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The Role of Government in Driving Sustainability: A Public Policy Perceptive

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Abstract

Sustainability is defined as socio-economic accomplishment without compromising the natural environment. The objective of the research is to assess the role of the government in driving sustainability as explained in the UN Sustainability Development Goals (SDGs). The research used content analysis and survey methods to understand the critical role of the government in achieving sustainable development and the perceptions of Saudi Arabian residents in this regard. The findings of the content analysis showed that the role of government at all levels is important to achieving sustainable development. The survey results also support the findings of the content analysis and show that the government's role in attaining sustainability is significant. All the variables of sustainability about government role proved to be very important. The research provided appropriate policy and practical implementation to facilitate the achievement of sustainability. The policy implications are that the government at all levels needs to ensure appropriate laws, regulations, codes, and the adoption of those rules to drive sustainable development. They also ensure that they have allocated resources to achieve sustainable development. In practical terms, the government should devise strategies for all levels of government to drive sustainable development. It should also set up participatory frameworks to ensure increased public involvement in urban planning and introduce education and public campaigns.

Keywords:

Role;
Government;
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1- Introduction

Sustainability is defined to include socio-economic accomplishment without compromising the natural environment [1, 2]. Sustainability is trying to maintain social equity between generations and propagate the liberty of individuals to meet their needs while being considerate of the needs of others [3]. The three dimensions of sustainability create social justice through economic prosperity, and in the process, they also ensure the protection of natural environments. The three dimensions are interconnected and interrelated, and they have also overlapped [4]. The role of government in sustainability is at the forefront, as it is trying to achieve social justice, economic growth, and environmental protection [5]. Sustainability and sustainable development have been integrated in various sectors since 1987. Sustainability has been one of the main agendas of governments around the globe. The governments, in their effort to achieve sustainability, have implemented measures and action plans. As the government is one of the main actors in materializing sustainability, it has introduced laws and policies on sustainability, funding for sustainable development, infrastructure, corporations, and coordination with various stakeholders.

The literature suggests that government commitment to energy efficiency, sustainable infrastructure, and the economy through laws, regulations, funding, and various corporations is crucial. These initiatives or actions help to reduce environmental degradation, mitigate environmental risk, and achieve sustainability [6–8]. They also suggest that the

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government should strategize, plan, and implement appropriate actions that suit its culture, geographical location, and economic condition. Once they are implemented, they should be audited to see the challenges and weaknesses so that corrective action can be implemented. This audit system could also be used to reward achievement in sustainability, allocate points for possible tax reduction, or create an enforcement mechanism [9–12].

The literature on Saudi Arabia is mainly focused on sustainable tourism, energy subsidiaries, sustainable initiatives by corporations, renewable energy, and knowledge economy initiatives of the government. There is also literature on innovations to reduce CO2 or control energy subsidiaries. However, there is a dearth of literature on the crucial role of government in achieving all sustainability goals. There is also a lack of literature that captures the view of residents regarding the role of government in driving sustainability. As such, the objective of the research is to assess the role of the government in driving sustainability through public policy and public awareness.

The rest of the chapters are divided as follows: Chapter 2 includes the objective of the study. Chapter 3 elaborates on the literature review, and Chapter 4 discusses the methodology used in this research. Chapter 5 presents the results of the content and survey analysis, while chapter 6 discusses the detailed analysis of the research results. Chapter 7 discusses the theoretical and practical implications of the research results. The last chapter concludes the research.

1-1- Objective of the Study

Sustainability is being adopted and implemented by all the countries on a smaller or larger scale, depending on the government's goals and economic conditions. Sustainability is something that has been accepted globally, and inaction could cause serious problems for the environment, economy, and humanity. The Intergovernmental Panel on Climate Change (IPCC) recommends a participatory model of risk management where various actors play crucial but equally important roles. The role of government in ensuring the achievement of sustainability is crucial, like that of any other actor in the continuum. The government plays an important role in providing laws, regulations, funding, standards, corporations, and other related resources. The research on sustainability so far has looked at the sustainable initiatives taken by corporations and government initiatives in certain sectors. Saudi Arabia, as an essential economic player in the world and region, has taken initiatives by adopting Vision 2030 to achieve sustainability and sustainable development. The research aims to analyze the role of government in achieving sustainability and the views of the residents of Saudi Arabia on the role of government in sustainability. Riyadh was chosen as a case study to analyze the views of residents. Riyadh is the capital city with a larger population, and its characteristics are similar to those of the other cities in Saudi Arabia. By applying content analysis and survey methods, the researcher suggested appropriate ways to achieve sustainability as enlisted in Vision 2030. The contribution of this research is significant as there is a limited study on the role of government in driving sustainability, and the current literature on this field is mainly focused on corporations, renewable energy, sustainable housing, and the green economy.

2- Literature Review

There are a multitude of concepts that explain the concept of government in different contexts. Some concepts link the government to public policy, and others link it to governance and the system of government. The role of government in sustainability should be considered instrumental as well as normative, where its role involves interventions with socio-economic and ecological aspects. According to Thiele [13], sustainability has been widely accepted as an important value, like democracy and human rights. Sustainability is a balanced and integrated value where social empowerment and economic and ecological health are taken care of by Sachs [14] and Baeten [15]. The most commonly used definition of sustainability is derived from the Brundtland report, where he stated, "Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [1]. Musgrave [16] explains that the role of government in sustainability is allocative, where resources and services are allocated according to need; the role is also distributive in dealing with equity, social justice, and security. The government plays regulatory and stabilization roles too [17]. Some consider the government a catalyst, and it enables transformation through laws and resource allocation [18, 19].

The government's role differs from sector to sector. In coastal resource management, the government's role is to provide appropriate policies and strategies according to the laws and regulations that allow the working of various parties [20]. The protection of Tampa Bay in the Gulf of Mexico is considered a success due to appropriate development, protection, and restoration plans. This was achieved through the Clean Water Act along with standards, appropriate infrastructure, government funding, and regulation on water infrastructure, along with citizens' actions to improve the condition and further degradation. The success of Tampa Bay showcased that for implementing sustainability initiatives, a proper network, laws, policies, and standards need to work trajectory. In a study conducted in Sweden on public-private partnerships in rural development, it was shown that government involvement in providing regulation, coordination, supervision, and facilitation of the partnership was crucial [21]. In wildlife protection or protection of national parks, the government is found to play regulatory, persuasive, facilitating, and enabling roles [22]. The need for coordination and cooperation of various actors are necessary. While the government plays various roles, its role in encouraging the private

sector to adopt sustainability in business practices is evident, as it could help to create social, economic, and environmental value [23]. Studies on government roles accentuated the good governance and policy-making role in attaining sustainability [24, 25]. The role of government in driving sustainable economic growth and the need for collaboration with others have also been emphasized [26, 27].

A joint voluntary partnership, also known as a public-private partnership (PPP) or muti-sector or muti-stakeholder network, is widely recommended to achieve sustainability. The partnership could include businesses, nongovernmental organizations, and citizens in joint actions and decisions to improve and protect environmental quality. In such a partnership, the resources, knowledge, power, expertise, and resources could be combined to achieve sustainability collectively [28]. This kind of partnership is promoted as an effective alternative in the absence of international governance on sustainability [29, 30].

The research on public-private partnerships shows two trends. One trend is towards establishing PPP as a management instrument that helps achieve the sustainable objectives of government. The other trend shows factors that contributed to the successful implementation of PPT in policy areas [31]. The role of the government is dimensional, as they could play the role of providing research and development funds, tax exemptions on innovation, or environmentally supportive practices [32]. It could provide guidance and support for sustainable goods and services [33]. The partnership between the government and other entities helps to exploit the public and market positively in setting up strategies, strengthening competition, encouraging innovation, and achieving economic benefit in sustainable fashion [33]. The involvement of various levels of government authorities is necessary to initiate, structure, finance, provide regulation, and implement public sector strategies. For instance, it could provide regulations on controlling energy subsidiaries and promote subsidiaries in rural tourism [21, 30]. The public-private partnership creates an opportunity to draft and implement sustainability policies and strategies that provide opportunities for alternatives to laws and regulations. In other words, it creates an opportunity to use a mix of policy instruments where the government could steer the public towards sustainability. In the regulatory sphere, the challenge would be to choose the appropriate regulation that should ensure satisfactory performance in the environment while not hindering development. The regulations could set an acceptable standard [34].

