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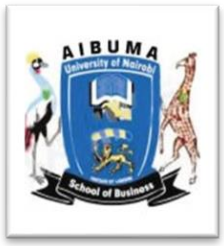

STRATEGIC PLANNING SYSTEMS AND SUSTAINABLE URBAN ROAD INFRASTRUCTURE DEVELOPMENT AMONG TOWN COUNCILS IN UGANDA

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Abstract

This investigation aimed to explore whether strategic planning systems significantly influence the advancement of sustainable urban road infrastructure within Ugandan Town councils. The strategic planning systems were delineated into six components, encompassing planning tools, planning resources, consideration of internal and external factors, resistance to planning, and functional coverage. Grounded in the socio-technical systems theory, the study adopted a positivist philosophical approach, employing a descriptive cross-sectional survey design. The target population comprised established Town councils in eastern and central Uganda as of July 1, 2022. The results revealed a statistically significant positive correlation between strategic planning systems and sustainable urban road infrastructure development (R-value = 0.589, R-squared = 0.346, F statistic = 14.837, p < .001). Encouraging and enhancing the utilization of strategic planning resources and tools during the strategic management process could foster the development of sustainable urban road infrastructure. Further research encompassing diverse urban landscapes, varied performance metrics, and longitudinal designs could contribute to extending the generalizability of these findings.

Key words: *Strategic planning systems, sustainable urban road infrastructure development, Town Councils, Uganda.*

Introduction

Urban areas heavily depend on road infrastructure for essential connectivity across their landscapes. However, the development of this infrastructure often leads to negative environmental and social consequences, including pollution, congestion, and urban sprawl. As a response, there is a growing emphasis on sustainable urban road construction, aiming to align with community-wide sustainable development objectives (Junussova et al., 2023; Derrible, 2018). Within the domain of strategic management, Namada et al. (2017) underscores the pivotal role played by strategic planning systems and their profound impact on organizational performance. Extensive research has explored this relationship, with a particular focus on economic and financial perspectives. However, a notable gap exists in the literature, as there is a scarcity of studies delving into their direct influence on sustainable performance metrics. Furthermore, empirical examinations of these dynamics in the context of urban road infrastructure systems in developing nations like Uganda are conspicuously scarce. Nonetheless, incorporating sustainability into urban road infrastructure aligns with broader objectives of creating eco-conscious, economically viable, and socially equitable urban environments, ultimately enhancing the quality of life for both current and future generations.

Several scholars have reached a consensus regarding the fundamental nature of strategic planning systems (Biondi & Russo, 2022; Namada, 2020). These systems encompass a comprehensive array of managerial structures and processes that are integral to an organization's strategic initiatives. Situated at the core of firms, these systems provide the foundational framework that supports and strengthens the strategic planning process itself (Cohen et al., 2019). Within these systems, there are two key components: design and context-oriented elements (Namada et al., 2017). The design elements encompass various strategic planning techniques, considerations of both internal and external facets to the organization, and the integration of functional aspects. On the other hand, the contextual elements revolve around the planning context and include resources available for planning and the challenges posed by resistance to planning (Namada et al., 2017; Grynko & Yehorova, 2020).

Sustainable infrastructure development (SID) encompasses various definitions, but this study aligns with (Ametepey et al., 2020). They define it as planning, constructing, operating, and maintaining road infrastructure while balancing societal, economic, and environmental concerns, emphasizing social justice, diversity, and ecological functioning. This definition underscores the pivotal role of road infrastructure in society, the economy, and the environment, which are fundamental aspects of sustainability. Scholarly discourse reflects extensive research on sustainability constructs employed to assess sustainable urban road infrastructure implementation (Badford, 2018; Friedrich, 2015). Suprayoga et al. (2020) posits that sustainable road infrastructure development encompasses socio-ecological integrity, resource efficiency, livelihood security, climate change resilience, and adaptation features. Socio-ecological integrity involves

indicators like species habitat mitigation, land use management, and pollution prevention during road development (Flores et al., 2016). Livelihood security entails mobility enhancement, community well-being (Marzouk, et al., 2017), and societal equity (Salling & Pryn, 2015). Resource efficiency centres on road infrastructure that supports sustainable livelihoods while reducing environmental impact (Suprayoga et al., 2020). Climate change resilience involves infrastructures designed to withstand shocks and unforeseen events (Joumard & Nicolas, 2010). This discourse underscores the multifaceted facets assessed for sustainable road infrastructure.

