

Table A1. Metric definitions

Acronym	Metric name	Description	Formula
MN	Mean	Mean equals the sum, across all cells of the corresponding cell type, of the corresponding cell metric values, divided by the number of cell of the same type.	$MN = \frac{\sum_{j=1}^n x_{ij}}{n_i}$
AM	Area-weighted mean	Area-weighted mean equals the sum, across all cells of the corresponding cell type, of the corresponding cell value multiplied by the proportional abundance of the cell.	$AM = \sum_{j=1}^n x_{ij} \left[\frac{a_{ij}}{\sum_{j=1}^n a_{ij}} \right]$
SD	Standard deviation	Standard deviation equals the square root of the sum of the squared deviations of each cell metric value from the mean metric value of the corresponding cell type, divided by the number of cells of the same type.	$SD = \sqrt{\frac{\sum_{j=1}^n \left[x_{ij} - \left(\frac{\sum_{j=1}^n x_{ij}}{n_i} \right) \right]^2}{n_i}}$
CV	Coefficient of variation	Coefficient of variation equals the standard deviation divided by the mean, multiplied by 100 to convert to a percentage, for the corresponding cell metric	$CV = \frac{SD}{MN} (100)$
Group I. Area, edge and density			
AREA_MN	Mean cell size	AREA is the size of the cell	$AREA = a_{ij} \left(\frac{1}{10,000} \right)$
AREA_AM	Area-weighted mean cell size	Area-weighted mean cell size	
AREA_CV	Cell size coefficient of variation	Coefficient of variation of cell size	
LCI	Largest cell index	Percentage of total area occupied by largest cell	$LCI = \frac{\max(a_{ij})}{A}$
ED	Edge density	Total length of edge per unit area	$ED = \frac{E}{A}$
CD	Cell density	Number of cells per unit area	$CD = \frac{N}{A}$
NSI	Network-scape shape index	Standardized measure of total edge or edge density, it increases without limit as network-scape shape becomes more irregular or as the length of edge within the network-scape increases. 0.282 is circle	$NSI = \frac{0.282E}{\sqrt{A}}$

			calibration constant, the same below.	
Group II. Shape				
SHAPE_MN	Mean shape index		SHAPE equals 1 when a cell is circular and increases without limit as cell shape becomes more irregular	$\text{SHAPE} = \frac{0.282 p_{ij}}{\sqrt{a_{ij}}}$
SHAPE_AM	Area-weighted mean shape index			
SHAPE_CV	Shape coefficient of variation			
FRAC_MN	Mean fractal dimension		FRAC approaches 1 for simple shapes and 2 for complex shapes	$\text{FRAC} = \frac{2 \ln(0.282 p_{ij})}{\ln a_{ij}}$
FRAC_AM	Area-weighted mean fractal dimension			
FRAC_CV	Fractal dimension coefficient of variation			
CIRCLE_MN	Mean related circumscribing circle		CIRCLE is a elongation measure that approaches 0 for circular cells and approaches 1 for elongate cells.	$\text{CIRCLE} = 1 - \left(\frac{a_{ij}}{a_{ij}^s} \right)$
CIRCLE_AM	Area-weighted mean related circumscribing circle			
CIRCLE_CV	Related circumscribing circle coefficient of variation			
Group III. Texture				
IJI	Interspersion and juxtaposition index		Measure of evenness of cell adjacencies, approaches 0 when for uneven adjacencies and equals 100 for even adjacencies.	$\text{IJI} = \frac{-\sum_{i=1}^m \sum_{k=i+1}^m \left[\frac{e_{ik}}{E} \cdot \ln \left(\frac{e_{ik}}{E} \right) \right]}{\ln(0.5[m(m-1)])} \times 100$
Group IV. Diversity				
RCR	Relative richness	cell	It represents richness as a percentage of the maximum potential richness (64 in this study).	$\text{RCR} = \frac{m}{m_{\max}}$
SHDI	Shannon's diversity index		Equals 0 when there is only 1 cell and increase as the number of different cell types increases or the proportional distribution of area among cell types becomes more equitable.	$\text{SHDI} = -\sum_{i=1}^m (q_i \cdot \ln q_i)$

SHEI	Shannon's evenness index	It equals 0 when there is only 1 cell and approaches 0 as the distribution of area among the different cell types becomes increasingly uneven. It equals 1 when distribution of area among cell types is perfectly even. Equals 0 when there is only 1 cell and increases as the number of different cell types increases or the proportional distribution of area among cell types becomes more equitable.	$SHEI = \frac{-\sum_{i=1}^m (q_i \cdot \ln q_i)}{\ln m}$
SIDI	Simpson's diversity index	It equals 0 when there is only 1 cell and approaches 0 as the distribution of area among the different cell types becomes increasingly uneven. It equals 1 when distribution of area among cell types is perfectly even. Equals 0 when there is only 1 cell and increases as the number of different cell types increases or the proportional distribution of area among cell type becomes more equitable.	$SIDI = 1 - \sum_{i=1}^m q_i^2$
SIEI	Simpson's evenness index	It equals 0 when there is only 1 cell and approaches 0 as the distribution of area among the different cell types becomes increasingly uneven. It equals 1 when distribution of area among cell types is perfectly even. Equals 0 when there is only 1 cell and increases as the number of different cell types increases or the proportional distribution of area among cell type becomes more equitable.	$SIEI = \frac{1 - \sum_{i=1}^m q_i^2}{1 - \frac{1}{m}}$
MSIDI	Modified Simpson's diversity index	It equals 0 when there is only 1 cell and approaches 0 as the distribution of area among the different cell types becomes increasingly uneven. It equals 1 when distribution of area among cell types is perfectly even.	$MSIDI = -\ln \sum_{i=1}^m q_i^2$
MSIEI	Modified Simpson's evenness index	It equals 0 when there is only 1 cell and approaches 0 as the distribution of area among the different cell types becomes increasingly uneven. It equals 1 when distribution of area among cell types is perfectly even.	$MSIEI = \frac{-\sum_{i=1}^m q_i^2}{\ln m}$

a_{ij} stands for the area(m²) of cell ij , A for total network-scape area(m²), E for the total length(m) of edge in the network-scape, N for the total number of cells in the network-scape, p_{ij} for the perimeter(m) of cell ij , e_{ik} for the total length(m) of edge in network-scape between cell types i and k , m for the number of cell types in the network-scape. q_i for the proportion of the network-scape occupied by cell type i .

