REVIEW

Knowledge diffusion as a key element in smart governance

La difusión del conocimiento como elemento clave de la gobernanza inteligente

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ABSTRACT

This study examines the critical role of knowledge diffusion in smart governance within complex and globalized contexts, emphasizing its importance in driving technological advancement and fostering an information-driven society. By integrating smart governance with knowledge diffusion, the research aims to identify strategies for building a more equitable and inclusive society. A narrative review of documents from 2015 to 2023 was conducted using Boolean operators across major databases, followed by a rigorous selection and analysis using a traceability matrix. The findings highlight the innovative culture of smart governance, showcasing successful integration of citizen participation, public value creation, open government, and interorganizational collaboration. The results demonstrate that effective knowledge diffusion is essential for establishing robust governance systems that contribute significantly to economic and social development. The study concludes that embedding knowledge diffusion within smart governance frameworks can drive substantial societal improvements, promoting greater equity and justice.

Keywords: Smart Governance; Knowledge Diffusion; Information Management; Public Participation; Economic Convergence.

RESUMEN

Este estudio examina el papel crítico de la difusión del conocimiento en la gobernanza inteligente dentro de contextos complejos y globalizados, enfatizando su importancia en el impulso del avance tecnológico y la promoción de una sociedad basada en la información. Al integrar la gobernanza inteligente con la difusión del conocimiento, la investigación busca identificar estrategias para construir una sociedad más equitativa e inclusiva. Se llevó a cabo una revisión narrativa de documentos de 2015 a 2023 utilizando operadores booleanos en bases de datos principales, seguida de un proceso riguroso de selección y análisis mediante una matriz de trazabilidad. Los hallazgos destacan la cultura innovadora de la gobernanza inteligente, mostrando una integración exitosa de la participación ciudadana, la creación de valor público, el gobierno abierto y la colaboración interorganizacional. Los resultados demuestran que la difusión efectiva del conocimiento es esencial para establecer sistemas de gobernanza sólidos que contribuyan significativamente al desarrollo económico y social. El estudio concluye que integrar la difusión del conocimiento en los marcos de gobernanza inteligente puede impulsar mejoras sociales sustanciales, promoviendo una mayor equidad y justicia.

Palabras clave: Gobernanza Inteligente; Difusión del Conocimiento; Gestión de la Información; Participación Pública; Convergencia Económica.

INTRODUCTION

Currently, the diffusion of knowledge emerges as a fundamental component within the framework of smart governance, especially pertinent in complex and globalized environments.[1] The significance of knowledge dissemination is increasingly vital for advancing technological development and fostering an information-rich society. The integration of knowledge diffusion within smart governance frameworks not only catalyzes decision-making processes and capacity building for information management but also supports the engagement of diverse stakeholders in governance.

These processes occur against a backdrop of rapidly changing global conditions that demand agility and transparency in governance.[2] Moreover, the interaction between knowledge diffusion and smart governance facilitates the development of innovative governance cultures, incorporating public participation, value creation, open governance, and interorganizational collaboration practices.[3]

According to Romero, smart governance in the 21st century responds to a global process associated with economic convergence, which in turn impacts cultural diversity and the ecosystem, creating environments of tension and significant dilemma due to emerging neoliberal issues.[4] From a management perspective, smart governance develops strategies and initiatives that address these tensions, enabling the strengthening of stakeholders and processes that are in constant interaction.[5,6,7,8]

To understand this interaction, it is needed to start from an analysis of management from a bureaucratic standpoint, where information plays a fundamental role in achieving scientific, administrative, and organizational objectives. This is because information, and the knowledge it contains, is viewed as an economic good and is highly valuable within global production processes, framed within an information society model.[9,10]

The main objective of this study is to enhance the theoretical understanding of smart governance and knowledge diffusion, aiming to evaluate their influence across various sectors in promoting a more equitable and inclusive society. This research seeks to develop a robust analytical framework by conducting a narrative review of how these concepts can improve governance practices in the digital era. By addressing these critical areas, the study contributes to the academic literature and establishes a foundation for future empirical and theoretical research in the field.