Town councils in Uganda, exhibit hallmark traits of urbanization, characterized by dense populations and diverse economic activities which has led to increased vehicle ownership, resulting in traffic congestion, inadequate road networks, and environmental degradation (Uganda Bureau of Statistics, 2020; Ministry of Works and Transport, 2020). The pressing challenge of unsustainable road infrastructure and demand for increased road infrastructure looms large in these towns. As Uganda endeavours to enhance its urban road systems, understanding the impact of strategic planning systems becomes pivotal in devising informed policies and guiding infrastructure investments. Hence, this paper presents a research inquiry into the relationship between strategic planning systems and the development of sustainable urban road infrastructure within Ugandan Town councils. The paper commences by setting the stage with a thorough contextual background and gradually narrows down to highlight the existing gap in knowledge. It subsequently presents a theoretical framework, elucidates the research methods employed, delves into the obtained results and subsequent discussions, outlines the implications of the findings, concludes, and acknowledges the inherent limitations of the study.

Statement of the problem

The development of sustainable urban road infrastructure is widely recognized as a vital facet of contemporary urban planning practices, driven by the urgent need to address the multifaceted challenges posed by unsustainable urban road infrastructure. These challenges encompass adverse impacts on public health, environmental degradation, and economic inefficiencies, all extensively documented in the literature (Liang et al., 2020; Khanani, et al., 2020). In light of these far-reaching consequences, urban policymakers and planners are compelled to adopt a forward-thinking perspective that prioritizes sustainability as the cornerstone of their decision-making processes.

Strategic planning systems (SPS) emerge as indispensable tools in the arsenal of urban authorities engaged in transportation infrastructure development. These systems hold the promise of ushering in sustainable and efficient transportation networks, mitigating carbon emissions, and bolstering resilience against the impacts of climate change. While some existing research has explored the link between strategic planning and sustainable road development (Banister & Hickman, 2013; Luyimbazi & Ntwatwa, 2022), a comprehensive understanding of the

relationship between strategic planning systems and sustainable road development remains limited. This knowledge gap has resulted in uncertainties regarding how strategic planning systems interact with the objectives of sustainable road infrastructure development. Furthermore, a substantial portion of research in this domain has primarily fixated on economic and financial outcomes, often relegating broader sustainability considerations to the periphery.

Within the domain of strategic planning systems (SPS), research has put forth the notion that discrete elements within these systems exhibit distinct degrees of influence on the efficacy of planning processes (Desmidt & Meyfroodt, 2018); Esfahani et al., 2018). This intriguing revelation has ignited a strong interest in exploring the intricate mechanisms through which these individual elements influence the ultimate outcomes of planning endeavours. Building upon this interest, studies have extended their focus to apply these specific SPS elements in the domain of sustainable road development (Lee, et al., 2018; George et al., 2019; Helmrich & Chester, 2022). This diversity in outcomes underscores the more nuanced and holistic understanding of how these SPS elements collectively shape the effectiveness of planning processes in the domain of sustainable urban road infrastructure development.

Investing in sustainable road infrastructure is not only essential for economic growth but also a strategic imperative for developing nations (Saidi et al., 2018; Wang et al., 2020). In Uganda, urban road networks serve as lifelines for transportation, accommodating the needs of over 70% of people and goods movement, with substantial financial investments channelled into urban road projects (Ministry of Finance, Planning and Economic Development, 2021). Uganda's Strategic Implementation Plan (2015-2025) underscores the priority accorded to urban road infrastructure, recognizing that 70% of non-agricultural GDP originates from urban areas. Nevertheless, disparities persist in the sustainable development of road infrastructure among Town councils, despite their statutory obligation, as stipulated in the Local Governments Act, to implement urban road infrastructure projects (Government of Uganda, 2017).

Recognizing the vital significance of sustainable urban road infrastructure development, persistent uncertainties surround the comprehensive and multidimensional effects of strategic planning systems on its achievement. Therefore, the central research question that guided this study was: "What is the influence of strategic planning systems on the realization of sustainable urban road development among Town councils in Uganda?"

Literature review

This study was anchored in the socio-technical systems theory (Carden et al., 2017), which serves as the theoretical foundation for our study. The Sociotechnical Systems (STS) theory posits that organizations are complex entities comprising technical and social subsystems intricately connected to their external environment. The complex equilibrium between these subsystems must be maintained in order to optimize and satisfy external expectations (Mendoza-Moheno et

al., 2021). In this framework, the technical subsystem encompasses the tools, techniques, and processes that transform inputs into outputs, thereby shaping the organizational configuration. It is within this technical system that Strategic Planning Systems (SPS) operate, with the aim of enhancing planning processes. Conversely, the social system revolves around stakeholders and the human aspects of the organization (Bednar & Welch, 2020). Urban road infrastructures, especially, are deeply embedded within the social fabric, as their networks span across geographical boundaries and wield substantial influence over human behaviour and societal interactions.

In the context of our investigation, the socio-technical systems theory provides a valuable framework that enables us to examine how various components of road infrastructure interact to impact an organization's sustainability outcomes concerning its external environment. This approach places a strong emphasis on the system-level perspective of road infrastructure development, highlighting its inherently socio-technical nature. Moreover, it recognizes the interdependence of these subsystems while acknowledging the context-specific nature of their development. Ultimately, the alignment of these subsystems emerges as pivotal for the effective design and development of infrastructure. Through a literature review, we explore how individual elements of strategic planning systems influence the development of sustainable road infrastructure.

