

Assessing the Determinants of Sustainable Local Economic Development (SLED) in Red Sea Island Communities: Insights from a Comparative Stakeholder

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ABSTRACT

Island communities face distinctive development challenges due to their geographic isolation, ecological sensitivity, limited infrastructure, and narrow economic bases. These conditions are especially pronounced in Saudi Arabia's Red Sea Islands, where tourism expansion, conservation priorities, and Vision 2030 initiatives are rapidly transforming territorial planning needs. This study investigates the determinants of Sustainable Local Economic Development (SLED) in these Island communities by comparing the perceptions of academic experts and government officials across five domains: economic, environmental, urban/infrastructure, governance and e-governance, and social factors. Using a mixed-methods approach incorporating descriptive statistics, chi-square (χ^2) tests, and thematic interpretation, the analysis reveals a multidimensional development landscape marked by strong consensus on environmental fragility and infrastructure deficits, alongside significant divergence in perceptions of governance readiness, human capital capacity, and economic diversification barriers. Environmental protection emerged as the most influential enabling factor, while infrastructure inadequacy and institutional fragmentation were identified as primary constraints. The findings highlight the need for an integrated SLED framework that aligns Blue Economy diversification, resilient infrastructure, adaptive governance, and community capacity-building. This research contributes new empirical evidence for Saudi Island development, refines theoretical applications of LED, TBL, and resilience theory in arid Island contexts, and offers policy directions to support sustainable and inclusive growth in the Red Sea region.

Keywords: Sustainable Local Economic Development (SLED); Island Communities; Red Sea; Blue Economy; Vision 2030; Local Economic Development (LED); Environmental Sustainability; Governance; Infrastructure; Resilience Theory; Triple Bottom Line (TBL); Saudi Arabia

INTRODUCTION

Island communities represent some of the most distinctive and challenging development contexts worldwide (UN, 2023). Their geographic isolation, limited resource bases, ecological sensitivity, and small populations create structural constraints that differ markedly from mainland territories (Bush, 2018; Rasheed, 2019; Pathirana, 2025). As a result, effective development planning in Islands communities requires approaches that integrate economic

diversification, environmental stewardship, governance efficiency, and social inclusiveness within a localized framework tailored to their unique socio-ecological conditions (Tandrayen et al., 2024; Pathirana, 2025). In recent decades, growing global interest in sustainable Island economies, particularly through concepts such as Local Economic Development (LED), Sustainable Local Economic Development (SLED), resilience theory, and the Blue Economy, has deepened understanding of how Island systems can harness their natural assets while mitigating development vulnerabilities (Shirakoti et al., 2022).

For Saudi Arabia, the Red Sea Islands have gained increasing strategic importance under Vision 2030, especially as the country accelerates tourism diversification, conservation initiatives, and coastal development projects (Saudi Version, 2016; SGI, 2021). Despite their economic potential, these Islands continue to face persistent challenges: limited infrastructure, constrained access to utilities and services, small labor pools, weak private-sector engagement, fragmented governance, and high ecological sensitivity (EU-GCC, 2021; GCC, 2024, Alhowaish, 2025). These conditions mirror patterns documented across Island regions globally, yet research focusing specifically on the Red Sea context remains extremely limited. Existing development frameworks are largely derived from tropical or volcanic Island settings and often do not fully reflect the unique environmental and institutional conditions specific to the Saudi context. This gap in context-specific knowledge has constrained the ability of policymakers and practitioners to formulate development strategies that reflect the Islands' unique environmental, institutional, and socio-economic realities (Balzan et al., 2018; Messerli et al., 2019; Waker et al, 2021; Fudjaja et al., 2020; Mycoo et al., 2022).

To address these shortcomings, scholars have increasingly emphasized the need for integrated development models that combine place-based LED principles, adaptive capacities from resilience theory, and the multidimensional sustainability orientation of the Triple Bottom Line (Elkington, 1997; World Bank, 2003; Meyer-Stamer, 2008; Hubbard, 2009; Hammer & Pivo, 2017; Rabbi, 2025). Likewise, the Blue Economy has gained prominence as a strategic pathway for Island communities seeking to leverage marine resources, such as fisheries, ecotourism, renewable energy, and conservation activities, while ensuring long-term ecological integrity (WWF, 2015; Thankachan, 2024). However, translating these frameworks into actionable strategies for Saudi Arabia's Red Sea Islands requires empirical insight into how key stakeholders understand development opportunities, constraints, and priorities. This study responds directly to these gaps by examining the determinants of Sustainable Local Economic Development (SLED) through a comparative analysis of academic experts and government officials, two groups whose perspectives shape policy formulation, planning practice, and implementation outcomes. By investigating their perceptions across economic, environmental, governance, e-governance, urban, and social domains, the research provides a multidimensional understanding of factors influencing Island development and reveals areas of convergence and divergence that have critical implications for policy design. In doing so, the study contributes both conceptually and empirically to the limited body of knowledge on SLED in the Middle East and offers a framework for guiding sustainable, resilient, and inclusive development in Saudi Arabia's Red Sea Islands.

