



E-Government Research Still Matter? A Bibliometric Analysis

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ABSTRACT

This paper proposes an analysis of the scientific works carried out on the topic of research specific to the field of e-government and to investigate the connection between the topics in the research area. In several countries, the desire to develop a new organizational structure of the e-government is in the initial stages. That is why we consider that there is still room for research in this field, especially in terms of insufficient clarification of the phenomenon, both conceptually and procedurally. Our study focuses on bibliometric analysis, investigating 484 references collected from the database of the Core Web of Science (WoS) collection. At the basis of the empirical approach proposed to render in a graphic map the results of the analysis, we resorted to the research tools VOSviewer similarities visualization program. In this research, we analyzed co-occurrence of keywords, co-authorship and co-citation in the field of e-governance. Such an approach is not only the state of knowledge but also has the most important influence, the authors, institutions and countries that develop research in the field. Our results evidence the existence of strong links between the main tools adopted by different countries regarding e-government. Taking into account the stage where most countries are regarding e-government, research in this area is required.

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1. Introduction

E-government is the principal element of the new society based on information and knowledge. E-government is a complex phenomenon, who refers to multiple connections that occur between authorities and citizens. Performance and provide better services are a few of the endless pressures the Governments are facing. In this sense, e-government is the answer to the continuous demand for performance improvement, because it has the potential to provide the basic pillars of efficiency, transparency and effectiveness. The necessary condition of the economic and social development of the whole society is represented by the digitalization of the public administration, this condition being also in conformity with international standards.

Nowadays, in order to give citizens confidence and to visibly increase the degree of administrative transparency, in the public sector it is necessary to implement innovation and creativity, these being vital for providing quality public services and increasing efficiency and performance in regarding the public sector, which will give confidence to citizens' and increase the degree of administrative transparency.

E-government is of major interest to society, assuming the creation of a connection between government and citizens' through the usage of computer applications, but also of other information technologies. The main purpose is to deliver information and services through the Internet. The main idea refers to the improvement of the Government's mode of action in its relation with the citizens' and the business environment.

Hence, the level of development of countries and factors that influence citizens' trust are two considerations that the adoption of e-government may depend on (Alzahrani et al., 2017; Mensah et al., 2018; Munyoka, 2019; Sabani et al., 2019; Weerakkody et al., 2013). Developing countries are facing some problems regarding the adoption, but also the development of e-government as compared to developed countries. Considering this, the difficulties that some developing countries face in implementing e-government are caused by several barriers such as lack of basic digital skills (enabling the practice of advanced technologies by both citizens' and employees public structures) and lack of an entity to coordinate efforts to implement the digital strategy.

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Hence, the governments of the developing countries have advanced in this area due to the support given by the developed countries (e.g. distribution and transfer of experiences) (Mkude and Wimmer, 2015). Munyoka (2019) suggests that e-government adoption and development by citizens' remains suboptimal and represents a real problem due to certain factors. Thus, age, level of education, accessibility to technology, perception, and gender are just a few of the numerous impediments to e-government adoption. In many countries e-government cannot be adopted because of the lack of citizens' participation; the great challenge of governments is making citizens have a high rate of participation regarding the adoption and development of e-government (Perez et al., 2019). Hence, the ultimate fundamental of e-government is to expand the degree of political participation of citizens and make the administrative apparatus more efficient. Hence, countries focus on adopting e-government to deliver excellent and efficient services to citizens'.

Nowadays, public administrations are making significant efforts and investing considerable resources regarding this approach. Of course, there are different ways to measure the success of e-government, which are often not quite clear. At the same time, there are a large number of limitations regarding the instruments of measurement regarding e-government. The success of e-government can be appreciated by adopting a series of performance indicators, among which we can mention: E-Government Development Index (EGDI) - which is a composite indicator based on weighted average of three indexes, as follows: TII (Telecommunication Infrastructure Index), HCI (Human Capital Index) and OSI (Online Service Index). As well, all of the three indexes are equally weighted, also they cover a wide range of topics that are related to e-government.

E-government stimulates economic growth and brings significant benefits. Firstly: improvement of economic competitiveness (e.g. increasing the efficiency of public services). Secondly: establishing a system that is modern, efficient and transparent. Last but not least: it ensures the increase of labour productivity (e.g. the state information infrastructure development).

