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DECISION-MAKING PROCESSES WITH FOCUS ON WATER DEMAND PLANNING***Tinashe Mukonavanhu^{1*}, Danielle Nel-Sanders²**

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Abstract. Decision-making processes in Water Demand Planning (WDP) represent a novel and significant concept within the domain of public administration. This paper employs a qualitative approach, integrating both secondary and primary data sources. Secondary data, acquired through a systematic literature review encompassing 468 documents from Scopus-indexed journals spanning from 1972 to 2024, shed light on the extensive literature surrounding decision-making processes in WDP. However, the bulk of this research has predominantly emanated from developed countries such as the USA, UK, Australia, and the Netherlands, with developing nations lagging in this area of study. In addition to secondary data analysis, primary data from interviews and questionnaires are utilised for thematic and statistical analysis. Insights gleaned from interviews and questionnaires suggest a potential deficiency in organisational decision-making processes within management ranks. In summary, this study underscores the newfound importance of decision-making processes in WDP within the public administration sphere.

Keywords: decision-making; water demand planning; systematic review; public management; public administration; government

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JEL Classifications: H30

Additional disciplines: Public Policy

1. Introduction to decision-making in public administration

Decision-making processes are significantly affected by prevailing public management styles. The underpinnings of decision-making processes in public administration stem from the theoretical frameworks that guide the field itself. Decision support regarding impacts, adaptation, and vulnerability has evolved from linear, science-driven approaches to encompass a diverse array of methodologies drawn from various disciplines (Westra & Zscheischler, 2023).

Notably, the New Public Management (NPM) theory underscores the importance of granting discretion to modern public managers in their decision-making capacities within their specific areas of jurisdiction. Unlike traditional public administrators, who adhered strictly to established rules and regulations, with minimal discretion and direct responsibility, today's public managers are expected to be more proactive, exercising decision-making authority and bearing responsibility for delivering public services (Masruki & Hussainey, 2022). The study of decision-

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making processes in public administration has garnered significant attention within the academic community, with numerous researchers delving into the topic (Böhmer et al., 2023; De Lima e Souza & Borges, 2023; Roberts, 2024; Montel, 2023; Shalko et al., 2023; Marienfeldt, 2024; Chintapanti, 2023).

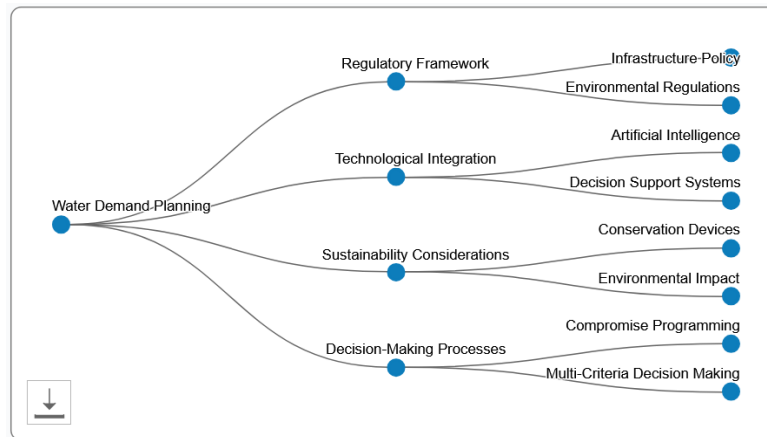
Over the past three decades, reforms inspired by NPM have played a significant role in public institutions across Europe and other OECD nations. NPM emphasises the use of limited public resources by incorporating management techniques from the private sector, partly on the premise that public organisations are inefficient without appropriate incentives. These reforms typically entail the introduction of new organisational or managerial methodologies or alterations within public institutions (Lindaas, Anthun & Magnussen, 2024).

The NPM approach seeks to modernise public administration by embracing market-oriented principles in public services, promoting greater adaptability and transparency, and advocating a shift towards smaller government through initiatives such as streamlining bureaucracy, decentralisation, and privatisation, while integrating liberal market ideals of efficiency and thrift into the public sector to bolster its effectiveness. Central to NPM are principles of managerialism, which entail applying private-sector management methods within public services, coupled with organisational principles from new institutional economics, such as competition, public choice, and principal-agent theories. The objective is to improve efficiency in public sector management and position the economic market as a model for political and administrative dynamics (Lameck & Shabiru, 2023).

Criticism of bureaucracy, characterised by its reliance on rules, permanence, and its dominant role in policymaking, intensified with the rise of neoliberal agendas. The concept of “big government” prompted a re-evaluation of bureaucracy, highlighting its pathologies and inefficiencies, which were perceived as hindering market dynamics. In this neoliberal perspective, reforms in the public sector, such as those advocated by NPM, redefined the role of bureaucracy. Rather than being seen as a rational and effective administrative structure as Weber posited, bureaucracy became synonymous with inefficiency due to its adherence to rules and its monopolistic tendencies. In the UK, Thatcherism brought about neoliberal reforms, including the privatisation of services, the divestment of public assets, the outsourcing of services to the private sector, the establishment of public agencies, and the integration of market principles such as competition and performance management. This shift in the state’s paradigm aimed to introduce free market dynamics, foster competition, and reduce the state’s size (Johnston, 2023).

Over the past few decades, NPM has significantly reshaped contemporary societies. NPM enables the implementation of programs that can be monitored against well-defined objectives, offering clear pathways and targets. In this regard, NPM principles can enhance management practices; moreover, NPM advocates for the elimination of unprofitable facilities. While NPM may strengthen governance and foster more active citizenship, it also facilitates the central government’s retreat from core governmental duties by outsourcing all non-essential public works. NPM promotes cost reduction through various means, including substituting costly services with more affordable alternatives, incentivising delivery, discontinuing unprofitable services, adjusting prices directly, and expanding cost-effective outpatient care (Chen, 2025).

In recent times, a significant number of researchers have directed their attention towards investigating decision-making processes for Water Demand Planning (WDP) (Hoepers et al., 2024; Hibjur Rahaman et al., 2023; Sabia et al., 2023; Zhang et al., 2023a; Sakiyama et al., 2023; Zhang et al., 2023b). Studies focusing on decision-making processes, particularly those incorporating water demand forecasting, are increasingly recognised tools for enhancing water resources management and supporting daily decision-making activities for managers, all while preserving the autonomy of involved stakeholders (González Perea et al., 2023) (Figure 1).