In working along with various stakeholders on sustainability, the government needs to assess its expenditures and operations. The government's role in making its procurement expenditures green was recommended. The OECD report states that government expenditure on infrastructure and asset maintenance accounts for a significant amount of the GDP in OECD countries. Going green will enhance environmental conditions, and it could also motivate others to follow the lead of the government. In going green, the government could train procurement officers and others on financial tools for the for the assessment and evaluation of green investment, pricing, and procedures for identifying greener products. It could also provide technical assistance and an introduction to monitoring and evaluating policies and procedures. In this regard, Japan successfully implemented the procurement of low-cost automobiles. This in turn helps to achieve innovation in this area, increase competition, environmental performance, and reduce consumer prices. The Japanese government has played an important role in building the capacity to build necessary technology and become a role model in sustainable procurement [34].

In an environment where there is a demand for sustainable products and services, the government role participates in drafting agendas and policies and implementing them to create a fair, efficient, and sustainable market [35]. The government should take an assertive leadership role in creating a fair, efficient, and sustainable market environment that is conducive to sustainable business. With the growth of the population, the demand for goods and services is growing. The government's role is to regulate demand and, at the same time, facilitate economic growth. In the process, it could manage the energy demand and increase the capacity for eco-friendly production [36, 37]. Accountability and transparency are also considered critical in the process of achieving sustainable development. These components became important in creating trust. The citizens and residents should be convinced that the government is the custodian of their well-being through sustainable action plans, strategies, and implementation [38].

The normative belief is that the government is responsible for protecting the environment, and it is likely that this belief of the public could be garnished in public spending, passing laws, and governance on this matter if the normative belief is confirmed. However, it is argued that the normative view of government responsibility may not always translate into action [39]. To convert the normative view of government responsibility to behavioral changes and subsequent support in behavior seems to rely on the quality of the government [40]. If the residents and citizens feel that the government's measures are fair and effective, they will stand behind the government. They look at values and beliefs. Citizens are likely to support government initiatives on the environment if they are convinced that the government is doing the right thing [41]. Trust in government also plays a crucial factor in getting residents and citizens' support [42, 43]. The quality of government is linked positively to economic growth, public health, and sustainability [44]. When citizens and residents are satisfied with the quality of the government, they are willing to make economic sacrifices to achieve sustainability goals [45]. A low level of government quality would be a barrier to achieving sustainable development [46].

The key role of the government is to facilitate through their proximity to citizens, their responsibility towards the citizens, orientation, and their competencies. The government could interact and manage well with various dynamics in sustainable development. The government's inherent abilities and competencies help to diagnose, plan, implement, and introduce alternatives and implement sustainable initiatives [47–49]. According to the UN Development Program (UNDP), the capacity or ability of the government comprises three components: the capacity to perform, the capacity to change and manage crises with solutions to improve, and the ability to come up with the road map for change management [50, 51]. Salvador and Sancho [51] discussed four additional capacities: strategies, analytical, organizational management, and collaboration. Strategic capacity helps to plan its vision and establish clear goals and policies, analytical capacity is where it collects the necessary data to improve decision-making. Organizational management comprises knowledge management, resource management, and the implementation of activities to achieve strategic goals. Collaboration capacity refers to the networking ability to motivate the interconnected parties to work toward achieving sustainability. Research conducted by the Barcelona City Council concluded that a positive result on the above four dimensions is a prerequisite to promoting sustainability, though they are not sufficient conditions to achieve sustainability [51].

The achievement in the ecosphere cannot simply be achieved through the drawing up of a master plan and mapping various points. The achievement needs the collective action of all the stakeholders. All the actors in the master plan should perform according to the plan. This demands collaborative, inclusive, and accountable governance. Engagement with citizens and others in formal and informal settings is necessary as part of community engagement. Failure to engage could hurt the initiatives taken to achieve sustainability. Engagement may also take the form of collaborative governance, where the state actor engages with the non-state actors for consultation before the implementation of any substantial actions [52].

In Saudi Arabia, much literature focused on corporate adoption, practices, and corporate social responsibility, and some of them looked at government practices on sustainability. For example, Pinto [53] looked at CSR practices in Saudi companies, managers' perceptions of CSR, and the correlation between CSR and company performance. Bhatti et al. [54] looked at the factors that SMEs look at when they move from conventional to sustainable business practices. Almadhi et. al. [55] analyzed plastic waste management in Saudi Arabia. Yusuf and Lytras [56] investigated greenhouse gas emissions in a circular carbon economy. They found that coordinating among businesses and government actors is necessary to reduce carbon emissions. They also suggested the need to introduce organizational changes, robust policy-making tools, support from all stakeholders, and the adoption of technology to attain a circular Corban economy and, vice versa, control carbon emissions. Research was also conducted on energy consumption and the need for the reduction of energy subsidiaries. The finding in this area suggests that government subsidiaries on energy cost the economy and the environment, and as such, there should be more measures to reduce energy subsidiaries [57].

Alrashed & Asif [58] researched the adoption of renewable energy technologies and the end-users preferred solar PV systems. The finding showed a positive perception of adopting solar PV systems, irrespective of the cost of consumption. Accordingly, they proposed to introduce zero tariffs for energy products and short-term and long-term loans for eco-friendly innovation. Bin Mohanna & Alqahtany [59] investigated sustainable housing and people's opinions on sustainable housing. They found that people are in favor of sustainable houses and sustainable development. Saudi Arabia, according to its vision for economic transformation, introduced a circular carbon economy (CCE) in 2020 and invested billions to diversify into tourism, launch massive infrastructure projects, and develop the financial and private sectors. According to Uppal [60], the non-oil economy is growing. In 2022, a Green Finance Framework was introduced within Saudi Arabia's Public Investment Fund. The Government invested $6.4 billion in the recycling of waste by 2035 to achieve sustainability. In line with the government's initiative to support sustainable development, new waste management and environmental laws and regulations were passed in 2021 [61]. Based on the literature review, the research flowchart is shown in Figure 1, and the hypotheses were developed. The hypotheses are:

Hypothesis 1: The government plays an important role in sustainable development by providing laws, and regulations and enforcing them.

Hypothesis 2: The government plays an important role in achieving sustainability by introducing initiatives to control emissions, reducing energy subsidiaries, and supporting sustainable housing.

Hypothesis 3: The government plays an important role in achieving sustainability by supporting innovation and making funding available for sustainable innovation.

Hypothesis 4: The government plays an important role in achieving sustainability by creating awareness about sustainability.

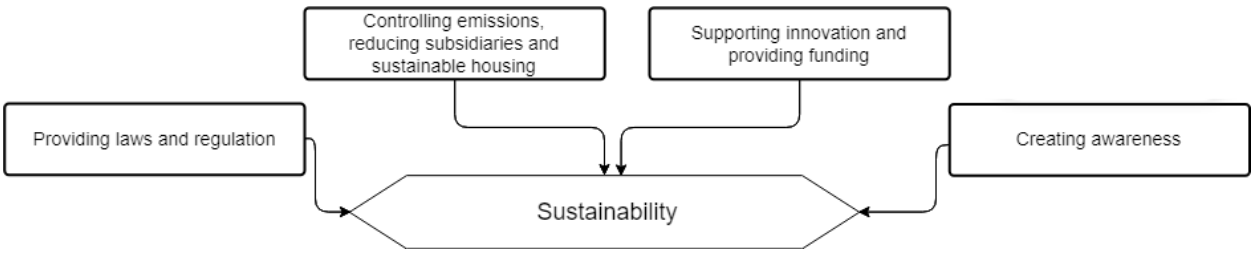

Figure 1. Research Flowchart

3- Methodology

The research used content analysis and survey methods to understand the role of the government in achieving sustainability in Saudi Arabia. For content analysis, research material published in academic journals from electronic databases like ACM Digital Library, IEEE Xplore, Scopus, and Web of Science, books, reports, laws, and regulations were considered on the subject matter. The analysis was conducted using an elimination strategy. If the abstracts were found to be out of the scope of the study, they were not collected as part of the literature. While analyzing the collected literature and interpreting the research material, Creswell's [62] coding techniques were adopted. As a first step, open coding was followed. In this process, the researcher read the abstracts, keywords, and summaries and generated coding and categories. Axial coding was followed as a second step where relationships and connections were derived to come up with a broader theme. Finally, selective coding was used to refine and understand the core theme [63]. After completing the three steps, relevant research materials were mapped, and the survey questions were drawn.

For survey methodology, the participants were selected based on a convenient sampling method. They were selected from Riyadh, Saudi Arabia. Riyadh was used in this study as the characteristics of Riyadh residents are like those of the other provinces in Saudi Arabia, and it is the capital of Saudi Arabia and the capital of the province of Riyadh. It is also the largest city in Saudi Arabia. The questionnaire was distributed online as well as face-to-face, and the participants consented to take part in the survey. 120 surveys were collected, of which 103 were considered complete. The questionnaire has two subject panels. The first panel tested the opinion of the residents on their knowledge regarding the concept of sustainability and their perception of the role of government. The researcher used a closed multiple-choice questionnaire with a 5-point Likert scale (where 1 means strongly disagree, 2 means disagree, 3 means neither agreed nor disagreed, (neutral) 4 means agreed, and 5 means strongly agreed). The second panel of the questionnaire collected respondents' opinions on ways to achieve sustainability. The opinion was solicited as an "open-ended" question. An Excel spreadsheet was used to evaluate and analyze the obtained data.