Table A2. Results of Calculated Metrics for the 100 cities

City	AREA _MN	AREA _AM	AREA _CV	LCI	ED	CD	NSI	SHAPE _MN	SHAPE _AM	SHAPE _CV	FRAC _MN	FRAC _AM
Athens	8999.218	52427.671	219.677	0.013	0.042	1.111	89.676	1.241	1.305	13.481	1.049	1.050
Atlanta	82141.818	744895.650	284.049	0.012	0.013	0.122	72.814	1.292	1.464	16.926	1.049	1.056
Auckland	169515.417	9581757.226	745.147	0.071	0.008	0.059	80.891	1.314	1.644	16.968	1.050	1.062
Austin	82151.458	2765237.183	571.491	0.032	0.012	0.122	96.109	1.320	1.645	16.833	1.055	1.067
Baghdad	34607.845	2102387.389	772.974	0.022	0.019	0.289	140.897	1.322	1.595	14.752	1.057	1.068
Bangkok	143867.509	10519423.325	849.228	0.056	0.007	0.070	71.265	1.370	1.639	19.933	1.062	1.062
Barcelona	27433.261	175221.402	232.103	0.011	0.024	0.365	82.159	1.311	1.479	20.862	1.055	1.061
Bejaia	141752.258	3701984.051	501.157	0.239	0.009	0.071	15.664	1.414	1.700	22.932	1.065	1.072
Bangalore	44161.978	2597128.902	760.323	0.018	0.013	0.226	122.058	1.339	1.455	14.133	1.064	1.055
Berlin	53436.164	787483.744	370.633	0.013	0.016	0.187	212.555	1.320	1.429	17.948	1.055	1.054
Birmingham	76736.481	408716.922	207.996	0.006	0.014	0.130	98.887	1.321	1.394	16.407	1.053	1.052
Bogota	15832.789	2410237.651	1229.759	0.050	0.025	0.632	151.679	1.265	1.524	11.944	1.054	1.063
Bordeaux	31327.463	427735.530	355.720	0.043	0.021	0.319	50.896	1.298	1.373	16.338	1.054	1.051
Boston	35695.747	356860.597	299.955	0.029	0.021	0.280	84.331	1.309	1.446	15.534	1.053	1.060
Brasilia	304548.133	38389682.779	1118.278	0.201	0.004	0.033	22.670	1.389	1.618	19.784	1.067	1.054
Brno	68678.920	1020046.529	372.188	0.015	0.013	0.146	76.111	1.385	1.517	20.597	1.066	1.062
Brussels	37987.239	681337.376	411.533	0.091	0.019	0.263	37.759	1.294	1.434	15.178	1.053	1.055
Budapest	57431.245	755297.027	348.588	0.009	0.015	0.174	134.368	1.323	1.415	18.136	1.055	1.053
Buenos Aires	22421.720	167735.275	254.577	0.011	0.026	0.446	123.670	1.215	1.244	13.201	1.040	1.038
Cardiff	74175.693	1543697.965	445.100	0.028	0.012	0.135	58.772	1.351	1.482	19.101	1.060	1.058
Charlotte	151085.149	1669916.335	317.062	0.010	0.009	0.066	76.132	1.313	1.616	18.914	1.050	1.065
Chattanooga	110051.403	2021311.689	416.737	0.036	0.010	0.091	57.610	1.317	1.686	19.567	1.053	1.070
Chennai	27629.690	1037593.233	604.595	0.026	0.021	0.362	109.209	1.318	1.492	15.045	1.059	1.062
Chongqing	4499538.271	198187325.965	656.096	0.182	0.001	0.002	17.630	1.346	1.483	21.152	1.047	1.043
Cincinnati	55508.447	840315.369	376.012	0.017	0.015	0.180	70.193	1.334	1.489	18.559	1.060	1.060
Cleveland	56108.586	279255.047	199.425	0.010	0.018	0.178	79.384	1.329	1.428	15.341	1.054	1.058
Curitiba	33065.956	588904.506	410.000	0.018	0.020	0.302	115.614	1.247	1.344	13.434	1.045	1.048

Dar es Salaam	146604.010	11499052.928	879.978	0.126	0.006	0.068	35.652	1.312	1.537	15.130	1.057	1.055
Delaware	114657.803	856229.499	254.317	0.076	0.011	0.087	17.753	1.264	1.442	14.527	1.041	1.053
Denver	33627.313	331439.655	297.595	0.016	0.022	0.297	129.258	1.321	1.384	16.046	1.056	1.054
Detroit	48572.207	212246.473	183.568	0.005	0.019	0.206	135.196	1.261	1.302	10.259	1.044	1.045
Edinburgh	98402.771	2405987.963	484.256	0.026	0.010	0.102	75.435	1.357	1.471	19.858	1.060	1.055
Edmonton	127639.323	4105814.547	558.277	0.020	0.010	0.078	105.597	1.353	1.553	18.753	1.055	1.059
Evansville	60519.051	726694.022	331.778	0.035	0.015	0.165	48.868	1.238	1.392	12.176	1.040	1.050
Frankfurt	51458.147	865230.768	397.671	0.033	0.016	0.194	108.269	1.324	1.425	20.819	1.055	1.055
Gdansk	109771.751	1437462.668	347.779	0.021	0.010	0.091	64.679	1.364	1.512	18.453	1.061	1.059
Glasgow	54882.961	496962.075	283.812	0.010	0.016	0.182	97.911	1.341	1.474	19.018	1.057	1.060
Grand Rapids	75639.077	379538.975	200.444	0.011	0.014	0.132	51.700	1.257	1.343	11.229	1.041	1.047
Hamburg	73360.238	2378517.656	560.557	0.015	0.012	0.136	145.427	1.317	1.491	16.945	1.054	1.056
Harare	211937.025	5649379.073	506.517	0.048	0.007	0.047	44.807	1.307	1.457	18.023	1.048	1.049
Honolulu	44071.655	464581.433	308.893	0.048	0.019	0.227	43.949	1.306	1.479	17.219	1.051	1.061
Islamabad	135391.776	31321083.439	1517.685	0.214	0.006	0.074	38.500	1.286	1.436	16.127	1.050	1.046
Kamloops	70996.933	2131643.658	538.743	0.124	0.013	0.141	33.404	1.430	1.742	24.154	1.071	1.080
Karachi	77804.019	15094848.846	1389.285	0.063	0.009	0.129	80.453	1.312	1.431	15.607	1.056	1.048
Karlsruhe	46413.754	340839.084	251.863	0.012	0.017	0.215	93.083	1.343	1.445	20.131	1.059	1.058
Kirovograd	77388.283	1196485.201	380.274	0.079	0.013	0.129	35.100	1.324	1.368	14.364	1.053	1.049
Krakow	77764.485	1659814.633	451.045	0.026	0.011	0.129	76.744	1.345	1.501	18.873	1.062	1.058
Kyiv	133880.026	3390678.967	493.216	0.015	0.008	0.075	89.147	1.355	1.502	20.006	1.060	1.055
Las Vegas	71141.416	636432.310	281.887	0.024	0.016	0.141	91.242	1.399	1.676	25.849	1.059	1.075
Lawrence	60840.848	497835.136	268.003	0.031	0.015	0.164	40.827	1.325	1.469	14.615	1.055	1.059
Lexington	353091.997	7944242.780	463.671	0.027	0.005	0.028	40.466	1.344	1.475	20.390	1.051	1.049
Lille	34976.217	167969.065	194.997	0.021	0.020	0.286	46.944	1.308	1.337	16.459	1.056	1.049
London	72882.632	954605.534	347.820	0.008	0.014	0.137	236.318	1.328	1.451	16.849	1.055	1.056
Lviv	123977.495	3292297.082	505.525	0.076	0.010	0.081	41.273	1.362	1.574	18.482	1.058	1.061
Lyon	29603.291	164044.195	213.106	0.018	0.022	0.338	55.835	1.308	1.334	19.998	1.058	1.049
Macon	68809.326	760268.410	317.000	0.038	0.014	0.145	46.267	1.267	1.474	14.298	1.044	1.058
Madison	83898.708	2833033.726	572.427	0.074	0.012	0.119	67.977	1.326	1.492	18.768	1.054	1.058
Madrid	46002.672	3139128.071	819.988	0.021	0.015	0.217	122.583	1.316	1.498	19.865	1.056	1.058
Manchester	56722.571	356979.450	230.075	0.009	0.016	0.176	72.895	1.297	1.401	16.819	1.051	1.053