LITERATURE REVIEW

Sustainable Local Economic Development (SLED) integrates economic, social, environmental, and governance dimensions to promote development that is both locally rooted and long-term in impact. For Island communities, characterized by geographic isolation, ecological fragility, resource limitations, and unique socio-economic challenges, the conceptual foundations of SLED are especially relevant. This section synthesizes global theoretical perspectives on Local Economic Development (LED), resilience theory, sustainability frameworks, and the Blue Economy, and reviews empirical studies on Island development. It also highlights research gaps and positions the Saudi Red Sea Islands within the broader global discourse.

Local Economic Development: Definitions and Theoretical Foundations

Local Economic Development (LED) is widely recognized as a community-driven process that seeks to enhance local economic capacity, stimulate entrepreneurship, attract investment, and create sustainable livelihoods (World Bank, 2003; Meyer-Stamer, 2008). Foundational definitions emphasize LED as a partnership-based model involving government, private sector actors, and community organizations collaborating to improve economic conditions within a defined territory (Elkington, 1997).

Blakely and Leigh (2010) describe LED as the process by which local governments and community-based organizations stimulate or maintain business activity and employment. Similarly, the International Labor Organization (ILO, 2006) stresses the importance of building local competitiveness and utilizing endogenous resources to overcome global market pressures. Meyer-Stamer (2008) views LED as the ability of a locality to generate income and improve quality of life through structured interventions addressing market failures and infrastructure gaps. Most LED definitions converge on key principles:

1. Place-based development, focusing on local assets.
2. Participatory governance, incorporating multiple stakeholders.
3. Economic diversification, reducing dependence on limited sectors; and
4. Sustainable development, ensuring long-term viability.

In the context of the Saudi Red Sea Islands, these principles are particularly relevant given their untapped economic potential, socio-economic disparities, and infrastructural deficits. The thesis highlights that LED provides a mechanism to address regional inequalities and enhance territorial competitiveness.

LED in Island Contexts: Global Insights

Island communities face development conditions that differ sharply from mainland territories, largely due to inherent structural constraints. Scholars highlight several persistent challenges, including geographical isolation that limits access to markets, heavy dependence on imported goods and energy, and narrow economic structures often dominated by tourism or fisheries (Baldacchino, 2006; Waker et al, 2021; Mycoo et al., 2022). Environmental vulnerability, particularly exposure to climate change, coastal erosion, and ecosystem degradation, further compounds these pressures. Small and dispersed populations weaken economies of scale and reduce the viability of large service systems or diversified industries, reinforcing a cycle of dependency and fragility (Tandrayen et al., 2024; Pathirana, 2025).

Given these constraints, development approaches for Islands must be grounded in community empowerment and locally driven strategies. External interventions alone cannot sustain Island economies without robust local participation and governance capacity (UN-Habitat, 2005). Evidence from the Caribbean, the Pacific Islands, and the Indian Ocean shows that successful Island development models integrate traditional knowledge, community co-management of natural resources, and governance reforms that strengthen accountability and adaptive decision-making (Vanderpool-Wallace, 2007; Hubbard, 2009; Rabbi, 2025). Such models demonstrate that sustainability in Islands is not solely a technical challenge but fundamentally a social and institutional one.

The prior assessments of the Virgin Islands reveals that Saudi Arabia's Red Sea Islands exhibit many of the same structural conditions found in global Island regions (Luijendijk, 2022; Robitzch et al., 2023; Almutlaq, 2025). These include inadequate infrastructure, such as transportation links, utilities, and digital connectivity, regulatory hurdles that discourage private-sector investment, shortages of technical and tourism-related skills, and weak marketing strategies for tourism and entrepreneurship. These parallels suggest that SLED frameworks developed for other Island contexts provide valuable insights for the Red Sea, offering guidance on how to align infrastructure development, governance reforms, and community capacity-building with sustainable and inclusive Island development objectives.

Resilience Theory and Adaptive Capacity in Island Development

Resilience theory offers a powerful framework for understanding how Island economies respond to environmental, economic, and institutional shocks. Originating in ecological science (Holling, 1973), resilience is defined as a system's capacity to absorb disturbances while maintaining essential functions. Applied to economic development, resilience emphasizes adaptability, structural flexibility, and the capacity of local economies to reorganize and recover from disruption (Martin, 2012). These ideas are particularly salient for Islands, where vulnerability is amplified by geographic isolation, environmental fragility, and limited economic diversification.

Four core dimensions of resilience are especially relevant to LED in Island contexts. Adaptive capacity refers to the ability of communities, institutions, and ecosystems to adjust to shocks such as climate change or sudden economic shifts (Funke et al., 2016; Rizzi et al., 2018; Rabbi, 2025). Diversification reduces dependence on single sectors, such as tourism or fisheries, and helps buffer local economies against external volatility. Recovery mechanisms, including effective governance, emergency systems, and institutional coordination, enable rapid rebuilding and reduce long-term losses after a disturbance. Finally, sustainability ensures that development pathways enhance long-term viability while minimizing ecological risks, recognizing that environmental degradation directly undermines economic and social well-being in Island settings. Global research consistently highlights the disproportionate exposure of Islands to climate hazards, supply chain interruptions, and fluctuations in tourism, making resilient policy frameworks essential (Funke et al., 2016; Bush, 2018; Shirakoti et al., 2022; Pathirana, 2025).

