

Unleashing the Potential of Saudi Municipal Finance Toward Sustainable Urban Environments: Barriers and Strategies

Abdulkarim K. Alhawaish^{1*}

¹ Department of Urban and Regional Planning, College of Architecture and Planning, Imam Abdulrahman Bin Faisal University, Saudi Arabia

*Corresponding Author: ahawaish@iau.edu.sa

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ABSTRACT

Saudi Arabia's rapid urbanization driven by Vision 2030 demands sustainable municipal finance systems. Using a mixed-methods analysis, this study analyzes 360 expert perspectives and identifies the key challenges of fiscal centralization ($\beta = -0.14$), governance deficits (20.2% variance), and overreliance on centralized funding (31.8% variance). However, decentralization ($\beta = 0.31$), policy alignment with Vision 2030, and green finance tools emerge as transformative pathways. Regression and correlation analyses reveal that municipal autonomy and legal frameworks are crucial in promoting sustainability integration. This study advocates for fiscal decentralization, Sharia-compliant green bonds, and institutional reforms and offers useful insights for policymakers.

Keywords: Municipal Finance, Sustainable Urban Environments, Fiscal Decentralization, Green Bonds, Governance Reforms

INTRODUCTION

Transformative agendas such as Vision 2030 (Saudi Vision 2030 2016) have boosted urbanization and population growth in Saudi Arabia, which has highlighted the urgency to develop sustainable urban environments. Cities in the Kingdom must meet escalating demands for infrastructure, public services, and climate resilience while considering fiscal limitations and environmental commitments (UN-Habitat 2023). Municipal finance, a pivotal lever for local governance, combats these challenges by enabling investments in sustainability (World Bank 2020a). However, the capacity of Saudi municipalities to leverage innovative financing mechanisms is constrained by systemic barriers, and this issue is further compounded by the lack of empirical insights into expert perspectives on fiscal governance (Alqahtani & Sloan 2021; Alhawaish 2025).

Based on expert perceptions, this study examines the challenges and opportunities in municipal finance for sustainable urban environments in Saudi Arabia. Focusing on the experiences and evaluations of urban planning, finance, and policy experts, this study aims to identify barriers to effective financial management and explore solutions to enhance sustainability financing. While Vision 2030 advocates fiscal decentralization and private-sector collaboration (Saudi Vision 2030 2021), municipal authorities are heavily dependent on centralized funding models and conventional revenue streams, such as property taxes and service fees (Alotaibi & Rahman 2019; Alhawaish & Alkubur 2025). These frameworks do not address contemporary challenges, including climate adaptation, resource efficiency, and equitable service delivery (OECD, 2021).

This study recognizes that expert insights are critical to diagnosing institutional, regulatory, and operational inefficiencies in municipal finance systems. Fragmented fiscal policies, underdeveloped public-private partnerships (PPPs), and limited adoption of green financing tools (e.g., green bonds and land value capture) are key

impediments (World Bank 2020a). Similarly, there is misalignment between national sustainability goals and local fiscal strategies, particularly in rapidly urbanizing regions (OECD 2021).

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The research adopts these perspectives to address the gap in the literature on Gulf Cooperation Council (GCC) municipal finance regarding practitioner-driven analyses of Saudi Arabia's unique governance landscape (Al-Hathloul & Mughal 2020; Alqahtani & Sloan 2021; Alhowaish 2025; Alhowaish & Alkubur 2025). These findings provide policymakers with evidence-based recommendations for aligning municipal finance with Vision 2030's objectives of economic diversification, social equity, and environmental resilience. This study emphasizes academic and practical contributions. Academically, it explains how experts' perceptions shape fiscal policy innovation in resource-dependent economies. It offers a roadmap for Saudi municipalities to transition toward sustainable financing models, emphasizing stakeholder collaboration, regulatory modernization, and capacity-building. As Saudi Arabia accelerates its urban transformation, this study underscores the need to embed expert-driven solutions into municipal finance frameworks to achieve long-term urban prosperity (Saudi Vision 2030 2016, 2021). Section 2 presents the literature review, and Section 3 outlines the methods. Section 4 presents and discusses the study's findings, and Section 5 concludes the study by highlighting its implications, limitations, and future research directions.

LITERATURE REVIEW

The literature review integrates concepts from sustainable urban development (SUD), public finance theory, and institutional economics to contextualize the interplay between municipal finance and sustainable urbanization in Saudi Arabia. This synthesis is anchored in three core pillars: (1) principles of SUD; (2) fiscal decentralization and municipal financial autonomy; and (3) institutional barriers and governance structures. The synthesis is enriched by the global and regional literature on innovative financing mechanisms such as green bonds and PPPs and their applicability to the Saudi context.

Sustainable Urban Development and Municipal Finance

SUD and municipal finance are inextricably linked because financial systems determine a city's capacity to balance economic growth, environmental resilience, and social equity. Theoretical frameworks such as the triple bottom line (Elkington 1997) and New Urban Agenda (UN-Habitat 2016) emphasize that municipal finance must prioritize diversified revenue streams, participatory governance, and climate-aligned investments to achieve sustainability goals. For instance, with the help of green bonds and land value capture (LVC), cities such as Copenhagen and São Paulo have funded renewable energy and affordable housing, demonstrating fiscal tools' ability to operationalize SUD principles (C40 Cities Finance Facility 2019). However, in Saudi Arabia, centralized fiscal structures and oil dependence, rooted in the rentier state theory (Luciani 1987; Hertog 2022), constrain municipalities' autonomy and limit their ability to adopt such innovations. This misalignment between global best practices and Saudi Arabia's centralized governance underscores the urgency of reimagining municipal finance to meet Vision 2030's sustainability targets (World Bank 2020b).

Successful models of sustainable finance rely on decentralization, adaptive regulation, and stakeholder collaboration (World Bank 2020a, 2020b). The fiscal decentralization theory (Oates 1972; Khanna & Palepu 1997) argues that local governments with financial autonomy can better address community-specific needs, as is evident in Singapore's PPP-driven water management and Seoul's LVC-funded transit systems (Asian Development Bank 2018; Lincoln Institute of Land Policy 2020). However, Saudi municipalities are tethered to centralized oil revenues, with over 80% of budgets derived from federal transfers (Alqahtani & Sloan 2021; Alhowaish 2014). This stifles innovation, as evident from Riyadh's reliance on sovereign wealth funds for green projects rather than decentralized mechanisms such as municipal bonds (Alshuwaikhat et al. 2017; Al-Hathloul & Mughal 2020; Alhowaish 2025). Additionally, institutional gaps such as underdeveloped green finance frameworks and poor technical expertise hinder the adoption of tools such as climate-resilient budgeting. These challenges reveal institutional voids (World Bank 2022), where weak regulatory ecosystems deter private investment and perpetuate siloed decision-making (OECD 2023), further distancing Saudi cities from global sustainability benchmarks.

Bridging this gap requires integrated reforms that align theory, global practices, and Saudi Arabia's unique context. Decentralizing the fiscal authority can empower municipalities to issue Sharia-compliant green bonds (Islamic Development Bank 2021) or leverage LVC (Lincoln Institute of Land Policy 2020) in Vision 2030 megaprojects, such as NEOM (NEOM Authority 2022a), redirecting land value gains to fund eco-infrastructure (World Bank 2022; OECD 2023). Simultaneously, capacity-building initiatives guided by

the capacity-building theory (UNDP 2019) can equip municipal staff with the skills required to implement sustainability metrics and participatory budgeting (World Bank 2020c). Collaborative frameworks engaging academia, NGOs, and the private sector would mirror the Net Unrealized Appreciation (NUA's) participatory ethos, fostering innovation in areas such as PPPs and carbon pricing (C40 Cities 2021; OECD 2022). By embedding the TBL into fiscal policies and learning from adaptive governance models, Saudi Arabia can transform municipal finance from a centralized constraint into a driver of equitable, low-carbon urbanization, proving that sustainability is a strategic imperative and catalyst for long-term prosperity under Vision 2030.