However, regarding the adoption and development of e-government, we can consider citizens as the most important subjects. Firstly, because citizens have the main role, their trust in all that comprise e-government being essential. Secondly, regarding e-government development, it is fundamental to receive feedback, therefore, accessibility and attractiveness of e-government can be enhanced, by modelling it according to the needs and expectations of the citizens'.

2. Materials and methods

This research benefits from the data collected from the Web of Science Core Collection database, the world's most potent source of interconnected research information. WoS represent one of the most significant and popular sources of scientific documentation worldwide. This database is selected because it only includes high-quality academic journals.

Instead, to concentrate exclusive on e-government material, the results were obtained using the expressions such as: "e-government adoption", "e-government efficiency", "e-government development" for all the knowledge fields in the WoS. Considering that the expressions are numerous, they are closely related to the "e-government". The study comprises all documents published until 2019. Also, the final sample was limited only to articles. The sample includes only 484 documents.

Science mapping is avail in our research: the VOSviewer software. This software allows constructing and visualizing of bibliometric networks. Furthermore, it is possible to create maps based on network data through the software tool VOSviewer. Network data may be already available, but it is also possible to construct a network data. Also, these networks can contain scientific publications or journals, keywords, researchers, countries, research organizations, inclusive terms and they can be constructed based on citation, co-authorship, co-occurrence, co-citation, bibliographic coupling links.

To create a network, we can provide as an input to VOSviewer: bibliographic database files (i.e. Web of Science files) and reference manager files (i.e. RIS files). Thus, we studied the co-occurrence of author keywords (more exactly: keywords that arise beneath the abstract); co-citation (two articles receiving a citation from the same document); and co-authorship (the number of co-authors among the most efficient sources).

Also, when practising with VOSviewer, it is essential to understand the terminology avail by this software. Maps constructed, visualized, and analyzed adopting VOSviewer comprise items. Items can be for example researchers, terms or publications, which represent the objects of interest. Among any couple of items is possible to exist a link that evidences the connection of two items, such are: bibliographic coupling links for publications, co-authorship links for researchers, and co-occurrence links for terms and notions. Any link can have a strength, characterized by a positive numerical value, which highlights a high value when the connection is stronger or vice versa. The strength of any of the links obtained is possible to highlights the number of references considered citations that, at least two publications have in common as references or the number of publications that at least two researchers have in common as co-authorship links. Any network can be created by placing together items and links. A network is a set of elements together with the links between elements, which in turn can be grouped into groups. Groups are also a set of items included in a map so it is essential to know if an item can only be part of a certain group. Clusters do not necessarily have to

cover the total items in a map. Therefore, there can be items that do not appertain to any of the clusters. In VOSviewer each cluster is labelled, applying for a cluster number and each item may have distinct attributes. Also, both weight and score attributes are considered relevant, so higher weight items are considered more significant than items with a low weight. Two standard weight attributes are considered, namely the Links and the Total link strength attribute that illustrate the number of connections between items and the total strength of those, too. This research tool is a valuable support for the proposed analysis as content analysis, authorship and spreading research around the world.

3. Results

1. Keywords Analysis

This method focuses on highlighting the most persistent keywords over keyword co-occurrence (keywords that occur simultaneously in the same article). Thus, it is important to mention that only the keywords avail by the author in the abstract are taken into account. The main purpose is to observe the most adopted keywords by authors in the field of e-government. Also, is counted the number of documents in which two keywords are presented together (highlighted in every document by the authors). Figure 1 indicates the most important keywords and the nodes between keywords, respectively: the larger the keyword and the node, the greater the weights; when the distance among the nodes is smaller, the stronger the relationship among them. Also, co-occurrence is more frequent when we have thicker lines. With the same colour is indicated a series of related keywords or a cluster of keywords. Thus, the program identifies seven clusters. Figure 1 represents the keywords with the most frequent co-occurrences (applying a threshold of 2 co-occurrences). The first cluster (red), led by the word “electronic government”; contains 6 items: “e-government development”, “e-participation”, “e-democracy”, “social media”, “online services” and “United Nations”. Also, cluster one contains the highest number of words. The second cluster (green), led by the word „e-government” (which is the subject of our analysis), from this time with 5 items, containing also “evolution”, “benchmarking”, “development” and “e-government services”. Cluster 3 and cluster 4 include both 5 items. Therefore, cluster 3 and cluster 4 are led by the keywords “e-governance” (that is a part of e-government) and “information and communication technologies”. Also, between “e-governance” and “information and communication technologies” exists a link; “e-governance” referring to the application of “information and communication technology” to provide government services and to devise better relationships between the citizens and government. The fifth and sixth clusters are the ones led by the keywords “adoption” and “e-government adoption” which also refer to the research topic. Last but not least, cluster seven (orange) is the one led by the keywords “digital divide”, “e-voting” and “technology adoption”. However, the keywords “e-government” (which led the green cluster) and “adoption” (which led the sixth cluster), are the keywords with the highest occurrence. The green cluster lead by the keyword “e-government” is positioned at a short distance of the light blue cluster lead by the keyword “e-government adoption”. Thus, we can conclude that the relationship between the two topics analyzed is a strong one.

