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The Role of Public-Private Partnerships in Developing Sustainable Cities: Framework, Opportunities, Mechanisms

Authors: ¹ Patrose Leshinka; ² Moffat Tembo, ³Erastus Misheng'u Mwanaumo



¹Department Civil & Environmental Engineering, University of Zambia, Lusaka, Zambia

²Department Civil & Environmental Engineering, University of Zambia, Lusaka, Zambia

³Department Civil & Environmental Engineering, University of Zambia, Lusaka, Zambia

ABSTRACT: The rapid rate of global urbanization has forced governments worldwide to develop sustainable cities through Public Private Partnerships (PPPs), which appear to offer suitable solutions that overcome the shortage of public finance and cuts on public spending. However, it is still unclear what strategies to follow when engaging private sector partners who can fulfill the requirements of PPP for sustainable cities. Based on the existing gap, the current study seeks to understand the role of PPP as a strategy for developing sustainable cities, by studying its framework, opportunities, and mechanisms. The study adopted a systematic review of relevant literature and published materials. The findings demonstrate that PPPs contribute to developing sustainable cities and further identify four common themes: Governance, Public-Private-People Partnerships (PPPPs), Sustainability, and Innovation. The study concluded that these themes are interconnected within the successful development process of a sustainable city PPP. The study further recommends adopting these themes while developing PPP frameworks and mechanisms for sustainable cities. This study adds to the body of knowledge literature on the applicability of PPPs for sustainable urban development.

Keywords: sustainable cities; public private partnerships; frameworks; opportunities; mechanisms

1. INTRODUCTION

Some 56% of the world's 4.4 billion inhabitants live in cities (Saner, 2023). This trend continues, with the urban population doubling its current size by 2050; at this point, nearly 7 out of 10 people will live in cities (World Bank, 2023). Current trends predict that this number will continue to rise, with urban population growth being significantly more pervasive and rapid-fire in the developing world than in the developed (UN-Habitat, 2022). Another considerable consequence is the focus on democracy, decentralization, and governance to promote the relationship between citizens, the private sector, civil society, and the government (Rasoolimanesh, et al., 2011). Recognizing this, governments worldwide are turning to sustainable smart cities as a strategic set of integrated initiatives encompassing infrastructures, technology, and digital services dedicated to achieving green, social, and economic sustainability.

A sustainable city is an innovative city that uses ICTs and other means to enhance the quality of life, effectiveness of civic operations and services, and competitiveness while meeting the needs of present and future generations for economic, social, environmental, and cultural aspects (UNECE, 2020). The provision of innovative, sustainable city infrastructure aligns with Smart Sustainable Development Goal (SDG) 11, which focuses on making cities and human settlements inclusive, safe, and sustainable (United Nations, 2020). However, the development and implementation of smart sustainable city projects require considerable investments that are difficult to fund with traditional public finance. In this context, Public-Private-Partnerships (PPP) appear to be suitable

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solutions to overcome the shortage of public finance and cuts on public spending (Calderini, et al., 2013).

It is uncertain what procurement procedures or strategies to follow when engaging private sector partners who can fulfill the requirements of PPP for sustainable cities, such as flexibility and true partnership. Based on the existing gap, the current study will identify the critical themes in applying PPP for sustainable city projects and the strategies and measures for improved use of PPP for developing sustainable cities. This will be necessary in transforming the PPP process and structure to ensure PPP projects achieve urban sustainability goals. Consequently, the current study seeks to review the Public-Private Partnership framework, available opportunities, and its risk-sharing mechanisms by illustrating their potential applicability and added value for smart sustainable city initiatives. This study aims to deepen the current understanding of the role of PPP as a possible strategy for developing sustainable cities for countries. The findings of this research will contribute to the existing academic literature on sustainable city practice and offer recommendations for further research areas. The study will adopt a systematic literature review.

2. LITERATURE REVIEW

2.1 Public-Private-Partnership

Quan (2023) defines a public-private partnership as a financing and contractual mechanism to establish a long-term relationship between the public and the private sectors to develop a capital investment project and provide the associated public service. According to Georgios Siokas (2022), partnerships with private and public entities provide a means to achieve the initial goal and, therefore, lead to the completion of smart city projects. In such an arrangement, the public and private sectors cooperate and “share resources, risks, responsibilities and rewards with each other for the achievement of joint objectives” (Lam, et al., 2020).

