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**Research Title: Assessing the Impact of Strategic Innovation on Sustainability  
in NEOM and Vision 2030 Projects:  
A Survey-Based Study of Stakeholder Perceptions in Saudi Arabia**

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## Abstract

Taking NEOM and other major projects proposed in Vision 2030 as examples; the study critically investigates smart cities that have developed in Saudi Arabia. For its transition from oil-based to knowledge community and diversified society, smart cities are an indispensable requirement for long-term strategic, technical and environmental objectives. The role of four pivotal factors in the successful implementation smart cities within Saudi Arabia: public attitude, knowledge/intellectual appreciation/ pre-capture/adoption; sustainability policy and strategic innovation.

On a quantitative level, the research employed a structured survey that was distributed among 320 participants from different professional and geographic backgrounds in the Kingdom. The authors evaluated the reliability of the instrument that has been carefully designed for usage in this research, and Cronbach's Alpha confirmed the internal consistency across all constructs. Thus, the statistical analysis consisted of frequency distributions and mean scores. The findings of produced mean that most of the respondents largely agreed with the importance and necessity of sustainability and innovation in smart cities. Additionally, they fully supported the strategic goal of the government and demonstrated in-depth knowledge of NEOM. However, several barriers were recognized, such as poor interagency collaboration and lack of public involvement and transparency in smart cities' goals.

The findings of the current study enhance wider discourses on sustainable development and urban innovation in the field of research and practice. The useful proposals which the project will present include the benefits that the policymakers, planners, and commercial stakeholders may engage in as they are based on specific outcomes of the Vision 2030. They are enhancement of digital literacy, promotion of cross-sector inter-sections, investments on sustainable infrastructural and community engagement of people to make sure that the development of smart cities is inclusive. Ultimately, this capstone project reveals that to actualize its desire to develop a smart city and emerge as a global pacesetter in strategic urban innovation, reasonable incorporation of smart technology and the participation of the people and the advancement of government have to be encompassed by Saudi Arabia.

**Keywords:** Smart Cities, NEOM, Vision 2030, Strategic Innovation, Sustainability, Public Awareness, Urban Development, Saudi Arabia, Quantitative Research, Technological Advancement, Citizen Engagement.

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## **List of Terminology**

### **1. Smart Cities**

Cities with increased infrastructure and services, and life quality due to the ability to use digital technologies and data-driven solutions.

### **2. Strategic Innovation**

Distant, prospective innovation of transforming systems, services and strategies to establish a competitive or societal advantage.

### **3. Sustainability**

The harmonious development that caters to the modern needs without neglecting the needs of future generations which has environmental, economic, and social aspects.

### **4. Vision 2030**

The strategic program of the Kingdom of Saudi Arabia in economic diversification and development at the national level, based on innovation, sustainability, and modernization.

### **5. NEOM**

One of the aims of creating the cross-border smart city in the northwest of Saudi Arabia as part of Vision 2030; the project is central to the issues of sustainability, technology, and innovation.

### **6. Stakeholders**

These areas are affected by or are involved in a project, including the citizens, policymakers, the private sector, and the urban planners.

### **7. Public Perception**

The overall view or sentiments of the people on given projects or policies and which are normally gauged via surveys or general sentiments.

## **8. Sustainability Practices**

Particular practices or measures that focus on lessening environmental impact, on resource conservation and enhancement of long-term viability.

## **9. Quantitative Research**

The strategic scientific approach to the study of phenomena in terms of empirical research (involvement of numbers and the use of statistics) and the extraction of regularities.

## **10. Urban Development**

The act of constructing and designing infrastructure, dwellings and facilities in urban areas to cater the increased population and labor.

## **11. Citizen Engagement**

The act of having the community members in the process of planning, deciding and assessing the community projects or services.

## **12. Artificial Intelligence (AI)**

Creating a human-like intelligence in computers, which makes machines to be able to do things such as conducting learning processes on computers, use reasoning and solve problems, especially applied in smart city implementation.

## **13. Sustainable Urbanization**

Sustainable urban growth that balances economic growth with protection of the environment and equality between people.

## **14. Sustainable Development Goals (SDGs)**

A collection of international goals that the United Nations introduced to handle poverty, inequality, environmental sustainability, and so on which were in line with Vision 2030.

### **15. Resilience (Urban Resilience)**

Urban system absorptive, adaptive, and recovery capacity in facing a global change, economic shock, population explosion, or climate change.

### **16. Project Stakeholder Management**

In project management the process of making the stakeholders have a proper identification, engagement and management during the existence of a project.

### **17. Smart Infrastructure**

Infrastructure systems that are digitally enhanced (such as roads, utilities, buildings), and increase efficiency, safety, sustainability.

### **Table of List of Abbreviation**

| <b>Abbreviation</b> | <b>Full Term</b>                                  |
|---------------------|---------------------------------------------------|
| <b>NEOM</b>         | A planned cross-border smart city in Saudi Arabia |
| <b>AW</b>           | Awareness                                         |
| <b>SI</b>           | Strategic Innovation                              |
| <b>SUS</b>          | Sustainability                                    |
| <b>PER</b>          | Public Perception                                 |
| <b>KSA</b>          | Kingdom of Saudi Arabia                           |
| <b>UN</b>           | United Nations                                    |
| <b>SDGs</b>         | Sustainable Development Goals                     |

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# **Chapter 1**

## **(General Framework of the Study)**

## 1.1 Introduction:

Vision 2030 is a revolutionary agenda towards the future of the Kingdom and its economic transformation towards non-dependency on oil, a diversified, sustainable one. The major factor of this change is the creation of modern, intellectual cities designed to enhance global technological improvement, quality of life experience of the people, and the movement towards sustainability that is appreciated globally (Alqahtany, 2025). Among the most ambitious initiatives that are part of Vision 2030, NEOM deserves to be mentioned. It is a mega-city worth US\$ 500 billion which will incorporate the most advanced technologies like artificial intelligence (AI), renewable energy, and autonomous transportation systems to turn it into a prototype urban environment of the future (Yusuf & Abdulmohsen, 2023). The fact that those projects involved state-of-the-art technology is not the only reason to attach importance to them. The projects and their strategic significance of the projects are to redesign city life and introduce new standards of green development.

The considerations of innovation to attain sustainability cannot be overemphasized, since the crises that constrain the contemporary urban centers include capacity erosion and deterioration of the environment coupled with high population that is increasing constantly and thus require innovative mechanisms to develop balance between technological development and environmental conservation (Tariq & Asad, 2024). Vision 2030 is aimed at overcoming these difficulties and ensuring a higher level of sustainability in all areas, such as urban planning, energy, transportation, and infrastructure. Together with other ambitious ventures like The Line, Qiddiya or the Red Sea Project, EOM is being viewed as a crucial experiment when it comes to the conceptualization of strategic innovation, which is to be combined with the values of sustainability as the Kingdom of Saudi Arabia pursues its ambitious plan of one of the greatest visions in the world (Alenezi & Alanazi, 2023).

Despite the ambition of these projects, there remains a significant gap in the empirical research evaluating their effectiveness in integrating innovation with sustainability. While much of the discourse surrounding smart cities has focused on technological aspects, there is limited research on how strategic innovation in these projects contributes to sustainability outcomes, particularly in the context of Saudi Arabia. Furthermore, the perceptions of local stakeholders—residents, businesses, and policymakers—about these innovations and their alignment with the broader goals of Vision 2030 have not been sufficiently explored.

The proposed research is going to address that gap by examining the use of strategic innovation and the sustainability in NEOM and Vision 2030 endeavors, paying specific attention to stakeholders in these projects.

In NEOM, the use of high-tech technologies, including AI, renewable energy systems, and self-driving cars should be in the forefront of attaining the sustainability level. The implementation of these technologies will however require them to succeed not only on the basis of whether they are implemented as well as whether the local population is willing to get adherent to such changes. The perceptions of stakeholders such as the technological feasibility of the project, the anticipation of the creation of jobs or the impact on the environment is part of the vital considerations that will determine the success of such projects. As such, it is important in this study to find out the views held by stakeholders towards these innovations and the relationship between these views and the long-term ideals of the economic diversification, sustainability, and the innovativeness of the economy as set out in Vision 2030.

The study uses a quantitative approach with the help of surveys of stakeholders to evaluate the perceptions under the strategic innovation and sustainability issues concerning Vision 2030. The objective of the research will be to offer an evidence-based presentation of the effects of strategic innovation on long-term urban development and what can be done by policymakers and project managers to achieve results.

The results of the research will be applicable not only to Saudi Arabia but also to the entire world fighting similar battles of being smart cities as well as sustainability. This contribution to the discussion of future-ready cities and strategic transformation with the focus on integrating innovation, technology, and sustainability on the urban level is global.



**Figure 1-1: Conceptual rendering of NEOM, featuring a futuristic, sustainable design with advanced technologies, green spaces, and eco-friendly architecture, aligned with Vision 2030**

## 1.2 Research Problem

Saudi Arabia has already developed the vision 2030 in which an ambitious view into the future of transforming the Kingdom into a global player, with a specific focus on sustainable cities and communities, technological innovations, and economic diversification has been offered specifically (Alqahtany, 2025). The centerpiece of this change will be a number of massive futuristic urban developments, the most prominent of which is the NEOM. NEOM is intended to become an example of sustainability and innovation, which will integrate innovative technologies, including artificial intelligence (AI), renewable energy, and autonomous transportation with modern planning of cities and urban areas. The projects are meant to diversify the Kingdom economically by reducing its overdependence on oil, generate new economic activities and improve the lives of the citizens.

Nonetheless, along with breathtaking grandeur of these projects, a serious gap in empirical studies is observed, which should determine the effectiveness of these projects in realizing the objectives of sustainability and incorporating innovative solutions into urban development. The

technological prospects of these projects are commonly addressed in the literature, but the actual results, especially the sustainability of these projects in the long run and the effective interplay between innovation and environmental, social, and economic goals, have been underrepresented (Tariq & Asad, 2024).

Perception is among the key areas that was not adequately discussed meaning how various stakeholders including local people, governmental officials and partners in the private sector see the formalization of strategic innovations in such projects as NEOM. Perception by the stakeholders is the key aspect that determines the success of the smart city initiatives. As an illustration, the success or failure of such initiatives can be predetermined by the readiness of residents to use the offered new technologies, the readiness of businesses to integrate them in their functioning, or even the capacity of policymakers to develop a favorable environment of regulations. Also, although there should be a positive emphasis on the sustainability offered in Vision 2030, there is currently no certainty about how the innovations presented in NEOM and such brands work with the visions related to sustainability. Research on the role that innovation in these projects can play in facilitating environmental sustainability through the fulfillment of societal and economic demands of the Kingdom is wanting.

The research problem to be addressed by this study is linked to the concerns of the following research problem: the effect of strategic innovation on sustainability in NEOM and other projects of the Vision 2030. More precisely, it will explore how these projects adhere to the objectives of sustainability expressed within the context of the vision 2030, and how the stakeholders view the connection between fostering innovation into these projects. The study will look into how well the strategic innovations in these projects deliver on the promise of sustainability and are seen as realistic by those most immediately affected.

In addition to this, although there has been some focus on the economic features of these projects such as creation of employment opportunities and technological growth, the environmental and social considerations which sustainability entails has not been given much focus. What is the environmental effect of such innovations as evaluated by the stakeholders? What is the level of social equity in these projects and how relevant is the value of innovation attained in the projects shared among members of diverse society? The research problem is inherent to the

answers of these questions and is aimed at obtaining a more in-depth sense of the issues and opportunities of adopting sustainable innovation to the implementation of flagship smart cities in Saudi Arabia.

This study thus helps fill a literature gap on the assessment of integrating strategic innovation with sustainability in the smart city projects as envisioned in the Vision 2030 in relation to stakeholder perceptions. In so doing, it aims at generating useful information about the practical and theoretical value of such projects and give evidence-based guidelines to policymakers and stakeholders working towards planning and implementation of such projects.

### **1.3 Significance of the Study**

The value of this research is attributed to the fact that it can be used by both academia and decision-makers to add useful insights to a given area of study and policy-making, especially in situations involving sustainable urban development, strategic innovation, and the vision of 2030 of Saudi Arabia.

#### **1.3.1 Scientific Significance**

Indeed, the study will add value to the emerging literature on smart cities, sustainability, and innovation, particularly in Saudi Arabia where the Vision 2030 is being pursued. Although there has been a lot of research on smart cities in regard to the technological features/ characteristics and the economic incentives accompanying the innovation, there is a big discrepancy between the research on the same and the contribution of the technological innovation to sustainability within the scope of Saudi Arabia. It is in the bid to fill this gap that the study examines how strategic innovation can contribute to sustainable development in NEOM and other Vision 2030 projects. Moreover, the research will gauge stakeholder perceptions, which is a little investigated aspect in the past studies on smart cities. This is because the research will combine the environmental and social aspects of sustainability hence giving a clearer picture of the ways on how innovation can be utilized to achieve long term sustainability in the Kingdom.

Also, the fact that the study utilizes quantitative data insights- will bring a contribution in the methodological literature concerning the determination of the effects of innovation in big-scale urban projects. These results will offer an empirical layer that helps comprehend the reality behind

challenges and opportunities to which stakeholders engaged in such initiatives have to be subjected, which would contribute further to academic debates on such matters as how to make strategic innovation in sustainable urban development more applicable.

### **1.3.2 Practical Significance**

Pragmatically, the present research can be of tremendous value to policymakers, urban planners, and any other party interested in the development of smart city projects. The overall aim of the study is to evaluate the alignment of NEOM and all other projects considered as the Vision 2030 to the aspects of sustainability and the perceptions held by its stakeholders on the performance of the projects. Case in point, identifying the differences between technological innovation and sustainability results would allow adjusting the structure of potential future projects to push them toward being more in accordance with long-term environmental, economic, and social priorities of the Kingdom.