Manila	11823.562	128329.694	313.906	0.037	0.037	0.846	62.311	1.323	1.401	13.942	1.062	1.062
Marseille	69259.383	1684735.655	482.960	0.049	0.013	0.144	68.259	1.367	1.649	19.220	1.063	1.072
Mexico City	29220.926	4994671.100	1303.564	0.040	0.019	0.342	165.871	1.301	1.542	14.898	1.056	1.062
Milan	46963.329	586990.190	339.100	0.019	0.016	0.213	79.812	1.297	1.362	17.233	1.054	1.049
Milwaukee	50936.689	492996.761	294.595	0.012	0.017	0.196	93.487	1.281	1.346	16.423	1.048	1.047
Mobile	60425.945	1256893.662	444.978	0.032	0.014	0.165	65.380	1.295	1.660	18.985	1.051	1.071
Monaco	6852.577	21290.528	145.153	0.029	0.054	1.459	24.228	1.514	1.548	24.798	1.102	1.086
Montpellier	33209.180	189927.038	217.235	0.011	0.021	0.301	55.270	1.351	1.462	18.827	1.063	1.062
Montreal	55940.277	2126300.066	608.360	0.030	0.016	0.179	137.337	1.355	1.529	17.909	1.059	1.063
Munich	32169.477	218525.327	240.685	0.004	0.021	0.311	148.407	1.319	1.395	19.011	1.058	1.054
Nairobi	137834.094	5079073.441	598.742	0.067	0.008	0.073	46.964	1.339	1.675	18.452	1.057	1.068
New Delhi	84880.136	8080085.163	970.536	0.033	0.008	0.118	80.161	1.351	1.460	17.665	1.066	1.049
New York	36535.116	7914055.235	1468.384	0.070	0.020	0.274	190.089	1.285	1.471	14.250	1.050	1.056
Newcastle	101234.079	1675014.026	394.284	0.045	0.011	0.099	44.714	1.367	1.583	20.296	1.059	1.064
Nuremberg	48390.787	477761.376	297.876	0.014	0.016	0.207	89.444	1.311	1.417	17.740	1.055	1.054
Odessa	130691.665	3016859.609	469.934	0.091	0.010	0.077	42.094	1.290	1.406	14.584	1.046	1.047
Osaka	16176.003	856460.386	720.738	0.032	0.028	0.618	142.505	1.248	1.358	13.164	1.048	1.051
Paris	33490.116	125013.703	165.313	0.005	0.022	0.299	93.212	1.293	1.306	13.807	1.052	1.047
Pittsburg	31086.584	388162.054	338.917	0.023	0.023	0.322	89.380	1.345	1.643	18.240	1.059	1.077
Porto Alegre	64473.471	6819932.012	1023.616	0.090	0.011	0.155	67.076	1.302	1.466	16.793	1.056	1.053
Reno	80570.488	1316461.556	391.654	0.053	0.013	0.124	51.655	1.337	1.653	20.187	1.055	1.071
Reykjavik	72070.795	1699825.217	475.242	0.030	0.013	0.139	64.756	1.317	1.443	17.001	1.054	1.054
Riga	95223.998	13432771.894	1183.491	0.126	0.010	0.105	74.165	1.349	1.617	17.154	1.060	1.062
Rotterdam	40664.233	935827.236	469.186	0.032	0.019	0.246	87.381	1.356	1.523	20.670	1.060	1.064
San Diego	59628.413	2972150.901	698.889	0.029	0.014	0.168	113.939	1.374	1.896	20.087	1.065	1.086
Santander	31695.482	326887.226	305.178	0.026	0.020	0.316	41.482	1.337	1.489	19.939	1.062	1.062
Santo Domingo	24388.774	356606.592	369.077	0.045	0.025	0.410	64.776	1.274	1.592	15.522	1.050	1.069
Seoul	95904.035	1472004.657	378.797	0.015	0.010	0.104	74.805	1.299	1.394	16.880	1.052	1.047
Shanghai	592637.552	32696685.992	736.013	0.025	0.003	0.017	63.831	1.266	1.334	15.967	1.046	1.035
Singapore	90733.823	3380473.281	602.138	0.047	0.011	0.110	71.173	1.372	1.669	19.970	1.065	1.070
St Louis	28895.918	423774.280	369.669	0.027	0.024	0.346	106.307	1.340	1.443	15.422	1.058	1.060
State College	23986.416	161657.047	239.573	0.070	0.023	0.417	24.365	1.280	1.317	14.009	1.056	1.048

Strasbourg	48559.328	686525.451	362.462	0.035	0.016	0.206	51.735	1.342	1.444	20.568	1.060	1.056
Taipei	36598.557	1349713.916	598.990	0.023	0.017	0.273	74.480	1.279	1.619	15.371	1.052	1.069
Tel Aviv	19003.609	132480.666	244.363	0.029	0.028	0.526	63.245	1.301	1.429	16.905	1.057	1.061
Terre Haute	60884.572	1209333.163	434.312	0.055	0.014	0.164	38.781	1.195	1.333	10.377	1.034	1.043
Toronto	55536.485	630031.078	321.628	0.007	0.016	0.180	153.242	1.335	1.531	17.995	1.058	1.064
Toulouse	33439.258	244007.288	250.939	0.012	0.020	0.299	77.696	1.386	1.507	22.801	1.070	1.065
Vancouver	24458.497	107250.386	183.984	0.008	0.028	0.409	124.724	1.324	1.371	13.347	1.056	1.057
Warsaw	90015.544	1348223.433	373.867	0.009	0.011	0.111	110.386	1.323	1.465	17.536	1.055	1.055
Yerevan	147547.203	4106963.113	518.024	0.071	0.009	0.068	47.932	1.351	1.590	18.168	1.054	1.063

City	FRAC _CV	CIRCLE _MN	CIRCLE _AM	CIRCLE _CV	IJI	RCR	SHDI	SHEI	SIDI	SIEI	MSIDI	MSIEI
Athens	2.558	0.529	0.533	22.309	29.932	0.683	2.505	0.666	0.858	0.878	1.952	0.519
Atlanta	2.816	0.552	0.594	23.324	29.855	0.825	2.044	0.517	0.765	0.780	1.448	0.366
Auckland	2.709	0.560	0.575	22.121	47.376	0.905	2.942	0.728	0.922	0.939	2.556	0.632
Austin	2.821	0.575	0.602	21.682	40.508	0.968	2.956	0.719	0.906	0.921	2.364	0.575
Baghdad	2.273	0.600	0.626	19.253	19.104	0.651	2.259	0.608	0.776	0.796	1.497	0.403
Bangkok	2.923	0.603	0.586	22.617	33.200	0.921	2.753	0.678	0.897	0.913	2.278	0.561
Barcelona	3.477	0.557	0.576	25.834	40.085	0.730	2.593	0.677	0.877	0.896	2.095	0.547
Bejaia	4.071	0.609	0.679	23.010	33.343	0.270	1.731	0.611	0.758	0.805	1.418	0.501
Bangalore	2.603	0.610	0.568	20.350	32.669	0.968	2.857	0.695	0.893	0.907	2.231	0.543
Berlin	3.028	0.580	0.592	22.963	40.896	0.905	2.791	0.690	0.912	0.928	2.426	0.600
Birmingham	2.768	0.579	0.593	22.255	48.101	0.968	3.117	0.758	0.929	0.944	2.642	0.643
Bogota	2.294	0.554	0.570	20.551	30.525	0.937	2.869	0.704	0.902	0.918	2.323	0.570
Bordeaux	2.902	0.573	0.569	21.639	39.987	0.476	2.419	0.711	0.845	0.874	1.861	0.547
Boston	2.552	0.585	0.604	21.226	33.799	0.952	2.646	0.646	0.833	0.847	1.791	0.437
Brasilia	3.540	0.613	0.613	23.794	43.012	0.841	2.101	0.529	0.761	0.775	1.430	0.360
Brno	3.648	0.613	0.621	23.139	44.437	0.492	2.430	0.708	0.880	0.909	2.116	0.616
Brussels	2.684	0.570	0.583	22.109	43.209	0.413	2.642	0.811	0.909	0.946	2.401	0.737
Budapest	3.145	0.585	0.597	23.022	41.456	0.492	2.622	0.764	0.892	0.921	2.223	0.647
Buenos Aires	2.444	0.494	0.495	24.708	21.240	0.508	1.852	0.534	0.724	0.748	1.289	0.372