The global expansion of smart, sustainable cities has led to increased research efforts toward building compelling smart cities. Collaboration is pivotal for effective urban development, often seen through establishing public-private partnerships (PPPs) (2020). Although PPP is an effective means to facilitate smart city development, its adoption in terms of its framework, available opportunities, and risk-sharing mechanisms into the concept of smart sustainable cities remains somewhat vague and ideological.

2.2 Role of Public-Private Partnership in Developing Sustainable Cities

Several researchers have studied the role of Public-Private Partnerships in developing sustainable cities. According to Fell & Mattsson (2021), PPP can potentially solve the problem of unsustainable urban development, and resident participation and inclusion are considered the best strategy for PPP to evolve as a future guarantor of a sustainable city. Figueroa & Greve (2014) assert the need for adopting a systematic approach that is applied early in the process and runs throughout the entire PPP lifecycle process that links with key sustainability principles. They further recommend commitment to the system by public and private actors motivated by corporate social responsibility to bring innovation and transparency to advance sustainability.

Parakhina et al. (2019) state that PPP provides wider city opportunities. It defines it as a promising strategy for fostering city smart transformations while turning the municipality into an investment-attracting spot. Radchenko1 (2021) researched the experiences of leading smart cities such as London, Bristol, Barcelona, and Amsterdam, revealing that PPP is a commonly applied practice.

The study showed that PPP is unique regarding the leadership structure and coordinating roles in each considered case. In Barcelona, the PPPs are centric-based, initiated, and coordinated by the city council. In Bristol, more freedom is given to the private stakeholders that can coordinate sustainable city projects. In London, all the smart sustainable partnerships are carried out by the authorities, but their role is instead advising than imposing the partnership's vision. In Amsterdam, the PPPs are a unique partnership between businesses, authorities, research institutions, and the people of Amsterdam.

2.3 PPP Frameworks for Sustainable Cities

Sustainable smart city projects usually involve a high level of innovation and intelligent solutions, sustainability objectives, and engagement in technical partnerships with local universities or research centers (Selim et al., 2018). Traditional contract-based PPP models may not be suitable for sustainable city endeavors (Tingting Liu, 2020). However, there is more than one way in which PPPs are developed and implemented, meaning there's no particular structure prescribed for PPPs to use. At the same time, its models depend on the factors yielded in a country during development. Thus, frameworks evolve, often as a response to specific challenges facing a PPP program (Mwanaumo et al., 2021). PPP models, such as Build-Operate-Transfer (BOT) and design-build-finance-operate (DBFO), used to provide public infrastructure, can also be adopted for sustainable city projects. Under these models, the private sector is appointed to finance, design, construct, maintain, and operate public assets and services under a long-term agreement (Cruz & Sarmiento, 2017). According to Lam & Yang (2020), the choice of the model largely depends upon the nature of the smart facilities and associated services to be delivered. They are implying that the models may evolve and adjust to suit the needs of different projects.

2.4 PPP Mechanisms for Sustainable Cities

The concepts of partnership and collaboration have close connections with sustainability, innovation, and risk and are crucial to implementing PPPs for sustainable city development. The partnership is built on equitable risk allocation, and the party assuming project risk should share the benefits that arise from innovation (Visconti et al., 2019). This means the percentage of available risk depends on the fundamental functionality of smart infrastructure during the operation stage.

Public-Private-People Partnerships (PPPPs) are an essential mechanism underpinning smart city PPPs (Liu et al., 2021). The PPPP is considered an expansion of a PPP model where the role of end-users, communities, and citizens is deemed critical to decision-making in urban development and upgrade (Tingting Liu, 2020). Rakpanitmanee & Pathranarakul (2023) opine that the people sector, which comprises end-users or impacted groups, has traditionally been invited to participate in PPP intervention only at the early stages, such as during a project's feasibility study. Relatively little attention has been given to the objective of delivering services with qualified standards and affordable tariffs to end-users compared to the concerns related to risk allocation between public and private sectors.