Planning resources

Effective utilization of an organization's resources and capabilities stands as a cornerstone for achieving and maintaining strategic performance (Namada et al., 2017; Nwachukwu & Chládková, 2019). The existing research presents a varied landscape when attempting to explore this connection for sustainable performance indicators, particularly in the context of urban road development. For instance, (Ametepey et al., 2020) examined sustainable road infrastructure projects in developing nations, revealing that resource utilization and management distinctly predict project sustainability. This insight aligns with (Xue et al., 2018) work, affirming the significant role of resource allocation in shaping project outcomes. Meng et l. (2015) contribute to this facet of the discussion by finding a positive correlation between the intellectual, managerial, emotional, and social competencies of top managers and the sustainability of infrastructure. Their study underscores the pivotal role played by multifaceted managerial competencies in fostering infrastructure sustainability. Furthermore, Gan et al.(2015) undertook an in-depth inquiry into the barriers impeding the progress of sustainable construction practices. Among the identified impediments, resource-related risks stood out as significant deterrents.

The aforementioned studies shed a spotlight on the importance of resource allocation in organizational performance and project sustainability, but a noticeable gap remains in understanding the intricate relationship between strategic planning resources as a

component of SPS and the development of sustainable urban road infrastructure.

Strategic planning tools

Within strategic planning, diverse tools have assessed alternative actions providing structured decision frameworks linking history with future goals, enhancing analytical prowess (Dias et al., 2018). Firms leverage these tools for competitive edge (Helmrich & Chester, 2020), converting data into choices (Aldehayyat & Khattab, 2011). They offer environmental awareness, risk mitigation, and priority establishment. Studies on the influence of strategic analytical tools on sustainable transport infrastructure reveal varying outcomes. Hadjidemetriou et al. (2021) applied Dynamic Adaptive Policy Pathways, effective for flood-risk planning, to long-term transport planning. They identified capacity vulnerabilities and mode-switching impacts between Manchester and London. Ruiz and Guevara (2020) used a hybrid SD and AHP approach to analyse sustainable road maintenance strategies in Colombia, highlighting their impact on economic decisions. Martens (2006) found that cost-benefit analysis and transport modelling promote sustainable transport. Conversely, earlier research noted a negative link between traditional strategic planning tools and sustainable urban road infrastructure (Blackmore et al., 2018; Saurí & Serra, 2010). These tools prioritize efficiency over sustainability, hindering progress. Amidst conflicting findings, do strategic planning tools influence sustainable urban road development in Uganda?

Internal and external orientation

Effective strategic planning hinges on a thorough assessment of internal capabilities (George et al., 2019), past performance (Meissner, 2014), and failures, ensuring alignment with organizational capacities. Neglecting these aspects risks plan failure. Similarly, acknowledging external factors is crucial; recognizing opportunities and threats is vital (Tykkyläinen, 2019). Scholarly works on environmental scanning highlights scrutinizing external events and trends, as a pivotal step in formulating and evaluating strategic alternatives. This study underscores the dual significance of internal and external considerations in planning for sustainable road infrastructure development. Ruiz and Guevara (2020) demonstrated the substantial impact of internal orientation on decision-making about maintenance policies within road preservation. In a study by Hatefi (2018), SWOT analysis examined the interplay of internal and external elements on strategic planning for Iran's urban transportation. This integration empowered managers and urban planners to identify crucial strategies for responsive transportation infrastructure development, catering to the growing city population.

Organizational Resistance to Planning

In the realm of organizational activity implementation, it is paramount to anticipate and proactively address resistance for a successful outcome (Agasisti et al., 2018). However, when confronted with unfavorable contexts characterized by significant planning resistance, the success of strategic planning initiatives becomes compromised. These challenging situations can trigger

dysfunctional managerial behaviors, including the rejection of planning outputs and the exclusion of line managers (Lorange, 1980). Essentially, the effectiveness of strategic planning hinges on its integration as a core organizational activity. Consequently, any resistance that emerges can have a detrimental impact on the overall utility and effectiveness of the planning systems. It is, therefore, imperative to recognize and address resistance as an integral part of the strategic planning process to ensure its successful implementation and outcomes.

Undertaking a study examining the influence of resistance to planning on sustainable road development is imperative given the existing research landscape. Although there is no direct exploration of the link between planning resistance and sustainable urban road infrastructure, existing studies emphasize the pivotal role of stakeholder engagement and participation of the community in the planning and development process (Jayasuriya et al., 2020; Osman et al., 2018). It has been demonstrated that this involvement fosters a sense of ownership and collaboration among many stakeholders, which lowers opposition to planning (Späth & Scolobig, 2017).