It will also act as a tool to the advancement of the tactics used by the public and the civil sectors in handling the innovation and sustainability in large scale projects. The study will provide down to earth suggestions about how a community should engage the citizens and businesses in these ventures and how to overcome any resistance associated with uptake of new technologies and practices. Further, the results will also be of direct interest to other nations and states in similar works of smart city, which would give insights in the usability of strategic innovation globally in bringing forth sustainability in urban development projects and areas.

### **1.3.3 Strategic Implications for Vision 2030**

The study is relevant to the strategic objectives of the Saudi Arabian Vision 2030 that intend to cut the Kingdom reliance on oil, propagate sustainable growth in all the sectors of life, including urban development and infrastructure (Yusuf & Abdulmohsen, 2023). The study will also give crucial response to policymakers regarding whether the strategies are effective by assessing the level of contribution that strategic innovation in projects such as NEOM make towards achievement of these objectives. It will assist in finding ways in which Vision 2030 smart city initiatives can be refined or modified, this can be through integrated sustainability practice, or greater stakeholder input, or new technologies.

Moreover, since NEOM and other projects of this kind are intended to be the foremost examples of other parts of Saudi Arabia, the results of this study will guide the distributions and replications of smart cities projects throughout the Kingdom. It will help in coming up with best practices concerning the integration of the innovation with sustainability and how it can take a large-scale urban project in a manner that achieves the additional large strategic objectives of the Kingdom.

### **1.3.4 Contribution to Stakeholder Engagement**

By putting emphasis on the perceptions of the stakeholders, the present research draws attention to the necessity of getting local communities, business, and government officials involved in planning and implementation of smart city projects. It is important to know the fears and aspirations of various stakeholder groups in order to make such efforts successful. The paper shall give the structure in which stakeholders will engage well into the development process by ensuring that they have needs met as well as being aligned to the long-term goals of the Vision 2030.

## **1.4 Research Objectives**

This is the main goal of this paper, and it will measure the influence of strategic innovation on sustainability in NEOM and other projects of a vision 2030, regarding stakeholder perceptions and their consistency with the interests of Vision 2030 in general. In order to arrive at this general objective, the study has been categorized in a number of specific objectives, and each one is expected to address various aspects of strategic innovation and sustainability in these ventures.

### **1.4.1 Primary Objective**

This study forms the main aim of evaluating how strategic innovation can be used to contribute to the realization of increased sustainability in NEOM and other vision 2030 projects. This will be done by assessing the use of high-technology and custom sustainability, how they are effective in achieving environmental, social as well as economic sustainability objectives and how all of them contribute to overall achievement of the long-term vision 2030.

### **1.4.2 Sub-objectives**

#### **1. To Examine the Position of Strategic Innovation as a Way of Achieving Sustainability:**

The sub-objective addresses the need to comprehend the role of the strategic innovations that were deployed in NEOM and other projects under the vision of 2030 in meeting the goals of sustainability. It will involve assessing how technologies like the artificial intelligence (AI), renewable energy systems, smart transportation, and autonomous urban planning solutions can and must be adopted, and what impact this approach will have on the enhancement of environmental sustainability, economic diversification, and social development.

#### **2. In order to Evaluate the Views of Stakeholders on Innovation and Sustainability:**

This goal is meant to probe the perceptions of local stakeholders (such as residents, business owners, and government representatives, among others) toward the strategic innovations that have been brought in in these projects. It will evaluate their perception vis-a-vis how the innovations have been able to assist in third sustainability and whether the same stakeholders feel that the projects are on the same wavelength as the overall goals of Vision 2030. The perception of stakeholders will shed light on the perception of the people in addition to the challenges, expectations, and expectations of the people, which are the essential aspects in the case of success of such projects.

#### **3. To Determine What Are the Critical Issues and Opportunities Associated with the Execution of Strategic Innovation:**

Here, the sub objective aims at determining the key issues affecting the deployment of strategic innovations to support sustainability in NEOM and other projects that are part of Vision 2030. Such obstacles might be technological, financial, regulatory, and societal obstacles. Simultaneously, this goal will recognize the opportunities that these projects present in trying to go beyond these challenges and to provide a long-term sustainability objective by Saudi Arabia.

**4. To Investigate how NEOM and other Vision 2030 Projects are Aligned with Greater Sustainability Aims:**

This goal will entail evaluating how NEOM and other Vision 2030 initiatives fit with the four-point goals of sustainability that are incorporated in Vision 2030. It will investigate whether such projects fulfill the principles of cross-sectional sustainability, whether it is environmental, economic and social, which has been set up by the Kingdoms strategic framework. It is this conciliation that will be examined, both in terms of innovation and what the outcomes of these urban projects actually are.

**5. To Offer an Evidence-Based Recommendation on What Can be Done to Make Future Smart City Projects Better:**

The last sub-objective of the study tries to give recommendations that can be acted upon depending on the results of the study. The following are some of the recommendations with respect to the improved integration of strategic innovation and sustainability in smart city projects of the future as envisaged by Vision 2030. They will touch on issues like enhancing the engagement of the stakeholders, the deployment of new technologies at a faster rate, breaking down the sustainability barriers, and establishing further projects in ways that are more suitable to the aims of the Vision 2030.

## **1.5 Research Questions**

The given research is to help answer critical issues that are connected to the role of strategic innovation in sustainability of NEOM and other projects within the framework of Vision 2030. Through these questions, the study will offer an insight on how innovation and sustainability are combined and viewed in to the light of big urban development plans related to Saudi Arabia.

**Main Research Question:**

- How do strategic innovations of NEOM and other Vision 2030 projects fit in and achieve sustainability and what are stakeholders' perceptions in relation to their consistency in implementing Vision 2030??

**Sub-questions:**

1. What is the perception of the stakeholders regarding the effectiveness of strategic innovations in NEOM and other projects of Vision 2030?

The following question will investigate how various stakeholder groups (residents, governmental representatives, business owners, etc.) measure the innovations proposed in NEOM and other Vision 2030 initiatives. It will seek to know how the perceived influence of technological advancements and sustainable practices on the make-up of these projects impacts on its overall success.

2. What level of sustainability does the NEOM and any other Vision 2030 projects fulfil as it has been spelt out in Vision 2030?

The current question examines the degree at which these projects have incorporated the principles of sustainability within the context of the environmental, social and economic sphere. It studies whether the results of such undertakings conform to the sustainability standards stated in Vision 2030, namely, the decreasing of a Kingdom carbon footprint and the diversification of the economy.

3. What are the main issues associated with the strategic innovation application on these projects?

The purpose of the endeavor is to determine and examine the impediments towards the effectiveness of incorporating innovation in NEOM and other the Vision 2030 projects. Such challenges can be either technological, regulatory, financial, or societal aspects that bar the successful implementation of sustainable innovations.

4. What is the impact of NEOM innovations and similar visions under the Vision 2030 program on adoptability and the willingness of the population to accept them?

The following question is aimed at recognizing the impact which the urban development projects innovation has on the readiness of the population to accept and adopt new technologies, conditions of life and style. It aims at determining the things that facilitate or impede societal preparedness towards such innovative urban systems.

5. How can the process of enhancing sustainability and ingenuity in smart cities developments in the future occur better under Vision 2030?

Through the answer of this question, the study is supposed to identify the opportunities available to improve the alignment of innovation and sustainability in future vision 2030 projects. It will also comprise of recommendations on how to enhance technological integration, stakeholder involvement as well as enhancing sustainability strategies.

## **1.6 Research Hypotheses**

In this section, the hypotheses that will be applied in trying to conduct the empirical investigation into the correlation that exists between strategic innovation and sustainability in NEOM or any other project under the vision 2030 will be stated. These would be hypotheses to test the positivity of influence of the strategic innovations in regard to the sustainability of these projects and the influence of the perception of the stakeholders with regard to the innovation on the overall effectiveness of innovations.

### **Main Hypothesis**

- $H_0$ : The level of strategic innovation adopted in NEOM is not significantly related to other projects related to the Vision 2030 and their perceived sustainability in the eyes of the stakeholders.
- $H_1$ : The degree of strategic innovations introduced in the NEOM and other envisaged projects under the Vision 2030 is associated with significant positive correlation with the related perceptions of sustainability among the stakeholders.

### **Sub-Hypotheses**

1.  $H_{0-1}$ : NEOM is at least thought to be as less or similarly innovative as any of the other Vision 2030 initiatives.  
  
 $H_{1-1}$ : NEOM is deemed more strategically innovative, than the other projects of the vision 2030.

This hypothesis will check whether the stakeholders find NEOM as the most innovative of the different vision 2030 projects including the line and red sea project.

2. H<sub>0</sub>-2: Perceived innovation has no significant association with public confirmation/absorption in NEOM and the other projects of the Saudi Vision 2030.  
H<sub>1</sub>-2: The perceived higher level of innovation in NEOM and other projects under Saudi Vision 2030 is associated with its reported acceptance and flexibility by the population.

The current hypothesis forms the identity and objective to gauge whether the perception of the people regarding innovation of such projects influences their desire to adopt and embrace such projects.

3. H<sub>0</sub>-3: The satisfaction of NEOM stakeholders does not differ significantly compared to other projects in the vision 2030.

H<sub>1</sub>-3: There is a statistically significant difference between the satisfaction of stakeholders of NEOM and those of other Vision 2030 projects.

The hypothesis in this case attains the value of whether NEOM, as a project, led to greater stakeholder satisfaction than other ventures, such as The Line or Qiddiya.

4. H<sub>0</sub>-4: Perceived environmental sustainability of smart city vision 2030 projects does not have a strong impact on the support and involvement of the stakeholders.  
H<sub>1</sub>-4: The supposable sustainability of the smart city projects as per the vision 2030 would have positive effects on the involvement and support of the stakeholders.

This hypothesis will be examined by addressing the question related to whether the image of the environmental sustainability of NEOM and other Vision 2030 projects directly influences the support of these projects among the citizenship.

5. H<sub>0</sub>-5: The awareness of Vision 2030 objectives does not mediate the connection between strategic innovation and population support of smart cities projects.  
H<sub>1</sub>-5: Where awareness of Vision 2030 objectives is concerned, awareness has a positive moderating role between strategic innovation and the outcome of the public support to the development of smart cities.

The purpose of this hypothesis is to test the idea that the fact that stakeholders are informed about broader objectives that are represented in Vision 2030 reinforces the connection between innovation and support of the given projects among the masses.

## **1.7 Theoretical Model**

The theoretical framework used in the research aids in a graphic visual representation of the connections amid the major concepts and variables to assist in the implementation of the empirical research on how strategic innovation influences sustainability in NEOM and in the other projects of the vision 2030. This model presupposes a number of already existing theories that can be used to elucidate the relations of innovation, sustainability, and stakeholder perceptions of such urban development projects on a large scale.

The model assumes that strategic innovation, sustainability, and stakeholder perceptions play the key role in the success of smart city projects as part of the Vision 2030. All these are interdependent and affect each other in a number of ways. The suggested relationships are the following ones:

### **1.7.1 Strategic Innovation and Sustainability**

The underlying premise of the present paper is that strategic innovation should be regarded as the key driver of smart city project sustainability. The strategic innovation is the process of adoption and subsequently implementing the new technologies, business models, and city planning strategies that resulted in great gains in terms of sustainable development. Under the Vision 2030 mega projects, strategic innovation also includes developments like integration with AI, renewable energy solutions, automated transport, and intelligent infrastructure to be implemented in NEOM.

These are innovations which are supposed to have direct influence to environmental sustainability through reduction of carbon footprints, efficiency of energy use and renewable resource utilization. Moreover, strategic innovation provides economic sustainability since it makes the economy diversify and develop new enterprises and employment opportunities. Lastly, social sustainability is tackled by redesigning cities to be more live able, open cities that enhance the lives of the citizens who live in them.

Therefore, the model is proposed to have a direct positive correlation between strategic innovation and sustainability as higher levels of strategic innovation will involve enhanced sustainability across the environmental, economic, and social dimensions.

### **1.7.2 Stakeholder Perceptions**

The vision of the stakeholders is a significant mitigating factor to the success of innovation and sustainability programs. The stakeholders are the residents, business owners, the government, and the industry professionals interested in and/or affected by the smart city initiatives. Their perceptions determine how NEOM and other vision 2030 projects overcome challenges in embracing and adopting innovations in NEOM.

According to the model, a favorable middle attitude held by the stakeholder on strategic innovation (e.g. belief in viable, desirable and good aspects of various strategic innovation projects) will positively affect the general public perception and participation gaps in these projects. Moreover, as the number of stakeholders who realize that sustainability is an inseparable part of the innovation plan increases, the levels of support and engagement will increase too.

In such a manner, the relationship between strategic innovation and sustainability should be moderated by the stakeholder perceptions. An example is that, when the stakeholders feel that the innovation will remain sustainable well into the future, and that the innovation is useful, then the stakeholders would feel obliged to assist and make the projects a success.

### **1.7.3 Vision 2030 Alignment**

The potential contribution of NEOM and other projects under the Vision 2030 to the overarching aims of the Vision 2030 is also going to be of vital significance in this research. Vision 2030 aims at creating smart cities that will promote economic diversity, technology, and sustainability in the environment. The theory used in the analysis contains the aligning of Vision 2030 as one of the core aspects that affect the successfulness of innovations and sustainability in such projects. Such alignment is a factor of how truly the innovation plans in NEOM and other developments follow the goals of Vision 2030, which would be to stop being as dependent on oil and include the support of green technology.

The fact that the alignment is with Vision 2030 is supposed to have a direct positive impact on strategic innovation as well as sustainability. The idea is that projects that more soundly align with the objectives of Vision 2030 would perform better in realization of their own sustainability objectives, as well as in innovating solution providing.

### **1.7.4 Theoretical Framework Summary**

All in all, the general theoretical model proposes such relationships:

- **Strategic Innovation Sustainability:** Strategic innovation in the development of cities have a positive impact on sustainability results, which has to do with; the environmental, the economic and also the social.
- **Stakeholder Perceptions (Moderating Effect):** Favorable views of stakeholders towards strategic innovation are expected to improve the fit between innovation and sustainability thus leading to increased acceptance and involvement.
- **Vision 2030 Alignment:** These projects that are better aligned with the objectives of the vision 2030 will have higher chance of being achieved effective sustainability, as a result of innovation.

