

| Keywords | Year | Strength | Begin | End | 2016 - 2021 |
|-----------------------------------|------|----------|-------|------|-------------|
| big data | 2016 | 5.07 | 2016 | 2017 | |
| urban development | 2016 | 3.66 | 2016 | 2017 | |
| energy efficiency | 2016 | 3.37 | 2016 | 2017 | |
| sensor network | 2016 | 3.12 | 2016 | 2018 | |
| performance | 2016 | 2.85 | 2016 | 2017 | |
| framework | 2016 | 2.85 | 2016 | 2017 | |
| smart home | 2016 | 2.78 | 2016 | 2017 | |
| mobile application | 2016 | 2.75 | 2016 | 2018 | |
| open innovation | 2016 | 2.75 | 2016 | 2018 | |
| collaborative governance | 2016 | 2.75 | 2016 | 2018 | |
| giscience | 2016 | 2.74 | 2016 | 2017 | |
| zigbee | 2016 | 2.36 | 2016 | 2018 | |
| intelligent transportation system | 2016 | 2.36 | 2016 | 2018 | |
| cyber-physical system | 2016 | 2.26 | 2016 | 2017 | |
| industry 4.0 | 2016 | 3.17 | 2017 | 2018 | |
| rfid | 2016 | 2.9 | 2017 | 2018 | |
| indicator | 2016 | 2.79 | 2017 | 2019 | |
| policy making | 2016 | 2.71 | 2017 | 2018 | |
| vehicular network | 2016 | 2.54 | 2017 | 2018 | |
| architecture | 2016 | 2.44 | 2017 | 2018 | |
| challenge | 2016 | 2.55 | 2018 | 2019 | |
| gamification | 2016 | 2.55 | 2018 | 2019 | |
| transport | 2016 | 2.55 | 2018 | 2019 | |
| hadoop | 2016 | 2.23 | 2018 | 2019 | |
| china | 2016 | 2.23 | 2018 | 2019 | |

Figure 1. Top 25 keywords with the strongest citation bursts in the second period.

Table 1. Top 20 most influential journals.

| No. | Source | Citations | Total link strength |
|-----|----------------------------------------------------------|-----------|---------------------|
| 1 | IEEE Access | 3097 | 65501 |
| 2 | Cities | 2970 | 40245 |
| 3 | IEEE Internet of Things Journal | 2446 | 47813 |
| 4 | Lecture Notes in Computer Science | 2380 | 28247 |
| 5 | IEEE Communications Magazine | 2197 | 44382 |
| 6 | Future Generation Computer Systems | 1815 | 35204 |
| 7 | Journal of Urban Technology | 1646 | 24415 |
| 8 | Sensors | 1545 | 26767 |
| 9 | IEEE Communications Surveys & Tutorials | 1396 | 33283 |
| 10 | Technological Forecasting and Social Change | 1231 | 21930 |
| 11 | Sustainable Cities and Society | 1227 | 22859 |
| 12 | IEEE Transactions on Intelligent Transportation Systems. | 1114 | 15047 |
| 13 | Sustainability | 1092 | 16259 |
| 14 | Journal of Cleaner Production | 1064 | 20360 |
| 15 | IEEE Transactions on Vehicular Technology | 1048 | 19963 |
| 16 | Urban Studies | 1015 | 12212 |
| 17 | Computer Networks | 1001 | 20069 |
| 18 | Government Information Quarterly | 988 | 12843 |
| 19 | IEEE Transactions on Industrial Informatics | 966 | 20551 |
| 20 | IEEE Transactions on Smart Grid | 823 | 16094 |

Table 2. Countries making more contribution to the smart cities literature.

| No. | Country | Documents | Citations | Total link strength |
|-----|-----------------|-----------|-----------|---------------------|
| 1 | USA | 792 | 13881 | 343866 |
| 2 | Italy | 495 | 13824 | 283551 |
| 3 | China | 1094 | 11944 | 324940 |
| 4 | England | 477 | 8789 | 285718 |
| 5 | Spain | 385 | 6195 | 195162 |
| 6 | Australia | 290 | 4725 | 187279 |
| 7 | Canada | 247 | 4506 | 131231 |
| 8 | The Netherlands | 155 | 4004 | 171655 |
| 9 | South Korea | 250 | 3979 | 95354 |
| 10 | India | 413 | 3202 | 152965 |
| 11 | Greece | 121 | 2762 | 87282 |
| 12 | France | 169 | 2562 | 82445 |
| 13 | Saudi Arabia | 217 | 2251 | 75767 |
| 14 | Germany | 161 | 1974 | 93713 |
| 15 | Pakistan | 196 | 1822 | 66714 |

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|----|----------|-----|------|--------|
| 16 | Sweden | 106 | 1731 | 92025 |
| 17 | Malaysia | 94 | 1433 | 39979 |
| 18 | Portugal | 119 | 1400 | 65173 |
| 19 | Finland | 88 | 1383 | 58699 |
| 20 | Brazil | 157 | 1378 | 123689 |

Table 3. Organizations that have made more contribution to the development of the field.

