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The Success of E-Participation in Supporting the Development of Smart Cities in Spain, Italy, United States, Germany

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ABSTRACT

This study aims to analyze the role of E-participation in supporting the success of smart city development. This research method uses qualitative research with a bibliometric analysis approach. Sources of research data obtained 218 documents from the Scopus database using the keywords "smart city" and "e-participation" with a span of 7 years from 2015 to 2022. The data analysis phase of this research used VOSviewer and NVivo12 Plus software to visualize the data. This study indicates that e-participation is essential in creating the successful implementation of smart cities. The implementation of e-participation in four countries has different participation strategies. Spain is increasing participation forms online communities and public participation platforms. Italy utilizes digital technology and involves volunteers in public participation. Germany, in increasing participation, develops digital participation platforms and implements practical participation projects. The United States applies a political approach and involves interest groups supported by digitization. Furthermore, increasing participation is supported by information and communication technology, services, and agile management are the main focus. Spain, management focuses on location data management, and service aspect focuses on service platforms, and technology focuses on blockchain technology. Italy, the service aspect focuses on open service, and the technology aspect focuses on open source technology. In the United States, the management aspect pays attention to location data management. Then, the technological aspect focuses on civil technology practices. Germany, management and service are not yet a top priority in this aspect. While the technology aspect only pays attention to the web technology sector. Based on these findings, Spain is a country that dominates various aspects. This means being a country that can be an example of e-participation development in realizing a smart city.

Keywords: Smart city, E-participation, Bibliometric analysis, ICT

INTRODUCTION

Smart city projects are getting more and more popular and widely spread all over the world. As we know that the growth of society in the city continues to grow and increase, a challenge for the city to continue to support the

use of technology to create public service (Dameri, 2013). The main determinant of urban intelligence is the network-type activity that characterizes it in many aspects of city life (Gagliardi *et al.*, 2017). Implementing smart city ideas requires a comprehensive city view and integration of many urban systems(Kauf, 2019). The standardization process also serves as a stepping stone for each city to outline its vision for a smart city strategy and build a complete smart city framework capable of linking all projects and activities (Dameri and Rosenthal-sabroux, 2017). In this category, e-Participation in the development and transition of participation in a democratic and consultative community system mediated by information and communication technology (ICT), especially the internet (Sæbø, Rose and Skiftenes Flak, 2008). E-participation aims to support active citizens by using modern technology, advancing access and availability of participation in the success of a just and efficient society and government (Sæbø, Rose and Skiftenes Flak, 2008). Therefore, the existence of e-Participation in a smart city is an effective solution to strengthen collaboration between the government and the community. Smart city development is an effective solution to improving the quality of life, supported by technology and information. Therefore, the researcher wants to focus on the four countries in terms of how the level of success of E-participation in supporting the development of smart cities in Spain, Italy, the United States, and Germany. We know that these four countries are countries that have dominated for the last 7 years, from 2015 to 2022. This is a very interesting and varied phenomenon to explore in more depth.

LITERATURE RIVIEW

The smart city idea is critical since its development and expansion benefit both sides, most notably municipal management, and the community (Kauf, 2019). Smart city programs aim to improve urban performance by harnessing data, information, and information technology (IT) to provide more efficient services to residents, monitor and manage existing infrastructure, and foster cooperation among varied economic players (Marsal-Llacuna, Colomer-Llinàs and Meléndez-Frigola, 2015). A related new approach to urban services has been based on leveraging technology, including ICT, to help create what some call smart cities (Albino, Berardi and Dangelico, 2015). From a citizen's point of view, involving the community in contributing through public participation is a voluntary action that aims to generate social benefits, which is carried out in public participation without the need for a legislature to include individuals in political decision-making (Vogt, Förster and Kabst, 2014). Local governments worldwide are progressively deploying e-participation platforms to engage citizens in consultation and decision-making (Macintosh and Whyte, 2008). Understanding the elements that influence e-participation over time is critical to developing dissemination and promotion strategies that encourage individuals to continue to participate (Naranjo-Zolotov *et al.*, 2019). Participation is a term that refers to the degree to which other parties are directly involved in making choices on government activities. Examples include public consultations, public meetings, and focus groups. Surveys, advisory or citizen groups, referendums,

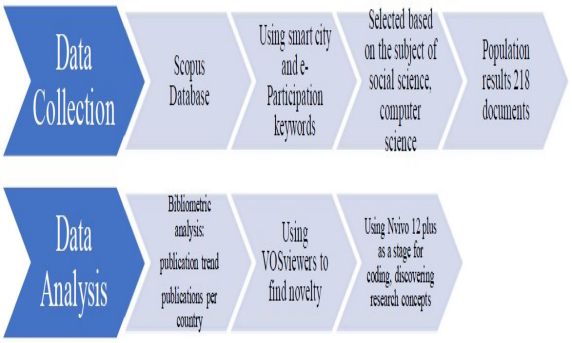

Figure 1: Stages of data identification and analysis.