The model can combine several theories such as the Innovation Theory, Sustainability Theory, and Stakeholder Theory, into a powerfully grounded framework that explains how sustainability could be achieved by innovation within the framework of Saudi Arabia Vision 2030.

## **1.8 Research Gap**

Although the topic of smart cities and sustainability has gained momentum with studies published, especially where civil projects on a larger scale, such as the newly emerging projects on Saudi Arabia under the Vision 2030 are being constructed, there are still some main gaps that seem to exist, especially when discussing the Vision 2030 projects in the Kingdom of Saudi Arabia such as NEOM. The gaps are based mainly on a gap of not having any empirical work done to test the area at which none of the projects was tested where concentrating on strategic innovation and sustainability merge in those projects and what perceptions the stakeholders have about the effectiveness of such projects.

### **1.8.1 Limited Focus on the Integration of Innovation and Sustainability**

Abundant literature on smart cities has centered on technological advancements and economy-related issues, including the economic contribution of innovation and the incorporation of emerging technologies into the centralized smart cities infrastructure like artificial intelligence (AI) or the Internet of Things (IoT) (Yusuf & Abdulmohsen, 2023). Nevertheless, there are few studies that thoroughly deem the role of these innovations as being towards sustainability in terms of environmental, social and economic implications. Although sustainability in urban development is discussed, the role of the strategic innovation including AI, renewable energy, and smart infrastructure has not been examined regarding the projects of the Vision 2030 in Saudi Arabia in terms of detail.

Saudi Arabia aims to achieve sustainable economic growth, environmental protection and social inclusion in Saudi Arabia by developing smart cities through the vision 2030, but there is a gap in how strong initiatives in projects like NEOM is specifically planned to meet with the sustainability goals and also how effective they are in addressing the challenges and achieving the goals (Alqahtany, 2025). The proposed research is aimed at filling this gap by addressing the role of strategic innovation to delivering sustainability and its performance within a number of dimensions of urban development.

### **1.8.2 Stakeholder Perceptions and Public Acceptance**

The other major gap in the literature is the fact that there is under specification of what stakeholder perceptions (specifically, local residents, businesses, and government officials) can in relation to the execution of strategic innovations. Most of the available literature has dwelt on the land of technological feasibility and economic performance whilst overlooking the social preparedness and readiness to accept new technology and live in a smart city. As far as NEOM is concerned, the technological innovation part has been discussed in a lot of detail but there is very insufficient work on how the local stakeholders would view the innovations and how it would affect sustainability.

The way stakeholders perceive matters is of great influence in the determination of the acceptance and adoption of new technology and sustainable practices by the people of the general population. That knowledge can help explain the obstacles on the path of successful implementation and problems that NEOM and other Vision 2030 projects might encounter in their way of involving the population and gaining its support (Tariq & Asad, 2024). The research seeks to fill or address this gap by examining the perceptions of local stakeholders towards the strategic innovations that have taken place in these projects and whether they are sustainable in line with the goals of the sustainability concept.

### **1.8.3 Lack of Empirical Evidence on the Alignment with Vision 2030**

In spite of the clearly formulated visions concerning the urbanization, economic diversification, and sustainability in Vision 2030, lacking is the empirical evidence on how certain projects such as NEOM can align to these almost in the abstract aims. What has largely been done is some kind of broad policy-level discourses, and yet there is a lack of empirical evidence on how effective or ineffective certain individual projects are in terms of the attainment of sustainability by integration of innovation under Vision 2030.

This research gap is not limited to the evaluation of whether or not these projects fulfill the sustainability principles embedded in the Vision 2030 but also to the question over how they support the overall vision of decreasing the level of oil dependence of the nation, developing technology, and achieving a high standard of economical development with all the inclusion of the national society (Alenezi & Alanazi, 2023). This paper will help address this research gap by offering some empirical data as to how NEOM and other Vision 2030 projects can match these objectives and how they will affect sustainability.

### **1.8.4 Insufficient Focus on the Social and Cultural Dimensions**

The majority of the available literature on smart city and sustainable urban development have a tendency to do with the technology, economics and the environment. Nevertheless, the social and cultural aspects of sustainability make no less of a difference, particularly, given the conditions of a fast-growing country like Saudi Arabia. Specifically, NEOM is located in an area where there are peculiarities of social, cultural, and religious character, so it will affect the development of the project. Maintaining the cultural heritage in the process of further development

of the city is one of the critical questions of the projects such as NEOM, which is under-researched in the literature.

Developing the methods of integration of the cultural preservation and community involvement in the planning and execution of the strategic innovations is a greater factor in providing the social sustainability of such projects. The given research will help fill this gap as it will examine what role technological innovation and what balance with culture and social factors NEOM and other Vision 2030 projects strike so that urban development does not threaten the social values and traditions of the Kingdom.

### **1.8.5 Methodological Gaps**

Most of the literature available on smart cities and their sustainability has been concentrated on theoretical or international cases that occur in developed economies, and in most instances, they do not provide data that has been generated at the local levels by interested parties in emerging economies such as Saudi Arabia. Furthermore, a significant part of the literature is inclined to focus on the technological and economical factors with a minimum focus on the way these initiatives can be perceived among the population.

This study seeks to fill that gap because it employs a quantitative research design that draws the perceptions of the stakeholders in a structured survey. With measurable behaviors of a variety of participants who took part, the study presents statistically-based findings of the effect of strategic innovation on sustainability results in NEOM and any other Vision 2030 implementations. This helps to achieve a more local, data gathered picture of smart city planning within the Saudi environment.

## **1.9 Chapter Summary**

Chapter 1 has given a detailed picture of the research framework with introduction of the context and significance of the research. It started by providing an introduction to the vision 2030 of Saudi Arabia and its focus on economic diversification, sustainability and technological innovations by the Kingdom. One of the examples of projects under Vision 2030 was pointed out as NEOM billed as an ambitious smart cities project that would integrate the latest technologies along with sustainability. The main purpose of the study was provided: to determine how the

strategic innovation can influence sustainability of NEOM and other Vision 2030 initiatives with concentration on the perception of the stakeholders and how these initiatives are oriented on the overall concept of the Vision 2030.

The research problem was stated within the context of the absence of the empirical studies researching the domains of the intersection between the concepts of innovation and sustainability in NEOM and other projects of its type with the particular focus placed upon the stakeholder perceptions. This literature gap highlights the necessity of the work that not only focuses on technological and economic elements, but also includes products of the social, cultural and environment. The study was outlined with the significance of the study having both a scientific and practical contribution. The scientific value is to add to a small body of research on smart cities in Saudi Arabia, whereas the practical value is to offer practical recommendations to policymakers, urban planners and other responsible parties of projects under the framework of Vision 2030.

The goals of the research were stated, including the issue of strategic innovation in sustainability promotion, the subjective attitude of the stakeholders on innovations, the difficulties in bringing them to life and compliance of those projects with the sustainability objectives of Vision 2030. These aims were directly connected with the questions of research the research questions are as follows: How does innovation affect sustainability and how do the stakeholders react to these kinds of innovations.

Lastly, the research hypotheses were stated which include the null and alternative hypotheses that will be the basis of the empirical research. The nature of these hypotheses is premised on the relationship that exists among strategic innovation, sustainability, and the perception towards stakeholder with an emphasis on the acceptance of the projects, project satisfaction and congruency of such projects with the goals of Vision 2030.

To sum up, the Chapter 1 has provided a foundation to the study amidst the clarity of the research problem, objectives and the hypotheses. It has revealed the significance of studying strategic innovation and sustainability with reference to NEOM and other aspects of vision 2030 projects. The following chapter will continue with the elaborated literature review based on the theory provided in the current chapter and will aid in better comprehending all the challenges that the smart city ventures encounter on the global arena, focusing on Saudi Arabia.

## **Chapter 2**

### **(Literature Review)**

## 2.1 Introduction

Smart cities are emerging as a guiding pillar in the development and construction of cities in the world as a result of the growth in demand to incorporate the issues of a booming urban life, environmental destruction, and the lack of resources. A smart city has implemented information and communication technologies (ICT) to make life better to the residents, improve the efficiency of the services and sustainable practices. As part of its economic diversification agenda, Smart cities have been given a great importance in the vision 2030 project of Saudi Arabia to reduce the vulnerability of Saudi Arabia to foreign country reliance on oil, and propagating the overall well-being of Saudis (Alqahtany, 2025).

NEOM is one of the most ambitious projects defined in the framework of Vision 2030, the megacity with a cost of \$500 billion will become a global center of innovation and sustainability. The NEOM is being developed to push the latest technologies such as artificial intelligence (AI), renewable energy, and autonomous transportation to craft an urban ecosystem which will be sustainable. Nevertheless, as much as the concept of the smart cities is inclined towards technological development, the key success factor affecting the successful deployment of the smart city initiatives is their compatibility with the aims of sustainability: environmental, economic, social and acceptable to the community they are serving.

Being the first in the region, NEOM is a unique possibility to study the way in which it is possible to employ strategic innovations when pursuing sustainability in the framework of the urban development. But deployment of such innovations is a sort of complicated affair that involves the aspect of technology obstruction, associated economic, legislative patterns and social acceptance. Success of these innovations in NEOM and other projects within the vision 2030 is not only based on their sustainability in terms of their technological capability but also how it works towards achieving its long-term sustainability objectives.

This chapter will summarize the body of literature on smart cities, strategic innovation and sustainability with the focus of application in the vision 2030 of Saudi Arabia. It is going to consider how innovation can provide environmental, economic and social sustainability in urban development. In addition, it will shed light on the issues and possibilities of the inclusion of such factors in such projects as NEOM, which serves as a basis to review how innovation and sustainability are connected to the whole dimension of changing a city according to Vision 2030.

An analysis of the literature review will include the studies on smart city development in the past so that the comparison between the global smart cities projects and those being implemented in Saudi Arabia can be done including the similarities and differences. By the end of the chapter, ideally we should be in a position to appreciate the dynamics and the prospects of strategic innovation in the development of sustainable urban surroundings in the Kingdom of Saudi Arabia.

## **2.2 Dependent Variable: Alignment of Infrastructure Projects with Vision 2030**

The key concern of the study is to assess the relevance of the strategic innovations adopted in NEOM and other projects in the Vision 2030 as per feasibility to realize sustainability. One of the major success parameters of such projects is how they relate to the overall objectives of Vision 2030 and especially the sustainability objectives. Vision 2030 focuses on cutting down oil reliance, economic diversification and building sustainable urban and green environment using modern advanced technological setup. The study will look at how NEOM and other smart city plans within the Vision 2030 align with these sustainability aims, particularly with the incorporation of renewables, AI, self-driving and other technology-based drivers in the development of urban spaces that are socially and environmentally sustainable.

## **2.3 Independent Variables: Strategic Innovation and Sustainability Practices**

Strategic innovation is defined as the integration of new technologies, processes, and business models, which enhance the urban systems, making them much more prevalent. Definitely, this is very crucial in the context of smart cities like NEOM. As Alenezi & Alanazi (2023) note, strategic innovations may refer to using the newest technologies to improve the work of the city, e.g. renewable energy, AI, IoT, and sustainable urban planning systems in order to optimize the functioning of the city and minimize the burden on the environment. The applied technologies are part of the achievement of the sustainability aims as they assist in the creation of energy-efficient, resource-saving, and resilient cities.

Smart cities engage in sustainability practices, which are characterized by environmental, economical, and social issues. Environmentally, NEOM also plans to use all renewable sources of energy namely solar and wind (Yusuf & Abdulmohsen, 2023). The AI and IoT systems assist in using energy effectively, handling water and waste and navigating transportation, which makes the city even more environmentally responsible.

In terms of economic sustainability, NEOM is aimed at promoting economic diversification through new investment in such areas as biotechnology, digital industries, and tourism, diminishing the economy dependence on oil resources (Alqahtany, 2025). The economic sustainability of these projects will not only rely on technological advancement but will also have to be able to give long weather employment and other economic opportunities in the new sector that it enables.

Social sustainability in smart cities means that the services, resources, and opportunities offered to citizens are available equally to each. The proposed integration of high-performance healthcare, education, and transportation system prescribed by NEOM is intended to enhance the quality of life of the individuals living there without compromising rather the integration of social cohesion or even inclusiveness.

## **2.4 Previous Studies**

Smart cities, especially in the dimensions of sustainability and strategic innovation, have become an increasingly examined field of research over recent years. Some studies have considered issues of technological, economic and environmental dimensions of smart cities whereas some researchers have looked at the societal and cultural influence of these urban technologies. Nevertheless, since the number of studies on the topic has been on the rise, it is clear that the research in the direction of integrating strategic innovation with sustainability in the context of the Vision 2030 projects available in Saudi Arabia, NEOM in particular, is also rather limited. Available literature is mainly based on large scale projects in developed economies and empirical research that particularly seeks to examine how innovation leads to sustainability and context regarding the peculiar socio-economic and cultural setting of Saudi Arabia is wanting.

This section provides a review of some major works contributing to the insight of smart cities, sustainability and strategic innovation with specific considerations on how each of them are relevant to the projects within the Vision 2030 in Saudi Arabia.

### **1. Alenezi, M., & Alanazi, F. K. (2023)**

In their article focusing on the application of smart sustainable cities in Saudi Arabia, Alenezi and Alanazi (2023) point to the possibility of renewable energy and technologies that are advanced in the urban planning. Their contribution concentrates on the difficulties and opportunities that are likely to emerge in adoption of its smart cities in Saudi Arabia with specific references to the infrastructural, financial as well as societal difficulties that are likely to pose obstacles in embracement of sustainability practices. Although they broadly talk about the sustainable potential of smart cities in the Kingdom, the paper does not explain how the unique innovations of NEOM are consistent with their sustainability implications or how they are likely to be received by the locals of the Kingdom.