3. METHODOLOGY

The study utilizes a systematic literature review of previous studies on public-private partnerships and sustainable smart cities. The advantages of this method are transparency, objectivity, and minimized risk of bias in the results (Nguyen et al., 2018). The review was restricted to relevant papers published in academic (peer-reviewed) journals. The explanation for this is that peer-reviewed journal papers are considered the most precious sources of information because of the academic rigor involved in their publications. As Xiao & Watson (2019) identified, the process involves a specific and reproducible approach for identifying, selecting, and appraising all literature of a certain agreed quality level relevant to the research question.

3.1 Data Collection

Step 1) Literature search: This step addressed research questions unambiguously and in a specified order. The research question, therefore, was: ‘What is the role of PPP in developing sustainable cities?’ With this, the paper selection for content analysis followed inclusion criteria such as (1) peer-reviewed journal articles representing the PPPs and sustainable smart cities and (2) the concepts of sustainable smart city or PPP were included in the title, abstract, or keywords; (3) research published in English; and (4) the sustainable smart city and PPP were the dominant focus. In the paper analysis and discussion, the search protocol was solely based on the following designated search keywords to ensure the criteria are maintained at a well-defined range: “public-private partnership, sustainable smart city, and smart infrastructure.”

Step 2) Literature selection: A comprehensive and extensive search from relevant databases was carried out to capture as many relevant citations and journals in the appropriate domain of study identified and selected. The chosen journals were listed in some well-known database providers, are multidisciplinary, and have global coverage. The database used includes Google Scholar. Open Access journals were also reviewed because articles are freely available to everyone. A total of 21 journals were selected from the two databases, with 56 papers identified. Figure 1 presents the exaction of keywords and the results of the paper collection process.

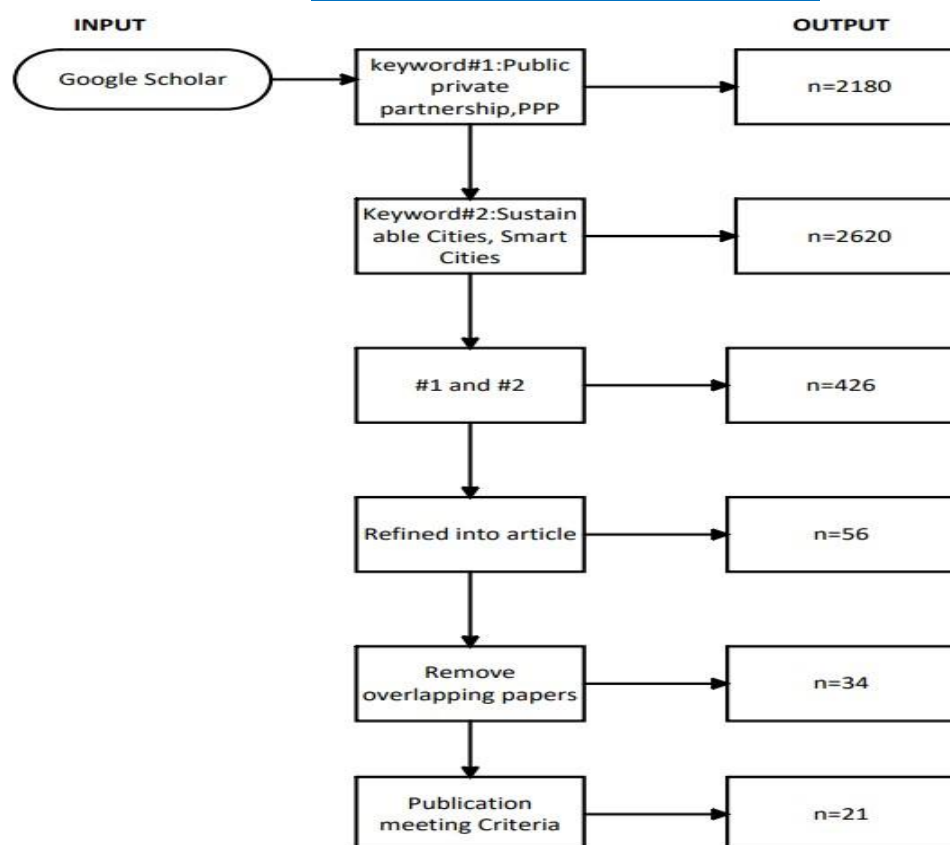


Fig.1 Paper collection process.