4- Result

The content analysis showed that the government's role in sustainability is critical. The role of the government is multiple. It acts as a powerful legitimate authority, financial support, regulator, mediator, coordinator, enabler, and initiator in planning, implementing, and attaining sustainability and sustainable development. The government contributes to regulating the aspects that are necessary to set up rules and regulations. Laws and regulations could be about materials that could be used in production, intellectual property laws, labor laws, and the rules of subsidiaries. In addition, it also provides standards that are necessary to achieve sustainability vis-à-vis carbon deduction and environmental degradation. The government plays an important role in ensuring that its operation is environmentally sustainable. In this regard, the government increased funding for innovation and environmentally friendly initiatives and implemented green procurement. The government also established various partnerships and collaborations. In public-private partnerships, the government acts as a strategist, negotiator, facilitator, and supporter. The content analysis further revealed that though the government played a significant role, the role of the government was not significantly captured in the literature, and the government's role most of the time was referred to as part of the social dimension of sustainability [36]. Currently, there is a lack of studies on the complicated role of government in various elements of sustainability [64]. The content analysis in Saudi Arabia revealed that the government's role is significant in achieving sustainability. Sustainable housing is something that Saudi residents are in support of, and as such, they are willing to bear the extra cost that comes along with it [59]. On energy consumption, Saudi Arabian residential, commercial, government, and industrial sectors consume large amounts of energy, which could lead to more emissions [65]. The literature also showed that the current strategies and initiatives in Saudi Arabia could only help to achieve a 67% sustainable energy target, as other measures like fewer subsidiaries, more support for innovation, and renewable energy are needed to achieve Saudi Vision 2030 [66].

The result of the survey showed that all four hypotheses were proven to be important. The respondents who participated in the survey were asked to rate the role of the government regarding sustainability on different items, and most of the respondents assessed the government's role in sustainability as significant. The participants were selected from various ethnic and educational backgrounds and work in Riyadh, Saudi Arabia. The participants' demographic

profile shows that most of them are educated, and 83% of them have completed postgraduate studies. About two-thirds of the participants were male, and one-third of them were female. Many of the respondents have experienced between 5 to 20 years of maturity. 92% of them were over 31 years old, and the rest were between 19 to 30 years old. The researcher believes that the data collected were unbiased, and the data collected from Riyadh, Saudi Arabia, residents represents the demography of residents living in other parts of Saudi Arabia. The detailed demographic profile of respondents is given in Table 1.

Table 1. Demographic Data

Profiles	Numbers/frequency	Percentage
Gender		
Male	62	60%
Female	41	40%
Education		
Postgraduate	83	83%
Undergraduate	15	15%
Diploma	2	2%
Year of Experience		
More than 20 years	0	0%
11-20 years	71	70%
6-10 years	18	17%
Less more than 5 Years	11	13%
Age		
19-25 years	4	4%
26-30 years	7	7%
31-35 years	13	13%
36-40 years	24	23%
More than 40 years	55	53%

The research questions were divided into two subject panels. The first subject panel examined the familiarity of the respondents with sustainability and the area of contribution of the government in achieving sustainability. Among the 103 participants who worked and lived in Riyadh, 66% (68 respondents) said that they were very familiar with sustainability, and another 27% (28 respondents) confirmed that they were somewhat familiar with it. About 7% (7 respondents) answered either not very familiar or not at all familiar. Figure 2 captures answers related to the familiarity of respondents with sustainability.

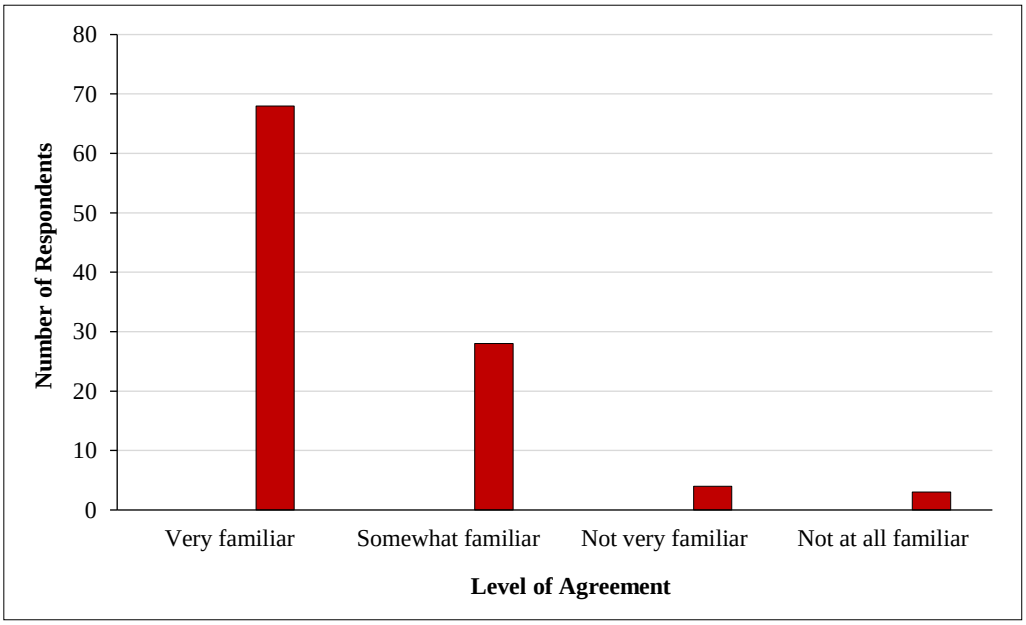

Figure 2. Familiarity with sustainability

As regards the area of government contribution to achieving sustainability, there were six items tested that represented the first three hypotheses, and all of them showed high importance. The first hypothesis concerns the government's role in passing laws and regulations on sustainable materials. The result showed that 45% of the respondents strongly agreed, while 35% agreed. There was no disagreement about the role of government in driving sustainability through the passage of appropriate laws and regulations. The detailed analysis of the result is shown in Figure 3.

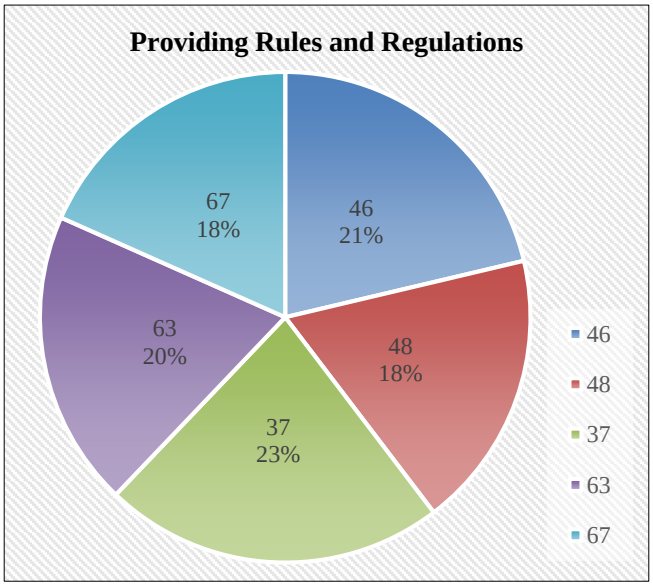

Figure 3. Government's role in providing laws and regulations

In the second hypothesis, the respondents on carbon emission, energy subsidiary reduction, and sustainable housing, 37% - 48% of the respondents strongly agreed on the need to control carbon control and control over energy subsidiary control to regulate carbon emission. About 2% of the respondents strongly disagreed on both carbon emission control and control of energy subsidiaries. On sustainable housing, about 62% strongly agreed with the need to have sustainable housing, while 32% agreed with sustainable housing. Figure 4 shows the detailed result of the testing of hypothesis 2.