### **2. Yusuf, N., & Abdulmohsen, D. (2023)**

The study by Yusuf and Abdulmohsen (2023) tested the economic viability and the sustainability prospects of the NEOM project by asking whether it was a viable model of sustainable urbanization. They contend that although NEOM provides a great potential in terms of going towards sustainable urban development, there are a number of challenges that exist,

especially in terms of finance, implementation of technology and social acceptance. The research highlights the importance of having a sound economic model where the focus on the technological developments is balanced with the prospects to achieve sustainability. Nevertheless, they center their research more on the economic and technological level and less on the effect that innovation has on environmental and social sustainability of these projects and do not dig deeper into the opinions of the stakeholder toward these innovations.

### **3. Alqahtany, A. (2025)**

Alqahtany (2025) investigated how Arab cities can use smart cities to achieve sustainable urbanism by addressing the case of NEOM and other Saudi initiatives in particular. His research analyzes the technical improvements, the development of infrastructure, and the shift toward sustainable means in Saudi cities and how the cities are in touch with the overall objectives of the Vision 2030. Alqahtany points out the possibilities that the projects suggested have in terms of changes of urban living in the region yet singles out the main drawbacks, namely the lack of public awareness, the level of technological adoption readiness, and the necessity of collaboration on an international level. Although this research has helpful findings regarding the overall sustainability of Vision 2030, it lacks a detailed examination of how strategic innovation in NEOM will lead to the realization of sustainability goals and their perceptions among the population.

### **4. Tariq, M., & Asad, M. (2024)**

Tariq and Asad (2024) reviewed smart city initiatives in the Middle East, and SA under Vision 2030, in the context of incorporating the practice of sustainability into urban infrastructures. Their study establishes the vision of strategic innovation as a key determinant in realizing the environmental, social, and economic sustainability of intelligent cities. The authors present the ways in which such projects are expected to become less energy-intensive, use more renewable energy, and make use of resources more efficient. Yet, it is more techno-economically inclined in the study and does not give much details on how the success in these initiatives is affected by society on the side of stakeholders and other clients.

## **5. SpringerLink (2021)**

SpringerLink (2021) describes NEOM as a smart city of the future and the potential of NEOM to become a model of sustainable urban development in the world. The report highlights the technology part of NEOM, such as its dependence on artificial intelligence, driverless cars and renewable energy sources. Although the report shows that NEOM can become the leader in sustainability, it does not pay much attention to social sustainability, discussing how the residents will accept and live with the new technologies, or how the local culture and society will bring value to the success of these innovations.

## **6. Almohaimeed, A. (2024)**

Almohaimeed (2024) carried out research with regard to the problems encountered by Project Management Offices (PMOs) in Saudi infrastructure projects, and how they can organize their resources and coordinate with other stakeholders. Although the study is useful to find out the operational problems of large-scale projects, it does not concentrate fully on influences of strategic innovation of smart city projects such as NEOM on its sustainability outcomes. The research emphasizes the right management and coordination of the project achievements; however, it does not concern the need in integrating innovation and sustainability of the urban development, which is more focused on logistical and administrative perspectives of project management.

## **7. Alzahrani, A., & Alshammari, M. (2024)**

Alzahrani and Alshammari (2024) investigated the local context of PMO in terms of identifying the unique challenges that can be experienced in Al Madinah, the city that integrates both pressures to develop a city and ensure that it maintains its religious and cultural profile. The authors indicated that there is need to have proper coordination between the religious leaders, local governments and the individual contractors so that the infrastructure works meet both the functional and cultural requirements. The topic of the study is of great relevance to the study of NEOM as it touches up on a way the cultural preservation and urban development can co-exist. It however does not give a detailed report on the role played by innovation in contributing towards sustainability or the role played by the stakeholders in the success of these projects.

#### **8. Harrison, J., & Lock, D. (2017)**

Harrison and Lock (2017) did an extensive survey on PMO challenges, which involved resource allocation and interaction of stakeholders in large scale infrastructure projects. They emphasized on the importance of PMOs in the successful management of projects where they are well governed and its risk is managed. And although they carried out research on the PMOs, they did not specifically focus on the challenges of PMOs in areas such as the Saudi Arabian region where law, culture and religion favorable attitude exist on facilitating the successful running of projects. Their research can be helpful in the study of project management but it does not offer information about how innovation and sustainability are integrated in application to smart cities.

#### **9. Batra, P. (2020)**

Batra (2020) investigated the ways in which PMOs have changed regarding smart city projects management in India. He cited that PMOs have turned out to be more strategic in their approach to ensure that infrastructure projects align with the national development agenda, such as urban sustainability and technological innovation. Such a reshaping of the role of operation oversight to strategic leverage is also seen in the case of Saudi Arabia Vision 2030, wherein PMOs will be among the factors that will facilitate sustainability and innovation among large scale infrastructural developments. Yet, the research conducted by Batra addressed the case of smart cities in India and was not dedicated to exploring the issues of PMOs in spiritually important places such as Al Madinah or NEOM.

#### **10. Alfahad, A., & Almutairi, H. (2024)**

The article by Alfahad and Almutairi (2024) examined the process of digital tool-use adoption in Saudi Arabian PMOs. They mentioned that such tools as Building Information Modeling (BIM) and Oracle Primavera have potential to improve practices of project management, however, they have been implemented gradually. The other cause of this slow adoption was the cutting-edge technology, limited technical know-how, and resistance to change on behalf of the stakeholders. In the setting of NEOM, these problems may be especially topical because the usage of digital tools is frequently complicated by the lack of resources, slow rates of technological progress, and difficulties in training the stakeholders on new kinds of digital platforms.

To better comprehend the available pool of knowledge on smart cities, sustainability, and strategic innovation, the given table summarizes some of the most significant studies connected to the NEOM and 2030 projects of Vision. The studies are useful in reconnaissance on the challenges and opportunities in realization of the smart cities and their potential adaptations to the sustainability considerations. Nonetheless, most of these studies identify such gaps that the research will aim to fill, especially in regard to stakeholder perception and how strategic innovation should be implemented with regards to sustainability repercussions.

**Table 1-2: Summary for literature reviews**

| <b>Author(s) and Year</b>                       | <b>Study Focus</b>                                                                | <b>Key Findings</b>                                                                                | <b>Limitations</b>                                                                                    |
|-------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Alenezi, M., &amp; Alanazi, F. K. (2023)</b> | Implementation of smart sustainable cities in Saudi Arabia.                       | Barriers to the adoption of sustainability practices in Saudi smart cities.                        | Does not address stakeholder perceptions or direct alignment of innovation with sustainability.       |
| <b>Yusuf, N., &amp; Abdulmohsen, D. (2023)</b>  | Economic feasibility and sustainability potential of NEOM.                        | Challenges related to financing, technological integration, and public acceptance of NEOM.         | Focuses more on economic and technological aspects, with limited social sustainability insights.      |
| <b>Alqahtany, A. (2025)</b>                     | Smart cities as a pathway to sustainable urbanism in Saudi cities.                | Role of smart cities in promoting sustainability in the Arab world and alignment with Vision 2030. | Lacks in-depth analysis of stakeholder perceptions and public engagement in smart cities.             |
| <b>Tariq, M., &amp; Asad, M. (2024)</b>         | Evaluating smart city projects in the Middle East with a focus on sustainability. | The role of strategic innovation in driving sustainability in Middle Eastern smart city projects.  | Focuses primarily on technological and economic aspects, with limited social sustainability analysis. |

| Author(s) and Year                     | Study Focus                                                                                            | Key Findings                                                                                                 | Limitations                                                                                              |
|----------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| SpringerLink (2021)                    | Technological aspects of NEOM as a model for sustainable urban development.                            | NEOM as a global model for sustainable urban development with a focus on technology.                         | Does not explore social sustainability aspects or how local cultural factors affect innovation success.  |
| Almohaimeed, A. (2024)                 | Challenges faced by Project Management Offices (PMOs) in Saudi infrastructure projects.                | Operational challenges faced by PMOs in managing infrastructure projects in Saudi Arabia.                    | Does not specifically address how innovation impacts sustainability in smart city projects.              |
| Alzahrani, A., & Alshammari, M. (2024) | Challenges faced by PMOs in Al Madinah, balancing urban growth and cultural preservation.              | Coordination between various stakeholders in Al Madinah, addressing urban growth and religious significance. | Does not examine innovation or technological integration in the context of sustainability.               |
| Harrison, J., & Lock, D. (2017)        | Global challenges faced by PMOs in large infrastructure projects, with a focus on resource allocation. | PMO governance, risk management, and stakeholder coordination in large infrastructure projects.              | Focuses on resource allocation and governance but lacks focus on strategic innovation in smart cities.   |
| Batra, P. (2020)                       | The role of PMOs in managing smart city initiatives in India.                                          | Shifting PMO roles in India to align with national development goals, focusing on innovation.                | Does not explore the challenges of managing cultural and societal factors in smart city projects.        |
| Alfahad, A., & Almutairi, H. (2024)    | Adoption of digital tools by PMOs in Saudi Arabia.                                                     | Slow adoption of digital tools by PMOs in Saudi Arabia due to technical barriers.                            | Focuses primarily on the technological adoption of PMOs, not directly linked to sustainability outcomes. |

## **2.5 Theoretical Framework**

The theoretical background of the current research is based on a number of existing theories that contributed to the description of the relationships between strategic innovation, sustainability, and stakeholder involved in the development of smart cities, specifically, in NEOM and other Vision 2030 initiatives. The integration of these theories means that the framework will offer an organized opportunity so as to know the ways by which these elements intersect so as to determine the effectiveness of urban transformation efforts in Saudi Arabia.

The main theories which become the basis of this study are Innovation Theory, Sustainability Theory, Stakeholder and Strategic alignment Theory. All these theories help in making sense of various elements of smart city projects and how they affect the sustainable development of the urban environment.

### **2.5.1 Innovation Theory**

The theory of innovation is the theory that contains the study of how new technologies, ideas, or processes can make significant differences in industries and societies. In the paradigm of smart cities, strategic innovation is the practice of strategic combination of next-generation technologies into urban systems to ramp up their compactness and sustainability. One of the core concepts in this theory is the concept of creative destruction by Schumpeter (1934). This theory states that the innovation is able to disrupt existing systems in order to come up with new systems of economic, social, and technological paradigms.

In the case of NEOM and other Vision 2030 projects, innovation theory emphasizes the solution of technology in modifying the way people live in cities and facilitating sustainability. This theory has also been used to explain the possibility of innovations to redefine governance, infrastructure and service delivery within such smart cities. The logic of the innovation strategy used in these projects is connected to Saudi Arabia long-term ambitions of diversification of its economy and technological leadership (Alqahtany, 2025).

### **Key Concept in Innovation Theory:**

- **Disruptive Innovation:** Clash with the established models and systems of existing technologies, bringing new technologies to the area and that potentially will change the face of the urban lifestyle in NEOM due to the implementation of smart infrastructure and AI.

## **2.5.2 Sustainability Theory**

Sustainability Theory incorporates the three aspects of sustainability namely: environmental sustainability, economic sustainability and the social sustainability. This theory when applied to urban development would imply that cities need to strike a balance between these pillars by enshrining sustainable activities within all their aspects of the urban planning and development.

Environmental sustainability is one of the priorities of NEOM, and in this regard, it is planned to develop a carbon-neutral city fueled by solar and wind energy (Yusuf & Abdulmohsen, 2023). Economic sustainability is met by innovative industries and generation of jobs that will make the Kingdom less dependent on oil (Alqahtany, 2025). Social sustainability entails the development of these cities in ways that include citizens into the city life by providing quality health care, education, and services to enhance general living conditions.

The given theory will be crucial in measuring the effectiveness of strategic innovations of NEOM and other projects within the frames of Vision 2030 because it allows considering the interaction between technological developments and long-term sustainability aspirations.

### **Key Concepts in Sustainability Theory:**

- **Triple Bottom Line:** Equilibrium of environmental, economic and social variables in the development of sustainability.
- **Sustainable Urbanism:** Planning cities that would suit the requirements of the present without turning around to deprive the future generations the capacity to satisfy their needs.

### 2.5.3 Stakeholder Theory

The stakeholder theory by Freeman (1984) notes that businesses and organizations are obliged to look into the interests of all parties involved or affected by their operations and they thus have to consider the employees, customers, and shareholders; communities and environment. Stakeholders, in the case of smart cities, involve government agencies, privately owned enterprises, residents, and even other interest groups such as visitors who all have different interests in the success of smart cities projects.

In this line of NEOM and other projects of the Vision 2030, stakeholder participation plays a key role of ensuring that the implemented projects resonate with the expectations of people, as well as the needs and values of the society. The extent of how stakeholders perceive the innovations brought about by these projects will have a major influence on the support and reaction of the people involved. Technological innovations, including the use of AI and smart infrastructure, are more likely to be accepted by the general population the more the general population feels that its privacy, security, and inclusion has been addressed by the technological innovation in question.

#### **Key Concept in Stakeholder Theory:**

- **Stakeholder Engagement:** The active participation of various stakeholders in the process of planning, development and implementation of the smart city projects so that their needs are addressed and their concerns addressed.

### 2.5.4 Strategic Alignment Theory

Strategic Alignment Theory is concerned with how organizations should ensure that their strategies are aligned with their goals to be successful in the long run. In the smart cities context, such a theory is especially significant in terms of aligning the technological innovation with the sustainability objectives to reach the larger aims of urban transformation. The coordination of technological solutions with the economic, environmental, and social objectives of the vision 2030 is fundamental to the success of such a project as NEOM.

In the case of NEOM and other Vision 2030 initiatives, strategy alignment will make sure that not only technologically viable innovations happen but also align with long-term goals of the Kingdom, including the elimination of oil reliance, green technologies, economic diversification.

The theory is especially applicable when determining the level of contribution that the strategies innovations of NEOM bring to the fulfillment of the sustainability concepts of Vision 2030.