METHOD

Building on this brief introduction, the present research aims to contribute to the theoretical understanding of the process of constructing smart governance and the diffusion of knowledge through a narrative review with documentary analysis elements. This state of the art review follows a methodology that allows for the synthesis of key developments in the area of interest, specifically examining the relationship between knowledge diffusion and smart governance.[11] The review combines both qualitative analysis and documentary synthesis, relying on diverse academic sources to provide a comprehensive overview of the field.[12]

As evidenced throughout the document, the concepts and assumptions related to governance, specifically smart governance, are recent in the field of knowledge, as is the systematic study of knowledge diffusion. Therefore, it is of interest, from both an academic perspective and from the praxis of governments, to recognize how knowledge diffusion and governance are related to the needs of implementing changes regarding technological developments and the emergence of the information society.[13]

The state of the art focuses on identifying and analyzing the most significant advancements in the literature from 2015 to 2023, encompassing theoretical contributions, empirical studies, and practical applications. This review critically analyzes and interprets the collected information to generate a thematic development that reflects the progression of knowledge and emerging trends in the field. The study does not claim to exhaustively cover all existing research but rather provides a representative sample that reflects the key themes and trends.

To ensure the review is based on the most relevant and high-impact literature, a selection of documents was made through systematic searches in three major scientific databases: Web of Science, Science Direct, and Scopus. The search strategy employed Boolean operators (AND, OR, XOR, NOT) with targeted keywords such as: governance, public value, knowledge diffusion, governance and education, local governance, public data, and open government. The aim was to capture the core concepts and trends in smart governance and knowledge diffusion within academic and applied contexts.

After retrieving the documents, the selection process involved reading and evaluating the relevance and contribution of each article. The collected information was then systematically organized using a traceability matrix, which facilitated the comparison of themes, fields of study, and contributions of the main and second authors. This method enabled the identification of recurring patterns, gaps in the literature, and emerging fields of research, which are discussed throughout the document.

Table 1 synthesizes the key concepts and authors consulted in the literature. It presents the number of publications, associated study areas, and leading and second authors for each term. This overview helped identify the most cited and influential contributions to the field of study.

#	Search Term	Results	Field of Study	#Pub./Field	Main Author	# Pub	Second Author	#Pub.
			Table 1. Concepts and Authors Consulted in the Literature					
1	Governance	143 177	Government Law,	23 203	Peter BG	38	Biermann F	33
			Public Administration.	16 977	Klij EH	53	Edelenbos J	48
2	Public Value	1 073	Government Law,	89	Hartley J	3	Ead Bw	2
			Public Administration.	359	Alford J	8	Bozeman B	7
3	Knowledge Diffusion	17 106	Business Economic,	2 466	Agarwal R	11	Afonso O	10
			Social Science.	68	Ferlie E	2	Padgett JF	2
4	Governance AND Education	7 533	Educational Research,	2 985	Lingard B	28	Mok KH	25
			Public Administration,	586	Capano G	5	Horvath A	5
			Social Science.	497	Aji RNB	3	Green M	3
5	Local Governance	21 265	Public Administration,	4 066	Feioick RC	18	Warner ME	13
			Government Law,	2 389	Copus C	13	Feiock RC	11
			Social Science.	1 130	Bramwell B	6	Boelens R	5
6	Public Data	3 594	Business Economic,	145	Julia C	2	Lopez A	2
			Public Administration,	12	Julia C	2	Lopez A	2
			Social Sciences.	5	Julia C	2	Lopez A	2
7	Open Government	1 211	Public Administration,	242	Janssen M	26	Zuiderwijk A	20
			Government Law,	169	Curtin D	3	Pardo TA	3
			Business Economic.	79	Albano CS	3	Cleland B	2

Following the analysis of the literature, the state of the art is structured into the following sections:
- Description of the concept of smart governance and its main components
- Analysis of knowledge diffusion as a crucial element in governance.
- Exploration of the relationship between knowledge diffusion and smart governance.
- Conclusion highlighting key findings and areas for future research.

This narrative approach provides a coherent and compact synthesis of the current knowledge in the field, identifying research trends and offering a progressive vision of the transformations in governance practices. [14] Additionally, it identifies fields where further advancements can be made in applying innovative forms of governance.

RESULTS
Governance and smart governance

In recent years, the concept of governance has been increasingly incorporated into the language of management and public administration.[15] To understand the operation of knowledge governance, like smart governance, it is needed to start from the concept of governance itself.[16] Governance is a polysemic idea that has generated several controversies and questions, thereby constantly reshaping its scope and potential.