initiatives, and business are all examples of these (Spil, Ton A.M, Robin Effing, 2017). According to (Gil-Garcia, Pardo and Nam, 2015), provides an in-depth examination of the components and features that comprise a smart city. This view consists of four perspectives: (1) technology and data, (2) government, (3) society, and (4) physical environment. Technology is seen as a perspective that contributes to them. One of the three components of the "Community" perspective is leaning toward the unique downtown environment of operations, emphasizing collaborative governance and the role of information and communication technologies in facilitating collaborative governance, participation, and engagement.

METHODS

This study uses a bibliometric analysis approach. At this stage, the researcher obtained 218 articles about "smart cities" and "e-Participation" which were sourced from the Scopus database. Bibliometric analysis evaluates bibliographic data objectively and quantitatively which is useful for constructing knowledge in a particular topic area (Merigó, Gil-Lafuente and Yager, 2015). Based on past research, qualitative techniques are used to organize issues and themes and organize ideas (Dixon-Woods *et al.*, 2006). This research consists of several stages, namely the identification of articles and data analysis. In the next stage, mutually supportive and related articles are needed to produce in-depth research.

The first step is to identify the article that a researcher wants to find. Then, the article search process uses the Scopus database by entering the keywords "smart city" and "e-Participation". After finding the total number of available articles, the researcher uses limits based on subject, number of documents, and applies a "limit to" application to limit the number of articles available. The second stage is the data analysis process using software that functions to analyze content, such as VOSviewers and Nvivo 12 plus. At this stage the purpose of using VOSviewers is to generate a concept, and research novelty related to the research topic. Meanwhile, using Nvivo 12 plus is to present visual data related to the topic, the relationship between concepts in a research.

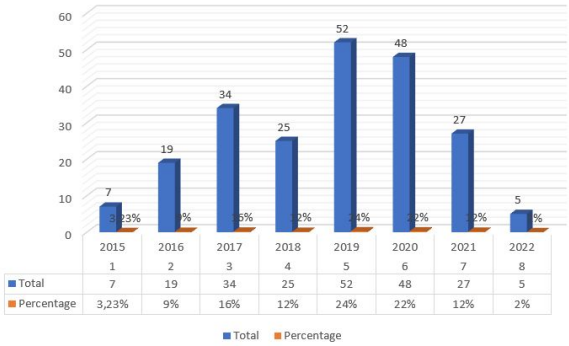

Figure 2: Scientific publication by year. Source: Scopus database.

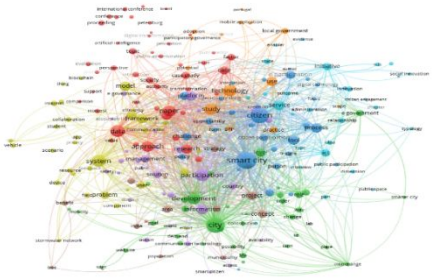

Figure 3: Network visualization co-occurance in E-participation smart city. Source: Processed by researchers using VOSviewer.

RESULTS

Trend in The Development of E-participation in Smart Cities

Trend data shows that in research publications based on year to year, namely from 2015 to 2022. Researchers obtained data within the last 7 years. We know that the data shows that it fluctuates from year to year. However, the highest data is in 2019. While the lowest data is the number of publications in 2022. Furthermore, the growth of these publications can be seen in the following table.

Based on the table above related to e-participation in smart cities, it shows that the highest achievement was in Spain with 26 documents, Italy 22 documents, United States 20 documents and Germany 18 documents. The table data is obtained from the Scopus database. Furthermore, the researcher chose the four countries that became the focus of his research.

Co-Occurance E-participation in Supporting Smart Cities

The success of E-participation in supporting smart cities in Spain, Italy, United States and Gemany is an effort by the state to achieve the goal of smart cities. VOSviewers software as a tool to display keyword relationships that can make it easier for researchers. So that later can find the novelty of the research process.

The picture is the result of the VosViewers software display related to network visualization E-participation in developing smart cities. Therefore,

Table 1. Four highest countries E-participation smart city.