Step 3) Assess the quality of studies: This step ensures academic rigor and implies that acquired articles for analysis and synthesis are subjected to assessed qualities. This meant the initial 56 papers retrieved were subjected to a screening process that involved reviewing the abstracts and contents of the 56 papers, and those identified as relevant to the review were listed and thoroughly reviewed. The number of papers on PPPs and sustainable smart cities was reduced to 21, as shown in Table 1.

Table 1: Summary of selected empirical studies on PPP in Sustainable smart cities

	Author	Title	Year	Country
1	Ternell, Anna	Public-private partnerships for multifunctional sustainable land use in peri-urban areas to mitigate the adverse effects of climate change	2020	Sweden
2	Chen, Bingyao	Public-Private Partnership Transportation Investment and Low-Carbon Economic Development: An Empirical Study Based on Spatial Spillover and	2022	China

		Project Characteristics in China		
3	Masekesa, L. K.	The potential of public private partnerships (PPPS) in the pursuit of sustainable development goal 11 in Zimbabwe	2021	Zimbabwe
4	Parygin, Danila	Tools and Technologies for Sustainable Territorial Development in the Context of a Quadruple Innovation Helix	2022	Switzerland
5	Selim, Ahmed M.	Infrastructure projects for green cities between implementation challenges and efficiency indicators	2021	UK
6	Yan, Min Ren	Towards a city-based cultural ecosystem service innovation framework as improved public-private-partnership model-A case study of Kaohsiung Dome	2019	China
7	Wang, Fang	The Effects of Investment in Major Construction Projects on Regional Economic Growth Quality: A Difference-In-Differences Analysis Based on PPP Policy	2022	UK
8	Dupont, Laurent	Innovative public-private partnership to support Smart City: the case of “Chaire REVES”	2015	China
9	Nzimande, Ntombifuthi Precious	Socially sustainable urban renewal in emerging economies: A comparison of Magdolna quarter, Budapest, Hungary And Albert Park, Durban, South Africa	2020	South Africa
10	Selim, Ahmed M.	Public-private partnerships (PPPs) in smart infrastructure projects: the role of stakeholders	2020	UK
11	Zhan, Changjie	Funding sustainable cities: A comparative study of Sino-Singapore Tianjin Eco-City and Shenzhen International Low-Carbon City	2018	China
12	Zheng, Shengqin	Investigating the sustainability performance of PPP-type infrastructure projects: A case of China	2018	China
13	Anwar, Bilal	Sustainable urbanization and development goals strategy through public-private partnerships in a South-Asian metropolis	2017	China
14	Adedeji, Joseph Adeniran	Urban open space transition and management in Lagos, Nigeria	2015	Nigeria
15	Li, Juankun	Advancing Urban Sustainability through Public-Private Partnerships: Case Study of the Gu’An New Industry City in China	2023	China

16	Fell, Terence	The role of public-private partnerships in housing as a potential contributor to sustainable cities and communities: A systematic review	2021	Denmark
17	Tingting Liu	Emerging themes of public-private partnership application in developing smart city projects: a conceptual framework	2021	Australia
18	Li, Lin	The role of public-private partnership in constructing the smart transportation city: a case of the bike sharing platform	2021	Korea
19	Moro Visconti, Roberto	Can public-private partnerships foster investment sustainability in smart hospitals?	2019	Finland
20	Radchenko, Karina	Public-Private Partnership for Smarter Cities	2022	UK
21	Rakpanitmanee, Supachai	The Critical Success Factors Of Public-Private-People Partnerships (PPPPs) For Efficient And Sustainable Infrastructure Development In Thailand	2023	Thailand

3.2 Data Analysis of Screened Articles

The data analysis was conducted to analyse and synthesise the remaining 21 screened articles, focusing on articles only related to the topic of interest and aligned with the research scope. From the analysis, there has been an increasing trend in the number of publications in the last nine years (2015–2023), indicating a significant growing research interest in PPPs in the context of a smart city-covered year of publication, as shown in Figure 2.

