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Generating density grids of services and utilities in Europe based on Point of Interest (POI) data

Technical Note

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Contents

1 Introduction

In this short technical note we describe the production of a set of density maps of facilities and utilities across Europe. This dataset consists of 24 raster grids layers of 500x500 metres with each 500 m^2 cell representing the number of Points of Interest (POI) per category, for the 2016 reference year, hereinafter referred as 'POI density grids'.

The work has been carried out in the frame of the Knowledge Centre for Territorial Policies. This dataset was produced in April 2018 in the scope of the collaboration between DG JRC and International Transport Forum (ITF) at the Organisation for Economic Co-operation and Development (OECD). It acts as a think tank for global transport policy issues and organises an annual summit of transport ministers. This work outputs will support the analysis of the spatial structure of regions and cities in terms of the supply of key urban services and amenities and will feed into the LUISA Territorial Modelling Platform.

In the next section are described the used datasets and the methods deriving the final density grids. Chapter 3 analysis the output results both thematically and spatially, focusing on Paris as example. The conclusions are presented on the final chapter just before the annexes where detailed statistics can be found.

2 Data and methods

Two input datasets were used to generate the POI density grids, both covering the entire European Union 28 countries, plus Norway, Switzerland, Iceland, the Balkan region, Turkey, Ukraine, Belarus and part of Russia:

- TomTom Multinet 2017 Points of Interest (POI);
- Reference 500 m^2 raster grid.

TomTom is a Dutch company that produces traffic, navigation and mapping products. It also makes action cameras, GPS sport watches, fleet management systems, and location-based products.

Its Multinet geospatial navigation data included 30.069.065 georeferenced points originally in WGS84 coordinate system, and then projected to ETRS89 Lambert Azimuthal Equal Area [1].

The reference raster and the categories used to calculate the final density grids, were provided and defined by ITF [2].

Figure 1: Partial representation of TomTom georeferenced Points of Interest.
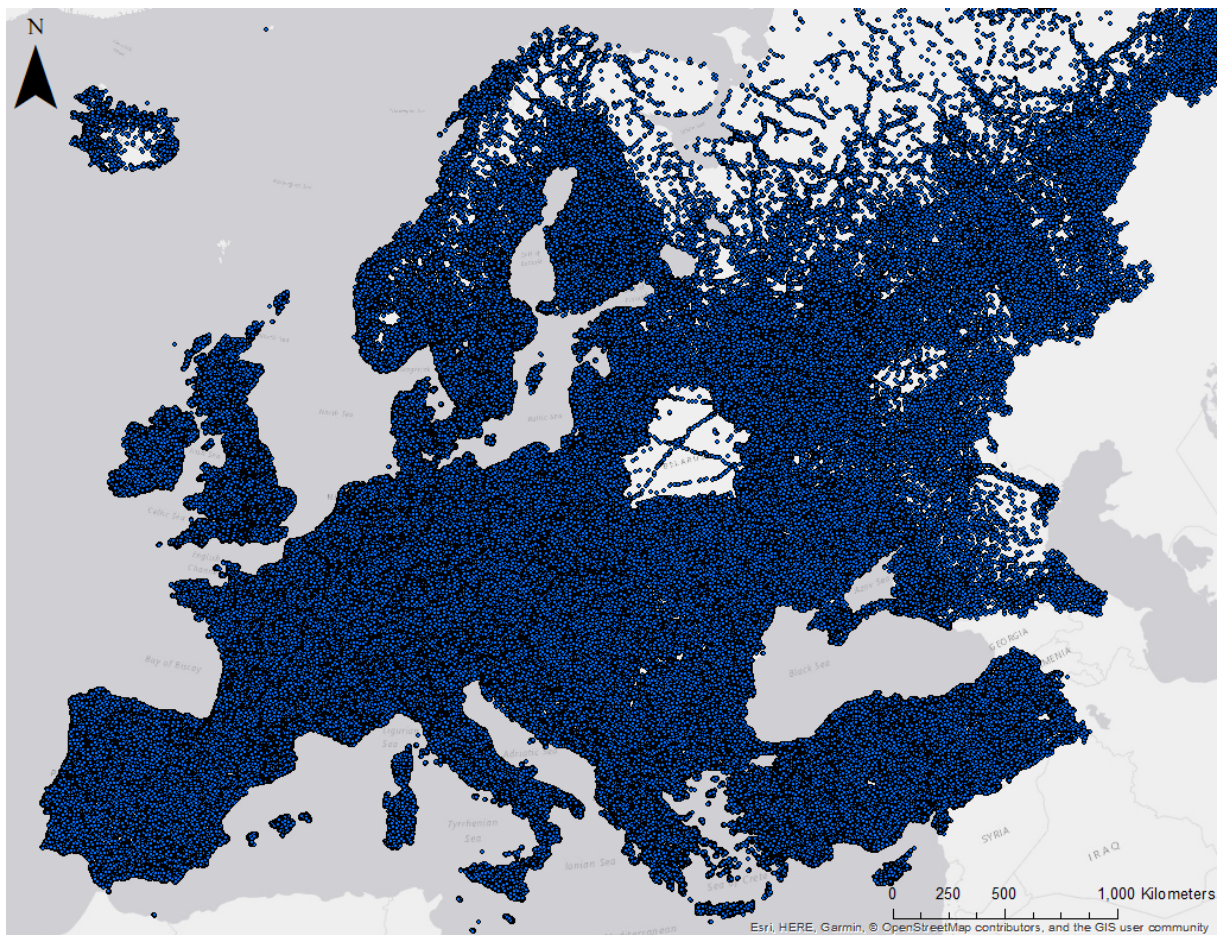
Python was the programing language chosen to perform the work, while resorting to ESRI's ArcPy library for the geospatial operations.

The initial 121 categories originally available at TomTom's dataset were aggregated to 24 larger groups as defined by ITF. This was done by creating specific SQL programming

language expressions. These expressions were used to select and aggregate all corresponding POI.[1]

As example, the following SQL expression selects all POI for "shop other" category. These are identified by their corresponding "SUBCAT" number:

SQL expression: *("SUBCAT" >= 9361001 AND "SUBCAT" <= 9361007) OR ("SUBCAT" >= 9361026 OR "SUBCAT" <= 9361083)*

Once selected, these were converted to raster format (i.e. .tif), using ITF 500 m^2 grid as reference, creating a density POI raster for that specific category.

Finally, a zonal statistics operation calculated the total and average number of points per cell for each EU28 countries.