Cardiff	3.200	0.595	0.603	22.459	51.790	0.492	2.768	0.806	0.920	0.951	2.525	0.735
Charlotte	3.015	0.562	0.582	22.839	33.168	0.746	2.285	0.593	0.838	0.856	1.820	0.473
Chattanooga	3.331	0.555	0.626	25.474	37.351	0.857	2.913	0.730	0.908	0.926	2.390	0.599
Chennai	2.680	0.581	0.587	21.668	41.036	0.984	3.354	0.813	0.948	0.963	2.949	0.715
Chongqing	2.804	0.562	0.548	24.689	40.368	0.556	1.891	0.532	0.777	0.800	1.502	0.422
Cincinnati	3.881	0.583	0.603	23.823	44.568	0.937	3.010	0.738	0.921	0.937	2.538	0.622
Cleveland	2.584	0.601	0.624	20.994	27.455	0.889	2.332	0.579	0.825	0.840	1.741	0.432
Curitiba	2.485	0.531	0.545	23.143	25.647	0.937	2.313	0.567	0.806	0.819	1.638	0.402
Dar es Salaam	2.777	0.570	0.552	21.922	34.950	0.476	2.503	0.736	0.898	0.929	2.283	0.671
Delaware	2.111	0.526	0.582	24.023	31.229	0.222	2.034	0.771	0.840	0.904	1.830	0.693
Denver	2.911	0.585	0.583	22.303	29.728	0.937	2.708	0.664	0.868	0.883	2.024	0.496
Detroit	1.673	0.557	0.569	17.943	19.776	0.873	1.894	0.473	0.738	0.752	1.340	0.334
Edinburgh	3.440	0.590	0.602	23.176	56.083	0.492	2.911	0.848	0.928	0.959	2.631	0.766
Edmonton	2.679	0.592	0.591	20.854	38.978	0.905	2.892	0.715	0.910	0.926	2.406	0.595
Evansville	1.842	0.510	0.547	22.808	26.917	0.429	1.905	0.578	0.745	0.774	1.368	0.415
Frankfurt	3.254	0.576	0.609	23.503	43.988	0.508	2.623	0.757	0.902	0.931	2.324	0.671
Gdansk	3.241	0.605	0.613	22.067	45.812	0.444	2.584	0.775	0.903	0.937	2.335	0.701
Glasgow	3.153	0.587	0.605	22.901	52.524	0.492	2.872	0.836	0.926	0.957	2.601	0.757
Grand Rapids	1.724	0.544	0.567	20.865	19.677	0.381	1.511	0.475	0.647	0.676	1.042	0.328
Hamburg	2.826	0.578	0.605	22.373	42.282	0.921	2.850	0.702	0.910	0.926	2.413	0.594
Harare	2.608	0.563	0.587	21.768	27.766	0.317	1.866	0.623	0.777	0.818	1.502	0.501
Honolulu	2.866	0.568	0.586	23.070	30.400	0.794	2.767	0.707	0.904	0.922	2.339	0.598
Islamabad	2.434	0.544	0.542	23.981	40.086	0.508	2.428	0.701	0.865	0.893	2.001	0.577
Kamloops	3.554	0.634	0.670	21.647	43.533	0.524	2.641	0.755	0.892	0.920	2.223	0.636
Karachi	2.727	0.583	0.571	22.778	30.340	0.683	2.596	0.690	0.893	0.914	2.232	0.594
Karlsruhe	3.253	0.591	0.615	23.454	42.306	0.905	2.850	0.705	0.907	0.923	2.376	0.588
Kirovograd	2.417	0.598	0.593	20.319	36.633	0.460	2.706	0.804	0.903	0.935	2.328	0.691
Krakow	3.438	0.592	0.605	22.836	49.570	0.810	2.949	0.750	0.922	0.940	2.549	0.648
Kyiv	3.241	0.597	0.589	22.700	48.117	0.968	3.327	0.809	0.948	0.964	2.961	0.720
Las Vegas	3.417	0.586	0.605	23.187	26.211	0.667	1.984	0.531	0.764	0.782	1.442	0.386

Lawrence	2.620	0.583	0.562	21.308	41.054	0.571	2.694	0.752	0.905	0.930	2.349	0.656
Lexington	2.779	0.581	0.578	21.625	37.476	0.603	2.454	0.675	0.879	0.902	2.109	0.580
Lille	3.166	0.580	0.567	22.477	36.234	0.857	2.758	0.691	0.869	0.885	2.029	0.509
London	2.891	0.583	0.596	21.874	53.987	1.000	3.339	0.806	0.951	0.966	3.013	0.727
Lviv	3.133	0.601	0.602	22.679	53.552	0.508	2.997	0.865	0.935	0.965	2.726	0.787
Lyon	4.143	0.566	0.570	25.313	38.431	0.921	2.914	0.718	0.910	0.926	2.408	0.593
Macon	2.235	0.535	0.590	23.383	25.022	0.492	2.040	0.594	0.805	0.832	1.634	0.476
Madison	3.080	0.574	0.581	22.553	37.914	0.841	2.754	0.694	0.903	0.921	2.337	0.589
Madrid	3.273	0.568	0.625	24.557	40.602	0.952	3.188	0.779	0.938	0.954	2.782	0.679
Manchester	2.844	0.554	0.564	23.018	42.822	1.000	3.069	0.741	0.925	0.940	2.591	0.625
Manila	2.613	0.602	0.600	20.860	35.964	0.651	2.747	0.740	0.891	0.913	2.212	0.596
Marseille	3.353	0.598	0.602	22.396	43.544	0.921	2.954	0.728	0.926	0.942	2.606	0.642
Mexico City	2.662	0.583	0.588	21.380	22.738	0.984	2.556	0.619	0.868	0.882	2.026	0.491
Milan	3.343	0.563	0.563	23.612	39.440	0.889	2.854	0.709	0.906	0.922	2.364	0.587
Milwaukee	2.797	0.555	0.560	21.419	25.275	0.746	2.085	0.542	0.770	0.786	1.468	0.381
Mobile	2.881	0.542	0.598	23.676	28.206	0.587	2.069	0.573	0.811	0.833	1.665	0.461
Monaco	5.590	0.675	0.665	23.390	43.882	0.460	2.834	0.842	0.919	0.952	2.519	0.748
Montpellier	3.455	0.589	0.592	22.831	45.555	0.714	2.911	0.765	0.920	0.941	2.532	0.665
Montreal	2.961	0.605	0.622	21.790	33.214	0.889	2.751	0.683	0.886	0.902	2.169	0.539
Munich	3.341	0.574	0.586	24.017	39.304	0.873	2.798	0.698	0.903	0.919	2.329	0.581
Nairobi	2.936	0.583	0.637	22.683	35.802	0.476	2.382	0.700	0.841	0.870	1.841	0.541
New Delhi	3.335	0.595	0.564	24.206	31.250	0.635	2.518	0.683	0.845	0.866	1.861	0.505
New York	2.523	0.576	0.581	19.017	27.075	0.984	2.639	0.639	0.867	0.881	2.015	0.488
Newcastle	3.211	0.600	0.601	22.760	46.429	0.841	2.909	0.733	0.916	0.934	2.478	0.624
Nuremberg	3.011	0.572	0.596	22.816	44.945	0.810	2.892	0.736	0.919	0.938	2.518	0.640
Odessa	2.331	0.563	0.582	22.606	34.567	0.714	2.838	0.746	0.908	0.928	2.384	0.626
Osaka	2.409	0.533	0.551	21.920	29.822	0.937	2.763	0.678	0.876	0.892	2.091	0.513
Paris	2.539	0.580	0.578	21.565	42.328	0.984	3.034	0.735	0.913	0.928	2.439	0.591
Pittsburg	2.771	0.603	0.657	21.876	35.659	0.873	2.880	0.719	0.905	0.922	2.357	0.588
Porto Alegre	3.534	0.573	0.540	22.688	38.229	0.651	2.384	0.642	0.852	0.873	1.912	0.515
Reno	3.195	0.572	0.621	23.714	35.329	0.619	2.471	0.675	0.854	0.876	1.923	0.525