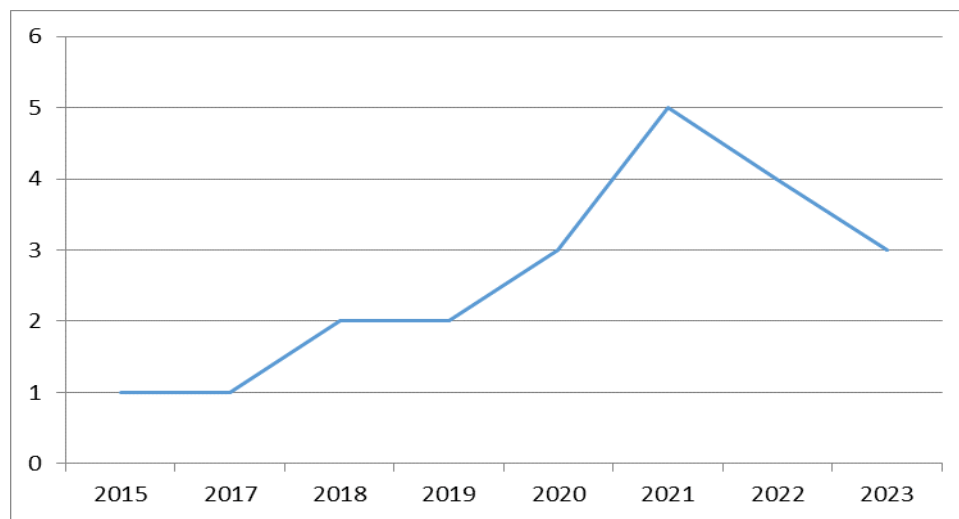


Fig.2 Research article distribution in the context of PPPs and sustainable cities.

The selected 21 papers revealed that using PPP projects in the context of smart cities was mainly reported in the EU countries, including Finland, Sweden, Denmark, Thailand, Korea, Australia, and UK as shown in Figure 3 .As stated earlier in this report, a limited body of research still

focuses on PPP and sustainable city development, especially in developing countries.

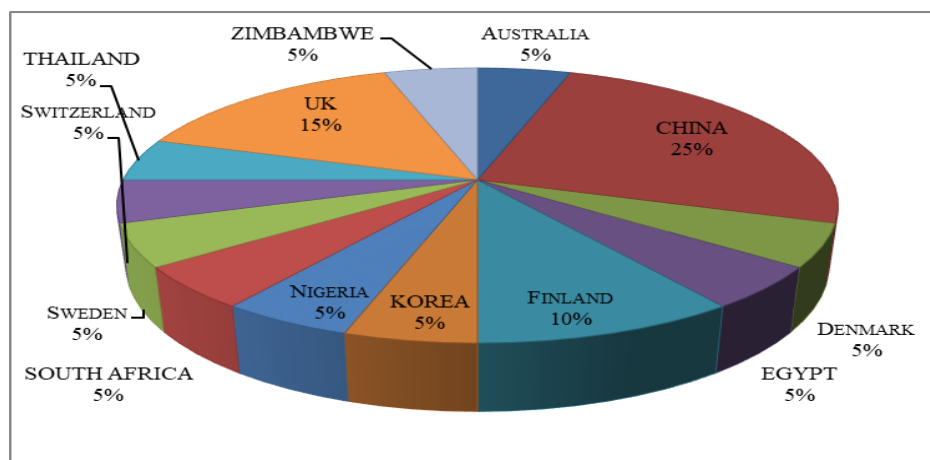


Fig. 3 Regional distribution of research in the context of PPPs and sustainable cities

4. FINDINGS

From the literature review, most articles agree that PPPs can evolve as a future guarantor of developing sustainable cities. Quan (2023), in his study, discovered that PPPs can act as a primary tool that should be used by towns or regions with weak economies, especially at the initial stages of smart transformation. Radchenko (2021) reveals that PPP facilitates smart specialization and further economic growth while the less advantaged communities turn into investment-attracting spots. Masekesa (2021) extends this view, noting that by resorting to PPPs, cities are more likely to provide better public services and build a long-term investment environment by taking advantage of the private sector's "know-how."