Ametepey et al. (2020) exemplify this by revealing that effective stakeholder management positively helped plan and implement sustainable road infrastructure projects in poor countries. Their findings underscore the pivotal importance of engagement in mitigating resistance. Additionally, Cheng and Zheng (2017) emphasize the significance of collaboration through their exploration of China's sustainable transportation policy implementation. Their research exposed barriers such as weak political will, funding constraints, inadequate engagement, and a lack of agency coordination.

In this context, studying the correlation between resistance to planning and sustainable road development is crucial. It allows us to delve into unexplored terrain, revealing how resistance hampers the achievement of efficient and eco-friendly road networks. By building on the lessons from stakeholder engagement and collaboration, does resistance to planning influence sustainable urban road infrastructure development in Uganda?

Functional Coverage in Planning

In the discourse of strategy development, emphasis is often placed on integrating functional areas to formulate an internally coherent plan (Nadikattu, 2020). Through prioritizing different key functional domains, the planning system can potentially enhance its capacity to leverage the organization's vital strengths.

Functional coverage signifies collaborative efforts among different departments to enhance public value and address, encompassing coordination, partnership, conflict resolution, and cooperation (Agranoff, 2007). In dynamic public services, functional coverage has evolved into a crucial agency practice (Wipulanusat et al., 2021). This practice yields diverse benefits that align with public policy objectives. Collaborative networks tap into organizational resources, enabling joint efforts to surmount budgetary constraints. Moreover, functional coverage facilitates

risk-sharing, especially pertinent in high-risk projects like road construction (Beiler, 2016). The impact of inter-departmental synergy holds substantial potential for public organizations, albeit more transformative than in less bureaucratic private counterparts (Lee, 2019; Lee et al., 2018).

The interplay between functional coverage and the development of sustainable road infrastructure warrants careful consideration. While a direct exploration of their correlation is inadequate, insights from existing studies provide a foundation for discussing the need for further investigation. The critical role played by inter-departmental collaboration in planning and development emerges from studies such as Jayasuriya et al. (2020) and Osman et al. (2018). They emphasize the value of engaging diverse functions to mitigate resistance and foster ownership. This underscores the potential of functional coverage to break down barriers and drive cohesive efforts.

Broader implications from functional coverage extend to organizational efficacy, enhancing overall performance (Liu & Zheng, 2018). The experience of (Margerum & Parker, 2019) with collaborative networks in Oregon's transportation planning underscores how cooperative approaches address interjurisdictional challenges, enhancing agency's' performance. This echoes the notion that functional coverage can streamline processes and yield tangible improvements.

Though not centred on internal departments, a study by Beiler (2016) on multi-jurisdictional collaboration in Pennsylvania's transportation planning sheds light on the positive impacts of measuring and monitoring agency collaboration. This contributes to more sustainable organizational planning, emphasizing the significance of collaboration in transportation initiatives.

Moreover, Pojani and Stead (2017) study on collaborative networks in sustainable transportation planning takes a comprehensive approach, encompassing interdisciplinary cooperation across Australia, Canada, and the US. Their research highlights the pivotal nature of interdisciplinary collaboration in achieving sustainable transportation goals. This resonates with the idea that collaborative network among functions plays a key role in shaping the execution and realization of sustainable road projects.

In light of these perspectives, the need for a study investigating the influence of functional coverage on the development of sustainable road infrastructure becomes evident. This research could offer deeper insights into how cross-departmental collaborations impact planning, execution, and overall success. By delving into the intricacies of functional coverage's role, such a study could guide practices that promote efficient, collaborative, and sustainable road projects.

Methods

Grounded in positivist philosophy, this study emphasizes theory-driven research, aiming to empirically test and establish concrete connections between variables (Cooper & Schindler, 2006; 2014). Positivism ensures objective measurement, sidestepping subjective inference (Creswell, 2012),

contributing to theory advancement and empirical scrutiny (Saunders et al., 2007). The investigation used a descriptive cross-sectional survey design to gather data from Town councils in eastern and central Uganda, examining variable associations within that specific timeframe (Cooper & Schindler, 2006). This led to conclusive insights and recommendations.

Focused on a sample of 186 Town councils selected from a total population of 244 Town councils in eastern and central Uganda, the study used a questionnaire to gather primary data on strategic planning systems and sustainable urban road infrastructure from one member of the Technical Planning Committee (Town clerk, Town Engineer, Planner, or Environment Officer). Utilizing the "drop and pick later" method, the collected questionnaires underwent subsequent analysis. Assessing responses and attitudes, the study computed mean, standard deviation, and one-sample t-tests. Mean reflects centrality, while standard deviation gauges variability (Sekaran & Bougie, 2014; Pallant, 2013).

