

Supplementary Material for the paper titled:

Urban resilience assessment: Mapping knowledge structure and trends

Search String

(TS= (("urban" OR "city" OR "cities") AND (("assess*" OR "measur*" OR "indicator" OR "Index") NEAR/5 ("resilien*")))) AND LANGUAGE: (English)
Indexes=SCI-EXPANDED, SSCI, A&HCI, ESCI Timespan=1900-2020

Table S1. Most influential institutions.

Rank	organization	Country	Documents	Citations	Total link strength
1	University of Exeter	UK	13	199	624
2	Politecnico di Torino	Italy	11	59	1314
3	University of Maryland	US	8	135	761
4	University of Tehran	Iran	8	36	977
5	Sun Yat-sen University	China	7	21	656
6	Kyoto University	Japan	6	107	779
7	Arizona State University	US	6	60	374
8	US Environmental Protection Agency	US	6	53	649
9	Universidade Federal do Rio de Janeiro	Brazil	6	34	541
10	Tongji University	China	6	22	764

Table S2. Frequently used terms in the urban resilience assessment literature.

Rank	Keyword	Occurrences	Total link strength
1	resilience	214	809
2	climate change	100	422
3	vulnerability	95	421
4	cities	90	360
5	framework	80	398
6	adaptation	63	311
7	risk	57	266

8	management	53	239
9	sustainability	50	248
10	community resilience	49	249
11	systems	48	237
12	model	42	173
13	floods	41	145
14	disasters	40	191
15	indicators	39	187
16	critical infrastructure	35	160
17	earthquake	33	132
18	natural hazards	33	161
19	social vulnerability	27	157
20	institutions	18	86
21	urbanization	18	89
22	community	17	75
23	recovery	17	84
24	reliability	17	53
25	challenges	15	72
26	performance	15	55
27	resilience assessment	15	58
28	social-ecological systems	15	67
29	ecological resilience	14	79
30	gis	13	71

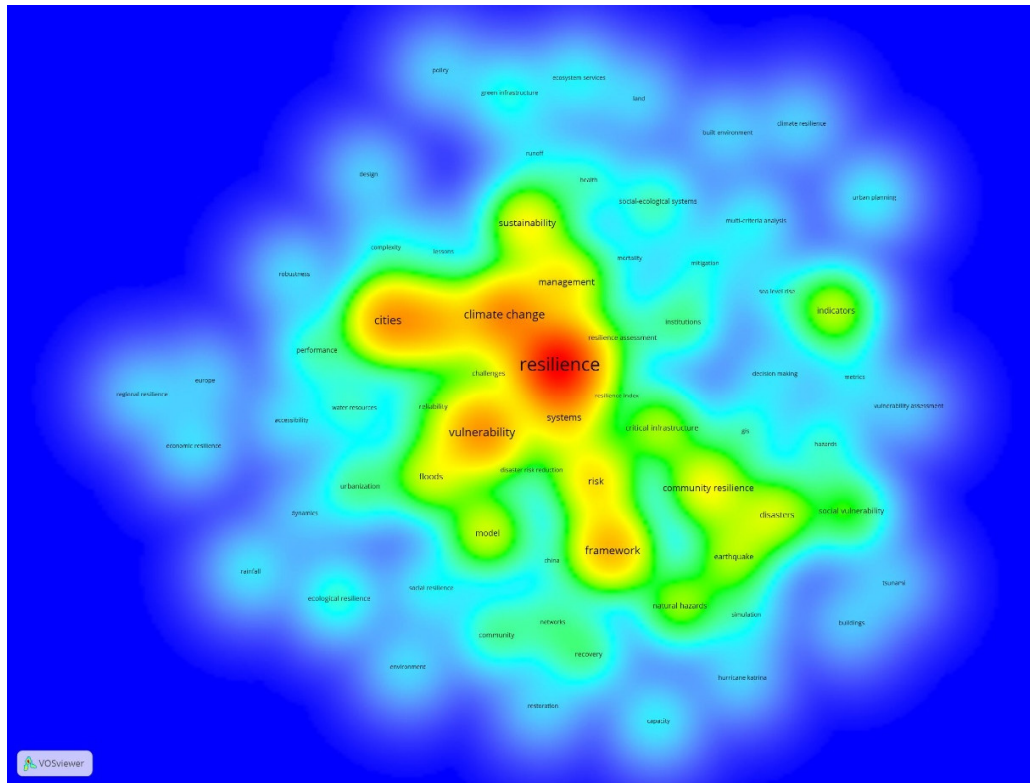


Figure S1. Density visualization of the frequently occurred terms.

Table S3. Top keywords from 1998-2009.

