EIT Urban Mobility

EIT Urban Mobility is supported by the EIT, a body of the European Union

SOUL

A DSS TO PLAN AND IMPLEMENT SMART MULTIMODAL MOBILITY HUBS

Data framework: an important source for SOUL DSS

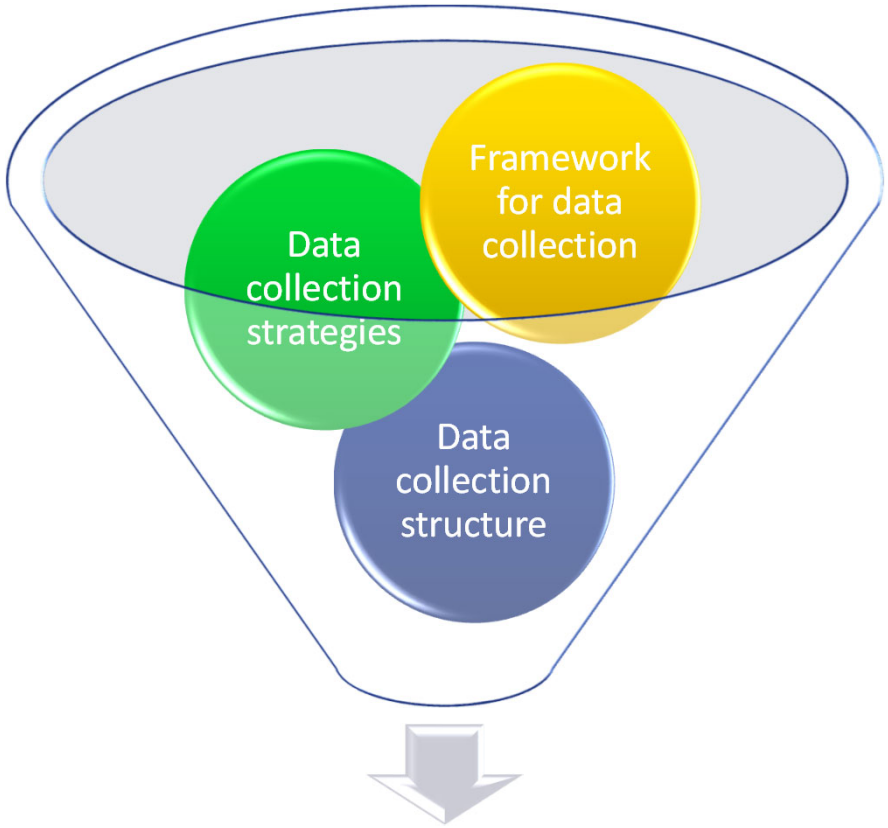
Dario Mertoli

Amat/City of Milan

Contents

- *WP3 – data collection and integration*
- *Stakeholders' perspective on mobility services - survey 2019*
- *Data framework – Milan, Barcelona and Eindhoven Mobility Hubs*
- *Framework for data collection*
- *Data collection strategies*
- *Next steps - data collection structure*
- *Data framework gains*