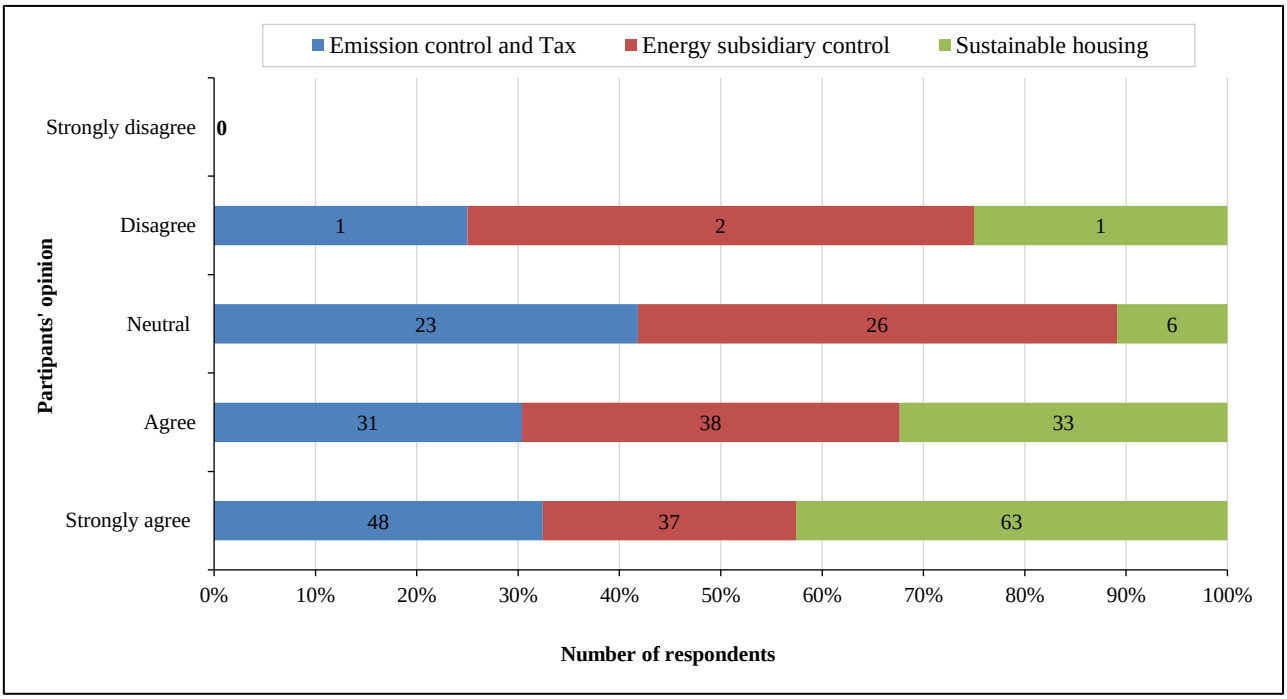

Figure 4. Carbon emission, energy subsidiary, and sustainable housing

Regarding the third hypothesis about sustainable innovation and innovation funding, 66% of the respondents supported sustainable innovation, and 64% strongly agreed to have funding support for sustainable innovation. It is interesting to note that no respondents disagreed, and most of the respondents agreed for both sustainable innovation and funding sustainable innovation. Figure 5 explains the detailed responses to the result.

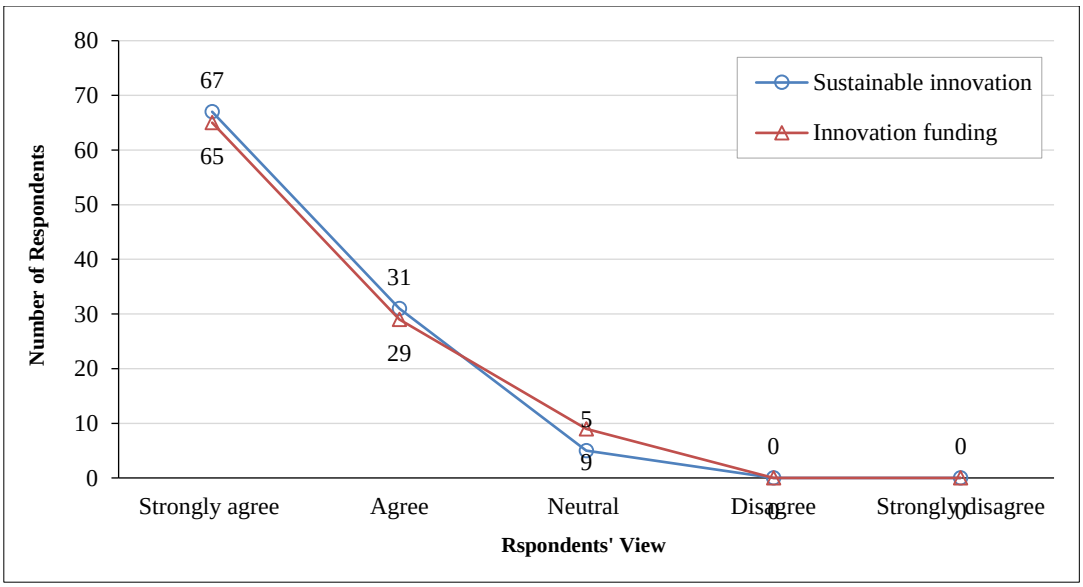

Figure 5. Sustainable innovation

Most of the respondents agreed on all the items related to the government's role in achieving sustainability, though the percentage of agreement was slightly different. In a nutshell, more than 50% of the participants strongly agreed about the role of government in laws and policies on recycling, sustainable housing, sustainable innovation, and innovation funding. About 45% of the respondents strongly agree with the government's role in carbon emission control. 36% of them strongly agreed with the reduction of energy subsidiaries.

No one strongly disagrees or disagrees with the government's role in recycling, sustainable innovation, and the availability of innovation funding. 6%–9% of the participants neither agreed nor disagreed with the role of the government on the above-mentioned items. It is interesting to note that 22%–25% of the participants on carbon emissions, carbon tax, and reduction of energy subsidiaries neither agreed nor disagreed, though none of them disagreed on the role of government on these issues. This shows that a minority of the participants are a bit reluctant to pay added taxes or pay more for energy consumption. The reason for the response reflectance could be due to economic reasons, where they are not willing to add to their economic liability. It is also interesting to note that all the participants did not disagree with any of the six items of the survey. The overall evaluation of the respondents is presented in Figure 6.

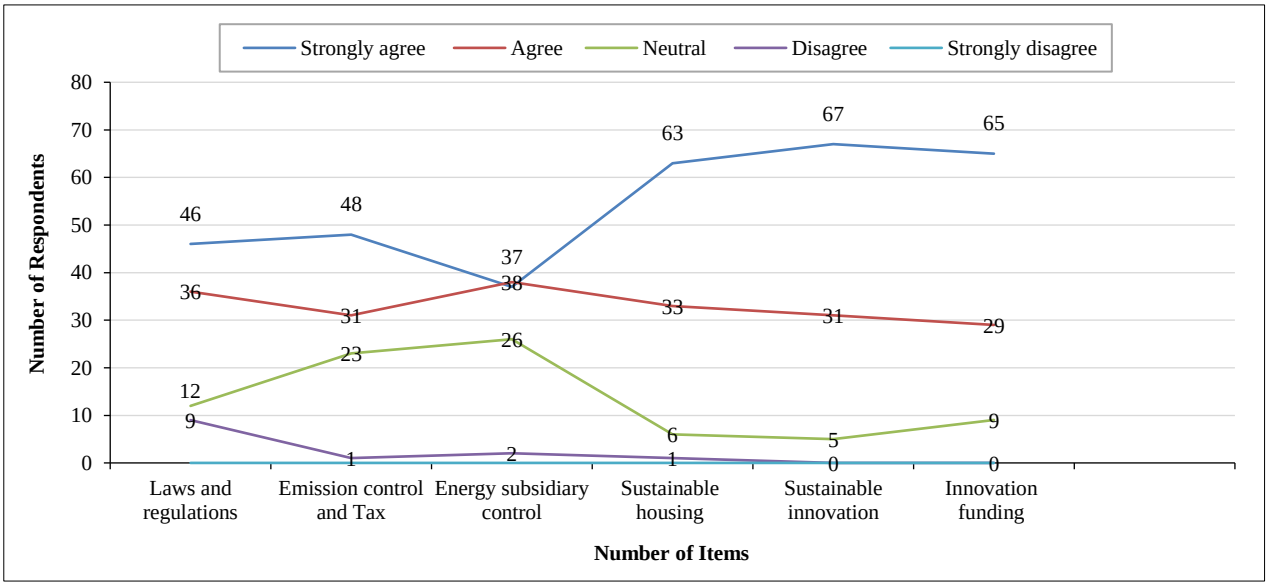

Figure 6. Role of government in driving sustainability

The second subject panel consisted of an open-ended question to collect the participants' general opinions on achieving sustainability. The majority of participants cited that introducing laws and regulations is very important to achieve sustainability. They added further that creating awareness about sustainability through awareness programs and education is important for the government to achieve sustainability. This part of the responses proved the fourth hypothesis about the government's role in creating awareness, besides rules and regulations creating awareness, other

themes that came about were enforcing laws and regulations, providing governance, and emphasizing green economy and green infrastructure. On the green economy, some of them mentioned that economic growth should include environmental protection and there should be a focus on regurgitation of energy consumption and coming up with alternative solutions to reduce refrigeration energy. On green infrastructure, they mentioned that there should be support for sustainable communities, promotion of sustainable local businesses, and more participation in green infrastructure. According to the respondents, greener homes and innovation in sustainable construction should also be given adequate consideration. On enforcing the law, the participants mentioned that there should be sanctions for violators and there should also be incentive measures to encourage more participation towards sustainability.