This research paper will integrates resilience theory to diagnose the vulnerabilities of Saudi Arabia's Red Sea Islands and demonstrates its importance in shaping adaptive LED strategies suited to fragile marine environments. By embedding resilience into planning and decision-making, policymakers can support development models that not only withstand shocks but also enhance the capacity of Island communities to thrive amid uncertainty.

The Triple Bottom Line (TBL) and Sustainable Development Frameworks

The Triple Bottom Line (TBL), introduced by Elkington (1997), broadens traditional economic assessments by incorporating social and environmental dimensions alongside financial performance. This triad, People, Planet, and

Profit, has become a foundational framework in Sustainable Local Economic Development (SLED), particularly in contexts where development decisions must account for ecological sensitivity and community well-being (Hubbard, 2009; Hammer & Pivo, 2017; Rabbi, 2025). For Island territories, where socioeconomic systems are tightly interdependent with natural ecosystems, the TBL offers a holistic lens through which sustainability can be evaluated and managed.

- The People dimension emphasizes social sustainability, including human capital development, community engagement, education, skills training, and social equity. These elements are especially critical in the Virgin Islands, where skills shortages, limited professional training opportunities, and insufficient community participation in planning and tourism initiatives remain major constraints (Luijendijk, 2022; Robitzsch et al., 2023; Almutlaq, 2025). Strengthening social sustainability is therefore essential not only for improving local livelihoods but also for enabling residents to contribute meaningfully to emerging economic sectors.
- The Planet dimension centers on environmental sustainability and is particularly salient for Island ecosystems, which are highly vulnerable to pollution, overfishing, coral reef degradation, and the impacts of climate change (Polman et al., 2016; Balzan et al., 2018; Sharma, 2023). The sensitivity of the Red Sea's marine and coastal environments makes them especially susceptible to unsustainable development practices, which could rapidly degrade the very ecological assets that underpin tourism, fisheries, and cultural heritage. Integrating environmental safeguards, conservation measures, and eco-friendly land-use planning is therefore a prerequisite for any long-term development strategy on these Islands.
- The Profit dimension addresses the economic sustainability of Island communities, focusing on diversification, entrepreneurship, investment incentives, sectoral innovation, and the creation of resilient local economies (Defilippis, 2001; Ashby et al., 2009; Androshchuk & Riedrieiev, 2024). There is broad agreement on the need for improved business support systems, investment facilitation, and value-chain development to advance LED in the Virgin Islands. Economic diversification, particularly through sustainable tourism, aquaculture, and renewable energy, is critical for reducing vulnerability to external shocks.

Together, these three dimensions of the TBL framework highlight the importance of integrated planning that balances economic aspirations with ecological protection and social well-being. This balanced approach is highly compatible with Saudi Arabia's Vision 2030 sustainability agenda, offering a structured pathway for aligning Island development strategies with national goals for environmental stewardship, economic transformation, and community empowerment.

The Blue Economy and Its Role in Sustainable Island Development

The Blue Economy has emerged as a transformative framework for guiding sustainable development in coastal and Island regions. Grounded in the principle of marine-based economic diversification, it emphasizes the productive and responsible use of ocean resources to stimulate economic growth while safeguarding ecological integrity (WWF, 2015; Thankachan, 2024). This paradigm shift moves beyond traditional sectoral development by integrating environmental sustainability as a central economic driver rather than a constraint, making it particularly relevant for fragile Island environments (Thankachan, 2024). Within this framework, a wide array of marine-based sectors contributes to diversified and resilient Island economies. Fisheries and aquaculture continue to form foundational livelihood systems, while marine tourism and recreation offer high-value opportunities that rely on the preservation of natural assets. Renewable energy technologies, such as wind, wave, and solar systems, provide alternatives to carbon-intensive power generation. Additional sectors such as maritime transport, conservation and ecosystem restoration, and marine biotechnology further expand the scope of Blue Economy applications. Together, these sectors create development pathways that balance economic opportunity with environmental responsibility (Lee et al., 2020; Pouponneau et al., 2024; alhowaish, 2025).

International experience demonstrates that Islands successfully adopting Blue Economy strategies tend to achieve stronger economic resilience, greater diversification, and heightened ecological stewardship (Pouponneau et al., 2024). By integrating conservation, innovation, and resource efficiency into development planning, these Islands reduce their vulnerability to external shocks, such as tourism fluctuations or climate-related hazards, while enhancing long-term sustainability (Smith-Godfrey, 2016). This model offers lessons for regions seeking to build robust marine-based economies without compromising environmental assets.