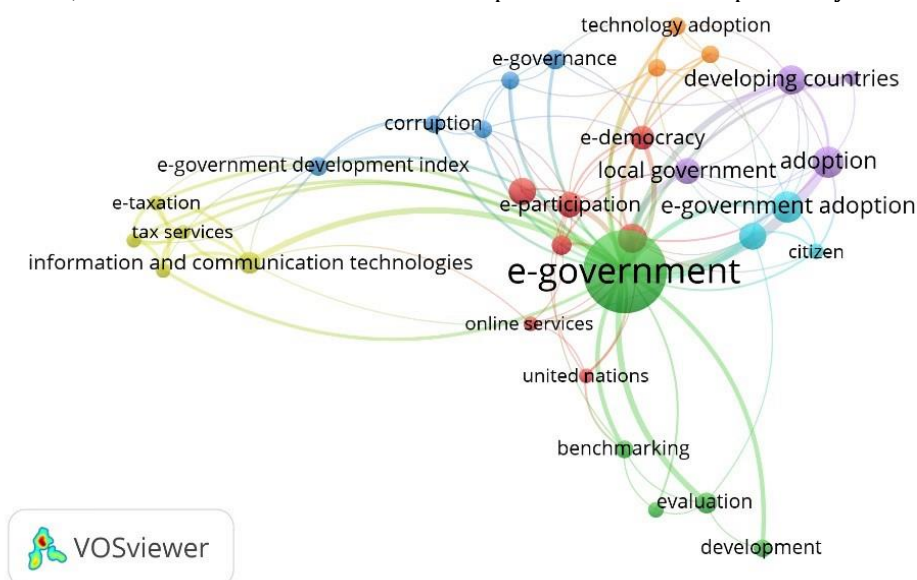


Figure 1. Co-occurrence network of author keywords of e-government related publications

2. Author co-citation network on e-government

In this section, the analysis focuses on the research area of the network of the main authors. Figure 2 presents 3 clusters, with 30 authors, out of 1385. Also, the threshold is 3 citations. The authors are grouped in 3 clusters, as follows: cluster one (red), cluster two (green) and cluster three (blue). The first cluster (in red), contains 13 items. Also, this cluster can be considered the main cluster of all (from the citation perspective). In this case, cluster one, led by Keeks, the author with the highest number of citations (216) and 1334 total link strength. Also, Keeks is followed by the United Nations (191 citations and 941 total link strength). In accordance with this criterion of the total link strength, we can consider two more authors: Roger (934 total link strength; 93 citations) and Moon (741 total link strength; 114 citations). The green cluster is another important cluster according to the citation criteria. This cluster contains Carter (156 citations; 1898 total link strength). Also, includes other two authors among the top 15 authors: Davis-131 citations; 1644 total link strength, Belanger-93 citations; 1135 total link strength. The last but not least, cluster three, with the colour blue, is also important because is led by Venkatesh, the author who is also in top 15 authors (171 citations; 2071 total link strength). Other authors who belong to this cluster and who have a significant number of citations are Weerakkody (68 citations; 618 total link strength), Rana (57 citations; 879 total link strength) and Dwivedy (57 citations; 730 total link strength). Finally, we can say that these authors concur on our field of research, but they are groups of authors who have developed the concept of e-government in general, not focusing on its adoption.