5- Discussion

The content analysis and survey established that the role of the government in driving sustainable public policy is important. The content analysis established various roles of government, like setting rules and regulations and standards, providing funding, creating awareness, working with various parties, setting appropriate action plans, and implementing them to achieve sustainability. In line with the content analysis. The survey showed that all the hypotheses were proven positive. More than 90% of the respondents agreed that the government's role is significant in driving sustainable public policy. This finding is in line with the literature [6, 7, 34]. Literature specifically mentions that the government is a catalyst for providing appropriate laws and regulations. These laws and regulations, according to Khurshid et al. [67], could be used to control manipulation and unfair enrichment, establish balance, and encourage the sharing of innovative technologies. The laws have the effect of protecting rights and creating duties that help to achieve a green economy. For example, laws related to a carbon tax could be used to control emissions and, at the same time, encourage innovation.

The findings of this study on sustainable housing are in line with the study conducted by Bin Mohanna & Alqahtany [59]. Accordingly, sustainable housing is something that Saudi residents are in support of, and as such, they are willing to bear the extra cost that comes along with it. The consumption of sustainable materials is another aspect that has been discussed in the literature. Zhang and Pearse [17] and Rees [37] discussed the need to make available resources, distribution, and consumption of those resources fairly and equitably. Sustainable innovation and funding for sustainable development are discussed in a few pieces of literature too. The current research findings could be supported by the findings of previous studies. For instance, Khurshid A. and Deng [32] argued that providing research and development funds for innovation or environmentally supportive practices is important. Khurshid et al., Xu et al., and Chien et al. [67–69] argued that the support of eco-friendly innovation could help to achieve sustainability in China, Korea, and elsewhere in Asia and Europe. Thus, the Saudi government should provide appropriate funding for eco-friendly innovations so that carbon emissions can be controlled, which helps to achieve sustainability.

More than 70% of the respondents "strongly agreed or agreed" with the government's role in carbon emission control. About 65% of them "strongly agreed or agreed" regarding the reduction of energy subsidiaries. The findings are also in line with the findings of Zink and Geyer [70] and Tsai [71]. Their findings showed that foreign investment and subsequent economic development contribute to greater consumption of materials and emissions of CO2. They further reiterated that appropriate dematerialization and decarbonization should be carried out so that domestic material consumption could be checked and balanced. Countries like Germany, Spain, Denmark, China, and Brazil, in controlling emissions, introduced or encouraged energy-efficient technology [72]. Fiorino [36] and Rees [37] discussed resource availability, distribution, and consumption for achieving sustainable development.

On the issue related to carbon tax and reduction of energy subsidiaries, though the majority of them "strongly agreed or agreed" on carbon tax and reduction of energy subsidiaries, about 22%–25% were neutral in their opinion. None of them disagreed on the role of the government on these issues. This finding is in line with the findings of [73–75] that mentioned the effectiveness of the carbon tax or reduction of energy subsidiaries. They also mentioned that to achieve sustainability, the introduction of financial rewards, innovation, and effective policies on the environment are also necessary. The literature further suggests that, along with the carbon tax, carbon pricing will also be effective in moving toward sustainability. Khurshid et al. [67] investigated carbon tax, innovation, and ecological policy on sustainable development in 15 EU countries from southern and western regions and found carbon tax will be beneficial in the long run [76]. The United Nations Convention on Climate Change also recommended the introduction of carbon taxes, as it could reduce carbon emissions and assist future investments. The European Union's Environment Action Program introduced carbon pricing to help control emissions. On energy consumption, Amran et al. [65] showed that Saudi Arabian residential, commercial, government, and industrial sectors consume large amounts of energy, which could lead to more emissions. According to AlArjani et al. [66], the current strategies and initiatives in Saudi Arabia could only help to achieve a 67% sustainable energy target, as other measures like fewer subsidiaries and more support for innovation and renewable energy are needed to achieve Saudi Vision 2030.

The research findings further showed that creating awareness about sustainability through awareness programs and education should be prioritized. This finding confirmed the findings of Nemat et al. and van Bussel et al. [78]. In increasing awareness and educational programs, the literature suggests that proper planning and implementation should be carried out. This could create awareness and motivate residents and citizens toward sustainable behavior [77–79].

Any educational initiative needs to look at the curriculum change to facilitate new references to sustainability, and it should also create awareness and expected achievement [80–82]. The awareness and education program could allow appropriate interaction with the socio-economic system and environment. There should be appropriate interaction with various stakeholders too. According to McGregor [83, 84], the education program, as part of the creation of environmental awareness, should empower the people. This empowerment could instigate change so that people would be able to change their intentions and behavior toward sustainability [85]. Engaging and challenging pedagogical approaches to education and the creation of awareness should allow individuals to motivate and participate in sustainability. Besides educational initiatives, the creation of awareness through media platforms is effective. The media is found to be effective in reaching out to residents on specific environmental concerns. The ban on the use of plastic bags in Tanzania was successful with the joint effect of the government and media [86].

6- Policy and Practical Implications

The research findings have policy and practical implications for the role of government in sustainable public policy. The role of government in drafting laws, rules, policies, and standards is considered important. In line with this finding, the Saudi government drafted Vision 2030 and implemented laws and regulations to achieve this vision. For instance, the government adopted and implemented innovation initiatives like the King Salman Renewable Energy Initiative, climate change agreements, a renewable energy program, a sustainable building code, and a sustainable farm. To achieve sustainability, the Saudi government established the Sustainable Development Steering Committee (SDSC) and developed 17 policy papers to address various sustainability goals. In introducing more laws and regulations, the government may look at the policy on carbon pricing and tax along with more steps towards better sustainable energy consumption, as the current energy consumption and subsidiaries should be relooked [66]. The government may look at more energy-efficient measures in the construction, transportation, and industrial sectors, as they are found to be the main consumers of energy [87].

Innovation and the availability of funding for innovation need attention, as they have the potential to reduce carbon emissions and attain sustainability. The Saudi Arabian government set up various initiatives to facilitate innovation and encourage investment and cooperation among educational institutions and the private and public sectors. The government also encourages small and medium enterprises to participate in these initiatives [54]. However, funding for innovation and start-up capital constraints could be an obstacle. As such, the government and international credit organizations could support small- to medium-scale projects with less or no interest loans. It could also develop a tax credit system where it could collect carbon tax from possible polluters and transfer it to inventors and innovators to work with eco-friendly innovation [88]. Subsidies or investments in hydrogen production facilities, developing and deploying carbon capture, utilization, and storage (CCUS) technologies, and biofuel will possibly draw more local and international experts and researchers to Saudi Arabia [89]. The application and approval process should also be simplified so that more participants can be attracted.

Saudi Vision 2030: In line with the UN SDGs, Saudi Arabia is planning to transform its economy to reach its target by implementing strategies and indicators for sustainable development. It focused on building a knowledge-based economy, increasing vegetation, controlling carbon emissions, preserving wildlife, building codes, and sustainable city initiatives. In its efforts, the government set up participatory frameworks to ensure increased public involvement in urban planning and management processes so that it could holistically approach the issues in collaboration with other stakeholders. The availability of a sovereign wealth fund for sustainable initiatives, circular carbon economy initiatives with USD180 billion investment from the government, and the availability of public transportation and metro systems King Abdullah City for Atomic and Renewable Energy is one of the examples of governments achieving sustainable infrastructure and economies [89]. However, setting up an emission inventory to identify emission sources and take adequate mitigation measures. The introduction of an audit could also help to detect violators and understand the areas for improvement in achieving sustainable objectives [88].

The introduction of the carbon tax and reductions in subsidiaries are found to be important factors in achieving sustainability and, vice versa, reductions in carbon emissions [73–75]. These measures will discourage energy consumption and encourage sustainable behavior. To materialize the introduction of the carbon tax and reduction in energy subsidiaries, the government should come up with more public campaigns on sustainability and introduce appropriate educational opportunities. Sustainability education could create awareness, encourage behavioral change, and conserve the environment [90, 91]. Education is set to create synergies with other sustainable goals and a balanced economic development. Empowering individuals creates significant changes in attitudes toward sustainability [92]. Therefore, focusing on awareness creation through education and training synergies could help to achieve Vision 2030 and a circular carbon economy as planned with minimum trade-offs, among other goals [93]. In this context, promoting responsible consumption habits, the use of innovation in food loss, waste management, and other initiatives will motivate individual participation. The awareness program could be carried out with various

media and think tanks like the King Salman Centre for Local Governance (CLG), which could host events and provide consultancy and specialized training. All the initiatives of the Saudi Arabian government are documented and published on the United Nations' website.

