

Midocean University

Faculty of Administration

Department / Major: Business of Administration



Research Title: Smart Cities, Strategic Innovation, and Sustainability in Saudi Arabia: Evaluating NEOM and Other Key Projects Under Vision 2030

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Academic Year: 2025

Introduction:

In recent years, the Kingdom of Saudi Arabia has embarked on an ambitious journey to redefine its economic and urban landscape, primarily through the implementation of Vision 2030. This strategic framework aims to diversify the nation's economy, reduce its dependence on oil, and foster sustainable development across various sectors. Central to this vision is the development of smart cities, with NEOM standing as a flagship project that epitomizes the integration of advanced technologies, sustainable practices, and innovative urban planning (SpringerLink, 2021; Yusuf & Abdulmohsen, 2023).

Smart cities are urban areas that leverage information and communication technologies (ICT) to enhance the quality and performance of urban services, thereby improving the well-being of citizens while ensuring environmental sustainability. Globally, the smart city concept has gained traction as a viable solution to the challenges posed by rapid urbanization, resource depletion, and climate change (Alenezi & Alanazi, 2023). In the context of Saudi Arabia, the adoption of smart city initiatives aligns with the nation's goals to create resilient, efficient, and livable urban environments.

NEOM, announced in 2017, is envisioned as a \$500 billion mega-city that will serve as a hub for innovation, sustainability, and economic diversification. The project aims to incorporate cutting-edge technologies such as artificial intelligence, renewable energy, and autonomous transportation systems to create a model city that sets new standards for urban living (Yusuf & Abdulmohsen, 2023; SpringerLink, 2021). Other significant projects under Vision 2030, including The Line, Qiddiya, and the Red Sea Project, further exemplify the Kingdom's commitment to transforming its urban spaces into smart, sustainable, and economically vibrant communities (Tariq & Asad, 2024).

Despite the ambitious nature of these projects, there is a paucity of empirical research evaluating their effectiveness in achieving the intended goals of sustainability, innovation, and economic diversification. Moreover, the perceptions and readiness of the local population to adapt to these technologically advanced environments remain underexplored. This research seeks to fill these gaps by conducting a comprehensive evaluation of NEOM and other key smart city projects,

focusing on their strategic innovations, sustainability measures, and alignment with the broader objectives of Vision 2030.

By employing a mixed-methods approach that includes surveys and comparative analyses, this study aims to provide actionable insights for policymakers, stakeholders, and the academic community. The findings are expected to contribute to the discourse on smart city development and offer guidance for the successful implementation of such initiatives in Saudi Arabia and beyond.

Research Problem:

The Kingdom of Saudi Arabia is undertaking transformative urban development initiatives under Vision 2030, with projects like NEOM, The Line, Qiddiya, and the Red Sea Project aiming to establish smart, sustainable cities. These endeavors are designed to diversify the economy, reduce dependence on oil, and position Saudi Arabia as a leader in innovation and sustainability. However, despite the ambitious nature of these projects, there is a notable gap in empirical research assessing their practical implementation, effectiveness, and alignment with the broader objectives of Vision 2030 (Alqahtany, 2025). Specifically, challenges such as technological integration, environmental sustainability, legal frameworks, and societal readiness have been identified as potential obstacles to the successful realization of these smart city initiatives.

For instance, studies have highlighted that NEOM may face legal and contractual challenges due to the involvement of foreign investors unfamiliar with Saudi law, as well as issues related to advanced technology adoption and a shortage of skilled manpower. Additionally, concerns about the feasibility and desirability of living in such highly structured environments have been raised, emphasizing the need for a deeper understanding of resident perceptions and societal adaptability. This research aims to address these gaps by conducting a comprehensive evaluation of NEOM and other key smart city projects in Saudi Arabia. By employing a survey-based methodology, the study will gather insights from residents, stakeholders, and experts to assess the strategic innovations, sustainability measures, and societal impacts of these initiatives. The findings are expected to contribute valuable knowledge to the academic community and provide actionable recommendations for policymakers and planners to enhance the effectiveness and inclusivity of smart city developments in the Kingdom.