Fiscal Decentralization and Financial Autonomy

Fiscal decentralization, the devolution of revenue-raising and spending powers to local governments, is the cornerstone of efficient and responsive governance, as articulated by the decentralization theorem (Oates 1972). This theory posits that local authorities with financial autonomy can better address community-specific needs by offering tailored services, thus reducing the inefficiencies inherent in centralized systems (Jensen & Meckling 1976; Eisenhardt 1989). For example, municipalities in decentralized systems, such as Canada (OECD 2020) and Germany (European Central Bank 2023), independently levy property taxes and issue municipal bonds, which help fund infrastructure aligned with local priorities, such as public transit or green spaces (Blöchliger and King 2006). However, in Saudi Arabia, fiscal authority is concentrated at the national level and municipalities rely on centralized oil revenue for over 80% of their budgets (Alhowaish 2014; Alqahtani & Sloan 2021; Alhowaish & Alkubur 2025). This stifles innovation and accountability, contradicting Vision 2030's pledge to empower local governance. This gap has been illuminated by the principal-agent theory (Jensen & Meckling 1976; Eisenhardt 1989), which highlights misaligned incentives when central governments dictate local spending without community input. Successful decentralization hinges on balancing autonomy and accountability. In the UAE, fiscal reforms have enabled cities such as Dubai to experiment with PPPs for sustainable infrastructure such as solar-powered desalination plants while ensuring oversight through performance-based grants (Alraouf 2021a; Dubai Electricity & Water Authority 2023). However, in Saudi Arabia, rigid regulatory frameworks limit municipalities' ability to explore PPPs or LVC, and bureaucratic inertia perpetuates reliance on outdated revenue models such as service fees and central transfers (Alotaibi & Rahman 2019; Alhowaish & Alkubur 2025). These challenges reflect institutional voids, where underdeveloped legal and financial ecosystems deter private-sector engagement (Kemp et al. 2005; Yescombe 2007; OECD 2022). For instance, Riyadh's attempts to decentralize waste management have been hampered by unclear procurement rules and weak enforcement mechanisms, discouraging private investors despite the high demand for sustainable solutions (King Abdullah & Petroleum Studies & Research Center 2023; Ministry of Municipal 2023).

Bridging these gaps requires reforms that align Saudi Arabia's governance model with the decentralization theory and global best practices. First, adopting fiscal federalism principles can empower municipalities to diversify revenue through local taxes or municipal bonds, as seen in Johannesburg's use of green bonds to fund climate-resilient infrastructure (C40 Cities Climate Leadership Group 2018; Climate Bonds Initiative 2020). Second, institutional capacity-building guided by the capacity-building theory can address technical deficits, training municipal staff in PPP negotiations, impact investing, and participatory budgeting (Ansell and Gash 2008; Bovaird & Löffler 2012). Third, embedding performance-based fiscal transfers, akin to Germany's "municipal solidarity funds," would incentivize sustainability projects while ensuring accountability (European Central Bank 2023). By integrating these strategies, Saudi Arabia can align Vision 2030's decentralization goals with its centralized legacy, transforming municipalities from passive budget recipients to proactive drivers of sustainable development (Ministry of Municipal, Rural Affairs, and Housing (MOMRAH) 2023a; Saudi Arabian General Investment Authority (SAGIA) 2023). This shift would enhance fiscal resilience and foster community trust, proving that financial autonomy is not merely a bureaucratic adjustment but also a catalyst for equitable, citizen-centric governance.

Institutional Barriers and Governance Challenges

Institutional barriers and governance challenges impede municipal finance system reforms. Rooted in institutional theory (North 1990), these barriers include fragmented regulatory frameworks, bureaucratic inertia, and weak enforcement mechanisms, which stifle innovation and accountability. For example, Saudi municipalities often operate under overlapping mandates from multiple central agencies, causing delays in project approval and inconsistent implementation of sustainability policies (King Abdullah Petroleum Studies and Research Center (KAPSARC) 2023; Ministry of Municipal, Rural Affairs, and Housing 2023). This fragmentation mirrors the institutional void theory (Khanna and Palepu 1997, 2010), where underdeveloped legal and financial ecosystems, such as the absence of standardized criteria for green bonds or PPP contracts, deter private-sector participation (Hueskes et al. 2017). Cities such as Singapore have overcome similar challenges by establishing unified regulatory

bodies to streamline PPP approval, demonstrating how adaptive governance can bridge institutional gaps (Asian Development Bank 2018).

Saudi Arabia's situation is complicated by the lack of stakeholder collaboration and technical capacity (Alqahtani & Sloan 2021; Alhowaish 2025). Municipal staff often lack expertise in sustainability finance, which hinders the adoption of tools such as climate-resilient budgeting or LVC, a gap illuminated by the capacity-building theory (Grindle 1997). For instance, Riyadh's Green Metro Project aligns with Vision 2030's sustainability goals; however, its financing relies on centralized oil revenues, reflecting a disconnection between national priorities and local execution (KAPSARC 2023). Conversely, South Korea's "smart city" initiatives thrive through partnerships with academia and tech firms, highlighting how inclusive governance models can enhance innovation (World Bank 2021; UN-Habitat 2023). By contrast, Saudi municipalities rarely engage NGOs or academia in fiscal planning, perpetuating siloed decision-making and limiting access to global best practices (Alotaibi & Rahman 2019). Addressing these barriers requires institutional entrepreneurship (World Bank 2022). First, modernizing regulatory frameworks by introducing municipal bond issuance laws or green finance certifications could align Saudi Arabia's practices with global standards (OECD 2019, 2023). Second, multi-stakeholder platforms such as Germany's municipal sustainability councils would enhance collaboration between the government, private actors, and civil society (European Central Bank 2023). Third, investing in training programs for municipal staff, modeled on the UAE's capacity-building initiatives for smart city projects, could help overcome technical deficits (Hertog 2023). These reforms can help Saudi Arabia transform institutional barriers into opportunities for governance innovation, ensuring that municipal finance systems evolve from rigid, centralized structures to agile, participatory frameworks capable of delivering Vision 2030's sustainable urban vision.

Innovative Financing Mechanisms and Global Benchmarks

Innovative financing mechanisms such as green bonds, PPPs, and LVC are global benchmarks for funding SUD and offer lessons for Saudi Arabia's municipal finance reforms. Green bonds have enabled cities such as Copenhagen (C40 Cities Finance Facility 2019) and Johannesburg (Climate Bonds Initiative 2020) to raise capital for renewable energy and water conservation projects, backed by rigorous certification frameworks (OECD 2019, 2023). These instruments align with the TBL by channeling investments into environmental resilience while generating economic returns and social co-benefits such as job creation (Elkington 1997). However, the lack of standardized criteria and investor confidence in Saudi Arabia's nascent green finance ecosystem hinder its adoption (Alhowaish 2025). Similarly, PPPs successfully deployed in Singapore's water management (Asian Development Bank 2018) and Dubai's solar infrastructure (Dubai Electricity and Water Authority 2023) demonstrate how risk-sharing with private entities can enhance service efficiency (World Bank 2020b). However, Saudi municipalities face regulatory ambiguity and bureaucratic resistance to PPPs, reflecting broader institutional voids (Khanna & Palepu 1997, 2010) that deter private-sector engagement. LVC (Lincoln Institute of Land Policy 2020) redirects gains from urban land appreciation to fund public goods. In São Paulo, LVC tools such as tax increment financing have financed affordable housing near transit hubs (City of São Paulo 2019), while Seoul's development impact fees fund ecofriendly infrastructure (Smolka 2013). These models align with the fiscal decentralization theory (Oates 1972), empowering local governments to leverage spatial growth for sustainability. Saudi Arabia's Vision 2030 megaprojects such as NEOM (NEOM Authority 2022b) and Red Sea Development (Red Sea Development Company 2023) are prime opportunities for LVC, as land values in these zones are expected to surge (Smolka 2013). However, the absence of legal frameworks to formalize LVC mechanisms, coupled with centralized land ownership, limits their application (Alqahtani & Sloan 2021; Alhowaish 2025). For instance, Riyadh's metro expansion could use LVC to fund transit-oriented development; however, current policies prioritize short-term revenue from land sales over long-term value retention.

Saudi Arabia must adapt global benchmarks to its unique governance and economic context. First, introducing Sharia-compliant green bonds (Islamic Development Bank 2021) could attract Islamic investors toward renewable energy projects, addressing both regulatory and cultural barriers (DinarStandard 2023; Mehmood 2023). Second, establishing clear PPP guidelines (Hueskes et al. 2017) inspired by the UAE's performance-based contracts would mitigate risks for private partners and align projects with Vision 2030's sustainability targets. Third, piloting LVC in special economic zones, such as NEOM, could test mechanisms such as joint development agreements, where private firms fund infrastructure in exchange for land-use rights (Lincoln Institute of Land Policy 2020; NEOM Authority 2022b). These strategies require parallel reforms such as enhancing municipal technical capacity through training programs and fostering multi-stakeholder platforms to integrate academia, NGOs, and developers into fiscal planning (UN-Habitat 2016; World Bank 2020a, 2020b). By embedding global innovations into localized frameworks, Saudi municipalities can transform from passive budget recipients to proactive sustainability financiers.

