

Central Europe: Urban Typology Based on Airport Location and Accessibility

Daniel Seidenglanz

Institute of Geography

Faculty of Science

Masaryk university

Brno, Czech Republic

seidenglanz@geogr.muni.cz

1. Geographical relevance of air transport

- Spatial impacts – changes in global accessibility (McConnel and Brue, 2002; Bowen, 2000; Keeling, 1995; O'Connor, 2003; ...):
 - positive changes
 - negative changes

 - Economic impacts

 - Dynamic development:
 - deregulation
 - social, economic and political changes in Central Europe
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Top Hubs Ranked by Centrality Index

Hub	1984		1996	
	Index	Rank	Index	Rank
London	1 918	1	1 876	1
Frankfurt	2 074	2	1 887	2
Paris	2 109	3	1 912	3
Amsterdam	2 175	5	1 956	4
Zurich	2 257	7	2 069	5
New York	2 139	4	2 110	6
Rome	2 231	6	2 128	7
Munich	2 503	40	2 144	8
Brussels	2 321	11	2 179	9
Madrid	2 310	10	2 212	10
Vienna	2 397	21	2 214	11
Moscow	2 394	19	2 215	12
Hong Kong	2 501	39	2 218	13
Tokyo	2 581	70	2 222	14
Copenhagen	2 268	8	2 226	15
Milan	2 382	18	2 226	16
Cairo	2 352	14	2 248	17
Seoul	2 842	171	2 248	18
Los Angeles	2 321	10	2 255	19
Chicago	2 378	17	2 256	20

Source: J. Bowen (2002)

2. Goal of the paper

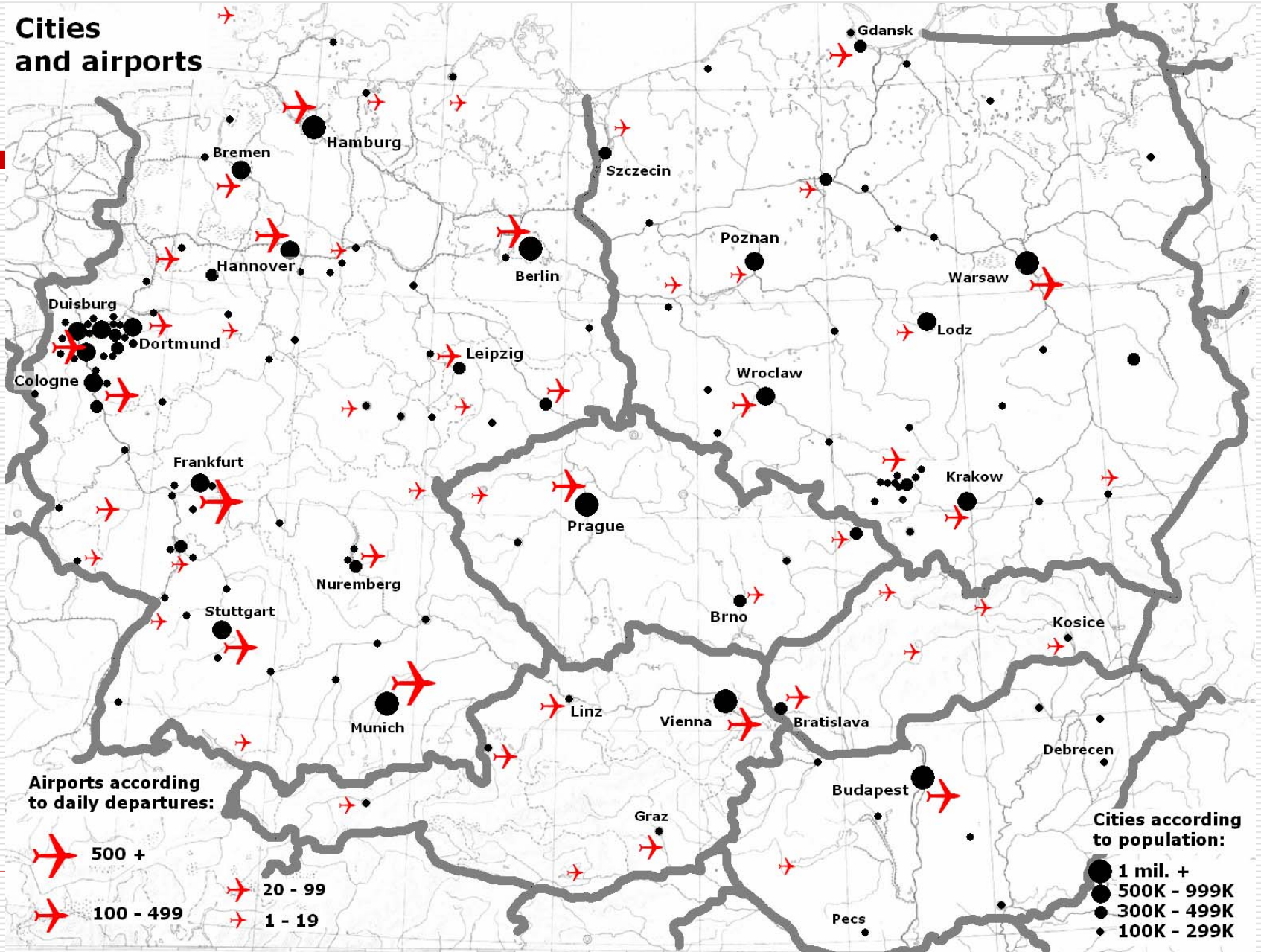
- Evaluation of the quality of air transport accessibility:
 - good
 - average
 - bad