Saudi Arabia's Red Sea Islands possess significant potential for Blue Economy development but currently remain in the early stages of utilization (Almutlaq, 2025). Opportunities include ecotourism, marine conservation enterprises, renewable energy deployment, and scientific research, yet these are constrained by environmental sensitivities, weak infrastructure systems, and regulatory gaps. Integrating Blue Economy principles into Sustainable Local Economic Development (SLED) strategies is therefore essential for aligning economic growth with ecological

protection. Doing so will help ensure that Saudi Island communities pursue development pathways that are both resilient and balanced, supporting long-term prosperity while maintaining the integrity of their unique marine environments.

Global Sustainable Local Economic Development (SLED) Practices

Empirical studies on Sustainable Local Economic Development (SLED) consistently identify a set of recurring economic drivers that are particularly relevant in Island settings. These include sustainable agriculture and fisheries, diversification of tourism offerings, improved access to finance, entrepreneurship support, the adoption of technology and innovation, and circular economy practices that reduce waste and enhance resource efficiency (Defilipps, 2001; Funke et al., 2016; Balzan et al., 2018; Pathirana, 2025). In the case of Saudi Arabia's Red Sea Islands, all of these factors emerge as critical determinants of sustainable development, with strong consensus on the need to expand and diversify economic activities to reduce dependence on a narrow set of sectors.

Governance is another central pillar of SLED in Island contexts. Research highlights that transparent regulatory systems, effective institutional coordination, meaningful community participation, and strong partnerships across government, private sector, and civil society are essential for successful local economic development (Polman et al., 2016). Challenges such as bureaucratic procedures, limited investment incentives, and weak local governance frequently hinder development progress in Islands worldwide (Sharma et al., 2023). Similar governance constraints have been observed in the Red Sea Islands, reflecting global patterns where institutional coordination challenges may limit the effectiveness of development interventions and private-sector engagement (Robitzsch et al., 2023).

Environmental determinants play an equally important role, given the ecological fragility of Island ecosystems. Sustainable resource management, renewable energy transitions, marine and coastal conservation, and disaster resilience strategies are consistently identified as foundational requirements in global SLED frameworks (UN-Habitat, 2005; UN, 2023). These measures are essential not only for protecting natural assets but also for sustaining the economic activities, such as tourism and fisheries, that depend directly on environmental quality. For Islands prone to climate risks and biodiversity loss, environmental sustainability becomes a prerequisite for long-term economic and social stability.

Additionally, social development factors complete the multidimensional foundation of SLED. Human capital development, educational access, workforce readiness, and community engagement are crucial for ensuring that development is inclusive and locally embedded (Shirakoti et al., 2022; Tandrayen-Ragoobur et al., 2024). Without skilled labor and active community participation, even well-designed development initiatives face significant implementation barriers. Together, these economic, governance, environmental, and social factors form the analytical basis for constructing the SLED conceptual framework, enabling a holistic understanding of how sustainable development can be achieved in Saudi Arabia's Island communities.

Conceptual and Empirical Gaps in Island Development Research

Despite the abundance of global studies on Island development, major conceptual and empirical gaps persist, particularly in the Middle East. Few investigations have examined Local Economic Development (LED) or Sustainable Local Economic Development (SLED) within Saudi Arabia's Island communities, despite their growing strategic, ecological, and economic significance. Much of the existing international literature is derived from tropical or volcanic Island contexts, limiting its applicability to the arid, high-conservation-value marine environments of the Red Sea. Furthermore, very little comparative research explores how key stakeholder groups, such as academic experts and government officials, perceive LED drivers, constraints, and opportunities. The absence of development models that integrate Saudi Arabia's Vision 2030 priorities into Island-specific planning further underscores the need for frameworks tailored to the region's ecological sensitivity, governance structures, and diversification agenda. This study addresses these gaps by generating new empirical evidence through two structured surveys targeting expertise, academic and government practitioners engaged in coastal and Island development. The comparative analysis provides a nuanced understanding of the challenges and opportunities shaping SLED in the Red Sea Islands, highlighting issues related to infrastructure deficits, governance fragmentation, environmental vulnerability, human capital limitations, and private-sector readiness (Kautsary, 2017; OECD, 2029).

To guide this analysis, the study employs a comprehensive conceptual framework derived from contemporary Blue Economy literature and supported by theoretical foundations in LED, resilience theory, and sustainability models. As shown in Figure 1, this integrated framework positions marine-based economic diversification, ecological stewardship, and community-centered development as essential pillars of sustainable Island economies (Roseland, 2000; Loh & Shear, 2015; Tandrayen-Ragoobur et al., 2024). By combining LED principles, such as place-based development, participatory governance, and economic diversification, with resilience concepts emphasizing adaptive capacity and long-term system sustainability, the model offers a multidimensional approach suited to the fragile marine environments of the Red Sea. Incorporating the Triple Bottom Line ensures balanced consideration of social, environmental, and economic priorities. Through the integration of high-potential Blue

Economy sectors, including ecotourism, sustainable fisheries, renewable marine energy, conservation enterprises, and marine biotechnology, the framework provides a forward-looking pathway for resilient, inclusive, and Vision 2030–aligned development. It serves as the analytical foundation for interpreting stakeholder perceptions, identifying SLED constraints and opportunities, and proposing policy directions that support long-term sustainable Island development.



