDR data
	Rationale for combining CDR data with other data sources	- Understand the need for bias-adjustment and describe how combining CDR data with survey data on mobility or expenditure can address biases
Types of MPD-derived aggregates and statistics	**Types of MPD aggregates**	- Describe four MPD-derived aggregates
	Introduction to short-term mobility aggregates	- Identify the main types of short-term mobility aggregates - Identify the features that are required for short-term mobility aggregates - Explain the importance of selecting the appropriate methods for counting trips and travellers
	Introduction to long-term mobility aggregates	- Identify the main types of long-term mobility aggregates - Identify the features that are required for long-term mobility aggregates - Explain what a subscriber home location is
	Further mobility aggregates	- Describe additional types of mobility metrics aggregates that can be produced (e.g. social mixing aggegates)
	Introduction to social network aggregates	- Identify the main types of social network aggregates - Identify the features that are required social network aggregates
	Introduction to expenditure aggregates	- Identify the main types of expenditure aggregates - Identify the features that are required for expenditure aggregates
	Introduction to network status and usage aggregates	- Identify the main types of network status and usage aggregates - Identify the features that are required for network status and usage aggregates
Introduction to the applications of MDP-derived statistics	**Overview of the applications of MPD-derived statistics**	- Identify the sectors in which MPD-derived data has been used for decision-making
	Introduction to MPD for disaster management	- Describe an example of MPD-derived data being used to inform disaster preparedness - Describe an example of MPD-derived data being used to inform disaster response - Identify the types of MPD-derived aggregates which are required for different disaster management applications
	Introduction to MPD for dynamic population mapping and migration statistics	- Describe an example of MPD-derived data being used to compute dynamic population estimates - Describe an example of MPD-derived data being used to compute migration statistics - Identify the types of MPD-derived aggregates which are required for different dynamic population mapping and migration applications
	Introduction to MPD for public health	- Describe an example of MPD-derived data being used to compute health metrics - Describe an example of MPD-derived data being used to inform infectious disease control - - Identify the types of MPD-derived aggregates which are required for different public health applications
	Introduction to MPD for transportation	- Describe an example of MPD-derived data being used to inform transporation planning or demand modelling - Identify the types of MPD-derived aggregates which are required for different transportation applications
	Introduction to MPD for tourism	- Describe an example of MPD-derived data being used to compute tourism statistics - Identify the types of MPD-derived aggregates which are required for different tourism applications
	Introduction to MPD for information society statistics	- Describe an example of MPD-derived data being used to compute information society statistics - Identify the types of MPD-derived aggregates which are required for different information society applications
	Introduction to MPD for socio-economic indicators	- Describe an example of MPD-derived data being used for poverty-mapping - Describer an example of MPD-dervied data being used to compute socio-economic indicators - Identify the types of MPD-derived aggregates which are required for different socio-economic indicator applications
Data governance: Data protection, data privacy, data ethics and data security	**Introduction to personal and non-personal data**	- Define what would make data 'personal data' - Identify the potential stakeholder in an MPD project - Identify the ways in which individual privacy can be protected in an MPD project
	Mobilty data as personal data	- Explain why mobility data is personal data
	Introduction to data protection regulations	- Identify the types of legislation that might regulate the use of mobile operator data - Identify the types of government body which may be responsible for enforcing these regulations

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	Introduction to commercially sensitive data and MPD projects	- Identify the types of data in an MPD project which may be commercially sensitive
	Introduction to the stakeholders in an MPD project	- Identify the main stakeholders involved in an MPD project and their potential role(s)
	The risks associated with MPD projects	- Identify the main data governance risks associated with an MPD project - Explain which stakeholders are most concerned with each risk
	Ethical use of MPD	- Identify the types of ethical concerns which may arise when working with mobile operator data
	Introduction to privacy enhancing technologies (PETs) for MPD	- Identify the main methods for preserving the privacy of subscribers - Explain the difference between pseudonymisation and anonymisation
Processing MPD into anonymised aggregates		
Methodologies for standard MPD aggregates	**Subscriber presence aggregates**	- Identify the features that are required for presence aggregates - Describe how presence aggregates are computed
	Trips and travellers aggregates	- Identify the features that are required for trips and travellers aggregates - Describe how different trips and travellers aggregates are computed
	Identifying points of interest	- Identify the features that are required for calculating points of interest - Describe the different methdologies from assigning subscriber home locations
	Resident and relocation aggregates	- Identify the features that are required for resident and relocation aggregates - Describe how relocation aggregates are computed - Describe how resident aggregates are computed using relocation aggregates
	Social mixing aggregates	- Identify the features that are required for social mixing aggregates - Describe how different social mixing aggregates are computed
	Social connecivity aggregates	- Identify the features that are required for social network aggregates - Describe how social network aggregates are computed
	Mobile expenditure aggregates	- Identify the features that are required for expenditure aggregates - Describe how expenditure aggregates are computed
	Network status and usage aggregates	- Identify the features that are required for network status and usage aggregates - Describe how network status and usage aggregates are computed
Privacy Enhancing Technologies (PETs)	**Introduction to preserving individual privacy**	- Explain why it is important to preserve individual privacy of subscribers - Describe the difference between pseudonymisation and anonymisation
	Pseudonymisation methods	- Explain how MPD can be pseudonymised
	Aggregation methods	- Explain how MPD can be aggregated
	Additional anonymisation tools	- Explain k-anonymisation and/or other anonymisation tools
	Differential privacy	- Explain differential privacy
Aggregates to indicators		
Population-scaling and bias-adjustment of aggregates	**Introduction to bias-adjustment and population scaling of MPD**	- Explain why MPD is not a non-probability sample of the population - Describe the selection errors that occur when using MPD alone
	Methodologies for bias-adjustment of MPD using survey data	- Explain how survey data can be used to adjust for the biases in MPD
	Caveat and limitations of using survey data to adjust for biases in MPD	- Describe the limitations and caveats of using survey data to adjust for biases in MPD
Quality assurance checks for MPD aggregates	**Introduction to quality assurance for MPD data**	- Explain why quality assurance checks are important when processing MPD - Identify which MPD aggregates are important for QA
	Investigating variation in the mobile network infrastructure	- Identify which MPD aggregates can help identify variation in the mobile network infrastructure which might confound the use of MPD - Explain how to use MPD aggregates to assess the status of and variation in mobile network infrastructure
	Investigating variation in mobile subsrciber behaviour	- Identify which MPD aggregates can help identify variation in the mobilie subscriber behaviour which might confound the use of MPD - Explain how to use MPD aggregates to assess variation in subscriber behaviour
Producing the standard set of mobility statistics from adjusted aggregates	**Calculating long-term mobility indicators**	- Describe how to use MPD aggregates for dynamic population mapping - Describe how to use MPD aggregates to investigate migration patterns - Describe how to use MPD aggregates to identify anomalous numbers of relocations
	Calculating short-term mobility indicators	- Describe how to use MPD aggregates for dynamic "presence" mapping - Describe how to use MPD aggregates to investigate connectivity and daily travel or commuting behaviour
	Calculating expenditure indicators	- Describe how to use MPD aggregates for mobile expenditure statistics - Describe how to use MPD for poverty mapping