| No. | Organization | Documents | Citations | Total link strength |
|-----|----------------------------------------------------------|-----------|-----------|---------------------|
| 1 | Polytechnic University of Milan | 37 | 1613 | 3403 |
| 2 | University of Naples Federico II | 35 | 1222 | 2635 |
| 3 | King Saud University | 63 | 1176 | 1770 |
| 4 | MIT | 39 | 805 | 3045 |
| 5 | Chinese Academy of Sciences | 57 | 744 | 1641 |
| 6 | Huazhong University of Science and Technology | 38 | 613 | 1685 |
| 7 | Utrecht University | 32 | 613 | 4531 |
| 8 | University of Bologna | 35 | 607 | 756 |
| 9 | King Abdulaziz University | 46 | 567 | 1389 |
| 10 | KTH Royal Institute of Technology | 30 | 518 | 3233 |
| 11 | The Hong Kong Polytechnic University | 35 | 428 | 2730 |
| 12 | University of Ottawa | 32 | 415 | 1053 |
| 13 | Tsinghua University | 36 | 382 | 1566 |
| 14 | UCL | 36 | 347 | 2251 |
| 15 | Beijing University of Posts and Telecommunications | 31 | 319 | 1477 |
| 16 | University of Electronic Science and Technology of China | 39 | 313 | 1365 |
| 17 | Southeast University | 32 | 303 | 3233 |
| 18 | Valencia Polytechnic University | 33 | 270 | 895 |
| 19 | Shanghai Jiao Tong University | 34 | 261 | 865 |
| 20 | University of New South Wales | 30 | 259 | 1939 |

Table 4. Most influential documents.

| No. | Reference | Paper title | Citation | Total link strength |
|-----|-------------------------------------------------------|---------------------------------------------------------------------|----------|---------------------|
| 1 | (Caragliu, Del Bo, & Nijkamp, 2011) | Smart Cities in Europe | 384 | 1925 |
| 2 | (Albino, Berardi, & Dangelico, 2015) | Smart Cities: Definitions, Dimensions, Performance, and Initiatives | 329 | 1684 |
| 3 | (Hollands, 2008) | Will the real smart city please stand up? | 292 | 1358 |
| 4 | (Zanella, Bui, Castellani, Vangelista, & Zorzi, 2014) | Internet of Things for Smart Cities | 280 | 714 |

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|----|------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----|------|
| 5 | (Kitchin, 2014) | The real-time city? Big data and smart urbanism | 273 | 1275 |
| 6 | (Neirrotti, De Marco, Cagliano, Mangano, & Scorrano, 2014) | Current trends in Smart City initiatives: Some stylised facts | 272 | 1503 |
| 7 | (Chourabi et al., 2012) | <i>Understanding Smart Cities: An Integrative Framework</i> | 253 | 1195 |
| 8 | (Giffinger & Pichler-Milanović, 2007) | <i>Smart cities: Ranking of European medium-sized cities</i> | 241 | 1228 |
| 9 | (Vanolo, 2014) | Smartmentality: The Smart City as Disciplinary Strategy | 217 | 1317 |
| 10 | (Nam & Pardo, 2011) | <i>Conceptualizing smart city with dimensions of technology, people, and institutions</i> | 202 | 1031 |
| 11 | (Batty et al., 2012) | Smart cities of the future | 200 | 936 |
| 12 | (Atzori, Iera, & Morabito, 2010) | The Internet of Things: A survey | 181 | 362 |
| 13 | (Townsend, 2013) | <i>Smart cities: Big data, civic hackers, and the quest for a new utopia</i> | 176 | 855 |
| 14 | (Söderström, Paasche, & Klauser, 2014) | Smart cities as corporate storytelling | 165 | 1016 |
| 15 | (Hollands, 2014) | Critical interventions into the corporate smart city | 155 | 1033 |
| 16 | (Meijer & Bolívar, 2016) | Governing the smart city: a review of the literature on smart urban governance | 155 | 989 |
| 17 | (Gubbi, Buyya, Marusic, & Palaniswami, 2013) | Internet of Things (IoT): A vision, architectural elements, and future directions | 148 | 305 |
| 18 | (Bakıcı, Almirall, & Wareham, 2013) | A Smart City Initiative: the Case of Barcelona | 141 | 872 |
| 19 | (Ahvenniemi, Huovila, Pinto-Seppa, & Airaksinen, 2017) | What are the differences between sustainable and smart cities? | 138 | 839 |
| 20 | (Harrison et al., 2010) | Foundations for Smarter Cities | 138 | 719 |



Figure 2. Top 25 references with the strongest citation bursts.

Table 5. The most influential authors.

| No. | Author | Affiliation | Citations | Total link strength |
|-----|---------------------|------------------------------------------------|-----------|---------------------|
| 1 | Rob Kitchin | National University of Ireland Maynooth | 771 | 5254 |
| 2 | Tan Yigitcanlar | Queensland University of Technology | 603 | 5089 |
| 3 | Andrea Caragliu | Polytechnic University of Milan | 585 | 5202 |
| 4 | Michael Batty | UCL | 441 | 3167 |
| 5 | Nicos Komninos | Aristotle University of Thessaloniki | 437 | 4745 |
| 6 | Nam Taewoo | Sungkyunkwan University | 429 | 3661 |
| 7 | Margarita Angelidou | Aristotle University of Thessaloniki | 356 | 4230 |
| 8 | Vito Albino | Politecnico di Bari | 342 | 2865 |
| 9 | Robert Hollands | Newcastle University | 309 | 3295 |
| 10 | Alberto Vanolo | Università di Torino | 299 | 2997 |
| 11 | Hafedh Chourabi | Université Laval | 293 | 2259 |
| 12 | Andrea Zanella | University of Padova | 285 | 963 |
| 13 | Paolo Neirotti | Politecnico di Torino | 273 | 2524 |
| 14 | Renata Paola Dameri | University of Genoa | 262 | 2843 |
| 15 | Jung Hoon Lee | Yonsei University | 247 | 2626 |
| 16 | Hans Kramar | TU Wien | 241 | 2135 |
| 17 | Simon Elias Bibri | Norwegian University of Science and Technology | 239 | 1924 |
| 18 | Stephen Graham | Newcastle University | 229 | 1918 |

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|----|---------------|------------------------|-----|------|
| 19 | Luigi Atzori | University of Cagliari | 226 | 653 |
| 20 | Albert Meijer | Utrecht University | 225 | 2212 |

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