URBAN POLICIES AND KNOWLEDGE-BASED SYSTEMS: HIGHLIGHTING THEIR RELATIONSHIP TO EACH OTHER OVER THE PERIOD 2010 – 2021

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ABSTRACT

Cities, as a source of and a solution to modern challenges (such as financial crisis or health-related crisis), are complex systems that give urban policies broad spatial significance. Creating and implementing urban policies engages with many social, economic, environmental, and spatial concerns, which often conflict. Modern technologies offer new possibilities for (i) understanding the special characteristics of the urban space, and for (ii) forming alternative scenarios in forecasts or evaluations. This article uses bibliostatistics analysis and review of about 1,000 relevant articles of the period 2010 - 2021 to identify dominant planning methods and relevant technological approaches or models, with emphasis on knowledge-based systems, and to add new aspects to successful decision making in urban planning.

KEYWORDS: Urban policies, urban space, planning methods, knowledge-based system

INTRODUCTION

New technologies offer important opportunities for understanding the special characteristics of urban space and understanding people's behavior in cities (Karduni et al., 2017) or forming alternative scenarios concerning forecasts such as possible changes in the urban fabric as a result of new mobility services or vehicle automation capabilities or a combination of them (Mladenović and Stead, 2021) or the evaluation of urban phenomena, and through these processes, for proceeding with urban policymaking.
It is a fact that the main goal of knowledge is to enhance personal and social wisdom (Maxwell, 1984) that is, the ability to use knowledge for the benefit of each user while the knowledge creation significantly affects the conditions and requirements for the development of sustainable innovation (Peters, Maruster and Jorna, 2007). One of the main characteristics of wisdom, as a knowledge adapted to the basic pragmatism of the main functions of life that enables exceptional insight, judgment, and guidance (Berlin Wisdom Paradigm as explained in (Jeste et al., 2010) is that it can be adjusted or even revised when deemed appropriate. Differences between knowledge and information can be defined as the ambiguity of knowledge (Law, 2014) and its frequent lack of structure in relation to information, the fact that the use of information is related to one's degree of understanding, and the fact that knowledge is constantly changing and evolving. Knowledge, or intellectual

capital, is replacing other more tangible assets as the key driver of economic growth (Gilbert, 2015) and can promote more inclusive urban policies (Chen and Skinner, 2014).

MAIN POINTS OF THE LITERATURE REVIEW

Knowledge can be distinguished into tacit knowledge and explicit knowledge (Krčál and Kubiš, 2016). Explicit learning and practice help the development of implicit knowledge (VanPatten, 2016). Implicit knowledge, as a new frontier in knowledge management, is conveyed through personal communication, making it difficult to share and therefore easily lost, but implicit knowledge management utilizes tools, options, methods in order to perform as well as possible the "seemingly elusive thought processes" (Frappaolo, 2017). Explicit knowledge is related to objective and rational knowledge, can be proceduralised and automatised through practice allowing for its use spontaneously (Ellis and Roever, 2018). It includes the policies, procedures, strategies and capabilities, and technological characteristics of an organization. The process of acquiring knowledge is presented in the literature with varying approaches to terminology, such as knowledge capture (Poolton, Ismail and Shahidipour, 2016), knowledge acquisition (Compton et al., 1993) and knowledge elicitation (Porayska-Pomsta et al., 2013).

According to the literature, the methods of acquiring knowledge are divided into manuscript methods, in which the knowledge engineer extracts the knowledge from the specialist or other sources and then encodes it in the knowledge base; semi-automatic methods; and automatic methods. Through horizontal and vertical cooperation and communication, knowledge management can contribute to the efficiency and productivity of various applications' problem solving or learning procedures, learning organizing, strategic planning procedures, urban planning, spatial planning issues, and policy-making processes as a framework to implementation and evaluation. New potentials, such as via automatically learning by maps, has been recognized (Barbanente et al., 1992).

It is a fact that design or planning includes a set of activities that require and at the same time result in ways in which knowledge is produced. The aim is to make knowledge a basis that can be utilized by planning and policymaking mechanisms while automated techniques seem to work very efficiently in matters of complex decision-making (Rubenstein-Montano and Malaga, 2000). Information and knowledge can shape the implementation process of planning especially when it faces environmental and health risks (Corburn, 2016) and by "shifting emphasis from the computerized tools developed to support urban planning to true urban knowledge systems" (Rubenstein-Montano, 2000).