Synthesis and Research Gaps

Municipal finance is a critical yet under-optimized lever for advancing sustainable urban environments in Saudi Arabia (Alshuwaikhat et al. 2017; Al-Hathloul & Mughal 2020). Theoretical frameworks such as the TBL, fiscal decentralization, and institutional entrepreneurship underscore the interdependence of economic, environmental, and social priorities in urban governance. Globally, cities have demonstrated the efficacy of innovative financing tools, green bonds, PPPs, and LVC in aligning fiscal strategies with sustainability goals. However, Saudi Arabia's centralized fiscal control, oil dependence, and regulatory fragmentation create a disconnect between global best practices and local implementation. For instance, while Vision 2030 advocates decentralization and green financing, municipalities are constrained by bureaucratic inertia, weak stakeholder collaboration, and poor technical expertise (Alqahtani & Sloan 2021; Alhowaish 2025; Alhowaish & Alkubur 2025). This highlights the need for context-specific strategies to reconcile the Saudi rentier economy and governance norms with global sustainability imperatives. Despite the growing scholarly attention to municipal finance, critical research gaps persist.

1. **Contextual Disconnect:** Most studies on innovative financing mechanisms focus on Western or Asian contexts, overlooking the applicability of these models in rentier states such as Saudi Arabia, where oil revenues and centralized governance disrupt conventional fiscal paradigms (Hertog 2022).
2. **Expert-Driven Insights:** The literature focuses on macro-level policy analyses or qualitative case studies, neglecting empirical investigations into practitioner perspectives, particularly the views of municipal finance experts, urban planners, and policymakers who navigate these systems daily (Alhowaish 2025; Alhowaish & Alkubur 2025).
3. **Quantitative Rigor:** Few studies have employed statistically robust methodologies to assess barriers and opportunities, which limits the generalizability of the findings. While a few studies analyze PPP challenges in Saudi Arabia, their work lacks large-scale empirical validation (Alotaibi & Rahman 2019; Alhowaish & Alkubur 2025).
4. **Institutional Innovation:** The role of institutional entrepreneurship in driving fiscal reforms remains underexplored, particularly regarding how local actors can catalyze regulatory and cultural shifts in centralized systems (North 1990; World Bank 2022).

To address these gaps, this study adopts a quantitative, expert-driven approach to analyze the perceptions of municipal finance challenges and solutions in Saudi Arabia. By surveying 360 experts across the government, academia, and private sector, this study provides statistically significant insights into institutional barriers, regulatory bottlenecks, and viability of global financing tools in the Saudi context. Furthermore, it contextualizes the findings within Vision 2030's transformative agenda and offers strategies to bridge theory and practice, such as adapting green bonds to Sharia-compliant frameworks or piloting LVC in NEOM. Ultimately, this study contributes to a novel, evidence-based roadmap for aligning Saudi municipal finance with sustainability goals, advancing the academic discourse and policymaking in a region where rapid urbanization intersects with ambitious economic diversification efforts.

MATERIALS AND METHODS

This study used a mixed-methods approach to examine municipal finance challenges and opportunities in Saudi Arabia by combining quantitative surveys with qualitative thematic analysis. The target population comprised 500 experts in municipal finance, urban planning, and sustainability from the government, private sector, and academia, with at least five years of field experience (Bryman 2016; Yin 2018). Cochran's formula helped determine the sample size, ensuring a 95% confidence level and 5% margin of error (Cohen 1960). Anticipating a 70%–80% response rate based on prior expert surveys in GCC contexts (Alotaibi & Rahman 2019; Alshehry & Belloumi 2020; Alnajem et al. 2021; Alhowaish 2025; Alhowaish & Alkubur 2025), the study achieved a 72% response rate, with 360 participants. This robust sample size enhanced the generalizability of the findings across stakeholder groups (Cohen 1960).

Data collection used a structured questionnaire developed through a comprehensive review of validated municipal finance frameworks, including the OECD's Green Infrastructure Financing guidelines (OECD 2019, 2021, 2023) and the World Bank's PPP frameworks (World Bank 2020a, 2020b, 2020c). The instrument was pilot-tested with 30 experts, yielding a Cronbach's α reliability score of 0.82, indicating high internal consistency (Cohen 1960). The final questionnaire comprised five sections: (1) demographic data, (2) challenges in municipal sustainability financing, (3) opportunities for alternative mechanisms (e.g., green bonds and digital finance), (4) policy and governance assessments (5-point Likert scale), and (5) open-ended questions probing barriers and cultural opportunities. The survey was distributed online via the QuestionPro (vX.X) platform over eight weeks (February–April 2025) with anonymized responses to reduce bias. Participation incentives included summary reports of the findings.

Quantitative analysis was performed using SPSS v28 for descriptive statistics (means and frequencies) and inferential methods (Jolliffe 2002; Hair et al. 2019), including one-way analysis of variance (ANOVA) to compare perceptions across stakeholder groups (e.g., government vs. private sector), chi-square tests to identify associations between categorical variables, regression analysis to predict policy impacts on sustainability outcomes, factor analysis to identify latent dimensions of financial challenges, and correlation analysis to examine the relationships between fiscal constraints and sustainability efforts. Qualitative insights were derived through the thematic coding of open-ended responses using NVivo 12, identifying recurring themes such as regulatory fragmentation and opportunities for Sharia-compliant finance (Creswell & Poth 2018; Maxwell 2023). Ethical protocols ensured digital informed consent, strict anonymity, and compliance with Imam Abdulrahman Bin Faisal University's Institutional Review Board (IRB-2025-06-0188). Full survey variables aligned with the municipal finance frameworks are cataloged in Appendix A, ensuring transparency and reproducibility.

RESULTS AND DISCUSSION

Demographic Profiles of Respondents

The demographic profiles of the 360 experts surveyed in this study highlight key characteristics relevant to Saudi Arabia's municipal finance and SUD challenges (Table 1). Among the participants, private sector representatives comprised the largest group (24.7%), followed by sustainability experts (20.0%), and academics or researchers (18.6%). This distribution aligns with the objective of exploring multi-stakeholder perspectives on municipal finance mechanisms, as private sector involvement is critical for PPPs, a key alternative financing mechanism (Asian Development Bank 2018; Alotaibi & Rahman 2019; OECD 2022). Government officials (16.1%) and urban planners (12.5%) also featured prominently, underscoring the importance of governance and policy frameworks in shaping financial decisions.

Table 1. Demographic Profiles of Respondents ($N = 360$)

Variable	Category	Number (%)
Professional Role	Government Official	58 (16.1%)
	Urban Planner	45 (12.5%)
	Sustainability Expert	72 (20.0%)
	Academic or Researcher	67 (18.6%)
	Private Sector Representative	89 (24.7%)
	Other	29 (8.1%)
Year of Experience	Less than 5 years	112 (31.1%)
	5–10 years	98 (27.2%)
	10–15 years	85 (23.6%)
	More than 15 years	65 (18.1%)
Region	Riyadh	92 (25.6%)
	Makkah	54 (15.0%)
	Eastern Province	167 (46.4%)
	Madinah	32 (8.9%)
	Other	15 (4.1%)
Sector	Government or Public Sector	137 (38.1%)
	Private Sector	95 (26.4%)
	Academia or Research	76 (21.1%)
	NGO	34 (9.4%)
	Other	18 (5.0%)

Note: A one-way ANOVA revealed significant differences in years of experience across professional roles ($F = 3.75, p = 0.003$). A chi-square test revealed a strong association between professional roles and sectors ($\chi^2 = 89.45, p < 0.001$).