The Importance of the Research:

Scientific Importance:

The scientific importance of this research lies in its contribution to the academic discourse on smart cities, sustainable development, and strategic innovation in emerging economies, specifically within the context of Saudi Arabia. While there is a growing body of international literature on smart urbanism, there remains a notable gap regarding comprehensive, empirical studies that evaluate mega-projects like NEOM and their alignment with national transformation strategies such as Vision 2030.

This study aims to bridge this gap by providing a comparative analysis of NEOM and other Saudi smart city projects, thereby contributing original data and insights to the field. Through survey-based primary research, it will explore not only the infrastructure and policy aspects but also the socio-cultural readiness and perceptions of the population-elements often underrepresented in the existing literature.

Practical Importance:

On a practical level, this study has the potential to inform policy-making and strategic planning in Saudi Arabia and other Gulf Cooperation Council (GCC) countries. By analyzing how Vision 2030 projects like NEOM and The Line are perceived and implemented, the research can support decision-makers in improving stakeholder engagement, technological integration, and the sustainability of urban planning strategies.

The study also addresses a key problem faced by the intended population: the gap between ambitious urban visions and the daily realities, expectations, and concerns of citizens and residents. Findings from the survey can help refine communication strategies, adjust urban designs, and identify training or policy gaps that need to be addressed for successful adoption.

The Objectives of the Research:

1. To analyze and compare NEOM and other major smart city projects in Saudi Arabia in terms of innovation, sustainability, and strategic alignment with Vision 2030.
2. To assess the perceptions and readiness of Saudi citizens and stakeholders regarding the transition to smart urban environments.
3. To identify challenges and opportunities in the implementation of smart city initiatives in the Kingdom.
4. To provide evidence-based policy recommendations that enhance the effectiveness of current and future smart city strategies.
5. To contribute new, context-specific knowledge to the global academic community on smart cities in developing or transitional economies.

The Questions of the Research:

1. How do the strategic innovations implemented in NEOM and other key smart city projects in Saudi Arabia contribute to the achievement of the sustainability goals set out in Vision 2030?
2. What is the level of societal readiness and public perception regarding the adoption of smart city concepts like NEOM and The Line in Saudi Arabia?
3. To what extent do NEOM and other smart city projects under Vision 2030 align with the economic diversification objectives of the Kingdom, and how are these projects perceived by local stakeholders?
4. What are the key challenges faced by smart city projects such as NEOM in terms of technological integration, environmental sustainability, and legal frameworks, and how can these challenges be overcome?
5. How do innovation and sustainability in smart city projects impact public acceptance, adaptability, and engagement, particularly in the context of Vision 2030's broader objectives for Saudi Arabia?

The Hypotheses of the Research:

Main Hypothesis:

There is a statistically significant relationship between the level of strategic innovation implemented in Saudi Arabia's smart city projects and the perceived sustainability and effectiveness of these projects by local stakeholders.

Sub-Hypotheses:

NEOM is perceived as more strategically innovative than other smart city projects under Vision 2030.

Higher perceived innovation in smart cities correlates with greater public acceptance and adaptability.

There is a significant difference in stakeholder satisfaction between NEOM and other smart city initiatives (e.g., The Line, Qiddiya, Red Sea Project).

The perceived environmental sustainability of smart cities positively influences citizens' support and engagement.

Awareness of Vision 2030 objectives moderate the relationship between project innovation and public support for smart city developments.

Literature Review:

The rapid development of smart cities has emerged as a pivotal aspect of urban planning and sustainable development worldwide. Saudi Arabia, through its Vision 2030, has committed to transforming its urban landscape by integrating cutting-edge technologies and sustainable practices into key projects such as NEOM, The Line, and Qiddiya. These initiatives are designed to not only foster economic diversification but also address the challenges of rapid urbanization and environmental sustainability. Despite the ambitious scope of these projects, there is a significant gap in empirical research evaluating their effectiveness in achieving the intended goals.