Figure 1. SELD Conceptual Framework

MATERIALS AND METHODS

This study employed a mixed-methods research design to generate a comprehensive understanding of the determinants shaping Sustainable Local Economic Development (SLED) in Saudi Arabia's Red Sea Island communities (Figure 2). By integrating quantitative assessments with qualitative explanatory comments embedded within the survey, the methodology captures both statistical patterns and contextual insights across diverse development dimensions (Creswell & Clark, 2017; Creswell & Poth, 2018). This approach aligns with global best practices in SLED and LED research, especially in complex territorial systems such as Island communities that require multi-perspective analysis to understand constraints, opportunities, and governance challenges (Denscombe, 2007). The research targeted two key stakeholder groups whose perspectives directly influence planning, policy formulation, and development implementation: academic experts and government officials. Academic participants were selected based on their specialization in areas including urban planning, economics, sustainability, and coastal or Island development, with a minimum of five years of relevant professional or research experience. Government officials were drawn from ministries, regional authorities, environmental agencies, and local municipalities engaged in Red Sea development initiatives. Of the 125 individuals invited, 96 completed surveys were obtained, 54 experts and 42 government officials, yielding response rates of 76.8% and 76.4%, respectively. These response rates meet statistical adequacy requirements based on Cochran's formula, ensuring that the dataset is reliable for comparative analysis (Bryman, 2016).

The survey instrument was constructed using the SLED conceptual framework, which informed the selection and organization of key variables. It was divided into two substantive components: demographic profiling and the rating of LED/SLED development factors. Respondents evaluated a series of statements across five core domains, economic, environmental, urban/infrastructure, governance and e-governance, and social factors, using a five-point Likert scale. These domains reflect internationally recognized LED/SLED indicators but were specifically tailored to the developmental conditions and ecological sensitivities of Red Sea Island communities. Preliminary expert review ensured content validity and alignment with the theoretical foundations outlined in the study.

Data collection was conducted electronically over an eight-week period, enabling broad participation across geographically dispersed institutions. An introductory invitation outlined the study's aims, confidentiality procedures, and expected completion time, while periodic reminders ensured high engagement rates. The digital distribution method not only facilitated efficient data retrieval but also aligned with the increasing institutional reliance on electronic communication across government and academic sectors in Saudi Arabia (Alhowaish &

Kubur, 2025). This approach additionally minimized response bias by allowing participants to complete the survey at their convenience.

The data-analysis phase employed a combination of descriptive and inferential techniques. Descriptive statistics were used to compute means, frequencies, and standard deviations for each factor domain, enabling the identification of priority issues across respondent groups. Chi-square (χ^2) tests were then conducted to examine statistically significant differences between expert and government responses across the measured domains. These inferential results helped determine where perceptions converged or diverged, particularly regarding governance efficiency, environmental vulnerabilities, infrastructure adequacy, and social readiness, areas essential for constructing a robust SLED strategy. Supplementary qualitative comments provided by respondents were thematically coded to contextualize the quantitative findings, allowing deeper interpretation of stakeholder perspectives.

Ethical considerations were addressed in accordance with established standards for social science research. All participants provided informed consent electronically, and surveys were completed anonymously to protect confidentiality. No personal identifiers were collected, and participation was voluntary, with individuals able to discontinue at any point. Collected data were securely stored and used solely for academic analysis, ensuring compliance with ethical guidelines for transparency, data protection, and participant welfare (Israel & Hay, 2006). Collectively, these methodological steps provide a rigorous and credible foundation for the empirical results presented in the following section.

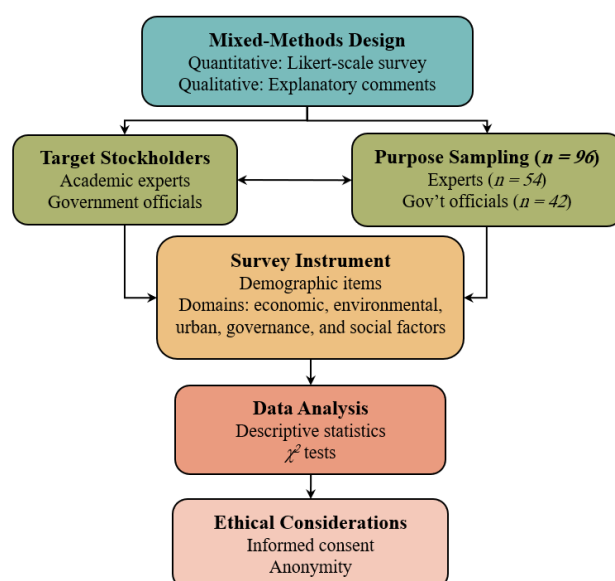


Figure 2. Mixed-Methods Research Design

RESULTS

This section presents the empirical findings derived from the comparative analysis of academic experts and government officials, offering a detailed examination of the determinants shaping Sustainable Local Economic Development (SLED) in the Red Sea Island communities. Drawing directly on survey data reported in the preceding demographic analysis and structured factor assessments, the results highlight areas of both convergence and divergence across key dimensions influencing Island development. These include economic conditions, e-governance capacity, environmental sustainability, urban infrastructure, and social readiness, all evaluated using descriptive statistics and chi-square (χ^2) tests to detect significant differences between stakeholder groups. Through this mixed-methods analytical approach, this section provides a holistic understanding of stakeholder perceptions, structural constraints, and enabling conditions that collectively inform the Islands' development trajectory, thereby establishing an empirical foundation for the discussion and integrated SLED framework presented in subsequent sections.