Years of experience varied significantly, with 31.1% and 18.1% reporting less than 5 and over 15 years of experience, respectively. A one-way ANOVA revealed statistically significant differences in experience across roles ($F = 3.72, p = 0.003$), with private sector representatives demonstrating lower average experience than government officials. This finding resonates with the literature on the skill gap in Saudi Arabia's municipal workforce, which hampers the implementation of complex sustainability projects (Alshuwaikhat et al. 2017; Alhowaish 2025; Alhowaish & Alkubur 2025). Such disparities may exacerbate financial management challenges, particularly when adopting innovative tools such as green bonds or digital finance. Geographically, 46.4% of the respondents worked in the Eastern Province, reflecting its economic significance as an industrial and urban hub, whereas only 8.9% worked in Madinah. This regional imbalance mirrors the broader fiscal decentralization debates in Saudi Arabia,

where resource allocation often prioritizes high-growth regions and marginalizes smaller municipalities (Alqahtani & Sloan 2021). A chi-square test confirmed a strong association between professional roles and sectors ($\chi^2 = 89.45, p < 0.001$), with government officials concentrated in the public sector (38.1%) and academics in research (21.1%). These trends highlight systemic silos that may hinder cross-sector collaboration, which is a barrier to achieving Vision 2030's integrated sustainability goals (MOMRAH 2023a, 2023b).

The dominance of the Eastern Province and public sector underscores the need for governance reforms to enhance fiscal equity and stakeholder engagement. For instance, empowering municipalities through fiscal decentralization can address regional disparities and improve their financial autonomy (World Bank 2020b; Hertog 2022). Similarly, the high representation of private sector respondents suggests opportunities to leverage PPPs, but this requires robust policy frameworks to mitigate risks (Asian Development Bank 2018; Alotaibi & Rahman 2019; OECD 2022). These demographic insights contextualize the study's focus on barriers and strategies, emphasizing the interplay between expert backgrounds, regional dynamics, and institutional structures in shaping Saudi Arabia's municipal finance landscape.

Municipal Finance Challenges

The perceived challenges in Saudi Arabia's municipal finance systems, as reported by 360 experts, revealed critical barriers to funding sustainable urban projects (Table 2). Descriptive statistics revealed that municipalities face significant financial constraints ($M = 3.8, SD = 1.2$), with 64.7% agreeing or strongly agreeing. Dependence on government funding emerged as a key issue, with 58.9% agreeing that it limits financial autonomy. These findings align with studies analyzing fiscal centralization in the Gulf states, which often stifles local revenue generation (KAPSARC 2022; Maxwell 2023).

Revenue generation mechanisms were also criticized: 52.2% of the respondents disagreed or strongly disagreed that municipalities effectively leveraged local sources such as taxes or service fees. This reflects systemic inefficiencies in fiscal decentralization, a strategy emphasized in Saudi Vision 2030 (MOMRAH 2023a, 2023b). Budget allocation processes fared worse, with 61.1% disagreeing that sustainability projects were prioritized, underscoring misalignments between financial planning and environmental goals.

Limited access to international funding (e.g., green bonds) and underutilization of PPPs were notable concerns. While 49.4% agreed that restricted international funding hindered sustainability initiatives, only 32.8% viewed PPPs as underutilized. This indicated skepticism about PPP efficacy, corroborating findings on regulatory gaps in Saudi PPP frameworks (Alotaibi & Rahman 2019). A one-way ANOVA revealed significant differences in agreement levels across challenges ($F = 4.33, p < 0.001$), with budget allocation and PPP utilization rated most critically ($p < 0.05$). A chi-square test identified associations between professional roles and perceptions of challenges ($\chi^2 = 145.27, p < 0.001$). For instance, 72% of government officials linked financial constraints to centralized funding, whereas 68% of private sector representatives emphasized PPP underuse. These disparities highlight the fragmented stakeholder perspectives, necessitating governance reforms to foster cross-sector collaboration. Integrating digital finance tools and green bonds require policy coherence and capacity-building to mitigate these challenges (Alhowaish 2025; Alhowaish & Alkubur 2025).

Table 2. Perceived Municipal Finance Challenges ($N = 360$)
(1 = Strongly Disagree, 5 = Strongly Agree)

Challenges	Mean (SD)	Frequency Distribution (%)
Municipalities face significant financial constraints	3.8 (1.2)	1: 13%, 2: 23%, 3: 19%, 4: 32%, 5: 14%
Lack of sufficient revenue streams	3.6 (1.3)	1: 15%, 2: 24%, 3: 21%, 4: 28%, 5: 11%
Dependence on government funding limits autonomy	3.9 (1.1)	1: 10%, 2: 19%, 3: 21%, 4: 35%, 5: 14%
Ineffective local revenue mechanisms	2.9 (1.2)	1: 18%, 2: 34%, 3: 24%, 4: 19%, 5: 5%
Budget allocation neglects sustainability	2.7 (1.1)	1: 21%, 2: 41%, 3: 22%, 4: 13%, 5: 5%
Limited access to international funding	3.6 (1.3)	1: 16%, 2: 25%, 3: 20%, 4: 28%, 5: 11%
PPPs are underutilized	2.9 (1.3)	1: 22%, 2: 28%, 3: 24%, 4: 19%, 5: 7%

Note: A one-way ANOVA showed significant differences in agreement levels across challenges ($F = 4.33, p < 0.001$). A chi-square test revealed significant associations between professional roles and perceptions of challenges ($\chi^2 = 145.27, p < 0.001$).

Opportunities for Enhancing Municipal Finance

The experts identified fiscal decentralization as a cornerstone for advancing Saudi Arabia's municipal finance systems, with 68.3% agreeing or strongly agreeing that granting municipalities greater financial control would enhance their capacity to fund sustainable projects ($M = 3.9, SD = 1.1$) (Table 3). This finding aligns with the assertion that fiscal autonomy empowers local governments to address region-specific sustainability challenges

(Blöchliger & King 2006; OECD 2020; Alqahtani & Sloan 2021). However, 23.0% expressed concerns about uneven implementation capacities across regions, a barrier noted in the analysis of Gulf fiscal disparities (KAPSARC 2022; Maxwell 2023). PPPs garnered moderate support ($M = 3.7$, $SD = 1.3$), with 61.4% agreeing that they can bolster sustainability initiatives. Despite this optimism, 26.4% disagreed, underscoring the persistent regulatory and transparency gaps in Saudi PPP frameworks (Alotaibi & Rahman 2019). A chi-square test revealed significant associations between professional roles and PPP perceptions ($\chi^2 = 132.45$, $p < 0.001$), with 72% of private sector representatives advocating for PPPs compared with only 38% of government officials. These divergences highlight the need for standardized governance frameworks to align stakeholder expectations (Alhawaish 2025).

Digital finance technologies, such as blockchain and automated tax systems, received cautious endorsements ($M = 3.5$, $SD = 1.2$), with 54.7% agreeing that they could improve fiscal efficiency. However, 31.3% expressed reservations, reflecting gaps in technical expertise and infrastructure, a challenge emphasized by researchers in their critique of municipal capacity-building needs (Alshuwaikhat et al. 2017; Al-Hathloul & Mughal 2020; Alhawaish 2025; Alhawaish & Alkubur 2025). These findings underscore the urgency of integrating digital literacy programs into Saudi Arabia's Vision 2030 workforce development strategies. Innovative financing tools such as green bonds and carbon credits emerged as high-potential solutions ($M = 3.8$, $SD = 1.3$), with 65.6% advocating their adoption. Academics or researchers were particularly supportive (72%), aligning with global trends in sustainable finance (World Bank 2020b; OECD 2021; UN-Habitat 2022). However, 25.0% remained neutral or skeptical, citing concerns about market readiness, a barrier observed in emerging economies that adopt green financial instruments (OECD 2023).

The Vision 2030 policy framework was hailed as a critical enabler ($M = 4.1$, $SD = 1.1$), with 73.6% agreeing that it would strengthen municipal sustainability financing. This consensus reflects the strategic alignment of national policies with localized sustainability goals, as outlined in the Saudi national municipal sector strategy (MOMRAH 2023a). A one-way ANOVA confirmed significant differences in perceived opportunities ($F = 5.12$, $p < 0.001$), with Vision 2030 support and fiscal decentralization rated most favorably ($p < 0.01$). Finally, 43.4% agreed that the private sector should play a greater role in financing urban sustainability, while 31.9% expressed neutrality or disagreement. This ambivalence mirrors the global debates on balancing profit motives with public goods in sustainability projects (Grindle 1997; Bovaird & Löffler 2012). To address this, some studies advocate hybrid financing models that incentivize private investment while ensuring equitable outcomes (Williams 2019; Alhawaish & Alkubur 2025), a key consideration for achieving Saudi Arabia's Vision 2030 equity goals.