Reykjavik	2.832	0.577	0.599	22.668	39.906	0.825	2.843	0.719	0.909	0.927	2.397	0.607
Riga	3.131	0.598	0.605	21.852	48.386	0.937	3.068	0.752	0.930	0.946	2.655	0.651
Rotterdam	3.529	0.594	0.603	23.947	36.887	0.762	2.630	0.679	0.889	0.908	2.195	0.567
San Diego	3.255	0.606	0.657	22.460	42.868	0.889	2.981	0.740	0.925	0.942	2.590	0.643
Santander	3.454	0.584	0.619	24.110	43.259	0.778	2.836	0.729	0.903	0.921	2.329	0.598
Santo Domingo	2.483	0.544	0.602	23.679	25.045	0.571	2.144	0.598	0.803	0.826	1.627	0.454
Seoul	2.570	0.571	0.571	21.590	33.519	0.778	2.736	0.703	0.886	0.905	2.172	0.558
Shanghai	2.970	0.532	0.545	22.937	47.260	1.000	2.761	0.666	0.897	0.911	2.273	0.549
Singapore	3.666	0.592	0.603	23.012	58.345	0.984	3.496	0.847	0.957	0.972	3.140	0.761
St Louis	2.589	0.607	0.622	22.071	30.966	0.825	2.617	0.662	0.891	0.909	2.219	0.562
State College	3.255	0.550	0.564	22.349	37.956	0.413	2.566	0.788	0.896	0.931	2.259	0.693
Strasbourg	3.762	0.588	0.606	23.290	42.660	0.778	2.843	0.730	0.918	0.937	2.499	0.642
Taipei	2.504	0.555	0.603	21.074	36.075	0.873	3.042	0.759	0.927	0.944	2.621	0.654
Tel Aviv	3.167	0.566	0.591	22.370	38.122	0.571	2.544	0.710	0.881	0.907	2.132	0.595
Terre Haute	1.608	0.463	0.495	21.830	18.756	0.286	1.586	0.549	0.710	0.752	1.239	0.429
Toronto	3.153	0.580	0.602	21.552	47.429	0.476	2.454	0.722	0.874	0.905	2.075	0.610
Toulouse	4.068	0.610	0.613	22.819	44.601	0.794	2.853	0.729	0.911	0.930	2.419	0.618
Vancouver	2.305	0.604	0.610	18.665	28.991	0.698	2.268	0.599	0.824	0.843	1.736	0.459
Warsaw	2.979	0.576	0.592	23.560	46.403	0.873	2.954	0.737	0.920	0.937	2.528	0.631
Yerevan	2.657	0.587	0.605	22.478	47.757	0.825	3.068	0.776	0.932	0.951	2.693	0.681

The units that were used in this work are all meter-based.

Table B1. Spearman Correlation Coefficients among the Group I, Group II and

Group IV of Metrics									
Group I	AREA_	AREA_A	AREA_C	LCI	ED	CD	NSI		
	MN	M	V						
AREA_MN	1								
AREA_AM	0.742**	1							
AREA_CV	0.430**	0.910**	1						
LCI	0.336**	0.572**	0.610**	1					
ED	-0.972**	-0.820**	-0.548**	-0.371**	1				
CD	-1.000**	0.742**	-0.430**	-0.336**	0.972**	1			
NSI	-0.370**	-0.124	0.025	-0.594**	0.357**	0.370**	1		
Group II	SHAPE_	SHAPE_	SHAPE_	FRAC_	FRAC_A	FRAC_C	CIRCLE	CIRCLE	CIRCLE
	MN	AM	CV	MN	M	V	_MN	_AM	_CV
SHAPE_MN	1								
SHAPE_AM	0.603**	1							
SHAPE_CV	0.748**	0.565**	1						
FRAC_MN	0.831**	0.461**	0.578**	1					
FRAC_AM	0.551**	0.849**	0.472**	0.531**	1				
FRAC_CV	0.636**	0.360**	0.824**	0.719**	0.357**	1			
CIRCLE_MN	0.881**	0.420**	0.451**	0.844**	0.475**	0.432**	1		
CIRCLE_AM	0.665**	0.608**	0.541**	0.588**	0.726**	0.412**	0.664**	1	
CIRCLE_CV	0.107	0.099	0.522**	0.094	0.012	0.528**	-0.182	0.075	1
Group IV	RCR	SHDI	SHEI	SIDI	SIEI	MSIDI	MSIEI		
RCR	1								
SHDI	0.622**	1							
SHEI	0.020	0.728**	1						
SIDI	0.414**	0.943**	0.847**	1					
SIEI	0.258**	0.868**	0.921**	0.975**	1				
MSIDI	0.414**	0.942**	0.845**	1.000**	0.975**	1			
MSIEI	-0.014	0.690**	0.970**	0.859**	0.940**	0.858**	1		

**Correlation is significant at the 0.01 level (2-tailed).

Table B2. Metric Selection for Groups I and IV where Strong Correlation Exists

Metrics combination	Cumulative variance explained	$\sum r$	Ratio	Highest loading metrics
AREA_MN AREA_AM LCI NSI	87.261%	2.738	0.319	AREA_AM NSI
AREA_MN AREA_CV LCI NSI	74.818%	2.365	0.316	AREA_CV NSI
AREA_CV ED LCI NSI	77.319%	2.505	0.309	AREA_CV NSI
AREA_CV CD LCI NSI	72.883%	2.365	0.308	AREA_CV NSI
AREA_AM ED LCI NSI	50.960%	2.838	0.180	AREA_AM LCI ED NSI
AREA_AM CD LCI NSI	47.247%	2.738	0.173	AREA_AM LCI CD NSI
MSIDI MSIEI RCR	99.796%	1.286	0.776	RCR MSIEI
SIDI MSIEI RCR	99.008%	1.286	0.770	RCR MSIEI
SHDI MSIEI RCR	99.282%	1.326	0.749	RCR MSIEI
MSIDI SHEI RCR	67.095%	1.280	0.524	RCR SHEI MSIDI
SIDI SHEI RCR	66.738%	1.281	0.521	RCR SHEI SIDI
SHDI SHEI RCR	68.046%	1.370	0.497	RCR SHDI SHEI
SHDI SIEI RCR	75.070%	1.748	0.429	RCR SHDI SIEI

Table B3. Factor Analysis of the Group I, Group II and Group IV of Metrics

Metrics	Group I	Factor	
		1	2
Eigenvalue		2.411	1.079
Percent of variance explained		60.279	26.982
Percent of cumulative variance explained		60.279	87.261
AREA_MN	Shape	0.975	0.132
AREA_AM	Shape	0.977	0.192
LCI	Shape	0.360	0.762
NSI	Shape	-0.011	-0.907