The finding emphasizes the role of government as one of the players in sustainability. The government alone will not be able to achieve the nation's sustainability goals. As such, there is a need for more public-private partnerships and corporations in various areas of sustainability. Governments and private entities could successfully participate in innovation, investment, infrastructure, waste management, education, and promotion. The residents could also be brought together so that the sustainability vision could be achieved as part of collective action.

7- Conclusion

Sustainability is like democracy, and human rights have been globally accepted as important and adopted on various scales by governments and others. The content analysis of the research found that many countries set sustainability targets and resources to achieve sustainability so that socio-economic development could be achieved without compromising the environment and the future needs of the people. This finding was in line with the findings of other studies on the government's role in sustainability [6, 7, 34]. The government plays a vital role in sustainability. In this process, the government introduced policies, laws, funding support, and educational activities to promote and attain sustainable development. Saudi Arabia, as an important player in the world and regional economies, has set Vision 2030 to achieve sustainable development and promised to spend $180bn in its economy to achieve the target. It passed laws, regulations, and codes to facilitate the accomplishment of sustainable goals. The government has also taken various measures to control its dependence on the oil-based economy. It introduced the reduction of energy subsidiaries and set up a center for finding renewable energy. It encourages partnerships with various stakeholders in innovation, training, and funding.

The survey findings showed that the residents agreed that the government played an important role in providing laws and regulations, providing and encouraging the consumption of sustainable materials, controlling carbon emissions, participating in innovation, and providing funding for innovation. They also agreed on the government's role in green infrastructure and the green economy. In the case of the carbon tax and reduction on energy subsidiaries, a minority of them are not sure that the government should implement this initiative; however, the majority agreed that such an initiative is necessary. In addition, there is a greater consensus among the participants on the role of the government in creating awareness and providing educational programs for promoting sustainability. The finding was like the study conducted by [36, 37, 70–72, 94, 95], where they found that sustainable materials, reduction of energy subsidiaries, innovation and providing of innovation funding, and appropriate laws and regulations contribute to sustainability. According to the findings, the government could implement more measures, like the active solicitation of public-private partnerships in innovation and providing education and resources, which are necessary. There should also be an audit system introduced to assess compliance and introduce corrective measures.

8- Declarations

8-1- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

8-2- Funding and Acknowledgments

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8-3- Institutional Review Board Statement

Not applicable.

8-4- Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

8-5- Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the author.

9- References

[1] Imperatives, S. (1987). Report of the World Commission on Environment and Development: Our common future. United General Assembly of the United Nations, New York, United States.

[2] Rydz-Żbikowska, A. (2012). The Concept of Sustainable Development and Its Impact on the Shaping of Modern International Relations through Global Agreements. Comparative Economic Research, 15(2), 101–118. doi:10.2478/v10103-012-0012-z.

[3] Dresner, S. (2012). The principles of sustainability. Routledge, London, United Kingdom. doi:10.4324/9781849773249.

[4] Schaltegger, S., & Burritt, R. (2005). Corporate sustainability. The International Yearbook of Environmental and Resource Economics 2005/2006, Edward Elgar, Northampton, United States. doi:10.4337/9781845425593.0001.

[5] Leuenberger, D. (2006). Sustainable Development in Public Administration: A Match with Practice? Public Works Management & Policy, 10(3), 195–201. doi:10.1177/1087724X06287496.

[6] Seip, M., Castaldi, C., Flikkema, M., & De Man, A.-P. (2018). The timing of trademark application in innovation processes. Technovation, 72–73, 34–45. doi:10.1016/j.technovation.2018.02.001.

[7] Jansri, W. I. L. A. W. A. N. (2018, July). Consumer perceived value: a systematic review of the research. Proceedings of 124th IASTEM international conference, 4-5 July, 2018, Krakow, Poland.

[8] Zihan, W., Makhbul, Z. K. M., & Alam, S. S. (2024). Green Human Resource Management in Practice: Assessing the Impact of Readiness and Corporate Social Responsibility on Organizational Change. Sustainability (Switzerland), 16(3), 1153. doi:10.3390/su16031153.

[9] Hanif, I. (2018). Impact of economic growth, nonrenewable and renewable energy consumption, and urbanization on carbon emissions in Sub-Saharan Africa. Environmental Science and Pollution Research, 25(15), 15057–15067. doi:10.1007/s11356-018-1753-4.

[10] Caspary, G. (2009). Gauging the future competitiveness of renewable energy in Colombia. Energy Economics, 31(3), 443–449. doi:10.1016/j.eneco.2008.12.007.

[11] Valencia, A. M. (2009). Effects of electricity market regulations on the promotion of non-conventional energy sources in Colombia's power mix. International Journal of Public Policy, 4(1–2), 76–99. doi:10.1504/IJPP.2009.021548.

[12] Adamu, M., & Ibrahim, Y. E. (2024). Environmental sustainability and cost-benefit analysis of concrete containing date palm ash and eggshell powder: A response surface methodology approach. Case Studies in Chemical and Environmental Engineering, 9. doi:10.1016/j.cscee.2024.100636.

[13] Thiele, L.P. (2013). Sustainability. Polity Press, Cambridge, United Kingdom.

[14] Sachs, W. (2000). Planet dialectics: explorations in environment and development. Choice Reviews Online, 37(10), 37-5636-37–5636. doi:10.5860/choice.37-5636.

[15] Baeten, G. (2000). The tragedy of the highway: Empowerment, disempowerment and the politics of sustainability discourses and practices. European Planning Studies, 8(1), 69–86. doi:10.1080/096543100110938.

[16] Musgrave, R.A. (1959) The Theory of Public Finance. McGraw Hill, New York, United States.

[17] Zhang, D., & Pearse, P. H. (2011). Forest Economics. University of British Columbia Press, Vancouver, Canada. doi:10.59962/9780774821544.

[18] Elhilali, C. (2023). the General Budget in the Kingdom of Saudi Arabia: Between the Governance Requirements and Financial Sustainability. Access to Justice in Eastern Europe, 6. doi:10.33327/AJEE-18-6S006.

[19] Subanidja, S., Sorongan, F. A., & Legowo, M. B. (2023). Bridging Sustainable Bank Performance through Fintech and Enacted Norms. Emerging Science Journal, 7(6), 2156–2164. doi:10.28991/ESJ-2023-07-06-017.

[20] Carriger, J. F., & Benson, W. H. (2011). Restoring and managing Gulf of Mexico fisheries: A path toward creative decision-making. Estuaries: Classification, Ecology, and Human Impacts, 291-334, Nova Science Publishers, Hauppauge, United States.

[21] Baker, S., & Eckerberg, K. (2014). The Role of the State in the Governance of Sustainable Development: Subnational Practices in European States. State and Environment, 179–202, Oxford University Press, Oxford, United Kingdom. doi:10.7551/mitpress/9780262027120.003.0007.

[22] Bjärstig, T., & Sandström, C. (2017). Public-private partnerships in a Swedish rural context - A policy tool for the authorities to achieve sustainable rural development? Journal of Rural Studies, 49, 58–68. doi:10.1016/j.jrurstud.2016.11.009.

[23] Jordan, S., & Benson, W. (2013). Governance and the Gulf of Mexico coast: How are current policies contributing to sustainability? Sustainability (Switzerland), 5(11), 4688–4705. doi:10.3390/su5114688.

[24] Farzin, Y. H., & Bond, C. A. (2006). Democracy and environmental quality. Journal of Development Economics, 81(1), 213–235. doi:10.1016/j.jdeveco.2005.04.003.

[25] Foray, D. (2009). Innovation policy for development: A review. Elgar, New York, United States.

[26] Trainer, T. (1995). Towards a sustainable economy. Envirobooks, Sydney, Australia.

[27] Haque, M. S. (2004). Governance based on partnership with NGOs: Implications for development and empowerment in rural Bangladesh. International Review of Administrative Sciences, 70(2), 271–290. doi:10.1177/0020852304044255.

[28] Hodge, G. A., & Greve, C. (2007). Public-private partnerships: An international performance review. Public Administration Review, 67(3), 545–558. doi:10.1111/j.1540-6210.2007.00736.x.

[29] Sørensen, E., & Torfing, J. (2009). Making governance networks effective and democratic through metagovernance. Public Administration, 87(2), 234–258. doi:10.1111/j.1467-9299.2009.01753.x.