Table 3. Perceived Opportunities for Enhancing Municipal Finance ($N = 360$)

(1 = Strongly Disagree, 5 = Strongly Agree)

Opportunities	Mean (SD)	Frequency Distribution (%)
Fiscal decentralization enhances funding for sustainable projects	3.9 (1.1)	1: 9%, 2: 14%, 3: 17%, 4: 42%, 5: 18%
Municipal-level taxation increases local revenues	3.6 (1.3)	1: 13%, 2: 21%, 3: 24%, 4: 32%, 5: 11%
PPPs enhance sustainability initiatives	3.7 (1.3)	1: 10%, 2: 16%, 3: 22%, 4: 38%, 5: 13%
Digital finance improves financial efficiency	3.5 (1.2)	1: 12%, 2: 19%, 3: 24%, 4: 34%, 5: 11%
Innovative tools (green bonds and carbon credits)	3.8 (1.3)	1: 10%, 2: 15%, 3: 19%, 4: 40%, 5: 15%
Vision 2030 supports municipal sustainability financing	4.1 (1.1)	1: 7%, 2: 11%, 3: 16%, 4: 44%, 5: 22%
Private sector should play a greater role	3.6 (1.3)	1: 14%, 2: 18%, 3: 25%, 4: 30%, 5: 13%

Note: A one-way ANOVA revealed significant differences in how experts prioritize opportunities ($F = 5.12$, $p < 0.001$). A chi-square test showed significant associations between professional roles and PPP perceptions ($\chi^2 = 132.45$, $p < 0.001$).

Policy and Governance Factors

The integration of sustainability into municipal financial planning emerged as a cornerstone of expert consensus, with 72.5% agreeing or strongly agreeing that such an integration was critical ($M = 4.0$, $SD = 1.0$) (Table 4). This aligns with Saudi Vision 2030's mandate to embed sustainability across governance frameworks, as emphasized by the MOMRAH (2023a, 2023b). However, skepticism persisted regarding the adequacy of the legal and regulatory framework, with 34.7% disagreeing that it sufficiently supported sustainable financing ($M = 3.6$, $SD = 1.3$). This disconnect underscores the need for legislative reforms to bridge policy intentions and implementation, a challenge highlighted by Alotaibi & Rahman (2019), Al-Hathloul & Mughal (2020), and Alhawaish & Alkubur (2025) in their analyses of Saudi PPP frameworks.

Transparency and accountability in financial management revealed significant gaps, as only 48.6% of the experts expressed agreement ($M = 3.4$, $SD = 1.3$). These findings resonate with the critique of fiscal centralization

in the Gulf states, where limited oversight often exacerbates inefficiencies (Alqahtani & Sloan 2021; Alraouf 2021b). Conversely, municipal autonomy garnered strong support ($M = 3.9$, $SD = 1.2$), with 68.3% advocating for localized financial decision-making. This reflects the argument that decentralization empowers municipalities to address region-specific challenges, although disparities in institutional capacity may hinder equitable outcomes (World Bank 2020b; Alqahtani & Sloan 2021; Hertog 2022). Government incentives, such as tax breaks and subsidies, were viewed cautiously ($M = 3.7$, $SD = 1.2$), with 58.3% agreeing that they could stimulate sustainable investment. A one-way ANOVA confirmed significant differences in perceptions across governance factors ($F = 4.85$, $p < 0.001$), with the integration of sustainability and municipal autonomy rated higher than transparency ($p < 0.01$). These results suggest that stakeholders prioritize structural reforms over incremental incentives, aligning with calls for systemic governance shifts to achieve SUD (UN-Habitat 2016, 2022). Chi-square tests revealed stakeholder-specific priorities ($\chi^2 = 98.33$, $p < 0.001$), with 82% of academics or researchers emphasizing the integration of sustainability into planning, exceeding the overall agreement (72.5%) and reflecting global advocacy for early-stage sustainability integration (UN-Habitat 2016, 2022). Meanwhile, 68% of private sector representatives supported incentives, underscoring their focus on financial mechanisms for de-risking investments. Conversely, government officials prioritized regulatory reforms (65%), highlighting the institutional roadblocks identified in Vision 2030's municipal strategy.

These divergences underscore the complexity of harmonizing multi-stakeholder priorities. While municipal autonomy and sustainability integration are widely endorsed, fragmented perceptions of transparency and regulatory efficacy undermine collaborative progress. Advancing Vision 2030 requires policy coherence and platforms for cross-sector dialogue to align stakeholder incentives and capacities (Al-Hathloul & Mughal 2020; Alqahtani & Sloan 2021; Alhowaish 2025; Alhowaish & Alkubur 2025). Addressing these governance challenges is pivotal to transforming Saudi municipalities into engines of SUD.

Table 4. Perceptions of Policy and Governance Factors ($N = 360$)

(1 = *Strongly Disagree*, 5 = *Strongly Agree*)

Factor	Mean (SD)	Frequency Distribution (%)
Legal or regulatory framework supports sustainable financing	3.6 (1.3)	1: 13%, 2: 22%, 3: 21%, 4: 33%, 5: 11%
Transparency or accountability in financial management	3.4 (1.3)	1: 15%, 2: 22%, 3: 24%, 4: 29%, 5: 9%
Integrate sustainability into financial planning	4.0 (1.0)	1: 9%, 2: 11%, 3: 17%, 4: 42%, 5: 22%
Government incentives encourage sustainable investments	3.7 (1.2)	1: 10%, 2: 16%, 3: 22%, 4: 38%, 5: 13%
Municipal autonomy in setting financial priorities	3.9 (1.2)	1: 10%, 2: 14%, 3: 19%, 4: 40%, 5: 17%

Note: A one-way ANOVA revealed significant differences in perceptions across governance factors ($F = 4.85$, $p < 0.001$). A chi-square test revealed significant associations between professional roles and policy perceptions ($\chi^2 = 98.33$, $p < 0.001$).

Open-Ended Feedback on Municipal Finance

Qualitative insights from 360 open-ended responses were thematically analyzed using NVivo 12 (Creswell & Poth 2018; Maxwell 2023) to identify recurring themes across financial challenges, strategic recommendations, and successful financing models. The analysis revealed eight interconnected themes (Table 5). The most prominent theme, financial constraints (19.9%), highlighted the municipalities' dependence on unstable central government funding and limited revenue autonomy, a concern aligned with critiques of the pre-Vision 2030 fiscal frameworks in Saudi Arabia (Al-Hathloul & Mughal 2020; Alqahtani & Sloan 2021). Closely tied was the call for fiscal decentralization (15.8%), where participants advocated for enhanced municipal fiscal control to improve accountability, a strategy that the World Bank (2021) linked to effective urban governance in GCC nations. These financial challenges underscore the urgency for innovative solutions, such as public-private partnerships, which 13.5% of the respondents identified as underutilized despite their potential for infrastructure projects. However, bureaucratic hurdles in Saudi Arabia often hinder PPP implementation, necessitating governance reforms (Alotaibi & Rahman 2019; Alhowaish 2025).

Parallel to PPPs, green finance mechanisms (10.3%), including green bonds and climate funds, emerged as tools that align with the sustainability objectives of Vision 2030. This echoed some researchers' emphasis on ESG-compliant investments in the Gulf's urban development (Busch et al. 2022; Ewis 2025). Complementing these strategies, digital finance tools (11.2%), such as blockchain tax systems, were proposed to streamline revenue collection and reduce administrative delays. These technological advancements were frequently linked to broader governance reforms (11.9%), particularly transparency and policy alignment with national goals. Studies corroborate this finding, highlighting that bureaucratic inefficiencies in Middle East and North Africa (MENA) municipalities often delay projects and erode public trust (OECD 2019; World Bank 2022). The role of community engagement (8.0%) was emphasized to ensure the social acceptance of projects through participatory budgeting,

as echoed in global best practices (UN-Habitat 2016, 2022; OECD 2019). Additionally, respondents urged the adoption of international models (9.6%) such as Dubai's PPPs and EU climate frameworks, reflecting the recommendation for knowledge transfer in GCC urban governance (World Bank 2020b). Regional disparities further shaped these themes: Eastern Province respondents prioritized industrial financing, whereas Riyadh focused on digital solutions, underscoring arguments for context-specific strategies (Alotaibi & Rahman 2019; KAPSARC 2023; SAGIA 2023; Alhawaish 2025; Alhawaish & Alkubur 2025). Collectively, these findings advocate a balanced approach that integrates fiscal autonomy, technological innovation, and global best practices to achieve sustainable municipal financing. This synthesis aligns with Vision 2030's goals and addresses the governance gaps identified in the regional literature.