This literature review aims to examine existing studies that explore smart city developments, strategic innovation, and sustainability in the context of Saudi Arabia. By analyzing the key findings, methodologies, and recommendations of various studies, this review will help establish a foundation for understanding the challenges and opportunities that Saudi Arabia faces in realizing the vision of creating smart, sustainable cities. The following studies provide valuable insights into the technological, economic, and societal aspects of these developments, offering a deeper understanding of their potential impact and the strategic innovations required for their success.

1. Title of Study: Implementing smart sustainable cities in Saudi Arabia.

Author(s): Alenezi, M., & Alanazi, F. K.

Year of Publication: 2023

This study explores the implementation of sustainable smart cities within Saudi Arabia, focusing on the integration of renewable energy and advanced technologies in urban planning. The authors used a combination of qualitative and quantitative analyses to assess how effectively these smart cities can meet sustainability goals under Saudi Arabia's Vision 2030. The key findings highlighted that while Saudi Arabia is well-positioned to integrate renewable energy into urban spaces, significant challenges remain, particularly in terms of the high costs of infrastructure and public readiness for these changes. To overcome these hurdles, the study recommends that policymakers increase efforts to raise public awareness and improve societal readiness to adopt new technologies. In comparison to other studies, such as Yusuf & Abdulmohsen (2023), which emphasize economic sustainability, this research focuses more on the infrastructural and societal challenges of smart city developments. Both studies stress the importance of preparing the public

for technological changes, though Alenezi & Alanazi (2023) place a stronger focus on technical readiness and infrastructure costs.

2. Title of Study: Saudi Arabia's NEOM project as a testing ground for economically sustainable urbanization

Author(s): Yusuf, N., & Abdulmohsen, D.

Year of Publication: 2023

Yusuf and Abdulmohsen's study focuses on the economic feasibility of the NEOM project, analyzing its potential as a model for sustainable urbanization under Vision 2030. The methodology involved case study analysis and interviews with experts to understand the economic dynamics at play in NEOM. The authors concluded that while NEOM presents a promising model for sustainable urban development, it faces considerable challenges such as financing, technological integration, and gaining social acceptance. They recommend that NEOM focus on building a resilient economic model that balances technological advancements with sustainability goals. Compared to Alenezi & Alanazi's (2023) emphasis on technological integration, this study places greater importance on the economic sustainability of smart city projects. Both studies highlight the need to prepare the public for new technologies, but Yusuf & Abdulmohsen place more emphasis on economic sustainability.

3. Title of Study: Smart cities as a pathway to sustainable urbanism in the Arab world: A case analysis of Saudi cities

Author(s): Alqahtany, A.

Year of Publication: 2025

In this study, Alqahtany investigates how Saudi Arabia's smart city initiatives, particularly NEOM, can contribute to sustainable urbanism in the broader context of the Arab world. The study adopts a comparative case study approach, assessing NEOM alongside other smart city projects in the Kingdom. Alqahtany found that while these projects are critical for advancing sustainability, challenges such as societal readiness and technological adoption are still significant barriers. The research suggests that promoting technological literacy and societal engagement will be essential in overcoming resistance to these developments. Compared to Yusuf & Abdulmohsen (2023), who focused primarily on economic sustainability, Alqahtany's work broadens the scope by

incorporating a regional perspective on the adoption of smart cities in the Arab world. Both studies identify the importance of public readiness but Alqahtany's approach emphasizes regional integration and the socio-cultural dimensions of implementing smart cities.

4. Title of Study: Sustainable transportation and intelligent infrastructure development in Saudi Arabia: A study on the impact of Saudi Vision 2030 and renewable energy integration.

Author(s): Alanazi, F. K., & Alenezi, M.