This process was repeated 24 times for the following categories:

- Bank;
- Café;
- Church;
- Cinema;
- Cultural centre;
- Department store;
- Health doctor;
- Health general;
- Hospital;
- Market;
- Museum;
- Parks;
- Pharmacy;
- Post;
- Rail;
- Restaurant;
- Restaurant area;
- School;
- Shop food;
- Shop other;
- Stadium;
- Theatre;
- Tourist;
- Transit.

In annex 1 a look-up table can be found with the correspondence between the aggregate grouping from ITF and the included TomTom POI categories.

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[1] TomTom official website (https://www.tomtom.com), accessed 20th April, 2018

[2] International Transport Forum official website (https://www.itf-oecd.org), accessed 20th April, 2018

3 Results

3.1 Thematic Analysis

From the resulting density grids, the average number of POI per cell was then calculated. Figure 2 reflects the computed results for cells with at least one POI. "Shop other" category is the densest with an average 805.8 points/cell, while "Restaurant area" the sparsest with 1.0 points/cell. In total terms, "Shop other" has a total of 2.822.325 points while only 44 POIs refer to "Restaurant area" in the entire dataset.

Figure 2. Average POI per 500 m² cell
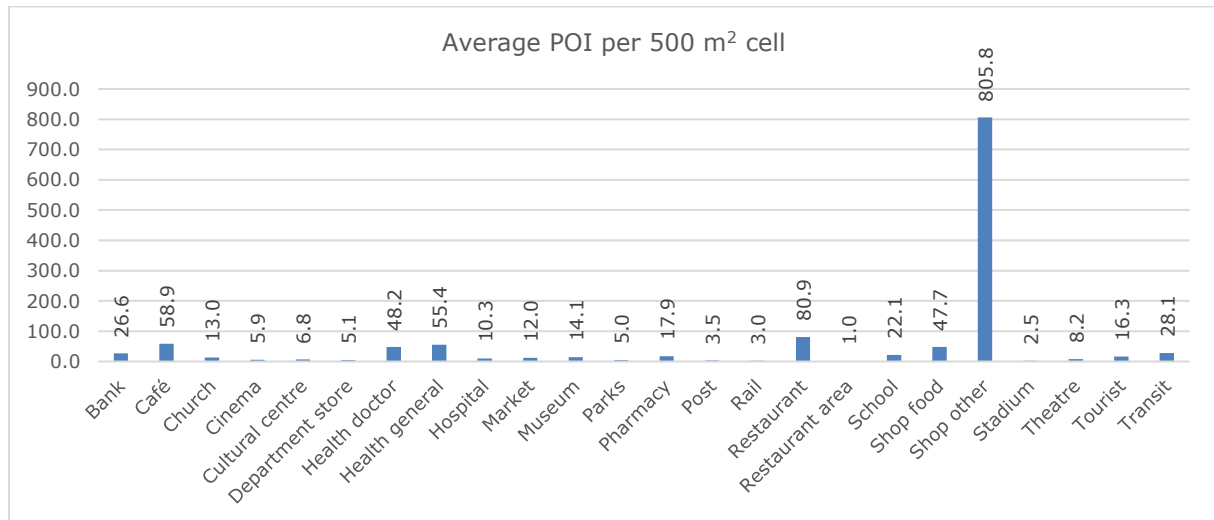
The following graph (figure 3) shows the average densest POI category per country and corresponding value. Due being under and overly represented, "Restaurant area" and "Shop other" were excluded and the analysis focused at EU28 level. Points related with health ("Health doctor" and "Health general") and leisure ("Restaurant" and "Café") are overall the most densely populated. The "Bank" category in Greece and Slovakia reaches the highest values (3.0 points/500 m² and 2.3 points/500 m² respectively). "Transit" (Public Transport Stop) is the densest in several countries (Belgium, Hungary and Italy) but its spatial distribution is not widespread and limited to some European areas (mainly Great Britain, Netherlands, Belgium Denmark, Sweden, Estonia, Switzerland and a few metropolitan areas). Annex 2 table shows all calculated values per category and country.

Figure 3. Highest average density (500 m²) and corresponding category per country

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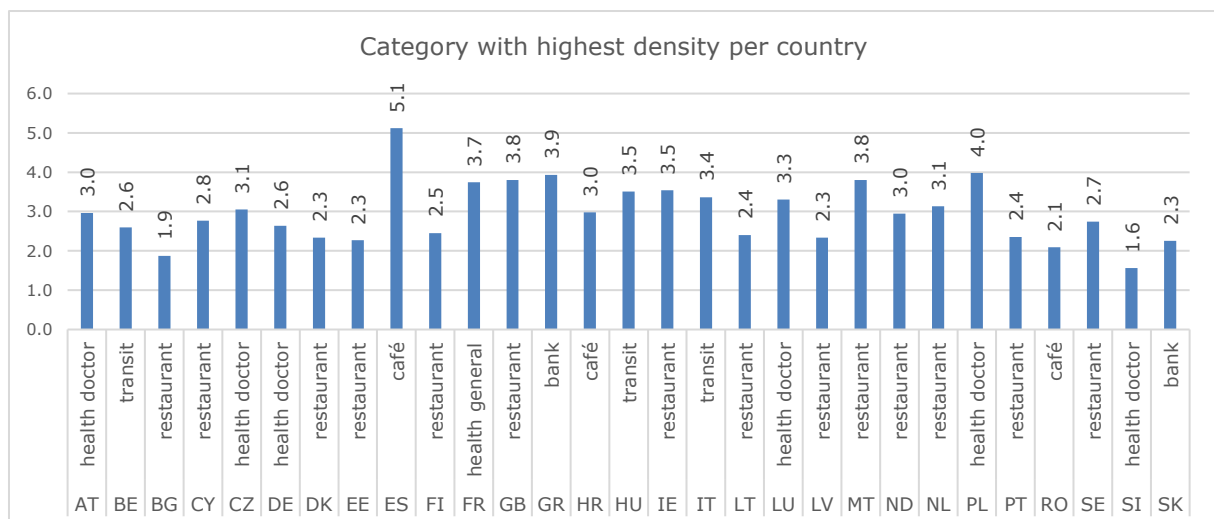
Using the same approach, the highest total value and corresponding category for each EU28 country is represented on the following graph (Figure 4). "Transit" in Great Britain (GB) has the highest total value of any country with 358.049 points. The lowest is found in Bulgaria for the restaurant category. Because countries dimensions influence this count, there is a wider gap between values. Annex 3 shows all values per category and country.