Table 5. Thematic Analysis of Open-Ended Responses

Theme	Description	Example Quotes (Translated)	Frequency (%)
Financial Constraints	Dependence on central budgets and limited revenue streams	"Weak financial autonomy due to reliance on central government allocations"	112 (19.9%)
Fiscal Decentralization	Advocacy for municipal fiscal control	"Granting municipalities financial control enhances accountability"	89 (15.8%)
Public-Private Partnerships	PPPs to bridge funding gaps	"PPPs are underutilized despite their potential"	76 (13.5%)
Digital Finance Tools	Blockchain and automated tax systems for efficiency	"Digital tools reduce administrative delays"	63 (11.2%)
Green Finance Mechanisms	Green bonds and climate funds	"Adopt green bonds like NEOM's model"	58 (10.3%)
Governance Reforms	Transparency and policy alignment	"Bureaucratic inefficiencies hinder prioritization"	67 (11.9%)
Community Engagement	Public involvement in budgeting	"Citizens' involvement ensures social acceptance"	45 (8.0%)
International Models	Learning from global examples	"Learn from Dubai's metro project"	54 (9.6%)

Integrated Analysis of Municipal Finance Challenges and Sustainability Efforts

Regression, factor, and correlation analyses holistically examined how systemic barriers and opportunities shape Saudi municipalities' capacity to advance SUD. The analyses diagnosed structural impediments (e.g., funding dependencies and governance gaps) and revealed pathways to align fiscal strategies with Saudi Vision 2030's sustainability imperatives, offering policymakers a data-driven blueprint for transformative reform.

Regression Analysis: Policy Impacts on Sustainability Outcomes

The regression analysis revealed that municipal autonomy ($\beta = 0.31, p < 0.001$) and legal or regulatory framework support ($\beta = 0.22, p < 0.001$) were the strongest predictors of integrating sustainability into municipal financial planning (Table 6). These findings align with researchers' argument that decentralization empowers local governments to address region-specific sustainability challenges (Alotaibi & Rahman 2019; Alqahtani & Sloan 2021; Alhawaish 2025). Others emphasized that robust legal frameworks are essential to align municipal actions with national goals like Saudi Vision 2030 (Alshuwaikhat et al. 2017; Al-Hathloul & Mughal 2020; Alhawaish & Alkubur 2025). Conversely, dependence on government funding negatively impacted sustainability integration ($\beta = -0.14, p = 0.012$), reflecting critiques of fiscal centralization in Gulf states (Alqahtani & Sloan 2021; Alraouf, 2021b; KAPSARC 2022).

Green bonds or carbon credits ($\beta = 0.18, p = 0.001$) and private sector involvement ($\beta = 0.12, p = 0.027$) were significant drivers of sustainability outcomes, underscoring the role of innovative financing and cross-sector collaboration. Green bonds are catalysts for sustainable urban projects globally (OECD 2019, 2023), whereas private-sector engagement requires transparent governance to balance profit motives with the public good (Yescombe 2007; Alotaibi & Rahman 2019; OECD 2022). Transparency or accountability ($\beta = 0.15, p = 0.004$) reinforced this need, as institutional trust gaps hinder progress despite Vision 2030's emphasis on governance reforms (KAPSARC 2022; MOMRAH 2023a). The model explained 42% of the variance in sustainability integration ($R^2 = 0.42$), with years of experience ($\beta = 0.09, p = 0.049$) suggesting that seasoned professionals prioritize systemic planning. However, some limitations include reliance on self-reported data and the use of integration as a proxy for tangible sustainability outcomes. To address these gaps, this study advocates for decentralizing authority, scaling green finance, and fostering multi-stakeholder platforms to harmonize policy implementation across Saudi municipalities.

Table 6. Regression Model Predicting Sustainability Integration

1. Regression Model Summary:					
Model	R^2	Adjusted R^2	F-statistic	Sig.	
Policy Impact	0.42	0.38	10.24	< 0.001	
2. Key Predictors:					
Variable	β	SE	t-value	Sig.	VIF
Municipal Autonomy	0.31	0.04	6.12	< 0.001	1.45
Legal or Regulatory Framework	0.22	0.05	4.01	< 0.001	1.82
Green Bonds or Carbon Credits	0.18	0.03	3.45	0.001	1.21
Transparency or Accountability	0.15	0.06	2.89	0.004	1.67
Dependence on Government Funding	-0.14	0.05	-2.54	0.012	1.32
Private Sector Role	0.12	0.04	2.22	0.027	1.18
Years of Experience	0.09	0.03	1.98	0.049	1.09

Note: β = Standardized coefficient; VIF = Variance inflation factor

Factor Analysis: Latent Dimensions of Municipal Finance Challenges and Sustainability Opportunities

The factor analysis revealed the distinct latent dimensions shaping Saudi Arabia's urban sustainability landscape (Table 7). For municipal finance challenges, two factors emerged. Funding limitations (31.8% variance) encapsulate systemic issues such as financial constraints, revenue shortages, and dependence on central funding, echoing the critique of fiscal centralization in the Gulf states (Alqahtani & Sloan 2021; Alhowaish 2025; Alhowaish & Alkubur 2025).

Governance deficits (20.2% variance) highlight institutional inefficiencies such as poor revenue mechanisms and underutilized PPPs, aligning with the emphasis on governance gaps in Saudi municipal systems (Alhowaish 2014; Al-Hathloul & Mughal 2020; Alhowaish & Alkubur 2025). These factors underscore the dual barriers of resource scarcity and institutional fragmentation that impede SUD. Sustainability opportunities were clustered into three dimensions. Fiscal innovation (34.5% variance), driven by decentralization and digital finance adoption, reflects advocacy in empowering municipalities to tailor solutions to local needs (Alshuwaikhat et al. 2017; Alotaibi & Rahman 2019; Alhowaish & Alkubur 2025). Collaborative tools (22.1% variance), including PPPs and green bonds, resonate with global trends in which cross-sector partnerships and sustainable finance instruments drive urban resilience (OECD 2019; World Bank 2020c; Busch et al. 2022). Policy alignment (18.9% variance), anchored in the strategic support of Vision 2030, underscores the national framework's role in harmonizing municipal actions with sustainability goals (KAPSARC 2023; SAGIA 2023).

The interplay between the challenges and opportunities reveals actionable pathways. Fiscal innovation strategies, such as municipal-level taxation and blockchain-based revenue systems, can mitigate funding limitations (e.g., reliance on central funding). Similarly, governance deficits (e.g., underutilized PPPs) align with collaborative tools, suggesting that strengthening PPP frameworks and green finance could address institutional inefficiencies. Vision 2030's policy alignment bridges these dimensions by providing a roadmap for systemic reforms, but its success depends on resolving the transparency gaps identified in the challenge analysis. These findings advocate for a multipronged approach: decentralizing fiscal authority to enhance local autonomy, scaling green finance mechanisms to diversify funding, and leveraging Vision 2030's policy to institutionalize sustainability planning. Such reforms require balancing private-sector incentives with public accountability, which is a critical step toward achieving Saudi Arabia's urban sustainability ambitions (Alqahtani & Sloan 2021; Alhowaish 2025).

Table 7. Factor Analysis Results: Challenges and Opportunities.

Domain	Factor	Key Variables	Loadings	Variance Explained
1. Challenges	Funding Limitations	Financial constraints	0.84	31.8%
		Lack of revenue streams	0.79	
		Dependence on government funding	0.72	
		Limited international funding	0.68	
	Governance Deficits	Ineffective revenue mechanisms	0.81	20.2%
		Budget neglects sustainability	0.76	
2. Opportunities	Fiscal Innovation	Underutilized PPPs	0.65	34.5%
		Fiscal decentralization	0.82	
		Municipal-level taxation	0.78	

		Digital finance	0.71	
	Collaborative Tools	PPP utilization	0.79	22.1%
		Green bonds or carbon credits	0.74	
		Private sector involvement	0.67	
	Policy Alignment	Vision 2030's policy support	0.85	18.9%

Note: Loading > 0.5 retained; total variance explained: 52.0% (challenges), 75.5% (opportunities). KMO values: 0.78 (Challenges), 0.81 (Opportunities); Bartlett's test * $p < 0.001$ for both.