The origin of its definition dates to 1990, associated with various governmental and private entities, which used the concept to refer to the activities of managing a country.[17] Currently, with institutions like the United Nations, the International Monetary Fund, and the World Bank using it, the term has gained popularity through a new schema focused on management and leadership. Economists and politicians associate it through a language that implies the acquisition of laws, norms, and powers within an organized society.[18]

For its understanding, it is necessary to revisit its current meaning, where it refers to public governance.[19,20] According to Aguilar, public governance is "the process by which actors in a society decide their fundamental and situational coexistence objectives and the ways to coordinate to achieve them: their sense of direction and their capacity for direction".[21] This definition indicates that the most relevant aspect within a governance framework is not the governors or the institution, but the act of governing itself. Thus, throughout the document, governance is understood as the process through which direction or control is exercised over a sector that requires it; that is, it involves actions associated with government actors, administrators, legislators, executives, among others.[22,23]

From this, four perspectives on governance have been developed. The work of Nederhand, Klijn, and Van der Steen (2019) brings together these four approaches to the concept. Firstly, governance is understood from the perspective of traditional public administration, where it acts as a guarantor of legal and public values, as well as facilitates the achievement of political objectives. In this view, governance operates based on impersonal and stable rules to protect citizens from arbitrariness, and the interaction between collectives must have clear

regulations. Consequently, in traditional public administration governance, governments regulate collectives and interactions with citizens.[24]

Secondly, there is governance from the perspective of New Public Management (NPM), where governments hold a superior hierarchical position to collectives and citizen or private organizations.[25] This is because, in NPM, process management is relevant, and governments decide which organizations best provide the required services for the public sector. This, in turn, implies that governments specify the objectives or goals and must have the capacity to follow up on compliance indicators.[24]

In the third perspective, network governance, a horizontal relationship is observed between collectives, citizens, and governmental entities.[26] For this scenario, interorganizational coordination and the quality of decision-making prevail over other factors. In this sense, the role of public officials is based on stimulating actors, generating cooperation among them, and defining the rules of behavior during interactions.[24] Thus, governance occurs in environments with some degree of stability in which there is a connection between institutions, and each individual actor contributes resources to generate a network of cooperation. The degrees of formalization of these networks can vary significantly.[23]

Lastly, there is the perspective of self-governance, for which the prevailing assumption is that public value originates from social dynamics,[27] implying that the government tends to favor and eliminate obstacles for self-organization but does not produce it per se.[24] According to Gallego, from a technical standpoint, self-governance is a highly abstract concept that can be applied at different organizational scales, but fundamentally involves creating contexts associated with the elimination or disassociation from a dominant government in favor of the interests of a collective.[28]

The concept of smart governance is understood in this article as a new paradigm in public management. Smart governance or intelligent governance refers to the direction or control of a sector with adequate coordination that allows facing risks and increasing performance and gains.[29] Like governance, it has undergone mutations in its approach but has become established when characterizing it based on the SMART acronym (Simple, Moral, Accountable, Responsive, Transparent).[30] With the global expansion and the role of Information and Communication Technologies (ICT), the concept of smart governance has transformed, understanding it as the coordination associated with technology, with the goal of benefiting the activities carried out by a government in a specific territory. From the link between ICT and governance, the concept of the information society is revisited, for all those actions or efficient managements that seek the welfare of the citizenry based on a set of elements, such as technology, information, resources, policies, people, among others.[31]

In general terms, smart governance is characterized by having a formal and informal network of interdependence and cooperation, giving the concept great complexity due to the roles derived and the different positions that need to be satisfied.[32] In terms of Oliveira, smart governance is a new paradigm in which channels of relationship with the citizenship are created, considering extensive use of data and information.[33] This interaction significantly affects the integration of resources and the implementation of new competencies for the maintenance of the various synergies that are created.[34]

To better understand the concept of smart governance, based on the authors mentioned in Table 1, the articles by Oliveira,[33] Charalabidis and Loukis,[35] Sanabria,[36] and Harrison, Guerrero, and Burke,[37] are also used as a basis. These authors define smart governance considering five relevant aspects: i) citizen participation, ii) public value creation, iii) open government, iv) interorganizational collaboration, and v) proper use of big data.

Citizen participation is fundamental within democracy. Citizen participation can be organized into three groups: i) voters who are citizens and have the right to vote in democratic elections; ii) citizens who contribute to political processes through individuals and organizations that represent stakeholders in political processes; and iii) users who expect affordable and quality services. Citizens can participate as creators of public value, as agents of change, and as users who can and should achieve public outcomes.