 - Cities in Central Europe:
 - population over 100 thousand
 - 142 cities

 - Airports with regular flights in Central Europe:
 - at least one departure
 - 55 airports
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**Cities
and airports**

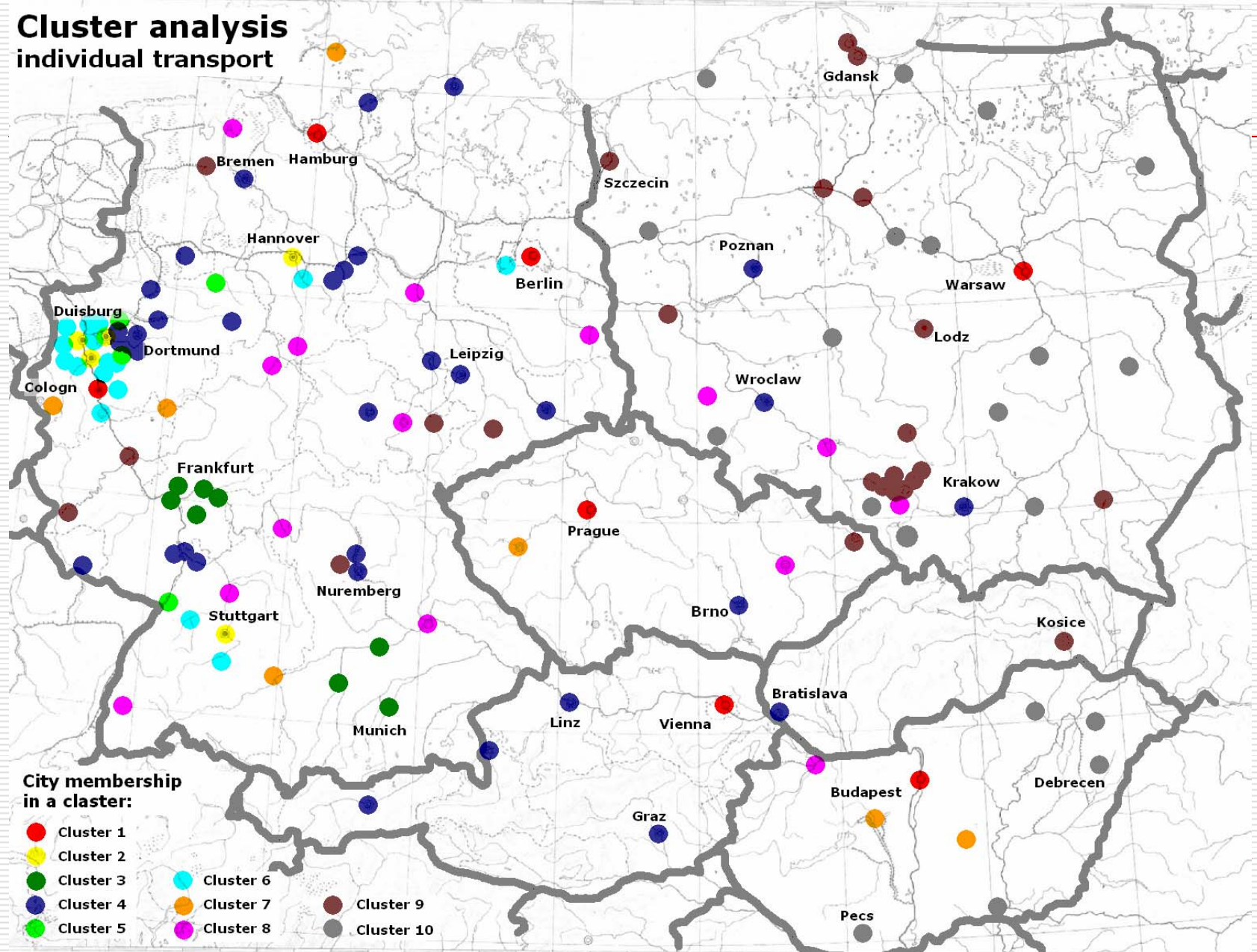


3. Cluster analyses

- Identification of the best accessible airport for each city (time):
 - individual transport (car)
 - public transport

 - Cluster analyses:
 - 10 clusters of cities with similar access to air transport
 - indicators:
 - distance (km)
 - travel time (minute)
 - motorway or road / way of connection of airport to transport network
 - departure
 - population
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**Cluster analysis
individual transport**

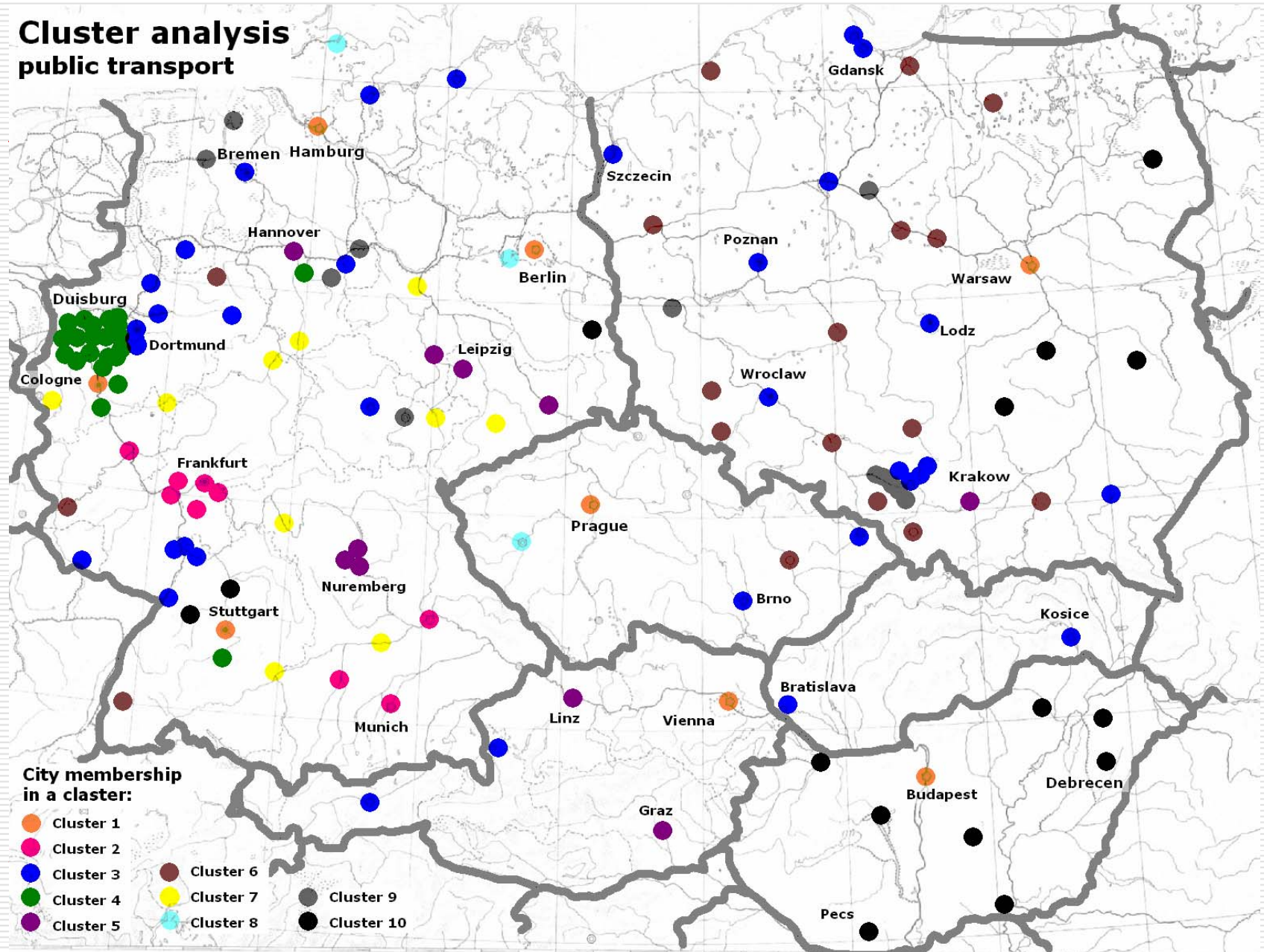


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Cluster analysis (individual transport) - results