Secondly, this study has found that few articles dealt with frameworks and mechanisms to be used in PPP infrastructure for sustainable city projects across the globe, as shown in Table 2 below. Tingting Liu(2020) proposed a framework that combines the PPP with people to become PPPP. Further, his framework offers insights into the prospects of using PPPs in smart city projects. It provides useful policy and management interventions for public and private sectors to engage in smart city PPPs. Li et al. (2022) developed a theoretical framework illustrating how to govern PPP urban development projects (UDPs) towards sustainable development, whose success relies on the coexistence of a network-oriented governance approach: collaborative partnerships, incentive contracts, and public participation.

From the in-depth content analysis conducted on the literature, it emerged that four main structural PPP issues are associated with some shortcomings that characterize PPP and, from the authors' point of view, hamper its ability to achieve the development of sustainable cities. The four areas that were identified as the common themes of the PPP framework and mechanisms for sustainable cities include Governance, Public-Private-People Partnerships (PPPPs), Sustainability, and Innovation. Table 2 displays the frequency of each issue concerning how many articles researchers have identified as a problem.

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Table 2: Key themes identified in research articles in the context of PPP and sustainable cities

No.	Title	Author [Ma1]	Frameworks	Governance	4Ps	Sustainability	Innovation
1	Public-private partnerships for multifunctional sustainable land use in peri-urban areas to mitigate the adverse effects of climate change	Ternell, Anna 2020				X	
2	Public-Private Partnership Transportation Investment and Low-Carbon Economic Development: An Empirical Study Based on Spatial Spillover and Project Characteristics in China	Chen, Bingyao 2022				X	
3	The potential of public-private partnerships (PPPs) in the pursuit of sustainable development goal 11 in Zimbabwe	Masekesa, 2021	X	X			
4	Tools and Technologies for Sustainable Territorial Development in the Context of a Quadruple Innovation Helix	Parygin, Danila 2022				X	
5	Infrastructure projects for green cities between implementation challenges and efficiency indicators	Selim, Ahmed M. 2021		X	X		
6	Towards a city-based cultural ecosystem service innovation framework as improved public-private-partnership model - A case study of Kaohsiung Dome	Yan, Min Ren 2019				X	
7	The Effects of Investment in Major Construction Projects on Regional Economic Growth Quality: A Difference-In-Differences Analysis Based on PPP Policy	Wang, Fang 2022		X		X	
8	Innovative public-private partnership to support Smart City: the case of “Chaire REVES”	Dupont, Laurent 2015					X
9	Socially sustainable urban renewal in emerging economies: A comparison of Magdolna quarter, Budapest, Hungary And Albert Park, Durban, South Africa	Nzimande, Ntombifuthi Precious 2020		X	X	X	
10	Public-private partnerships (PPPs) in smart infrastructure projects: the role of stakeholders	Selim, Ahmed M. 2020		X			
11	Funding sustainable cities: A comparative study of Sino-Singapore Tianjin Eco-City and Shenzhen International Low-Carbon City	Zhan, Changjie 2018			X	X	