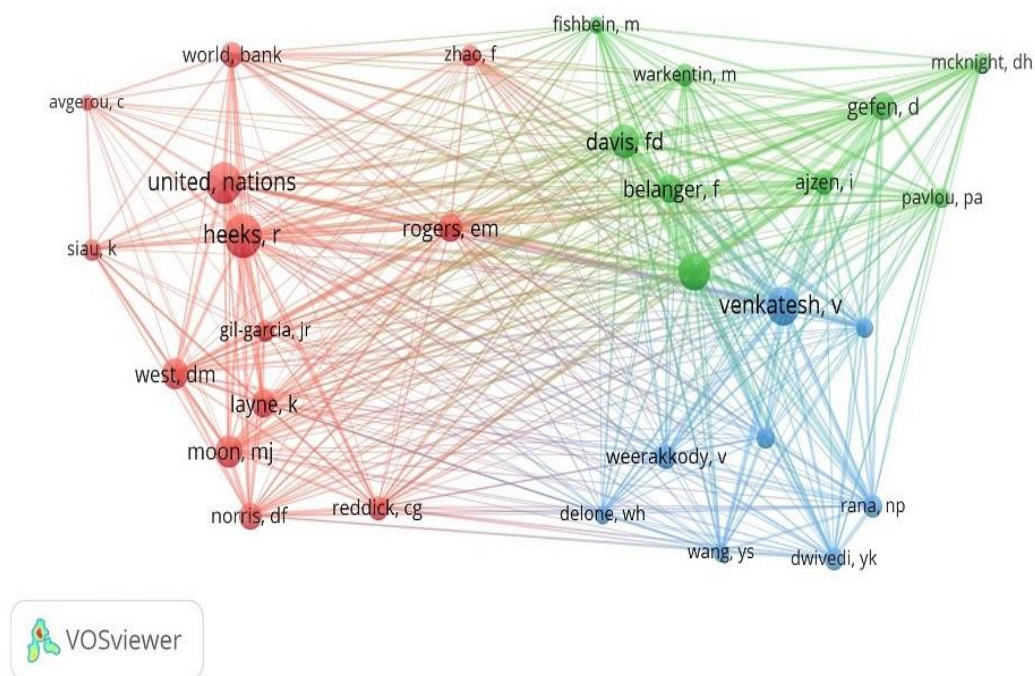


Figure 2. Author co-citation network on e-government

3. Country and University Co-Author Analysis

The co-authorship analysis allows the examination of the structure of research collaboration networks in a particular field. The present analysis allows identification of the behaviour of the research teams, but also their network relationship. Thus, the nodes represent either countries or institutions. The degree of collaboration is given by the thickness and the distance between the nodes. In this sense, we performed two co-authorships analyses: Country Co-Author Analysis and University Co-Author Analysis.

3.1. Country Co-Author Analysis

As we can notice this figure contains 6 clusters. The most important clusters are the first 4. They are represented by different colours as red, blue, green and yellow. Cluster one (red) contains the countries such as Australia, Jordan, Egypt, United Arab Emirates and England.

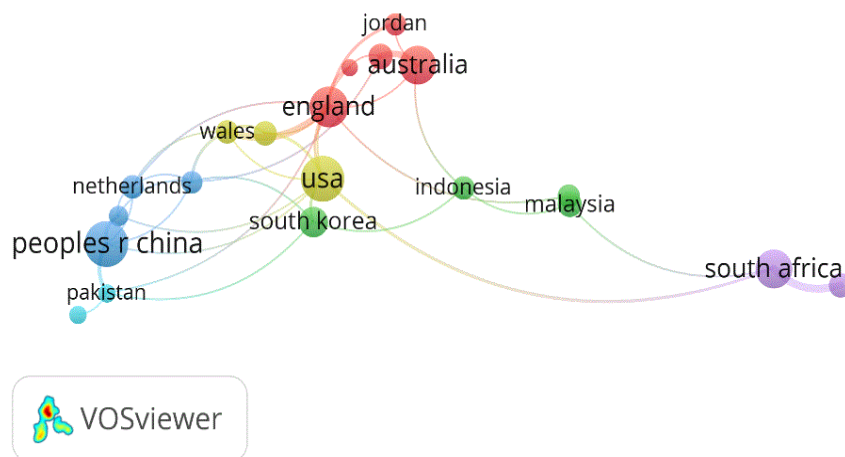


Figure 3. Countries co-authorship network of e-government

We can state not only that these countries are the most important, but we also can say that the links between the countries included are the strongest. The next cluster is the green one and contains the following countries: Indonesia, Iran, Malaysia and South Korea. The blue cluster consists of the following countries: Canada, Netherlands, China and Singapore. The last but not least cluster is represented by the colour purple. The following countries from the purple cluster: India, USA, Wales. The results indicate that the geographical area that analyzes the topics discussed is large. Thus, the results of the analysis are complex and we can see strong links between different countries in different parts of the world.