As a result, thanks to the outcomes, citizens have been seen as agents of change and have also gained greater importance in relation to their role in seeking solutions to social problems and public sector problems.[38] These contributions show citizens with roles as co-initiators, co-designers, or co-implementers. As co-initiators, citizens can take the initiative to provide public services and encourage public and private organizations to work together. As co-designers, citizens can have an influential role both in the design and in the implementation of public policy initiatives,[39] and as co-implementers, citizens can carry out tasks that are of service providers. Likewise, citizen participation can result in the provision of quality services and good governance. This, in fact, can occur through networks of community organizations, corporations, and associations.[40] However, it is worth noting that this event presents various challenges in the 21st century and that implementation in practice can be difficult.

For its part, public value is defined as "the social value generated by governmental actions". It is important that it is not confused with public values, which are "the principles that arise from social agreements and that frame public action",[36] these principles can be justice, equity, solidarity, due process, etc. Public value is

generated through concrete actions that meet citizen needs and fulfill community expectations.

The concept of public value emerged as an alternative to New Public Management. Moore (1995) creates the concept of public value and addresses the accountability problem of private and public organizations.[41] Public value has been defined as everything that is good for society and that achieves measuring public management and rendering accounts.

Public value has two outstanding characteristics. First, it seeks to evaluate public institutions or its representatives, as well as the interaction of such entity or individual with communities. Second, the measurement for accountability has differentiated approaches from private sector accountability.[42] To the extent that the private sector does not have the obligation to report on expenses, budgets, and investments to the citizenship.[43,44,45]

On the other hand, open government is defined as the government that shares data that can be used, modified, and shared freely by anyone for any purpose. As Vetro et al explain, the public sector has historically been linked to the production and possession of all kinds of information from the birth registration of its citizens to their tax payment history. In addition, this sector also has information on a local and national scale, as well as on companies, industrial sectors, among others.[46]

Therefore, the concept of open government is related to the notion of open data, which is strongly linked to the capacity for innovation and the potential for transformation of processes and information management that the fourth industrial revolution offers. In this way, open government is an organizational invention that emerged recently and that has been gradually established in governments according to the organizational capacity and resources that compose them.[35]

As for the concept of inter-organizational collaboration, it is based on formal and informal networks between institutions and interactions amongst them that are forged for the development of projects or for the fulfillment of activities.[47] Therefore, this assistance is based on collective action and mainly occurs between local and regional governments or public and private entities.[48]

Inter-organizational collaboration has elements such as coordination, the interests of the actors involved, negotiation strategies, among others.[49] In addition, governance between different actors is intertwined through the concepts and indicators of interconnectivity, which include the ability to dialogue between actors or institutions and compliance with mutually agreed rules which can be given by collective, operational, or constitutional choice.[50]

These initiatives are intended or aim in most cases to increase government transparency, citizen participation, and inter-organizational collaboration. In addition, the improvement of these variables impacts operational and technical benefits for public entities and social benefits for the citizenship. These benefits include the ability to reuse data, increase in trust towards the government, reduction in communication costs between local and national entities, among others.[51]

The smart governance paradigm identifies new management tools in public contexts and new and informed communication channels with the citizenship that are based on the widespread use of the data generated in the development of the actor or institution. The use of big data in public administrations represents a fundamental element in smart governance. In fact, the recognition of the potential of data use and processing serves as an instrument of accountability and transparency in governments.

Table 2 presents the synthesis of each of the characteristics that define smart governance from the perspective of public management.

Table 2. Concepts and Definitions	
Concept	**Definition**
Citizen Participation	Citizens can be agents of change with roles as co-initiators, co-designers, or co-implementers of policies or public initiatives.
Public Value	Public value is defined as the social value generated by governmental actions. It has also been defined as everything that is good for society and that achieves the measurement of public management and accountability.
Open Government	Open government is defined as the government that shares data historically belonging to the public sector so that these can be used, modified, and shared freely by anyone for any purpose.
Interorganizational Collaboration	Interorganizational collaboration is understood as formal and informal networks and interactions between institutions that are forged for the development of projects or for the fulfillment of activities. This type of collaboration requires collective action and relationships between governments of local and regional scale or public and private institutions.
Data Usage	The recognition of the potential for data usage and processing serves as an instrument of accountability and transparency in governments.