Correlation Analysis: Financial Constraints and Sustainability Efforts

The analysis revealed significant negative correlations between financial constraints and key sustainability efforts in Saudi municipalities (Table 8). The strongest relationship existed between financial constraints and fiscal decentralization ($r = -0.32$, $p < 0.001$), indicating that municipalities with fiscal limitations cannot implement localized sustainability strategies. This aligns with the assertion that fiscal centralization in Saudi Arabia stifles municipalities' ability to tailor solutions to regional needs, perpetuating their dependence on unsustainable top-down funding models (Alqahtani & Sloan 2021; Alraouf, 2021b; Ewis 2025). Similarly, financial constraints were inversely linked to integrating sustainability into financial planning ($r = -0.28$, $p < 0.001$). Municipalities facing budgetary pressures prioritize short-term fixes, similar to other Gulf states where centralized systems marginalize environmental planning (Alshehry & Belloumi 2020; Ewis 2025). The negative correlation with green bond adoption ($r = -0.19$, $p = 0.004$) underscores how fiscal strain limits access to innovative financing tools, echoing global challenges in scaling green finance under resource scarcity (OECD 2019, 2023).

These findings highlight that financial constraints hinder sustainability investments, while the absence of sustainable practices exacerbates long-term fiscal risk. For instance, centralized funding restricts municipalities from exploring decentralized revenue streams or green bonds, trapping them in a cycle of dependence (Alhawaish 2025). This is a systemic barrier to urban sustainability, emphasizing that fiscal health is a prerequisite for transitioning to resilient, low-carbon cities (UN-Habitat 2016; Alawadi et al. 2023). The results advocate dual reforms as a solution: decentralizing the fiscal authority to empower municipalities and creating accessible green finance mechanisms. However, such reforms must be coupled with governance safeguards to ensure transparency and accountability, ensuring that constrained budgets align with Vision 2030's sustainability mandates (KAPSARC 2023; SAGIA 2023). By addressing fiscal and institutional barriers, Saudi municipalities can transform their financial constraints into opportunities for innovation and sustainable growth.

Table 8. Correlations Between Financial Constraints and Sustainability Efforts ($N = 360$)

Sustainability Effort	r	95% CI	p -value	Interpretation
Fiscal Decentralization	-0.32	[-0.41, -0.22]	< 0.001	Strong inverse link; centralization hinders autonomy
Sustainability Integration	-0.28	[-0.38, -0.17]	< 0.001	Constraints reduce long-term planning capacity
Green Bonds or Carbon Credits	-0.19	[-0.30, -0.07]	0.004	Fiscal strain limits innovative financing

Note: r = Pearson's correlation coefficient; CI = Confidence interval. All correlations are considered significant at $p < 0.01$ (two-tailed).

These analyses revealed a complex interplay of structural, institutional, and financial dynamics that shape Saudi municipalities' capacity to advance SUD. Municipal autonomy ($\beta = 0.31$) and legal or regulatory frameworks ($\beta = 0.22$) are pivotal drivers of sustainability integration, underscoring the need for decentralization and alignment with Vision 2030's strategic goals. Conversely, reliance on centralized funding ($\beta = -0.14$) and transparency gaps hinder progress, highlighting the systemic dependencies that stifle innovation. The Factor analysis reinforced these findings, delineating funding limitations (31.8% variance) and governance deficits (20.2% variance) as the primary challenges, while fiscal innovation (34.5% variance), collaborative tools (22.1%), and policy alignment (18.9%) emerged as actionable pathways. Notably, fiscal centralization exacerbated resource scarcity; however, decentralized revenue mechanisms, green finance, and PPPs offered viable solutions. The correlation analysis revealed that financial constraints weakened fiscal decentralization ($r = -0.32$) and sustainability planning ($r = -0.28$), perpetuating dependence on unsustainable models. These results advocate for dual reforms:

- Decentralizing fiscal authority to help municipalities tailor solutions as per local needs, coupled with governance safeguards to ensure accountability.
- Scaling green finance (e.g., green bonds and carbon credits) and cross-sector partnerships to diversify funding streams and break dependence cycles.

Vision 2030's policy framework acts as a critical enabler if transparency gaps are addressed and multi-stakeholder collaboration is institutionalized. By aligning fiscal strategies with governance reforms, Saudi municipalities can transform systemic barriers into opportunities for resilient and sustainable urban growth.

Synthesizing the Research Trajectory

To synthesize the outcomes, the findings were consolidated into a conceptual framework (Figure 1) that systematically maps the research trajectory. The framework examined Saudi Arabia's municipal finance challenges, fiscal centralization, funding dependencies, and governance gaps, alongside sustainability opportunities such as green finance mechanisms, PPPs, and Vision 2030 alignment. Inputs derived from 360 experts and thematic analysis of qualitative responses were analyzed through a mixed-methods approach: quantitative tools (regression, factor, and correlation analyses) identified statistical drivers like municipal autonomy ($\beta = 0.31$) and legal frameworks ($\beta = 0.22$), while qualitative coding in NVivo revealed systemic inefficiencies such as regulatory fragmentation. In the exit phase, the framework delineated interdependencies, where systemic barriers, funding limitations (31.8% variance) and governance deficits (20.2% variance), perpetuated fiscal strain, as evidenced by negative correlations (e.g., financial constraints weakening decentralization, $r = -0.32$). Furthermore, actionable pathways emerged: decentralizing fiscal authority to empower local governance, scaling green finance (e.g., bonds and PPPs), and aligning reforms with Vision 2030's imperatives. By bridging structural barriers with institutional innovation, the framework allows Saudi municipalities to transform challenges into opportunities for resilient, low-carbon urban growth.

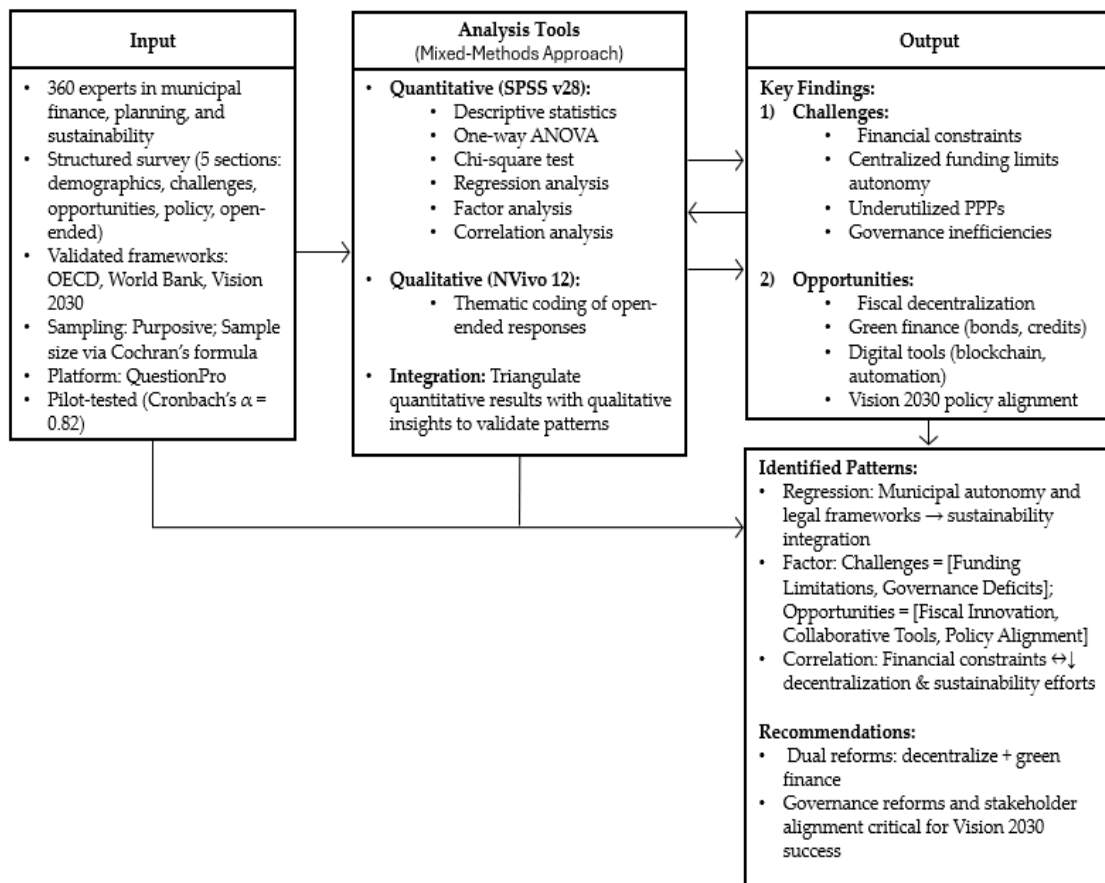


Figure 1. Conceptual framework: Systematizing study outcomes

CONCLUSIONS

This study examined the interplay of fiscal, institutional, and governance dynamics that shape Saudi Arabia's municipal finance landscape under Vision 2030. Through a mixed-methods analysis of 360 expert perspectives, three systemic barriers were identified: fiscal centralization ($\beta = -0.14$), governance deficits (20.2% variance), and funding dependencies (31.8% variance). Decentralization ($\beta = 0.31$), green finance ($\beta = 0.18$), and policy alignment offer transformative potential. These findings have important global and regional implications for policymakers.