Figure 4. Highest total value and most represented category per country
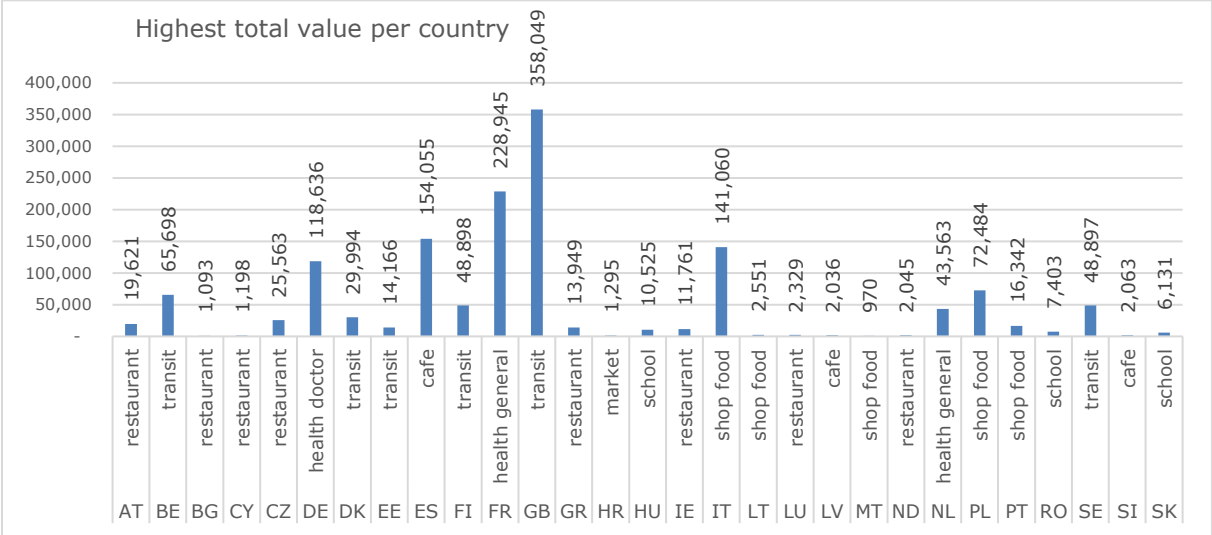
3.2 Spatial Analysis

In addition to the thematic analysis above, it is interesting to explore the spatial distribution of the data. The following graph (Figure 5) depicts the population per POI ratio. "Transit" category was not included due not being represented in all countries. At EU28 the value is set at 16.47 persons per POI. Eastern countries, mainly Bulgaria, Romania, Croatia, Slovakia but also Greece, Cyprus and the Baltic countries are clearly above this average. Luxembourg, Belgium and France are on the opposite side of the spectrum. This reveals the dataset spatial heterogeneity and which countries might be underrepresented.

Figure 5. Population per country at country level
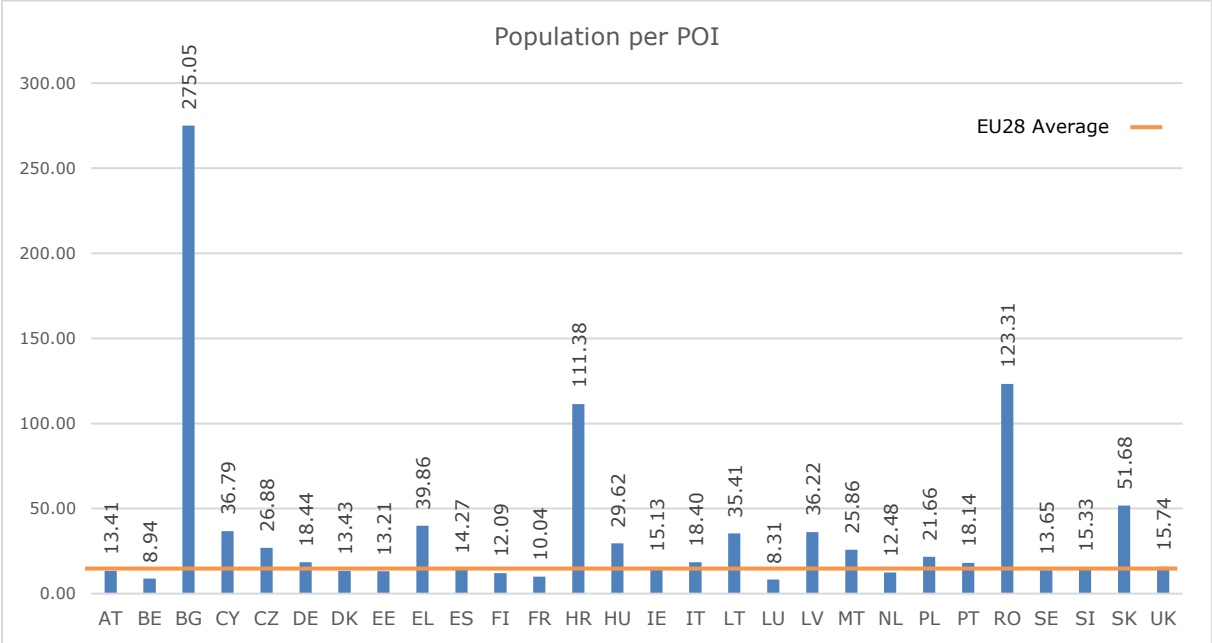
Figure 6 exemplifies a grid map of all POI types per 500 m^2 cells. Urban areas have the highest densities while rural zones the lowest presence of services following current population distribution.