Metrics	Group II	Factor		
		1	2	3
Eigenvalue		5.646	1.509	1.024
Percent of variance explained		62.738	16.766	11.373
Percent of cumulative variance explained		62.738	79.504	90.877
SHAPE_MN	Shape	0.860	0.422	0.163
SHAPE_AM	Shape	0.170	0.934	0.135
SHAPE_CV	Shape	0.591	0.399	0.610
FRAC_MN	Shape	0.906	0.272	0.130
FRAC_AM	Shape	0.346	0.885	0.041
FRAC_CV	Shape	0.748	0.134	0.586
CIRCLE_MN	Shape	0.914	0.308	-0.152
CIRCLE_AM	Shape	0.567	0.697	-0.024
CIRCLE_CV	Shape	-0.047	-0.007	0.968

Metrics	Group IV	Factor	
		1	2
Eigenvalue		1.988	1.005
Percent of variance explained		66.281	33.516
Percent of cumulative variance explained		66.281	99.769
RCR	Diversity	0.082	0.996
MSIDI	Diversity	0.930	0.364
MSIEI	Diversity	0.995	-0.090

Table B4. Spearman Correlation Coefficient among the 8 Selected Metrics for Overall Analysis

	AREA_AM	NSI	SHAPE_AM	CIRCLE_MN	CIRCLE_CV	IJI	RCR	MSIEI
AREA_AM	1.000							
NSI	-0.124	1.000						
SHAPE_AM	0.507**	-0.098	1.000					
CIRCLE_MN	0.119	0.053	0.418**	1.000				
CIRCLE_CV	-0.020	-0.208*	0.099	-0.183	1.000			
IJI	0.160	-0.089	0.247*	0.398**	0.182	1.000		
RCR	0.082	0.557**	0.041	0.074	-0.113	0.153	1.000	
MSIEI	0.077	-0.142	0.187	0.298**	0.059	0.780**	-0.014	1.000

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table C1. Topological analysis of 100 urban road networks

	C	L	SW	β	R^2	HO	ρ	z	DC	α	p	SF
Athens	0.20	5.48	1	0.73	0.76	1	-0.06	-4.95	-1	3.72	0.39	1
Atlanta	0.27	6.11	1	0.80	0.74	1	-0.13	-11.40	-1	2.63	0.13	1
Auckland	0.20	6.71	1	0.84	0.85	1	-0.23	-32.52	-1	2.70	0.94	1
Austin	0.27	6.69	1	0.91	0.87	1	-0.12	-17.05	-1	2.74	0.34	1
Baghdad	0.07	7.04	1	0.85	0.49	1	-0.17	-33.66	-1	2.92	0.02	0
Bangkok	0.14	7.56	1	0.90	0.64	1	-0.34	-63.74	-1	2.80	0.23	1
Barcelona	0.21	5.60	1	0.62	0.74	1	0.08	9.80	1	2.69	0.21	1
Bejaia	0.33	4.19	1	0.85	0.95	1	-0.12	-1.69	0	2.93	0.18	1
Bangalore	0.21	7.32	1	0.92	0.90	1	-0.21	-55.80	-1	2.98	0.44	1
Berlin	0.28	7.22	1	0.93	0.90	1	-0.13	-37.07	-1	3.03	0.18	1
Birmingham	0.19	7.37	1	0.86	0.95	1	-0.11	-16.54	-1	2.70	0.44	1
Bogota	0.09	7.23	1	0.74	0.74	1	-0.11	-24.36	-1	3.30	0.49	1
Bordeaux	0.29	5.30	1	0.85	0.90	1	-0.15	-8.91	-1	2.62	0.08	1
Boston	0.26	6.42	1	0.85	0.90	1	-0.19	-19.98	-1	2.75	0.62	1
Brasilia	0.22	6.35	1	0.80	0.59	1	-0.16	-7.51	-1	2.95	0.56	1
Brno	0.28	9.06	1	0.98	0.95	1	-0.19	-21.39	-1	2.79	0.01	0
Brussels	0.29	6.45	1	0.78	0.80	1	-0.10	-4.85	-1	3.02	0.90	1
Budapest	0.25	6.88	1	0.90	0.86	1	-0.12	-20.59	-1	2.80	0.29	1
Buenos Aires	0.24	4.53	1	0.57	0.71	1	0.07	12.95	1	4.54	0.69	1
Cardiff	0.21	7.46	1	0.86	0.88	1	-0.11	-12.26	-1	2.97	0.72	1
Charlotte	0.22	7.16	1	0.78	0.75	1	-0.11	-13.58	-1	2.93	0.05	0
Chattanooga	0.25	6.27	1	0.87	0.88	1	-0.08	-6.76	-1	2.68	0.82	1
Chennai	0.17	7.51	1	0.98	0.90	1	-0.25	-41.05	-1	2.95	0.77	1
Chongqing	0.27	6.12	1	0.86	0.85	1	-0.06	-2.16	-1	2.80	0.35	1
Cincinnati	0.24	6.74	1	0.84	0.80	1	-0.13	-16.20	-1	2.58	0.29	1
Cleveland	0.23	6.20	1	0.92	0.81	1	-0.21	-8.54	-1	2.58	0.82	1
Curitiba	0.18	6.27	1	0.71	0.72	1	0.02	4.19	1	3.34	0.76	1
Dar es Salaam	0.29	6.22	1	0.95	0.95	1	-0.18	-13.10	-1	3.03	0.29	1
Delaware	0.23	5.14	1	0.68	0.54	1	-0.13	-2.32	-1	2.86	0.92	1
Denver	0.24	6.68	1	0.92	0.60	1	0.04	7.53	1	2.98	0.54	1
Detroit	0.17	4.59	1	0.82	0.75	1	-0.20	-24.04	-1	2.59	0.22	1
Edinburgh	0.26	7.34	1	0.96	0.94	1	-0.19	-24.16	-1	2.84	0.50	1
Edmonton	0.24	6.38	1	-0.68	0.92	1	0.10	15.65	1	2.65	0.50	1
Evansville	0.16	4.99	1	0.81	0.65	1	-0.01	1.27	0	2.55	0.44	1
Frankfurt	0.27	6.60	1	0.88	0.92	1	-0.15	-19.53	-1	2.89	0.09	1
Gdansk	0.28	6.87	1	1.07	0.89	1	-0.18	-16.64	-1	3.03	0.67	1
Glasgow	0.26	6.97	1	0.89	0.96	1	-0.12	-17.78	-1	2.98	0.88	1
Grand Rapids	0.17	4.61	1	0.72	0.59	1	-0.19	-9.46	-1	2.52	0.69	1
Hamburg	0.29	8.38	1	0.93	0.96	1	-0.24	-48.89	-1	3.12	0.53	1
Harare	0.26	5.99	1	0.78	0.80	1	-0.16	-12.39	-1	2.93	0.67	1
Honolulu	0.27	5.56	1	0.69	0.71	1	-0.16	-8.59	-1	2.35	0.07	1
Islamabad	0.13	6.84	1	0.87	0.71	1	-0.21	-19.10	-1	2.91	0.12	1
Kamloops	0.31	6.17	1	0.83	0.60	1	-0.19	-11.74	-1	2.56	0.14	1
Karachi	0.15	6.72	1	0.85	0.75	1	-0.19	-28.12	-1	2.88	0.04	0
Karlsruhe	0.26	6.53	1	0.84	0.92	1	-0.18	-21.45	-1	2.71	0.43	1
Kirovograd	0.28	5.84	1	0.93	0.76	1	-0.15	-6.52	-1	2.58	0.05	0