[30] Christopoulos, S., Demir, C., & Kull, M. (2016). Cross-sectoral coordination for sustainable solutions in Croatia: The (meta) governance of energy efficiency. Energy Policy, 99, 57–87. doi:10.1016/j.enpol.2016.09.010.

[31] Pinz, A., Roudyani, N., & Thaler, J. (2018). Public–private partnerships as instruments to achieve sustainability-related objectives: the state of the art and a research agenda. Public Management Review, 20(1), 1–22. doi:10.1080/14719037.2017.1293143.

[32] Khurshid, A., & Deng, X. (2021). Innovation for carbon mitigation: a hoax or road toward green growth? Evidence from newly industrialized economies. Environmental Science and Pollution Research, 28(6), 6392–6404. doi:10.1007/s11356-020-10723-1.

[33] Wang, X., Xiao, X., Xu, X., Zou, Z., Chen, B., Qin, Y., Zhang, X., Dong, J., Liu, D., Pan, L., & Li, B. (2021). Rebound in China's coastal wetlands following conservation and restoration. Nature Sustainability, 4(12), 1076–1083. doi:10.1038/s41893-021-00793-5.

[34] Bell, D.V.J. (2002). A Background Paper prepared by the Sustainable Enterprise Academy, York University (www.SustainableEnterpriseAcademy.org) under contract to Environment Canada for the G8 Environmental Futures Forum (EFF) in Vancouver, Vancouver, Canada.

[35] Peck, S. W., & Gibson, R. B. (2000). Pushing the revolution. Alternatives Journal, 26(1), 20-23.

[36] Fiorino, D. J. (2014). Sustainable cities and governance: what are the connections? Elgar Companion to Sustainable Cities, Edward Elgar, Northampton, United States. doi:10.4337/9780857939999.00028.

[37] Rees, W. (2014). Avoiding collapse: Agenda for sustainable degrowth and relocalizing the economy, Canadian Electronic Library. Ottawa, Canada. doi:10.4324/9781315818863-10.

[38] Waldt, G. van der. (2016). From Policy to Projects: A Public Service Value-Chain Network Model. Journal of Social Sciences, 49(1–2), 145–157. doi:10.1080/09718923.2016.11893607.

[39] Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research, 8(3), 239–260. doi:10.1080/13504620220145401.

[40] Hooghe, M. (2012). The quality of government: Corruption, social trust and inequality in international perspective. Acta Politica, 47(3), 317–320. doi:10.1057/ap.2012.9.

[41] Jæger, M. M. (2006). What makes people support public responsibility for welfare provision: Self-interest or political ideology? A longitudinal approach. Acta Sociologica, 49(3), 321–338. doi:10.1177/0001699306067718.

[42] Fairbrother, M. (2016). Trust and public support for environmental protection in diverse national contexts. Sociological Science, 3(17), 359–382. doi:10.15195/v3.a17.

[43] Kollmann, A., & Reichl, J. (2015). How Trust in Governments Influences the Acceptance of Environmental Taxes. Political Economy and Instruments of Environmental Politics, 53–70, Oxford University Press, Oxford, United Kingdom. doi:10.7551/mitpress/9780262029247.003.0004.

[44] Holmberg, S., Rothstein, B., & Nasiritousi, N. (2009). Quality of government: What you get. Annual Review of Political Science, 12(1), 135–161. doi:10.1146/annurev-polisci-100608-104510.

[45] Harring, N. (2013). Understanding the effects of corruption and political trust on willingness to make economic sacrifices for environmental protection in a cross-national perspective. Social Science Quarterly, 94(3), 660–671. doi:10.1111/j.1540-6237.2012.00904.x.

[46] Kulin, J., & Johansson Sevä, I. (2019). The Role of Government in Protecting the Environment: Quality of Government and the Translation of Normative Views about Government Responsibility into Spending Preferences. International Journal of Sociology, 49(2), 110–129. doi:10.1080/00207659.2019.1582964.

[47] Knill, C., Steinbacher, C., & Steinebach, Y. (2021). Balancing Trade-Offs between Policy Responsiveness and Effectiveness: The Impact of Vertical Policy-Process Integration on Policy Accumulation. Public Administration Review, 81(1), 157–160. doi:10.1111/puar.13274.

[48] Park, A. Y. S., & Sapotichne, J. (2020). Punctuated Equilibrium and Bureaucratic Autonomy in American City Governments. Policy Studies Journal, 48(4), 896–925. doi:10.1111/psj.12333.

[49] Wu, X., Ramesh, M., Howlett, M. (2018). Policy Capacity: Conceptual Framework and Essential Components. Policy Capacity and Governance. Studies in the Political Economy of Public Policy. Palgrave Macmillan, Cham, Switzerland. doi:10.1007/978-3-319-54675-9_1.

[50] United Nations Development Programme (UNDP). (2015). Measuring Capacity. United Nations Development Programme, New York, United States.

[51] Salvador, M., & Sancho, D. (2021). The role of local government in the drive for sustainable development public policies. An analytical framework based on institutional capacities. Sustainability (Switzerland), 13(11), 5978. doi:10.3390/su13115978.

[52] Gollagher, M., & Hartz-Karp, J. (2013). The role of deliberative collaborative governance in achieving sustainable cities. Sustainability (Switzerland), 5(6), 2343–2366. doi:10.3390/su5062343.

[53] Pinto, L. (2023). A Qualitative Analysis of Corporate Social Responsibility in Saudi Arabia's Service Sector-Practices and Company Performance. Sustainability (Switzerland), 15(12), 9284. doi:10.3390/su15129284.

[54] Bhatti, M. A., Alyahya, M., Alshiha, A. A., Aldossary, M., Juhari, A. S., & Saat, S. A. M. (2022). SME's sustainability and success performance: the role of green management practices, technology innovation, human capital and value proposition. International Journal of eBusiness and eGovernment Studies, 14(2), 112-125.

[55] Almadhi, A., Abdelhadi, A., & Alyamani, R. (2023). Moving from Linear to Circular Economy in Saudi Arabia: Life-Cycle Assessment on Plastic Waste Management. Sustainability (Switzerland), 15(13), 10450. doi:10.3390/su151310450.

[56] Yusuf, N., & Lytras, M. D. (2023). Competitive Sustainability of Saudi Companies through Digitalization and the Circular Carbon Economy Model: A Bold Contribution to the Vision 2030 Agenda in Saudi Arabia. Sustainability (Switzerland), 15(3), 2616. doi:10.3390/su15032616.

[57] Almasri, R. A., & Narayan, S. (2021). A recent review of energy efficiency and renewable energy in the Gulf Cooperation Council (GCC) region. International Journal of Green Energy, 18(14), 1441–1468. doi:10.1080/15435075.2021.1904941.

[58] Alrashed, F., & Asif, M. (2015). An Exploratory of Residents' Views Towards Applying Renewable Energy Systems in Saudi Dwellings. Energy Procedia, 75, 1341–1347. doi:10.1016/j.egypro.2015.07.207.

[59] Bin Mohanna, A., & Alqahtany, A. (2020). Identifying the preference of buyers of single-family homes in Dammam, Saudi Arabia. International Journal of Housing Markets and Analysis, 13(2), 165–184. doi:10.1108/IJHMA-02-2019-0011.

[60] Uppal, R. (2023). Saudi economy edging closer to reducing dependence on oil, IMF official says. Reuters, Toronto, Canada. Available online: https://www.reuters.com/world/middle-east/saudi-economy-edging-closer-reducing-dependence-oil-imf-official-2023-05-03/ (accessed on May 2024).

[61] Karim, S., & Yong, E. (2023). The developing legal and regulatory regime for ESG in the Middle East and emerging D&O exposures. Norton Rose Fulbright, London, United Kingdom. Available online: https://www.nortonrosefulbright.com/en/knowledge/publications/730055eb/the-developing-legal-and-regulatory-regime-for-esg-in-the-middle-east-and-emerging-do-exposures (accessed on May 2024).

[62] Creswell, J. W. (2015). Educational research: Planning, conducting, and evaluating quantitative and qualitative research. Pearson, London, United Kingdom.

[63] Lo, C. K. (2023). What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature. Education Sciences, 13(4), 410. doi:10.3390/educsci13040410.

[64] Zhang, R., Lin, X., & Li, A. (2023). Understanding the role of the government in promoting various sustainability sub-systems: An analysis based on new parallel-series network data envelopment analysis models. Journal of Cleaner Production, 398, 136593. doi:10.1016/j.jclepro.2023.136593.

[65] Amran, Y. H. A., Amran, Y. H. M., Alyousef, R., & Alabduljabbar, H. (2020). Renewable and sustainable energy production in Saudi Arabia according to Saudi Vision 2030; Current status and future prospects. Journal of Cleaner Production, 247, 119602. doi:10.1016/j.jclepro.2019.119602.

