sustainability

MDPI

Article

A Bibliometric Diagnosis and Analysis about Smart Cities

Luis Miguel Pérez *,†, Raul Oltra-Badenes † and Juan Vicente Oltra Gutiérrez † and Hermenegildo Gil-Gómez †

Business Organization; Universitat Politècnica de València; 46022 Valencia, Spain; rauloltra@doe.upv.es (R.O.-B.); jvoltra@omp.upv.es (J.V.O.G.); hgil@ai2.upv.es (H.G.-G.)

* Correspondence: luipepe1@upv.es; Tel.: +34-667-389-232

† These authors contributed equally to this work.

Received: 29 June 2020; Accepted: 1 August 2020; Published: 7 August 2020

Abstract: This article aims to present a bibliometric analysis of Smart Cities. The study analyzes the most important journals during the period between 1991 and 2019. It provides helpful insights into the document types, the distribution of countries/territories, the distribution of institutions, the authors' geographical distribution, the most active authors and their research interests or fields, the relationships between principal authors and more relevant publications, and the most cited articles. This paper also provides important information about the core and historical references and the most cited papers. The analysis used the keywords and thematic noun-phrases in the titles and abstracts of the sample papers to explore the hot research topics in the top journals (e.g., 'Smart Cities', 'Intelligent Cities', 'Sustainable Cities', 'e-Government', 'Digital Transformation', 'Knowledge-Based City', etc.). The main objective is to have a quantitative description of the published literature about Smart Cities; this description will be the basis for the development of a methodology for the diagnosis of the maturity of a Smart City. The results presented here help to define the scientific concept of Smart Cities and to measure the importance that the term has gained through the years. The study has allowed us to know the main indicators of the published literature in depth, from the date of publication of the first articles and the evolution of these indicators to the present day. From the main indicators in the literature, some were selected to be applied: The most influential journals on Smart Cities according to the general citation structure in Smart Cities, Global Impact Factor of Smart Cities, number of publications, publications on Smart Cities around the world, and their correlation.

Keywords: smart city; intelligent city; public digitalization; knowledge-based city; bibliometrics

1. Introduction

This article presents an exhaustive review of the bibliography of Smart Cities with worldwide scope and over all time. The search for and gathering of data were performed considering that there were publications previous to the appearance and use of the term "Smart City" and the acknowledgement of the scientific community.The identification of this term's appearance was made by previous studies that were devoted to investigating the evolution of concepts and uses of other terms throughout history before "Smart City" became the most used term. The concept of the Smart City was used tacitly before being recognized as a term by the disciplines, institutions, and entities that work in the creation, study, and improvement of cities.

A bibliometric study offers a statistical description of scientific production. It tries to extract as much information as possible from the studied data set to offer researchers a complete and organized vision of the multidisciplinary scientific production of the subject matter studied.

The Smart City concept encompasses various areas of knowledge, that is, the Smart City is the result of the evolution and adaptation of technologies and knowledge of the sciences, as well as the strengthening and improvement of raw materials, but also the needs and challenges that society has imposed, such as security and efficient use of time and resources.

A bibliometric study allows knowledge of the figures of scientific production. These figures could be used to obtain from the various utilities, e.g., the identification and assessment of lines of research from expert researchers, from the most developed countries, or from the pioneers and the emerging ones in the subject, as well as the levels of citations and their evolution over time, etc.

The domains or dimensions that the concept of the Smart City encompasses are very diverse: Transport, architecture, governance, signage, storage and use of information, security schemes, citizen education, care for the environment, urban planning, and even food. In a short time, the whole society has contributed to the creation of environments where the reasons and ways of being of things are the product of the consideration of more factors and variables and the processing of more data. Nevertheless, for this study, the importance of all these themes is the same, centering the analysis on authors, institutions, and articles.

The purpose of this scientific document is to review and describe the bibliography generated around Smart Cities, considering all disciplines that have contributed to the development of cities and have led them to be what they are today.

In addition, this paper does not study the institutions the authors represented or the numbers of articles published; however, it does examine their research interests or fields. In scientific research, cooperation is regular. What kinds of authorship patterns and global/local partnership are found in the top journals? There are many grand theories and essential articles in every discipline. Which papers are now relevant core documents (most cited references) in the top journals? It is also necessary to identify the hottest new records in addition to understanding the core historical documents. Which new studies are the most popular, what are the most critical research directions or research, focusing on the top journals, and what are the changes in research directions between 1991–2019: The paper is organized as follows.

This document intends to update bibliometric studies applied to Smart Cities, complementing previous studies such as the one developed by Yi-Ming G. et al. [1] entitled "Bibliometric Analysis on Smart Cities Research". In addition, the article on bibliometrics of Smart Cities publications is the one presented by Ramaprasad et al. [2] (2017), and the one analyzing the evolution of Smart Cities during the last two decades is "The First Two Decades of Smart-City Research: A Bibliometric Analysis" (L. Mora et al. 2017 [3]).

This paper carries out a bibliometric analysis of the most critical journals from 1991 to 2019 to identify the principal authors, institutions, countries, and collaborations to determine the research interests of active researchers and research trends. It also examines some aspects not considered in reviews or previous studies, such as the most frequent countries and institutions in the top journals and the most productive authors in the top journals during the study period.

The article has four sections. The first section presents the literature review. The second section shows the methodology, which includes a description of the central concepts, tools, and limitations, and the third section presents the results of this bibliometric study. Finally, in the last section, the article presents deeply analyzed conclusions.

For a better understanding and contextualization for the reader, the definition of the Smart City is quoted below.

Smart City

A Smart City is a place where traditional networks and services are made more efficient with the use of digital and telecommunication technologies to benefit its inhabitants and businesses.

> *"Smart Cities" is a term denoting the effective integration of physical, digital, and human systems in the built environment to deliver a sustainable, prosperous, and inclusive future for its citizens (PAS 180:2014 Smart Cities—Vocabulary).*

The Smart City term is relatively recent; there are no articles about this written before 1990, and the first remarkable one was dated in 1991. Nevertheless, despite the tacit description of a Smart City, the term was not defined. Before the extensive use of Smart City, there are synonyms of Smart City that emerged and are also quoted today, such as: "Smart Cities", "Digital City", "Information City", "Intelligent City", "Knowledge-Based City", or "Ubiquitous City". The Smart City concept encompasses all other concepts, as shown in the (Table 1).

Table 1. Identification of main terms.

Document Types	Records
Smart Cit*	10,357
Smart Cities	7818
Intelligent City	2300
Digital City	6416
Knowledge-Based City	1183
Ubiquitous City	2456

In Smart Cit*, the asterisk represents any group of characters, including the absence of characters.

According to Albino et al. [4], the first use of the term Smart City was in 2007.

The idea of Smart Cities is rooted in the creation and connection of human capital, social capital, and information and communication technology (ICT) infrastructure to generate a more remarkable and more sustainable economic development and a better quality of life.

The concept of the Smart City advances with the advancement of different technologies, mainly information and communication technologies. Humans take advantage of the convergence of these technologies to improve their quality of life.

This advancement of technologies implies the change of the term of what is known as a Smart City. According to the European Commission,

> *A Smart City goes beyond the use of information and communication technologies (ICT) for better resource use and fewer emissions. It means smarter urban transport networks, upgraded water supply, and waste disposal facilities, and more efficient ways to light and heat buildings. It also means a more interactive and responsive city administration, safer public spaces, and meeting the needs of an aging population* (https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en).

The concept of the Smart City has become the purpose of many cities in the world because of the interest in transforming communities into places to foster human welfare, the saving and efficient use of energy, and rational use of resources, something associated with the human desire for progress. These large urban concentrations, whose operation requires highly advanced technological solutions, have an increasing amount of information.

This study goes about Smart Cities research through the Web of Science (WoS) database, identifying the most critical advances in the field classified by authors, articles, journals, universities, institutions, and countries.

With the development of technology, there are more and more resources for handling more extensive amounts of data, which are known instantly and facilitate decision-making in urban environments. It will be common to use geospatial dashboards, such as those exposed by Changfeng, J. et al. [5]. The use of Smart Dashboards allows the sustainable development and management of urban centers and the natural reserves surrounding them, always seeking a balance between the exploitation of resources to supply the cities without irremediable effects on nature.

Another critical factor is the availability of information for all agents present in Smart Cities—citizens, rulers, businesses, and other actors. The opening of data will influence people's way of life, according to Chengming, L. et al. [6].

This document's structure encompasses a literature review, definition and explanation of the methodology, results and discussion, and conclusions. The article includes an appendix with 300 of the most cited papers on Smart Cities.

2. Literature Review

Bibliometrics is an essential field of information; the literature presents many examples in many fields, such as medicine, accounting (e.g., Merigó, V. et al. 2019 [7]), and, recently, in new areas, such as information technology, electronics, and telecommunications (for instance, Garg et al. [8] or Metse et al., 2017 [9]). It is very beneficial in organizing available knowledge within a specific scientific discipline. The literature on technology and Smart Cities grows in line with its advancement. The literature on the theory of bibliometrics and its tools has increased across the years to make it more accurate and useful in describing literature. Some essential articles analyzed are presented below to explain the considerations and ideas taken from them to create this article.

The results show that bibliometrics is proper to a complete area of knowledge, a comprehensive database, a specialized journal or publishing house, or a specific subject, topic, or issue. The use of bibliometrics is versatile and diverse, as demonstrated in this literature review, which was also developed by using the Web of Science (WoS).

Many articles explore the definition of bibliometrics and its development until becoming a research tool. These articles go through a description of bibliometrics; for instance, Broadus, R.N. [10] defines the objectives, methodologies, tools, and other aspects of bibliometrics. As a second example, we present the article proposed by Hood, W.W. et al. [11], entitled "The Literature of Bibliometrics, Scientometrics, and Informetrics Analysis". Another fundamental article is the one written by White, H.D. [12], entitled "Bibliometrics". This paper presents a study focused on information processing and retrieval.

When making a search in WoS, some special studies appear, some of them gathering, sorting, and analyzing large amounts of information to elucidate interesting figures and statistics deserving to be highlighted. For instance, the article "A Bibliometric Chronicling of Library and Information Science's First Hundred Years Review", by Lariviere, V. [13], examines in detail the variable rate of knowledge production.

Other articles focus on the advancement and evolution of bibliometrics; for instance, the paper presented by Thelwall, M. [14], "Bibliometrics to Webometrics". This article analyzes the evolution of bibliometrics since 2008 and the rising of a new term in the time of digitalization. In addition, in the article "Informetrics at the Beginning of the 21st Century—A Review", in which the author, Bar-Ilan, J. [15], reviews developments in informetrics between 2000 and 2006.

Some researchers are specialized in the theorization, modernization, and improvement of bibliometrics, discovering issues and areas for improvement, and taking it to higher levels; for example, the article "Bibliometrics Theory, Practice, and Problems (Narin, F. et al. [16])", published in 1994, presents a view supporting bibliometric techniques.

Other studies are focused on proposing methods for sorting and analyzing data. For instance, Zupic, I. et al. [17] wrote the article "Bibliometric Methods in Management and Organization: Bibliometric Methods of Citation Analysis, Co-Citation Analysis, Bibliographical Coupling, Co-Author Analysis, and Co-Word Analysis". In this category, another example is the article "Bibliometrics, Citation Analysis, and Co-Citation Analysis: A Review of the Literature", which reviews citation analysis as one of the significant methods of bibliometrics, presenting its background and applications, and was written by Osareh, F. [18]. In addition, there is the article "Growth Rates of Modern Science: A Bibliometric Analysis Based on the Number of Publications and Cited References". In this last article, Bornmann, L. et al. [19] use an advanced statistical technique—segmented regression analysis—to identify specific segments with similar growth rates in the history of science.

Some of the articles are dedicated to a wide area of knowledge, such as the article proposed by Merigo, J. M. et al. [20], "An Overview of Fuzzy Research with Bibliometric Indicators", which presents a general overview of research in fuzzy science and logic using bibliometric indicators. Another example is the article "Fuzzy Decision Making: A Bibliometric-Based Review", which analyzes the main contributions in fuzzy decision-making by using bibliometrics (Blanco-Mesa, F. et al. [20,21]).

Bibliometric analysis reviews and classifies bibliographic material quantitatively. In recent years, it has become prevalent to assess the art of a scientific discipline, chiefly motivated by the development of computers and the internet. For instance, the article "Toward a Basic Framework for Webometrics" by Bjorneborn, L. [22] developed a consistent and detailed link typology and terminology, and made explicit the distinction among different web node levels when using the proposed conceptual framework, informetrics, and bibliometrics.

The article "Electronic Books: A Scientometric Assessment of Global Literature during 1993–2018" reviews the articles published between 1993 and 2018 regarding electronic books, which are defined as electronic resources available through the internet and readable by various types of electronic devices. The author describes the analysis of a series of indicators, such as the most productive countries, the most productive institutions, and organizations. The data set includes 2116 publications made in the mentioned period [23].

Bibliometrics is a tool extensively used in areas such as medicine; for instance, in the article "Application of Bibliometrics in Medicine: A Historical Bibliometrics Analysis", the authors, Kokol, P. et al. [24], reviewed publications related to the application of bibliometrics in medicine from 1970 to 2018 that were harvested from the Scopus bibliographic database.

Another example by Michalopoulos, A. [25], "A Bibliometric Analysis of Global Research Production in Respiratory Medicine", analyzes articles from 30 journals included in the Respiratory System category of the Journal Citation Reports database over nine years (1995 to 2003). Through multivariate regression analysis, Lefaivre, K. A. [26] analyzes "100 Most Cited Articles in Orthopaedic Surgery".

Kelly, J. C. [27] proposes "The 100 Classic Papers of Orthopaedic Surgery: A Bibliometric Analysis". This article analyzes articles from the Science Citation Index database of the Institute for Scientific Information that were published between 1945 and 2008.

Below, other examples of bibliometrics in medicine are cited.

As mentioned above, bibliometrics allows the analysis of long periods of specific themes, reading, and extraction from literature, as well as its evolution, such as in the article "The 100 Most-Cited Articles on Prenatal Diagnosis: A Bibliometric Analysis", which presents an analysis of the articles published between 1900 and 2018. The first 100 articles, published between 1972 and 2015, have an average of 332.7 citations. The following variables were reviewed for each of these articles: Journal name, year of publication, country, institution, total citations, citation density, *h*-index, research field, article type, and keywords [28].

Regarding the types of conclusions stated by previous researches on bibliometrics, one example is the article "Bibliometric Analysis of Oncolytic Virus Research", which, taking articles from 2000 to 2018, analyzes the production of a method for the treatment of cancer. The study concluded that scientific production went from 10 publications in 2000 to 199 publications in 2018, and identified the countries and institutions with the highest production, the top 15 academic journals, and their specialties. The most highly cited papers in this bibliometric study identify the top four hot-spots in oncolytic virus research [29].

One of the interests in developing this literature review was to understand how the *h*-index is used to describe a study statistically, and this is the case of the article "The Use of the *h*-Index in Academic Otorhinolaryngology", by Svider, P. F. et al. [30]. This article calculates the *h*-index of faculty members from 50 otolaryngology residency programs.

The *h*-index is also used in the analysis of a specific discipline, such as in the article "Scientific Publications in Dentistry in Lithuania, Latvia, and Estonia Between 1996 and 2018: A Bibliometric Analysis", which determined the number and quality of scientific publications in dentistry from

the Baltic countries of Lithuania, Latvia, and Estonia between 1996 and 2018 using bibliometric analysis. In qualitative terms (citation rate and *h*-index), the article ranked highest the countries with which authors from these countries collaborated, as well as the main journals and authors [31]. Furthermore, Ahmad, P. et al. [32], proposed the article "A Bibliometric Analysis of Periodontology 2000". Periodontology 2000 is a publication of 100 articles produced by eminent researchers and clinicians from many dental institutions and countries.

Bibliometrics can also be used simultaneously with other tools, as in the article "Text Mining Using Database Tomography and Bibliometrics: A Review", which describes the Database Tomography (D.T.), a textual database analysis system consisting of two major components: Algorithms for extracting multi-word phrase frequencies and phrase proximity and the interpretative capabilities of the expert human analyst, proposed by Kostoff, R.N. [33].