The highly complex and demanding nature of urban planning requires techniques capable of substantially assisting the support-decisions process. The decision-making process based on a single criterion is a passable challenge that can be faced by calculating the alternative with the best performance against the criterion. However, decision problems are associated with multiple and often conflicting goals. Spatial problems, which are multidimensional and related to spatial and/or non-spatial parameters, belong to this category. The method based on knowledge management andresults from a strategic urban planning approach tends to be an alternative to traditional planning.

METHODOLOGY

This article attempts to identify the prevailing bibliographic trends in urban-policy issues and knowledge-based approaches to urban planning. Two pillars of the search were set. On the one hand, the reference to knowledge-based systems was ensured, and on the other, terms such as "urban policy," "urban policies," "policy-making," "public administration," "decision-making," "city planning," "urban planning," and "decision support system" were employed.

RESULTS

Bibliographic searches were made based on the Web of Science Core Collection. The first search resulted in 3033 articles. Articles were selected that were published in 2010–2021 to reflect the most recent developments in these issues. Based on their abstracts and their relevance to these items, 928 articles were finally utilized and imported into Bibliometrix and Biblioshiny, open-source packages used from the R language environment (Aria and Cuccurullo, 2017), (Aria, Misuraca and Spano, 2020). Table 1 shows the main elements of the data used while Figure 1 shows the article production per year. Figure 2 shows the evolution of the use of key concepts.

Table 2: Main data used

Description	Results
Timespan	2010:2021
Sources (Journals, Books, etc)	410
Documents	928
Average years from publication	4.76
Average citations per documents	12.01
Average citations per year per doc	1.926
DOCUMENT TYPES	
article	891
article; early access	29
article; proceedings paper	8
DOCUMENT CONTENTS	
Keywords Plus (ID)	1824
Author's Keywords (DE)	2963
AUTHORS	
Authors	3088
Author Appearances	3426
Authors of single-authored documents	163
Authors of multi-authored documents	2925
AUTHORS COLLABORATION	
Single-authored documents	166
Documents per Author	0.301
Authors per Document	3.33
Co-Authors per Documents	3.69
Collaboration Index	3.84

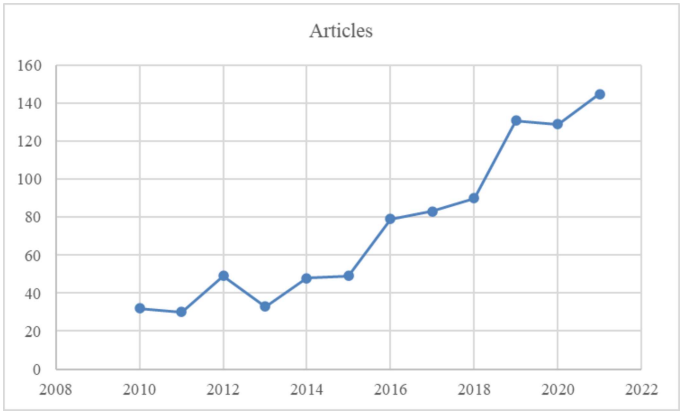

Figure 31: Articles production per year

More specifically, we observe an upward trend in decision-making concepts, with a significant upward trend from 2015 onwards, while at the same time, the concepts of information, innovation, and knowledge are nearly constant with a small upward trend in research interest. These results are confirmed by Figure 3, which presents the trend topics.