To gauge respondents' attitudes on study variables, a Likert scale was chosen, known for capturing nuanced opinions (Cooper & Schindler, 2014). With a 5-point range from "Strongly Disagree" to "Strongly Agree," it facilitated agreement differentiation. Thoughtfully crafted items assessed dimensions, while a neutral midpoint allowed neutrality. Clear instructions aided scale interpretation, ensuring systematic measurement. The instrument demonstrated reliability with Cronbach alpha values ranging from 0.720 to 0.939 for elements of strategic planning systems and from 0.797 to 0.886 for elements of sustainable road infrastructure development. A response rate of 94% was achieved. Diagnostic tests were conducted on normality, linearity, multicollinearity, and homoscedasticity, all confirming the dataset's suitability for further empirical analysis. Regression analysis was then employed to examine how strategic planning systems affect sustainable urban road infrastructure development among Town councils in Uganda.

The overarching model for predicting sustainable urban road development is depicted as follows:

$Y = f$ (Strategic Planning Systems (SPS))

$Y = \beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\varepsilon$

Where:

Y – Sustainable Road Infrastructure Development (SRID),

X_1 – Strategic planning techniques,

X_2 – Planning resources,

X_3 – consideration of external facets,

X_4 – internal facets,

X_5 - Resistance to planning,

X_6 – Functional coverage

Results

The results pertaining to strategic planning resources indicate a mean range of 2.83 to 3.04. The majority of t-values exhibited significance at the 95% confidence level, and coefficients of variation (CV) spanned from 21% to 29%. These outcomes collectively suggest that within Town councils, the

utilization of planning resources for the advancement of sustainable urban road infrastructure manifests to a moderate extent. Resistance to planning exhibits mean values between 3.05 and 3.26. Most t-values are significant at 95% confidence, and CV ranges from 18.6% to 22.8%. This denotes moderate resistance to planning for sustainable road infrastructure, with lower CV suggesting reduced response variability.

The findings for consideration of internal facets reveal mean values spanning 2.59 to 3.29. With significant t-values at 95% confidence and CV between 29.3% to 34.8%, it indicates a moderate level of dispersion around the mean. This reflects varying opinions and perceptions among Town councils concerning the integration of internal facets in sustainable urban road infrastructure development.

Examining consideration of external facets, mean values ranged from 2.93 to 3.07. No t-values were significant at 95% confidence, and CV ranged from 25.2% to 28.5%. This suggests moderate extent of considering external facets in sustainable urban road development among Town councils. CV values of 29.3% to 34.8% show moderate dispersion around the mean, reflecting diverse opinions among Town councils on integrating external facets in sustainable road infrastructure development.

Utilization of strategic planning tools demonstrates mean values from 2.69 to 2.94. Most t-values are significant at the 95% confidence level, and CV ranges from 21.4% to 28.1%. This suggests that the degree of using strategic planning tools/techniques in sustainable urban road infrastructure development across Town councils is moderate. Lower CV values indicate comparatively less response variability regarding the use of strategic planning tools in sustainable road infrastructure development.

Focusing on all functions yields mean values spanning from 2.82 to 2.98. Most t-values are significant at the 95% confidence level, and CV ranges between 19.5% and 24.6%. This implies that functional coverage extent in sustainable urban road infrastructure across Town councils is moderately established. Lower CV values indicate relatively reduced response variability concerning functional coverage in sustainable road infrastructure development.

The effect of the composite index of strategic planning systems on sustainable urban road infrastructure development was determined. Multiple linear regression analysis was used to carry out the test of the hypothesis and the results are presented in Table 1.

Table 1: Model Summary of Strategic Planning Systems and Sustainable Urban Road Infrastructure

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.589[a]	.346	.323	.29550

a. Predictors: (Constant), Consideration of external facets, Functional coverage & integration, Consideration of internal facets, Resistance to planning, Use of planning techniques, Planning resources

b. Dependent Variable: Sustainable Urban Road Infrastructure Development

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.773	6	1.296	14.837	.000[b]
	Residual	14.669	168	.087		
	Total	22.443	174			

a. Dependent Variable: Sustainable Urban Road Infrastructure Development

b. Predictors: (Constant), Consideration of external facets, Functional coverage & integration, Consideration of internal facets, Resistance to planning, Use of planning techniques, Planning resources

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.996	.157		12.746	.000
	Planning resources	.195	.062	.331	3.113	.002
	Resistance to planning	-.001	.063	-.002	-.023	.982
	Consideration of internal facets	-.003	.039	-.006	-.077	.939
	Use of planning techniques	.125	.056	.205	2.225	.027
	Functional coverage & integration	.051	.051	.076	.997	.320
	Consideration of external facets	.070	.039	.127	1.786	.076

a. Dependent Variable: Sustainable Urban Road Infrastructure Development

Source: *Primary Data (2023)*

In table 1, the results reveal an R-value of 0.589, indicating the correlation between the combined elements assessing strategic planning systems and sustainable urban Road infrastructure development. This suggest a moderate and positive relationship within Ugandan Town councils. Improved strategic planning systems correspond to enhanced sustainable urban road infrastructure development. The R-squared value of 0.346 signifies that 34.6% of the variability in sustainable urban road infrastructure development among Town councils in Uganda is explained by strategic planning systems.