Knowledge Diffusion

Managing within an information society involves identifying the benefits that knowledge brings to the development of new useful elements. These are transformed into tools for organization and management, and ultimately allow for proper handling within a globalized environment.[52] Within this management, diffusion is crucial as it enables the establishment of power dialogues, recreating knowledge governance, and subsequently smart governance.[53]

Smart governance linked to ICT finds its meeting point in the diffusion of knowledge, primarily conducted through scientific communication. For Sanz (2017), scientific communication is understood as the results of how researchers in any field of research use and disseminate information through various formal and informal channels -mainly associated with ICT.[54] In this sense, dissemination allows for the engagement of social actors with the objectives of research and with the results of science in the social environment.[55]

Knowledge diffusion can be considered as a responsibility of the researcher insofar as it generates democratization.[56] This concept has been defined as a public relations activity in which the scientific community shows people the results and research processes.[57] In knowledge diffusion, various tools and strategies are provided that allow non-hierarchical communication with society. Both diffusion and scientific dissemination are communication activities.[58]

In the public sector, knowledge diffusion refers to the elements that the government makes known to the citizenry in terms of what resources are available and how the management of these resources is carried out. [59] Consequently, knowledge diffusion occurs when public actors and institutions involve civil society in the processes of public knowledge management, as well as in moments when information and knowledge are used for decision-making.[60]

In the public sector, not only the resources are important, but also public policies, national and international agreements, and the information of each of the institutions. The way in which knowledge diffusion can be exercised can be partly through reports and direct communication with the citizenship. An example of this is developed by Serrano (2015), where it is shown that citizen participation derives from the construction of channels and legal frameworks, through which a bond of information and trust is created that significantly affects the relationship between government, citizenship, and political participation.[61]

According to Criado (2016), knowledge management plays a highly relevant role within smart governance, given the opportunities that arise from the inclusion of exogenous elements brought by new global environments. [1] One of the elements affected by knowledge diffusion is the creation of new leadership environments, which not only impact internally but are also exhibited in external decision-making.[62] Among the benefits of using knowledge diffusion is the process of self-determination and projection, which allows the missions and visions of projects or work schemes to be met in an articulated manner. According to Alvarado (2018), changes in interaction in an information society are positively projected given the evidence on new potentialities and paths to work on, knowledge diffusion impacts on improving learning capabilities, creating smarter institutions with citizen and social links around research and information utilization.[63]

In relation to productivity, it is also perceived that the management and diffusion of knowledge associated with smart governance improves outcomes. This is not only supported by the increase in interactions but also by the new paths that are constantly developed as a tool to link the use of information, resource allocation, and the monitoring of smart management. Moreover, these changes emerge in a necessary cultural change, where best practices are adopted, and new thought schemes are embraced for decision-making and problem-solving. [2] In this way, knowledge diffusion is closely related to the concept of smart governance to the extent that both can make use of technological elements to govern, create greater management competencies, and enable citizens to have a closer and more critical relationship with rulers and public institutions.[64,65,66] This denotes smart management framed in a global environment with a strong theoretical and practical focus.

DISCUSSION AND CONCLUSIONS

Throughout this paper, knowledge diffusion has been emphasized as a foundational element in the framework of smart governance. As evidenced by the integration of technological advances and innovative practices, knowledge diffusion shapes the utilization of information, transforming leadership styles and the management of processes within a culture geared towards intelligent and strategic public administration.

The innovative culture fostered by smart governance enables information to be structured for a variety of strategic applications. These include knowledge management, governmental innovation, and project development, along with the implementation of collective intelligence approaches aimed at enhancing public services. Moreover, the creation of communities centered around leadership and technological innovation practices plays a central role. This study has shown how within smart governance, integral concepts such as citizen participation, public value, open government, and interorganizational collaboration are not isolated components but interact synergistically to forge a comprehensive, effective governance system.

Analytically, the relationship between smart governance and knowledge diffusion manifests through the operationalization of knowledge governance. This form of governance utilizes information as a crucial asset,

catalyzing the development of knowledge which in turn fosters the creation of organizational strategies dedicated to social progress. These strategies are reflected in the improved functionalities of economic systems and societal development, as discussed in the sections on public sector knowledge diffusion and the implications of ICT in governance.

The evidence presented highlights the transformative potential of knowledge diffusion in enhancing learning capabilities and fostering the development of smarter institutions with strong civic and social linkages focused on research utilization and information exploitation. This reiterates the necessity for continuous technological and administrative innovation, ensuring that governance systems not only respond to current needs but are also proactive in shaping future societal outcomes. In conclusion, this study underscores that smart governance, underpinned by robust knowledge diffusion mechanisms, significantly contributes to the refinement of economic and social frameworks. The discourse on smart governance and knowledge diffusion not only supports a theoretical understanding but also prompts practical implementations that enhance the interplay between government actions and societal benefits. This aligns with the broader goal of achieving a more informed, engaged, and responsive governance landscape in the context of global challenges and opportunities.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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