Rank	Keyword	Frequency	Centrality
1	resilience	3	0
2	water supply	2	0
3	reliability	2	0.01
4	social ecological system	2	0
5	vulnerability	2	0
6	adaptive capacity	1	0
7	Systems engineering	1	0
8	index	1	0
9	infrastructure	1	0
10	pattern	1	0
11	simulation	1	0
12	policy	1	0
13	network	1	0
14	explanation	1	0
15	fema	1	0
16	ecological resilience	1	0
17	adaptation	1	0
18	access	1	0
19	reservoir operation	1	0
20	new orlean	1	0

Table S4. Top keywords from 2010-2014.

Rank	Keyword	Frequency	Centrality
1	resilience	15	0.37
2	vulnerability	13	0.32
3	adaptation	11	0.25
4	framework	9	0.23
5	disaster	7	0.09
6	system	7	0.12
7	risk	7	0.16
8	community resilience	6	0.12
9	metaphor	4	0.08
10	hazard	4	0.1
11	management	4	0.08
12	environment	3	0.12
13	food security	3	0.14
14	urban	3	0
15	area	3	0.09
16	ecological resilience	3	0.04
17	indicator	3	0.03
18	performance	3	0
19	sustainability	3	0.02
20	Chennai	2	0.05

Table S5. Top keywords from 2015-2020.

Rank	Keyword	Frequency	Centrality
1	resilience	131	0.03
2	vulnerability	80	0.04
3	climate change	73	0.05
4	framework	72	0.07
5	city	68	0.09
6	urban resilience	52	0.07
7	risk	50	0.07
8	management	49	0.07
9	community resilience	43	0.05
10	adaptation	42	0.08
11	system	40	0.05
12	model	39	0.06
13	sustainability	31	0.02
14	impact	30	0.11
15	hazard	26	0.1
16	indicator	26	0.07
17	disaster	25	0.09
18	infrastructure	24	0.04
19	disaster resilience	24	0.06
20	social vulnerability	23	0.05
21	network	16	0.05
22	recovery	15	0.03
23	urban	15	0.06
24	governance	15	0.13
25	community	14	0.05
26	earthquake	14	0.03
27	urbanization	14	0.07
28	climate	12	0.03
29	reliability	12	0.05
30	resilience assessment	12	0.02
31	natural hazard	12	0.04
32	seismic resilience	12	0.02

33	flood	11	0.03
34	challenge	11	0.01
35	performance	11	0.04
36	health	10	0.04
37	simulation	10	0.09
38	GI (Green Infrastructure)	9	0.03
39	ecological resilience	9	0.05
40	urban planning	9	0.01

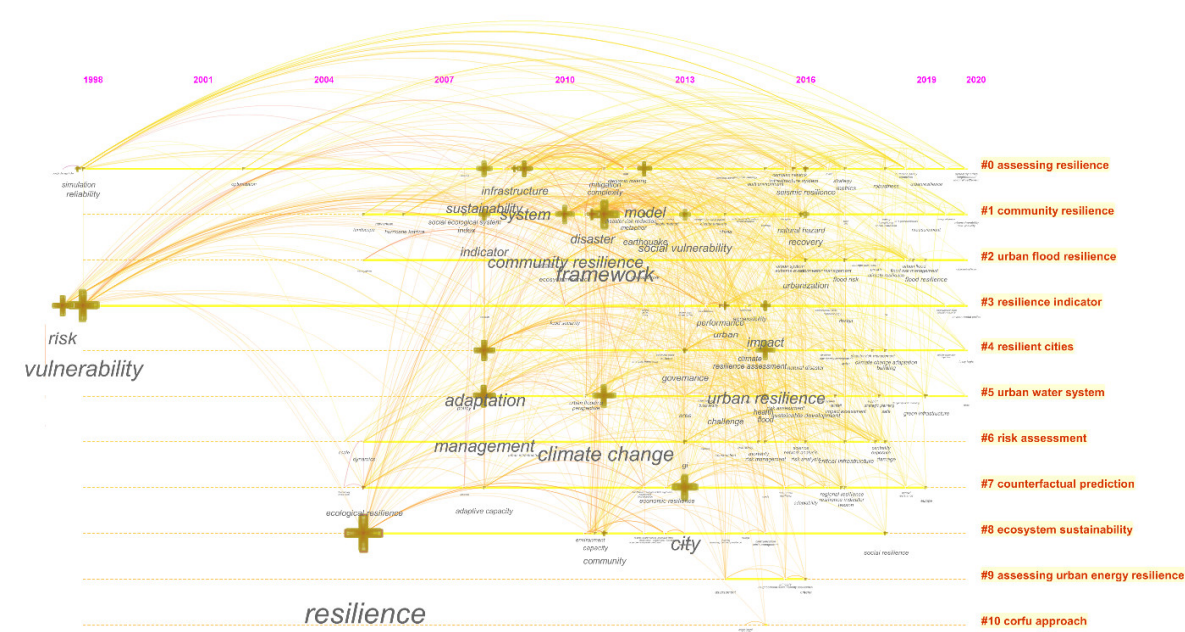


Figure S2. Keyword timeline view of the urban resilience assessment field from 1998-2020. Larger cross size is indicative of the relatively higher importance of the term. In addition, links indicate connections between keywords in terms of co-occurrence.