Krakov	0.29	6.48	1	1.03	0.85	1	-0.22	-25.95	-1	2.94	0.29	1
Kyiv	0.29	6.65	1	0.86	0.70	1	-0.17	-28.46	-1	2.87	0.66	1
Las Vegas	0.18	7.18	1	0.90	0.73	1	-0.11	-13.16	-1	2.80	0.41	1
Lawrence	0.25	5.34	1	0.83	0.58	1	-0.11	-5.05	-1	2.42	0.45	1
Lexington	0.24	5.72	1	0.82	0.76	1	-0.19	-11.63	-1	2.64	0.85	1
Lille	0.25	6.30	1	0.76	0.79	1	-0.10	-6.20	-1	2.45	0.01	0
London	0.22	9.46	1	0.99	0.96	1	-0.19	-61.11	-1	2.79	0.16	1
Lviv	0.19	8.05	1	0.98	0.83	1	-0.23	-17.29	-1	2.90	0.76	1
Lyon	0.23	6.15	1	0.73	0.86	1	-0.04	-1.86	0	2.69	0.02	0
Macon	0.28	5.24	1	0.80	0.85	1	-0.10	-4.17	-1	2.50	0.00	0
Madison	0.32	6.76	1	0.85	0.83	1	-0.18	-15.84	-1	3.01	0.26	1
Madrid	0.26	6.42	1	0.87	0.78	1	-0.14	-23.65	-1	3.06	0.57	1
Manchester	0.18	6.60	1	0.90	0.85	1	-0.19	-23.05	-1	2.72	0.52	1
Manila	0.17	5.35	1	0.87	0.70	1	-0.05	-2.48	-1	3.23	0.64	1
Marseille	0.26	7.38	1	0.88	0.88	1	-0.13	-13.44	-1	2.84	0.76	1
Mexico City	0.18	6.60	1	0.78	0.70	1	-0.06	-14.90	-1	2.75	0.02	0
Milan	0.27	6.21	1	0.82	0.89	1	-0.07	-7.77	-1	2.69	0.06	1
Milwaukee	0.19	5.43	1	-0.56	0.86	1	0.08	10.60	1	2.44	0.00	0
Mobile	0.31	5.86	1	0.99	0.83	1	-0.31	-33.24	-1	2.52	0.95	1
Monaco	0.32	4.66	1	0.71	0.84	1	-0.12	-1.91	0	2.71	0.38	1
Montpelier	0.29	6.88	1	0.85	0.92	1	-0.14	-9.56	-1	2.63	0.09	1
Montreal	0.29	5.89	1	0.90	0.83	1	-0.04	-4.98	-1	2.47	0.00	0
Munich	0.25	6.89	1	0.96	0.93	1	-0.16	-30.99	-1	3.02	0.83	1
Nairobi	0.24	7.75	1	0.95	0.81	1	-0.12	-11.92	-1	2.78	0.01	0
New Delhi	0.16	8.06	1	0.90	0.66	1	-0.15	-27.41	-1	2.84	0.00	0
New York	0.28	6.66	1	0.75	0.81	1	-0.03	-5.31	-1	2.47	0.00	0
Newcastle	0.21	8.72	1	1.00	0.88	1	-0.17	-13.02	-1	2.76	0.00	0
Nuremberg	0.25	6.64	1	0.89	0.94	1	-0.19	-24.50	-1	2.90	0.21	1
Odessa	0.19	6.60	1	0.83	0.62	1	-0.08	-4.49	-1	2.44	0.00	0
Osaka	0.21	5.27	1	0.75	0.83	1	-0.03	-4.16	-1	3.02	0.68	1
Paris	0.28	5.11	1	0.81	0.87	1	-0.12	-11.50	-1	2.32	0.00	0
Pittsburgh	0.24	6.72	1	0.76	0.83	1	-0.05	-4.87	-1	2.98	0.61	1
Porto Alegre	0.22	6.52	1	0.89	0.81	1	-0.12	-11.92	-1	2.76	0.00	0
Reno	0.30	6.74	1	0.82	0.79	1	-0.12	-9.32	-1	2.50	0.00	0
Reykjavik	0.27	6.66	1	0.93	0.84	1	-0.19	-16.42	-1	3.05	0.65	1
Riga	0.30	7.36	1	1.04	0.92	1	-0.19	-20.01	-1	2.63	0.02	0
Rotterdam	0.26	7.39	1	0.91	0.88	1	-0.16	-19.04	-1	3.31	0.58	1
San Diego	0.31	7.14	1	0.81	0.75	1	-0.08	-12.48	-1	2.43	0.00	0
Santander	0.30	5.38	1	0.90	0.85	1	-0.15	-9.03	-1	2.91	0.88	1
Santo Domingo	0.23	5.53	1	0.92	0.67	1	0.00	1.65	0	2.66	0.02	0
Seoul	0.27	5.74	1	0.77	0.89	1	-0.07	-6.72	-1	2.90	0.58	1
Shanghai	0.20	9.05	1	0.77	0.76	1	-0.05	-7.00	-1	2.77	0.00	0
Singapore	0.26	6.73	1	0.83	0.91	1	-0.11	-12.80	-1	2.83	0.01	0
St. Louis	0.19	4.75	1	0.76	0.64	1	-0.12	-10.36	-1	2.30	0.01	0
State College	0.26	4.30	1	-0.67	0.85	1	-0.03	0.93	0	2.56	0.15	1
Strasbourg	0.29	6.51	1	0.91	0.95	1	-0.14	-10.09	-1	3.24	0.74	1
Taipei	0.21	5.52	1	0.84	0.79	1	-0.10	-10.05	-1	2.57	0.15	1
Tel Aviv	0.23	5.99	1	0.84	0.73	1	-0.10	-7.48	-1	2.70	0.44	1
Terre Haute	0.26	3.98	1	0.82	0.55	1	-0.05	1.15	0	2.53	0.84	1
Toronto	0.29	5.91	1	0.94	0.93	1	-0.13	-27.49	-1	2.66	0.02	0

Toulouse	0.33	6.83	1	0.98	0.91	1	-0.17	-18.17	-1	3.50	0.79	1
Vancouver	0.25	4.87	1	0.82	0.74	1	-0.02	0.24	0	2.17	0.00	0
Warsaw	0.25	6.67	1	0.99	0.68	1	-0.10	-18.33	-1	2.71	0.00	0
Yerevan	0.25	6.56	1	0.89	0.83	1	-0.15	-10.91	-1	2.87	0.05	0

Note: C , L , β , α , ρ denote the topological properties, namely the clustering coefficient, average shortest path length, the exponent characterizing the correlation between degree and clustering coefficient, the power exponent characterizing the degree distribution, and the assortativity coefficient. R^2 , z , p denote the determination coefficient of the $C(k) \sim k$ correlation, the z-score of ρ compared to random counterparts, and the probability to accept the power law distribution for the observed degrees, which indicate the significance of the corresponding property. SW, HO, DC, SF denote the qualitative topological property used in the comparison, where 0 or 1 for SW, HO, and SF means the absence or presence of the property in the network. 1, 0, -1 for DC means assortative, neutral, or disassortative degree correlations respectively.

