

ORIGINAL ARTICLE

Smart urban mobility: Economic and social dimensions of sustainable development in times of digitalization

Supplementary File

Table S1. Key parameters of urban mobility quality assessment

Number	City, Country	Time per trip (min)	Index of dissatisfaction with the transportation system	Transportation inefficiency index	Carbon dioxide emissions per trip (g)	Ratio of monthly public transportation fare to average monthly salary	Taxi affordability
1	Brasov, Romania	18.1	18.1	38.8	2,232.2	0.019	0.007
2	Plzen, Czech Republic	24.4	24.4	38.9	1,255.7	0.015	0.008
3	Vienna, Austria	22.3	22.3	63.5	1,523.6	0.015	0.007
4	Helsinki, Finland	25.2	25.2	68.6	1,293.2	0.023	0.004
5	Valencia, Spain	23.4	23.4	86.3	2,050.1	0.016	0.006
6	Novi Sad, Serbia	18.3	18.3	93.8	1,925.4	0.027	0.008
7	Tallinn, Estonia	24.5	24.5	97.8	2,200.6	0.019	0.005
8	Vilnius, Lithuania	26.1	27.2	64.8	2,347.9	0.018	0.006
9	Brno, Czech Republic	26.2	27.9	74.6	1,763.5	0.015	0.010
10	Reykjavik, Iceland	21.3	21.3	93.6	3,430.0	0.020	0.006
11	Split, Croatia	17.4	17.4	79.7	1,342.1	0.026	0.017
12	Amsterdam, Netherlands	24.1	24.1	145.0	1,554.2	0.023	0.007
13	Timisoara, Romania	24.3	24.3	100.9	2,029.7	0.025	0.008
14	Copenhagen, Denmark	27.8	43.9	104.5	1,410.2	0.026	0.006
15	Luxembourg, Luxembourg	27.5	40.2	127.6	3,907.0	0.000	0.006
16	Prague, Czech Republic	31.8	218.7	77.7	1,905.7	0.012	0.007
17	Plovdiv, Bulgaria	26.6	29.9	77.2	2,173.5	0.026	0.007
18	Shenzhen, China	34.3	469.4	91.8	2,311.0	0.013	0.002
19	Chisinau, Moldova	28.5	57.6	78.2	3,206.2	0.020	0.004
20	Oslo, Norway	28.0	46.9	124.7	2,508.0	0.022	0.004
21	Krakow (Cracow), Poland	31.4	183.8	86.8	2,656.9	0.015	0.006
22	Madrid, Spain	27.4	37.8	119.8	3,266.5	0.016	0.006
23	Varna, Bulgaria	29.1	73.9	93.0	1,589.9	0.029	0.008
24	Cluj-Napoca, Romania	29.5	89.9	103.7	2,849.4	0.017	0.007
25	Poznan, Poland	31.6	202.8	75.4	2,744.2	0.021	0.006
26	Berlin, Germany	33.6	382.2	108.6	1,366.5	0.018	0.007
27	Barcelona, Spain	30.3	124.1	120.9	2,342.7	0.012	0.011
28	Ljubljana, Slovenia	26.3	28.6	133.8	3,122.8	0.023	0.007
29	Sofia, Bulgaria	30.9	154.6	100.5	3,266.0	0.019	0.005
30	Munich, Germany	30.9	156.8	121.7	2,561.5	0.017	0.008

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Table S1. (Continued)