**Figure 1.** Concept map

Source: produced by the SCOPUS AI tool

Consequently, the concept of decision-making processes in WDP has garnered growing interest among public policymakers and managers worldwide over the past half-decade or so.

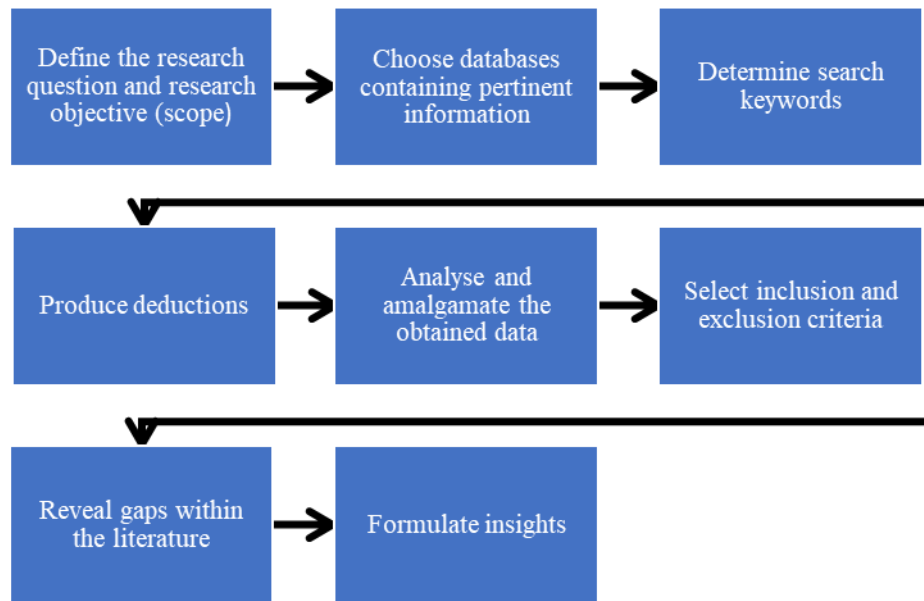
2. Research methodology

When initiating this research endeavour, the authors decided to undertake a literature review. Consequently, they opted for the qualitative method. They examined diverse secondary literature sources, including peer-reviewed journal articles, academic books, articles in professional journals, data sourced from government websites, and material from professional associations, all of which they approached with caution and selectivity. The review encompassed 468 literature sources. Additionally, the authors employed the framework depicted in Figure 2.

**Figure 2.** Literature Review framework

Source: Adapted by the authors, using Leite, Pedilha & Seccati (2019)

Using the above framework, the authors followed the research approach shown in Figure 3 below to address the research question, achieve the research objectives, select the appropriate research methodology, and present and discuss their findings (results).

**Figure 3.** Research approach

Source: Authors' own

- Define the research question and research objective (scope)

Research question: What is the state of research regarding decision-making processes for water demand planning?

Research scope

Given that decision-making processes in WDP involve implementing policies, it would be insightful to examine the historical progression, current status, and driving forces of change in the field. Moreover, although this study focuses on the historical evolution of WDP, it assumes that WDP is integral to public administration reform. Therefore, the research aims to evaluate the development of decision-making processes for WDP critically and to understand the reasons behind its evolution over time. This includes examining the historical trajectory, current state, and underlying factors motivating change, with the overarching goal of substantiating the notion that decision-making processes in WDP constitute a significant aspect of public administration reform.

- Choose a database that offers the most pertinent sources:

Scopus

- Determining search keywords:

To pinpoint applicable publications, the authors opted for search terms (themes): "Decision-making processes", "Water demand," and "Planning." The search terms were utilised through the titles, abstracts, and keywords of scholarly articles and reviews written in English and indexed in the mentioned scholarly literature database.

- Determine inclusion and exclusion criteria:

The search terms (themes) serve as the sole inclusion criteria. Essentially, the resulting dataset encompasses every academic work (published in English) in which at least one term from the search words appears in the title, abstract, or keywords. The authors deemed it appropriate to include literature within the past 20 years, despite acknowledging that the 5-year limit is arbitrary. For validity and reliability, the authors opted to exclude literature older than 20 years. Furthermore, 468 literature sources were examined.

- The synthesis of the gathered:

A methodical examination of secondary literature sources was conducted, employing critical reading and analytical skills. The analysis and synthesis of gathered literature involved addressing the following inquiries: "Was the research project appropriately designed and executed? Are the results and discussions logical, and do they align with the research objectives and methodology? What are the strengths and weaknesses of this study?"

How do the authors substantiate their findings? How does this study enrich the existing research topic?” (Leite, Padilha & Cecatti, 2019).

- Develop conclusions:

Pie charts, graphs, tables, and spreadsheets were utilised to highlight similarities and differences. Following the identification of these similarities and differences in the reviewed literature, the authors presented their own observations and concluded (Leite, Padilha & Cecatti, 2019).

- Identify gaps in the literature:

Employing the aforementioned method, the authors underscored deficiencies in the literature (Leite, Padilha & Cecatti, 2019), particularly noting a significant lack of empirical research on decision-making processes for water demand planning in developing countries. Therefore, further research is imperative to determine the most appropriate decision-making processes for these nations and whether their adoption enhances water demand planning.

- Draft paper, containing authors' insights:

The article was composed in accordance with the research methods outlined previously.

3. Findings from systematic literature

This study conducts a literature review on decision-making processes in WDP using Scopus-indexed journals. The keywords “decision-making processes”, “water demand”, and “planning” were used to search the titles of Scopus-indexed journals, yielding 468 articles on decision-making processes for WDP published from 1972 to 2024. Statistical analysis reveals a notable shift in research attention towards decision-making processes for WDP. Initially, there was minimal focus on this topic until around 2002, when researchers began to emphasise it. For instance, in 2003, four articles were published on this topic, increasing to nine in 2004. The number of publications gradually rose, reaching 42 in 2022. However, in January 2024, only one article on this topic was published in a Scopus-indexed journal. Figure 4 illustrates the distribution of published papers across years.