Demographic Profiles of Respondents

A total of 96 respondents participated in the study, consisting of 54 academic experts and 42 government officials whose work relates to local economic development, coastal management, sustainability, and planning within Saudi Arabia. The demographic analysis provides insight into respondent characteristics and establishes the foundation for the comparative assessment undertaken in this research. A cross-tabulation of the demographic variables,

supplemented with chi-square (χ^2) statistical tests, was conducted to determine whether the two stakeholder groups differed significantly across key attributes. The results indicate several important distinctions. Gender distribution differed significantly between experts and government officials ($\chi^2 = 6.18, p = .013$), with experts being predominantly male (77.8%) while the government group displayed a more balanced gender composition (53.8% male, 46.2% female). Nationality also differed significantly ($\chi^2 = 6.68, p = .009$), as all government respondents were Saudi nationals, whereas the expert group included a modest proportion of non-Saudi professionals (Table 1). These differences reflect the broader institutional context in which government agencies rely heavily on national employment, while academia tends to attract a more internationally diverse workforce.

In contrast, no statistically significant differences were found for education level, professional role, or years of experience. Both groups demonstrated similarly high levels of educational attainment, with a majority holding master's degrees or higher. Professional roles also showed substantial overlap, with senior management, technical specialists, and planners represented in both groups. Years of experience were likewise comparable, with the majority in each group having more than sixteen years of professional practice (experts: ~60%; government officials: 58.3%), indicating a mature and experienced respondent pool.

Overall, the demographic profiles reveal both shared and divergent characteristics between the two stakeholder groups. While the significant differences in gender and nationality highlight structural features of the academic and governmental sectors in Saudi Arabia, the similarity in educational attainment and professional experience reinforces the validity of comparing their perspectives on Sustainable Local Economic Development (SLED). The demographic consistency across most variables supports the reliability of cross-group comparisons and enhances confidence in the robustness of the empirical findings.

Table 1. Cross-Tabulation of Demographic Characteristics for Experts and Government Officials ($N=54$ for experts; $N=40$ for government officials)

Variable	Experts	Gov't officials	χ^2	p-Value	Interpretation
Gender	Male: 42 (77.8%) Female: 12 (22.2%)	Male: 22 (53.8%) Female: 19 (46.2%)	6.18	0.013**	Significant difference; government group more gender-balanced.
Nationality	Saudi: ~46 (85%) Non-Saudi: ~8 (15%)	Saudi: 42 (100%)	6.68	0.009***	Significant difference; government group entirely Saudi.
Education Level	Master's: 35 (64%) Bachelor's/PhD: 19 (36%)	Master's: 25 (58.3%) Bachelor's/PhD: 17 (41.7%)	0.36	0.55	Not significant; similar education levels.
Professional Role	Senior Mgmt: 18 (33.3%) Consultants: 11 (20.8%) Academics: 9 (16.7%)	Urban Planners: 14 (33.3%) Senior Mgmt: 10 (25%) Other: 7 (25%) Consultants: 7 (16.7%)	4.21	0.24	Not significant; roles differ but not statistically.
Years of Experience	>16 years: ~60% (estimated predominant group)	>16 years: 25 (58.3%) 11–15 years: 10 (25%) 6–10 years: 7 (16.7%)	0.28	0.87	Not significant; both groups highly experienced.

Notes: Significance Levels: *** $p < 0.01$, ** $p < 0.05$

Factors Affecting the LED in Islands' Community

This section presents a comprehensive analysis of the key factors influencing Local Economic Development (LED) in the Red Sea Island communities, based on comparative responses from academic experts and government officials. Drawing on the SLED framework and global Island development literature, this section examines how economic, e-governance, environmental, urban, and social dimensions shape development opportunities and constraints within these unique territorial contexts. By integrating descriptive statistics with chi-square (χ^2) tests, the analysis identifies both shared perceptions and significant divergences between stakeholder groups, offering deeper insight into institutional readiness, environmental vulnerabilities, human capital conditions, and the enabling environment for sustainable growth. This multifaceted assessment provides the empirical basis for understanding the structural dynamics of Island development and informs the synthesis, theoretical interpretation, and policy recommendations that follow.