[66] AlArjani, A., Modibbo, U. M., Ali, I., & Sarkar, B. (2021). A new framework for the sustainable development goals of Saudi Arabia. Journal of King Saud University - Science, 33(6), 101477. doi:10.1016/j.jksus.2021.101477.

[67] Khurshid, A., Qayyum, S., Calin, A. C., Saleem, S. F., & Nazir, N. (2022). The role of pricing strategies, clean technologies, and ecological regulation on the objectives of the UN 2030 Agenda. Environmental Science and Pollution Research, 29(21), 31943–31956. doi:10.1007/s11356-021-18043-8.

[68] Xu, L., Fan, M., Yang, L., & Shao, S. (2021). Heterogeneous green innovations and carbon emission performance: Evidence at China's city level. Energy Economics, 99, 105269. doi:10.1016/j.eneco.2021.105269.

[69] Chien, F., Sadiq, M., Nawaz, M. A., Hussain, M. S., Tran, T. D., & Le Thanh, T. (2021). A step toward reducing air pollution in top Asian economies: The role of green energy, eco-innovation, and environmental taxes. Journal of Environmental Management, 297, 113420. doi:10.1016/j.jenvman.2021.113420.

[70] Zink, T., & Geyer, R. (2017). Circular Economy Rebound. Journal of Industrial Ecology, 21(3), 593–602. doi:10.1111/jiec.12545.

[71] Tsai, W. T. (2017). Green public procurement and green-mark products strategies for mitigating greenhouse gas emissions—experience from Taiwan. Mitigation and Adaptation Strategies for Global Change, 22(5), 729–742. doi:10.1007/s11027-015-9695-3.

[72] Vachon, S., & Menz, F. C. (2006). The role of social, political, and economic interests in promoting state green electricity policies. Environmental Science and Policy, 9(7–8), 652–662. doi:10.1016/j.envsci.2006.07.005.

[73] Van Dijk, A. L., Beurskens, L. W. M., Boots, M. G., Kaal, M. B. T., De Lange, T. J., Van Sambeek, E. J. W., & Uyterlinde, M. A. (2003). Renewable energy policies and market developments. ECN-C—03-029, Netherlands.

[74] Lin, B., & Li, X. (2011). The effect of carbon tax on per capita CO2 emissions. Energy Policy, 39(9), 5137–5146. doi:10.1016/j.enpol.2011.05.050.

[75] Szlávik, J., Pálvölgyi, T., Füle, M., & Ürge-Vorsatz, D. (2000). Carbon mitigation in Hungary: challenges for a sustainable national energy policy. Periodica Polytechnica Social and Management Sciences, 8(2), 103-120.

[76] Mahmood, H., Irshad, A. ur R., & Tanveer, M. (2024). Do innovation and renewable energy transition play their role in environmental sustainability in Western Europe? Humanities and Social Sciences Communications, 11(1), 1-9. doi:10.1057/s41599-023-02539-4.

[77] Nemat, B., Razzaghi, M., Bolton, K., & Rousta, K. (2019). The role of food packaging design in consumer recycling behavior-a literature review. Sustainability (Switzerland), 11(16), 4350. doi:10.3390/su11164350.

[78] van Bussel, L. M., Kuijsten, A., Mars, M., & van 't Veer, P. (2022). Consumers' perceptions on food-related sustainability: A systematic review. Journal of Cleaner Production, 341, 130904. doi:10.1016/j.jclepro.2022.130904.

[79] Durmanov, A., Saidaxmedova, N., Mamatkulov, M., Rakhimova, K., Askarov, N., Khamrayeva, S., Mukhtorov, A., Khodjimukhamedova, S., Madumarov, T., & Kurbanova, K. (2023). Sustainable Growth of Greenhouses: Investigating Key Enablers and Impacts. Emerging Science Journal, 7(5), 1674–1690. doi:10.28991/ESJ-2023-07-05-014.

[80] Wals, A. E., & Heymann, F. V. (2004). Learning on the edge: exploring the change potential of conflict in social learning for sustainable living. Educating for a culture of social and ecological peace. Suny Press, Albany, United States.

[81] Dyball, R., & Keen, M. (Eds.). (2012). Social Learning in Environmental Management. Routledge, London, United Kingdom. doi:10.4324/9781849772570.

[82] Clugston, R., & Calder, W. (2007). Food and Higher Education for Sustainable Development. Journal of Education for Sustainable Development, 1(2), 209–218. doi:10.1177/097340820700100211.

[83] McGregor, S. (2005). Sustainable consumer empowerment through critical consumer education: A typology of consumer education approaches. International Journal of Consumer Studies, 29(5), 437–447. doi:10.1111/j.1470-6431.2005.00467.x.

[84] McGregor, S. L. T. (2016). Framing consumer education conceptual innovations as consumer activism. International Journal of Consumer Studies, 40(1), 35–47. doi:10.1111/ijcs.12208.

[85] Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191–215. doi:10.1037/0033-295X.84.2.191.

[86] Lusagalika, J. S. (2020). The Role and Influence of Media in Creating Environmental Awareness in Dar es Salaam Tanzania. Nokoko, 8, 83-98.

[87] Alrashoud, K., & Tokimatsu, K. (2020). An exploratory study of the public's views on residential solar photovoltaic systems in oil-rich Saudi Arabia. Environmental Development, 35. doi:10.1016/j.envdev.2020.100526.

[88] Hwang, J. J., & Chang, W. R. (2011). Policy progress in mitigation of climate change in Taiwan. Energy Policy, 39(3), 1113–1122. doi:10.1016/j.enpol.2010.11.033.

[89] HLPF. (2023). Accelerating to Achieve Sustainable Future. Saudi Arabia's Voluntary National Review: 1444-2023. High-Level Political Forum on Sustainable Development, United Nation, New York, United States. Available online: https://hlpf.un.org/sites/default/files/vnrs/2023/VNR%202023%20Saudi%20Arabia%20Report.pdf (accessed on May 204).

[90] Al-Nuaimi, S. R., & Al-Ghamdi, S. G. (2022). Sustainable Consumption and Education for Sustainability in Higher Education. Sustainability (Switzerland), 14(12), 7255. doi:10.3390/su14127255.

[91] Sund, P., & Lysgaard, J. (2013). Reclaim "Education" in Environmental and Sustainability Education Research. Sustainability, 5(4), 1598–1616. doi:10.3390/su5041598.

[92] Lima, F. P., & Bastos, R. P. (2019). Perceiving the invisible: Formal education affects the perception of ecosystem services provided by native areas. Ecosystem Services, 40, 101029. doi:10.1016/j.ecoser.2019.101029.

[93] Singh, H. P., Singh, A., Alam, F., & Agrawal, V. (2022). Impact of Sustainable Development Goals on Economic Growth in Saudi Arabia: Role of Education and Training. Sustainability (Switzerland), 14(21), 14119. doi:10.3390/su142114119.

[94] AlQahtany, A. M., & Abubakar, I. R. (2020). Public perception and attitudes to disaster risks in a coastal metropolis of Saudi Arabia. International Journal of Disaster Risk Reduction, 44, 101422–101422. doi:10.1016/j.ijdrr.2019.101422.

[95] Mazzetto, S., & Vanini, F. (2023). Urban Heritage in Saudi Arabia: Comparison and Assessment of Sustainable Reuses. Sustainability (Switzerland), 15(12), 9819. doi:10.3390/su15129819.

Appendix I

Questionnaire

Role of government in driving sustainability:

A. Demographics

1. **Gender:**

   ☐ Male ☐ Female

2. **Highest Level of Educational Qualification:**

   ☐ Ph.D. ☐ Masters ☐Bachelors ☐ Diploma ☐ High School Certificate

3. **Age:**

   ☐ less than 18 years ☐ 19-25 years ☐ 26 -30 years ☐ 31-35 years

   ☐ 36 -40 years ☐ above 40 years

4. **No. of years of total experience:**

   ☐ 0 -5 years ☐ 6 -10 years ☐ 11 -15 years ☐ 16 -20 years ☐ above 21 years

5. **How familiar are you with the sustainability?**

   ☐ Very familiar

   ☐ Somewhat familiar

   ☐ Not very familiar

   ☐ Not at all familiar

B. Government role in sustainability

How important is the government's role in driving sustainability?
Please check/tick one for each category

	Strongly Agree (5)	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly Disagree (1)**
Laws and regulations on sustainability (materials)					
Control on carbon emission control and carbon tax					
Reduction of energy subsidiary					
Sustainable housing					
Sustainable Innovation					
Funding of Sustainable Innovation					