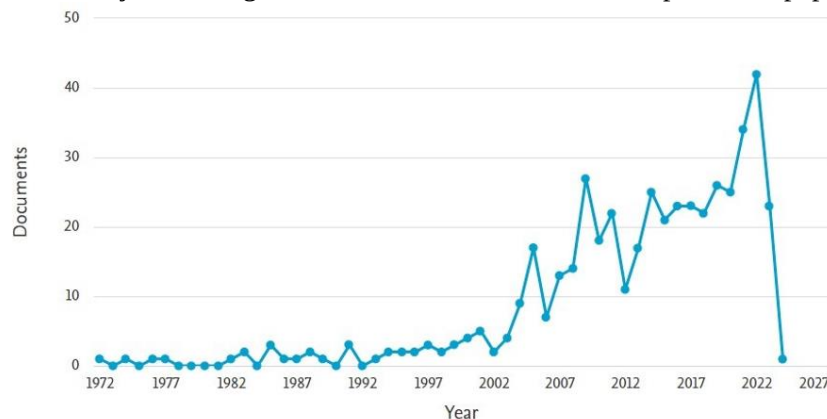


Figure 4. Distribution of papers by publication year

Figure 5 below displays the titles of journals that have published articles regarding decision-making processes for WDP. The data indicate that the majority of these papers were featured in environmental research journals. Notably, the journal *Science of the Total Environment* led with the most articles (19), followed by *Water Resources Management* with 18. The *Journal of Water Resources Planning and Management* ranked third with 15 articles, followed by *Water (Switzerland)* and the *Journal of Cleaner Production*, which published 14 and 9 articles, respectively. Additionally, *Ecological Indicators*, *Sustainability (Switzerland)*, and *Environmental Modelling & Software* contributed 8, 7, and 6 articles, respectively, on decision-making processes for WDP.

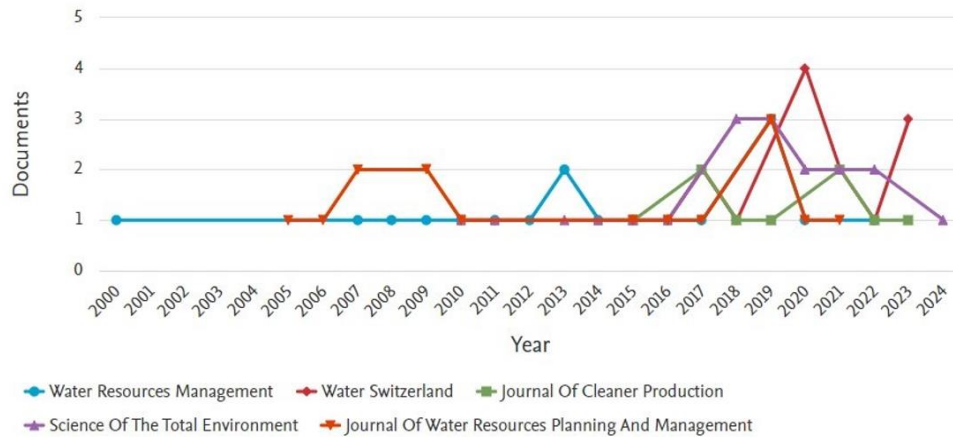


Figure 5. Distribution of papers by journals

Although researchers worldwide have shown interest in decision-making processes for WDP, the majority of research in this area has been conducted in developed countries. The United States has the highest number of articles on decision-making processes for WDP, with 113 publications. China follows with 57 articles, while the United Kingdom and Australia have also made significant contributions, with 46 and 41 articles, respectively. Figure 6 illustrates the distribution of research articles published by each country from 1972 to 2024.

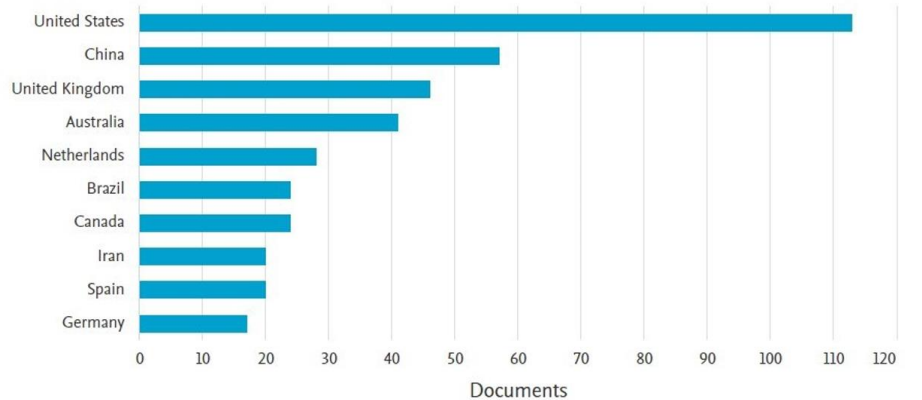


Figure 6. Distribution of papers by countries

Numerous researchers have contributed to the field of decision-making processes for WDP. Among the most prolific authors in Scopus within this field are Li, Huang, Avraamidou, Banihabib, Chung, Islam, Jeffrey, Kapelan, Karamouz, and Lansey, among others. Li has authored six articles on decision-making processes for water demand planning, while Huang has contributed four articles. Avraamidou, Banihabib, Chung, Islam, Jeffrey, Kapelan, Karamouz, and Lansey have each published three articles on this topic. Figure 7 provides a breakdown of the number of papers published by each author concerning decision-making processes for WDP.