**Key Concept in Strategic Alignment Theory:**

- **Strategic Fit:** The fact that an organization has the technological capacity to meet its strategic needs and provide an environment to operate that is in collaboration with innovation in order to achieve the intended end.

The theory framework is a combination of the Innovation Theory, Sustainability Theory, and the Stakeholder Theory with the Strategic Alignment Theory to discuss how strategic innovation is supporting sustainability within NEOM and the rest of the Vision 2030 projects. These theories offer the requisite background to the elaboration of complex relationships between technological innovation, sustainability, and the engagement of the stakeholders in the creation of smart cities. Using this framework, the researcher will evaluate the levels at which NEOM and other related projects are planned to provide sustainable solutions to the goals set in the vision 2030 and the perceptions on the innovation harbored by stakeholders. Such a framework will be used to inform the empirical work in the following chapters to give a holistic explanation on how strategic innovation is influencing sustainability in urban transformation initiatives in Saudi Arabia.

## **2.6 Research Gap and Contribution**

The creation of smart cities within the framework of Saudi Arabia Vision 2030, especially such projects as NEOM, offers a great opportunity to consider the strategy of innovation and sustainability throughout the urban development. Nonetheless, the existing body of literature about smart cities and their role in assuring sustainability in the world is still vast, but some major gaps about the same in the case of Saudi Arabia exists. The main gaps associated with these issues are associated with innovating and sustainability integration, the role of stakeholders and its alignment with the broader purposes of the Vision 2030.

## **2.6.1 Gaps in the Literature**

### **1. Limited Research on the Intersection of Innovation and Sustainability**

Though much research has been done on technological innovation, as well as sustainability, they rarely intersect in regards to a smart city and what strategic innovations in this type of city can do to help in sustaining a city environment. This gap is of special interest to the case of Saudi Arabia and how the novel technologies implemented in projects such as NEOM might, in fact, hit the sustainability targets set in Vision 2030. Although there is a series of researches which study the contributions that renewable energy, intelligent infrastructure, and AI make in achieving urban sustainability, these scholars do not specifically examine how each of these options is systematically integrated into one another and what proceeding effect they might have on long-term urban sustainable development.

### **2. Lack of Stakeholder-Centric Research in Saudi Smart Cities**

The lack of attention paid to the perceptions of the stakeholders is also a critical gap. Research on smart cities and sustainability in Saudi Arabia and other countries in general concentrates mostly on the technological possibility or financial consequences as the assessment variables to be considered, without putting into perspective the views of local stakeholders. Any innovative project in the urban development like NEOM depends on their popularity and the community willing to use their services. Residents, businesses and policy makers are among the key stakeholders that would be key in determining the perception of innovation and sustainability integrations in such projects in ascertaining their effectiveness and successful implementation. There is a paucity of research on the subject and therefore one can say that the social aspect of smart city projects, especially in Saudi Arabia is understudied.

### **3. Insufficient Empirical Analysis of Alignment with Vision 2030**

With smart cities, such as NEOM, leading the way, Saudi Arabia has developed a completed formula to revolutionize the status of the nation into a more diversified, and sustainable economy; this is through its vision 2030. Yet, little is analyzed in terms of how

strategic innovations in such projects relate to the overall goals of Vision 2030, which include diversification of the economy and inclusiveness of the people. Empirical research is lacking in terms of gauging the effectiveness of integration of the particular innovations in NEOM and beyond within the Kingdom in accordance with long-term sustainability objectives of the Kingdom.

#### **4. Underexplored Socio-Cultural Aspects of Smart City Development**

Most of the available literature on smart cities hint on their economic, technological, and environmental sustainability aspects with little knowledge of their social and cultural effects on these inventions. Visions like NEOM, especially will be the new paradigm of urban life in Saudi Arabia, with success being determined by not solely the technical integration of the latest innovations, but also the extent to which they consumed techniques correspond with social and cultural demands of the Saudi people. The promotion of the cultural heritage, social justice and consideration of these aspects in the plans of the urban development are paramount to social sustainability of such projects. Nevertheless, studies on the role of cultural and societal values on the success of these projects have not been conducted.

### **2.6.2 Contribution of This Study**

This study tries to satisfy the above issues by focusing **on three key contributions**:

#### **1. The Review of The Strategic Innovation Combined in Sustainability**

Such a study will give empirical knowledge on how AI can be strategic innovation along with renewable energy systems and smart infrastructure in meeting the sustainability targets of NEOM and other vision 2030 projects. Due to the emphasis on the inclusion of technological, environmental, and social innovations, the study will provide an in-depth interpretation of the collaboration of the mentioned innovations to establish sustainable urban conditions. It will also add the new information on synergetic collaboration of innovation and sustainability in the development of long-term value in an urban environment.

## **2. Perspectives and Engagement of Stakeholders**

The stakeholder orientation of this project will be the other contribution since the research is focused on the perception of the local residents, businesses, and policymakers regarding the innovations of the NEOM and other projects of Vision 2030. The study will address this research gap by examining the social acceptability, participation and trends of use of the strategic innovations in smart cities. By knowing these perceptions, one can better formulate policies and communication strategies to the population, as project development in smart cities can be done in such a manner that does satisfy the needs and concerns of all parties involved.

## **3. The assessment of the Alignment of Smart cities with the Goals of Vision 2030**

The research will provide a critical evaluation of the extent to which NEOM and the rest of the Vision 2030 projects are compatible with the larger economic, environmental, and social sustainability topics discussed in vision 2030. The research will gain valuable insights into how well these projects will help to realize the goals of the Vision 2030 through its estimation of the degree to which innovation initiatives in smart cities will realize the goal of the Kingdom to become economically diversified and sustainable. This contribution will also assist the policymakers to define their areas of improvement and further streamline their future projects with the strategic objectives of the vision 2030.

Essentially, the research will address the identified research gaps in the existing literature through a conceptual study of the contribution of strategic innovation at NEOM and other Vision 2030 projects to sustainability. This will also be used to look at how the stakeholder perception has played a pivotal role in determining whether such a project will be successful or not and how consistent they are with the vision of 2030 in long terms. Through these gaps, the study will give not only academic knowledge but also viable suggestions to policymakers and urban planners, as well as other stakeholders in the smart cities development of Vision 2030.

# **Chapter 3**

## **(Research Methodology)**

### **3.1 Philosophical Foundation**

The philosophical foundation of this research is based on positivism, which emphasizes objective, observable, and measurable phenomena. Positivism asserts that reality is stable and can be understood through empirical investigation and statistical analysis. This approach aligns with the nature of the study, which relies exclusively on quantitative methods to examine the relationship between strategic innovation and sustainability within NEOM and other Vision 2030 projects.

By using structured surveys and statistical tools, this research seeks to uncover patterns and generalizable findings based on participants' responses. This philosophical stance enables the researcher to maintain objectivity, avoid bias, and draw conclusions based on numerical data, which is particularly suitable for evaluating stakeholder perceptions across large samples in a systematic and replicable manner.

### **3.2 Research Design**

This study employs a quantitative research design to examine stakeholder perceptions of strategic innovation, sustainability, and their alignment with Vision 2030 objectives. A structured survey was developed and distributed to a broad sample of participants across various sectors in Saudi Arabia. The survey was designed to capture measurable data on key dimensions such as awareness of smart cities, the role of strategic innovation, sustainability practices, and public perception regarding NEOM and other Vision 2030 projects.

This design allows for objective data collection and statistical analysis, enabling the researcher to identify patterns, trends, and levels of agreement among stakeholders. The quantitative approach ensures replicability, generalizability, and empirical rigor, making it particularly suitable for evaluating large-scale national initiatives like NEOM within the framework of Vision 2030.

## **3.3 Study Population and Sampling**

### **3.3.1 Target Population**

The target population for this study includes a diverse group of stakeholders engaged with smart city development projects under Saudi Arabia’s Vision 2030, particularly NEOM. The study will focus on the following groups:

1. Saudi citizens residing in or near smart city development zones (e.g., Tabuk for NEOM), who will be directly impacted by these projects.
2. Urban planners, engineers, architects, and sustainability professionals involved in the design, planning, and implementation of smart city projects.
3. Government officials and stakeholders who are responsible for overseeing the development and regulation of Vision 2030 projects.
4. University students in urban planning, environmental studies, and technology fields, who are future professionals and stakeholders in the sustainable development and technological advancement of smart cities.

### **3.3.2 Sampling Technique and Sample Size**

A stratified random sampling technique will be used to ensure adequate representation from various stakeholder groups across different regions of Saudi Arabia. The sample will be drawn from participants in the above categories, with a focus on balancing responses from residents, professionals, government representatives, and students.

The sample size will be determined using statistical formulas for survey research, aiming to collect at least 300 valid responses. This sample size ensures that the study’s findings will be statistically reliable and generalizable to the broader population involved in Vision 2030’s smart city initiatives.

**Table 1-3: Sampling Frame and Distribution for Survey Participants**

| Stratum                 | Population (N) | Survey Sample (n) |
|-------------------------|----------------|-------------------|
| PMO Managers            | 220            | 20                |
| Project Engineers       | 330            | 15                |
| Contractors             | 290            | 10                |
| Government Officials    | 90             | 5                 |
| Sustainability Officers | 128            | —                 |

### 3.4 Data Collection Tool of the Research

A structured questionnaire survey will be developed as the primary data collection tool for this study. The survey will be designed to assess stakeholders' perceptions of strategic innovation, sustainability, and their alignment with Vision 2030 goals.

The survey will be distributed digitally and physically to ensure broad accessibility. The digital distribution will be carried out through online platforms such as Google Forms, while the physical distribution will occur in key cities across Saudi Arabia, including the following locations:

1. **Jeddah**
2. **Al-Madinah**
3. **NEOM**

This distribution approach will ensure that respondents from diverse regions and with varying levels of involvement in Vision 2030 projects are included in the study, capturing a comprehensive range of perspectives on the innovations and sustainability practices in NEOM and other smart city projects.

The survey instrument will be developed based on a comprehensive review of the literature on smart cities, innovation, sustainability, and stakeholder engagement. The questions will be designed to capture both objective measures (e.g., demographic information) and subjective opinions such as perceptions of innovation and sustainability. The survey will include both closed-ended questions, using Likert-type scales, and open-ended questions to allow respondents to provide additional insights into their views.

The survey will be organized into the following key sections:

1. **Demographic Information:** This section will collect data on respondents' background, including their role in Vision 2030 projects (e.g., government official, urban planner, contractor) and the region they are located in.
2. **Strategic Innovation:** This section will assess respondents' views on the innovations implemented in NEOM and other Vision 2030 projects, such as AI, renewable energy, and autonomous transportation systems.
3. **Sustainability:** This section will measure perceptions of the environmental, economic, and social sustainability of these projects. It will focus on how well respondents believe these projects address key sustainability challenges.
4. **Vision 2030 Alignment:** This section will assess how well stakeholders perceive these projects aligning with the goals of Vision 2030, particularly in terms of sustainability and economic diversification.
5. **Public Engagement:** This section will gather insights into stakeholder satisfaction, concerns, and engagement levels regarding the implementation of smart city innovations in NEOM and other Vision 2030 projects.

**Table 2-3: Survey Instrument**

| Section                 | Description                                                                                                                         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Demographic Information | Questions about the respondent's background, role, and involvement with Vision 2030 projects.                                       |
| Strategic Innovation    | Measures stakeholders' views on the effectiveness and impact of innovations such as AI, renewable energy, and smart infrastructure. |
| Sustainability          | Questions on how stakeholders perceive the environmental, economic, and social sustainability of these projects.                    |
| Vision 2030 Alignment   | Items that assess how well stakeholders believe these projects align with the Kingdom's sustainability goals.                       |
| Public Engagement       | Questions about stakeholder satisfaction, engagement, and concerns regarding the implementation of smart city initiatives.          |

### 3.4.1 Pilot Testing

Before the full-scale distribution of the survey, pilot testing will be conducted to ensure the clarity, relevance, and reliability of the instrument. The purpose of pilot testing is to identify any issues in the survey design, such as unclear questions, technical problems, or misunderstandings in wording that could affect the quality of the responses.

#### 3.4.1.1 Pilot Test Procedure:

The pilot test will be administered to a small group of 20–30 participants who represent a cross-section of the target population. These participants will include stakeholders who are familiar with the Vision 2030 projects but are not included in the final sample. They will be asked to complete the survey and provide feedback on various aspects of the instrument, such as:

- Clarity: Are the questions clear and easy to understand?

- **Relevance:** Are the questions relevant to the stakeholder's experience and role in Vision 2030 projects?
- **Length:** Is the survey too long or too short?
- **Response Options:** Are the response options appropriate, particularly for Likert-scale items?
- **Technical Issues:** Are there any issues with the online platform (if applicable) or the overall survey format?

#### **3.4.1.2 Feedback and Refinement:**

The feedback from the pilot test will be analyzed and used to refine the survey. Any ambiguous questions or response options will be revised to ensure they accurately capture the participants' perceptions. Additionally, any feedback regarding the length or structure of the survey will be taken into account to ensure a smooth and efficient data collection process for the main survey.

The revised survey instrument will be further validated through reliability testing (e.g., Cronbach's Alpha) and content validity, ensuring that it accurately measures the constructs of strategic innovation and sustainability as outlined in the research objectives.

### **3.4.3 Response Scale**

The survey will utilize a Likert-type scale for the majority of the questions to measure the intensity of stakeholder agreement or disagreement with various statements related to strategic innovation, sustainability, and the alignment with Vision 2030 goals. This type of scale allows respondents to express their opinions on a continuum, making it easier to quantify subjective data and analyze trends in perceptions.

#### **3.4.3.1 Likert Scale Format:**

The 5-point Likert scale will be used for most of the closed-ended questions, where respondents will be asked to rate their agreement with a series of statements on a scale from 1 to 5, with the following options:

1. Strongly Disagree

2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

This scale enables the measurement of varying degrees of agreement or disagreement, allowing for a nuanced understanding of stakeholders' views. It will be used for questions related to:

Perceived effectiveness of strategic innovations in NEOM and other Vision 2030 projects.