Number	City, Country	Time per trip (min)	Index of dissatisfaction with the transportation system	Transportation inefficiency index	Carbon dioxide emissions per trip (g)	Ratio of monthly public transportation fare to average monthly salary	Taxi affordability
31	Yerevan, Armenia	30.5	135.2	85.0	2,806.4	0.030	0.006
32	Minsk, Belarus	31.2	174.3	98.1	3,525.2	0.023	0.004
33	Skopje, North Macedonia	27.3	36.6	82.9	2,621.2	0.037	0.007
34	Warsaw, Poland	34.8	531.9	107.0	2,905.8	0.015	0.005
35	Gdansk, Poland	30.4	126.4	112.7	4,456.4	0.018	0.005
36	Sarajevo, Bosnia And Herzegovina	27.0	33.8	79.4	3,109.9	0.036	0.010
37	Hanoi, Vietnam	28.7	63.4	108.8	3,480.7	0.017	0.013
38	Geneva, Switzerland	32.5	273.3	143.8	4,683.2	0.011	0.005
39	Bratislava, Slovakia	30.3	123.1	129.3	2,444.9	0.026	0.011
40	Taipei, Taiwan	35.0	557.7	123.3	3,190.2	0.021	0.004
41	Zagreb, Croatia	29.9	106.9	108.1	3,296.6	0.033	0.007
42	Riga, Latvia	31.0	163.8	124.2	3,634.9	0.025	0.007
43	Wroclaw, Poland	34.0	423.6	142.2	3,397.3	0.019	0.005
44	Las Vegas, Nevada, United States	27.4	38.4	149.8	6,640.0	0.016	0.004
45	Abu Dhabi, United Arab Emirates	30.0	111.4	230.9	6,447.3	0.006	0.001
46	Tashkent, Uzbekistan	35.4	610.4	182.3	2,856.3	0.019	0.006
47	Calgary, Canada	29.1	76.3	144.0	5,652.2	0.026	0.004
48	Singapore, Singapore	40.5	1,750.5	144.1	2,456.4	0.022	0.002
49	Birmingham, United Kingdom	33.3	345.3	129.0	4,650.4	0.026	0.005
50	Hong Kong, Hong Kong (China)	41.8	2,185.9	148.4	1,660.4	0.018	0.004
51	Doha, Qatar	29.1	75.5	148.4	7,279.6	0.009	0.007
52	Zurich, Switzerland	38.1	1,127.6	193.7	2,818.6	0.013	0.006
53	Thessaloniki, Greece	28.7	64.9	115.1	3,957.1	0.032	0.013
54	Astana (Nur-Sultan), Kazakhstan	33.3	349.1	87.9	3,701.7	0.028	0.012
55	Ho Chi Minh City, Vietnam	31.9	222.1	133.5	3,555.6	0.024	0.013
56	Seoul, South Korea	42.2	2,332.5	163.1	2,802.3	0.015	0.002
57	Milan, Italy	35.9	704.9	129.1	3,137.2	0.019	0.013
58	Tel Aviv-Yafo, Israel	35.7	657.2	156.6	5,867.0	0.020	0.002
59	Ankara, Turkey	36.2	747.1	147.5	5,063.4	0.011	0.009
60	Belgrade, Serbia	36.4	786.4	135.4	3,780.2	0.021	0.010
61	Budapest, Hungary	38.8	1,291.6	137.3	2,945.9	0.020	0.009
62	Ahmedabad, India	38.6	1,244.4	157.8	3,868.0	0.018	0.006
63	Lisbon, Portugal	34.7	515.3	140.7	4,041.0	0.034	0.006
64	Gurgaon, India	35.4	619.3	201.7	6,809.3	0.009	0.002
65	Iasi, Romania	33.6	382.8	199.3	4,201.2	0.027	0.008
66	Rome, Italy	37.0	890.4	166.0	4,458.0	0.020	0.008
67	Vancouver, Canada	36.7	839.5	169.9	5,242.1	0.024	0.005
68	Jeddah (Jiddah), Saudi Arabia	30.3	123.3	186.1	7,506.1	0.015	0.008
69	Bucharest, Romania	41.1	1,941.6	154.9	4,737.3	0.014	0.005
70	Katowice, Poland	37.8	1,051.4	177.1	5,048.8	0.021	0.005

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Table S1. (Continued)

Number	City, Country	Time per trip (min)	Index of dissatisfaction with the transportation system	Transportation inefficiency index	Carbon dioxide emissions per trip (g)	Ratio of monthly public transportation fare to average monthly salary	Taxi affordability
71	Paris, France	41.1	1,939.8	150.9	2,804.3	0.028	0.007
72	San Diego, CA, United States	34.7	509.2	207.7	7,799.7	0.013	0.004
73	Odessa (Odesa), Ukraine	36.6	811.9	130.4	4,999.7	0.036	0.007
74	Riyadh, Saudi Arabia	32.3	255.0	204.2	8,070.6	0.013	0.007
75	New York, NY, United States	43.	2,873.7	190.9	3,196.5	0.023	0.004
76	Tbilisi, Georgia	39.8	1,562.3	177.0	2,709.1	0.025	0.013
77	Tokyo, Japan	42.9	2,601.1	185.4	1,659.5	0.022	0.012
78	Almaty, Kazakhstan	39.7	1,538.6	174.9	4,155.6	0.022	0.010
79	Hyderabad, India	42.3	2,360.7	207.7	5,360.5	0.014	0.003
80	Montreal, Canada	39.9	1,593.8	181.1	5,269.2	0.025	0.005
81	Athens, Greece	37.7	1,042.1	155.8	5,257.1	0.028	0.010
82	Dallas, TX, United States	34.9	548.3	200.2	8,678.5	0.019	0.004
83	Dublin, Ireland	40.6	1,802.4	184.4	4,122.3	0.033	0.006
84	Kiev (Kyiv), Ukraine	43.1	2,648.8	154.6	5,033.1	0.017	0.006
85	Denver, Colorado, United States	35.7	663.6	221.3	8,458.1	0.018	0.003
86	Beijing, China	43.6	2,864.9	192.3	5,245.2	0.021	0.002
87	Shanghai, China	46.1	4,034.2	223.2	3,206.6	0.020	0.002
88	Dubai, United Arab Emirates	36.3	767.5	249.5	8,038.5	0.021	0.002
89	Pune, India	44.1	3,080.4	222.2	5,885.2	0.009	0.003
90	Izmir, Turkey	39.9	1,574.7	189.8	4,775.1	0.028	0.009
91	Baku, Azerbaijan	38.0	1,113.0	187.7	4,193.2	0.036	0.012
92	Chicago, Illinois, United States	41.7	2,162.2	209.9	7,472.8	0.015	0.003
93	Brisbane, Australia	40.3	1,713.4	243.1	7,078.0	0.017	0.004
94	Auckland, New Zealand	37.4	968.4	199.4	6,646.5	0.037	0.006
95	Kuwait City, Kuwait	34.5	495.5	203.5	7,905.9	0.019	0.014
96	Seattle, Washington, United States	42.4	2,387.2	228.8	7,761.0	0.015	0.002
97	Santiago, Chile	37.1	920.0	123.4	3,426.6	0.055	0.018
98	Chennai, India	46.7	4,363.6	231.3	4,860.7	0.014	0.004
99	Perth, Australia	40.7	1,834.4	254.2	7,201.9	0.017	0.006
100	Melbourne, Australia	41.8	2,186.3	223.2	6,673.8	0.029	0.004
101	Kuala Lumpur, Malaysia	41.6	2,106.6	208.0	8,475.0	0.008	0.008
102	Philadelphia, Pennsylvania, United States	40.4	1,733.1	272.3	7,400.1	0.023	0.004
103	London, United Kingdom	44.8	3,393.7	172.2	1,909.6	0.056	0.008
104	Lahore, Pakistan	34.7	509.9	166.1	5,459.4	0.033	0.028
105	Boston, Massachusetts, United States	44.3	3,167.8	247.0	8,433.2	0.016	0.003
106	Coimbatore, India	47.0	4,504.4	210.2	4,944.6	0.026	0.008
107	Moscow, Russia	50.3	6,560.5	220.6	4,560.4	0.021	0.003
108	Tirana, Albania	39.0	1,336.4	95.5	1,425.4	0.024	0.045
109	Toronto, Canada	44.6	3,315.2	250.2	6,705.5	0.035	0.004