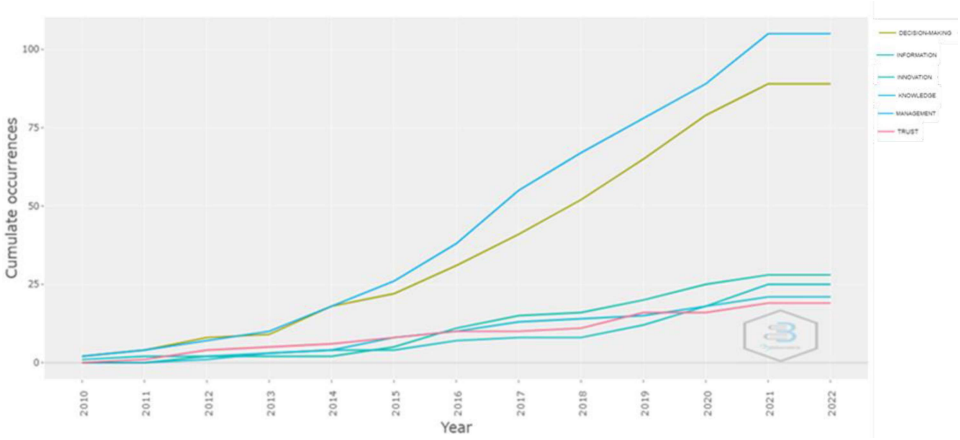

Figure 32: Word Growth

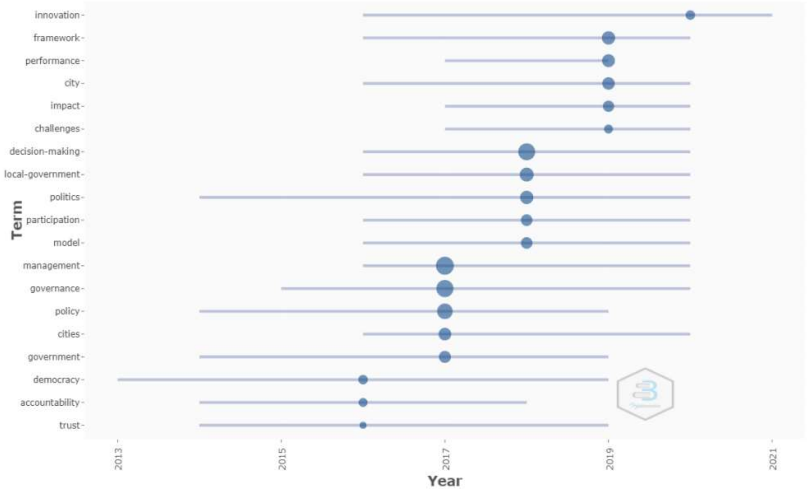

Figure 33: Trend topics diagram

Figure 4 represents a co-occurrence network map. The number of occurrences of each keyword is directly proportional to the size of the cycle. When authors' keywords are more co-selected, the cycle is larger. Various colors have been attributed to individual clusters.. According to this, we can distinguish three main clusters and one smaller cluster.
The main cluster makes the connection between the concepts of decision-making, management, public participation, and performance. The second cluster emphasizes government, information, trust, and democracy. The third cluster connects the city and cities (as networks) with policies and innovation. Finally, the fourth cluster highlights the link between knowledge and sustainability and policies.

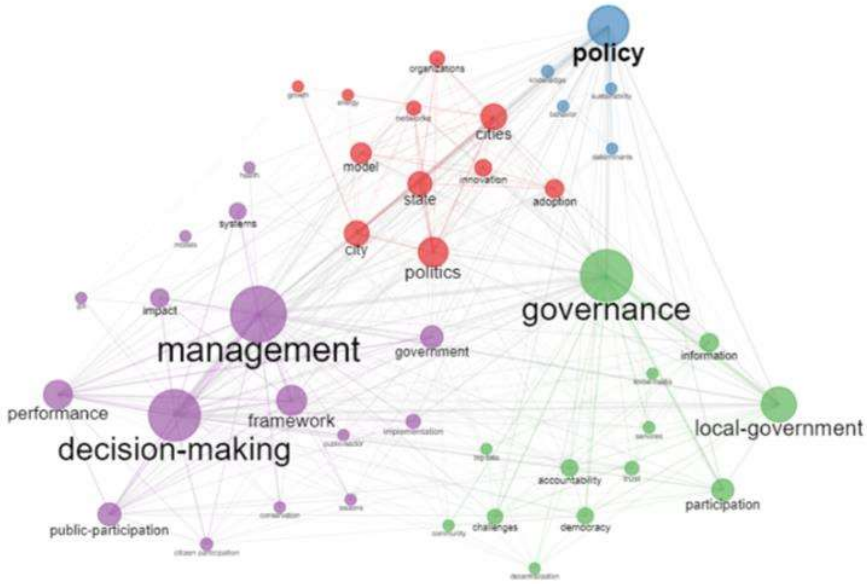

Figure 34:Co-occurrence map

CONCLUSION

Based on the literature review and applications of bibliostatistics analysis, it seems that in the last decade there has been a strong tendency to recognize knowledge as an essential aspect of urban planning that can be taken into account in order to lead effective policymaking as accurately as possible. The various ways of acquiring this knowledge can be included in the stages of analysis, problem-solving, and decision-making. This paper confirms the connections between the individual dominant concepts. The additional study of these concepts can be a compass for further relevant studies.

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