Table S6. Top 20 most influential journals based on the co-citation analysis.

Rank	Source	Citations	Total link strength
1	Global Environmental Change	406	8767
2	Natural Hazards	389	7891
3	Ecology and Society	275	6246
4	International Journal of Disaster Risk Reduction	234	4833
5	landscape urban plan	209	4546
6	Cities	177	3787

7	Reliability Engineering and System Safety	176	3256
8	Earthquake Spectra	175	2779
9	Risk Analysis	135	2781
10	Science	135	2650
11	Natural Hazards and Earth System Sciences	132	2589
12	Nature	125	2136
13	Disasters	124	2318
14	sustainability-basel	123	2751
15	Cambridge Journal of Regions Economy and Society	117	1886
16	Annual Review of Ecology, Evolution, and Systematics	110	2207
17	Natural Hazards Review	109	2228
18	Journal of Hydrology	108	1716
19	Proceedings of the National Academy of Sciences of the United States of America	103	2156
20	Science of the Total Environment	97	2219

Table S7. List of top journals based on the number of publications.

Rank	Source	Documents	Citations
1	Sustainability	36	121
2	International Journal of Disaster Risk Reduction	24	216
3	Natural Hazards	18	177
4	Water Resources	15	64
5	Sustainable Cities and Society	10	92
6	Science of the Total Environment	10	73
7	Ecology and Society	7	249
8	Urban Water Journal	7	71
9	International Journal of Disaster Resilience in the Built Environment	7	8
10	Water Research	6	109
11	Cities	6	70
12	Journal of Structural Engineering	6	61
13	Journal of Flood Risk Management	6	21
14	Transportation Research Record	6	17
15	International Journal of Environmental Research and Public Health	6	8
16	Urban Climate	5	45
17	Reliability Engineering & System Safety	5	38
18	Journal of Homeland Security and Emergency Management	4	478

19	Ecological Indicators	4	172
20	Environmental Science & Policy	4	101

Table S8. Top 20 most influential articles based on co-citation analysis.

Rank	Cited reference	Citations	Total link strength
1	holling c.s., 1973, annual rev ecol syst, v4, p1, doi 10.1146/annurev.es.04.110173.000245	110	499
2	bruneau m, 2003, earthq spectra, v19, p733, doi 10.1193/1.1623497	105	452
3	cutter sl, 2008, global environ chang, v18, p598, doi 10.1016/j.gloenvcha.2008.07.013	76	445
4	norris fh, 2008, am j commun psychol, v41, p127, doi 10.1007/s10464-007-9156-6	53	344
5	cutter sl, 2010, j homel secur emerg, v7	51	307
6	folke c, 2006, global environ chang, v16, p253, doi 10.1016/j.gloenvcha.2006.04.002	50	268
7	meerow s, 2016, landscape urban plan, v147, p38, doi 10.1016/j.landurbplan.2015.11.011	50	271
8	godschalk dr, 2003, nat hazards rev, v4, p136, doi 10.1061/(asce)1527-6988(2003)4:3(136)	44	296
9	cutter sl, 2003, soc sci quart, v84, p242, doi 10.1111/1540-6237.8402002	39	193
10	cimellaro gp, 2010, eng struct, v32, p3639, doi 10.1016/j.engstruct.2010.08.008	37	169
11	adger wn, 2000, prog hum geog, v24, p347, doi 10.1191/030913200701540465	36	237
12	cutter sl, 2014, global environ chang, v29, p65, doi 10.1016/j.gloenvcha.2014.08.005	36	255
13	davoudi s, 2012, plan theory pract, v13, p299, doi 10.1080/14649357.2012.677124	32	132
14	carpenter s, 2001, ecosystems, v4, p765, doi 10.1007/s10021-001-0045-9	30	173
15	adger wn, 2006, global environ chang, v16, p268, doi 10.1016/j.gloenvcha.2006.02.006	28	149
16	adger wn, 2005, science, v309, p1036, doi 10.1126/science.1112122	25	153
17	folke c, 2010, ecol soc, v15, doi 10.5751/es-03610-150420	25	126
18	klein r. j. t., 2003, env hazards, v5, p35, doi 10.1016/j.hazards.2004.02.001	25	176
19	chang se, 2004, earthq spectra, v20, p739, doi 10.1193/1.1775796	24	135
20	sherrieb k, 2010, soc indic res, v99, p227, doi 10.1007/s11205-010-9576-9	24	180

Table S9. List of top references based on the number of citations.