Figure 6. Grid map of all POI per 500 m^2 cell
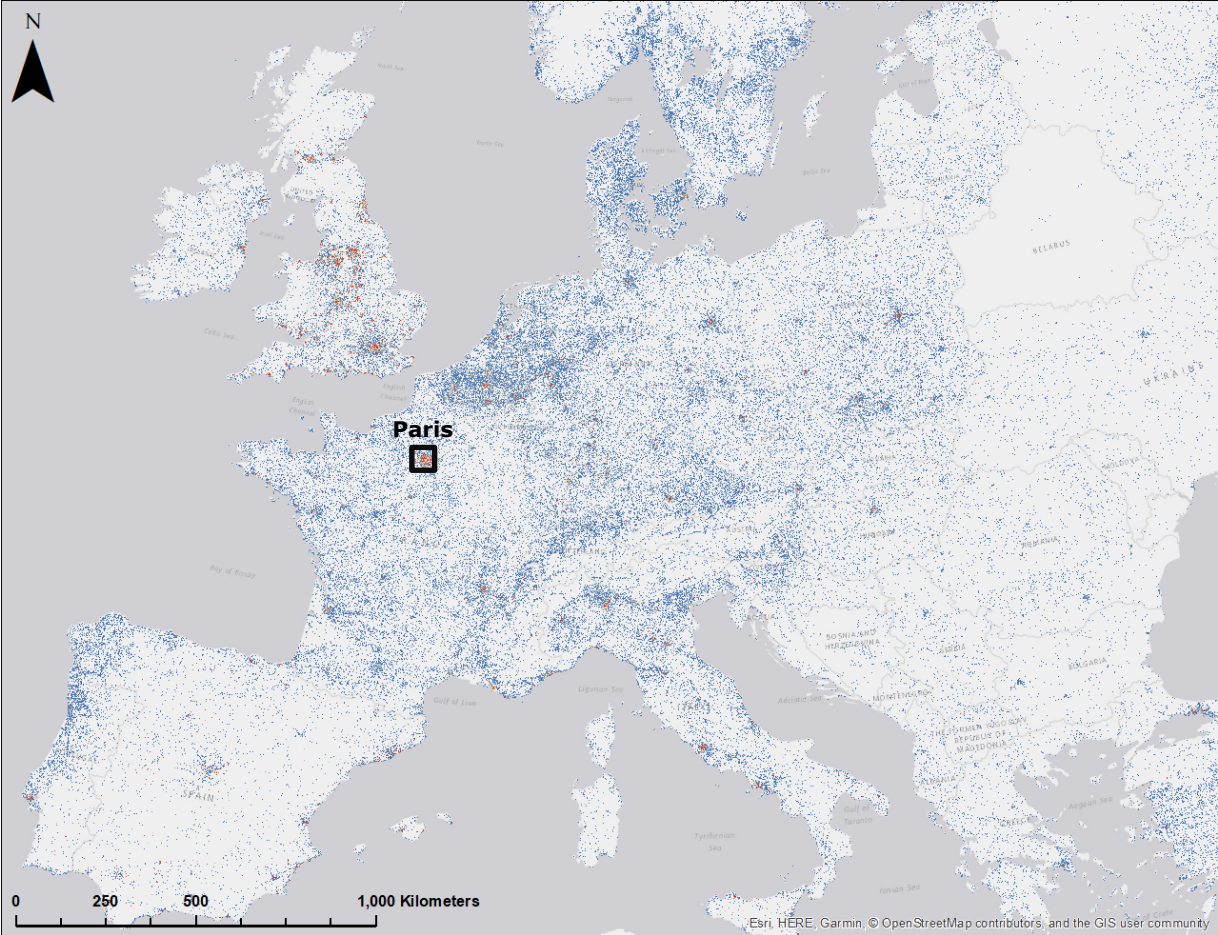
As result of the wide geographical coverage, figure 6 depict Paris zoom-ins for every POI type. "Restaurant area" was omitted since no point are present for that specific location. The colour ramp varies from red for highest densities, to blue for the lowest. In general these figures reflect the variance reflected on the graph from the above figure 2.