Some publications use bibliometrics as a part of a methodology, e.g., the article "Evaluating 'Payback' on Biomedical Research from Papers Cited in Clinical Guidelines: Applied Bibliometric Study". This article presents the development of a methodology for evaluating the impact of the research on health care (Grant, J. et al. [34]). In addition, in the article entitled "Bibliometric Analysis of Global Trends for Research Productivity in Microbiology" presents a bibliometric analysis of publications between 1995 and 2003 on microbiology (Vergidis, P.I. et al. [35]).

Some articles are focused on or limited to only one journal or magazine, and even when the focus is the same unique magazine, each author uses and combines different tools according to their needs.

For instance, articles on engineering use graphic tools; e.g., the article "Bibliometric Study of the Journal *Ingeniería* (2010–2017)" analyzes the complete bibliography and authors considering productivity, authorship, citation, subject, and geographic coverage, along with collaboration networks, thematic conceptual maps, and impact metrics. *Ingeniería* is a scientific journal edited in Colombia by Universidad Distrital Francisco Jose de Caldas. This publication reviews more than 144 papers [36].

Bibliometrics could also be used to measure changes; e.g., the article "Trends and Changes in *Thunderbird International Business Review*", written by Ratten, V. et al. [37]. *Thunderbird International Business Review* is amongst the most influential journals in the field of international business studies. Another example in this type of study is the one focused on the evolution of knowledge, e.g."Fifty Years of the Financial Review: A Bibliometric Overview" written by Baker et al. [38].

There is also the case of articles focused on several journals, such as "A Bibliometric Analysis of the Conversion and Reporting of Pilot Studies Published in Six Anaesthesia Journals" by Charlesworth, M. et al. [39], or the one written by Van Noorden, R. et al. [40] analyzing the top 100 most cited research papers of all time.

Articles proposing comparisons are also available; e.g., the article "Bibliographic and Web Citations: What Is the Difference?" by Vaughan, L. [41], which presents the differences between these concepts by comparing 46 journals in library and information science, or the article "Interdisciplinary Research by the Numbers", written by Van Noorden, R. [42], which analyzes the interactions among several disciplines (143 specialities) and their impacts in science.

There are also articles comparing authors and magazines simultaneously; e.g., "A Bibliometric Analysis of Articles Identified by Editors as Representing Excellence in Nursing Publication" analyzes subsequent citations of articles identified by editors as reflecting excellence in nursing literature and a companion dataset from the same journals comparing the concepts of reach, persistence, and dissemination in these two datasets (Nicoll, L.H. et al. [43]).

Bibliometrics is also consistently used in engineering and science.

Some articles focus on particular topics; e.g., the article entitled "Comprehensive Analysis of Energy Management Strategies for Hybrid Electric Vehicles (HVes) Based on Bibliometrics" written by Zhang, P. et al. [44] quantitatively analyzes the current research status of energy management strategies of HVes.

Some articles use only some tools of bibliometrics; e.g., the article "Using Data-Sets from the Web of Science (WoS)". This study conducts a co-word analysis of 1971 publications on customer relationship

management from East Asia, North America, and Europe and uses WoS as the source (written by Liu, W. et al. [45]). Another article classified in this category is the article "Bibliometrics and Beyond: Some Thoughts on Web-Based Citation Analysis", which presents in-depth research on citation analysis and the evolution from the citation index to the bibliometric spectroscopy concept (written by Cronin, B. [46]). In this category, we can include the article "Bibliometric Indicators: Quality Measurements of Scientific Publication" by Durieux, V. [47], which provides an overview of the currently used bibliometric indicators and summarizes the critical elements and characteristics that one should be aware of when evaluating the quantity and quality of scientific output. Other examples in this category are the articles proposed by Guerola-Navarro V. [48], Vicedo, P. [49], and Gil-Gómez H. [50] as studies preceding an industrial process optimization.

There are bibliometric studies for forecasting based on the evolution of publications across the years; e.g., the article "Forecasting Emerging Technologies: Use of Bibliometrics and Patent Analysis" by Daim, T.U. [51] makes forecasts for three emerging technology areas by integrating the use of bibliometrics and patent analysis into well-known technology forecasting tools, such as scenario planning, growth curves, and analogies.

Other studies use other databases but the same tools; e.g., the article entitled "The Eigenfactor algorithm and Impact Factor (IF)", published online in Journal Citation Reports as part of the ISI Web of Knowledge, which was also analyzed by Fersht, A. [52] in the article "The Most Influential Journals: Impact Factor and Eigenfactor". The analysis of other indexes with the WoS is also convenient, as in the article "Mapping of Drinking Water Research: A Bibliometric Analysis of Research Output during 1992–2011", where Fu, H. et al. [53] present a bibliometric analysis based on the Science Citation Index Expanded from the WoS. The article provides insights into research activities and tendencies of global drinking water from 1992 to 2011. The author also applied the procedure in the article "A Bibliometric Analysis of Solid Waste Research during the Period 1993–2008". The authors, Fu, H.Z. et al. [54], analyze aspects including document type, language, and publication output as well as the distribution of journals, subject category, countries, institutes, title-words, and author.

From articles mentioned in the last paragraph and many of the articles reviewed, the average period of bibliometrics studies is twenty years. For instance, the text of "Global Urbanization Research from 1991 to 2009, A Systematic Research Review", written by Wang, H. et al. [55], analyzes scientific outputs, subject categories, significant journals, international collaboration, geographic distribution, and temporal trends in keyword usage in urbanization.

Other articles also based in the Web of Science have allowed us to define the methodology; e.g., the text of the article "The Bibliometric Analysis of Scholarly Production", which is an article studying the ways that institutions and universities of science are ranked worldwide (written by Ellegaard, O. [56]). However, reviewing the literature on bibliometrics has allowed for the definition of the information to be gathered, the contents of tables, the period, and the other main aspects. However, the review of these approximately fifty articles also led to the construction of the methodology presented in the following paragraph.

3. Methodology

There is no previous methodology describing a standardized procedure indicating the number of papers as proper regarding the number of published or referenced papers in a specific database, the structure of matrices and tables, or specific indicators. The methodology presented here was defined from the ideas, analyses, and conclusions of previous research presented in the literature review section—the main factor considered for the definition of a statistically significant sample that guarantees representative results. The methodology was determined after reviewing data and noting that the distribution of the number of citations is concentrated in a few articles. With the support of the conclusions in these articles, we determined that the more representative variables are the number of works published, citations, the Impact Factor (IF), and the *h*-index. Thus, if a set of papers has an

h-index of 30, it means that at least 30 papers have each received 30 citations or more. This measure combines the number of papers with citations [20].

The data were obtained from a query of the WoS database, one of the most important databases in the world, which guarantees the representativeness of the data. A series of indicators accepted to analyze the data and used by researchers of high relevance in the field of bibliometrics were used. Although the database does not include all the journals and all the articles written at all times, the most impactful journals specialized in the areas related to Smart Cities are found in the WoS.

Regarding authorship, this research aims to identify mainly productivity, identifying those authors who publish the highest numbers of papers independently, whether these papers are single-authored or not.

The primary materials used in this research are data lodged in the WoS Database and tools incorporated into the WoS system for the classification and analysis of data. The method used could be described as the organization of these data in tables to try to get valuable information that could help readers know the evolution of research on the Smart City so far through analysis of statistics.

The first step was to select the databases to be used for the recovery of the articles. Databases gathering sciences and areas of knowledge related to the theme studied and most relevant were selected: Academic Search by EBSCO Publishing, Arnetminer (Aminer) by the German Archaeological Institute and the University of Cologne, the Scopus abstract and citation database of peer-reviewed research literature, the Science Citation Index (SCI), Social Sciences Citation Index (SSCI), and Humanities Citation Index (A&HCI) of the Web of Science (WoS),the Association for Computing Machinery, and the Digital Library of IEEE Xplore. After reviewing the previous articles, functionality, and availability of databases, the Web of Science was chosen as the tool for data recovery and analysis.

The Web of Science (WoS) is a platform based on web technology that gathers the references of the prominent scientific publications of any discipline of knowledge—scientific, technological, humanistic, or sociological—essential for the support of research and the recognition of the efforts and advances made by the scientific and technical community.

The second step was the identification of the type of documents to be analyzed. There are many types of publications: Articles, meetings, books, reviews, editorials, clinical trials, corrections, letters, data papers, biographies, and retracted publications. Nevertheless, many of them are discarded for this study because only those that introduce a scientific contribution are taken into account: Articles, reviews, notes, and letters.

A scientific text is a written production that addresses theories, concepts, or any other subject based on scientific knowledge through a specialized technical language. It should be emphasized that scientific publications represent more than 50% of all publications. Table 2 presents the types of documents or formats in which the information is presented.

The search "Smart Cit*" retrieves 17,774 documents. Using filter tools and limiting the types of documents to articles, books, and reviews, the number of documents retrieved is 10,357 (58% of total records).

The analysis was focused on the results obtained from "Smart Cit*" referred to in articles, books, and reviews. The search term that was selected by its statistical frequency was Smart City.

The third step was the revision of articles on bibliometrics and selection of indicators, a combination of variables to get an appropriate analysis.

The top five journals all publish articles in all areas of technology rather than in a particular branch. Therefore, this article analyzes publications in the five journals as a dataset in this study. The sample-set is composed of the documents that were published by the five journals.

The Web of Science (WoS) database provides users access to a wide range of bibliographic and citation information from articles published in international journals over a long period.

Articles were reviewed to select the most proper database, which is to say the database with more resources, available data, and tools to facilitate the comparison and analysis according to the criteria of time, authors, and publishers.

Table 2. Document types.

Document Types	Records	% of 17,774
Article	9090	51
Meeting	8529	48
Book	809	5
Review	458	2
Editorial	407	2
Other	269	2
News	37	0
Unspecified	35	0
Clinical trial	18	0
Letter	12	0
Data paper	8	0
Early access	6	0
Correction	11	0
Biography	4	0
Art and Literature	2	0
Retracted Publication	2	0
Bibliography	2	0
Case Report	2	0

The WoS database collection indexes documents of different types, namely, articles, reviews, proceedings papers, editorial material, and book reviews, in various languages.

The fourth step was defining the period representative and useful for accomplishing the research objectives. This study collects and analyzes documents of all types that were written in English between 1991 and 2019.

The "analyze the results" tool of the Web of Science (WoS) database allows for classifications of "authors", "countries", "document types", "organizations", "publication years", and "source titles". The WoS also has the "create citation report" tool, which allows the collection of information relating to the "sum of the times cited" and "average citations per item".

The versatility of the analysis tools of the Web of Science allows filtering of the data to obtain the most detailed data possible. So, it is possible to know the organized data in the way that is needed for the analysis that we want to develop: We want to select from the search for the leading publications and know from them the number of citations and publications in the field of Smart Cities to establish a distribution of the number of publications with a minimum number of citations (at least 200, 100, or 50), as well as the *h*-index and the Impact Factor (IF). This procedure can be replicated, but taking institutions and countries as variables, rather than publications.

The Web of Science also allows distribution of publications to know the data from a temporal perspective, that is, classifying the number of publications each year, determining the number of publications for each one, and making a comparison with the years $n - 1$ and $n - 2$ and their respective Impact Factors.

For data analysis, Microsoft Excel (2019) was used. The tables were created and distributed in a comprehensive dashboard, facilitating analysis and contrast among them. The WoS database allows the researcher to download the data in text format, which can be transferred to tools such as Microsoft Excel (2019) and Microsoft Power BI (Pro) to create a dynamic dashboard. Through tables, graphs, and dynamic tables, the data are classified and organized to extract the main conclusions.

> *The Impact Factor (IF) is a measure of the frequency with which the average article in a journal has been cited in a particular year. It is used to measure the importance or rank of a journal by calculating the times its articles are cited* (https://clarivate.com/webofsciencegroup/essays/impact-factor/).

The main 300 articles were ranked in terms of numbers of articles published by a specific magazine regarding Smart Cities; the magazine with the most articles published is considered as the most important and the first one.

Previously to the analysis, the data were treated to eliminate duplicity.

Duplicates

It was necessary to identify and analyze the possible duplicity of values in two specific variables: Countries and journals. When analyzing these variables, among the main countries, China (first place) and People's Republic of China (second place) were referenced; also in the case of journals, *Sensors* of Basel, Switzerland and *Sensors* as a Journal from MDPI are the same reviews. Finally, it was demonstrated that there is no duplicity when both terms are selected for refining the results, as the system shows the real number of articles.

Another case of often-recurring duplicates is the appearance of the United Kingdom and England.

In addition, a productive and influential institution is found by not only the publications of its researchers, but also by the collaborations with researchers from other institutions.

4. Results and Discussion

This section presents the results obtained by the implementation of the methodology exposed in the previous section. The figures and tables are based on the data retrieved from WoS for the most prolific authors, institutions, and countries regarding Smart Cities. The tables and the figures are based on the aforementioned variables, both individually and as matrices, resulting in a combination of them.

The results are finally summarized in the following tables and figures: Document types (Table 2, presented in the methodology section (Section 3)), identification of main terms (Table 1, also mentioned in Section 3), most influential journals on Smart Cities according to the WoS (Table 3), general citation structure in Smart Cities (Table 4), global impact factor of Smart Cities (Table 5), number of publications ("Smart Cit*") (Figure 1), Smart Cities publications around the world (Figure 2), the most productive and influential institutions (Table 6), the most productive countries in Smart Cities (Table 7), the most productive and influential authors (Table 8), authors with the highest numbers of papers in the top four journals (Table 9), institutions with the highest numbers of papers in the top four journals (Table 10), the most productive countries and journals in Smart Cities (Table 11), and the 300 most cited papers on Smart Cities of all time (Table A1) .

As shown in the Table 4, only four articles have been cited more than 500 times in all time, and two between 2011 and 2019. These articles, presented in Table 4, have all been published in the last decade, the oldest of them dating from 2009, and the most recent of 2019 is the most cited of all time.

As shown in Table 5, the scientific production of the decade between 2010 and 2019 is 20 times higher.

The years 2016 and 2017 are the years with the highest Impact Factors and the most productivity.

In terms of the first factor considered in the bibliometric studies, as seen in Figure 1, for the geographical distribution of the scientific production, the United States (1567 articles) and China (1224 articles) stand out as the most relevant countries. Nevertheless, if the European Union is considered a whole, it stands out as the geographical area with the highest scientific production in the field of Smart Cities (6640 articles), followed by the United States and Canada, which have produced more than 2500 articles on this subject. On the other hand, Russia, one of the most advanced countries, is one of those lagging behind among the most relevant countries regarding Smart Cities.

Figure 1 presents the distribution of the contributions of countries to the debate around Smart Cities, This figure shows the most prolific European countries in the field of Smart Cities. Italian researchers have published more than 800 articles, followed by Spain with more than 700 articles published, and by researchers in the United Kingdom with more than 650 articles. After Europe and the United States, the largest scientific production is located in Asia. Countries like India, China, and Japan have produced more than 1200 articles.

Country	Record Count
USA	1567.00
CHINA	1224.00
ITALY	800.00
SPAIN	709.00
ENGLAND	657.00
INDIA	448.00
AUSTRALIA	419.00
CANADA	329.00
SOUTH KOREA	323.00
GERMANY	320.00
UK	319.00
NETHERLANDS	259.00
FRANCE	245.00
BRAZIL	214.00
GREECE	174.00
PORTUGAL	169.00
JAPAN	163.00
SAUDI ARABIA	148.00
PAKISTAN	145.00
SWEDEN	141.00
TAIWAN	125.00
FINLAND	118.00
RUSSIA	114.00
SWITZERLAND	114.00

Figure 1. Publications on Smart Cities around the world.

Table 3. The most influential journals on Smart Cities according to the Web of Science (WoS).