Year of Publication: 2024

Alanazi and Alenezi's study explores how sustainable transportation and intelligent infrastructure systems can contribute to urban innovation and sustainability under Saudi Arabia's Vision 2030. Using a mixed-methods approach, the authors combined surveys and expert interviews to analyze the impact of renewable energy and intelligent transportation on Saudi cities. The study found that sustainable transportation infrastructure is crucial for achieving the nation's sustainability goals, and renewable energy integration plays a pivotal role in reducing the carbon footprint of urban transportation. The authors recommend increasing investment in these technologies to support smart city infrastructure. Compared to other studies, such as Alenezi & Alanazi (2023), which focus more broadly on smart city sustainability, this research delves deeper into the specific role of transportation and mobility in sustainability. Both studies emphasize sustainability, but Alanazi & Alenezi (2024) focus more on mobility systems and renewable energy.

5. Title of Study: Saudi says The Line will be the world's first "eco-city." Construction and design specialists aren't so sure.

Author: Business Insider.

Year of Publication: 2024

This article which is by Business Insider discusses the potential of The Line, a key component of Saudi Arabia's Vision 2030, to become the world's first eco-city. However, the article features concerns raised by construction and design experts about the feasibility of The Line's proposed technologies and design. Expert opinions reveal significant practical challenges, including the integration of advanced technologies and the economic viability of such a large-scale project. The article recommends conducting further feasibility studies to ensure the ambitious goals of The Line are achievable. Compared to more optimistic academic studies like Yusuf & Abdulmohsen (2023),

which are more optimistic, this article takes a more cautious approach, focusing on the practical challenges and uncertainties surrounding The Line. Both perspectives agree on the importance of innovation, but this article emphasizes the need for more thorough planning and realistic projections to meet the ambitious environmental goals of the project.

6. Title of Study: NEOM smart city: The city of the future

Author: SpringerLink.

Year of Publication: 2021

In this paper, SpringerLink discusses the role of NEOM as a cutting-edge smart city, focusing on its use of artificial intelligence, autonomous systems, and renewable energy to drive urban development. The paper reviews existing literature and compares NEOM with other global smart cities, emphasizing its potential to set new standards for urban living. However, the study highlights that the integration of these technologies may be hindered by local socio-political factors. The authors recommend focusing on inclusive public policy and engaging citizens in the technological transition to ensure societal acceptance of these innovations. Compared to studies like Yusuf & Abdulmohsen (2023), which emphasize the economic model of smart cities, this study concentrates on the technological and societal aspects of NEOM's development. Both studies agree on the importance of preparing society for technological advancements, though SpringerLink (2021) places greater emphasis on technological integration and inclusivity.

7. Title of Study: Leveraging advanced digital technologies for smart city development in Saudi Arabia

Author: Oxford Academic.

Year of Publication: 2024

This study explores how advanced digital technologies, such as AI and IoT, can support the development of smart cities in Saudi Arabia, particularly in achieving sustainability goals. Using a case study analysis approach, the authors examined several smart city projects, focusing on digital infrastructure and renewable energy integration. The study found that digital technologies are central to the success of these cities, providing critical support for sustainability and innovation. The Oxford academic recommend fostering partnerships with international tech firms and further investing in digital infrastructure to ensure the sustainability of smart city initiatives. Compared to

Alanazi & Alenezi (2024), which emphasizes transportation and mobility, this study broadens the scope to include the broader digital infrastructure that underpins smart city development. Both studies highlight the importance of technological integration, though this research places a stronger emphasis on the role of digital technologies in urban planning.

8. Title of Study: Evaluating smart city projects and sustainable urban development in the Middle East: Case studies of Saudi Arabia. *Urban Planning and Development*, 50(2), 100-115.

Author(s): Tariq, M., & Asad, M..

Year of Publication: 2024

Tariq and Asad's study evaluates various smart city projects in the Middle East, with a specific focus on Saudi Arabia's Vision 2030 initiatives. Their analysis used case studies of NEOM, The Line, and the Red Sea Project, examining how these projects integrate sustainable urban development practices. The methodology includes data collection from government reports, expert interviews, and urban development surveys. The key findings suggest that although significant progress has been made in incorporating sustainability into urban planning, these projects face challenges related to environmental, social, and economic factors, including water scarcity, energy consumption, and social equity. The authors recommend enhancing collaboration between governmental bodies, local communities, and international partners to improve the sustainability and inclusivity of these projects. This study is valuable for comparing the local challenges faced by Saudi Arabia with those of other regions, and it highlights the importance of a multi-stakeholder approach to implementing large-scale smart city projects. Compared to other studies like Alenezi & Alanazi (2023), which primarily focus on infrastructure and technological readiness, Tariq and Asad (2024) focus more on the holistic integration of sustainability across multiple facets of urban development.