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12	Investigating the sustainability performance of PPP-type infrastructure projects: A Case of China	Zheng, Shengqin 2018				X	
13	Sustainable urbanization and development goals strategy through public-private partnerships in a South-Asian metropolis	Anwar, Bilal 2017			X	X	
14	Urban open space transition and management in Lagos, Nigeria	Adedeji, Joseph Adeniran 2015					
15	Advancing Urban Sustainability through Public-Private Partnerships: Case Study of the Gu'An New Industry City in China	Li, Juankun 2023	X	X			
16	The role of public-private partnerships in housing as a potential contributor to sustainable cities and communities: A systematic review	Fell, Terence 2021			X	X	
17	Emerging themes of public-private partnership application in developing smart city projects: a conceptual framework	Tingting Liu 2021	X		X	X	X
18	The role of public-private partnership in constructing the smart transportation city: a case of the bike sharing platform	Li, Lin 2021		X	X		X
19	Can public-private partnerships foster investment sustainability in smart hospitals?	Moro Visconti, Roberto 2019			X		X
20	Public-Private Partnership for Smarter Cities	Radchenko, Karina 2022		X	X		
21	The Critical Success Factors Of Public-Private-People Partnerships (PPPPs) For Efficient And Sustainable Infrastructure Development In Thailand	Rakpanitmanee, Supachai 2023		X	X		
Total			3	9	10	11	4

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In all the twenty-one articles reviewed, it was discovered that they pertain in one way or another to the identified four thematic areas. Regarding the frequency of each theme, 43 % of the articles touched on governance, 48% on PPPP, 52% on sustainability, and 19% on innovation, as shown in Table 3 below.

Table 3: Frequency distribution of each identified theme on the total reviewed articles

Theme	Frequency	Percent
Governance	9	43%
PPPP	10	48%
Sustainability	11	52%
Innovation	4	19%

Quan (2023) reveals that focusing on these four concepts will bring the PPP closer to achieving SDG 11, expanding beyond what is acceptable within the parameters of economic growth.

From the literature reviewed, research into PPPs for sustainable cities, such as by Rakpanitmanee & Pathranarakul (2023), has found that risk transfer is a crucial characteristic of PPP. An optimal risk-sharing framework needs to be developed such that the public sector should undertake the risks involved in implementing government changes and those attributable to political instability and other political and legal risks (Radchenko, 2021). On the other hand, Fell & Mattsson (2021) opine that the private sector should bear the construction risks, for example, technical, cost overruns, and construction delays, while macroeconomic risks, operational risks, and risks of force majeure should be shared by the public and the private sector.

5. DISCUSSION

The literature review has identified four essential cross-cutting themes for smart cities: Governance, Public-Private-People Partnerships (PPPPs), Sustainability, and Innovation. The key theme that emerged from the analysis is sustainability, which points to the importance of context, in line with Selim et al.(2018), who assert that sustainable smart city PPP aims to improve the quality of life and enhance the efficiency to achieve sustainable environmental, social and economic development. An urban environment can be sustainable when social equity, conservation of the natural environment and its resources, economic vitality, and quality of life are achieved (Selim et al., 2018). PPPs can enhance people's environmental sustainability and social well-being by offering more opportunities to develop environmentally friendly products or services (Berrone et al., 2019). Further, PPPs are characterized by long-term contracts, which motivate the service providers to extend service solutions from a long-term perspective, aligning with sustainable development's essence (Liu et al., 2021). To better utilize PPPs for achieving urban sustainability, it is important to perform detailed planning and seek solutions to address the significant issues in PPP applications (Tingting Liu, 2020).

In the content analysis employed in the literature review, Public-Private-People Partnerships (PPPPs) have emerged as a key topic throughout the studies. PPPP is considered an expansion of a PPP model where the role of end-users, communities, and citizens is considered in critical decision-making in urban development and upgrade (Radchenko, 2021). Marana et al. (2017)

stated that there has been an emerging need to involve citizens in creating a city's resilience to understand the diverse perspectives on the same reality. Given the complexity of PPP projects and their long duration, many unexpected things can happen, hence the need for constant nurturing of the collaborative people's partnership to create the ability to cope with unforeseen events that are not specified in the contract and managing relations which are crucial for the project's success (Will, 2020). Klijn and Koppenjan (2016) highlighted the significance of trust-building and collaborative processes in PPPs to foster long-term partnerships and ensure the sustainability of urban projects. It is a recognised problem that binding agreements between public and private actors may outline the development principles early in the project. In contrast, public participation often occurs later in the process (Nordregio Magazine, 2023). Public-private-people partnerships have emerged as a way to address the problems related to public-private partnerships by bringing the general public ("people") into the partnerships alongside public and private actors.