R	Name	T300	%TC	TP	*h*-Index	>200	>100	>50	Y	Vol	IF
1	Sensors (Basel)	4	1550	1596	19	0	1	2	2010	10	2.475
2	IEEE Access	9	1359	2596	22	0	1	2	2013	3	3.557
3	Sust.	0	623	673	13	0	0	2	2011	1	3.073
4	Sust C.S.	3	479	1341	17	1	1	3	2014	37	4.639
5	Future G.	5	609	424	10	0	0	0	2011	7	0
6	IEEE Commun.	18	602	2216	26	2	4	15	2011	49	9.270
7	IEEEITJ	8	538	424	10	0	0	0	2016	0	0
8	Cities	8	329	85	4	0	0	0	2009	62	0
9	Future I.	2	531	250	9	0	0	0	2011	6	0
10	J. Clean. Prod.	3	427	48	3	0	0	0	2010	26	0
11	Ad21hs	0	510	114	6	0	0	0	2014	248	0
12	Techno.	5	488	2875	17	3	4	6	2014	1	5.874
13	Energies	2	474	1584	18	1	4	6	1999	16	2.704
14	JUT	4	410	42	3	0	0	0	2014	248	0
15	IEEETITS	1	410	631	12	0	1	3	2013	54	5.651
16	SESC	0	512	750	13	0	2	5	2012	69	3.131
17	GIQ	1	323	472	13	0	2	5	2012	49	6.430
18	PMC	0	735	345	13	0	2	5	2012	59	2.769
19	EB	2	951	623	13	0	2	5	2012	63	4.495
20	IEEEIC	2	1301	750	13	0	2	5	2012	79	1.929

Abbreviations: R = Rank; TC and TP = Total citations and papers; >200, >100, >50 = number of papers with more than 200, 100, and 50 citations; Y = Year when the journal was included in WoS; Vol. = First volume included in the WoS; IF = Impact Factor 2012; 5-IF = five-year Impact Factor 2012; T300 = Number of papers in the Top 300 list. (1) Sensors (Basel) = Sensors, (2) Access = IEEE Access Journal, (3) Sust. = Sustainability, (4) Sust. C. S. = Sustainable Cities and Society, (5) Future G. = Future Generation Computer Systems of the International Journal of eScience, (6) IEEE Commun. = IEEE Communications Magazine, (7) IEEEITJ = IEEE Internet of Things Journal, (8) Cities = Cities Journal Elsevier, (9) Future I. = Future Internet, (10) J. clean. prod. = Journal of Cleaner Production, (11) Ad21hs = Advances in 21st Century Human Settlements, (12) Techno = Technological Forecasting and Social Change, (13) Energies = Energies, (14) JUT = Journal of Urban Technology, (15) IEEETITS = Transactions on Intelligent Transportation Systems, (16) SESC = Smart Economy in Smart Cities, (17) GIQ = Government Information Quarterly, (18) PMC = Pervasive and Mobile Computing, (19) EB = Energy and Buildings, (20) IEEEIC = IEEE Internet Computing.

Figure 2 shows the annual number of publications around the Smart Cities theme.

Between 2015 and 2018, there was a great leap, and more than a thousand articles were published. In 2017, 1652 articles were published, which represents 614 articles more than the previous year.

Table 4. General citation structure in Smart Cities.

Citations	All time		2011–2019	
	Number of Papers	% of Papers	Number of Papers	% of Papers
≥500 citations	4	0	2	0
≥200 citations	21	0	21	2
≥100 citations	68	1	69	5
≥50 citations	354	4	74	5
≤50 citations	7950	95	7725	96
Total	8397	100	7981	100

Table 5. Global Impact Factor for Smart Cities.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
TP	86	145	194	253	403	699	1036	1643	2981	2342
TC	4267	3674	4121	5044	10219	9206	9733	9531	5466	9435
TC2	2744	6616	9151	9205	1893	19,308	25,790	27,125	31,224	30,342
TP2	111	136	229	343	451	661	1119	1749	2690	3661
IF	24.720	48.640	39.960	26.836	24.152	29.210	23.047	15.508	11.607	8.287

Abbreviations: TP = Total number of papers published in year n; TC = Total number of citations received from papers published in year n; TC2 = Total citations received in year n − 1 and n − 2 from year n; TP2 = Total number of papers published in year n − 1 and n − 2; IF = Impact Factor of year n (IF = TC2/TP2).

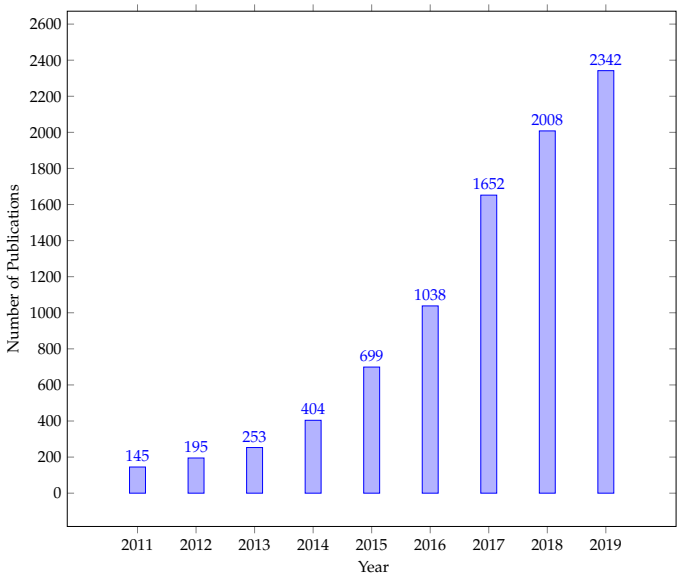

Figure 2. Annual number of publications.

Table 6 presents the most productive institutions in terms of Smart Cities. It summarizes the Total Papers (TP) and the Total Citations (TC) in journals indexed in WoS; >200, >100, and >50 = the number of papers with more than 200, 100, and 50 citations. It also summarizes the number of papers, their citations in the last ten years (P10Y and C10Y, respectively), and the Impact Factor (IF). Note that only one institution from the United States is among the most relevant, while five institutions from Italy and four from China are there. China is the country with the most citations in this table, while England and Italy are essential from the perspective of most cited institutions.

Table 7 presents the most productive countries in terms of Smart Cities. It summarizes TP and TC (total papers and citations in journals indexed in WoS, respectively), the numbers of papers with more than 200, 100, and 50 citations (>200, >100, >50), P10Y and C10Y (number of papers and their citations in the last ten years), and the Impact Factor (IF).

Within the first 300 articles published, the publications with the most records are *IEEE Communications Magazine* with 18 publications (6% of the total) and *IEEE Access* with 9 publications (3% of the total). Another magazine of remarkable importance is the *IEEE Internet of Things Journal*. The oldest publication within the first 300 articles, that is to say, with the highest number of citations, dates from 1991, and the most recent one from 2018.

Table 6. The most productive and influential institutions.

Institution	Country	TP	TC	H	>200	>100	>50	TP4	TC4
CAS	China	121	1825	21	1	2	2	19	154
UL	England	90	1880	18	0	1	2	7	277
CNR	Italy	74	916	13	0	1	2	9	74
ACAD	China	121	1825	21	0	0	0	19	154
PUM	Italy	55	1385	14	1	1	3	4	34
PUT	Italy	46	1488	11	0	0	2	5	50
MIT	US	60	893	15	0	0	0	4	31
UB	Italy	59	1474	16	2	4	15	5	101
IIT	India	58	504	11	0	0	0	2	7
UNFII	Italy	52	1072	12	0	0	0	8	77
Delft	Netherlands	49	791	15	1	1	1	3	15
Wuhan	China	53	729	14	0	0	0	7	47
CNRS	France	49	645	10	0	0	0	4	17
Tsinghua	China	48	563	13	3	4	6	8	134
UCL	England	45	1097	13	1	4	6	2	21
USG	Norway	42	500	10	1	1	3	6	371
UPV	Spain	42	562	12	0	0	0	12	141
UU	Netherlands	45	838	15	0	1	3	0	0
UNSWS	Australia	46	347	10	0	2	5	5	56

Abbreviations: TP4, TC4 = Total papers, citations in the top four journals; >200, >100, >50 = the number of papers with more than 200, 100, and 50 citations; TP, TC, and H = Total papers, citations, and *h*-index in journals indexed in WoS. CAS = Chinese Academy of Sciences, UL = University of London, CNR = Consiglio Nazionale delle Ricerche, ACAD = Chinese Academy of Sciences, PUM = Polytechnic University of Milan, PUT = Polytechnic University of Turin, MIT = Massachusetts Institute of Technology, UB = University of Bologna, IIT = Indian Institute of Technology, UNFII = University of Naples Federico II, Delft = Delft University of Technology, Wuhan = Wuhan University, CNRS = Centre National de la Recherche Scientifique, Tsinghua = Tsinghua University, UCL = University College London, USG = Norwegian University of Science, UPV = Universitat Politècnica de Valéncia, UU = Utrecht University, UNSWS = University of New Wales, Sydney.

Table 7. Performance of the most productive countries in Smart Cities.

Rank	Country	TP	TC	h-index	>200	>100	>50	TP4	TC4	P10Y	C10Y
1	U.S.A.	1354	27,104	74	2	2	150	0	0	1256	22,530
2	China	252	6714	36	0	1	2	284	2907	1132	15,679
3	Italy	740	14,534	45	0	1	2	101	101	730	14,365
4	Spain	679	7821	38	0	0	0	152	1212	677	7546
5	England	614	13,557	49	1	1	3	71	904	603	10,586
6	India	421	2927	27	0	0	2	35	368	439	2896
7	Australia	394	6235	39	0	0	0	354	3616	387	6120
8	Germany	291	6264	29	2	4	15	35	201	286	3325
9	Canada	317	6180	41	0	0	0	53	569	310	5895
10	South Korea	305	4743	34	0	0	0	82	592	303	4730
11	France	248	3283	32	1	1	1	15	89	216	2965
12	Netherlands	274	4841	28	0	0	0	12	52	274	4841
13	Brazil	235	1178	17	0	0	0	32	197	235	1178
14	Greece	179	3007	23	3	4	6	21	201	158	3003
15	Portugal	178	1393	17	1	4	6	24	142	157	1366
16	Japan	160	1047	17	1	1	3	21	229	141	1027
17	Saudi Arabia	145	1722	23	0	0	0	61	549	145	1722
18	Sweden	127	2209	22	0	1	3	16	66	125	2180
19	Taiwan	112	1138	20	0	2	5	28	308	108	1323

Abbreviations: TP4 and TC4 = Total papers and citations in the top four journals; TP and TC = Total papers and citations in journals indexed in WoS; >200, >100, >50 = Number of papers with more than 200, 100, and 50 citations; P10Y and C10Y = Number of papers and their citations in the last ten years; Y = Year of publication. Note that China includes Hong Kong and Taiwan.

Table 8. The most productive and influential authors.

Name	Country	TC4	H4	TP4	TCA	HA	TPA	TC	H	TP	T300
Zhang, Y.	China	39	3	5	287	10	36	287	10	36	5
Wang, Y.	China	0	0	0	222	8	25	229	8	28	9
Liu, Y.	China	41	3	4	356	10	27	348	10	26	5
Lee, S.	China	26	3	6	306	6	21	309	6	25	1
Li, Y.	China	3	1	1	238	7	22	239	7	27	45
Choo, K.K.R.	China	0	0	0	327	10	22	321	9	23	4
Munoz, L.	Spain	77	4	7	587	10	18	582	10	19	4
Wu, J.	China	77	3	5	201	7	18	191	7	20	8
Dameri, R.P.	Italy	0	0	0	219	8	17	217	8	17	45
Kumar, N.	India	0	0	0	325	11	22	325	11	22	9
Song, H.B.	China	346	5	7	572	11	17	570	11	17	6
Kantarci, B.	Italy	197	5	7	447	11	18	443	11	18	41
Yigitcanlar, T. A.	Australia	15	1	2	473	12	21	473	12	21	4
Zhang, H.	China	18	3	6	126	6	17	125	6	21	3
Houbing, S.	U.S.A.	399	6	6	626	12	16	623	12	16	4
Li, J.	China	420	7	8	342	8	21	342	8	21	4
Carvalho, L.C.	Portugal	399	6	6	9	2	14	9	2	14	4
Lee, J.	China	0	0	1	211	7	11	214	7	14	6
Liu, X.	China	99	2	2	221	9	14	280	10	16	5
Mehmood, R.	Saudi Arabia	123	4	6	315	12	15	308	12	16	7
Ratti, C.	Italy	0	0	0	204	9	15	221	10	16	7
Wang, J.	China	3	1	3	217	7	20	216	7	20	13
Chen, X.	China	45	3	3	136	7	14	136	7	14	4
Alba, E.	Spain	2	1	1	58	4	14	58	4	14	4
Kim, J.	China	32	1	3	138	5	15	141	5	19	5

Abbreviations: R = Rank; H4, TC4, and TP4 = Total papers, citations, and H = *h*-index in the top four journals; HA = *h*-index in all the science journals; TPA and TCA = Total papers and citations in journals indexed in WoS; TP, TC, and H = Total papers and citations; T300 = Number of papers in the Top 300.

The articles revealed by the "Smart Cit*" search have 92,534 citations, of which the first 44,277 correspond to the 300 most cited. This latter figure corresponds to almost 48% of the total citations.

Concerning the years of publication, the publications were made mainly between 2010 and 2018. Two hundred forty-two publications (out of 300) were published during these years.

Considering the results as a whole, there is a strong correlation between academia, industrial development, and the strengthening of Smart Cities.

The number of articles and citations is low compared with other topics; however, the results in this research demonstrate that Smart Cities are becoming a transcendental subject in the current scenario of societies. New countries and institutions are starting to participate in this global discussion of the digitalization of urban centers. Furthermore, the number of authors and media involved in Smart Cities research and dissemination is increasing across the years.

Table 9. Authors with the highest numbers of papers in the top four journals.

	Sensors			IEEEAccess			Sustainability			Sustainable Cities			IEEEIT		
R	**Author**	**TP**	**TC**	**Author**	**TP**	**TC**	**Author**	**TP**	**TC**	**Author**	**TP**	**TC**	**Author**	**TP**	**TC**
1	Zhang, Y.	3	4	Zhang, Y.	0	0	Zhang, Y.	0	0	Zhang, Y.	0	0	Zhang, Y.	2	46
2	Wang, Y.	0	0	Wang, Y.	0	0	Wang, Y.	0	0	Wang Y.	0	0	Wang Y.	0	0
3	Liu, Y.	0	0	Liu, Y.	2	62	Liu, Y.	0	0	Liu, Y.	0	0	Liu, Y.	0	0
4	Lee, S.	2	9	Lee, S.	0	0	Lee, S.	2	9	Lee, S.	0	0	Lee, S.	4	17
5	Li, Y.	0	0	Li, Y.	0	0	Li, Y.	0	0	Li, Y.	0	0	Li, Y.	2	10
6	Choo, K.K.R.	0	0	Choo, K.K.R.	0	0	Choo, K.K.R.	0	0	Choo, K.K.R.	0	0	Choo, K.K.R.	0	0
7	Munoz, L.	2	5	Munoz, L.	0	0	Munoz, L.	0	0	Munoz, L.	0	0	Munoz, L.	0	0
8	Wu, J.	0	0	Wu, J.	5	77	Wu, J.	0	0	Wu, J.	0	0	Wu, J.	0	0
9	Dameri, R.P.	0	0	Dameri, R.P.	0	0	Dameri, R.P.	0	0	Dameri, R.P.	0	0	Dameri, R.P.	0	0
10	Kumar, N.	0	0	Kumar, N.	0	0	Kumar, N.	0	0	Kumar, N.	0	0	Kumar, N.	3	96
11	Song, H.B.	1	5	Song, H.B.	7	348	Song, H.B.	0	0	Song, H.B.	0	0	Song, H.B.	0	0
12	Kantarci, B.	1	11	Kantarci, B.	4	181	Kantarci, B.	0	0	Kantarci, B.	2	7	Kantarci, B.	1	101
13	Yigitcanlar, T. A.	0	0	Yigitcanlar, T. A.	2	15	Yigitcanlar, T. A.	0	0	Yigitcanlar, T. A.	1	42	Yigitcanlar, T. A.	0	0
14	Zhang, H.	1	4	Zhang, H.	3	8	Zhang, H.	2	6	Zhang, H.	0	0	Zhang, H.	0	0
15	Houbing, S.	0	0	Houbing, S.	6	402	Houbing, S.	0	0	Houbing, S.	0	0	Houbing, S.	3	114
16	Li, J.	0	0	Li, J.	0	0	Li, J.	0	0	Li, J.	0	0	Li, J.	0	0
17	Carvalho, L.C.	0	0	Carvalho, L.C.	0	0	Carvalho, L.C.	0	0	Carvalho, L.C.	0	0	Carvalho, L.C.	0	0
18	Lee, J.	0	0	Lee, J.	0	0	Lee, J.	0	0	Lee, J.	0	0	Lee, J.	0	0
19	Liu, X.	0	0	Liu, X.	1	13	Liu, X.	0	0	Liu, X.	0	0	Liu, X.	1	38
20	Mehmood, R.	1	10	Mehmood, R.	4	114	Mehmood, R.	1	15	Mehmood, R.	0	0	Mehmood, R.	0	0
21	Ratti, C.	0	0	Ratti, C.	0	0	Ratti, C.	0	0	Ratti, C.	0	0	Ratti, C.	2	15
22	Wang, J.	0	0	Wang, J.	0	0	Wang, J.	0	0	Wang, J.	0	0	Wang, J.	0	0
23	Chen, X.	3	45	Chen, X.	0	0	Chen, X.	0	0	Chen, X.	0	0	Chen, X.	1	1
24	Alba, E.	0	0	Alba, E.	0	0	Alba, E.	0	0	Alba, E.	0	0	Alba, E.	0	0
25	Kim, J.	1	32	Kim, J.	0	0	Kim, J.	1	0	Kim, J.	0	0	Kim, J.	1	4

Abbreviations: TP and TC = Total papers and citations in journals indexed in WoS.