The Methodology of the Research:

This study adopts a quantitative, descriptive, and analytical research design to evaluate the strategic innovation and sustainability of smart city projects under Saudi Arabia's Vision 2030. The methodology is designed to gather primary data from stakeholders directly involved in or affected by these developments, ensuring a contextual and data-driven understanding of NEOM and other smart cities in the Kingdom.

Research Design:

The research uses a survey-based quantitative approach, which is suitable for measuring public perceptions, attitudes, and awareness of smart city projects. This method allows the researcher to collect data from a large and diverse population in Saudi Arabia and perform statistical analysis to test the hypotheses outlined earlier.

Study Population and Sample:

The Target Population Includes:

1. Saudi citizens residing in or near smart city development zones (e.g., Tabuk for NEOM)
2. Urban planners, engineers, architects, and sustainability professionals
3. Government officials and stakeholders involved in Vision 2030 projects
4. University students in urban planning, environmental studies, and technology fields

A stratified random sampling technique will be used to ensure representation from different regions and roles within the Kingdom. The sample size will be determined using statistical formulas for survey research, aiming for at least 300 valid responses to ensure the reliability and generalizability of findings.

The Data Collection Tool of the Research:

A structured questionnaire survey will be developed and distributed digitally and physically (in universities, municipal offices, and public centers) across key cities in Saudi Arabia, including:

1. Jeddah
2. Riyadh
3. Tabuk
4. Dammam
5. Al-Khobar

Data Analysis Methods:

Collected data will be analyzed using Statistical Package for the Social Sciences (SPSS) and Microsoft Excel. The analysis will include:

- Descriptive statistics (mean, standard deviation, frequency).
- Inferential statistics (T-tests, ANOVA, correlation analysis).
- Hypothesis testing to evaluate the stated research hypotheses.

Ethical Considerations:

The research will strictly adhere to ethical standards. Participants will be informed about:

- The purpose of the research.
- Voluntary participation and the right to withdraw at any time.
- Data confidentiality and anonymity.

Research Limits:

Spatial Limits:

This study is geographically limited to the Kingdom of Saudi Arabia, with a focus on regions directly affected by or involved in smart city projects under Vision 2030. Temporal Limits:

Temporal Limits:

The research is cross-sectional in nature and reflects data collected during the academic year 2024-2025.

Methodological Limits:

This study uses a quantitative survey-based approach and does not include qualitative methods such as interviews or focus groups.

Additional limitations include:

- Potential sampling bias due to digital-only distribution in some regions
- Self-reporting bias among respondent

Topical Focus Limits:

The research is focused on strategic innovation and sustainability in the context of smart cities, not on economic feasibility, foreign investment, or political implications.

The General Perception of the Research Structure:

This research proposal is methodically organized into key chapters and sections that guide the reader through a comprehensive examination of Saudi Arabia's ambitious smart city projects under Vision 2030. The primary sections of this research are structured as follows:

- 1. Introduction.**
- 2. Research Problem.**
- 3. The Importance of the Research.**
- 4. The Objectives of the Research.**
- 5. The Questions of the Research.**
- 6. The Hypotheses of the Research.**
- 7. Literature Review.**
- 8. The Methodology of the Research.**
- 9. The Data Collection Tool of the Research.**
- 10. Research Limits.**
- 11. The General Perception of the Research Structure.**
- 12. Theoretical Explanations of Key Concepts.**
- 13. References.**

Theoretical Explanations of Key Concepts:

In the context of this research, the aim is to provide a comprehensive understanding of the key concepts and theoretical underpinnings that guide the study of smart cities, sustainability, and strategic innovation in Saudi Arabia. These concepts will not only inform the structure of the research but also serve to clarify the critical elements and frameworks that shape the development of smart city projects like NEOM. By offering a detailed explanation of these concepts, we aim to equip the reader with the necessary knowledge to fully grasp the significance of the research and its objectives, particularly as they relate to Vision 2030 and its ambitious urban transformation initiatives.