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Table S1. (Continued)

Number	City, Country	Time per trip (min)	Index of dissatisfaction with the transportation system	Transportation inefficiency index	Carbon dioxide emissions per trip (g)	Ratio of monthly public transportation fare to average monthly salary	Taxi affordability
110	Sydney, Australia	43.5	2,827.6	288.9	6,383.1	0.032	0.007
111	Kathmandu, Nepal	35.3	599.6	107.7	1,255.7	0.045	0.045
112	Casablanca, Morocco	44.0	3,036.4	180.1	4,688.6	0.046	0.016
113	Curitiba, Brazil	33.4	358.3	141.1	5,010.3	0.098	0.016
114	Saint Petersburg, Russia	48.7	5,514.7	191.2	4,966.	0.045	0.006
115	Cape Town, South Africa	42.4	2,384.4	248.6	10,241.5	0.027	0.007
116	Buenos Aires, Argentina	49.7	6,124.0	215.6	4,127.6	0.027	0.014
117	Montevideo, Uruguay	40.9	1,895.0	170.3	3,825.2	0.044	0.033
118	Johannesburg, South Africa	40.8	1,838.8	246.8	10,397.2	0.060	0.007
119	Mumbai, India	54.8	10,213.8	273.6	7,222.5	0.004	0.004
120	Bangalore, India	53.6	9,140.1	290.7	7,428.9	0.013	0.003
121	Amman, Jordan	40.3	1,694.4	208.9	8,164.1	0.061	0.020
122	Karachi, Pakistan	42.2	2,314.7	220.3	6,839.0	0.033	0.033
123	Bangkok, Thailand	45.4	3,652.7	261.4	7,863.3	0.051	0.016
124	Istanbul, Turkey	51.3	7,296.4	253.0	7,310.3	0.049	0.006
125	Jakarta, Indonesia	53.0	8,604.8	285.8	8,368.2	0.023	0.007
126	San Francisco, California, United States	49.5	6,042.6	560.0	8,953.3	0.012	0.003
127	Kolkata, India	59.4	15,134.2	286.0	4,774.3	0.006	0.007
128	Mexico City, Mexico	52.7	8,403.2	349.4	9,371.1	0.024	0.004
129	Tehran, Iran	52.3	8,062.4	260.2	8,228.5	0.039	0.012
130	Cairo, Egypt	49.9	6,273.6	291.1	9,209.9	0.039	0.019
131	Delhi, India	57.8	13,299.7	314.8	9,153.7	0.014	0.003
132	São Paulo, Brazil	50.8	6,909.	281.4	7,256.2	0.073	0.013
133	Colombo, Sri Lanka	60	15,838.9	401.4	7,904.0	0.032	0.015
134	Bogota, Colombia	51.8	7,696.1	232.2	5,143.2	0.110	0.041
135	Nairobi, Kenya	52.7	8,352.5	281.3	7,772.3	0.078	0.039
136	Dhaka, Bangladesh	61.4	17,566.0	341.0	5,475.9	0.072	0.015
137	Los Angeles, California, United States	56.9	12,275.6	685.9	14,242.8	0.017	0.004