Table 10. Institutions with the highest numbers of papers in the top four journals.

	Sensors			Access			Sust.			S. Cities S.			IEEEIT		
R	**Institution**	**TP**	**TC**	**Institution**	**TP**	**TC**	**Institution**	**TP**	**TC**	**Institution**	**TP**	**TC**	**Institution**	**TP**	**TC**
1	CAS	3	3	CAS	7	64	CAS	6	38	CAS	1	4	CAS	3	27
2	UL	3	225	UOL	3	16	UL	0	0	UL	0	0	UL	3	51
3	CNR	3	32	CNR	1	0	CNR	5	10	CNR	0	0	CNR	1	15
4	ACAD	76	98	ACAD	76	98	ACAD	76	98	ACAD	76	98	ACAD	76	98
5	PUM	1	12	PUM	1	0	PUM	1	3	PUM	1	12	PUM	0	80
6	PUT	91	88	PUT	91	88	PUT	91	88	PUT	91	88	PUT	91	88
7	MIT	0	0	MIT	2	2	MIT	1	15	MIT	1	7	MIT	3	6
8	UB	3	27	UB	1	48	UB	0	0	UB	0	0	UB	3	48
10	UNFII	1	2	UNFII	0	0	UNFII	5	55	UNFII	1	6	UNFII	1	0
11	DELFT	1	0	DELFT	0	0	DELFT	2	14	DELFT	0	0	DELFT	2	31
12	WUHAN	2	16	WUHAN	1	8	WUHAN	2	0	WUHAN	0	0	WUHAN	1	1
13	CNRP	8	11	CNRP	0	0	CNRP	0	0	CNRP	0	0	CNRP	0	0
14	TSING	2	64	TSING	6	54	TSING	0	0	TSING	0	0	TSING	2	0
15	UU	0	0	UU	0	0	UU	0	0	UU	0	0	UU	0	0
16	USG	0	0	USG	0	0	USG	0	0	USG	0	0	USG	0	0
17	UPM	7	39	UPM	4	15	UPM	1	12	UPM	1	14	UPM	0	0
18	SJTU	0	0	SJTU	7	66	SJTU	0	0	SJTU	0	0	SJTU	2	33
19	UNSWS	1	2	UNSWS	3	10	UNSWS	0	0	UNSWS	1	15	UNSWS	2	5

Abbreviations: TP, TC TP and TC = Total papers and citations in journals indexed in *WoS* (1) CAS = Chinese Academy of Sciences (2) UL = University of London (3) CNR = Consiglio Nationale delle Richerche (4) ACAD = Chinese Academy of Sciences (5) PUM = Polytechnic University of Milan (6) PUT = Polytechnic University of Turin (7) MIT = Massachusetts Institute of Technology (8) UB = University of Bologna (9) UNFII = University of Naples Federico II (10) Delft = Delft University of Technology (11) WUHAN = Wuhan University (12) CNRS = Centre National de la Recherche Scientifique (13) Tsinghua = Tsinghua University (14) RTT = Royal Institute of Technology (15) UPV = Universitat Politècnica de València (16) UG = University of Genoa (17) SJTU = Shanghai Jiao Tong University (18) UCB = University of California Berkeley.

Table 11. The most productive countries and journals in Smart Cities.

R	Sens.	IA	Sust.	SCS	IOT	Fut.	Cities	CM	EnP.	JCP	En.	FGCS	TFSC	PCS	SP.	21ST	IT	JUT	IS	US	Total
U.S.A.	0	67	12	0	45	16	17	26	3	5	6	15	10	3	21	13	18	8	7	12	304
China	24	105	39	14	33	9	9	28	11	26	6	17	5	1	10	6	20	0	26	1	390
Italy	25	19	37	12	12	7	13	12	19	4	12	5	14	4	2	1	8	0	4	1	211
Spain	96	21	15	7	5	21	10	9	6	6	13	16	8	4	2	0	2	7	4	2	254
England	14	22	7	12	16	6	11	10	5	10	4	4	10	6	1	1	6	11	3	13	172
India	3	85	1	14	8	15	2	2	5	3	2	13	1	12	0	18	1	0	0	0	185
Australia	55	16	7	8	9	6	8	8	3	10	9	2	1	4	0	0	1	6	2	2	157
Germany	16	7	6	3	8	4	2	6	0	18	2	2	1	1	0	5	0	0	3	2	86
Canada	11	22	3	12	8	5	2	14	0	2	0	1	0	1	0	4	1	2	4	4	96
S. Korea	15	75	25	10	6	9	3	18	1	1	0	7	4	1	1	0	0	1	2	1	180
UK	9	22	3	10	13	8	0	2	5	7	2	8	11	7	1	0	5	0	2	0	115
France	25	3	3	2	4	6	0	8	0	3	1	3	6	4	4	0	4	2	2	1	81
Neth	5	1	5	1	2	0	4	0	2	5	3	0	5	1	0	0	1	7	2	3	47
Brazil	13	5	4	3	4	6	3	1	1	9	4	1	1	0	0	0	0	1	0	1	57
Greece	9	3	5	2	3	3	3	3	1	1	3	3	1	0	2	0	0	4	0	0	46
Portugal	4	5	5	4	3	4	2	3	4	4	7	0	1	3	1	0	2	1	3	0	56
Japan	2	10	3	5	3	4	1	6	4	6	3	2	2	0	0	0	0	0	0	0	51
Sweden	3	4	4	3	0	2	2	5	5	3	0	1	1	2	0	0	2	1	0	1	39
S. Arabia	6	33	6	4	1	5	2	6	5	0	3	4	0	5	0	0	10	1	0	0	91
Taiwan	10	34	4	2	3	2	1	1	0	1	1	0	3	0	0	0	3	0	0	0	65
Pakistan	7	22	3	11	1	8	0	3	0	2	0	6	0	1	0	0	0	0	0	0	64
Finland	3	6	2	1	3	1	3	3	1	4	2	14	3	0	0	0	0	0	3	0	49
Russia	3	2	1	0	1	1	1	2	5	0	0	0	3	1	2	1	0	0	0	0	23
CzR	2	1	2	1	0	1	3	0	0	0	1	3	0	14	2	0	0	1	17	0	48
Sing	0	25	2	0	6	1	0	2	4	0	1	1	0	2	2	0	1	0	30	2	79
Ireland	4	5	0	1	2	1	1	2	1	1	0	1	0	2	0	0	3	1	0	1	26
Poland	2	2	8	0	0	0	2	2	2	1	5	0	0	0	1	0	0	1	1	0	27
Austria	1	2	3	0	0	0	2	1	1	2	1	0	1	0	2	0	0	0	1	1	18
Belgium	3	0	2	0	0	2	2	2	4	1	0	1	4	0	2	0	2	0	75	1	101
Malaysia	0	12	1	1	0	4	0	4	0	0	0	0	0	2	0	0	0	1	0	0	25

5. Conclusions

The analysis shows that Smart City research is a theme where many areas of research converge. The bibliometric analysis indicates that Smart Cities are emerging as a fast-growing topic of scientific inquiry, and much of the knowledge generated about them is singularly technological. A Smart City is a social and economic phenomenon driven by environmental issues and human welfare.

A specific methodology was defined to take advantage of data available in the Web of Science (WoS). The types of documents were also selected to obtain a bibliographic study, including only those written from a scientific perspective. In the matter of Smart Cities, some publications do not have the scientific character expected for this study; then, they were excluded from the study. Table 2 shows the papers' distribution by the type of document, which was obtained using the "analyze the results" tool of the WoS database. Overall, 46% of the papers were articles, 44% were meeting papers, and 4% were books. The proportion of other types (news, letters, corrections, reviews, biographical items) was small (less than 5%).

As presented in Table 3, the most influential journals on Smart Cities, according to the WoS, are *Sensors* (Basel—Open Access Journal), *IEEE Access* (The Multidisciplinary Open Access Journal), and *Sustainability*. These journals represent about 12% of the total publications about Smart Cities. In addition, *IEEE Communications Magazine* might be considered as an influential review; eighteen articles published in this review are referenced in the list of three hundred more relevant articles listed in Table A1 in Appendix A.

As seen in Table 4, entitled "General citation structure in Smart Cities", only four articles were cited by over five hundred citations. Furthermore, more than 96% of papers of all time were cited less than fifty times. For papers published between 2001 and 2019, the percentage of papers is similar to the percentage of papers ever published; nevertheless, those with less than fifty citations were 95%.

Many Smart Cities have evolved over the past decade. Consequently, scientific output has increased proportionally, and vice-versa. The analysis of successful cases will lead to facilitation and acceleration of the emergence of new Smart Cities. As seen in Figure 2, entitled "Annual Number of publications ('Smart Cit*')", during 2017, almost three thousand articles were published. A decade earlier, in 2007, less than 100 articles had been published, which means that the number has increased by more than thirty times. In general, the increase in the number of citations is slow; most of the articles with the majority of citations were published between 2011 and 2012.

As mentioned before, the evolution of Smart Cities is linked to technological progress, and the bibliographic study shows a high degree of correlation between the countries with the greatest technological advancement and scientific production in the field of Smart Cities. The results regarding geo-economical evolution support the still-valid influence of the United States, but show the importance of other emerging powers in terms of economy and knowledge, research, and innovation. In terms of the Smart City publications around the world, Asia is the most productive region in the world. Almost 4100 publications were published between 2012 and 2019 in Asia, while 3469 were published in Europe and 1781 in America.

The influence of educational and research institutions and universities has influenced the design, forecasting, and measurement of performance of Smart Cities. According to the results summarized in Table 6, the most prolific institution published more than twenty of the total publications in 2012; the most prolific were the Chinese Academy of Sciences, the University of London, the Consiglio Nationale delle Ricerche, the Polytechnic University of Milan, the Polytechnic University of Turin, the Massachusetts Institute of Technology, the University of Bologna, the University of Naples Federico II, the Delft University of Technology, the Wuhan University, the Centre National de la Recherche Scientifique, the Tsinghua University, the Royal Institute of Technology, the Universitat Politècnica de València, the University of Genoa, Shanghai Jiao Tong University, and The University of California Berkeley.

The leading institutions do not coincide with the most relevant countries; among the first 24 traces of the list, only three American institutions appear. This means that the United States' publications are

distributed among more institutions. In contrast, in the leading countries of Table 6, China and Italy, there are institutions specialized in the topic of Smart Cities.

The most productive countries in terms of scientific publications are the United States, China, Spain, and England. It can be concluded from Table 6 ("The most productive and influential institutions"), a matrix in which the number of publications in the first thirty countries is presented, that in the journals with the largest number of publications, a large contribution is from the USA's institutions, followed by the Chinese, Spanish, Italian, and English, all of them with many publications in these magazines.

The *h*-index allowed us to determine the most productive authors. Table 6 presents the *h*-index, and this indicator is superior for the University of Bologna (26), CNR (Consiglio Nationale delle Ricerche; 22), University of London (19), and the Royal Institute of Technology (18).

Table 5 presents the Global Impact Factor for Smart Cities. Between 2014 and 2017, the number of citations reached around 30,000 in 2018 and 2019. Regarding Global Impact Factor for Smart Cities, in 2012, the indicator reached a maximum value, and almost a decade later, the indicator decreased due to the number of articles published, that means, more than 13 times more.

The most productive and influential institutions do not coincide with the most relevant countries; among the first 24 traces of the list, only three American institutions appear. This means that the United States' publications are distributed among more institutions. In contrast, in the leading countries of Table 6, China and Italy, there are institutions specialized in the topic of Smart Cities.

In general, there is a very diverse relationship between authors and the journals in which they publish; there is no marked collaboration between the principal authors and the prominent journals to highlight. According to Table 9, the most prolific authors did not publish their articles in the most critical reviews in the area of Smart Cities. Nevertheless, there is a correlation between the researcher's citizenship and publications. Regarding Table 11, researchers in the USA published mainly in *IEEE Access*, *IEEE Internet of Things*, and *IEEE Communications Magazine*.

Sensors is the magazine with the most articles in the area of Smart Cities. This confirms the importance of these devices in Smart City development. More than 1500 articles were published and referenced in WoS. Researchers were related mainly to the USA, China, India, and South Korea. China is the country with the most productive authors (Table 8).

There is a high correlation between leading institutions and main journals (Table 10).

The three hundred most cited papers on Smart Cities are summarized in the appendix. There are 173 different magazines referenced in this list. The magazines with the most articles published were the *IEEE Communications Magazine* (18 articles), *IEEE Access* (nine articles), *IEEE Internet of Things Journal* (eight articles), *Cities* (eight articles), and *Renewable and Sustainable Energy Reviews* (seven articles).

Author Contributions: These authors contributed equally to this work. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

Abbreviations

The following abbreviations are used in this manuscript:

MDPI	Multidisciplinary Digital Publishing Institute
DOAJ	Directory of Open Access Journals
TLA	Three-letter acronym
LD	Linear dichroism

Appendix A

Table A1. Three hundred most cited papers on Smart Cities.