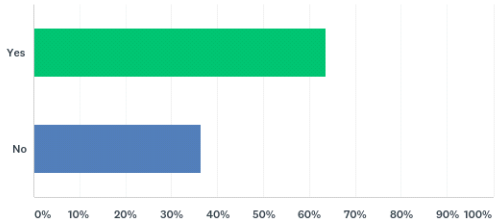
WP3 – data collection and integration



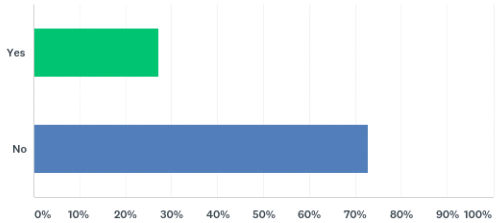
OUT04 – Data collection framework

Stakeholders’ perspective on mobility services - survey 2019

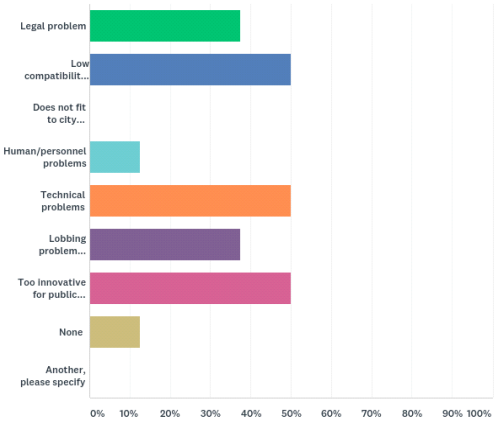
Q1 Do you dispose of tools to collect data regarding the mobility hubs? (Y/N; If yes please describe shortly which one)



Q3 Are you satisfied with the current data source available for your organization (raw data, analysed data)?



Q3 Can you see any stoppers on the public administration side regarding mobility hubs (please choose 3 main stoppers)?



Data framework - Milan Mobility Hub

DATA PROVIDERS	AVAILABLE DATASETS
Milan Municipality (datasets owner) with the support of AMAT	parking, bycle lanes, bicycle stalls, road accidents, charging station, shared mobility services information, pedestrian areas, zone 30, etc.
ATM (Azienda Trasporti Milanesi/Milan transport company)	ATM Static GTFS, metro stops access, metro routes, public transport timetable, bus stops, bus routes, cycle lanes localization, parking meter localization, bike sharing stations, etc.
Trenord, regional rail transport operator	Regional trains info, regional routes timetable, Trenord static GTFS
RFI (Rete Ferroviaria Italiana/Italian railway network) - owner of railway national network	National and Regional routes timetable, national railway stations localization

Data framework - Barcelona Mobility Hub

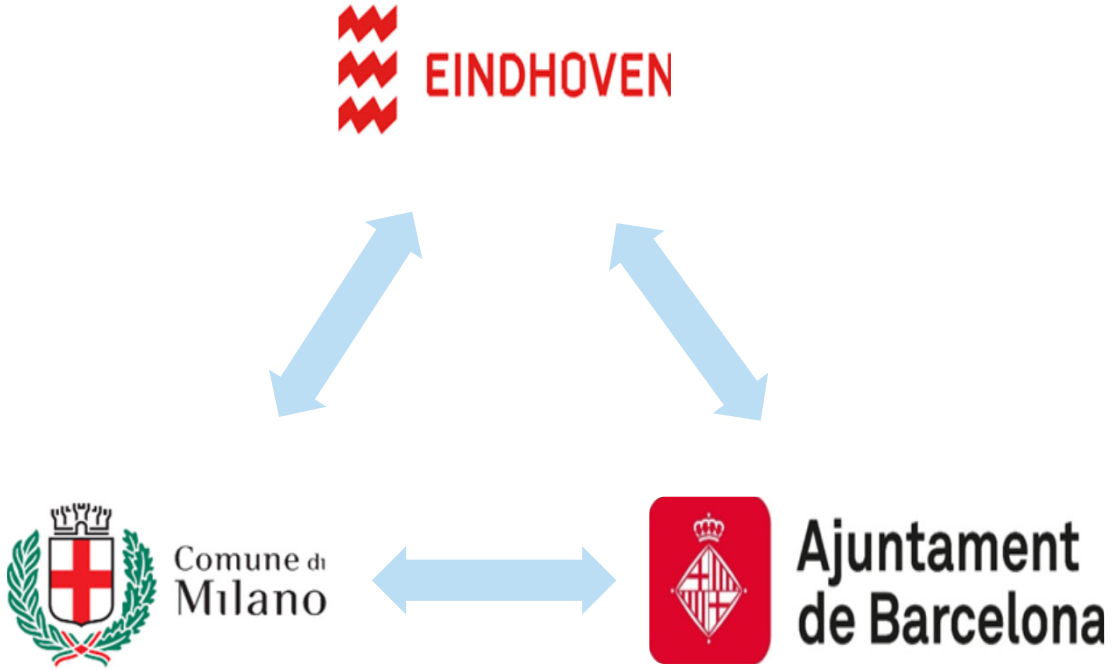
DATA PROVIDERS	AVAILABLE DATASETS
TMB - Transport Metropolità de Barcelona/Metropolitan Barcelona Transport	Bus lines, bus routes, bus stops, metro lines, metro stations, metro sections, metro access, TMB Static GTFS, etc.
FGC - Ferrocarrils Generalitat de Catalunya	FGC Static GTFS
RENFE - Red Nacional de los Ferrocarriles Españoles/National Network of Spanish Railways	RENFE Stations, Passengers volume
BSM - Barcelona de Serveis Municipals/Barcelona Municipal Services	Charging stations, bike station information, bike stations status, parking
Mobility department - Barcelona City Council	Taxi stops, loading areas, traffic status information, zone 30, bicycle lanes, bicycle lanes in construction, etc.