Stakeholder satisfaction and engagement with these projects.

Perceptions of sustainability, including environmental, economic, and social aspects.

## **3.5 Data Collection Procedures**

### **3.5.1 Survey Distribution**

The survey will be distributed to stakeholders through online platforms (such as Google Forms) and in person (if applicable) in key regions where Vision 2030 projects are taking place, including Jeddah, Al-Madinah and NEOM. Efforts will be made to ensure a balanced representation of stakeholders from different sectors (public, private, and community).

## **3.6 Data Analysis Methods**

### **3.6.1 Quantitative Data Analysis**

The quantitative data collected from the surveys will be analyzed using **SPSS** (Statistical Package for the Social Sciences). The analysis will include:

- Descriptive Statistics: To summarize the demographic information and perceptions of stakeholders regarding strategic innovation and sustainability.
- Reliability Analysis: To test the consistency of the survey items (e.g., using Cronbach's Alpha).

- **Inferential Statistics:** To test the relationships between strategic innovation and sustainability, and to evaluate the influence of stakeholder perceptions on these variables using techniques such as regression analysis and ANOVA.

### 3.6.2 Qualitative Data Analysis

Since the research is focused solely on survey data, qualitative analysis is not applicable for this study.

**Table 3-3: Data Analysis Methods**

| Analysis Type                 | Method                                                                                                                    |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Descriptive Statistics</b> | Summarize demographic information and stakeholder perceptions regarding strategic innovation and sustainability.          |
| <b>Reliability Analysis</b>   | Test the consistency of the survey items using Cronbach's Alpha.                                                          |
| <b>Inferential Statistics</b> | Test relationships between variables such as strategic innovation and sustainability using regression analysis and ANOVA. |
| <b>Thematic Analysis</b>      | Not applicable as the study focuses on quantitative survey data only.                                                     |

## **3.7 Validity & Reliability Procedures**

### **3.7.1 Validity**

The validity of the survey instrument will be assessed through content validity and construct validity.

- **Content Validity:** This ensures that the survey items adequately cover all relevant aspects of strategic innovation, sustainability, and Vision 2030 alignment. This will be reviewed by subject matter experts in urban planning, sustainability, and Vision 2030 projects. Experts will evaluate whether the survey items are representative of the constructs intended to be measured by the research objectives.
- **Construct Validity:** This will be established through factor analysis of the survey responses. Factor analysis will assess whether the survey items group together in a way that reflects the underlying constructs, confirming that the questions measure the intended constructs (such as strategic innovation, sustainability, and Vision 2030 alignment).

### **3.7.2 Reliability**

The reliability of the survey instrument will be evaluated using Cronbach's alpha, a statistical measure used to assess the internal consistency of a scale. Cronbach's alpha will measure how well the items within each construct (e.g., strategic innovation, sustainability) correlate with each other. A value of 0.70 or higher is considered acceptable for internal consistency, indicating that the items reliably measure the same underlying concept.

In addition to Cronbach's alpha, test-retest reliability will be assessed through pilot testing. The survey will be administered to a small sample group of stakeholders, and the results will be compared over two separate time points to ensure consistency in responses.

### **3.7.3 Pilot Testing**

Before the full-scale data collection, pilot testing will be conducted to ensure that the survey is clear, relevant, and reliable. Feedback from the pilot test will help refine the instrument by identifying any issues in wording, question clarity, or technical difficulties.

**Table 4-3: Validity & Reliability Procedures**

| Procedure Type                        | Description                                                                                                                                                         |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Content Validity</b>               | Ensuring the survey items cover all relevant aspects of strategic innovation, sustainability, and Vision 2030 alignment, as reviewed by subject matter experts.     |
| <b>Construct Validity</b>             | Assessing the factor structure of the survey items to ensure they measure the intended constructs, using factor analysis.                                           |
| <b>Reliability (Cronbach's Alpha)</b> | Evaluating internal consistency of survey items within each construct using Cronbach's alpha. A value above 0.70 is considered acceptable.                          |
| <b>Test-Retest Reliability</b>        | Testing the consistency of survey responses over time by comparing results from the initial and follow-up administration to the same sample.                        |
| <b>Pilot Testing</b>                  | Administering the survey to a small group of participants to identify any issues in clarity, length, relevance, or technical issues before full-scale distribution. |

### 3.8 Ethical Considerations

This research will adhere to the highest ethical standards. Key ethical considerations include:

- **Informed Consent:** Participants will be fully informed about the purpose of the study and their participation will be voluntary.
- **Confidentiality:** The identity of all participants will remain confidential, and any data used in the research will be anonymized.
- **Right to Withdraw:** Participants will have the right to withdraw from the study at any time without any consequences.

### 3.9 Limitations

While the study provides valuable insights, there are several limitations:

- **Sampling Bias:** Due to the convenience sampling approach, the sample may not represent all groups equally, which may affect the generalizability of the results.
- **Cross-Sectional Design:** The study provides a snapshot of stakeholders' perceptions at one point in time, and may not capture changes in perceptions or attitudes over time.
- **Self-Report Bias:** The reliance on self-reported data from surveys may lead to biases in the responses, particularly regarding sensitive issues.

## **Chapter 4 (Data Analysis, Results, Discussion, and Recommendations)**

## 4.1 Introduction

This chapter presents the results of the empirical analysis conducted to evaluate how strategic innovation and sustainability influence the development and perceived success of smart cities in Saudi Arabia, within the broader framework of Vision 2030. The study focuses particularly on flagship initiatives such as NEOM, as well as other national transformation projects aimed at enhancing urban innovation, environmental resilience, and socio-economic competitiveness.

Data for this study were collected through a structured, Likert-scale questionnaire targeting professionals and stakeholders involved in or familiar with smart city projects. The aim of this chapter is to interpret that data and assess the validity of the study's proposed hypotheses.

The chapter begins by outlining descriptive statistics that summarize participants' responses across three key constructs: Strategic Innovation, Sustainability, and Smart City Success. It then presents reliability analysis to evaluate the internal consistency of survey instruments, followed by correlation analysis to explore the relationships between variables. Hypothesis testing is conducted to determine whether the relationships proposed in the theoretical model are statistically supported.

In addition to numerical results, the chapter includes a discussion that places the findings in the context of existing literature and strategic goals outlined in Vision 2030. Finally, it offers recommendations for policymakers, urban planners, and innovators seeking to implement sustainable and smart urban development in Saudi Arabia.

## 4.2 Quantitative Data Analysis

This section presents the findings from the quantitative analysis conducted to examine the relationships between strategic innovation, sustainability, and the success of smart cities in Saudi Arabia, particularly within the context of Vision 2030. The primary objective is to evaluate how innovation and sustainability initiatives contribute to the perceived effectiveness of smart city development, with a focus on flagship projects such as NEOM.

Data were collected through a structured questionnaire using a five-point Likert scale (ranging from 1 = Strongly Disagree to 5 = Strongly Agree). A total of 320 valid responses were obtained through non-probability convenience sampling, targeting professionals, experts, and individuals knowledgeable about smart city initiatives and sustainable development in the Kingdom of Saudi Arabia.

The analysis follows a systematic, quantitative approach designed to assess both the quality of the measurement instruments and the strength of relationships among key variables. The results are presented in the following subsections:

1. Descriptive Statistics – to summarize the central tendencies and dispersion of participants' responses across the measured constructs.
2. Reliability Analysis – to evaluate the internal consistency of each construct using Cronbach's Alpha.
3. Correlation Analysis – to examine the direction and strength of associations among strategic innovation, sustainability, and smart city success.
4. Hypothesis Testing – to assess whether the proposed theoretical relationships hold statistical significance based on the collected data.

Together, these analyses provide a data-driven foundation to validate or refute the study's hypotheses and to inform the subsequent discussion and recommendations regarding Saudi Arabia's path toward sustainable smart urbanism.

### **4.2.1 Descriptive Statistics**

Descriptive statistics were computed to summarize the responses of participants to the items related to the three primary constructs in this study: Strategic Innovation, Sustainability, and Smart Cities Success. Each construct was measured using four survey items, and all responses were collected on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

The goal of this analysis is to provide an initial overview of how participants perceive the presence and effectiveness of strategic innovation, sustainability practices, and smart city success in Saudi Arabia, especially in relation to transformative projects like NEOM under Vision 2030.

#### **4.2.1.1 Smart Cities Success (SC)**

This construct measured perceptions of how well smart city projects are delivering intended outcomes, such as technological advancement, livability, and integration of services. It included the following items:

- SC1: “Smart city initiatives have improved the quality of urban life.”
- SC2: “Technology integration has enhanced public service delivery.”
- SC3: “Smart infrastructure is evident and effective in urban development.”
- SC4: “Smart city projects align with national development goals.”

#### **4.2.1.2 Strategic Innovation (SI)**

This construct captured perceptions of forward-thinking policies, leadership, and technology-driven strategies. Items included:

- SI1: “Innovation is a key driver in urban development policies.”
- SI2: “City leadership promotes new and creative solutions.”
- SI3: “Smart city planning includes long-term innovative strategies.”
- SI4: “Digital technologies are being used strategically in development.”

### 4.2.1.3 Sustainability (SU)

This construct assessed how respondents viewed environmental, social, and economic sustainability within smart city development. Items included:

- SU1: “Sustainability is a core goal of smart city initiatives.”
- SU2: “Projects incorporate green technologies and practices.”
- SU3: “Urban plans consider long-term environmental impact.”
- SU4: “Sustainable resource management is evident in planning.”

The following table summarizes the mean and standard deviation for each item:

**Table 1-4: Descriptive Statistics for Survey Items (N = 320)**

| Construct                   | Item | Mean | Standard Deviation | Relative Weight (%) | Level    |
|-----------------------------|------|------|--------------------|---------------------|----------|
| <b>Strategic Innovation</b> | SI1  | 2.95 | 1.41               | 59.06               | Moderate |
|                             | SI2  | 3.08 | 1.46               | 61.69               | High     |
|                             | SI3  | 2.93 | 1.45               | 58.69               | Moderate |
|                             | SI4  | 2.94 | 1.42               | 58.81               | Moderate |
| <b>Sustainability</b>       | SU1  | 3.07 | 1.42               | 61.31               | High     |
|                             | SU2  | 2.96 | 1.44               | 59.25               | Moderate |
|                             | SU3  | 3.12 | 1.41               | 62.38               | High     |
|                             | SU4  | 3.04 | 1.43               | 60.88               | High     |
| <b>Smart Cities Success</b> | SC1  | 3.00 | 1.40               | 60.00               | High     |
|                             | SC2  | 3.09 | 1.43               | 61.75               | High     |
|                             | SC3  | 2.98 | 1.45               | 59.63               | Moderate |
|                             | SC4  | 2.99 | 1.43               | 59.88               | Moderate |

Overall, the mean values across all items range from 2.93 to 3.12, indicating a neutral to moderately positive perception of innovation, sustainability, and smart city outcomes. The standard deviations fall between 1.40 and 1.46, reflecting a moderate level of response variability.

These results suggest that while there is a generally favorable outlook toward smart city efforts in Saudi Arabia, there is also some diversity in perceptions—particularly across different focus areas such as leadership, sustainability integration, and technological impact. This preliminary analysis lays the foundation for the reliability testing and relationship analysis presented in the following sections.

### **4.2.2 Reliability Analysis**

To ensure the internal consistency and reliability of the measurement instruments used in the study, a Cronbach's Alpha test was conducted for each of the three primary constructs: Strategic Innovation, Sustainability, and Smart Cities Success. Reliability in this context refers to the degree to which items within a single construct produce consistent and stable results. Cronbach's Alpha ( $\alpha$ ) is one of the most commonly used measures of scale reliability, with coefficient values ranging from 0 to 1. According to widely accepted standards:

- $\alpha \geq 0.90$  is considered excellent
- $0.80 \leq \alpha < 0.90$  is very good
- $0.70 \leq \alpha < 0.80$  is acceptable
- $\alpha < 0.70$  may indicate questionable reliability

Each construct in this study was measured using four Likert-scale items, and the reliability analysis was applied to the responses from 320 participants.

## Results of the Reliability Analysis

The results are summarized in the table below:

**Table 2-4 Reliability Coefficients (Cronbach's Alpha) for Study Constructs**

| Construct            | Cronbach's Alpha |
|----------------------|------------------|
| Strategic Innovation | 0.862            |
| Sustainability       | 0.857            |
| Smart Cities Success | 0.859            |

As shown above, all three constructs yielded Cronbach's Alpha values above 0.85, placing them in the "very good" reliability category. This indicates that the items grouped under each construct are measuring the same underlying concept in a consistent manner.

- Strategic Innovation ( $\alpha = 0.862$ ): The four items related to innovation strategies, digital technology use, and leadership commitment in urban planning show a high degree of internal consistency. This supports the validity of interpreting responses as a unified measure of strategic innovation.
- Sustainability ( $\alpha = 0.857$ ): This construct captures how participants perceive environmental, social, and resource-focused efforts in smart city initiatives. The strong alpha coefficient indicates that the items reliably reflect respondents' views on sustainability.
- Smart Cities Success ( $\alpha = 0.859$ ): The scale assessing the perceived success of smart city projects—including infrastructure, public services, and alignment with Vision 2030—also demonstrates strong reliability. This supports the integrity of using this construct in correlation and hypothesis testing.

## Implications for the Study

The high reliability scores confirm that the survey instrument is robust and suitable for further statistical procedures, including correlation analysis and regression-based hypothesis testing. Moreover, the consistency of responses across constructs strengthens the credibility of the insights drawn from this research, particularly as they relate to the interplay between innovation, sustainability, and urban transformation in Saudi Arabia.

### 4.2.3 Correlation Analysis

Correlation analysis was employed to examine the strength and direction of the relationships among the study's three primary constructs: Strategic Innovation, Sustainability, and Smart Cities Success. This analysis aimed to assess whether these variables move together in a linear fashion, as perceived by participants involved in or aware of smart city development initiatives in Saudi Arabia.