Article	Authors	R	Year	J	C/Y	TC
SMART, a Simple Modular Architecture Research Tool: Identification of Signaling Domains	Schultz, J. et al.	1	1998	PNAS	126	2580
Shell-Isolated Nanoparticle-Enhanced Raman Spectroscopy	Li, J. F. et al.	2	2010	Nature	1	1881
Internet of Things for Smart Cities	Zanella, A. et al.	3	2014	IEEEITJ	310	1286
Smart Cities in Europe	Caragliu, A. et al.	4	2009	JUT	99	681
Edge Computing: Vision and Challenges	Shi, W. et al.	5	2016	IEEEITJ	255	545
Integration of Cloud Computing and Internet of Things: A Survey	Botta, A. et al.	6	2016	FGCS	188	469
Current Trends in Smart City Initiatives: Some Stylised Facts	Neirotti, P. et al.	7	2014	Cities	107	461
Smart Cities of the Future	Batty, M.	8	2012	EPJ	72	419
Correlation or Causality between the Built environment and Travel Behavior? Evidence from Northern California	Handy, S.	9	2005	TR:TE	34	455
Smart Cities: Definitions, Dimensions, Performance, and Initiatives	Albino, V.	10	2015	JUT	116	357
An Information Framework for Creating a Smart City through Internet of Things	Jiong, J. et al.	11	2016	IEEEITJ	87	383
Smart Cities: Quality of Life, Productivity, and the Growth Effects of Human Capital	Shapiro, J.M.	12	2005	RES	31	369
The Internet of Things Vision: Key Features, Applications and Open Issues	Borgia, E.	13	2014	CC	76	326
MES (Multi-Energy Systems): An Overview of Concepts and Evaluation Models	Mancarella, P.	14	2018	Energy	76	328
pH-Induced Aggregation of Gold Nanoparticles for Photothermal Cancer Therapy	Nam, J. et al.	15	2009	JTA	37	349
Smart Cities and the Future Internet: Towards Cooperation Frameworks for Open Innovation	Schaffers, H.	16	2015	FIA	46	350
Sensing as a Service Model for Smart Cities Supported by Internet of Things	Neirotti, P.	17	2014	TETT	72	315
A Survey on Internet of Things: Architecture, Enabling Technologies, Security and Privacy, and Applications	Lin, J. et al.	18	2017	IEEEITJ	116	233
The Compact City Fallacy	Neuman, M.	19	2005	JPER	23	304
Low-Power Wide-Area Networks: An Overview	Raza, U.	20	2016	IEEECST	112	225
The Economics of Using Plug-In Hybrid Electric Vehicle Battery Packs for Grid Storage	Peterson, S.B.	21	2010	JPS	34	283

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year TC = Total citations in science journals indexed in WoS. PNAS = Proceedings of the National Academy of Sciences of the United States of America. Cities = The International Journal of Urban Policy and Planning, EPJ = The European Physical Journal, TR:TE = Transportation Research Part D—Transport and Environment, JUT = Journal of Urban Technology, IEEEITJ = IEEE Internet of Things Journal, RES = Review of Economics and Statistics, CC = Computer Communications, JTA = Journal of the American Chemical Society, FIA = Future Internet: Future Internet Assembly 2011: Achievements and Technological Promises, TETT = Transactions on Emerging Telecommunications Technologies, IEEEIOT = IEEE Internet of Things Journal, JPER = Journal of Planning Education and Research, IEEECST = IEEE Communications, Surveys, and Tutorials, JPS = Journal of Power Sources.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Enhancing the Quality of Life through Wearable Technology	Park, S. et al.	22	2003	IEEEEMBM	18	266
A Neoliberal Nexus: Economy, Security, and the Biopolitics of Citizenship on the Border	Sparke, M.B.	23	2006	US	56	260
Foundations for Smarter Cities	Harrison, C. et al.	24	2010	IBMJRD	24	235
Random Access for Machine-to-Machine Communication in LTE-Advanced Networks: Issues and Approaches	Hasan, M. et al.	25	2013	IEEECM	47	262
Smart Specialization, Regional Growth, and Applications to European Union Cohesion Policy	Mccann, P. et al.	26	2015	RE	47	228
Smartmentality: The Smart City as Disciplinary Strategy	Vanolo, A.	27	2013	US	20	224
A Systematic Review of Built Environment Factors Related to Physical Activity and Obesity Risk: Implications for Smart Growth Urban Planning	Durand, C. et al.	28	2011	OR	31	224
Long-Range Communications in Unlicensed Bands: The Rising Stars in the IoT and Smart City Scenarios	Centenaro, M. et al.	29	2016	IEEEWC	81	183
Multi-Sensor Fusion in Body Sensor Networks: State-of-the-Art and Research Challenges	Gravina, R. et al.	30	2016	IF	119	173
Big Data, Smart Cities, and City Planning	Batty, M. et al.	31	2013	DHG	39	192
The Research Agenda on Social Acceptance of Distributed Generation in Smart Grids: Renewable as Common Pool Resources	Wolsink, M.	32	2012	RSER	33	216
SmartSantander: IoT Experimentation over a Smart City Testbed	Sanchez, L. et al.	33	2014	CN	46	212
Detection and Spatial Mapping of Mercury Contamination in Water Samples Using a Smart-Phone	Wei, Q. et al.	34	2014	ACS Nano	46	212
Response Surface Methodological Approach for Optimizing Production of Geranyl Propionate Catalysed by Carbon Nanotube Nanobioconjugates	Mohamad, N. et al.	35	2015	BBE	57	201

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IEEEEMBM = IEEE Engineering in Medicine and Biology Magazine, US = Urban Studies, IBMJRD = IBM Journal of Research and Development, IEEECM = IEEE Communications Magazine, RE = Regional Studies, US = Urban Studies, OR = Obesity Reviews, IEEEWC = IEEE Wireless Communications, IF = Information Fusion, DHG = Dialogues in Human Geography, RSER = Renewable and Sustainable Energy Reviews, CN = Computer Networks, ACS Nano = ACS Nano, BBE = Biotechnology and Biotechnological Equipment.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Flexible Technologies and Smart Clothing for Citizen Medicine, Home Healthcare, and Disease Prevention	Axisa, F. et al.	36	2005	IEEETITB	18	209
Fabrication of pH-Responsive Nanocomposites of Gold Nanoparticles/Poly(4-Vinylpyridine)	Li, D. et al.	37	2007	CM	27	208
Smarter Cities and their Innovation Challenges	Naphade, M. et al.	38	2011	Computer	54	201
Smart Tourism: Foundations and Developments	Gretzel, U. et al.	39	2015	EM	13	167
A Review on Static and Dynamic Shape Control of Structures by Piezoelectric Actuation	Irschik, H.	40	2002	ES	14	201
Effects of Two Prevention Programs on High-Risk Behaviors among African American Youth —A Randomized Trial	Flay, B.R. et al.	41	2004	APAM	16	201
Chemodosimeters and 3D Inorganic Functionalised Hosts for the Fluoro-Chromogenic Sensing of Anions	Martinez-Manez, R. et al.	42	2006	CCR	29	204
Modelling the Smart City Performance	Lombardi, P. et al.	43	2012	IEJSSR	22	186
Current Directions in Core-Shell Nanoparticle Design	Schärtl, W.	44	2010	Nanoescale	28	193
Estimation of a Disaggregate Multimodal Public Transport Origin–Destination Matrix from Passive Smartcard Data from Santiago, Chile	Munizaga, M. A.	45	2012	TPCRT	38	166
Smart Health: A Context-Aware Health Paradigm within Smart Cities	Solanas, A. et al.	46	2014	IEEECM	32	168
The Role of Advanced Sensing in Smart Cities	Hancke, G.P. et al.	47	2013	Sensors	3	167
Smart City Policies: A Spatial Approach	Angelidou, M.	48	2014	Cities	37	159
Smart and Digital City: A Systematic Literature Review	Cocchia, A.	49	2014	Smart City	61	146
Internet of Things and Big Data Analytics for Smart and Connected Communities	Sun, Y. et al.	50	2016	Access	36	152
Forecasting Energy Consumption of Multi-Family Residential Buildings Using Support Vector Regression: Investigating the Impact of Temporal and Spatial Monitoring Granularity on Performance Accuracy	Jain, R. K. et al.	51	2014	AE	23	163

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IEEETITB = IEEE Transactions on Information Technology in Biomedicine, CM = Chemistry of Materials, Computer = Computer, EM = Electronic Markets, ES = Engineering Structures, APAM = Archives of Pediatrics and Adolescent Medicine, CCR = Coordination Chemistry Reviews, IEJSSR = Innovation—The European Journal of Social Science Research, Nanoscale = Nanoscale, TRPC = Transportation Research Part C—Emerging Technologies, IEEECM = IEEE Communications Magazine, AE = Applied Energy.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Creating Smart-er Cities: An Overview	Allwinkle, S. et al.	52	2011	JUT	36	165
Towards an Effective Framework for Building Smart Cities: Lessons from Seoul and San Francisco	Lee, J.H. et al.	53	2014	TFSC	30	150
Enabling Smart Cities through a Cognitive Management Framework for the Internet of Things	Panagiotis, V. et al.	54	2013	IEEECM	6	150
Mediating Mechanisms in a School-Based Drug Prevention Program—1st-Year Effects of the Midwestern Prevention Project	Mackinnon, D.P. et al.	55	1991	HP	44	179
Sustainable–Smart–Resilient–Low-Carbon–Eco-knowledge Cities; Making Sense of a Multitude of Concepts Promoting Sustainable Urbanization	de Jong, M. et al.	56	2015	JCP	17	150
Emergence of High Levels of Extended-Spectrum-beta-Lactamase-Producing Gram-Negative Bacilli in the Asia-Pacific Region: Data from the Study for Monitoring Antimicrobial Resistance Trends (SMART) Program, 2009	Hawser, S. P. et al.	57	2007	AAC	25	172
Laboratory Detection of Enterobacteriaceae that Produce Carbapenemases	Doyle, D. et al.	58	2012	JCM	56	149
Urban Planning and Building Smart Cities Based on the Internet of Things Using Big Data Analytics	Mazha, M. et al.	59	2014	CN	84	126
What Are the Differences between Sustainable and Smart Cities?	Ahvenniemi, H. et al.	60	2017	Cities	56	121
The Role of Big Data in a Smart City	Hashem, I.A.T. et al.	61	2016	IJIM	31	123
State-of-the-Art, Challenges, and Open Issues in the Integration of Internet of Things and Cloud Computing	Diaz, M. et al.	62	2016	JNCA	28	133
T-Drive: Enhancing Driving Directions with Taxi Drivers' Intelligence	Yuan, J. et al.	63	2013	ITKDE	24	142

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. JUT= Journal of Urban Technology, TFSC = Technological Forecasting and Social Change, Smart City = Smart City: How to Create Public and Economic Value with High Technology in Urban Space, IEEECM = IEEE Communications Magazine, HP = Health Psychology, JCP = Journal of Cleaner Production, AAC = Antimicrobial Agents and Chemotherapy, JCM = Journal of Clinical Microbiology, CN = Computer Networks, IJIM = International Journal of Information Management, JNCA = Journal of Network and Computer Applications, ITKDE = IEEE Transactions on Knowledge and Data Engineering.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Definition Methodology for the Smart Cities Model	Lazaroiu, G.C. et al.	64	2012	Energy	54	145
Governing the Smart City: A Review of the Literature on Smart Urban Governance	Meijer, A. et al.	65	2016	IRAS	32	118
A Survey on Advanced Metering Infrastructure	Mohassel, R.R. et al.	66	2014	IJEPES	159	143
IoT security: Review, Blockchain Solutions, and Open Challenges	Khan, M.A. et al.	67	2018	FGCS	11	82
Couple-Focused Support to Improve HIV Medication Adherence: a Randomized Controlled Trial	Remien, R.H. et al.;	68	2005	AIDS	31	152
Programming Environments: Environmentality and Citizen Sensing in the Smart City	Gabrys, J.	69	2014	EPDSS	15	135
The Relationship between the Built Environment and Nonwork Travel: A Case Study of Northern California	Cao, X. et al.	70	2009	TRPAP	19	134
Quantifying the Influence of Environmental and Water Conservation Attitudes on Household End Use Water Consumption	Willis, R. M. et al.	71	2011	JEM	25	138
An Integrated Service-Device-Technology Roadmap for Smart City Development	Lee, J.H.	72	2013	TFSC	50	137
A Review of the Development of Smart Grid Technologies	Tuballa, M.L.	73	2016	RSER	25	134
Convergence of MANET and WSN in IoT Urban Scenarios	Bellavista, P. et al.	74	2014	Sensors	17	133
Low-Carbon Communities as a Context for Individual Behavioural Change	Heiskanen, E. et al.	75	2010	EP	38	145
Smart Cities: A Conjuncture of Four Forces	Angelidou, M.	76	2015	Cities	37	124
Applications of Big Data to Smart Cities	Al Nuaimi, E. et al.	77	2015	JISA	37	109
Critical Interventions into the Corporate Smart City	Hollands, R.G.	78	2015	CJRES	25	113
Fostering Participation in Smart Cities: A Geo-Social Crowdsensing Platform	Cardone, G. et al.	79	2013	IEEECM	37	130

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IRAS = International Review of Administrative Sciences, IJEPES = International Journal of Electrical Power and Energy Systems, FGCS = Future Generation Computer Systems—The International Journal of eScience, EPDSS = Environment and Planning D—Society and Space, TRPAP = Transportation Research Part A—Policy and Practice, JEM = Journal of Environmental Management, TFCS = Technological Forecasting and Social Change, RSER = Renewable and Sustainable Energy Reviews, EP = Energy Policy, JISA = Journal of Internet Services and Applications, CJRES = Cambridge Journal of Regions, Economy, and Society, IEEECM = IEEE Communications Magazine.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
The 'Actually Existing Smart City'	Shelton, T. et al.	80	2016	CJRES	16	118
Attribution of Climate Forcing to Economic Sectors	Unger, N. et al.	81	2010	PNAS	71	139
Large-Scale Physical Activity Data Reveal Worldwide Activity Inequality	Althoff, T. et al.	82	2017	Nature	16	106
Management of Severe Asthma in Children	Bush, A. et al.	83	2010	Lancet	70	134
Smart Sustainable Cities of the Future: An Extensive Interdisciplinary Literature Review	Bibri, S.E. et al.;	84	2017	SCS	139	90
A Survey on 5G Networks for the Internet of Things: Communication Technologies and Challenges	Akpakwu, G.A. et al.	85	2017	Access	20	83
Growing Cities Sustainably: Does Urban Form Really Matter?	Echenique, M.H. et al.	86	2012	JAPA	10	131
Four Strategies for the Age of Smart Services	Allmendinger, G. et al.	87	2005	HBR	34	122
Making Sense of Smart Cities: Addressing Present Shortcomings	Kitchin, R.	88	2015	CJRES	22	102
Sustainable Energy Performances of Green Buildings: A Review of Current Theories, Implementations and Challenges	Ghaffarian, H.	89	2013	RSER	19	121
Crowdsourced Health Research Studies: An Important Emerging Complement to Clinical Trials in the Public Health Research Ecosystem	Swan, M.	90	2012	JMIR	66	125
Big Data and Cloud Computing: Innovation Opportunities and Challenges	Yang, C.	91	2017	IJDE	44	98
Everything You Wanted to Know about Smart Cities: The Internet of Things is the Backbone	Mohanty, S.P. et al.	92	2016	IEEECEM	17	97
Smart Cities at the Forefront of the Future Internet	Hernandez-Munoz, J.M. et al.	93	2011	FI	13	111
Political Ecologies of Gentrification	Quastel, N. et al.	94	2009	UG	16	114
The Smart Grid—A Saucerful of Secrets?	Wissner, M.	95	2011	AE	25	122
Privacy in the Internet of Things: Threats and Challenges	Ziegeldorf, J.H. et al.	96	2014	SCN	63	106

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. CJRES = Cambridge Journal of Regions, Economy, and Society, PNAS = Proceedings of the National Academy of Sciences of the United States of America, RSER = Renewable and Sustainable Energy Reviews, Sensors = IEEE Sensors Journal, EP = Energy Policy, Cities = Cities, JISA = Journal of Internet Services and Applications, Nature = Nature, Lancet = Lancet, SCS = Sustainable Cities and Society, Access = IEEE Access, JAPA = Journal of the American Planning Association, HBR = Harvard Business Review, CJRES = Cambridge Journal of Regions, Economy, and Society, RSER = Renewable and Sustainable Energy Reviews. JMIR = Journal of Medical Internet Research, IJDE = International Journal of Digital Earth, IEEECEM = IEEE Consumer Electronics Magazine, FI = Future Internet: Future Internet Assembly 2011: Achievements and Technological Promises, UG = Urban Geography, AE = Applied Energy, SCN = Security and Communication Networks.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Vehicular Social Networks: Enabling Smart Mobility	Ning, Z. et al.	97	2017	IEEECM	63	103
UAV-Enabled Intelligent Transportation Systems for the Smart City: Applications and Challenges	Menouar, H. et al.	98	2017	IEEECM	32	87
A Survey on IEEE 802.11ah: An Enabling Networking Technology for Smart Cities	Khorov, E. et al.	99	2015	CC	25	113
Detecting the Dynamics of Urban Structure through Spatial Network Analysis	Zhong, C. et al.	100	2014	IJGIS	11	109
The Impact of the Phoenix Urban Heat Island on Residential Water Use	Guhathakurta, S. et al.	101	2014	JAPA	31	101
The Emerging Internet of Things Marketplace from an Industrial Perspective: A Survey	Perera, C. et al.	102	2015	IEEETETC	16	103
Why Are Smart Cities Growing? Who Moves and Who Stays	Winters, J.V. et al.	103	2011	JRS	25	109
African Urban Fantasies: Dreams or Nightmares?	Watson, V. et al.	104	2014	EU	25	103
Citrate-Capped Platinum Nanoparticle as a Smart Probe for Ultrasensitive Mercury Sensing	Wu, G-W.et al.	105	2014	AC	25	111
Electric Vehicle Charging Station Placement: Formulation, Complexity, and Solutions	Lam, A.Y.S. et al.	106	2014	IEEETCG	25	111
The Smart Grid State-of-the-art and Future Trends	El-Hawary, M.E.	107	2014	EPCS	31	116
Conceptual Foundations for Understanding Smart Tourism Ecosystems	Gretzel, U. et al.	108	2015	CHB	39	90
Energy Management and Planning in Smart Cities	Calvillo, C. F. et al.	109	2015	RSER	30	90
New Urban Utopias of Postcolonial India: 'Entrepreneurial Urbanization' in Dholera Smart City, Gujarat	Datta, A.	110	2015	DHG	29	94
A Heuristic Operation Strategy for Commercial Building Microgrids Containing EVs and PV System	Liu, N. et al.	111	2015	IEEETIE	29	106