Data framework - Eindhoven Mobility Hub

DATA PROVIDERS	AVAILABLE DATASETS
Eindhoven Municipality	parking, electric charging stations, bicycle count data, bike lanes, shared mobility fleet data
NDOV – National Datawarehouse for public transport	public transport vehicles location and public transport time tables
NDW – National Datawarehouse for Road data. Database of both real time and historic traffic data	traffic constraints (scheduled events, accidents, etc.)

First task: framework for data collection

- Gather basic information on all the potentially interesting datasets for three cities
- Define the actors involved in data management
- Overview of data collection from each city involved
- Investigate and analyse the datasets available in each mobility hubs, identifying analogies or uniqueness
- Data collection methodology



First task: framework for data collection

The aim is to use a spread sheet to collect metadata about the datasets available. A dataset may be a table, a collection of more complex structured data or a collection of unstructured data or documents.

The main info requested are:

- Dataset _ID
- Ownership
- Metadata
- GDPR
- Update frequency
- License
- Access mode

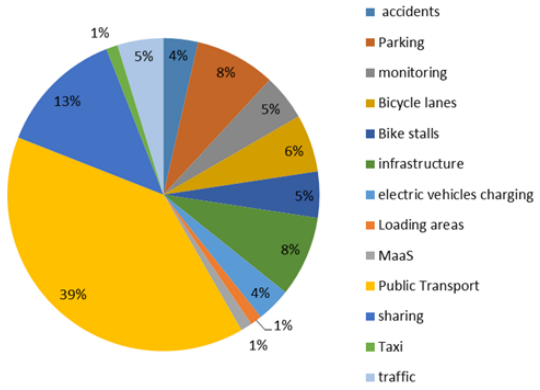
.

.

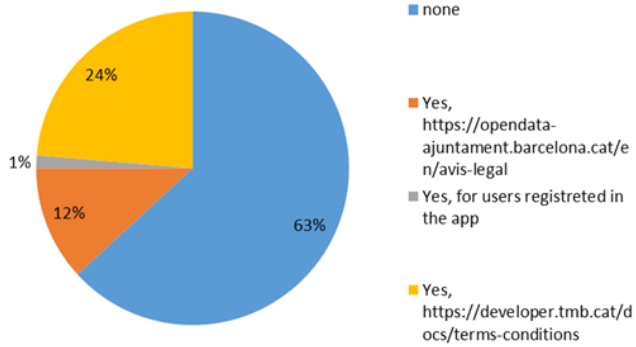
.