The ANOVA also in Table 1 shows the results of a test of significance for R and R^2 using the F statistic. The F statistic of 14.837 with a p-value which is well below .05 ($p < .001$) indicates that the regression model is significant. These results are further used to test for the null and alternative hypotheses using the value in the Sig column. The results show that the value in the Sig column is very small (less than 0.05) thus the null hypothesis is rejected. Thus, strategic planning systems significantly influence the development of sustainable urban road infrastructure among Town councils in Uganda.

The coefficients of the components used to measure strategic planning systems are presented in Table 1. The study found out that the coefficients of some of the components are statistically significant at 0.05 significance. These include planning resources ($\beta = .195, t = 3.113, p = .002$) and use of planning techniques ($\beta = .125, t = 2.225, p = .027$). However, some components are not statistically significant which include consideration of internal facets ($\beta = -0.003, t = -0.077, p = .939$), resistance to planning ($\beta = -0.001, t = -0.023, p = .982$), consideration of external facets ($\beta = .070, t = 1.786, p = .076$) and functional coverage ($\beta = 0.051, t = .997, p = .320$).

Thus, the following model:

SRID = 1.996 + .195 PR +.125 PT + .29550

Where

SRID - Sustainable Urban Road Infrastructure Development

PR - Planning resources

PT - Use of planning techniques

β_0 = 1.996 - Constant in Table 4.15

The error term ε = .29550 (from Table 1 - Std. Error of the Estimate)

The model indicates that with constant explanatory variables, Sustainable Urban Road Infrastructure Development in Town councils totals 2.2915 (1.996 + 0.29550). Moreover, each additional unit change in strategic planning systems contributes to a 0.6155 increase (0.195 PR + 0.125 PT + 0.29550) in sustainable urban road infrastructure development. Therefore, strategic planning systems significantly impact development in these councils. Notably, only strategic planning resources and tools were statistically significant indicators of strategic planning systems affecting sustainable urban road infrastructure development in eastern and central Uganda's Town councils.

Discussion

The variation of sustainable urban road infrastructure development in this study was predicted by six organizational strategic planning systems sub-variables that included strategic planning tools, planning resources, consideration of both external and internal facets, resistance to planning and functional coverage. Strategic planning systems were found to significantly influence the development of sustainable urban road infrastructure ($R = .589$, $R^2 = .349$, $F = 14.837$, $p = 0.000$). This study then determined the influence of each of the dimensions of strategic planning systems on sustainable urban infrastructure development. The dimensions of strategic planning systems with significant influence were planning resources ($\beta = .195, t = 3.113, p = .002$) and use of planning techniques ($\beta = .125, t = 2.225, p = .027$).

Surprisingly, consideration of both internal and external facets, resistance to planning and functional coverage were found to have a weak and insignificant influence despite their importance in strategic management literature to influence strategic planning effectiveness (Elbanna, Andrews, & Pollanen, 2015; Venkatraman & Ramanujam, 1985). The finding that these factors have a weak and insignificant influence on strategic planning effectiveness raises questions about the actual practice of strategic planning within Town councils. The fact that the majority of respondents had less than 5 years of experience in that particular urbanity might have implications on their understanding and involvement in the strategic planning process. Strategic planning is often a complex and dynamic activity that benefits from experienced individuals who have a deeper understanding of the organization's history, capabilities, and external environment (Posch & Garaus, 2019; Ugboro et al., 2011). With limited experience, the respondents may have faced challenges in comprehensively assessing and integrating internal and external factors.

Besides, several studies emphasize the importance of incorporating various functional aspects to enhance the planning system's ability to utilize critical resources and avoid resistance to planning (Camillus & Venkatraman, 1984; Grant & King, 1982; Lorange, 1980). The fact that the majority of Town councils were less than 5 years since they were established could also play a role in the weak influence of resistance to planning. Organisations in their nascent stages tend to possess a greater degree of flexibility and adaptability in their approach to (Lumpkin & Dess, 1996), and resistance might not have had sufficient time to manifest or become apparent. Additionally, during the early stages of establishment, the focus might be on other foundational aspects of the organization, leading to less emphasis on strategic planning and potential resistance.

The surprising nature of the perceived insignificance regarding internal and external considerations in the development of sustainable urban road infrastructure contrasts with its established importance in strategic management (Hyder et al., 2015; Malik, et al., 2013). This apparent contradiction could potentially be elucidated by the prevailing circumstances within urban local authorities in Uganda, where budget

constraints are an outstanding challenge (Mushemeza, 2019). Notably, financial resources have been identified as factors that significantly influence both internal and external strategic analyses (Nwachukwu & Chládková, 2019). In this context, the allocation and availability of financial resources could play a pivotal role in shaping the extent to which internal and external considerations are taken into account during the planning and development of sustainable urban road infrastructure.