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IEEECM = IEEE Communications Magazine, CC = Computer Communications, IJGIS = International Journal of Geographical Information Science, JAPA = Journal of the American Planning Association, IEEETETC = IEEE Transactions on Emerging Topics in Computing, JRS = Journal of Regional Science, EU = Environment and Urbanization, AC = Analytical Chemistry, IEEETSG = IEEE Transactions on Smart Grid, EPCS = Electric Power Components and Systems, CHB = Computers in Human Behavior, RSER= Renewable and Sustainable Energy Reviews, DHG = Dialogues in Human Geography, IEEETIE = IEEE Transactions on Industrial Electronics.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
A Survey of MAC Layer Issues and Protocols for Machine-to-Machine Communications	Rajandekar, A. et al.	112	2015	IEEEITJ	10	104
Local Government Efforts to Promote the "Three ES" of Sustainable Development—Survey in Medium to Large Cities in the United States	Saha, D. et al.	113	2008	JPER	19	2008
Distribution of Extended-Spectrum beta-Lactamases, AmpC beta-Lactamases, and Carbapenemases among Enterobacteriaceae Isolates Causing Intra-Abdominal Infections in the Asia-Pacific Region: Results of the Study for Monitoring Antimicrobial Resistance Trends (SMART)	Sheng, W-H.et al.	114	2013	AAC	19	110
From Taxi GPS Traces to Social and Community Dynamics: A Survey	Castro, P.S. et al.	115	2013	ACMCS	111	104
Intelligent Services for Big Data Science	Dobre, C. et al.	116	2014	Access	28	80
Smart Charging of Electric Vehicles with Photovoltaic Power and Vehicle-To-Grid Technology in a Microgrid; A Case Study	van der Kam, M. et al.	117	2015	IEEECST	16	71
Coexistence of High-Bit-Rate Quantum Key Distribution and Data on Optical Fiber	Patel, K.A.	118	2012	PRX	27	106
Sharing Cities: A Case for Truly Smart and Sustainable Cities	McLaren, D. et al.	119	2015	MIT Press	18	86
Energy Management for Smart Grids With Electric Vehicles Based on Hierarchical MPC	Kennel, F. et al.	120	2013	IEEETII	14	102
The Triple-Helix Model of Smart Cities: A Neo-Evolutionary Perspective	Leydesdorff, L. et al.	121	2011	JUT	54	100
On-Demand High-Capacity Ride-Sharing via Dynamic Trip–Vehicle Assignment	Alonso-Mora, J.	122	2017	PNAS	15	100
Implementation of Vehicle-to-Grid Infrastructure Using Fuzzy Logic Controller	Singh, M. et al.	123	2012	IEEETOSG	21	100
Information-Centric Services in Smart Cities	Piro, G. et al.;	124	2014	JSS	8	93

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IEEEIOTJ = IEEE Internet of Things Journal, JPER = JPER + J114, AAC = Antimicrobial Agents and Chemotherapy, ACMS = ACM Computing Surveys, ACCESS = IEEE Access, IEEECST = IEEE Communications, Surveys, and Tutorials, PRX = Physical Review X, MIT Press = Sharing Cities: A Case for Truly Smart and Sustainable Cities, IEEETII = IEEE Transactions on Industrial Informatics, JUT = Journal of Urban Technology, PNAS = Proceedings of the National Academy of Sciences of the United States of America, IEEETSG = IEEE Transactions on Smart Grid, JSS = Journal of Systems and Software.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Comparative Metabonomics of Differential Hydrazine Toxicity in the Rat and Mouse	Bollard, M.E. et al.	125	2005	TAP	9	103
Citrate-Coated Gold Nanoparticles as Smart Scavengers for Mercury(II) Removal from Polluted Waters	Ojea-Jimenez, I. et al.	126	2011	ACS NANO	20	100
Smart Sustainable Cities—Exploring ICT Solutions for Reduced Energy Use in Cities	Kramers, A. et al.	127	2011	EMS	20	100
Smart Cities and Green Growth: Outsourcing Democratic and Environmental Resilience to the Global Technology Sector	Viitanen, J. et al.	128	2014	EPAES	50	86
Mobile Edge Computing Potential in Making Cities Smarter	Tarik, T. et al.	129	2017	IEEECM	25	86
European Smart Cities: The Role of Zero-Energy Buildings	Kylili, A. et al.	130	2015	SCS	20	89
Optimal PV Inverter Reactive Power Control and Real Power Curtailment to Improve Performance of Unbalanced Four-Wire LV Distribution Networks	Su, X. et al.	131	2014	IEEETSE	17	91
Vita: A Crowdsensing-Oriented Mobile Cyber-Physical System	Hu, X. et al.	132	2013	IEEETOETIC	14	96
Common Misconceptions in Molecular Ecology: Echoes of the Modern Synthesis	Karl, Stephen A.	133	2012	ME	11	98
Modeling Citizen Satisfaction with Mandatory Adoption of an E-Government Technology	Chan, Frank K.Y.	134	2010	JAIS	10	94
Social Sustainability and Urban Form: Evidence from Five British Cities	Bramley, G.	135	2009	EPAES	12	88
B Cell Activation Biomarkers as Predictive Factors for the Response to Rituximab in Rheumatoid Arthritis	Sellam, J.	136	2011	AR	12	99
The Bounds of Smart Decline: A Foundational Theory for Planning Shrinking Cities	Hollander, Justin B.	137	2011	HPD	33	84

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. TAP = Toxicology and Applied Pharmacology, ACS NANO = ACS NANO, EMS = Environmental Modelling and Software, EPAES = Environment and Planning A—Economy and Space, IEEECM = IEEE Communications Magazine, SCS = Sustainable Cities and Society, IEEETSE = IEEE Transactions on Sustainable Energy, IEEETOETIC = IEEE Transactions on Emerging Topics in Computing, ME = Molecular Ecology, JAIS = Journal of the Association for Information Systems, AR = Arthritis and Rheumatology, HPD = Housing Policy Debate.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Electrical Energy Storage Systems in Electricity Generation: Energy Policies, Innovative Technologies, and Regulatory Regimes	Kyriakopoulos, G. L. et al.	138	2016	RSER	25	86
Wearables: Has the Age of Smartwatches Finally Arrived?	Rawassizadeh, R.	139	2015	CACM	97	88
Towards Fog-Driven IoT eHealth: Promises and Challenges of loT in Medicine and Healthcare	Farahani, B. et al.	140	2018	FGCS	49	62
IoT Considerations, Requirements, and Architectures for Smart Buildings, Energy Optimization, and Next-Generation Building Management Systems	Minoli, D. et al.	141	2017	IEEEITJ	16	65
The Pursuit of Citizens' Privacy: A Privacy-Aware Smart City Is Possible	Martinez-Balleste, A. et al.	142	2013	IEEECM	16	83
An Experimental Test of Voluntary Strategies to Promote Urban Water Demand Management	Fielding, K.S. et al.	143	2013	JEM	16	86
Spatiotemporal Patterns of Urban Human Mobility	Hasan, S. et al.	144	2013	JSP	6	86
Transect Planning	Duany, A.T. et al.	145	2002	JAPA	6	95
Nurses' Attitudes, Behaviours and Perceived Barriers Towards Pressure Ulcer Prevention	Moore, Z. et al.	146	2009	JCN	5	88
Smart Cities—The Singapore Case	Mahizhnan, A.	147	1999	Cities	23	88
Crowdsourcing for Climate and Atmospheric Sciences: Current Status and Future Potential	Muller, C. L. et al.	148	2015	IJC	12	88
Robust Detection of Abandoned and Removed Objects in Complex Surveillance Videos	Tian, Y. et al.	149	2011	IEEETSMC	23	84
Lessons in Urban Monitoring Taken from Sustainable and Livable Cities to Better Address the Smart Cities Initiative	Marsal-Llacuna, M. et al.	150	2015	TFSC	46	83
Fog of Everything: Energy-Efficient Networked Computing Architectures, Research Challenges, and a Case Study	Baccarelli, E. et al.	151	2017	Access	30	69

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. RSER = Renewable and Sustainable Energy Reviews, CACM = Communication of the ACM, FGCS = Future Generation Computer Systems, The International Journal of e-Sience, IEEEITJ = IEEE Internet of Things Journal, IEEECM = IEEE Communications Magazine, JEM = Journal of Environmental Management, JSP = Journal of Statistical Physics, JAPA = Journal of the American Planning Association, JCN = Journal of Clinical Nursing IJC = International Journal of Climatology, IEEETSMC = IEEE Transactions on Systems, Man, And Cybernetics Part C—Applications and Reviews TFSC = Technological Forecasting and Social Change, Access = IEEE Access.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Privacy Protection for Preventing Data Over-Collection in Smart City	Li, Y. et al.	152	2016	IEEETC	23	77
Real-Time City-Scale Taxi Ridesharing	Ma, S. et al.	153	2015	IEEEETKDE	18	69
Korean Ubiquitous Eco-City: A Smart–Sustainable Urban Form or a Branding Hoax?	Yigitcanlar, T. et al.	154	2015	TFSC	23	69
Solar Irradiance Forecasting Using Spatial–Temporal Covariance Structures and Time-Forward Kriging	Yang, D. et al.	155	2013	JDMM	23	62
Dual-Targeting and pH/Redox-Responsive Multi-Layered Nanocomplexes for Smart Co-delivery of Doxorubicin and Sirna	Han, L.et al.	156	2013	Biomaterials	23	62
A Survey on the Edge Computing for the Internet of Things	Yu, W. et al.	157	2018	PAR	45	80
Internet-of-Things-Based Smart Cities: Recent Advances and Challenges	Mehmood, Y. et al.	158	2017	IEEECM	18	60
Intermediating Technologies and Multi-Group Adoption: A Comparison of Consumer and Merchant Adoption Intentions toward a New Electronic Payment System	Plouffe, C.R. et al.	159	2001	IEEEITJ	18	79
Understanding Metropolitan Patterns of Daily Encounters	Sun, L. et al.	160	2013	EP	7	82
Greenways: Multiplying and Diversifying in the 21st Century	Walmsley, A.	161	2006	LUP	29	84
What Makes Big Data, Big Data? Exploring the Ontological Characteristics of 26 Datasets	Kitchin, R. et al.	162	2016	BDS	44	66
Efficient Energy Management for the Internet of Things in Smart Cities	Ejaz, W. et al.	163	2017	IEEECM	18	30
Alarming Visual Display Monitors Affecting Shower End Use Water and Energy Conservation in Australian Residential Households	Willis, Rachelle M. et al.	164	2010	RCR	44	80
Placement of EV Charging Stations—Balancing Benefits among Multiple Entities	Luo, C. et al.	165	2017	IEEETSG	22	77

Abbreviations: R = Rank; J=Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IEEETC = IEEE Transactions on Computers, IEEETKDE = IEEE Transactions on Knowledge and Data Engineering, TFSC = Technological Forecasting and Social Change, JDMM = Journal of Destination Marketing and Management, Biomaterials = Biomaterials, PAR = Public Administration Review, IEEECM = IEEE Communications Magazine, IEEEITJ = IEEE Internet of Things Journal, EP = Energy Policy, LUP = Landscape and Urban Planning, BDS = Big Data and Society, RCR = IEEE Transactions on Smart Grid, IEEETSG = Journal of Business Research.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
How Long to Wait? Predicting Bus Arrival Time with Mobile-Phone-Based Participatory Sensing	Zhou, P. et al.	166	2013	IEEETMC	10	65
Impacts of Urban Form on Future US Passenger-Vehicle Greenhouse Gas Emissions	Hankey, S. et al.	167	2010	EP	43	83
Narrow Band Internet of Things	Chen, M. et al.	168	2017	Access	22	65
Cyber Security Challenges in Smart Cities: Safety, Security and Privacy	Chen, M. et al.	169	2014	JAR	14	60
Modelling the Potential Effect of Shared Bicycles on Public Transport Travel Times in Greater Helsinki: an Open Data Approach	Elmaghraby, A.S. et al.	170	2014	AG	12	60
Sustainability versus Liveability: An Investigation of Neighbourhood Satisfaction	Howley, P. et al.	171	2009	IEEETPA	5	81
Statistical Characterization of Urban Spatial Radio Channels	Toeltsch, M. et al.	172	2002	IEEEJSAC	9	84
Civic Engagement and Sustainable Cities in the United States	Portney, K.	173	2005	JEPM	42	81
Security and Privacy in Smart City Applications: Challenges and Solutions	Zhang, K. et al.;	174	2017	IEEECM	14	62
Crowdsourcing for Climate and Atmospheric Sciences: Current Status and Future Potential	Muller, C. L. et al.	175	2015	IJC	14	81
Privacy-Preserving Data Aggregation in Smart Metering Systems	Zekeriya, E. et al.	176	2015	ISPM	12	81
Smart Ideas for Smart Cities: Investigating Crowdsourcing for Generating and Selecting Ideas for ICT Innovation in a City Context	Schuurman, D. et al.	177	2015	JTSE	9	81
Trustworthy Sensing for Public Safety in Cloud-Centric Internet of Things	Kantarci, B. et al.	178	2014	IEEEITJ	27	79

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IEEETMC = IEEE Transactions on Mobile Computing, EP = Energy Policy, JAR = Journal of Advanced Research, AG = Applied Geography, IEEETPA = IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEEJSAC = IEEE Journal on Selected Areas in Communications, JEPM = Journal of Environmental Planning and Management, IEEECM= IEEE Communications Magazine, IJC = International Journal of Climatology, ISPM = IEEE Signal Processing Magazine, JTSE = Journal of Theoretical and Applied Electronic Commerce Research, IEEEITJ = IEEEITJ = IEEE Internet of Things Journal.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Foggy Clouds and Cloudy Fogs: A Real Need for Coordinated Management of Fog-To-Cloud Computing Systems	Masip-Bruin, X. et al.	179	2016	IEEEWC	20	67
Smart Charging of Electric Vehicles with Photovoltaic Power and Vehicle-To-Grid Technology in a Microgrid; A Case Study	van der Kam, M. et al.	180	2012	AE	20	71
A Survey of Incentive Mechanisms for Participatory Sensing	Restuccia, F. et al.	181	2012	IEEECST	27	71
Meta-Principles for Developing Smart, Sustainable, and Healthy Cities	Ramaswami, A. et al.	182	2016	Science	11	64
Protein/Polymer-Based Dual-Responsive Gold Nanoparticles with pH-Dependent Thermal Sensitivity	Strozyk, M. S. et al.	183	2012	AFM	4	64
Intermediating Technologies and Multi-Group Adoption: A Comparison of Consumer and Merchant Adoption Intentions toward a New Electronic Payment System	Plouffe, C.R. et al.	184	2016	JPIM	20	64
Combining Smart Card Data and Household Travel Survey to Analyze Jobs–Housing Relationships in Beijing	Long, Y. et al.	185	2015	CEUS	13	30
A Novel Mixed Method Smart Metering Approach to Reconciling Differences between Perceived and Actual Residential end use water consumption	Beal, C.D. et al.	186	2015	JCP	13	30
Bootstrapping Smart Cities through a Self-Sustainable Model Based on Big Data Flows	Vilajosana, I. et al.	187	2015	IEEECM	7	30
Is Compact Growth Good for Air Quality?	Stone, B.Jr.	188	2015	JAPA	16	30
Multidimensional Context-Aware Social Network Architecture for Mobile Crowdsensing	Hu, X. et al.	189	2015	IEEECM	77	30
Adherence to Treatment in Children and Adolescent Patients with Cystic Fibrosis	Zindani, G.N. et al.	190	2013	JAH	4	56
Retracting Suburbia: Smart Growth and the Future of Housing	Danielsen, K.A. et al.	191	2013	HPD	19	56
Knowledge Transfer in Smart Tourism Destinations: Analyzing the Effects of a Network Structure	Del Chiappa, G. et al.	192	2015	JDMM	25	30