CITY	DATASET_ID	LOC_NAME	NAME	ABSTRACT	KEYWORDS	OWNERSHIP	METADATA	GRDP	UPDATE_FREQ	VOLUME	LICENSE
Milano	DSMI_PK_FACILITIES	Parcheggi Pubblici in Struttura	**Public parking facilities**	Public parking facilities localization	Parking	Producer: Milan municipality; Manager:	CKAN	none	yearly	200 records; low increase rate	CC-BY 4.0
Milano	DSMI_PK_TOURBUS	Sosta bus turistici	**Touristic bus**	Touristic bus stalls localization	Parking	Producer: Milan municipality; Manager:	CKAN	none	yearly	30 records	CC-BY 4.0
Milano	DSMI_PK_ROAD	Sosta su strada	**Roadside Parking**	Regulated roadside parking lanes localization	Parking	Producer: Milan municipality; Manager:	CKAN	none	yearly	50000 records; low increase rate (regulation	confidential
Milano	DSMI_BK_LANES	Piste ciclabili	**Cycle lanes open data**	Cycle lanes and related crossings	Bicycle lanes	Producer: AMAT; Manager:	CKAN	none	each six months	Low (1554 records); few yearly additions	CC-BY 4.0
Milano	DSMI_BK_STALLS	Stalli sosta bici	**Public bike stalls open data**	Public bike stalls localization Incl	Bike stalls	Producer: AMAT; Manager:	CKAN	none	each six months	Low (3174 records)	CC BY-NC-SA
Milano	DSMI_SH_BK_RTDATA	Occupazione stazioni bike	**Bike sharing station based,**	Bike stations localization,	sharing	ATM	N/A	none	real time	Very low	None
Eindhoven	DSEIN_TC_CONSTRAINTS		**Traffic constraints**	Open data from the NDW (National	accidents, monitoring	NDW	TPEG/DATEX2	none	real time	-	CC-BY-SA
Eindhoven	DSEIN_PK_OFFSTREET		**Parking (OffStreet)**	This data set contains the (near) real-time	Parking	NPR	SPDP2.0	none	real time	-	CC BY-NC-SA
Eindhoven	DSEIN_PK_ONSTREET_OCC		**Parking (OnStreet)**	Real-time dynamic occupancy of	Parking	Ehv Municipality	N/A	none	real time	-	Open, limited api usage
Eindhoven	DSEIN_PK_ONSTREET_LOC		**Parking (OnStreet)**	public parking places and	Parking	Ehv Municipality	CKAN	none	monthly	<1000 records	CC-BY-SA
Eindhoven	DSEIN_PT_LOC		**Public Transport**	Location of all public transport	Public transport	NDOV	BISON KV6	none	real time	-	CC-BY-SA
Barcelona	DSBC_BUS_CL	Correspondencia d'una linia	**Connection of Line Stops**	Transport connections of Bus Line stops	Public Transport	TMB	N/A	Yes; https://developer.tmb.cat/docs/t	daily	15053	CC-BY 4.0
Barcelona	DSBC_BUS_F	Mobiliari	**Bus furniture**	List of furniture at Bus stops that are	Public Transport	TMB	N/A	Yes; https://developer.tmb.cat/docs/t	daily	2722	CC-BY 4.0
Barcelona	DSBC_FGC_AG	Static Transit Trains in GTFS	**FGC Static GTFS**	Paths, stops; routes, timetables	Public Transport	FGC	N/A	none	real time	-	CC-BY 4.0
Barcelona	DSBC_Metro_L	Linies de Metro	**Metro lines**	List of Metro lines	Public Transport	TMB	N/A	Yes; https://developer.tmb.cat/docs/t	daily	11	CC-BY 4.0
Barcelona	DSBC_Metro_ST	Estacions de Metro	**Metro stations**	List of Metro stations ordered	Public Transport	TMB	N/A	Yes; https://developer.tmb.cat/docs/t	daily	135	CC-BY 4.0
Barcelona	DSBC_Metro_SL	Estacions per linia	**Metro stations per line**	List of stations that form part of each Metro or Bus	Public Transport	TMB	N/A	Yes; https://developer.tmb.cat/docs/t	daily	167	CC-BY 4.0
Barcelona	DSBC_Metro_SEC	Trams de Metro	**Metro sections**	routes or bus lines, for each direction of the	Public Transport	TMB	N/A	Yes; https://developer.tmb.cat/docs/t	daily	178	CC-BY 4.0
Barcelona	DSBC_Metro_C	Correspondencia Metro	**Metro connections**	Connections of Metro stations, per line	Public Transport	TMB	N/A	Yes; https://developer.tmb.cat/docs/t	daily	753	CC-BY 4.0