Table C2. Grid coefficients and four factor scores of the 100 urban road

networks					
	GRID	Evenness (FAC 1)	Richness- density (FAC 2)	Shape irregularity (FAC 3)	Size and shape variation (FAC 4)
Athens	0.0943	-0.4758	-0.0264	-1.8155	-0.2783
Atlanta	0.1233	-1.1681	0.2008	-0.5677	0.6131
Auckland	0.1062	0.4867	0.5253	0.6161	0.4628
Austin	0.1349	-0.1603	0.8410	0.9564	0.0525
Baghdad	0.1695	-2.5880	0.3795	1.6957	-1.4143
Bangkok	0.1738	-0.1103	0.4386	1.3797	0.5377
Barcelona	0.1057	0.3464	-0.0664	-1.0899	1.1299
Bejaia	0.1209	-0.8437	-2.3146	1.8296	-0.0380
Bangalore	0.1397	-0.7104	1.2270	0.8338	-0.8982
Berlin	0.1212	0.4889	2.1864	-0.6613	-0.1574
Birmingham	0.1084	1.0202	1.0278	-0.5231	-0.1387
Bogota	0.1177	-0.8089	1.4038	0.0385	-0.6675
Bordeaux	0.1148	-0.0521	-1.0592	-0.4521	-0.6936
Boston	0.1085	-0.9806	0.7567	0.2916	-0.3020
Brasilia	0.1671	-0.8867	-0.1129	1.7081	2.2082
Brno	0.1125	0.6369	-0.7617	0.6468	-0.2531
Brussels	0.1152	1.0236	-1.5261	-0.4096	-0.7424
Budapest	0.1245	0.7089	-0.0412	-0.5460	-0.4981
Buenos Aires	0.1196	-1.1328	-0.1260	-3.2317	0.5818
Cardiff	0.1176	1.4889	-0.9534	0.2000	-0.5097
Charlotte	0.1315	-0.7984	-0.0917	0.4385	0.3637
Chattanooga	0.1469	0.4827	-0.0769	0.0844	1.4403
Chennai	0.1366	0.7436	1.0472	0.0904	-0.4405
Chongqing	0.1500	-1.8310	-0.2461	1.1305	7.5083
Cincinnati	0.1202	0.9277	0.4967	-0.1754	0.5556
Cleveland	0.1255	-1.3652	0.4600	0.5561	-0.6028
Curitiba	0.1420	-1.0970	1.0618	-1.6788	0.4208
Dar es Salaam	0.1248	0.0271	-1.4061	0.3407	-0.2593
Delaware	0.1607	0.5038	-2.4759	-1.4908	-0.0472
Denver	0.1267	-0.6327	1.2193	-0.4038	-0.2349
Detroit	0.1231	-2.7247	1.1597	-0.3448	-1.7177
Edinburgh	0.1228	2.0061	-0.7171	-0.1563	-0.2449
Edmonton	0.1333	-0.2137	0.8084	0.9199	-0.5197
Evansville	0.1467	-1.1962	-1.3177	-1.6315	0.0733
Frankfurt	0.1174	1.0452	-0.3178	-0.7225	-0.2036
Gdansk	0.1212	0.8898	-1.0747	0.6447	-0.7456
Glasgow	0.1210	1.7262	-0.4780	-0.1928	-0.4667
Grand Rapids	0.1171	-2.3106	-1.4003	-0.7990	-0.8549
Hamburg	0.1131	0.3415	1.3951	-0.0840	-0.0556
Harare	0.1339	-1.0755	-1.7309	-0.1142	-0.5524

Honolulu	0.1237	-0.0960	-0.3859	-0.2741	0.1106
Islamabad	0.1526	0.2177	-1.0381	-0.8713	1.3985
Kamloops	0.1380	0.1140	-1.3121	2.6353	-0.5291
Karachi	0.1381	-0.2669	-0.1572	-0.1516	0.1816
Karlsruhe	0.1190	0.6246	0.7085	-0.2119	0.2666
Kirovograd	0.1264	0.2026	-1.3995	0.1771	-1.5279
Krakow	0.1216	1.0692	0.2408	0.2194	0.0677
Kyiv	0.1299	1.3234	0.8228	0.2811	0.0526
Las Vegas	0.1355	-1.5849	-0.1908	1.1690	0.3587
Lawrence	0.1363	0.3589	-0.9968	0.2509	-0.8005
Lexington	0.1372	-0.1925	-0.8655	0.3115	-0.3066
Lille	0.1208	-0.1296	0.0327	-0.6300	-0.0544
London	0.1152	1.5467	2.8243	-0.4273	-0.5467
Lviv	0.1253	1.7507	-1.1747	0.7680	-0.3089
Lyon	0.1085	0.9643	0.2848	-1.5738	0.9746
Macon	0.1370	-0.9702	-1.2547	-0.8857	0.2057
Madison	0.1302	0.1212	0.1474	-0.0159	0.0866
Madrid	0.1105	1.0892	1.1172	-0.6913	0.7411
Manchester	0.1185	0.8043	0.7393	-1.0293	0.3167
Manila	0.1329	-0.1740	-0.4628	0.3385	-1.0649
Marseille	0.1195	0.4736	0.3390	1.2485	0.1129
Mexico City	0.1271	-1.4528	1.6961	0.5691	-0.3391
Milan	0.1123	0.5927	0.5004	-1.1761	0.3509
Milwaukee	0.1450	-1.5879	0.2401	-0.8142	-0.4361
Mobile	0.1269	-1.0399	-0.7836	0.1600	0.6183
Monaco	0.1126	1.2900	-1.5909	1.9035	-0.5912
Montpelier	0.1100	0.9849	-0.3541	-0.0257	-0.1385
Montreal	0.1409	-0.5525	1.1303	0.8075	-0.3914
Munich	0.1174	0.5830	1.2912	-1.0227	0.3160
Nairobi	0.1477	-0.5118	-1.2843	1.1972	0.0950
New Delhi	0.1581	-0.3362	-0.2995	-0.0516	0.5539
New York	0.1243	-1.6583	2.1100	0.5125	-1.1449
Newcastle	0.1297	0.6881	-0.1224	0.9161	0.1962
Nuremberg	0.1221	0.8893	0.3878	-0.6247	-0.0471
Odessa	0.1312	0.2159	-0.5709	-0.6690	-0.1050
Osaka	0.1098	-0.6225	1.3774	-1.4676	-0.2003
Paris	0.0915	0.4512	1.0264	-0.7773	-0.4550
Pittsburgh	0.1243	-0.2965	0.4117	1.4093	-0.2480
Porto Alegre	0.1278	-0.2275	-0.3549	-0.1133	0.1776
Reno	0.1270	-0.3213	-0.8105	0.6426	0.5288
Reykjavik	0.1150	0.4060	0.0886	-0.2668	0.0079
Riga	0.1240	0.6033	0.5840	1.2618	0.3149
Rotterdam	0.1293	0.2073	0.1256	0.1952	0.3750
San Diego	0.1338	0.1132	0.6857	2.6218	0.2724
Santander	0.1191	0.7820	-0.3417	-0.1440	0.5624
Santo Domingo	0.1211	-1.1461	-0.8360	-0.1670	0.4649
Seoul	0.1229	-0.3299	0.0667	-0.3998	-0.4828
Shanghai	0.1342	0.4604	0.9069	-1.4333	1.5839
Singapore	0.1399	1.9105	0.6367	1.0173	0.4804

St. Louis	0.1364	-0.3841	0.5495	0.3576	-0.5116
State College	0.1390	0.7355	-1.6709	-1.3925	-0.6690
Strasbourg	0.1119	0.8484	-0.2138	-0.1987	0.1065
Taipei	0.1140	-0.1178	0.1987	0.5387	-0.3838
Tel Aviv	0.1143	0.1692	-0.7055	-0.4939	-0.3737
Terre Haute	0.1515	-1.7324	-1.9392	-2.6049	-0.3573
Toronto	0.1267	0.3930	0.1772	0.2684	-0.8134
Toulouse	0.1209	0.6711	0.1674	0.6038	-0.0898
Vancouver	0.1259	-1.6005	0.4979	0.6520	-1.8516
Warsaw	0.1231	1.0133	0.8335	-0.4735	0.3380
Yerevan	0.1211	0.9321	-0.1441	0.7343	0.1409