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IEEEWC = IEEE Wireless Communications, AE = Applied Energy, IEEECST = IEEE Communications Surveys and Tutorials, AFM = Advanced Functional Materials, JPIM = Journal of Product Innovation Management, CEUS = Computers, Environment, and Urban Systems, JCP = Journal of Cleaner Production, IEEECM = IEEE Communications Magazine, JAPA = Journal of the American Planning Association, JAH = Journal of Adolescent Health, HPD = Housing Policy Debate, JDMM = Journal of Destination Marketing and Management.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Efficient Scavenging of Solar and Wind Energies in a Smart City	Wang, S. et al.	193	2016	ACS NANO	19	59
Benefits and Challenges of Using Smart Meters for Advancing Residential Water Demand Modeling and Management: A Review	Cominola, A. et al.	194	2015	EMS	15	63
The Information Have-Less: Inequality, Mobility, and Translocal Networks in Chinese Cities	Cartier, C. et al.	195	2005	IEEETMC	13	60
Towards Smart City: M2M Communications with Software Agent Intelligence	Chen, M.	196	2013	SCS	11	56
Recent Insights into the Biomedical Applications of Shape-memory Polymers	Serrano, M.C. et al.	197	2013	MB	6	56
Crowdsourcing Urban Air Temperatures from Smartphone Battery Temperatures	Overeem, A. et al.	198	2005	GRL	5	60
Treatment of Hydrocephalus Determined by the European Orbis Sigma Valve II Survey: A Multicenter Prospective 5-Year Shunt Survival Study in Children and Adults in Whom a Flow-Regulating Shunt Was Used	Hanlo, P.W. et al.	199	2005	JN	15	60
A Methodological Framework for Benchmarking Smart Transport Cities	Marine-Roig, E.;	200	2014	Cities	4	66
Making Smarter Environmental Management Decisions	Gregory, R.S. et al.;	201	2015	JAWRA	8	71
Epidemiology and Antimicrobial Susceptibility Profiles of Aerobic and Facultative Gram-Negative Bacilli Isolated from Patients with Intra-Abdominal Infections in the Asia-Pacific Region: 2008 Results from Smart (Study for Monitoring Antimicrobial Resistance Trends)	Hsueh, P.R. et al.	202	2015	IJAA	8	71
Internet of Things Security: A Survey	Alaba, F.A. et al.	203	2017	UFR	36	87
The Role of Big Data Analytics in Internet of Things	Noshina, T. et al.	204	2017	CN	36	87

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. ACS NANO = ACS Nano, EMS = Environmental Modelling and Software, IEEETMC = IEEE Transactions on Mobile Computing, SCS = Sustainable Cities and Society, MB = Macromolecular Bioscience, GRL = Geophysical Research Letters, JN = Journal of Neurosurgery, Cities = Cities, JAWRA = Journal of the American Water Resources Association, IJAA = International Journal of Antimicrobial Agents, UFR = Urban Affairs Review, CN = Computer Networks.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
A Lightweight Privacy-Preserving Data Aggregation Scheme for Fog Computing-Enhanced IoT	Lu, R. et al.	205	2017	Access	36	52
Big IoT Data Analytics: Architecture, Opportunities, and Open Research Challenges	Mohsen, M. et al.	206	2017	Access	24	52
Smart Tourism Destinations: Ecosystems for Tourism Destination Competitiveness	Boes, K. et al.;	207	2016	IJTC	12	52
Trace Analysis and Mining for Smart Cities: Issues, Methods, and Applications	Pan, G. et al.	208	2013	IEEECM	35	57
How Do We Understand Smart Cities? An Evolutionary Perspective	Rama, Krishna R. et al.	209	2013	Cities	35	57
Smart Cities: A Survey on Data Management, Security, and Enabling Technologies	Gharaibeh, A.	210	2013	IEEECST	18	57
Smart City Architecture and its Applications based on IoT	Gaur, A. et al.	211	2013	6ICAS	14	57
A Strategic View on Smart City Technology: The Case of IBM Smarter Cities during a Recession	Paroutis, S. et al.	212	2014	TFSC	6	62
Smart Cafe Cities: Testing Human Capital Externalities in the Boston Metropolitan Area	Fu, S.	213	2007	JUE	35	59
Heterogeneous ad hoc Networks: Architectures, Advances and Challenges	Qiu, T. et al.	214	2007	AN	17	59
Smart Sustainable Cities: Definition and Challenges	Hojer, M. et al.	215	2017	ICTIS	14	48
The Participact Mobile Crowd Sensing Living Lab: The Testbed for Smart Cities	Cardone, G. et al.	216	2014	IEEECM	10	62
Passive Cooling Design Options to Ameliorate Thermal Comfort in Urban Streets of a Mediterranean Climate (Athens) under Hot Summer Conditions	Shashua-Bar, L. et al.	217	2014	BE	34	62
Designing e-Government Services: Key Service Attributes and Citizens' Preference Structures	Venkatesh, V. et al.	218	2014	JOM	11	62
The Future of Earth Observation in Hydrology	Cardone, G. et al.	219	2014	HESS	34	62

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in *WoS*. Access = IEEE Access, IJTC = International Journal of Tourism Cities, IEECM = IEEE Communications Magazine, IEEECST = IEEE Communications Surveys and Tutorials, 6ICAS = 6th International Conference on Ambient Systems, Networks, and Technologies (Ant-2015), The 5th International Conference on Sustainable Energy Information Technology (Seit-2015), TFSC = Technological Forecasting and Social Change, JUE = Journal of Urban Economics, AN = Ad-Hoc Networks, ICTIS = ICT Innovations for Sustainability, BE = Building and Environment, JOM = Journal of Operations Management, HESS = Hydrology and Earth System Sciences.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Fog Orchestration for Internet of Things Services	Wen, Z. et al.	220	2017	IEEEIC	17	48
What Is Second Screening? Exploring Motivations of Second Screen Use and Its Effect on Online Political Participation	Raza, U. et al.	221	2017	JC	17	225
Towards Cloud-Based Big Data Analytics for Smart Future Cities	Khan, Z. et al.	222	2017	JCCASA	5	225
Nanometer-Sized Gold-Loaded Gelatin/Silica Nanocapsules	Liu, S.H. et al.	223	2017	AM	67	225
Security and Privacy in Smart Health: Efficient Policy-Hiding Attribute-Based Access Control	Zhang, Y. et al.	224	2018	IEEEITJ	11	50
Legalizing Smart Growth—An Empirical Study of Land Use Regulation in Illinois	Talen, E. et al.	225	2003	IEEECM	7	62
Smart Metering: Enabler for Rapid and Effective Post Meter Leakage Identification and Water Loss Management	Britton, T.C. et al.	226	2013	JCP	11	62
Architectural Implications of Smart City Business Models: An Evolutionary Perspective	Mulligan, C.E.A. et al.	227	2013	IEEECM	11	65
An Architectural Framework and Enabling Wireless Technologies for Digital Cities Intelligent Urban Environments	Yovanof, G.S. et al.	228	2009	IEEEWPC	33	225
A Review of Smart Cities Based on the Internet of Things Concept	Saber, T. et al.	229	2017	Energies	22	225
Machine-to-Machine (M2M) Communications: A Survey	Verma, Pawan K.	230	2019	JNCA	17	54
Software-Defined Internet of Things for Smart Urban Sensing	Liu, J.	231	2015	IEEECM	13	56
A Smart City Application: A Fully Controlled Street Lighting Isle Based on Raspberry-Pi Card, a ZigBee Sensor Network and WiMAX	Leccese, F. et al.	232	2014	Sensors	9	60

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IEEEIC = IEEE Internet Computing, JC = Journal of Communication, JCCASA = Journal of Cloud Computing—Advanced Systems and Applications, AM = Advanced Materials, IEEEITJ = IEEE Internet of Things Journal, IEEECM = IEEE Communications Magazine, RE = Renewable Energy, JCP = Journal of Cleaner Production IEEEWPC = Wireless Personal Communications, JNCA = Journal of Network and Computer Applications.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Urban Energy Systems with Smart Multi-Carrier Energy Networks and Renewable Energy Generation	Niemi, R. et al.	233	2012	RE	21	59
Socio-technical Evolution of Decentralized Energy Systems: A Critical Review and Implications for Urban Planning and Policy	Adil, A.M. et al.	234	2016	RSER	21	55
Privacy Preserving Deep Computation Model on Cloud for Big Data Feature Learning	Zhang, Q. et al.	235	2015	IEEETC	16	55
Home Demand Side Management Integrated with Electric Vehicles and Renewable Energy Sources	Marine-Roig, E. et al.	236	2014	EB	5	66
Parental Perspectives on Influenza Immunization of Children Aged 6 to 23 Months	Debnath, A.K. et al.	237	2005	AJPM	4	64
Conventional Development versus Managed Growth: The Costs of Sprawl	Robert, W.B. et al.	238	2003	AJPH	4	64
Spaces of Surveillant Simulation: New Technologies, Digital Representations, and Material Geographies	Graham, S. et al.	239	2003	JPER	32	62
Software-Defined Networks with Mobile Edge Computing and Caching for Smart Cities: A Big Data Deep Reinforcement Learning Approach	Ying, H. et al.	240	2003	IEEECM	32	62
Incorporating Intelligence in Fog Computing for Big Data Analysis in Smart Cities	Tang, B.et al.	241	2017	IEEETII	32	49
Trends of European Research and Development in District Heating Technologies	Ma, S. et al.	242	2017	RSER	21	49
Smartbuddy: Defining Human Behaviours Using Big Data Analytics in Social Internet of Things	Anand, P. et al.	243	2016	IEEEWC	21	68

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. RE = Renewable Energy, RSER = Renewable and Sustainable Energy Reviews, IEEETC = IEEE Transactions on Computers, EB = Energy and Buildings, AJPM = American Journal of Preventive Medicine, AJPH = American Journal of Public Health, JPER = Journal of Planning Education and Research, IEEECM = IEEE Communications Magazine, IEEETII = IEEE Transactions on Industrial Informatics, IEEEWC = IEEE Wireless Communications.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Smart Cities: Concepts, Architectures, Research Opportunities	Rida, K. et al.	244	2016	ACM	21	68
Cities and Sustainability: Polycentric Action and Multilevel Governance	Homsy, G.C. et al.	245	2015	UFR	16	53
Mapping Atmospheric Aerosols with a Citizen Science Network of Smartphone Spectropolarimeters	Frans, S.C. et al.	246	2015	GRL	13	53
Accidental, Open and Everywhere: Emerging Data Sources for the Understanding of Cities	Arribas-Bel, D.	247	2014	AG	13	58
Bridge over Troubled Waters: Understanding the Synthetic and Biological Identities of Engineered Nanomaterials	Fadeel, B. et al.	148	2014	AG	11	58
Evaluating Smart Growth—Implications for Small Communities	Mary, M.E. et al.	249	2014	JPER	5	58
Networked Microgrids for Enhancing the Power System Resilience	Homsy, G.C. et al.	250	2015	Proceedings	31	53
Block-VN: A Distributed Blockchain Based Vehicular Network Architecture in Smart City	Jannat, J.	251	2014	JIPS	31	58
An Optimized Grey Model for Annual Power Load Forecasting	Zhao, H. et al.	252	2016	Energy	21	30
A Comprehensive Approach to Privacy in the Cloud-Based Internet of Things	Henze, M.	253	2016	FGCSIJS	21	56
CityPulse: Large Scale Data Analytics Framework for Smart Cities	Puiu, D. et al.	254	2016	Access	21	55
Data from Mobile Phone Operators: A Tool for Smarter Cities?	Steenbruggen, J.	255	2015	TP	16	53
Developing and Validating a Citizen-Centric Typology for Smart City Services	Kim, S.A. et al.	256	2014	GIQ	12	49
Evaluating Smart Growth—Implications for Small Communities	Edwards, M. et al.	257	2007	JPER	4	60
Evaluating the Impact and Risk of Pluvial Flash Flood on Intra-Urban Road Network: a Case Study in the City Center of Shanghai, China	Yin, J. et al.	258	2016	JH	20	44

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. ACM = Communications of the ACM, UFR = Urban Affairs Review, GRL = Geophysical Research Letters, AG = Applied Geography, Nanomedicine = Wiley Interdisciplinary Reviews—Nanomedicine and Nanobiotechnology, JPER = Journal of Planning Education and Research, Proceedings = Proceedings of the IEEE, JIPS= Journal of Information Processing Systems, Energy = Energy, FGCSIJS = Future Generation Computer Systems—The International Journal of eScience, Access = IEEE Access, TP = Telecommunications Policy, GIQ = Government Information Quarterly, JPER = Studies in Comparative International Development, JH = Journal of Hydrology.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
An Efficient Conditional Privacy-Preserving Authentication Scheme for Vehicular Sensor Networks Without Pairings	Lo, N-W. et al.	259	2015	IEEETITS	20	48
Optical Waveguides in Lithium Niobate: Recent Developments and Applications	Bazzan, M. et al.	260	2015	APR	15	48
Simulating a Future Smart City: An Integrated Land Use–Energy Model	Yamagata, Y. et al.	261	2012	AE	10	60
Smart Networked Cities?	Tranos, E.	262	2012	IEJSSR	9	64
How to Strategize Smart Cities: Revealing the SMART Model	Ben Letaifa, S.	263	2015	JBR	3	72
Fog Computing for Sustainable Smart Cities: A Survey	Perera, C. et al.	264	2015	ACMCS	30	72
Internet of Things Applications and Challenges in Smart Cities: a Case Study of IBM Smart City Projects	Scuotto, V. et al.	265	2016	BPMJ	20	50
A Study on Smart Parking Guidance Algorithm	Lee, J. et al.	266	2014	TRPCT	12	48
Towards Smart City: M2M Communications with Software Agent Intelligence	Min, C. et al.	267	2014	MTA	10	48
Characterizing Growth Types and Analyzing Growth Density Distribution in Response to Urban Growth Patterns in Peri-Urban Areas of Lianyungang City	Shi, Y. et al.	268	2012	LUP	9	48
Can a City Successfully Shrink? Evidence from Survey Data on Neighborhood Quality	Hollander, J.B.	269	2011	UAR	8	53
A Multi-Scale Analysis of Urban Form and Commuting Change in a Small Metropolitan Area (1990–2000)	Horner, M.W. et al.	270	2007	ARS	5	30
A GIS-Based Decision Support System for Brownfield Redevelopment	Thomas, M.R. et al.	271	2002	LUP	4	54
Greening the Smart Cities: Energy-Efficient Massive Content Delivery via D2D Communications	Liang, Z. et al.	272	2002	IEEETII	59	54
Don't Call Me Resilient Again!: The New Urban Agenda as Immunology ... or ... What Happens When Communities Refuse to Be Vaccinated with Smart Cities' and Indicators	Kaika, M.	273	2017	EU	30	54

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. IEEETITS = IEEE Transactions on Intelligent Transportation Systems, APR= Applied Physics Reviews, AE = Applied Energy, IEJSSR = Innovation—The European Journal of Social Science Research, JBR = Environment And Planning D—Society and Space, ACMCS = ACM Computing Surveys, BPMJ = Business Process Management Journal, TRPCT = Transportation Research Part C—Emerging Technologies, MTA= Multimedia Tools and Applications, LUP = Landscape and Urban Planning, UAR = Urban Affairs Review, ARS = Annals of Regional Science, IEEETII = IEEE Transactions on Industrial Informatics, EU = Environment and Urbanization.