Figure 7. Paris zoom-ins per POI type

Paris restaurant density grid

Paris school density grid

Paris shop food density grid

Paris shop other density grid

Paris stadium density grid

Paris theatre density grid

Paris tourist density grid

Paris transit density grid

Legend

Density level

None — High

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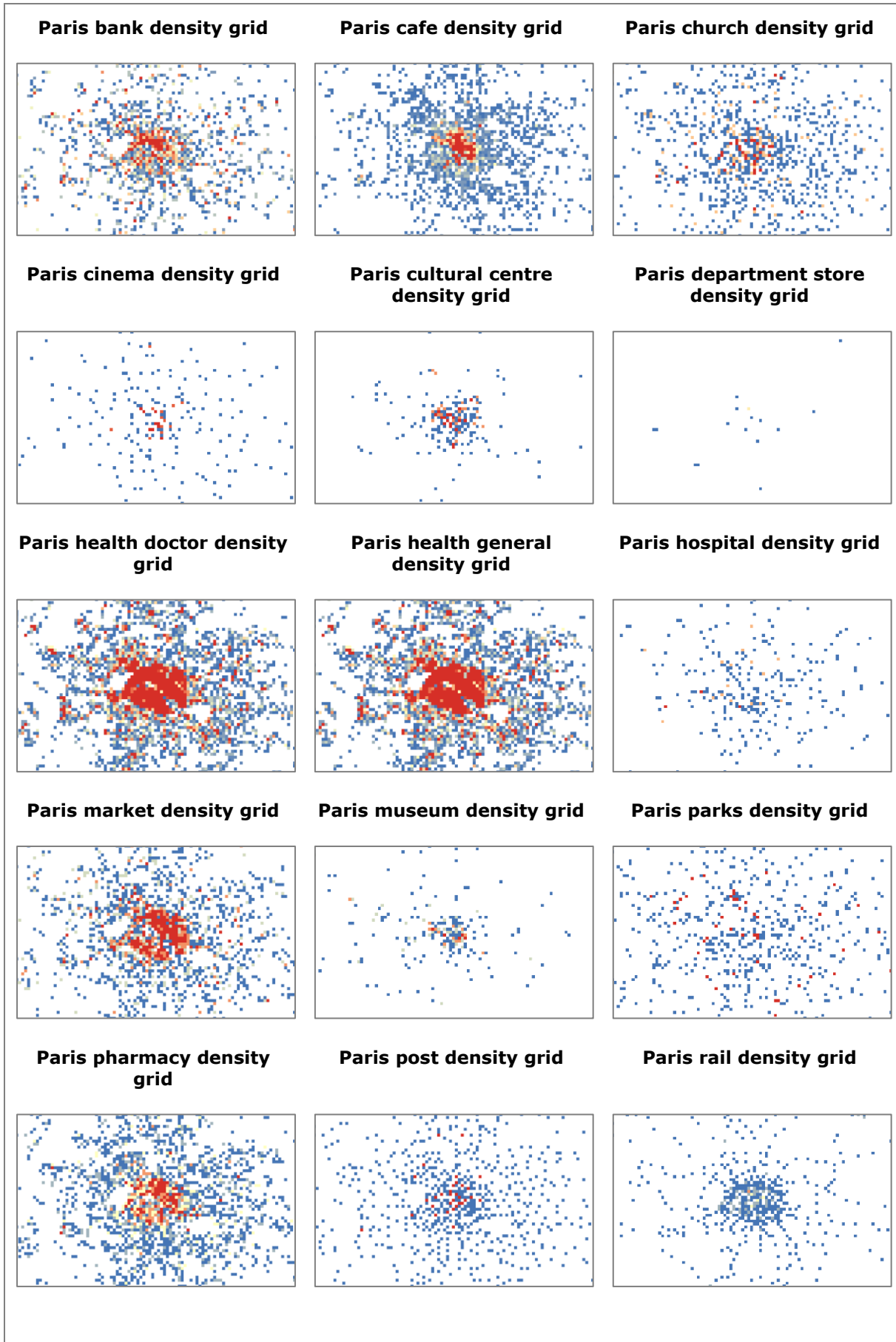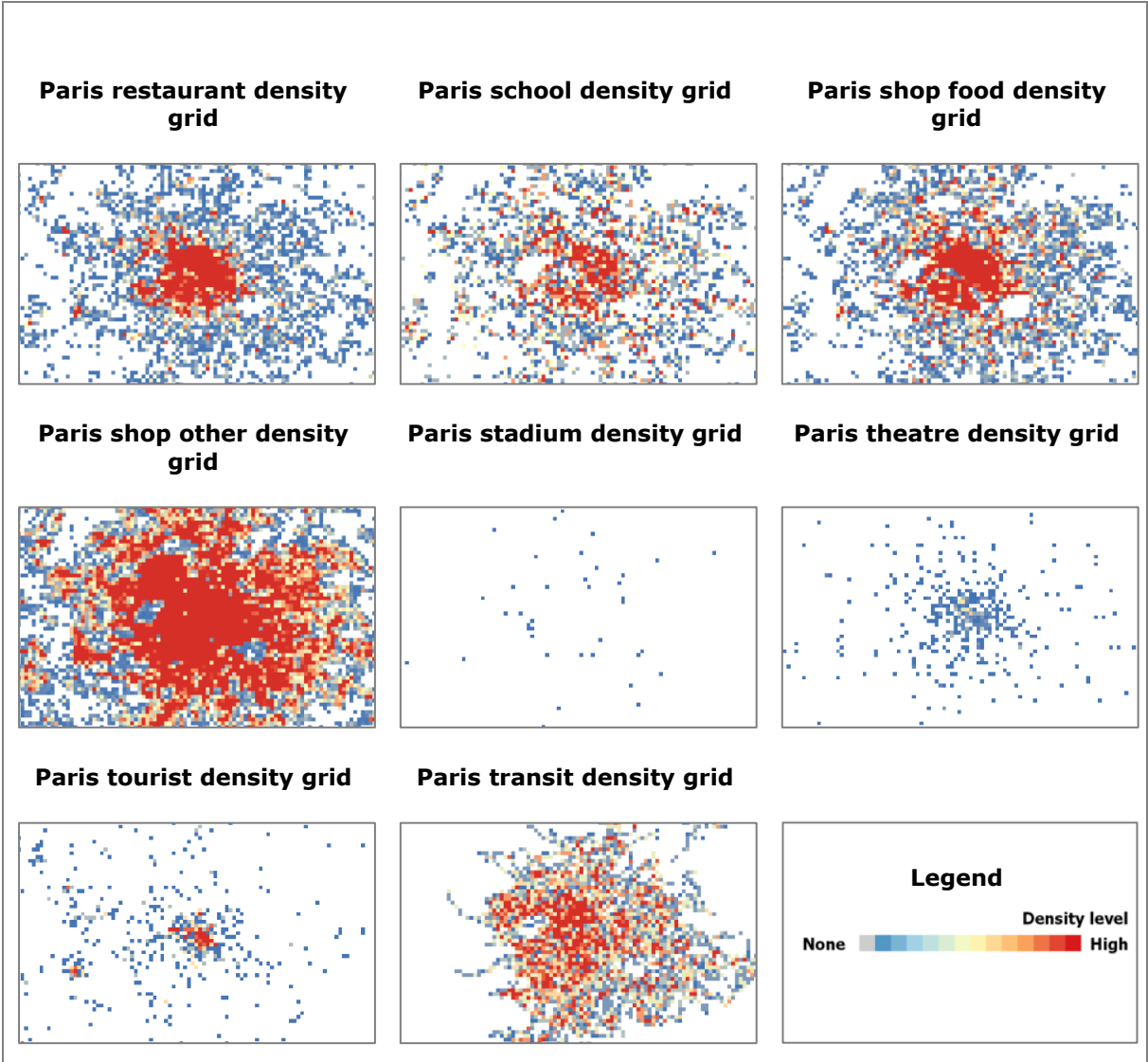
4 Conclusions

The resulting POI density grids described in this technical note have the potential to be used in several ways and scopes. From refining land-use/land-maps, to measuring accessibility and supply of key services and amenities or the impact of these in housing prices.

This new data sources can be combined with existing information and modelling techniques providing new insights on the phenomena driving urban and rural areas. Cities and urban areas can be compared and spatial distributions studied to better understand their allocation determinants, giving planners and policymakers new key insights.

These grids provide an added input value to territorial analysis by giving extra layers of information often still missing at European level.

As final note, other data sources like Open Street Map and Eurographics could have been used, but due its commercial character, spatial precision and wide use, TomTom was the preferred.