Strategic planning tools

Strategic planning tools, according to Kalkan and Bozkurt (2013), encompass a comprehensive spectrum of concepts, practices, and approaches that stimulate strategic thinking, decision-making, and the execution of strategies within organizations. There is a consensus that these tools empower managers to shape and execute strategic decisions, influencing organizational outcomes (Ramanujam & Venkatraman, 1987). Grant and King (1979), Hofer & Schendel (1978), Fleisher and Bensoussan (2003) posit that strategic planning tools play a pivotal role within formalized strategy formulation methods, offering a platform to deliberate and assess myriad options, ultimately leading to superior decision-making. Consequently, the selection of strategic planning tools in this study is predicated on the notion that they serve as a significant indicator of planning practices geared towards achieving sustainable outcomes in the realm of urban road infrastructure development.

Findings from this study indicate that not all Town councils use strategic planning tools in spite of the fact that use of suitable strategic planning tools enables organizations to assess and predict organizational sustainability outcomes. Given the growing call for sustainable development, mainly for infrastructure projects, strategic planning tools are essential for such projects to guarantee realizing sustainability goals while improving project outcomes. In this study, it was found out that use of strategic planning tools contributed significantly to the development of sustainable urban road infrastructure (ß = 0.125, p = 0.027). The inference that can be readily drawn is that the planning and development of sustainable urban road infrastructure is automatically improved by using strategic planning tools/techniques. These findings are partially supported by earlier studies.

For example, Hadjidemetriou et al. (2021) explored whether strategic planning tools such as Dynamic Adaptive Policy Pathways, a tool used in long-term transport infrastructure planning had an influence on sustainable road and rail infrastructure development in Manchester and London in UK. The study demonstrated that this tool had a positive influence in identifying periods of significant capacity vulnerability in the coming decade, as well as the points in time when policy-makers will have to make decisions and assess the impact of transport mode switching. Ruiz and Guevara (2020) also investigated the influence of planning tools using a hybrid methodology that combines the system dynamics (SD) and analytic hierarchical process (AHP) approaches for analysing sustainable road maintenance strategies in Colombia. The

findings revealed that the decision-making process concerning sustainable maintenance policies was significantly influenced by the two tools employed. Similarly, studies by Blackmore et al. (2018), Martens (2006), and Chung et al. (2016) explored the influence of scenario planning and cost-benefit analysis on sustainable transport infrastructure development. From these studies, there is consensus that transport modelling based on the principle of need and cost-benefit analysis are effective tools for promoting effective design of a sustainable road network.

This study's findings contrast with previous research by Blackmore et al. (2018) and Saurí and Serra (2010). Blackmore et al. identified a negative link between traditional strategic planning tools, like cost-benefit analysis and traffic models, and sustainable urban road infrastructure development. They argued that these tools prioritize motorized traffic and economic efficiency, potentially hindering sustainability. Similarly, Saurí and Serra found a negative relationship, with traditional tools focusing on road network expansion and traffic flow rather than promoting public transport, cycling, and walking, which could impede sustainable urban road infrastructure development.

The findings from this study make modest contributions to the body of research literature on strategic planning tools. Socio-technical systems theory emphasizes the importance of understanding the complex interactions between social and technical factors in shaping technological systems, including roads and other infrastructure (Emery & Trist, 1960). By using strategic planning tools to identify and analyse these interactions, planners can develop road development strategies that are more likely to be socially and environmentally sustainable in the long term. This can contribute to the development of more resilient and adaptive socio-technical systems that are better able to meet the needs of communities and the environment.

Planning resources

Strategic planning resources refer to the tangible and intangible assets that organizations use to create and execute strategies that help them achieve their goals. These resources include financial, physical, human, and technological resources, as well as intangible resources such as intellectual property, reputation, and culture. Empirical studies have found that effective strategic planning requires organizations to identify and prioritize their resources, and allocate them in a way that maximizes their impact on achieving the organization's goals (Gonzalez & Gomez-Mejia, 2014). Additionally, empirical research suggests that organizations with strong strategic planning capabilities tend to have a more comprehensive understanding of their resource needs, and are better able to align their resource allocation decisions with their strategic goals (Chen & Lin, 2012).