Cluster	Population (thousand)	Distance (km)	Travel time (minute)	Motorway (%)	Departure (number)	Airport in another city (%)
Cluster 1	1 767,9	17	26	86	245	0
Cluster 2	554,3	18	25	100	259	40
Cluster 3	374,6	41	35	100	665	75
Cluster 4	291,6	19	20	97	27	29
Cluster 5	274,0	52	40	100	30	75
Cluster 6	169,4	34	32	88	259	94
Cluster 7	156,4	86	60	100	207	100
Cluster 8	137,4	90	61	100	30	100
Cluster 9	234,2	33	33	0	20	64
Cluster 10	168,9	129	112	5	48	100

Cluster analysis public transport



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Cluster analysis (public transport) - results

Cluster	Population (thousand)	Distance (km)	Travel time (minute)	Railway connection (%)	Departure (number)	Airport in another city (%)
Cluster 1	1 620,8	4	24	50	240	0
Cluster 2	345,8	47	53	100	669	78
Cluster 3	291,5	13	30	0	18	26
Cluster 4	242,0	30	41	100	298	91
Cluster 5	364,0	7	20	100	59	20
Cluster 6	148,5	94	134	0	18	100
Cluster 7	163,5	107	84	100	94	100
Cluster 8	180,6	67	73	0	263	100
Cluster 9	142,7	42	72	0	19	92
Cluster 10	174,4	146	158	73	178	100

4. General quality of access to air transport

- Indexation of all clusters:
 - individual / public transport
 - 3 = good access; 2 = average access; 1 = bad access

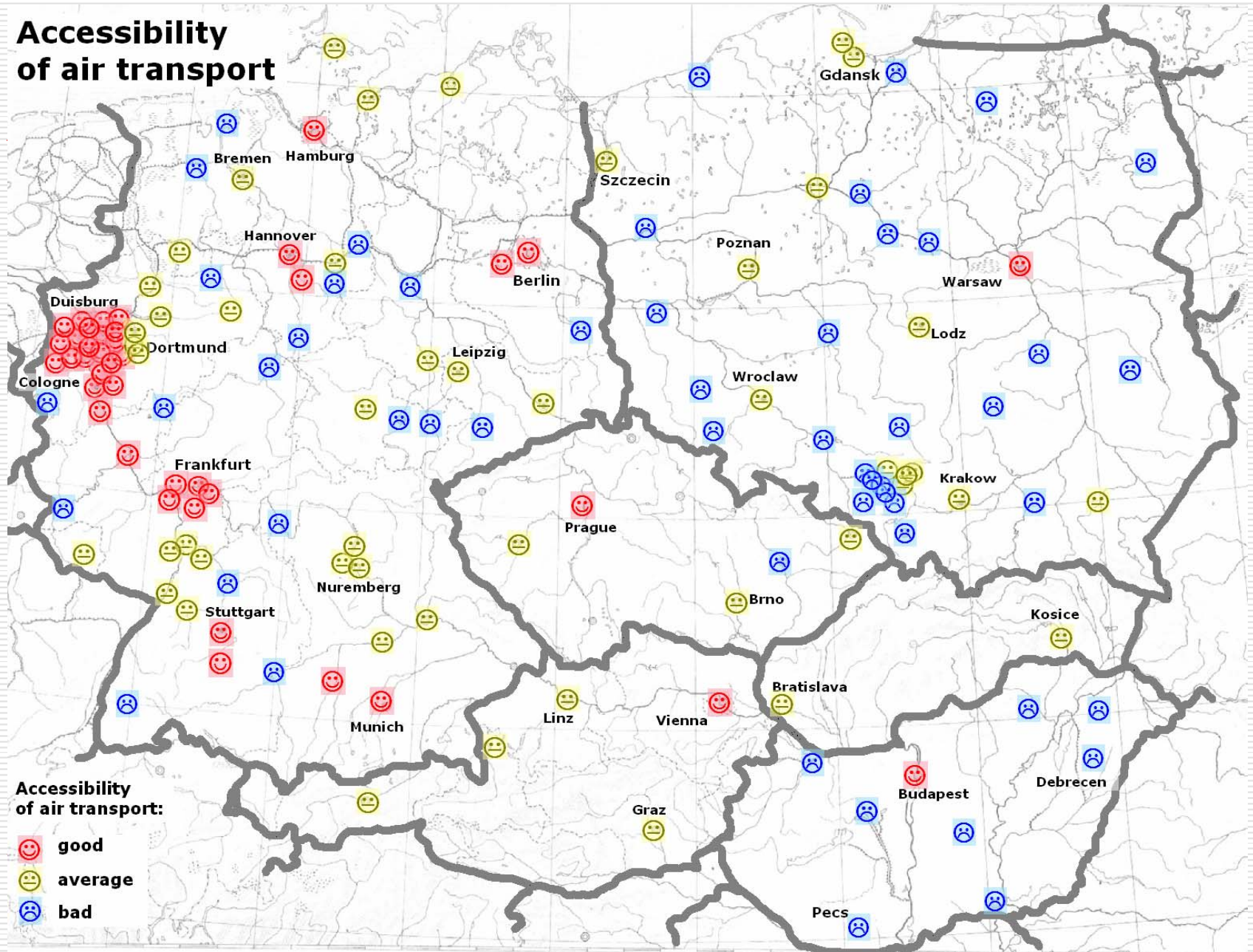
- Summation of indices – general level of access to air transport:

- good (5 or 6 points)
- average (4 points)
- bad (2 or 3 points)

Indexation of clusters according to quality of access to air transport

Individual transport		Public transport	
cluster	index	cluster	index
cluster 1	3	cluster 1	3
cluster 2	3	cluster 2	3
cluster 3	3	cluster 3	2
cluster 4	2	cluster 4	2
cluster 5	2	cluster 5	2
cluster 6	3	cluster 6	1
cluster 7	2	cluster 7	1
cluster 8	1	cluster 8	2
cluster 9	2	cluster 9	1
cluster 10	1	cluster 10	1

Accessibility of air transport



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Good accessibility of air transport - national differences

	Germany	Austria	Poland	Czech Republic	Slovakia	Hungary
Number of cities (%)	43,9	20,0	2,6	20,0	0,0	11,1
Population of 100K cities (%)	61,8	69,9	15,4	55,7	0,0	59,9

Average accessibility of air transport - national differences

	Germany	Austria	Poland	Czech Republic	Slovakia	Hungary
Number of cities (%)	32,9	80,0	33,3	60,0	100,0	0,0
Population of 100K cities (%)	26,3	30,1	47,3	39,6	100,0	0,0

Bad accessibility of air transport - national differences

	Germany	Austria	Poland	Czech Republic	Slovakia	Hungary
Number of cities (%)	23,2	0,0	64,1	20,0	0,0	88,9
Population of 100K cities (%)	11,8	0,0	37,3	4,7	0,0	40,1

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Good accessibility of air transport - differences between population categories

	1 million +	500 thousand - 999 thousand	300 thousand - 499 thousand	100 thousand - 299 thousand
Number of cities (%)	100,0	53,8	18,8	21,7
Population of 100K cities (%)	100,0	53,3	17,2	22,1

Average accessibility of air transport - differences between population categories

	1 million +	500 thousand - 999 thousand	300 thousand - 499 thousand	100 thousand - 299 thousand
Number of cities (%)	0,0	46,2	68,8	30,2
Population of 100K cities (%)	0,0	46,7	71,8	33,4

Bad accessibility of air transport - differences between population categories

	1 million +	500 thousand - 999 thousand	300 thousand - 499 thousand	100 thousand - 299 thousand
Number of cities (%)	0,0	0,0	12,5	48,1
Population of 100K cities (%)	0,0	0,0	11,0	44,5

5. Other interesting results

- Airports with regular flights in small cities
 - Germany: Altenburg, Friedrichshafen, Hahn, Hof-Plauen, Westerland / Sylt
 - Austria: Klagenfurt
 - Czech Republic: Karlovy Vary
 - Slovakia: Zilina, Sliac, Poprad / Tatry
 - Hungary: Sarmelleek / Balaton

 - Best accessible airport – differences in case of individual and public transport:
 - Hannover, Leipzig / Halle, Duesseldorf, Friedrichshafen
 - Budapest
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Thank you for your attention!