List of abbreviations and definitions

AT   Austria

BE   Belgium

BG   Bulgaria

CY   Cyprus

CZ   Czech Republic

DE   Germany

DK   Denmark

EE   Estonia

ES   Spain

ESRI   Environmental Systems Research Institute

FI   Finland

FR   France

GB   Great Britain

GR   Greece

HR   Croatia

HU   Hungary

IE   Ireland

IT   Italy

ITF   International Transport Forum

LT   Lithuania

LU   Luxembourg

LV   Latvia

ND   Northern Ireland

NL   Netherlands

OECD   Organisation for Economic Co-operation and Development

PL   Poland

POI   Points of Interest

PT   Portugal

RO   Romania

SE   Sweden

SI   Slovenia

SK   Slovakia

UK   United Kingdom

List of figures

Annexes

Annex 1. Description and codes of ITF categories

Feature Code	POI Name	Subcategory	Subcategory Description	ITF category
7328	Bank			bank
7315	Restaurant	all		restaurant
9359	Restaurant Area			restaurant_area
9376	Café/Pub	all		café
7324	Post Office	all	Unspecified	post
7372	School	7372001	Unspecified	school
7372	School	7372002	School	school
7372	School	7372003	Child Care Facility	school
7372	School	7372004	Pre School	school
7372	School	7372005	Primary School	school
7372	School	7372006	High School	school
7372	School	7372007	Senior High School	school
7372	School	7372008	Vocational Training	school
7372	School	7372009	Technical School	school
7372	School	7372010	Language School	school
7372	School	7372011	Sport School	school
7372	School	7372012	Art School	school
7372	School	7372013	Special School	school
7372	School	7372014	Middle School	school
7321	Hospital/Polyclinic	all		hospital
7326	Pharmacy			pharmacy
9373	Doctor	all		health doctor
9663	Health Care Service	all		Health general
7317	Museum			museum
7318	Theatre	all		theatre
7319	Cultural Centre			cultural centre
7342	Cinema	all		cinema
9362	Park and Recreation Area	all		parks
7327	Department Store			department store
7332	Market	all		market
9361	Shop	9361018	Food & Drinks: Bakers	shop_food
9361	Shop	9361019	Food & Drinks: Butchers	shop_food
9361	Shop	9361020	Food & Drinks: Fishmongers	shop_food
9361	Shop	9361021	Food & Drinks: Food markets	shop_food
9361	Shop	9361022	Food & Drinks: Green Grocers	shop_food
9361	Shop	9361023	Food & Drinks: Grocers	shop_food

9361	Shop	9361024	Food & Drinks: Other Food Shops	shop_food
9361	Shop	9361025	Food & Drinks: Wine & Spirits	shop_food
9361	Shop	9361001	Unspecified	shop_other
9361	Shop	9361002	Book Shops	shop_other
9361	Shop	9361003	CD's, DVD & Videos	shop_other
9361	Shop	9361004	Clothing & Accessories: Children	shop_other
9361	Shop	9361005	Clothing & Accessories: Footwear & Shoe Repairs	shop_other
9361	Shop	9361006	Clothing & Accessories: General	shop_other
9361	Shop	9361007	Clothing & Accessories: Men	shop_other
9361	Shop	9361008	Clothing & Accessories: Women	shop_other
9361	Shop	9361009	Convenience Stores	shop_other
9361	Shop	9361010	Dry cleaners	shop_other
9361	Shop	9361011	Electrical, Office & IT: Camera's & Photography	shop_other
9361	Shop	9361012	Electrical, Office & IT: Computer & Computer Supplies	shop_other
9361	Shop	9361013	Electrical, Office & IT: Consumer Electronics	shop_other
9361	Shop	9361014	Electrical, Office & IT: Office Equipment	shop_other
9361	Shop	9361015	Real Estate Agents	shop_other
9361	Shop	9361016	Factory Outlet	shop_other
9361	Shop	9361017	Florists	shop_other
9361	Shop	9361026	Gifts, Cards, Novelties & Souvenirs	shop_other
9361	Shop	9361027	Hairdressers & Barbers	shop_other
9361	Shop	9361028	House & Garden: Carpet/Floor Coverings	shop_other
9361	Shop	9361029	House & Garden: Curtains/Textiles	shop_other
9361	Shop	9361030	House & Garden: Do-It-Yourself Centers	shop_other
9361	Shop	9361031	House & Garden: Furniture & Fittings	shop_other
9361	Shop	9361032	House & Garden: Garden Centers & Services	shop_other
9361	Shop	9361033	House & Garden: Kitchens & Bathrooms	shop_other
9361	Shop	9361034	House & Garden: Lighting	shop_other
9361	Shop	9361035	House & Garden: Painting & Decorating	shop_other
9361	Shop	9361036	Jewelry, Clocks & Watches	shop_other
9361	Shop	9361037	Newsagents & Tobacconists	shop_other
9361	Shop	9361038	Opticians	shop_other
9361	Shop	9361039	Sports Equipment & Clothing	shop_other
9361	Shop	9361040	Toys & Games	shop_other
9361	Shop	9361041	Travel Agents	shop_other
9361	Shop	9361042	Construction Material & Equipment	shop_other
9361	Shop	9361043	Medical Supplies & Equipment	shop_other
9361	Shop	9361044	CD/Video Rental	shop_other
9361	Shop	9361045	Laundry	shop_other
9361	Shop	9361046	Photo Lab/Development	shop_other

9361	Shop	9361047	Photocopy	shop_other
9361	Shop	9361048	Animal Services	shop_other
9361	Shop	9361049	Antique/Art	shop_other
9361	Shop	9361050	Beauty Supplies	shop_other
9361	Shop	9361051	Drug Store	shop_other
9361	Shop	9361052	Electrical Appliance	shop_other
9361	Shop	9361053	Hobby/Free Time	shop_other
9361	Shop	9361054	Furniture/Home Furnishings	shop_other
9361	Shop	9361055	Glassware/Ceramic	shop_other
9361	Shop	9361056	Local Specialities	shop_other
9361	Shop	9361057	Recycling Shop	shop_other
9361	Shop	9361058	Bags & Leatherwear	shop_other
9361	Shop	9361059	Musical Instruments	shop_other
9361	Shop	9361060	Delicatessen	shop_other
9361	Shop	9361061	Specialty Foods	shop_other
9361	Shop	9361062	Shopping Service	shop_other
9361	Shop	9361063	Retail Outlet	shop_other
9361	Shop	9361064	Pet Supplies	shop_other
9361	Shop	9361065	Marine Electronic Equipment	shop_other
9361	Shop	9361066	Wholesale Clubs	shop_other
9361	Shop	9361067	Beauty Salon	shop_other
9361	Shop	9361068	Nail Salon	shop_other
9361	Shop	9361069	Hardware	shop_other
9361	Shop	9361070	Pawn Shop	shop_other
9361	Shop	9361071	Lottery Shop	shop_other
9361	Shop	9361072	Betting Station	shop_other
9361	Shop	9361073	Agricultural Supplies	shop_other
9361	Shop	9361074	Stamp Shop	shop_other
9361	Shop	9361075	Mobile Phone Shop	shop_other
9361	Shop	9361076	Drive Through Bottle Shop	shop_other
9361	Shop	9361077	Tailor Shop	shop_other
9361	Shop	9361078	Security Products	shop_other
9361	Shop	9361079	Clothing & Accessories: Specialty	shop_other
9361	Shop	9361080	House & Garden: Glass & Windows	shop_other
9361	Shop	9361081	Variety Store	shop_other
9361	Shop	9361082	Christmas/Holiday Store	shop_other
9361	Shop	9361083	Boating Equipment & Accessories	shop_other
7374	Stadium	all		stadium
7376	Important Tourist Attraction	all		tourist
7380	Railway Station	all		rail
9942	Public Transport Stop	all		transit
7339	Place of Worship	7339002	Church	church