It is assumed in this study that Town councils that upheld the strategic configuration of planning resources have the opportunity of realizing higher sustainability outcomes in their road development projects. This study established that acquiring the assurance of organizational managers, and guaranteeing an applicable level of apportionment of

planning resources, is significant. The inference drawn is that achieving sustainable urban roads necessitates a substantial infusion of planning resources. This entails not only an increase in the allocation of managerial personnel for planning, designing, constructing, operating, and maintaining sustainable roads but also entails greater involvement from technical department heads and top management. Management's involvement in sustainability management of the organization is one of the key success factors for sustainable development of an organization. Managers not only provide resources and design incentives for employees to promote sustainability initiatives but also strongly influence organizational culture and organization-wide decision-making processes through their commitment and leadership. Active engagement of management in the sustainability management of an organization stands as a pivotal success factor in its sustainable development. Managers assume a multifaceted role wherein they not only allocate resources and establish incentives to encourage employee-driven sustainability initiatives but also wield considerable influence over organizational culture and the decision-making processes that span across the entire organization, all through their dedicated commitment and effective leadership (Elbanna, 2008).

Despite numerous research studies aiming to clarify the connection between strategic planning resources and organizational outcomes, the outcomes of this collective body of research remain fragmented and lacking a cohesive framework (Ramanujam et al., 1986; Ketokivi & Gastner, 2004) and limited results have yet emerged in the area of sustainable road development. The findings of this study hold significant implications for the strategic planning literature, which has thus far struggled to establish a clear positive correlation between strategic planning resources and the ensuing sustainability outcomes in the context of road infrastructure development.

For instance, Girma et al. (2019) evaluated urban green infrastructure planning in Ethiopia's Oromia special zone. Their mixed-method study revealed the need for budget allocation and stakeholder engagement to effectively implement green space planning practices according to urban green infrastructure principles. Ketokivi & Gastner (2004) previously emphasized that management participation in strategic planning sparks commitment to tools used in the process.

The positive influence of planning resources on sustainable urban road infrastructure development found in this study supports the institutional theory, which highlights the importance of institutional factors in shaping sustainable development outcomes (Weber, 1978). Institutions such as Central Government agencies (Ministry of Works, Uganda National Road Authority) and community groups play an important role in shaping the behaviour of Town council planners, engineers, and other stakeholders involved in urban road infrastructure planning and implementation. By providing planning resources such as funding, technical expertise, and regulatory guidelines, these

institutions can create a supportive environment for sustainable infrastructure development. This can lead to the adoption of sustainable practices, the integration of social and environmental considerations into road infrastructure design and management, and the promotion of long-term thinking and collaboration among stakeholders.

Implications

The study provides empirical evidence to support the use of Strategic Planning Systems (SPS) for Sustainable Road Infrastructure Development (SRID). This is of help to transport planners and decision-makers in urban planning and infrastructure development to make informed decisions based on the best available evidence. Strategic planning resources and tools/techniques stand out among SPS components as significant. Strategic planning resources positively influence SRID, emphasizing their pivotal role in driving positive and sustainable urban road projects. This underscores their value in informed decision-making and project management for resilient and eco-friendly infrastructure. Recognizing their importance empowers urban authorities to advance sustainable development by efficiently utilizing these resources for improved road infrastructure aligned with urban growth.

The study also indicates that employing strategic planning and analytical tools significantly benefits sustainable urban road infrastructure development. Such tools facilitate data-driven insights and systematic analyses in urban planning, enhancing livable and thriving environments. They contribute positively by enabling comprehensive environmental, traffic, and community analyses, aligning road projects with sustainability objectives, optimizing resource use, and ensuring effective implementation. Moreover, these tools enable continuous evaluation and improvement of strategies for sustainable outcomes, underscoring their value in urban development for present and future generations.

Building on these findings, several avenues for future research come to light. Primarily, delving into the mechanisms through which strategic planning resources and tools/techniques impact Sustainable Road Infrastructure Development (SRID) is warranted. This should involve investigating specific contributions of resources like finance, human capital, and technology to the planning and execution of urban road infrastructure. Simultaneously, assessing the effectiveness and suitability of distinct tools and techniques within strategic planning can provide nuanced insights into their influence on the outcomes of infrastructure development.

Moreover, further exploration can venture into potential interaction effects between strategic planning resources and tools/techniques. A focus on how amalgamating diverse elements creates synergy, thereby amplifying their influence on SRID, can provide a more holistic grasp of their collective impact. Such insights can illuminate the intricate interplay of these dimensions.

Additionally, broadening the scope involves conducting cross-regional comparative studies encompassing varied contextual factors. This approach enhances understanding about the relationship between Strategic Planning Systems (SPS) and infrastructure development. By juxtaposing scenarios with differing resource availability,

technological advancements, institutional contexts, and urbanization patterns, researchers can pinpoint context-specific factors influencing the efficacy of strategic planning resources and tools/techniques.

Furthermore, embracing long-term studies tracking the trajectory of strategic planning resources and tools/techniques on SRID over extended periods can yield insights into their sustained effectiveness. By tracing urban road infrastructure projects from inception to completion and evaluating their long-term performance, resilience, and adaptability in addressing evolving urban challenges, researchers can offer valuable insights for policy-making and practice.

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