Rank	Document	Citations
1	(Cutter, Burton, & Emrich, 2010)	465
2	(Leichenko, 2011)	206
3	(Reed, Kapur, & Christie, 2009)	181
4	(Ahern, Cilliers, & Niemela, 2014)	130
5	(Liao, 2012)	118
6	(Milman & Short, 2008)	115
7	(Allen, Gunderson, & Johnson, 2005)	108
8	(Faturechi & Miller-Hooks, 2015)	105
9	(Ouyang, Dueñas-Osorio, & Min, 2012)	89
10	(Sharifi, 2016)	86
11	(Sharifi & Yamagata, 2016)	85
12	(Comfort, 2006)	70
13	(Mugume, Gomez, Fu, Farmani, & Butler, 2015)	70
14	(Brown, Dayal, & del Rio, 2012)	66
15	(Kit, Ludeke, & Reckien, 2012)	61
16	(Ainuddin & Routray, 2012)	59
17	(Attoh-Okine, Cooper, & Mensah, 2009)	59
18	(Kotzee & Reyers, 2016)	59
19	(Djordjevic & Cotton, 2011)	54
20	(Blackmore & Plant, 2008)	48

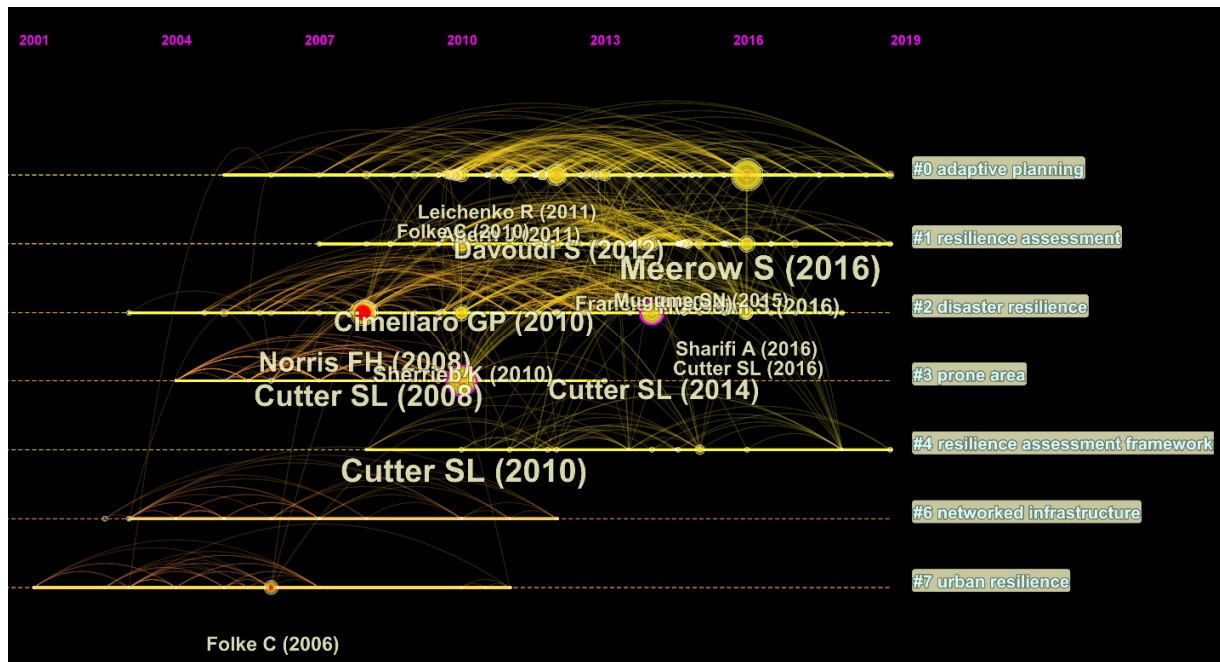


Figure S3. Timeline view of influential references from 1998-2020. Node size is proportional to the number of citation and links indicate co-citation connections between references.

Table S10. Top 20 authors based on the co-citation analysis.

Rank	Author	Citations	Total link strength
1	Cutter, SL	286	2766
2	Holling, CS	168	1488
3	Folke, C	136	1451
4	Adger, WN	134	1589
5	Bruneau, M	127	1045
6	Cimellaro, GP	89	773
7	Walker, B	83	760
8	Sharifi, A	72	756
9	Meerow, S	70	722
10	Ouyang, M	63	492
11	Chang, SE	61	529
12	Norris, FH	58	748
13	Berkes, F	52	667
14	Birkmann, J	52	586
15	Godschalk, DR	52	658
16	Gunderson, LH	47	503
17	Pelling, M	44	467

18	Davoudi, S	43	399
19	Martin, R	43	225
20	Rose, A	39	494

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