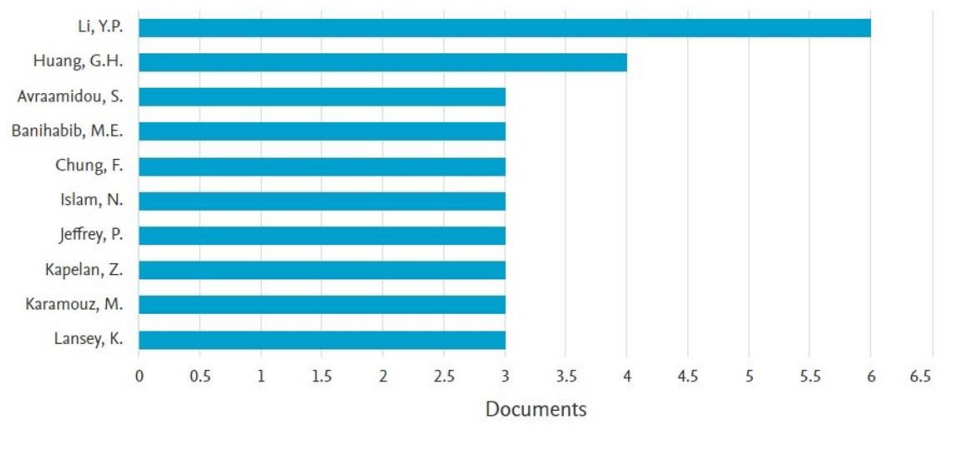


Figure 7. Distribution of papers by authors

Researchers worldwide are actively engaged in studying decision-making processes for WDP. To date, the Commonwealth Scientific and Industrial Research Organisation has been at the forefront, with 12 research papers published on this topic. Following closely, the Beijing Normal University has produced 11 publications, while the University of Tehran ranks third with ten research papers on decision-making processes for WDP. The Chinese Academy of Sciences has contributed eight research articles in this field. The Delft University of Technology, Universitat Politècnica de València, University of California, Davis, and Texas A&M University have each published seven papers on decision-making processes for WDP. Figure 8 provides a graphical representation of the number of publications per university concerning decision-making processes for WDP.

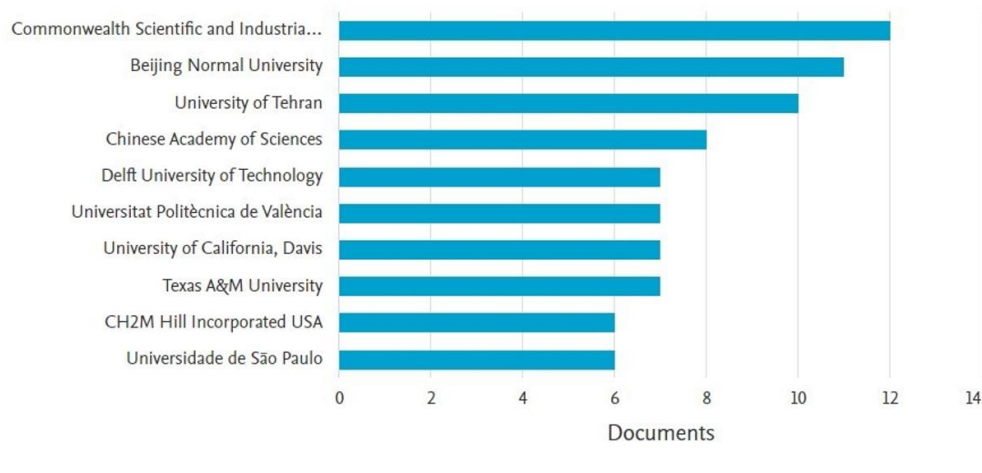


Figure 8. Distribution of papers by universities

Research on decision-making processes for WDP serves the betterment of society and spans various fields of study. While it falls under the realm of social sciences, it is also interconnected with other disciplines. Numerous researchers from diverse fields incorporate concepts of decision-making processes for WDP into their studies to better humanity. Figure 9 illustrates that 35.6% of the research on decision-making processes for WDP is conducted within the Environmental Sciences domain. Engineering accounts for the second-largest share, at 15.6% of the research output. Social Sciences rank third in terms of publication contributions, making up 11.3% of the total production on decision-making processes for WDP. Agricultural and Biological Sciences follow, contributing 6.8% to research publications on this topic. The analysis demonstrates that decision-making

processes for WDP are multidisciplinary, encompassing various subject areas such as Earth and Planetary Sciences, Energy, Computer Science, Mathematics, Business, Management and Accounting, and Biochemistry, among others.

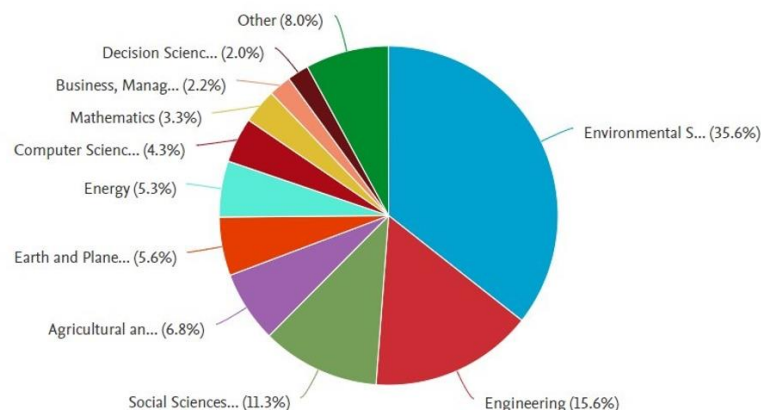


Figure 9. Distribution of papers by subject area

The highest number of published documents on decision-making processes for WDP, totalling 25, indicates a significant research investment by the National Natural Science Foundation of China (Figure 9). Another noteworthy contributor is the U.S. National Science Foundation (NSF), which has supported 14 studies published in Scopus within this field. Additionally, the Brazilian agency Coordenação de Aperfeiçoamento de Pessoal de Nível Superior has sponsored a considerable number of studies, totalling nine publications in Scopus on WDP decision-making processes, indicating an international perspective on this subject.

The European Commission has eight publications listed in Scopus concerning WDP decision-making processes (Figure 10). Its involvement reflects a commitment to research and collaboration on WDP at the European level. Additionally, there are various other sponsors, with publication numbers ranging from one to seven. This diversity of sponsors from different countries and organisations shows the global interest and support for research in this field. Several sponsors with similar publication count (e.g., six, five, four) have contributed at comparable levels, underscoring collaborative endeavours and shared interests in understanding decision-making processes related to WDP. Many sponsors are listed with only one publication, indicating smaller-scale contributions but still highlighting a widespread interest and support network for research in this area.