Economic Factors

Economic determinants play a central role in shaping the prospects for Local Economic Development (LED) in the Red Sea's Island communities, and the comparative analysis of expert and government responses reveals both areas of convergence and statistically significant divergence. Overall, both stakeholder groups recognize the importance of core Blue Economy sectors, sustainable agriculture and fisheries, as foundational components of

Island-based economies. These factors exhibited no statistically significant differences between groups ($p > .05$), suggesting a shared understanding of the critical role of food security, resource management, and marine-based livelihoods in supporting long-term economic resilience. The strong mean scores for sustainable fisheries (Mean-exp. = 4.50; Mean-gov't = 4.40) further indicate broad alignment on its strategic value as a high-potential development pathway. Beyond these shared perspectives, however, most economic variables demonstrated statistically significant differences in perception between experts and government officials (Table 2).

Government respondents expressed stronger confidence in several economic enablers, particularly access to finance, tourism diversification, circular economy practices, and economic specialization. Conversely, experts tended to emphasize structural weaknesses and market barriers more critically. The chi-square analysis confirms significant differences for: access to finance ($\chi^2 = 7.04$, $p = .030$), tourism diversification ($\chi^2 = 10.55$, $p = .014$), circular economy adoption ($\chi^2 = 6.29$, $p = .043$), technology and innovation uptake ($\chi^2 = 21.24$, $p < .001$), and both diversification and specialization of the economic base ($p < .01$). These results indicate that experts perceive greater challenges related to institutional readiness, private-sector engagement, and workforce capabilities, particularly in areas requiring advanced skills and innovative approaches.

Table 2. Economic Factors Affecting LED in Island Communities (Experts vs. Government Officials), Including χ^2 Tests ($N=54$ for experts; $N=40$ for government officials)

Economic Factor	Mean (Exp.)	Mean (Gov.)	χ^2	df	p-value	Significance
1. Positive Factors						
Sustainable Agriculture	4.28	4.30	7.76	3	0.051	Not Sig. (borderline)
Sustainable Fisheries	4.50	4.40	1.57	2	0.456	Not Sig.
Access to Finance	4.11	4.40	7.04	2	0.030	Significant
Tourism Diversification	4.56	4.40	10.55	3	0.014	Significant
Circular Economy	3.83	4.00	6.29	2	0.043	Significant
Technology & Innovation	4.17	3.40	21.24	3	<0.001	Highly Significant
Diversifying Economic Base	3.61	4.30	29.31	2	<0.001	Highly Significant
Specializing Economic Base	3.94	4.20	13.04	2	0.001	Significant
2. Negative Factors						
Limited Market Access	4.17	3.90	12.31	3	0.006	Significant
Overdependence on One Industry	3.78	3.50	15.44	3	0.001	Significant

Notes: Significance Levels set for $p < 0.05$

Negative economic factors also exhibit meaningful differences between groups. Limited market access ($\chi^2 = 12.31$, $p = .006$) and overdependence on a single industry ($\chi^2 = 15.44$, $p = .001$) were significantly more pronounced concerns among experts than government officials. This aligns with LED theory, which emphasizes the vulnerability of small economies that rely heavily on narrow sectoral structures, and with global Island research highlighting logistical constraints, scale limitations, and supply-chain dependencies. Experts' heightened sensitivity to these risks suggests a stronger awareness of long-term structural vulnerabilities and the need for diversified economic strategies to reduce exposure to external shocks.

Taken together, the results demonstrate that while both stakeholder groups acknowledge the importance of economic transformation for Island development, experts tend to adopt a more cautious and risk-centered perspective, whereas government officials express greater optimism regarding emerging economic opportunities. These differing views highlight the need for enhanced dialogue and coordinated planning to ensure that economic policies effectively balance ambition with feasibility, and that LED strategies reflect both on-the-ground realities and national development priorities.

E-Governance Factors

E-governance plays a central role in shaping the institutional environment necessary for effective Local Economic Development (LED) in Island communities. Insights derived from both expert and government respondents highlight that digital governance mechanisms, particularly collaboration platforms, knowledge-sharing systems, and transparent policy processes, enable smoother coordination, improved information flows, and more efficient planning outcomes. As shown in the survey results (Table 3), both stakeholder groups consistently rate e-governance as a highly influential determinant of LED, reflecting the growing importance of digital transformation in public administration, especially in geographically isolated Island settings. The strong performance of factors such as Collaboration and Partnerships and Knowledge Sharing and Learning Networks indicate that respondents perceive digital platforms as essential tools for bridging institutional gaps, reducing fragmentation, and fostering cross-agency alignment.

At the same time, perceptions regarding Governance and Policy Challenges illustrate that e-governance is not simply a technical solution but an institutional reform agenda. Experts report moderate concerns over procedural inefficiencies, while government officials express greater confidence in the effectiveness of existing governance systems. This perception gap may reflect differences in operational experience, policy expectations, and exposure to on-the-ground implementation challenges. Nevertheless, the high mean scores across all e-governance indicators, combined with statistically meaningful divergence between groups, demonstrate that enhancing digital coordination, regulatory transparency, and policy communication is indispensable for strengthening sustainable LED outcomes. For Island communities aspiring to integrate Blue Economy sectors, eco-tourism, and innovation-driven development, robust digital governance infrastructure will continue to be a foundational enabler.