7339	Place of Worship	7339003	Mosque	church
7339	Place of Worship	7339004	Synagogue	church
7339	Place of Worship	7339005	Temple	church

Annex 2. Average POI density value (500 m^2) per category and country

POI type	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI
bank	1.48	1.92	1.03	1.34	1.95	1.10	1.82	1.58	3.07	1.54
cafe	1.59	2.20	1.16	2.02	1.35	1.63	2.01	1.81	5.12	1.58
church	1.08	1.09	1.20	1.21	1.08	1.14	1.10	1.29	1.13	1.02
cinema	1.05	1.11	1.00	1.04	1.03	1.06	1.09	1.21	1.05	1.05
cultural_centre	1.00	1.38	0.00	1.16	1.06	1.00	1.00	1.05	1.24	1.00
department_store	1.00	1.13	0.00	1.00	1.00	1.14	1.09	0.00	1.11	1.17
health_doctor	2.96	2.40	0.00	1.00	3.06	2.64	1.40	1.14	1.02	1.46
health_general	1.24	1.56	0.00	1.56	0.00	1.62	1.00	1.16	1.15	1.00
hospital	1.04	1.06	1.10	1.22	1.06	1.11	1.00	1.20	1.06	1.02
market	1.31	1.20	1.12	1.16	1.18	1.34	1.60	1.29	1.38	1.28
museum	1.22	1.34	1.26	1.28	1.25	1.12	1.22	1.30	1.26	1.19
parks	1.09	1.02	1.00	1.09	1.01	1.01	1.03	1.09	1.18	1.02
pharmacy	1.08	1.24	1.14	1.76	1.27	1.32	1.04	1.23	1.64	1.07
post	1.01	1.02	1.01	1.00	1.00	1.04	1.01	1.16	1.04	1.00
rail	1.03	1.03	1.01	0.00	1.00	1.03	1.01	1.01	1.03	1.00
restaurant	1.77	2.26	1.87	2.77	2.11	1.89	2.34	2.27	3.23	2.45
school	1.66	1.78	0.00	1.67	1.72	1.46	1.19	1.65	1.82	1.38
shop_food	1.54	2.17	0.00	1.14	1.10	1.61	1.24	1.15	4.22	1.73
stadium	1.00	1.01	1.00	1.09	1.10	1.01	1.04	1.03	1.05	1.06
theater	1.30	1.32	1.38	1.15	1.28	1.24	1.25	1.31	1.16	1.05
tourist	1.06	1.44	1.10	1.17	1.61	1.33	1.29	1.31	1.59	1.21
transit	1.08	2.66	1.00	1.18	2.41	1.04	1.89	1.94	2.65	1.28
shop_other	10.42	19.65	2.76	7.77	6.51	12.26	5.99	4.82	21.47	3.06
restaurant_area	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POI type	FR	GB	GR	HR	HU	IE	IT	LT	LU	LV
bank	1.95	2.60	3.93	1.56	1.71	1.70	1.94	1.85	2.83	1.83
cafe	1.86	2.61	3.26	2.98	1.99	2.22	2.93	2.02	2.31	2.25
church	1.06	1.06	1.26	1.25	1.24	1.10	1.23	1.13	1.01	1.13
cinema	1.06	1.11	1.20	1.40	1.22	1.09	1.11	1.00	1.00	1.24
cultural_centre	1.18	1.17	1.04	0.00	1.05	1.05	1.26	1.07	1.06	1.02
department_store	1.05	1.50	0.00	1.08	1.00	1.39	1.10	1.00	1.30	0.00
health_doctor	3.62	1.24	1.00	1.00	1.54	2.41	2.05	1.07	3.30	1.22
health_general	3.74	1.55	1.05	1.00	1.29	1.41	1.00	1.05	1.65	1.00
hospital	1.07	1.06	1.38	1.29	1.13	1.04	1.03	1.10	1.10	1.16
market	1.29	1.36	1.47	1.18	1.34	1.87	1.36	1.27	1.37	1.24
museum	1.19	1.23	1.37	1.88	1.34	1.38	1.38	1.44	1.42	1.34
parks	1.02	1.04	1.18	1.00	1.04	1.07	1.01	1.01	1.01	1.05

POI type									
pharmacy	1.30	1.16	2.98	1.21	1.16	1.45	1.20	1.51	1.28	1.34
post	1.01	1.03	1.05	1.04	1.11	1.07	1.09	1.04	1.00	1.01
rail	1.02	1.02	1.03	1.00	1.07	1.00	1.02	1.00	1.00	1.00
restaurant	2.70	3.80	2.66	1.50	1.96	3.54	1.83	2.04	3.18	2.34
school	1.49	1.20	2.30	0.00	1.66	1.21	2.12	1.36	1.78	1.19
shop_food	2.12	2.69	1.33	1.26	1.28	2.49	2.96	1.85	2.09	1.12
stadium	1.02	1.01	1.01	1.00	1.10	1.02	1.06	1.05	1.05	1.07
theater	1.21	1.22	1.82	1.25	1.33	1.34	1.11	1.29	1.12	1.29
tourist	1.23	1.24	1.22	1.09	1.28	1.20	1.74	1.13	1.37	1.21
transit	3.19	3.39	1.20	2.54	3.51	2.58	3.36	1.00	1.50	1.07
shop_other	13.98	22.03	5.82	2.93	9.02	10.50	15.11	3.51	21.45	4.37
restaurant_area	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00