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Smart Utopia vs. Smart Reality: Learning by Experience from 10 Smart City Cases	Anthopoulos, L.	274	2002	Cities	30	54
Internet of Things for Smart Cities: Interoperability and Open Data	Bengt, A. et al.	275	2016	IEEEIC	20	54
Spurring Impactful Research on Information Systems for Environmental Sustainability	Malhotra, A. et al.	276	2013	MIS	10	30
A Community-Based Restaurant Initiative to Increase Availability of Healthy Menu Options in Somerville, Massachusetts: Shape Up Somerville	Economos, C.D. et al.	277	2009	PCD	6	56
Mobile-Edge Computing and the Internet of Things for Consumers Extending Cloud Computing and Services to the Edge of the Network	Corcoran, P. et al.	278	2014	IEEECEM	19	40
Building Energy Management Systems The Age of Intelligent and Adaptive Buildings	Manic, M. et al.	279	2016	IEEEIEM	19	52
Distributed Manufacturing: Scope, Challenges and Opportunities	Jagjit, S.S. et al.	280	2009	PCD	19	56
The Digital Skin of Cities: Urban Theory and Research in the Age of the Sensored and Metered City, Ubiquitous Computing and Big Data	Rabari, C. et al.	281	2014	CJRES	15	44
Intelligent Metering for Urban Water: A Review	Boyle, T. et al.	282	2013	Water	10	53
Energy Management and Smart Grids	Miceli, R.	283	2013	Energies	21	65
Urban Containment Strategies: A Case-Study Appraisal of Plans and Policies in Japanese, British, and Canadian Citiest Intelligence	Millward, H.	284	2006	LUP	4	60
Smart Contradictions: The Politics of Making Barcelona a Self-Sufficient City	March, H. et al.	285	2016	EURS	19	46
Smart Cities from Scratch? a Socio-Technical Perspective	Carvalho, L.	286	2014	CJRES	14	46
Smart Cities: Moving beyond Urban Cybernetics to Tackle Wicked Problems	Goodspeed, R.	287	2014	CJRES	14	47

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS. Cities = Cities, IEEEIC = IEEE Internet Computing, MIS = MIS Quarterly, PCD = Preventing Chronic Disease, IEEECEM = IEEE Consumer Electronics Magazine, IEEEIEM = IEEE Industrial Electronics Magazine, CJRES = Cambridge Journal of Regions, Economy, and Society, Water = Water, LUP = Land Use Policy, EURS = European Urban and Regional Studies, .

Table A1. *Cont.*

Article	Authors	R	Year	J	C/Y	TC
Dynamic Accessibility Mapping Using Floating Car Data: A Network-Constrained Density Estimation Approach	Li, Q. et al.	288	2011	JTG	7	41
Travel Time and Transfer Analysis Using Transit Smart Card Data	Wonjae, J.	289	2011	TRR	6	41
Is There Anybody Out There? the Place and Role of Citizens in Tomorrow's Smart Cities	Vanolo, A.	290	2011	Futures	19	41
Impact of the First 5 Years of a National Abdominal Aortic Aneurysm Screening Programme	Jacomelli, J. et al.	291	2016	BJS	19	41
A Smart Parking Lot Management System for Scheduling the Recharging of Electric Vehicles	Kuran, M.S. et al.	292	2015	IEEETSG	14	46
A Literature Survey on Smart Cities	Yin, C.T. et al.	293	2014	CCIS	14	30
A Cloud-Based Car Parking Middleware for IoT-Based Smart Cities: Design and Implementation	Ji, Z. et al.	294	2014	Sensors	11	51
A Routing Protocol Based on Energy and Link Quality for Internet of Things Applications	Machado, K. et al.	295	2014	Sensors	9	51
Local Political Institutions and Smart Growth: An Empirical Study of the Politics of Compact Development	Ramírez de la Cruz, E.E.	296	2009	UFR	9	51
Shocking the Suburbs: Urban Location, Homeownership and Oil Vulnerability in the Australian City	Dodson, J. et al.	297	2007	HS	19	55
Heterogeneous ad hoc Networks: Architectures, Advances and Challenges	Qiu, T. et al.	298	2017	IEEECST	19	55
Indoor Air Quality and Its Effects on Humans—A Review of Challenges and Developments in the Last 30 Years	Tham, K.W.	299	2016	EB	12	48
A Hierarchical Security Framework for Defending Against Sophisticated Attacks on Wireless Sensor Networks in Smart Cities	Wu, J. et al.	300	2016	Access	12	48

Abbreviations: R = Rank; J = Journal; C/Y = Citations per year; TC = Total citations in science journals indexed in WoS, JTG = Journal of Transport Geography, TRR = Transportation Research Record, Futures = Futures, BJS = British Journal of Surgery, IEEETSG = IEEE Transactions on Smart Grid, CCIS = Science China—Information Sciences, Sensors = Sensors, UFR = Urban Affairs Review, HS = Housing Studies, IEEECST = IEEE Communications, Surveys, and Tutorials, EB = Energy and Buildings.

References

1. Guo, Y.M.; Huang, Z.L.; Guo, J.; Li, H.; Guo, X.R.; Nkeli, M.J. Bibliometric Analysis on Smart Cities Research. *Sustainability* **2019**, *11*, 3606. [CrossRef]
2. Ramaprasad, A.; Sánchez-Ortiz, A.; Syn, T. A Unified Definition of a Smart City. *Lect. Notes Comput. Sci.* **2015**, *22*, 13–24
3. Mora, L. The First Two Decades of Smart-City Research: A Bibliometric Analysis. *J. Urban Technol.* **2017**, *24*, 3–27. [CrossRef]
4. Albino, V.; Berardi, U.; Dangelico, R.M. Smart Cities: Definitions, Dimensions, Performance, and Initiatives. *J. Urban Technol.* **2015**, *22*, 3–21. [CrossRef]
5. Changfeng, J.; Mingyi, D.; Songnian, L.; Siyuan, L. Geospatial Dashboards for Monitoring Smart City Performancea. *Sustainability* **2019**, *11*, 5648.
6. Chengming, L.; Xiaoli, L.; Zhaoxin, D.; Zhanjie, Z. Smart City: A Shareable Framework and Its Applications in China. *Sustainability* **2019**, *11*, 4346.
7. Merigó, J.M.; Yang, J.-B. Accounting Research: A Bibliometric Analysis. *Aust. Account. Res.* **2017**, *27*, 71–100.
8. Garg, K.C.; Sharma, C. Bibliometrics of Library and Information Science research in India during 2004–2015. *J. Libr. Inf. Technol.* **2017**, *37*, 221–227. [CrossRef]
9. Metse, A.P.; Wiggers, J.H.; Wye, P.M.; Wolfenden, L.; Prochaska, J.J.; Stockings, E.A.; Bowman, J.A. Smoking and Mental Illness: A Bibliometric Analysis of Research Output Over Time. *Nicotine Tob. Res. Oxf. Acad.* **2019**, *19*, 24–31. [CrossRef]
10. Broadus, R.N. Toward a definition of bibliometrics. *Scientometrics* **1987**, *12*, 373–379.
11. Hood, W.W.; Wilson, C.S. The literature of bibliometrics, scientometrics, and informetrics analysis. *Scientometrics* **2001**, *52*, 291–314. [CrossRef]
12. White, H.D.; McCain, K.W. Bibliometrics. *Annu. Rev. Inf. Sci. Technol.* **1989**, *24*, 119–186.
13. Larivière, V.; Sugimoto, C.R.; Cronin, B. A bibliometric chronicling of library and information science's first hundred years review. *Landsc. Urban Plan.* **2012**, *63*, 997–1016.
14. Thelwall, M. Bibliometrics to webometrics. *J. Inf. Sci.* **2008**, *34*, 605–621. [CrossRef]
15. Bar-Ilan, J. Informetrics at the beginning of the 21st century—A review. *J. Inf.* **2008**, *2*, 1–52.
16. Narin, F. Bibliometrics theory, practice and problems. *Eval. Rev.* **1994**, *11*, 65–76.
17. Zupic, I.; Čater, T. Bibliometric Methods in Management and Organization. *Organ. Res. Methods* **2014**, *18*, 429–472. [CrossRef]
18. Osareh, P.F. Bibliometrics, citation analysis and co-citation analysis: A review of literature. *Libri* **1996**, *46*, 149–158. [CrossRef]
19. Bornmann, L.; Mutz, R. Growth rates of modern science: A bibliometric analysis based on the number of publications and cited references. *J. Assoc. Inf. Sci. Technol.* **2015**, *66*, 2215–2222. [CrossRef]
20. Merigó, J.M.; Gil-Lafuente, A.M.; Yager, R.R. An overview of fuzzy research with bibliometric indicators. *Appl. Soft Comput.* **2015**, *27*, 420–433. [CrossRef]
21. Blanco-Mesa, F.; Merigó, J.M.; Gil-Lafuente, A.M. Fuzzy decision making: A bibliometric-based review. *J. Intell. Fuzzy Syst.* **2017**, *32*, 2033–2050. [CrossRef]
22. Bjorneborn, L.; Ingwersen, P. Toward a basic framework for webometrics. *J. Inf.* **2004**, *55*, 1216–1227. [CrossRef]
23. Gupta, B.M.; Dhawan, S.M. Electronic Books: A Scientometric Assessment of Global Literature during 1993–2018. *J. Libr. Inf. Technol.* **2019**, *39*, 251–258. [CrossRef]
24. Kokol, P.; Blažun, V.H.; Završnik, J. Application of bibliometrics in medicine: A historical bibliometrics analysis. *Health Inf. Libr. J.* **2020**. [CrossRef]
25. Michalopoulos, A.; Falagas, M.E. A bibliometric analysis of global research production in respiratory medicine. *Chest* **2005**, *128*, 3993–3998. [CrossRef]
26. Lefaivre, K.A.; Shadgan, B.; O'Brien, P.J. 100 Most Cited Articles in Orthopaedic Surgery. *Clin. Orthop. Relat. Res.* **2011**, *469*, 1487–1497
27. Kelly, J.C.; Glynn, R.W.; O'Briain, D.E.; Felle, P.; McCabe, J.P. The 100 classic papers of orthopaedic surgery a bibliometric analysis. *J. Bone Jt. Surg. Br. Vol.* **2010**, *92*, 1338–1343
28. Zhang, M.; Zhou, Y.; Lu, Y.; He, S.; Liu, M. The 100 most-cited articles on prenatal diagnosis A bibliometric analysis. *Medicine* **2019**, *98*, e17236. [CrossRef]

29. Zou, Y.; Luo, Y.; Zhang, J.; Xia, N.; Tan, G.; Huang, C. Bibliometric analysis of oncolytic virus research, 2000 to 2018. *Medicine* **2019**, *98*, e16817. [CrossRef]
30. Svider, P.F.; Choudhry, Z.A.; Choudhry, O.J.; Baredes, S.; Liu, J.K.; Eloy, J.A.The use of the h-index in Academic Otolaryngology. *Laryngoscope* **2013**, *123*, 103–106. [CrossRef]
31. Poskevicius, L. Scientific Publications in Dentistry in Lithuania, Latvia, and Estonia between 1996 and 2018: A Bibliometric Analysis. *Med. Sci. Monit.* **2019**, *25*, 4414–4422. [CrossRef] [PubMed]
32. Ahmad, P.; Asif, J.A.; Alam, M.K.; Slots, J. A bibliometric analysis of Periodontology 2000. *Periodontol. 2000* **2020**, *82*, 251–258. [CrossRef] [PubMed]
33. Kostoff, R.N. Text mining using database tomography and bibliometrics: A review. *Technol. Forecast. Soc. Chang.* **2001**, *68*, 223–253
34. Grant, J.; Cottrell, R.; Cluzeau, F.; Fawcett, G. Evaluating "payback" on biomedical research from papers cited in clinical guidelines: Applied bibliometric study. *Br. Med J.* **2000**, *321*, 1107–1111. [CrossRef] [PubMed]
35. Vergidis, P.I.; Karavasiou, A.I.; Paraschakis, K.; Bliziotis, I.A.; Falagas, M.E. Bibliometric analysis of global trends for research productivity in microbiology. *Eur. J. Clin. Microbiol. Infect. Dis.* **2005**, *24*, 342–346.
36. Suárez-Roldán, C.; Chaparro, N.; Rojas-Galeano, S. Bibliometric Study of the Journal Ingeniería (2010–2017). *Ingeniería* **2019**, *24*, 96–115. [CrossRef]
37. Ratten, V.; Pellegrini, M.M.; Fakhar, M.M.; Dabić, M. Trends and changes in Thunderbird International Business Review journal: A bibliometric review. *Thunderbird Int. Bus. Rev.* **2020**. [CrossRef]
38. Baker, H.K.; Kumar, S.; Pattnaik, D. Fifty years of The Financial Review: A bibliometric overview. *Financ. Rev.* **2020**, *55*, 7–24. [CrossRef]
39. Charlesworth, M.; Klein, A.A.; White, S.M. A bibliometric analysis of the conversion and reporting of pilot studies published in six anaesthesia journals. *Anaesthesia* **2020**, *75*, 247–253. [CrossRef]
40. Van Noorden, R.; Maher, B.; Nuzzo, R. The top 100 papers. *Nature* **2014**, *514*, 550–553. [CrossRef]
41. Vaughan, L.; Shaw, D. Bibliographic and web citations: What is the difference? *J. Assoc. Inf. Sci. Technol.* **2003**, *54*, 1313–1322. [CrossRef]
42. Van Noorden, R. Interdisciplinary research by the numbers. *Nature* **2015**, *525*, 306–307. [CrossRef] [PubMed]
43. Nicoll, L.H.; Oermann, M.H.; Carter-Templeton, H.; Owens, J.K.; Edie, A.H. A Bibliometric Analysis of Articles Identified by Editors as Representing Excellence in Nursing Publication: Replication and Extension. *J. Adv. Nurs.* **2019**, *76*, 1247–1254. [CrossRef] [PubMed]
44. Zhang, P.; Yan, F.; Du, C. Comprehensive analysis of energy management strategies for hybrid electric vehicles based on bibliometrics. *Renew. Sustain. Energy Rev.* **2015**, *48*, 88–104. [CrossRef]
45. Liu, W.; Wang, Z.; Zhao, H. Comparative study of customer relationship management research from East Asia, North America and Europe: A bibliometric overview. *Electron. Mark.* **2020**, *11*, 251–258. [CrossRef]
46. Cronin, B. Bibliometrics and beyond: Some thoughts on web-based citation analysis. *J. Inf. Sci.* **2001**, *27*, 1–7
47. Durieux, V.; Gevenois, P.A. Bibliometric Indicators: Quality Measurements of Scientific Publication. *Radiology* **2010**, *255*, 342–351. [CrossRef]
48. Guerola-Navarro, V.; Oltra-Badenes, R.; Gil-Gomez, H.; Gil-Gomez, J.A. Customer Relationship Management (CRM): A Bibliometric Analysis. *Int. J. Serv. Oper. Inform.* **2020**, in press. [CrossRef]
49. Vicedo, P.; Gil-Gómez, H.; Oltra-Badenes, R.; Guerola-Navarro, V. A Bibliometric Overview of How Critical Success Factors Influence on Enterprise Resource Planning Implementations. *J. Intell. Fuzzy Syst.* **2020**, *38*, 5475–5487. [CrossRef]
50. Gil-Gómez, H.; Arango, M.D.; Oltra-Badenes, R. Evolution and trends of information systems for business management: The M-Business. A Review. *Dyna* **2010**, *77*, 181–193.
51. Daim, T.U.; Rueda, G.; Martin, H.; Gerdsri, P. Forecasting emerging technologies: Use of bibliometrics and patent analysis. *Technol. Forecast. Soc. Chang.* **2006**, *73*, 981–1012. [CrossRef]
52. Fersht, A. The most influential journals: Impact Factor and Eigenfactor. *Proc. Natl. Acad. Sci. USA* **2009**, *106*, 6883–6884. [CrossRef] [PubMed]
53. Fu, H.Z.; Wang, M.H.; Ho, Y.S. Mapping of drinking water research: A bibliometric analysis of research output during 1992–2011. *Sci. Total Environ.* **1989**, *43*, 757–765. [CrossRef] [PubMed]
54. Fu, H.-Z. A bibliometric analysis of solid waste research during the period 1993–2008. *Waste Manag.* **2010**, *30*, 2410–2417. [CrossRef] [PubMed]

55. Wang, H.; He, Q.; Liu, X.; Zhuang, Y.; Hong, S. Global urbanization research from 1991 to 2009: A systematic research review. *Landsc. Urban Plan.* **2012**, *104*, 299–309. [CrossRef]
56. Ellegaard, O.; Wallin, J.A. The bibliometric analysis of scholarly production: How great is the impact? *Scientometrics* **2015**, *105*, 1809–1831. [CrossRef] [PubMed]