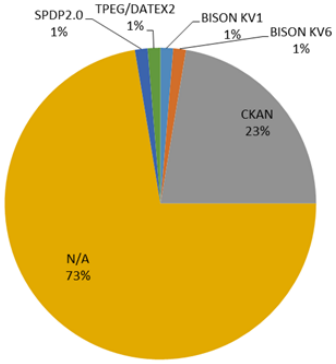
Framework for data collection results



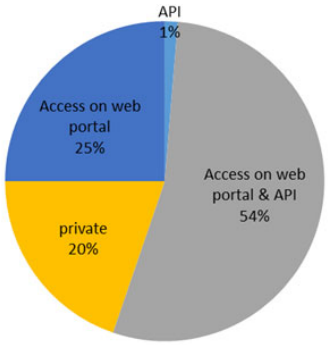
Keywords datasets



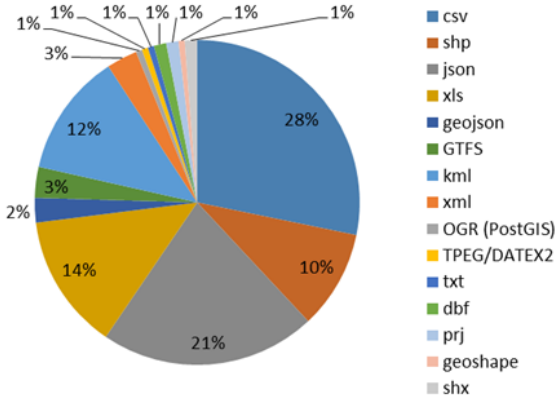
GDPR



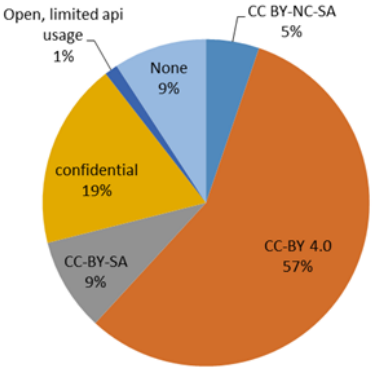
Metadata



Access mode



Data format



License

Framework for data collection results

- Similarity in most of the data provided by three cities
- The lack of common metadata layer for describing datasets requires a specific need of a data integration strategies, also considering the language problem, where a lot of datasets attributes are described in the native language
- Technical problem that needs be considered is related to the access and reuse of datasets, especially the ones who do not offer a real open data style licenses and are declared “private”
- The availability of information about public transport, shared mobility as well as private mobility, instead, can provide enough data for mobility forecast analysis and “what if” scenario, useful for DSS development

Second task: data collection strategies

a. describe how the initial datasets candidate list was developed

b. describe how the dataset selection criteria were applied to select the final list of datasets

c. introduce the final list of selected datasets

a. Background information about data editor

b. 6 modules for the data collection strategies

c. completed the survey, proceed with the data analysis. This process allowed to gain valuable insights and trends