POI type	MT	ND	NL	PL	PT	RO	SE	SI	SK	
bank	1.74	2.19	1.40	2.02	1.58	2.07	1.95	1.54	2.25	
cafe	2.43	1.90	1.97	1.11	1.59	2.09	1.44	1.52	2.05	
church	1.74	1.26	1.32	1.04	1.28	1.20	1.01	1.01	1.07	
cinema	1.00	1.00	1.20	1.04	1.28	1.02	1.21	1.08	1.04	
cultural_centre	0.00	0.00	1.03	1.06	1.11	0.00	1.00	1.00	1.08	
department_store	1.33	1.53	1.02	1.00	1.17	0.00	1.10	1.00	1.00	
health_doctor	1.16	1.00	1.50	3.98	1.29	1.23	1.53	1.56	1.50	
health_general	1.08	1.10	2.41	1.00	1.00	1.22	1.00	1.31	0.00	
hospital	1.07	1.03	1.20	1.05	1.06	1.07	1.00	1.09	1.08	
market	1.38	1.22	1.31	1.19	1.10	1.11	1.45	1.33	1.16	
museum	1.78	1.08	1.30	1.16	1.21	1.26	1.26	1.27	1.28	
parks	1.21	1.07	1.05	1.02	1.01	1.01	1.00	1.00	1.01	
pharmacy	1.64	1.26	1.08	1.50	1.48	1.50	1.19	1.07	1.51	
post	1.00	1.01	1.01	1.02	1.05	1.01	1.08	1.01	1.00	
rail	0.00	1.00	1.01	1.01	1.02	1.02	1.01	1.00	1.00	
restaurant	3.80	2.95	3.13	2.33	2.35	1.73	2.79	1.13	1.95	
school	1.33	1.00	2.04	2.31	1.15	1.26	1.19	1.02	1.62	
shop_food	3.45	1.86	2.15	2.14	1.84	1.05	1.68	1.47	1.03	
stadium	1.00	1.00	1.00	1.02	1.05	1.00	1.00	1.00	1.10	
theater	1.33	1.00	1.15	1.29	1.10	1.14	1.49	1.23	1.40	
tourist	1.67	1.34	1.39	1.37	1.72	1.30	1.23	1.08	1.33	
transit	0.00	1.25	2.42	1.11	1.00	1.09	1.21	0.00	1.00	
shop_other	20.24	8.65	21.86	9.53	11.14	3.95	5.03	8.25	4.65	
restaurant_area	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	

Annex 3. Total POI per category and country

	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI
bank	4350	7533	364	313	2001	13090	1160	141	29485	1505
cafe	3387	23388	36	245	5795	36001	3435	918	154055	3227
church	3744	1929	437	718	8029	7964	2391	521	7199	916

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cinema	160	127	15	28	410	1288	184	17	723	147
cultural_centre	32	800	0	29	177	7	1	64	567	4
department_store	12	231	0	2	35	4736	12	0	242	644
health_doctor	12337	34254	0	7	14894	118636	2289	145	6441	3118
health_general	328	18314	0	39	0	43943	4	249	1966	1
hospital	152	293	137	77	314	3431	44	89	673	55
market	4781	3217	387	216	1457	36929	3338	277	9024	3090
museum	488	998	48	87	986	2478	888	483	1086	391
parks	1032	1636	3	202	5421	31461	2775	1665	1604	84
pharmacy	1333	2850	191	565	2739	20465	321	464	20158	806
post	1843	1319	118	58	3167	9809	985	447	2347	277
rail	1592	647	125	0	2817	7600	501	128	2123	213
restaurant	19621	15730	1093	1198	25563	118207	10103	1301	80962	14427
school	8052	6839	0	933	11326	37460	2674	1763	28434	6489
shop_food	4063	26376	0	96	4906	66157	890	871	101462	5334
stadium	53	85	93	111	354	389	105	359	522	69
theater	236	349	18	31	285	2185	151	85	1315	86
tourist	636	989	148	54	3740	2520	350	4305	6414	98
shop_other	569591	1120256	22964	18723	2975577	3813017	387912	85011	2646224	412025
restaurant_area	0	3	0	0	0	0	0	0	0	0

	FR	GB	GR	HR	HU	IE	IT	LT	LU	LV
bank	33634	10842	6255	618	3289	761	30871	508	501	512
cafe	34642	77085	3581	346	2282	7025	130867	1452	924	2036
church	39832	2886	11481	444	5953	3294	3613	290	220	236
cinema	2032	706	272	35	277	38	2579	19	8	26
cultural_centre	602	7	167	0	1904	42	177	208	70	310
department_store	92	2416	0	13	1	265	349	2	13	0
health_doctor	109248	10014	143	35	8665	3334	43388	143	1616	146
health_general	228945	26533	279	1	2723	1084	9	139	513	12
hospital	2668	1489	916	165	235	99	1446	398	23	141
market	23008	12670	3016	1295	9030	3039	23454	664	194	356
museum	3777	1097	342	79	1720	828	4688	261	92	390
parks	40583	14251	8341	17	4218	1064	3563	446	108	161
pharmacy	22426	7485	7179	250	3432	1025	16710	1076	113	777
post	16039	10366	365	260	3213	396	14068	458	104	979
rail	4033	2933	377	312	1679	138	3330	178	65	317
restaurant	135523	81416	13949	830	7955	11761	63515	1054	2329	1686
school	65435	26594	7061	0	10525	5109	61936	1275	1072	175
shop_food	117633	65789	430	67	644	5155	141060	2551	695	758
stadium	409	482	380	12	137	96	582	20	39	16
theater	2693	1206	409	25	164	122	1609	76	38	27
tourist	28856	3310	1152	48	1872	761	5596	627	56	492
shop_other	5487155	3674669	209289	33259	2631077	258827	2759557	70093	58961	45279

restaurant_area	0	0	0	0	1	0	0	0	4	0
	MT	**ND**	**NL**	**PL**	**PT**	**RO**	**SE**	**SI**	**SK**	
bank	94	322	1987	11676	2182	2931	1742	422	1039	
cafe	342	948	13055	487	5695	827	444	2063	219	
church	451	1621	5278	13669	1319	4531	3587	784	3720	
cinema	5	13	194	252	87	52	182	13	169	
cultural_centre	0	0	108	3721	10	0	8	13	195	
department_store	16	119	555	17	7	0	100	4	17	
health_doctor	36	2	6814	33768	559	2302	3518	513	617	
health_general	91	23	36789	8	2	113	1	468	0	
hospital	15	37	317	677	178	425	100	35	185	
market	106	270	4347	6910	1123	851	6819	882	770	
museum	48	14	910	977	148	446	1204	76	463	
parks	68	474	2007	7889	657	3639	100	130	1841	
pharmacy	224	397	1883	14725	3011	4081	1884	284	776	
post	12	364	2152	6781	516	2318	1473	533	1679	
rail	0	54	526	827	719	1996	770	287	903	
restaurant	650	2045	28805	23742	14973	2449	29174	280	2877	
school	165	6	18630	43596	5594	7403	5313	784	6131	
shop_food	970	1655	11970	72484	16342	62	8847	1270	419	
stadium	7	29	83	227	136	69	61	13	98	
theater	4	19	358	648	285	82	465	43	74	
tourist	260	127	1824	913	1604	596	108	56	2200	
shop_other	12914	63606	1213601	1533243	488402	126285	646244	125808	80418	
restaurant_area	0	0	34	0	0	1	0	0	0	

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