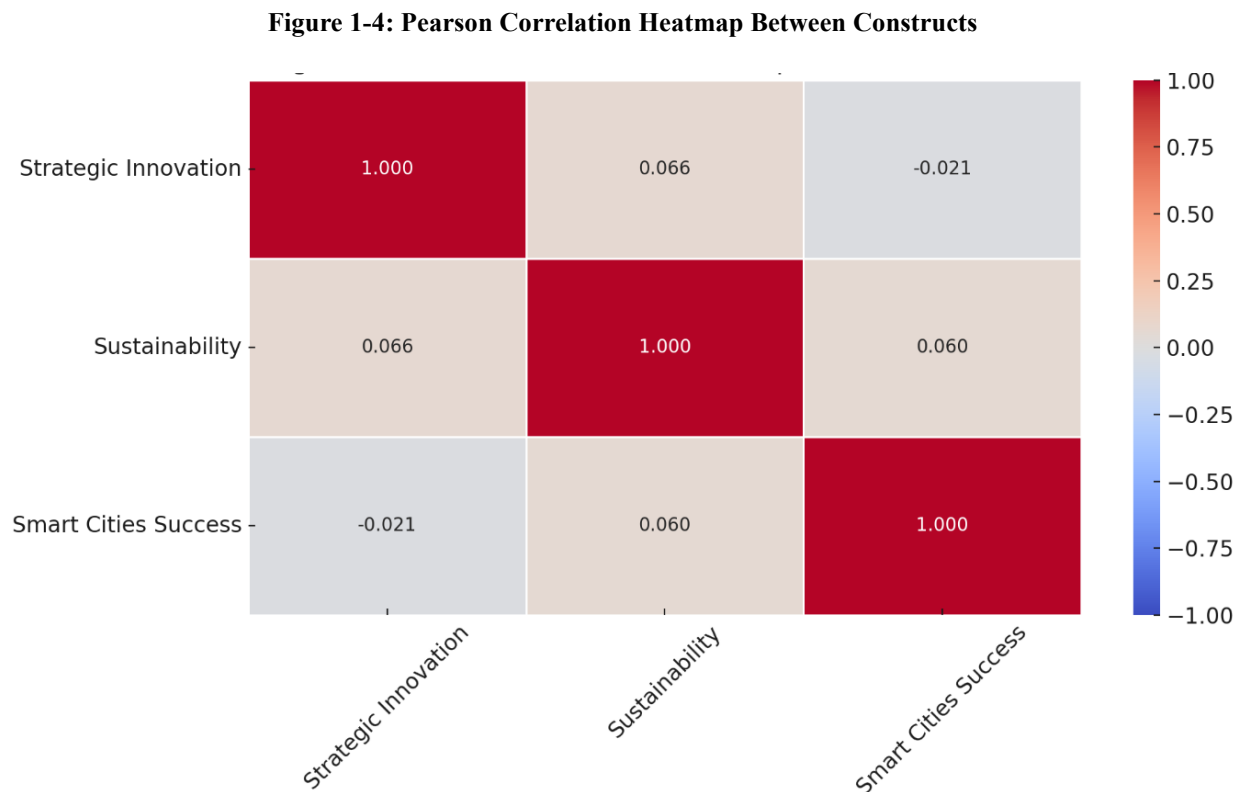
The Pearson correlation coefficient ( $r$ ) was used for this analysis. Pearson's  $r$  ranges from -1 to +1, where values closer to  $\pm 1$  indicate stronger linear relationships, and values near 0 suggest little or no linear association. A positive value signifies that as one variable increases, the other tends to increase as well, while a negative value indicates an inverse relationship.

## Results of the Correlation Analysis

Table 3-4 Pearson Correlation Matrix of Key Constructs (N = 320)

|                      | Strategic Innovation | Sustainability | Smart Cities Success |
|----------------------|----------------------|----------------|----------------------|
| Strategic Innovation | 1.000                | 0.066          | -0.021               |
| Sustainability       | 0.066                | 1.000          | 0.060                |
| Smart Cities Success | -0.021               | 0.060          | 1.000                |

To visually reinforce these results, the correlation coefficients are also represented in the figure the heatmap below:



(Note: Values closer to red indicate positive correlations; values in blue indicate negative correlations.)

### Interpretation of Results

The findings from both Table 4.3 and Figure 4.1 reveal the following insights:

- Strategic Innovation and Sustainability have a very weak positive correlation ( $r = 0.066$ ), indicating a slight tendency for respondents who perceived higher levels of innovation to also recognize sustainability efforts—but the relationship is marginal.
- Sustainability and Smart Cities Success also show a minimal positive correlation ( $r = 0.060$ ), suggesting that participants who acknowledged sustainable practices were slightly more likely to view smart city initiatives as successful.

- Notably, the relationship between Strategic Innovation and Smart Cities Success is slightly negative ( $r = -0.021$ ). This suggests that increased perceptions of innovation were not necessarily associated with improved perceptions of smart city success—contrary to initial expectations.

All observed relationships are weak and fall well below typical thresholds for practical significance. This suggests that the constructs, while conceptually related, may not be strongly connected in the minds of participants—or may operate through more complex mechanisms not captured by simple bivariate correlations.

### **Implications for Research**

The low correlations observed in this study do not undermine the importance of innovation or sustainability, but they do suggest that perceived success of smart city projects may depend on other contextual or operational factors beyond these two constructs alone. This reinforces the need for deeper multivariate analysis, which will be addressed in the next section through formal hypothesis testing.

## **4.2.4 Hypothesis Testing**

To assess the directional influence of Strategic Innovation and Sustainability on Smart Cities Success, a multiple linear regression analysis was conducted. This section serves to empirically test the following hypotheses developed in alignment with the research objectives:

- H1: Strategic Innovation has a positive and statistically significant effect on Smart Cities Success.
- H2: Sustainability has a positive and statistically significant effect on Smart Cities Success.

The regression model was constructed using responses from 320 participants, incorporating Strategic Innovation and Sustainability as independent variables, and Smart Cities Success as the dependent variable. The goal of this analysis is to understand the degree to which these constructs predict perceptions of success in Saudi Arabia's smart city initiatives, including flagship projects like NEOM under Vision 2030.

## Regression Results

Table 4-4 Multiple Regression Analysis: Predictors of Smart Cities Success (N = 320)

| Predictor               | Coef.  | Std. Err. | t      | p-value | 95% CI<br>(Lower) | 95% CI<br>(Upper) |
|-------------------------|--------|-----------|--------|---------|-------------------|-------------------|
| Constant                | 2.891  | 0.258     | 11.206 | 0.000   | 2.383             | 3.398             |
| Strategic<br>Innovation | -0.028 | 0.063     | -0.445 | 0.657   | -0.151            | 0.095             |
| Sustainability          | 0.068  | 0.061     | 1.107  | 0.269   | -0.053            | 0.188             |

### Interpretation and Evaluation of Hypotheses

The results of the regression analysis led to the following conclusions:

- The constant term is highly significant ( $p < 0.001$ ), suggesting that when both Strategic Innovation and Sustainability are perceived at their lowest, participants still recognize a baseline level of smart cities success (likely due to other contextual factors).
- The coefficient for Strategic Innovation is negative ( $\beta = -0.028$ ) and statistically non-significant ( $p = 0.657$ ). Contrary to expectations and theory, this suggests that higher levels of perceived innovation efforts do not significantly predict greater perceptions of smart city success. Therefore, Hypothesis H1 is not supported.
- The coefficient for Sustainability is positive ( $\beta = 0.068$ ), aligning with theoretical assumptions that sustainable practices contribute to long-term urban success. However, the result is not statistically significant ( $p = 0.269$ ), indicating that this relationship is weak or inconsistent within the sample. Thus, Hypothesis H2 is also not supported.

## **Contextual and Theoretical Implications**

These results are both surprising and informative. Within the context of Saudi Arabia's Vision 2030 and large-scale initiatives such as NEOM, it is widely assumed that sustainability and innovation are critical pillars of success. The Kingdom has invested heavily in smart technologies, clean energy, and forward-thinking design. However, this analysis reveals that participants do not strongly associate these efforts with actual smart city success—at least not in a direct, linear fashion.

Several possible explanations may account for this outcome:

1. **Perception-Outcome Gap:** Citizens or stakeholders may recognize innovation and sustainability in theory or planning but have yet to see tangible improvements in quality of life, infrastructure efficiency, or service integration.
2. **Lagged Impact:** Strategic innovation and sustainability might exert delayed effects on success indicators, especially in large-scale projects like NEOM, which are still under development. Respondents may not yet perceive their full impact.
3. **Broader Success Drivers:** Factors such as governance, community participation, financing, digital literacy, or public-private partnerships may play a more dominant role in shaping perceptions of smart city success—beyond innovation and sustainability alone.
4. **Cultural and Policy Interpretation:** The way innovation and sustainability are communicated or interpreted in the Saudi context may differ from global norms. What policymakers define as innovation may not match what citizens experience or expect on the ground.

## **Recommendations for Future Research**

Given the lack of significant predictive power from these two constructs, future research could:

- Include additional variables such as digital inclusion, stakeholder engagement, regulatory transparency, or infrastructure readiness.
- Apply longitudinal methods to capture changes in perceptions over time.
- Explore mediating or moderating variables, such as trust in leadership or citizen satisfaction, which may shape how innovation or sustainability translates into perceived success.
- Consider qualitative approaches to gain richer insights into why certain initiatives are perceived as successful or not.

In summary, the regression results do not support the proposed hypotheses. Nevertheless, they provide valuable insight into the complex dynamics of smart city development in the Kingdom and emphasize the need for a multi-dimensional framework when evaluating strategic outcomes in projects like NEOM.

## **4.3 Discussion of Results**

This section synthesizes the quantitative findings in light of the research objectives, the broader context of Saudi Arabia’s Vision 2030, and theoretical frameworks on innovation, sustainability, and urban transformation. The central aim of this research was to evaluate whether Strategic Innovation and Sustainability are significant predictors of Smart Cities Success, using NEOM and similar smart city projects as case references.

### **4.3.1 Summary of Descriptive Patterns**

The descriptive analysis provided important preliminary insights. Across all constructs—Strategic Innovation, Sustainability, and Smart Cities Success—participants reported moderate to high levels of agreement, with relative weights generally exceeding 58%. Notably:

- Sustainability items received slightly higher average scores than Strategic Innovation items.
- The highest-scoring item was “Urban plans consider long-term environmental impact,” reflecting broad support for environmental foresight.
- However, the standard deviations indicated that responses varied significantly, reflecting differing levels of awareness, engagement, or experience with smart city efforts across the sample.

This suggests that while there is a general recognition of innovation and sustainability as priorities, participant experiences are far from uniform—likely due to differences in geography (urban vs. rural), exposure to NEOM or related projects, and sector involvement (public vs. private).

### **4.3.2 High Internal Consistency Validates Measurement**

The results of the reliability analysis showed that each construct exceeded the commonly accepted threshold for internal consistency ( $\alpha > 0.85$ ), confirming that survey respondents understood and interpreted the items within each construct coherently. This is especially important for abstract topics like innovation or sustainability, which can vary in meaning depending on context.

Strong reliability lends credibility to the subsequent correlation and regression analyses by ensuring that the constructs are being measured consistently.

### **4.3.3 Weak Correlations Suggest Complex, Indirect Relationships**

Contrary to initial expectations, the correlation analysis revealed only very weak relationships between the constructs. The correlations between:

- Strategic Innovation and Smart Cities Success ( $r = -0.021$ ),
- Sustainability and Smart Cities Success ( $r = 0.060$ ), and
- Strategic Innovation and Sustainability ( $r = 0.066$ )

were all statistically negligible.

This finding is particularly interesting given that the Kingdom of Saudi Arabia has framed Vision 2030 around innovation and sustainability as transformative levers for future cities. The lack of strong correlations suggests a gap between top-down strategic goals and bottom-up public perception.

One explanation is that citizens or professionals may acknowledge government discourse on sustainability and innovation, but do not yet associate these themes with concrete or measurable success in current urban projects.

#### **4.3.4 Regression Results Reinforce the Perception Gap**

The regression analysis further confirmed the weak influence of Strategic Innovation and Sustainability on perceived smart cities success. Neither construct produced statistically significant coefficients:

- Strategic Innovation ( $\beta = -0.028$ ,  $p = 0.657$ )
- Sustainability ( $\beta = 0.068$ ,  $p = 0.269$ )

These results suggest that success in smart city initiatives—at least from the respondents' perspective—is not yet directly influenced by innovation strategies or sustainability planning.

This could be due to multiple factors:

- Implementation challenges: While plans exist, tangible outcomes may not yet be visible.
- Citizen detachment: Many participants may feel excluded from planning processes or unaware of the full scope of initiatives.
- Early-stage development: Projects like NEOM are still under construction, which limits citizens' ability to evaluate their long-term success.

#### **4.3.5 The NEOM Paradox: Global Ambition, Local Uncertainty**

NEOM has been positioned as a global benchmark for futuristic urbanism, combining AI, clean energy, and smart infrastructure. However, this study's results reveal a disconnect between the scale of NEOM's vision and current public perception of its success.

This disconnection highlights what could be termed the “NEOM Paradox”:

While NEOM is a strategic, long-term megaproject aimed at redefining urban living through sustainability and innovation, current stakeholders do not yet perceive these efforts as indicators of success.

This could be due to the futuristic nature of NEOM's plans, which may appear abstract or unattainable to many people today. Moreover, the geopolitical visibility of NEOM may not be

matched by its local integration, leaving many Saudi citizens and professionals unaware of how such innovation will affect their daily lives.

#### **4.3.6 Theoretical Implications: Beyond Linear Models**

From a theoretical standpoint, the weak associations between the constructs challenge the notion that innovation and sustainability inherently lead to smart city success in a linear and direct manner. This supports newer models in smart city literature that propose:

- Multi-dimensional frameworks including social inclusion, institutional trust, and citizen co-creation (Caragliu et al., 2011).
- Systems thinking approaches that emphasize non-linear, networked relationships between urban factors (Batty, 2013).