1. **Decentralization and Fiscal Autonomy:** Rooted in the decentralization theorem, granting fiscal autonomy to municipalities is crucial to addressing region-specific challenges, such as water scarcity or industrial pollution (Oates 1972; World Bank 2020b; Hertog 2022). Municipal autonomy ($\beta = 0.31$) and legal frameworks ($\beta = 0.22$) are key enablers, echoing advocacy for localized governance (Alqahtani & Sloan 2021). However, reliance on centralized oil revenue perpetuates inefficiencies, necessitating reforms

such as municipal-level taxation and blockchain-based transparency protocols (Blöchliger and King 2006; OECD 2021, 2023). Addressing regional disparities (e.g., 46.4% of respondents from the Eastern Province) requires equitable fiscal transfers, ensuring that Vision 2030's equity goals extend to marginalized regions such as Hail in the north or Jazan in the south (Saudi Vision 2030 2021; Alhawaish 2025).

2. **Green Finance and Cross-Sector Innovation:** Green bonds ($\beta = 0.18$) and PPPs ($M = 3.7/5$) have great potential, but the underutilization of PPPs ($M = 2.9/5$) reflects regulatory gaps (Alawadi et al. 2023; Ewis 2025). By emulating Dubai's PPP-driven solar projects (Dubai Electricity and Water Authority 2023), Saudi Arabia could establish dedicated PPP units to streamline approvals and attract investments (Alhawaish 2025; Alhawaish & Alkubur 2025). Carbon credit systems integrated with industrial hubs such as Jubail could disrupt fiscal constraint cycles ($r = -0.28$), channeling revenues into eco-infrastructure, which aligns with advocates' emphasis on ESG-compliant tools (Busch et al. 2022; Ewis 2025). Sharia-compliant green bonds tailored to Islamic finance norms could further bridge cultural and regulatory divides and foster investor confidence (Islamic Development Bank 2021; DinarStandard, 2023; Mehmood 2023).
3. **Institutional Capacity and Collaborative Governance:** The skill gap (31.1% of respondents with less than five years of experience) underscores the call for capacity-building partnerships with entities such as the OECD to train staff in digital finance and climate-resilient budgeting (Ansell & Gash 2008; Bovaird and Löffler 2012; UNDP 2019). Institutional entrepreneurship justifies the creation of regional sustainability councils (North 1990; World Bank 2022), mirroring Germany's municipal solidarity funds (European Central Bank 2023), to integrate academia and NGOs into fiscal planning. Regulatory harmonization, such as mandating sustainability impact assessments, would align policies with Vision 2030, addressing the critique of siloed decision-making ($\chi^2 = 89.45$).
4. **Community-Centric Reforms and Cultural Adaptation:** Participatory governance, emphasized in 8% of the qualitative responses, aligns with global models for inclusive urbanism (UN-Habitat 2016, 2022; OECD 2019). Digital town halls and co-design workshops could enhance transparency ($\beta = 0.15$), addressing distrust in centralized systems (Alshehry and Belloumi 2020; Ewis 2025). Culturally adaptive strategies, such as integrating zakat into community-led green projects, resonate with contextualized ESG frameworks (Busch et al. 2022; Ewis 2025). For instance, LVC in Riyadh's metro expansion could fund affordable housing, replicating Seoul's success while honoring local sociocultural norms (KAPSARC 2023; SAGIA 2023).

LIMITATIONS AND FUTURE RESEARCH

Limitations

First, reliance on self-reported expert data may introduce social desirability bias, potentially inflating the alignment with Vision 2030's objectives; however, a robust Cronbach's α score (0.82) ensures internal consistency. Second, regional imbalances, such as 46.4% of respondents being from the Eastern Province, skew insights toward urban-industrial challenges, sidelining rural municipalities such as Najran; this gap was observed in broader fiscal research. Third, the cross-sectional design prevents definitive conclusions about whether decentralization directly drives sustainability or merely correlates with it. Additionally, using "sustainability integration" as a proxy for tangible outcomes (e.g., emission reductions) risks conflating intent with impact, as such metrics may not fully capture real-world results. Finally, excluding citizens' perspectives, despite themes such as community engagement in the qualitative responses, narrowed the understanding of grassroots barriers and highlighted the need for participatory approaches to complement expert-driven analyses.

Future Research Directions

Future research should prioritize longitudinal analyses to assess the long-term efficacy of reforms such as fiscal decentralization and use established decentralization principles to track causal links between autonomy and environmental outcomes in cities such as Riyadh. Regional equity studies should address disparities by applying targeted frameworks to underserved areas, such as Jazan. Pilots of Sharia-compliant green bonds and blockchain tax systems should test innovative financing in tech-forward hubs. Comparative GCC analyses can identify scalable strategies from regional models, such as Dubai's PPPs or Kuwait's welfare systems, to address institutional gaps. Community-driven research should integrate citizen surveys to evaluate participatory budgeting inspired by successful LVC initiatives and explore cultural adaptations such as zakat-backed solar projects. Finally, policy

impact metrics can track green-bond proceeds against renewable energy targets, ensuring that Vision 2030's fiscal reforms translate into measurable, equitable progress.

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Appendix A. Variables from the questionnaire survey with citations

Section	Variable/Question	Citation
1. Municipal Finance Challenges		
	1. Financial constraints in implementing sustainable projects	Alshuwaikhat et al. (2017), World Bank (2020a), and MOMRAH (2023b)
	2. Lack of sufficient revenue streams	World Bank (2020a), Alqahtani and Sloan (2021), and OECD (2021)
	3. Dependence on government funding	Luciani (1987), Alhowaish (2014), and Hertog (2022)
	4. Ineffective local revenue mechanisms	Smolka (2013), Lincoln Institute of Land Policy (2020), and OECD (2021)
	5. Budget allocation not prioritizing sustainability	Saudi Vision 2030 (2016, 2021) and Al-Hathloul and Mughal (2020)
	6. Limited access to international funding	Climate Bonds Initiative (2020), Islamic Development Bank (2021), and Alhowaish (2025)

	7. Underutilized PPPs	Yescombe (2007), Asian Development Bank (2018), and Alotaibi and Rahman (2019)
2. Opportunities		
	1. Fiscal decentralization	OECD (2020), Alqahtani and Sloan (2021), and Hertog (2022)
	2. Municipal-level taxation	Smolka (2013), Lincoln Institute of Land Policy (2020), and Alqahtani and Sloan (2021)
	3. PPPs for sustainability finance	Asian Development Bank (2018), Alotaibi and Rahman (2019), and C40 Cities Finance Facility (2019)
	4. Digital finance technologies	World Bank (2020a), DinarStandard (2023), and OECD (2023)
	5. Green bonds and carbon credits	OECD (2019), DinarStandard (2023), and Alhawaish (2025)
	6. Vision 2030's policy support	Saudi Vision 2030 (2016, 2021) and KAPSARC (2023)
	7. Private sector role in financing	Jensen and Meckling (1976), Alotaibi and Rahman (2019), and World Bank (2020a)
3. Policy and Governance		
	1. Legal framework for sustainable finance	Saudi Vision 2030 (2016), OECD (2021), and MOMRAH (2023b)
	2. Transparency in financial management	Grindle (1997), Bovaird and Löffler (2012), and OECD (2020)
	3. Integration of sustainability in planning	Kemp et al. (2005), Alraouf (2021b), and UN-Habitat (2022)
	4. Government incentives for investments	Alshehry and Belloumi (2020), OECD (2021), and SAGIA (2023)
	5. Municipal financial autonomy	Blöchliger and King (2006), OECD (2020), and Hertog (2022)
4. Open-Ended Questions		
	1. Main financial challenges	Alshuwaikhat et al. (2017), World Bank (2020a), and Hertog (2022)
	2. Strategies for improvement	C40 Cities (2021), OECD (2023), and Alhawaish (2025)
	3. Successful financing models	C40 Cities Climate Leadership Group (2018), NEOM Authority (2022b), and Dubai Electricity and Water Authority (2023)