Through this section, we will cover essential definitions, theories, and variables pertinent to the study, allowing us to explore in-depth the theoretical foundations that underlie the challenges,

opportunities, and outcomes of smart city projects in Saudi Arabia. For instance, if the research revolves around the integration of sustainability into urban design, we will begin by explaining the concept of sustainability, its different types, and the steps needed for effective implementation. By providing a clear framework for understanding these theoretical aspects, we will be able to address the main focus of the research, ensuring the reader has the context necessary to understand the study's findings and conclusions.

1. Smart Cities: -

Smart cities are urban environments that use information and communication technologies (ICT) to improve the quality of life, optimize resource usage, and reduce environmental impact. This involves the integration of sustainable infrastructure, energy-efficient systems, and technologies such as artificial intelligence (AI), the Internet of Things (IoT), and renewable energy solutions. The aim is to create cities that are not only technologically advanced but also socially and environmentally sustainable. In Saudi Arabia, smart cities like NEOM are designed to incorporate cutting-edge technologies for urban living, reducing the carbon footprint and enhancing the quality of life for citizens (Alenezi & Alanazi, 2023; SpringerLink, 2021)

2. Sustainability: -

Sustainability, in the context of urban development, involves creating cities that are environmentally responsible, socially inclusive, and economically viable. A sustainable smart city ensures that its infrastructure supports long-term ecological balance, reduces waste, conserves resources, and provides a high standard of living for all residents. For Saudi Arabia, this involves integrating renewable energy sources such as solar and wind, promoting green transportation systems, and adopting smart waste management solutions. The goal is to achieve a balance between urban growth and the planet's environmental limits (Alqahtany, 2025; Alanazi & Alenezi, 2024).

3. Strategic Innovation: -

Strategic innovation refers to the adoption of new methods, technologies, or business models that result in significant improvements in processes, services, or products. In the context of smart cities, strategic innovation includes the use of advanced technologies like AI, machine learning,

autonomous vehicles, and smart grids to enhance the functionality of urban systems. In Saudi Arabia, projects like NEOM are considered models for strategic innovation, aiming to redefine how cities operate and meet the needs of future generations (Oxford Academic, 2024; SpringerLink, 2021).

4. Vision 2030: -

Vision 2030 is a comprehensive framework for Saudi Arabia's transformation, aiming to diversify its economy, reduce dependence on oil, and promote sustainability and technological innovation. A core component of this vision is the development of smart cities, which will serve as catalysts for economic diversification and social development. Projects like NEOM and The Line are central to this vision, as they incorporate advanced technologies to create urban environments that meet the challenges of the 21st century while aligning with the broader goals of Vision 2030 (Yusuf & Abdulmohsen, 2023).

5. Societal Readiness: -

Societal readiness refers to the level at which the population is prepared to accept and adapt to technological changes and innovations within urban environments. For smart cities to be successful, it is crucial that residents are willing to adopt new technologies and lifestyles. This concept involves assessing public perceptions, knowledge, and willingness to engage with technological innovations. In Saudi Arabia, understanding societal readiness is key to the successful implementation of projects like NEOM, as these will directly affect the quality of life and the degree of citizen participation (Business Insider, 2024; Alenezi & Alanazi, 2023).

6. Challenges of Smart City Projects: -

While smart cities offer numerous benefits, their implementation is fraught with challenges. These challenges include technological integration, regulatory hurdles, financing issues, and societal readiness. In Saudi Arabia, projects like NEOM face specific challenges, including the integration of renewable energy, the need for robust legal frameworks, and public perceptions of these new urban models. This research will explore these barriers and provide insights into how they can be overcome, ensuring that smart city projects achieve their intended goals of innovation and sustainability (Tariq & Asad, 2024; Alqahtany, 2025).

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