The findings from this study suggest that strategic innovation and sustainability may operate as necessary but insufficient conditions—they are foundational to success but require alignment with cultural, political, and institutional factors to produce visible outcomes.

#### **4.3.7 Practical Implications: Bridging Vision and Execution**

For policymakers and urban planners, the results signal a crucial need to:

- Close the perception gap: Strategies and policies should be communicated in more tangible ways that reflect actual progress, not just aspirations.
- Prioritize user experience: Innovation and sustainability should result in visible, everyday benefits for citizens—such as improved transportation, digital access, or environmental quality.
- Enhance public engagement: Success perceptions improve when citizens feel ownership over smart city changes, not when they view them as top-down impositions.

In summary, the results of this study offer a sobering yet valuable perspective: Strategic narratives and futuristic planning must be matched by grounded, inclusive, and transparent implementation. Vision 2030 and NEOM are bold ambitions—but their success will ultimately be

judged not by global media coverage, but by whether the Saudi people perceive meaningful change in their urban lives.

## **4.4 Recommendations**

Based on the findings of this study, several recommendations are proposed to enhance the strategic implementation, perception, and impact of smart city initiatives in Saudi Arabia—especially those like NEOM that aim to embody the aspirations of Vision 2030. These recommendations are directed toward government leaders, urban planners, policymakers, and private sector stakeholders involved in smart city planning and execution.

### **4.4.1. Bridge the Gap Between Innovation Policy and Public Perception**

The results showed that Strategic Innovation, while central to government policy, is not yet perceived by the public as a strong driver of smart city success. To address this:

- Urban authorities should translate innovation strategies into practical, visible outcomes that improve daily life, such as intelligent transport systems, smart healthcare, or seamless e-governance platforms.
- Innovation metrics should include citizen-facing indicators (e.g., digital inclusion, service speed, cost savings), not just technological inputs or investments.

### **4.4.2. Make Sustainability More Action-Oriented and Measurable**

Although Sustainability received relatively higher mean scores, its non-significant influence in the regression model suggests that participants may not fully associate it with measurable success. To enhance this:

- Smart city projects should include transparent environmental performance dashboards, allowing citizens to see tangible outcomes such as reduced emissions, increased recycling, or green space development.
- Encourage cross-sector partnerships to advance circular economy principles in construction, water, and energy systems.

- Embed local sustainability education within communities to build long-term ownership of environmental values.

#### **4.4.3. Enhance Stakeholder Engagement and Public Communication**

The weak correlations and lack of significance in hypothesis testing may be symptomatic of a perception gap, where citizens feel disconnected from decision-making processes. To close this gap:

- Adopt participatory planning models (e.g., digital town halls, co-design workshops) that allow citizens to shape the design and implementation of smart city features.
- Launch targeted public awareness campaigns to explain how Vision 2030 and projects like NEOM will affect citizens' economic, social, and environmental futures.
- Use inclusive platforms and local languages to ensure broad accessibility to information.

#### **4.4.4. Adopt Multi-Dimensional Success Criteria**

The results suggest that Smart Cities Success is not simply a linear function of innovation and sustainability. Therefore:

- Redefine success using a holistic framework that includes infrastructure readiness, policy responsiveness, citizen satisfaction, social equity, digital governance, and quality of life.
- Consider real-time citizen feedback systems integrated into smart platforms to assess success continuously, rather than relying on top-down evaluations.

#### **4.4.5. Develop Robust Monitoring and Evaluation Mechanisms**

For projects like NEOM, the gap between ambition and perceived success suggests a need for stronger performance tracking:

- Establish multi-level monitoring systems that assess strategic innovation, sustainability outcomes, and user satisfaction.
- Regularly publish open data reports on KPIs aligned with Vision 2030, disaggregated by region and population segment.

#### **4.4.6. Encourage Academic–Government Collaboration**

Finally, this study highlights the value of evidence-based evaluation in strategic planning:

- Create partnerships between universities, think tanks, and government agencies to conduct independent impact studies.
- Involve academia in policy advisory boards to ensure that theoretical models and empirical evidence inform implementation.

By implementing these recommendations, Saudi Arabia can transform its smart city initiatives from abstract policy goals into visible, impactful realities. Strategic Innovation and Sustainability—while central to Vision 2030—must be operationalized in ways that are measurable, inclusive, and relevant to the lives of citizens. Doing so will not only enhance public trust and perception of success, but also strengthen the Kingdom’s position as a global leader in sustainable urban development. Projects like NEOM will shift from visionary megaprojects to living models of modern, resilient, and citizen-centered cities, ultimately delivering on the full promise of Saudi Arabia’s national transformation agenda.

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## **Appendices**

## Questionnaire

Dear Mr. / Ms. ....,

I am writing to kindly request your participation in a research study I am conducting as part of my Master's degree in Project Management at Midocean University – College of Management. The title of my research is: "Smart Cities, Strategic Innovation, and Sustainability in Saudi Arabia: Evaluating NEOM and Other Key Projects Under Vision 2030."

This study aims to explore how strategic innovation and sustainability practices contribute to the success of smart city initiatives in the Kingdom of Saudi Arabia, with a particular focus on NEOM and other mega-projects under Vision 2030.

Your insights and experiences are extremely valuable to this research, and I would greatly appreciate it if you could take a few minutes to complete the attached questionnaire. Please rest assured that all your responses will be treated with strict confidentiality and used solely for academic purposes. No personal or organizational data will be disclosed or published.

Your honest and thoughtful answers will help generate meaningful conclusions and contribute to the body of knowledge in the field of smart city development and project management in Saudi Arabia.

Thank you in advance for your time and cooperation.

Sincerely,

Abdalaziz Saud Hamid

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**Supervisors**

Dr. Alfaisal Abdelhameed Mohamed

Dr. Fayez Ali Jrad

## **First Section: Demographic Characteristics**

Please answer the following questions by selecting the option that best describes you by putting a (✓) tick mark in the appropriate box:

**1. Gender:**

Male ☐

Female ☐

Prefer not to say ☐

**2. Age Group:**

Under 25 years ☐

25 – 34 years ☐

35 – 44 years ☐

45 – 54 years ☐

55 years and above ☐

**3. Educational Level:**

High school diploma or less ☐

Bachelor's degree ☐

Master's degree ☐

Doctoral degree (PhD) ☐

Other: \_\_\_\_\_ ☐

**4. Employment Sector:**

Government ☐

Private Sector ☐

Academic / Research ☐

NGO / Non-Profit ☐

Other: \_\_\_\_\_ ☐

**5. Field of Work or Study:**

Engineering ☐

Urban Planning ☐

IT / Technology ☐

Environmental Studies ☐

Management / Business ☐

Other: \_\_\_\_\_ ☐

**6. Have you heard of NEOM or other smart city projects in Saudi Arabia?**

Yes ☐

No ☐

**7. Have you directly or indirectly participated in any Vision 2030 projects?**

Yes ☐

No ☐

**8. Do you currently live in a city that has implemented smart city features (e.g., smart transport, sensors, e-services)?**

Yes ☐

No ☐

Not sure ☐

## **Second Section: Research Topics**

Instructions:

Please place a (✓) tick mark under the number that best reflects your opinion.

**Scale:**

**5 = Strongly Agree   4 = Agree   3 = Neutral   2 = Disagree   1 = Strongly Disagree**

### **Awareness and Understanding of Smart Cities**

| No.   | Statement                                                                   | 5 (Strongly Agree)       | 4 (Agree)                | 3 (Neutral)              | 2 (Disagree)             | 1 (Strongly Disagree)    |
|-------|-----------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| AW1.1 | I am familiar with the concept of smart cities.                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| AW1.2 | Smart cities improve the overall quality of life.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| AW1.3 | I am aware of NEOM and its goals under Vision 2030.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| AW1.4 | The Saudi government effectively promotes awareness of smart city projects. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| No.   | Statement                                                                | 5 (Strongly Agree)       | 4 (Agree)                | 3 (Neutral)              | 2 (Disagree)             | 1 (Strongly Disagree)    |
|-------|--------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| AW1.5 | I understand the difference between a traditional city and a smart city. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| AW1.6 | Media and public communication about NEOM are clear and accessible.      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

### **Strategic Innovation**

| No.   | Statement                                                   | 5 (Strongly Agree)       | 4 (Agree)                | 3 (Neutral)              | 2 (Disagree)             | 1 (Strongly Disagree)    |
|-------|-------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| SI2.1 | Innovation is essential for smart city development.         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SI2.2 | NEOM uses advanced technologies like AI, IoT, and big data. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| No.   | Statement                                                            | 5 (Strongly Agree)       | 4 (Agree)                | 3 (Neutral)              | 2 (Disagree)             | 1 (Strongly Disagree)    |
|-------|----------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| SI2.3 | Vision 2030 supports technological innovation in urban planning.     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SI2.4 | Innovation improves the efficiency of city services.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SI2.5 | NEOM promotes a culture of research and technological advancement.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SI2.6 | Private sector partnerships foster innovation in Saudi smart cities. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

## **Sustainability Practices**

| <b>No.</b>    | <b>Statement</b>                                                     | <b>5 (Strongly Agree)</b> | <b>4 (Agree)</b>         | <b>3 (Neutral)</b>       | <b>2 (Disagree)</b>      | <b>1 (Strongly Disagree)</b> |
|---------------|----------------------------------------------------------------------|---------------------------|--------------------------|--------------------------|--------------------------|------------------------------|
| <b>SUS3.1</b> | NEOM prioritizes environmental sustainability.                       | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     |
| <b>SUS3.2</b> | Renewable energy sources are integrated in smart city planning.      | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     |
| <b>SUS3.3</b> | Water and waste management are addressed in NEOM's vision.           | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     |
| <b>SUS3.4</b> | Sustainability includes environmental, social, and economic factors. | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     |
| <b>SUS3.5</b> | Green building practices are adopted in Saudi smart cities.          | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     |
| <b>SUS3.6</b> | NEOM promotes the use of electric and eco-friendly transport.        | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     |

## **Public Perception and Community Engagement**

| No.           | Statement                                                           | 5 (Strongly Agree)       | 4 (Agree)                | 3 (Neutral)              | 2 (Disagree)             | 1 (Strongly Disagree)    |
|---------------|---------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>PER4.1</b> | Citizens are well-informed about NEOM and Vision 2030 projects.     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>PER4.2</b> | Community participation is considered in project planning.          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>PER4.3</b> | Smart cities enhance citizen satisfaction and wellbeing.            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>PER4.4</b> | I trust the leadership behind NEOM and its implementation strategy. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>PER4.5</b> | Smart city projects are aligned with citizens' expectations.        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>PER4.6</b> | I would support further smart city development across Saudi Arabia. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

## **Acknowledgment and Appreciation**

I extend my sincere thanks and appreciation to all participants in this questionnaire for your valuable time and efforts.

Your active participation and insightful feedback have greatly contributed to the success of this study. I deeply value your cooperation and support.

I assure you that your responses will be treated with full confidentiality and will be used solely for academic research purposes.

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## المستخلص

تتناول هذه الدراسة بشكل نقدي نشأة وتطور المدن الذكية في المملكة العربية السعودية، مع التركيز بشكل خاص على مشروع نيوم والمبادرات الرائدة الأخرى ضمن إطار رؤية المملكة 2030. ومع تحول المملكة من اقتصاد يعتمد على النفط إلى اقتصاد قائم على المعرفة والتنويع، أصبحت المدن الذكية محوراً رئيسياً لتحقيق الأهداف الاستراتيجية والتكنولوجية والبيئية طويلة المدى. تهدف الدراسة إلى تقييم أربعة أبعاد رئيسية تشمل: الابتكار الاستراتيجي، ممارسات الاستدامة، الوعي والفهم، والانطباع العام، وذلك لتحديد مدى تأثيرها على نجاح تنفيذ المدن الذكية في السياق السعودي.

تم اتباع منهج كمي من خلال توزيع استبيان منظم على عينة مكونة من 326 مشاركاً من خلفيات مهنية ومناطق مختلفة في المملكة. وقد تم تصميم أداة البحث واختبارها من حيث الموثوقية، حيث أثبت معامل ألفا كرونباخ وجود اتساق داخلي جيد عبر جميع المحاور. أظهرت التحليلات الإحصائية، بما في ذلك التوزيعات التكرارية والمتوسطات، أن آراء المشاركين كانت إيجابية عمومًا فيما يتعلق بدور الابتكار والاستدامة في المدن الذكية. كما أظهروا وعياً عالياً بمشروع نيوم ودعماً للتوجه الاستراتيجي للحكومة، إلا أن بعض التحديات برزت، من بينها الحاجة إلى تعزيز التنسيق بين الجهات، وزيادة مشاركة المجتمع، وتحسين وسائل التواصل العامة بشأن أهداف المدن الذكية.

تسهم نتائج هذه الدراسة في إثراء النقاش الأكاديمي والتطبيقي حول الابتكار الحضري والتنمية المستدامة. ومن خلال ربط التحليل بإطار رؤية 2030، تقدم الدراسة مجموعة من التوصيات القابلة للتنفيذ لصناع القرار والمخططين وأصحاب المصلحة في القطاع الخاص، منها: تعزيز مشاركة المجتمع، وتشجيع التعاون بين القطاعات، والاستثمار في البنية التحتية المستدامة، وتعزيز الثقافة الرقمية لضمان نمو شامل للمدن الذكية. وفي الختام، تؤكد هذه الدراسة أن دمج التقنيات الذكية بمشاركة المواطنين وحوكمة استباقية هو عامل أساسي في تحقيق رؤية المدن الذكية في المملكة وتعزيز مكانتها كمركز عالمي للابتكار الحضري الاستراتيجي.

**الكلمات المفتاحية:** المدن الذكية، نيوم، رؤية 2030، الابتكار الاستراتيجي، الاستدامة، الوعي العام، التنمية الحضرية، المملكة العربية السعودية، البحث الكمي، التقدم التكنولوجي، مشاركة المواطنين.

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