International collaborations are evident in the publications listed on Scopus concerning WDP decision-making processes (Figure 10). The presence of sponsors from various countries and regions reflects a cooperative and interconnected approach to studying these processes. Both governmental and non-governmental organisations, such as the National Key Research and Development Program of China, the Ministry of Science and Technology, Israel, as well as non-governmental organisations, such as the global environment nonprofit Nature Conservancy and The Rockefeller Foundation, indicate a diverse range of funding sources. Universities and academic institutions, such as Lund University and Imperial College London, also sponsor research on decision-making processes in WDP.

In conclusion, Figure 10 illustrates a diverse and worldwide panorama of financial backing for research on WDP decision-making processes, with substantial contributions from different nations, governmental entities, and non-governmental organisations. The variety of sponsorship sources suggests an interdisciplinary approach to tackling the challenges associated with WDP.

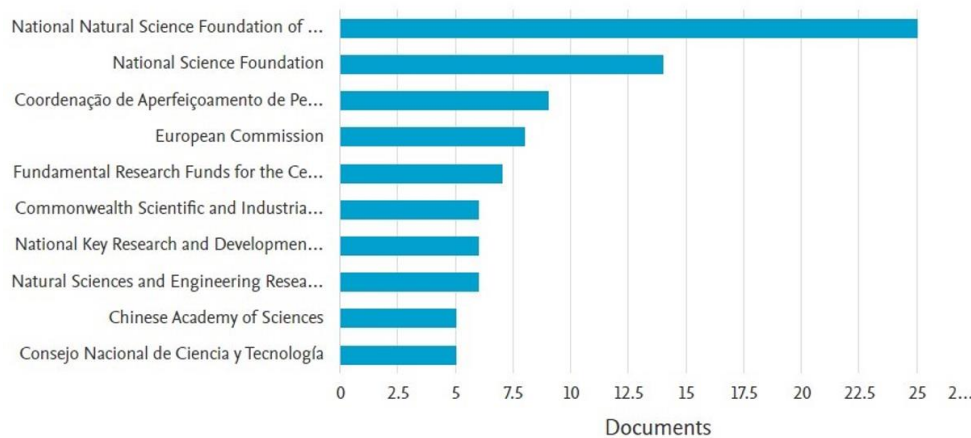


Figure 10. Distribution by funding sponsor

Figure 11 illustrates a predominant presence of articles (65.8%), indicating a substantial emphasis on scholarly investigation concerning decision-making processes in WDP. Articles offer detailed insights, methodologies, and findings derived from specific research endeavours. The inclusion of conference papers (23.1%) suggests active engagement and dissemination of research findings and discussions on decision-making processes in WDP through conferences. Conference papers may provide practical applications and innovative perspectives. The relatively lower proportion of book chapters (4.7%) implies that although there is some coverage in book format, it may not be as extensive as other formats. Book chapters likely delve into specific aspects of decision-making in WDP in greater detail. The presence of reviews (4.3%) indicates an effort to synthesise literature and research on decision-making processes in WDP. Reviews offer a broader understanding of the current state of knowledge in the field. The lower conference review count (1.3%) suggests that critical assessments of WDP-related conferences are less common. Conference reviews can offer insights into key discussions and emerging trends in the field. The least prevalent format is books (0.9%), suggesting that comprehensive publications on decision-making processes in WDP are less common. Books may provide a comprehensive perspective on the subject, covering various aspects in greater depth.

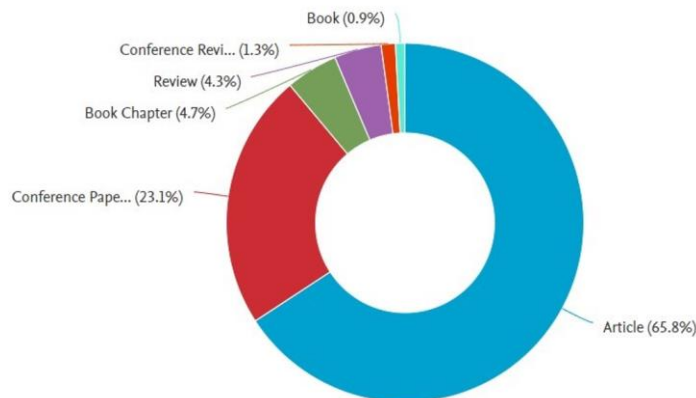


Figure 11. Distribution by type

In conclusion, the distribution of document types highlights a notable focus on scholarly articles and conference papers, underscoring a research-driven approach to understanding and addressing decision-making processes in

WDP. The array of document types further indicates a broad spectrum of sources, encompassing detailed research investigations, comprehensive reviews, and conference contributions.

4. Findings stemming from primary data analysis

In a research endeavour focused on eliciting recommendations from experts regarding the flexibility of the Vhembe District Municipality (VDM) in decision-making processes for WDP, interviewees were posed the following inquiry: “Do the decision-making processes within the Vhembe District Municipality exhibit flexibility and demonstrate effective adaptation to meet the requirements of water demand planning?”

The primary data for the study were collected using a mixed-methods approach that integrated both quantitative questionnaires and qualitative face-to-face interviews. Over three days in 2022, the first author directly administered an open-ended interview schedule to five handpicked management-level participants, and 50 other respondents, including supervisors, technicians, planners, administrators, and lower-level employees, completed structured self-administered questionnaires. A total of 55 individuals took part in the research. The Vhembe District Municipality's various departments, including Agriculture, Forestry and Fisheries; Sports, Arts and Culture; Environmental Affairs; Health and Social Development; Energy; Provincial and Local Government; Local Government and Housing; and Water Affairs, were targeted through a non-probability, purposive sampling method. The in-depth interviews provided qualitative insights, whereas the questionnaires yielded quantitative data suitable for descriptive statistical analysis.