Country	Number of Document	Afiliation	Author
Spain	26	Universidad de Granada	Rodríguez Bolívar, M.P
		Universidad Autónoma de Madrid	Alcaide Muñoz, L
		Universidad Complutense de Madrid	Cantador,
Italy	22	Università degli Studi di Sassari	Coscia, C.,
		Politecnico di Torino	Niglia, F.
		The University of Manchester	Bellavista, P.
United States	20	State University of New York Albany	Cronemberger, F.
		Georgia Institute of Technology	Aal, K.
		Argonne National Laboratory	Altarawneh,
Germany	18	Heinrich-Heine-Universität Düsseldorf	Avgerou, A.
		Ministry of Housing and Urban Affairs	Aal, K.
		National Library Board	Afrooz, A.E

Source: Scopus Database

the researcher demonstrates that the focus and strategy in developing agile human resources is supported by participatory services from government, community, interest groups. So this can make an adaptive smart city. In this case, technology is an important part of the sustainability of smart cities.

The Success of E-Participation Smart Cities

Visualization of data using VOSviewer software, then the data is coded with NVivo 12 plus. The data obtained from each country found the main focus in the success of e-participation smart city from three important aspects, management, service and technology in Spain, Italy, United States and Germany. The following is an image that interprets the success of e-participation in smart cities.

Based on the picture above, related to the success of e-participation in developing a smart city, it needs to be supported by strategic actions. In this study, each country has a different focus and strategy. Engagement is the main thing that can be done to create success for every country. Based on the concept of e-Participation is a form of involvement of citizens and other parties by utilizing technology, information and communication. In this context, the focus and strategy that can be used as a benchmark is the management, service sector and using technology as a tool to simplify and accelerate all activities. In this context, Spain has supporting variables, including management that pays

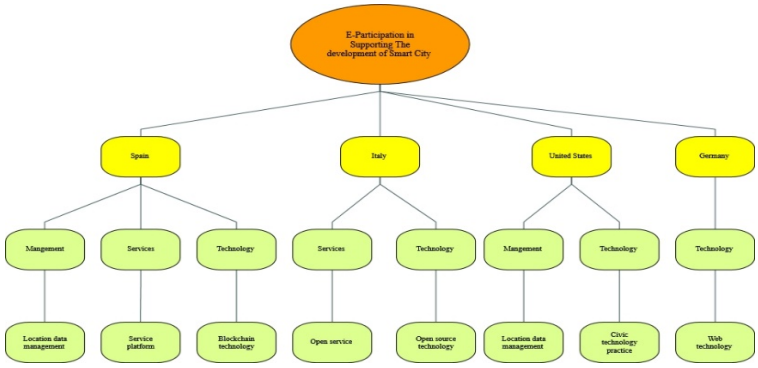

Figure 4: Coding data with Nvivo 12 Plus. Source: Processed by researches using NVivo 12 plus.

attention to location data management which is useful for providing privacy for the location of the data. Meanwhile, the agile service sector applies the latest cellular technology, georeference and wiki concepts. This is influenced by technological advances related to smartphones and mobile internet (De Reuver, Stein and Hampe, 2013). Aspects of the country's public services is to adopt web 2.0 technology. Increasing citizen participation is one way to change people's perceptions in political and public dialogue (Bolívar, 2017). As for the technology sector, by adopting Distributed Ledger Technologies-DLTs or it can be said that Blockchain technology can change the channel of citizen participation and facilitate the transparency of public information (Benítez-Martínez, Hurtado-Torres and Romero- Frías, 2021).Based on the State of Italy, adequate technology and good service are the main priorities in supporting community involvement. For example, the services carried out are open services that aim to involve citizens and the government in a participatory manner (Gagliardi *et al*., 2017). Then, there is the use of open source technology to encourage e-participation in urban planning (De Filippi, Coscia and Guido, 2017). In the United States, the management sector focuses more on location data management which is used to provide location privacy for the data. While the technology sector uses civic technology practices to develop smart cities by combining open civic data, collaborative civic technology to facilitate effective governance (David, McNutt and Justice, 2018). Furthermore, the German state is only in the technology sector by using web technology that utilizes HTML5 and WebGL to facilitate public participation in urban planning (Dambruch and Krämer, 2014).

CONCLUSION

This research is related to the success of e-participation in developing smart cities which is supported by several variables including management, agile services and adequate technology. Regarding the growth of e-participation publications from year to year, it fluctuates based on data from 2015 to 2022. On the other hand, with the development of technology, public involvement has become important in supporting smart cities. Each country has a different perception in developing it, some are using online communities, forming

volunteers, and so on. In the researcher's perception that the success of e-participation is not only in the community, but it requires the synergy of the government, interest groups and supported by adequate technology. So that the smart city becomes realized and has implications for the community.

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