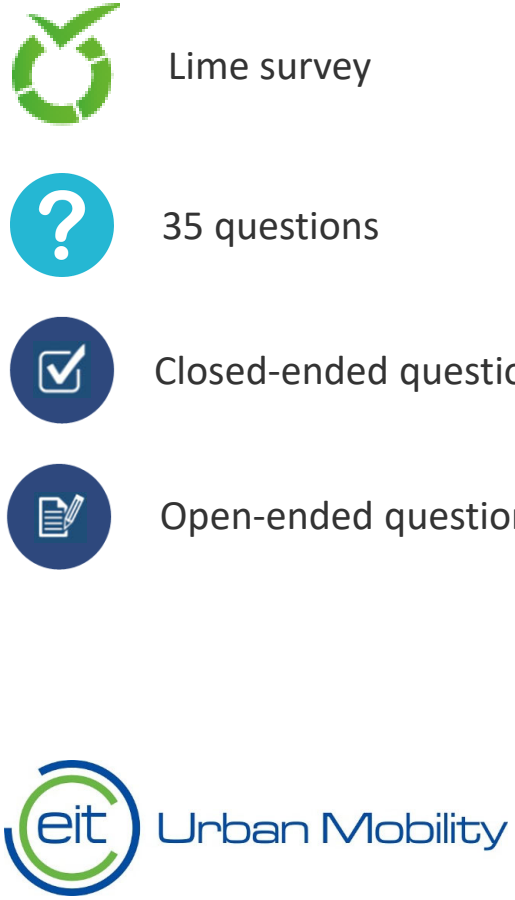
Second task: data collection strategies

Lime survey

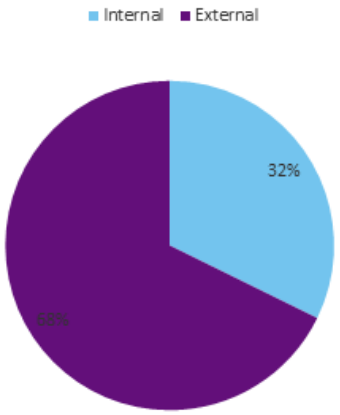
35 questions

Closed-ended questions

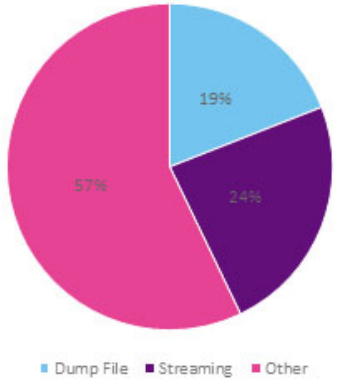
Open-ended questions



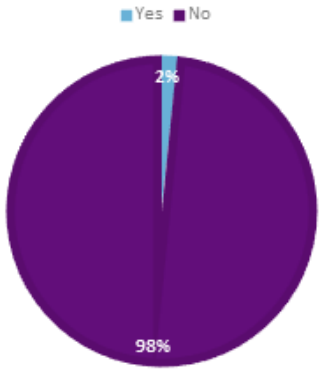
Data collection strategies results



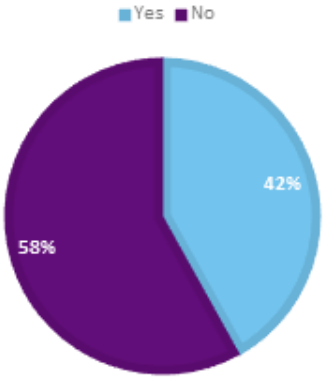
Source of the collected dataset



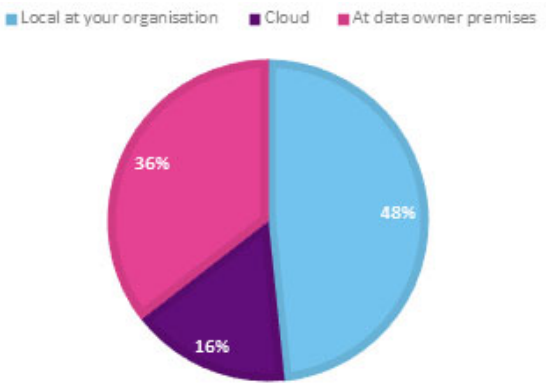
Data collection methods for the external dataset