The majority of interview participants concurred that the decision-making processes within the VDM exhibit flexibility and effectively adjust to meet the demands of WDP. They indicated agreement with the notion that the VDM demonstrates adaptability in its decision-making processes in response to WDP requirements. Specifically, 80% of participants acknowledged that the VDM's decision-making processes were flexible enough to cater to the needs of WDP (Mukonavanhu, 2022). According to these respondents, varying circumstances necessitate different solutions and decisions, leading to evolving decision-making processes over time. Moreover, they noted that decisions evolve as problem dynamics change, influenced by factors that also change over time. The consultation processes involving community members in decision-making were viewed as enabling the municipality to make decisions aligned with community needs, thus reflecting changing times and conditions. Notably, none of the participants adopted a neutral stance on whether the VDM's decision-making processes are flexible and adaptable to WDP needs, and none disagreed with this assertion. Among the participants, 20% expressed disagreement regarding the effectiveness of the VDM's decision-making processes in terms of flexibility and adaptation to WDP needs (Mukonavanhu, 2022). To illustrate, one participant who held this view stated: *“With regards to the flexibility in decision-making processes, the graph is just straight, as one would not be able to determine whether any changes are actually made in terms of the decisions that were made, with most of the activities that take place being more of a routine. Innovation is suppressed in the public sector unless higher authorities determine that action is needed. However, it is difficult for the public servants to come up with innovative ways of doing things, as they, in most cases, have to adhere to existing guidelines and frameworks.”*

While the interview findings suggest that the VDM's decision-making processes are flexible and responsive to WDP's demands, the literature presents contrasting evidence. Access to water in the Vhembe District remains a significant problem, despite several policy changes implemented since 1994. Communities depend on numerous sources, mainly boreholes, and roughly as few as 28% of these boreholes work, causing unhappiness with respect to water quantity, quality, and service delivery, indicating a lack of effective adaptation in the VDM's decision-making processes to address limited water access (Malima & Pindihamu, 2022). This implies that the VDM may lack sufficient training in adaptability for its management in decision-making processes. Moreover, the VDM makes insufficient efforts to encourage citizen participation in IDP processes, which is crucial for identifying current community challenges and facilitating adaptation to environmental changes. Additionally, the VDM's

management styles may not be conducive to adaptable decision-making. It may be necessary for the VDM to steer clear of rigid management approaches, such as bureaucratic management, which tend to centralise information with top management, thereby restricting the potential for inclusive and adaptable decision-making.

All stakeholders engaged in WDP must participate in decision-making processes, fostering compromise, negotiation, and accommodation of diverse viewpoints to ensure flexibility and responsiveness. Adopting a polycentric system with multiple decision-makers who consider their individual perspectives and expertise can enhance decision-making flexibility and responsiveness to specific contexts in WDP. Managers, serving as decision-makers in WDP, should also ensure that their decision-making processes remain adaptable and responsive to evolving environments. Excessive reliance on bureaucratic decision-making procedures hampers effective communication within the municipality. Instead of rigid bureaucratic approaches, organisations should embrace socially inclusive and democratic principles. Democratic frameworks would mitigate inequalities and promote social justice by employing communication and negotiation to reconcile divergent interests. Organisational structures serve as valuable tools by delineating effective communication channels within the municipality. The municipal Integrated Development Plan (IDP) theoretically supports communication and should therefore be leveraged to facilitate effective communication in WDP processes within the VDM.

The introduction of New Public Management (NPM) under neoliberalism brought market dominance into public management, grounded in the idea that private-sector markets operate more efficiently than public-sector markets (Kinder & Stenvall, 2024). Essentially, market-based governance advocates implementing market-oriented strategies in the government sector to leverage proven private-sector strategies and enhance performance in the public sector. Public-Private Partnerships (PPPs) can offer advantages in WDP by fostering competition and productivity in the water sector, broadening service delivery, and reducing costs associated with service provision. Professional Service Providers are also better equipped to manage essential supply chains for service delivery than public entities.

In response to the question whether decision-making processes are flexible and effectively adapt to the requirements of WDP, the larger share indicates that 14 (28%) of the questionnaire respondents strongly agreed with the statement. In comparison, 20 (40%) agreed. Conversely, 5 (10%) participants disagreed with the notion that decision-making processes adequately adapt to WDP needs. No participants strongly disagreed, and 11 (22%) remained neutral. Overall, the majority of questionnaire respondents (68%) agreed that decision-making processes demonstrate flexibility and adaptation to WDP needs (Mukonavanhu, 2022). This suggests that the VDM effectively responds to external environmental changes impacting WDP.

5. Concluding insights and suggestions for decision-making in water demand planning

Engaging all stakeholders in WDP fosters negotiation, bargaining, and the accommodation of diverse interests, thereby promoting flexibility and responsiveness in decision-making. It is crucial to avoid bureaucratic management styles, as they impede effective communication within the municipality. Instead, organisational principles should be based on democratic principles to encourage inclusivity and adaptability. Involving the private sector contributes to decision-making flexibility by aligning decisions with environmental conditions and contextual factors.

Suggestions concerning public officials' decision-making regarding WDP entail advocating for the introduction of comprehensive decision-making methodologies. The recommendations from the study underscore the importance of involving all stakeholders impacted by WDP in policy formulation, integrating WDP approaches to expand decision-making options, contextualising to ensure project sustainability, and improving the flexibility and contextualisation strategies.

The model depicted in Figure 12 below provides a framework for a comprehensive decision-making process in WDP, thereby ensuring the involvement of all stakeholders. According to this model, goals established in WDP are formulated based on identified needs, with all stakeholders, both public and private, included. Public sector organisations, acting as professional service providers (PSPs), play significant roles as they are closely involved in WDP initiatives. By involving all stakeholders in goal-setting, the range of alternatives is expanded, and strategic plans are contextualised. Stakeholders such as households and industries are essential, as they must take ownership of WDP projects implemented in their communities. Stakeholder ownership helps in reducing infrastructure vandalism and encourages reporting of issues such as burst pipes. Effective communication among all stakeholders is crucial for successful collaboration.