Governance has been emphasized as a vital research theme in smart cities PPPs. New governance frameworks, sometimes called participatory or collaborative governance, are desirable to facilitate learning and knowledge sharing, citizen participation, and bottom-up innovation (Stone et al., 2018). Collaborative and entrepreneurial mode of governance strategy leads to attracting investments in the city infrastructure on a sustained basis and effectively revitalizes the city economy. According to Radchenko (2021), the success of the smart city PPP is determined by the role and responsibilities undertaken by the government. In the smart city PPP context, the city government has six key roles: connector and protector, director and regulator, strategist and advocate, and solution enabler and steward (Radchenko, 2021).

In addition, Masekesa (2021) states that SDG 11 highlights the significance of a multilevel governance approach and recognizes that local authorities do not exist in isolation since "national and regional development planning" is supposed to strengthen links between urban, peri-urban, and rural areas. Hence, there's a need to promote good urban governance to pursue local sustainability.

Innovation has been highlighted as a significant research theme in developing sustainable smart cities. The building of smart city projects usually involve a high level of innovation and intelligent solutions, sustainability objectives, and engagement in technical partnership with local universities or research centers (Selim et al., 2018).

The concept of risk and role under the theme "private" suggests that the incorporation of technological innovation will significantly increase the risk profile in smart city projects; hence the private sector is generally reluctant to assume the additional risk associated with innovation; thus, traditional, contract-based PPP models may not be suitable for the smart city endeavours (Radchenko, 2021). However, Visconti et al. (2019) argue that the partnership is built on equitable risk allocation, and the party assuming project risk should share the benefits of innovation.

6. CONCLUSION

This study concluded that PPPs contribute to developing sustainable cities. Further, this paper concludes that from the in-depth literature review conducted to enhance understanding of PPP in smart cities, four themes emerged: Governance, Public-Private-People Partnerships (PPPPs), Sustainability, and Innovation. The study concludes that these themes are interconnected within the smart city development process in such a way that the success of a sustainable city PPP is determined by the role and responsibilities undertaken by the government, which includes smart

citizen engagement and participatory governance, and address sustainability issues in a more systematic, participatory, and collaborative manner. Adding a fourth P, people, to PPP is a first step in the right direction for this to be achieved and finally establishing an innovation ecosystem in which public, private, business, and citizens cooperate and perform creative activities collectively towards a successful smart city project.

7. IMPLICATIONS OF THE RESEARCH

This study sheds more light on the significant role of PPPs as an effective tool for developing sustainable cities. This study adds to the body of knowledge literature on the positive impact of sustainable cities by supporting the applicability of PPPs for sustainable urban development.

The findings of this study can contribute to policy-making for sustainability outcomes in infrastructure delivery, public service provision, and sustainable urban development. Policymakers are encouraged to recognize the potential of PPPs as a policy tool for regional development and rapid urbanization. The government must promote inclusive and participatory development by engaging various stakeholders, including civil society organizations and local communities.

The study emphasizes the importance of long-term sustainability and maintenance of sustainable city projects. PPPs facilitate the exchange of innovative ideas, technologies, and expertise between public and private entities. By leveraging the strengths of both sectors, PPPs drive innovation in areas like smart city technologies, renewable energy, circular economy, sustainable mobility, and nature-based solutions.

8. RECOMMENDATIONS

This research recommends the development of a sustainable city PPP framework that incorporates the four themes of Governance, Sustainability, PPP with people to become PPPP, and Innovation, which will offer insights into the prospects of using PPPs in sustainable city projects and will provide useful policy and management interventions for both the public and private sectors to engage in smart city PPPs.

The study recommends searching for new approaches to city governance to deal with the urban development challenges more efficiently and provide better services for the citizens. It is recommended that smart PPP projects should ensure governance structures are in place to ensure that the stakeholders are engaged more effectively and efficiently. The study recommends the engagement of multiple stakeholders as an essential tool for achieving the desired outcomes in smart city PPP projects.

Finally, the study recommends establishing an innovation ecosystem where public, private, business and citizens can cooperate and collectively perform creative activities to achieve successful, sustainable smart city PPP projects.

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