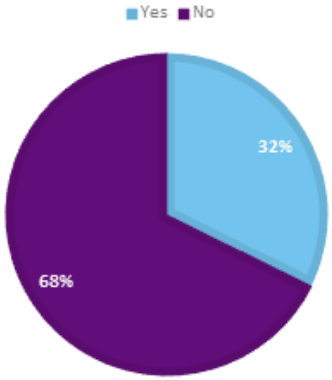
Data enrichment



Transformation of the data



Data Storage places



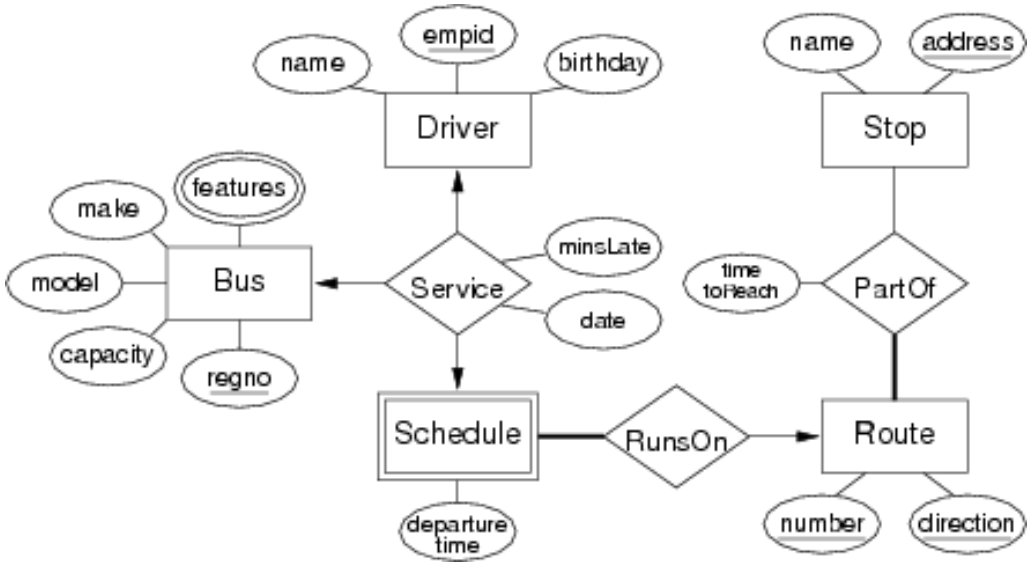
Implementation of a data quality assessment process

Data collection strategies results

- Most of the datasets are external, taken from the Open Data Portal or by engaging the data provider generally by a contract. The frequency for a lot of datasets is daily (traffic, public transport, and mobility data)
- Several external data are retrieved through datafiles and APIs
- For the datasets transformed, the reason of transformation is very high volume and only aggregated data are needed or because their format do not comply with Open Data Portal. Only a few datasets KPIs exist, in order to give statistics about several events (number of accidents per vehicle, per year, etc)
- Many datasets are stored locally, followed by stored at data owner servers, and only a few adapt strategies such as storage in clouds
- Most of the datasets do not follow a data quality assessment process. Regarding the quality dimensions, the most considered one is the consistency assessed by applying rules such as foreign key constraints, numeric ranges, etc

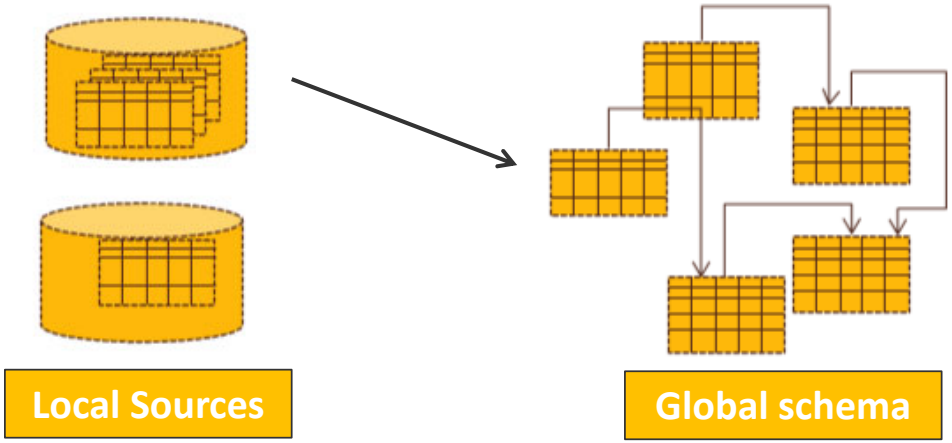
Next steps – data collection structure

- Build a integrated high level data structure including all the top-level concepts used by each Municipality
- Use of Entity Relationship as data model able to describe concepts and their relationships



Data framework gains

- Each concept in the local source of a Municipality could be mapped in terms of the unique global schema
- All analysis will be realized on global schema → all analysis can be applied to data of local source



- Full exploitation of the dashboard and analysis, that will be defined in WP4 - DSS Framework Design

Thank you!

dario.mertoli@amat-mi.it

https://www.amat-mi.it/it/progetti/kic-urban-mobility/

https://www.fondazionepolitecnico.it/en/initiatives/soul/

EIT Urban Mobility is supported by the EIT,
a body of the European Union