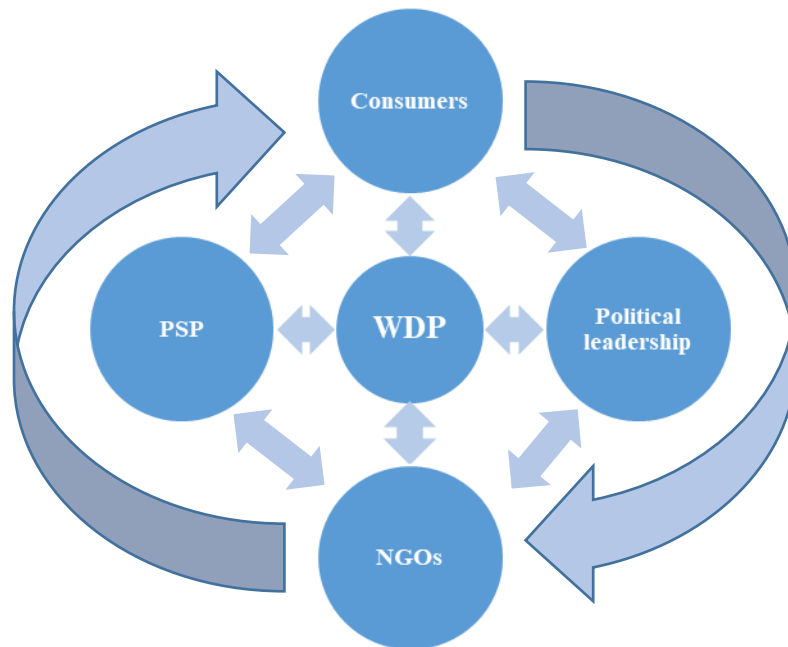


Figure 12. Holistic Decision-Making model
Source: based on Mukonavanhu 2022

The Holistic Decision-Making model (Figure 12) seeks to foster the participation of previously marginalised individuals in decision-making processes regarding water resources, particularly during the apartheid era. This model also upholds democratic principles, including stakeholder engagement, accountability, transparency, and decentralisation, grounded in ethical norms. Additionally, the Holistic Decision-Making model aligns with the principles of NPM, which advocates for professionalisation of the sector through decentralised decision-making processes.

The *vertical vectors* emphasise the advancement of consumers and non-governmental organisations advancing comprehensive decision-making in (WDP).

Consumers

The Holistic Decision-Making model can promote water conservation among consumers by fostering effective collaboration among political leaders and experts to make decisions on efficient water use. Additionally, this model can help minimise water infrastructure. By encouraging dialogue, the model enhances decision-making by Water Service Providers (WSPs), leading to improved water service provision. This, in turn, reduces consumers' sense of desperation, diminishing the likelihood of resorting to vandalism to access water.

Non-Governmental Organisations

The Holistic Decision-Making model has the potential to address skills shortages within the public sector. By fostering enhanced collaboration in decision-making among NGOs, governmental bodies, and consumers involved in WDP, the model facilitates more effective resource utilisation and promotes better cooperation between the public and private sectors, enabling the public sector to leverage resources and expertise from the private sector. This collaboration can contribute to improved planning and financial services within the public sector.

The *horizontal vectors* emphasise the importance of professional service providers and political leaders in advancing holistic decision-making in WDP.

Professional Service Providers (PSP)

The Holistic Decision-Making model can contribute to achieving the objectives outlined in the Constitution of the Republic of South Africa (South Africa, 1996), which emphasises decentralisation and allows the national government to delegate authority. By facilitating cooperative decision-making, particularly when local governments engage professional service providers for water services, the model can ensure that the national government retains ultimate accountability for compliance with legislative requirements in service provision. This involvement of the national government in decision-making processes will help uphold adherence to regulations across all levels.

Political leadership

The Holistic Decision-Making model can help garner political support for WDP in South Africa. This can be achieved by increasing politicians' involvement in WDP decision-making processes, thereby encouraging their endorsement of WDP initiatives. Additionally, the model can assist politicians in achieving their objectives of finding solutions to public-sector challenges by implementing technical solutions that enhance efficiency. WDP incorporates various technical solutions to address the diverse challenges encountered in water service delivery.

Moreover, the Holistic Decision-Making model aligns with the ideologies advocated by Woodrow Wilson and Goodnow, which emphasise the importance of a distinct public administration separate from politics to enhance efficiency and mitigate corruption. This is because the model promotes the integration of business-like principles from the private sector into the public sector, thereby elevating public sector policies to a level more akin to business principles rather than traditional public administration.

As depicted in Figure 12, each stakeholder can engage directly in WDP activities without necessarily involving other stakeholders. However, stakeholders should collaborate on WDP endeavours to ensure a cohesive, integrated approach. Such collaboration enhances the range of available options, tailors responses to specific contexts, and promotes the long-term sustainability of projects. It is essential for WDP initiatives not to be constrained by predetermined goals, thereby allowing for flexibility and adaptation of strategies as needed. According to the model, stakeholders should engage in collaborative efforts and resource-sharing in WDP to enhance the implementation of plans. For instance, NGOs can provide households with tap nozzles to reduce tap water pressure, thereby encouraging water-saving practices among household users.

In conclusion, the Holistic Decision-Making model presents a comprehensive approach to WDP that emphasises inclusion, collaboration, and flexibility. By incorporating stakeholders from various sectors, including public organisations, service providers, NGOs, households, and industries, the model aims to set goals based on identified needs and to promote effective decision-making. This model not only aligns with democratic principles, such as transparency and decentralisation, but also reflects NPM principles by promoting professionalism and accountability in the public sector. It encourages mutual communication among stakeholders to foster cooperation

and ensure that all voices are heard in the decision-making process. Furthermore, the model recognises political support and involvement in WDP initiatives, aiming to align political interests with efficient solutions to public-sector challenges. It also emphasises the importance of approaches, flexibility in goal-setting, and collaboration among stakeholders to maximise contextualisation and ensure project sustainability.

The Holistic Decision-Making model provides a framework for promoting water conservation, addressing infrastructure issues, and enhancing service delivery through collaborative efforts and stakeholder engagement. By encouraging dialogue, accountability, and shared responsibility, the model strives to achieve more efficient and sustainable outcomes in WDP initiatives.

Scholars from developing and underdeveloped nations are encouraged to contribute further to research on decision-making processes for WDP, and, thereby to contribute to the improvement of their respective public sectors.