3.2. University Co-Author Analysis

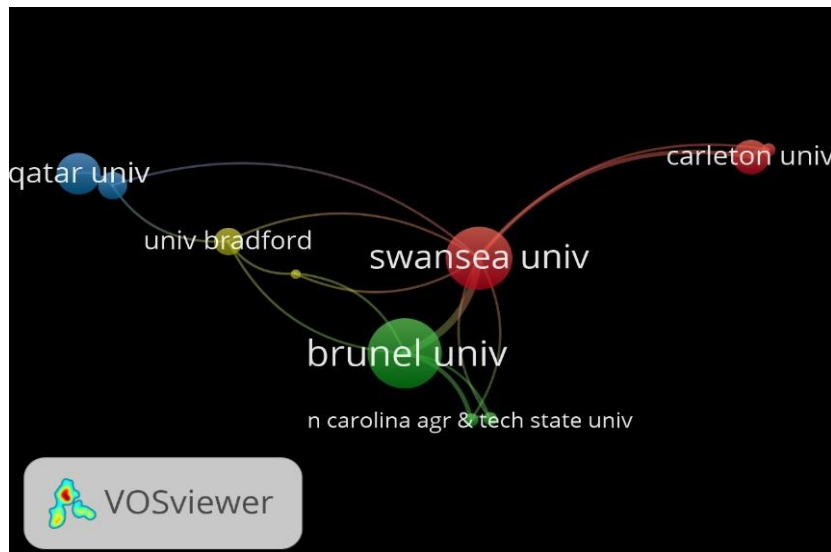


Figure 4. Institutions' co-authorship network regarding e-government

In this figure, the most important institution among the 4 clusters is Brunel University London (green cluster), with 10 published documents and 9 total link strength. Cluster one (red) contains another remarkable institution like Swansea University which has 9 assigned documents and 12 total link strength. Carleton University (cluster red) from Canada, represents other institution that has 5 published documents and 4 total link strength. However, VosViewer identifies 4 clusters. The first three clusters are the most important, among them being universities from countries like Canada, England, United Kingdom, Qatar, SUA and others.

4. Conclusions

This study presents an analysis of e-government from the bibliometric perspective, to observe if this subject is important for researchers. Thus, the following conclusions are revealed by our performed analysis. Firstly, keywords analysis highlights the distribution of the most frequent keywords through keyword co-occurrence. Also, the tool indicates the existence of numerous keywords relevant to our topic of research. Related to this, the software allows the visualization of the most frequent and important keywords. Referring to our analysis, the most availed words are represented by: “e-government”, “e-government adoption”, “e-government development” and “information and communication technologies”. Furthermore, there are words which are considered to be connected with “e-government” and “e-government adoption”, words like: “citizen”, “evolution”, “online services” and “e-participation”. Following the analysis, it is possible to state that e-government is strongly connected with other areas of research. Secondly, through co-citation analysis, we discovered the most important authors in the research area. Hence, each of them having significant contributions to the debate on the topic of analysis. Thirdly, there are identified six nodes of countries (led by the USA, Australia, Jordan, and Egypt) after countries co-authorship analysis of e-government documents. Ultimately, from the United Kingdom come to the most influential universities, with Brunel University London; other universities from Canada, England, SUA, Qatar are also important. The degree of development of civil society is based on the following relevant indicators: communication between authorities, institutions and, citizens. The way people perceive their relationship with public institutions can influence their interest in participation in the adoption of e-government. The results of the analysis can be considered the basic pillars in government decisions, regarding the adoption and development of e-government. In the results of the study, we can easily observe that e-government is not easy to adopt due to some factors related to citizens’ and their perceptions and expectations.

This study concludes that the adoption of this methodology has led to the result that e-government exerts its influence on large areas and has implications in the social, political or economic sphere, radically transforming the interaction of citizens’ with central or local public authorities. Finally, the attempts, involvement and efforts of governments around the world in adopting e-government cannot be disregarded, but they have failed due to certain factors. However, the main purpose of developing countries is to follow the methods and means of the developed countries regarding the adoption of e-government. We can also mention that different countries have failed to adopt e-government due to certain obstacles. This fact brings limitations for researchers in the research area of this topic. On the other hand, we can see this as an advantage, because the area is not a very large one, otherwise, there is space for new approaches.

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