References

- Böhmer, R., Busbach, U. & Kiesel, B. (2023). The Kehler Management System®: Integration of external stakeholders in the quality assessments of municipal administrations. *Economics and Culture*, 20(2), 32-45. <https://doi.org/10.2478/jec-2023-0014>
- Chen, Y. (2025). A Replication of "Did New Public Management Matter? An Empirical Analysis of the Outsourcing and Decentralization Public Sector Size. *Public Administration*, 3, 942-953. <https://doi.org/10.1111/padm.70001>
- Chintapanti, A. (2023). Law, development and regulatory globalisation of the World Bank in India's electricity sector. Routledge: Taylor & Francis Group. <https://doi.org/10.4324/9780429342097>
- De Lima e Souza, V. & Borges, M. M. (2023). The information on decision-making in health: From predictable to unpredictable. *Journal of Health Management*, 25(4), 850-859. <https://doi.org/10.1177/09720634231215393>
- González Perea, R., Fernández García, I., Camacho Poyato, E. & Rodríguez Díaz, J. A. (2023). New memory-based hybrid model for middle-term water demand forecasting in irrigated areas. *Agricultural Water Management*, 284108367. <https://doi.org/10.1016/j.agwat.2023.108367>
- Hibjur Rahaman, M., Roshani, Masroor, M. & Sajjad, H. (2023). Integrating remote sensing derived indices and machine learning algorithms for precise extraction of small surface water bodies in the lower Thoubal river watershed, India. *Journal of Cleaner Production*, 422138563. <https://doi.org/10.1016/j.jclepro.2023.138563>
- Hoepers, T. R., Leithold, J., Monteiro, M. M., Corzo Perez, G. A., Fernandes, C. V. S., Zevenbergen, C. & Dos Santos, D. C. (2024). An integrated approach to decision-making variables on urban water systems using an urban water use (UWU) decision-support tool. *Science of the Total Environment*, 912168865. <https://doi.org/10.1016/j.scitotenv.2023.168865>
- Johnston, K. (2023). New public service bargain: Time for paradigm shift in turbulent times? *Transylvanian Review of Administrative Sciences*, 85-100. <https://doi.org/10.24193/tras.SI2023.5>
- Kinder, T. & Stenvall, J. (2024). Local Public Sector Innovation. In: Problem-solving and Learning for Public Services and Public Management. Springer Texts in Business and Economics. Springer, Cham. https://doi.org/10.1007/978-3-031-43230-9_5
- Lameck, W. & Shabiru, C. (2023). The impact of New Public Management reforms on the delivery of secondary education in Tanzania. *Commonwealth Journal of Local Governance*, (28), 122-131. <https://doi.org/10.5130/cjlg.vi28.8818>
- Leite, D. F. B., Padilha, M. A. S., & Cecatti, J. G. (2019). Approaching literature review for academic purposes: The Literature Review Checklist. *Clinics*, 74. <https://doi.org/10.6061/clinics/2019/e1403>
- Lindaas, N. A., Anthun, K. S. & Magnussen, J. (2024). New public management and hospital efficiency: The case of Norwegian public hospital trusts. *BMC Health Services Research*, 24(1), 36. <https://doi.org/10.1186/s12913-023-10479-7>

Malima, T. P., & Pindiham, G. K. (2022). Potable Water Security in Rural South Africa: A Case Study of Vhembe District. *African Journal of Governance and Development*, 11(1.2), 256-275. <https://doi.org/10.36369/2616-9045/2022/v11si2a3>

Marienfheldt, J. (2024). Does digital government hollow out the essence of street-level bureaucracy? A systematic literature review of how digital tools' foster curtailment, enablement and continuation of street-level decision-making. *Social Policy & Administration*, 58(5), 831-855. <https://doi.org/10.1111/spol.12991>

Masruki, R., Hussainey, K., & Aly, D. (2022). Stakeholder expectations of the accountability of Malaysian State Islamic Religious Councils (SIRCS): to whom and for what? *Journal of Islamic Accounting and Business Research*, 13(5), 760-777. <https://doi.org/10.1108/JIABR-04-2021-0130>

Montel, L. (2023). Harnessing the power of the law: A qualitative analysis of the legal determinants of health in English urban planning and recommendations for fairer and healthier decision-making. *BMC Public Health*, 23(1). <https://doi.org/10.1186/s12889-023-15166-0>

Mukonavanhu, T. (2022). Water demand management and planning in the Vhembe District Municipality. University of Johannesburg. <https://search.proquest.com/openview/3915eb4d48da0349112ce2ef2cec4bd6/1?pq-origsite=gscholar&cbl=2026366&diss=y>

Republic of South Africa. (1996). Constitution of the Republic of South Africa, 1996. <https://www.parliament.gov.za/constitutional-amendments>

Roberts, R. (2024). The new public integrity management and the protection of the impartiality of bureaucratic decision-making. *Public Integrity*, 27(3), 316-339. <https://doi.org/10.1080/10999922.2023.2297118>

Sabia, G., Mattioli, D., Langone, M. & Petta, L. (2023). Methodology for a preliminary assessment of water use sustainability in industries at sub-basin level. *Journal of Environmental Management*, 343. <https://doi.org/10.1016/j.jenvman.2023.118163>

Sakiyama, R. Z., Zukeram, E. S. J., Ruiz, L. B. & Andrade, C. M. G. (2023). Development of a platform for monitoring the levels of dispersed oxygen in river components of a water supply micro basin using programmable microcontrollers. *Water*, 15(13), 2316. <https://doi.org/10.3390/w15132316>

Shalko, M., Lavruk, A., Babiak, O., Khanina, O., Zinchenko, V. & Melnyk, D. (2023). Digital decision-making tools in the field of public administration of healthcare. *Financial and Credit Activity: Problems of Theory and Practice*, 6(53), 528-540. <https://doi.org/10.55643/fcaptive.6.53.2023.4211>

Westra, S., & Zscheischler, J. (2023). Accounting for systemic complexity in the assessment of climate risk. *One Earth*, 6(6), 645-655. <https://doi.org/10.1016/j.oneear.2023.05.005>

Zhang, R., Chen, T., Wang, Y. & Short, M. (2023a). Systems approaches for sustainable fisheries: A comprehensive review and future perspectives. *Sustainable Production and Consumption*, 41242-41252. <https://doi.org/10.1016/j.spc.2023.08.013>

Zhang, Y. F., Li, Y. P., Huang, G. H. & Ma, Y. (2023b). Sustainable management of water-economy-ecology nexus through coupling bi-level fractional optimization optimization-trading mechanism: A case study of Dongjiang watershed. *Ecological Indicators*, 154. <https://doi.org/10.1016/j.ecolind.2023.110752>

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