Table 3. E-Governance Factors Affecting LED in Island Communities (Experts vs. Government Officials), Including χ^2 Tests ($N=54$ for experts; $N=40$ for government officials)

Group	Strongly Effective	Effective	Neutral	Ineffective	Strongly Ineffective	Mean	χ^2	p-value
1. Collaboration & Partnerships								
Experts	27	24	3	0	0	4.44	9.85	0.020*
Government	28	4	8	0	0	4.50		
2. Knowledge Sharing & Learning Networks								
Experts	21	21	12	0	0	4.17	14.22	0.003**
Government	16	24	0	0	0	4.40		
3. Governance & Policy Challenges								
Experts	12	30	3	9	0	3.83	6.74	0.034*
Government	16	12	12	0	0	4.10		

Notes: χ^2 and p-values computed using 5-category Likert distributions for experts vs. government groups. Significance thresholds: $p < .05^*$ (significant), $p < .01^{**}$ (highly significant). Higher means = greater perceived positive effect on LED.

Environmental Factors

Environmental factors emerged as one of the strongest and most consistently supported determinants of Sustainable Local Economic Development (SLED) across both expert and government stakeholder groups. The results demonstrate exceptionally high levels of agreement regarding the central role of environmental stewardship, particularly renewable energy potential, climate resilience, sustainable tourism, and conservation, in shaping development prospects for the Red Sea Islands. The environmental dimension showed some of the highest mean values in the dataset, reflecting the recognition that ecological integrity forms the foundation for tourism, fisheries, community well-being, and broader economic viability.

The χ^2 tests reinforce this interpretation by confirming no statistically significant differences between experts and government officials across all environmental factors, indicating a robust shared understanding of environmental priorities (Table 4). For example, Renewable Energy & Energy Efficiency, rated with mean scores of 4.33 (experts) and 4.40 (government), yielded a nonsignificant χ^2 value ($\chi^2 = 2.41$, $p > .05$), demonstrating nearly identical perceptions. Similarly, Resilience and Adaptation ($\chi^2 = 6.73$, $p > .05$) and Sustainable Tourism Practices ($\chi^2 = 7.88$, $p > .05$) exhibited high agreement, with government officials showing slightly more variation but still affirming the overall positive importance of these factors. Sustainable Resource Management & Conservation produced one of the tightest alignments ($\chi^2 = 3.92$, $p > .05$), further underscoring the strong consensus that environmental protection is a non-negotiable component of Island development.

The negative environmental factor, Vulnerability to Climate Change & Natural Disasters, also demonstrated convergence between groups, with experts ($M = 4.61$) and officials ($M = 4.40$) rating it as the single most severe threat to LED. The χ^2 test again showed no significant difference ($\chi^2 = 8.21$, $p > .05$). This shared concern highlights the urgent need for climate adaptation strategies, given the Islands' exposure to sea-level rise, increasing temperatures, coral bleaching, storm surge risks, and ecosystem degradation. Importantly, the consistency of these findings suggests a strong policy foundation for environmental planning: both experts and government officials clearly recognize that without environmental safeguarding, the Islands' development potential cannot be realized.

Overall, the combination of high mean scores and nonsignificant χ^2 values reveals a powerful consensus that environmental sustainability is not merely desirable but essential. This alignment strengthens the argument for integrating conservation zones, renewable energy systems, climate adaptation planning, and sustainable tourism guidelines into all future development frameworks for the Red Sea Islands. The environmental pillar thus stands out as one of the most unified and strongly endorsed components of the SLED model.

Table 4. Environmental Factors Affecting LED in Island Communities (Experts vs. Government Officials), Including χ^2 Tests ($N=54$ for experts; $N=40$ for government officials)

Group	Strongly Effective	Effective	Neutral	Ineffective	Strongly Ineffective	Mean	χ^2	p-value
1. Renewable Energy & Energy Efficiency								
Experts	27	21	3	3	0	4.33	2.41	> .05
Government	16	24	0	0	0	4.40		
2. Resilience & Adaptation								
Experts	27	21	3	3	0	4.33	6.73	> .05
Government	12	20	8	0	0	4.10		
3. Sustainable Tourism Practices								
Experts	16	12	0	0	0	4.33	7.88	> .05
Government	16	12	4	0	0	4.57		
4. Sustainable Resource Management & Conservation								
Experts	15	21	0	0	0	4.42	3.92	> .05
Government	24	12	4	0	0	4.43		
5. Vulnerability to Climate Change & Natural Disasters (Negative Factor)								
Experts	39	12	0	3	0	4.61	8.21	> .05
Government	24	12	0	4	0	4.40		

Notes: χ^2 and p-values computed using 5-category Likert distributions for experts vs. government groups. Significance thresholds: $p < .05^*$ (significant)

Urban Factors

Urban factors constitute a fundamental dimension of Sustainable Local Economic Development (SLED) in Island contexts, where spatial constraints, limited service infrastructure, and geographic isolation magnify the importance of effective urban systems (Kautsary, 2017; OECD, 2029). The comparative analysis of expert and government responses reveals strong alignment on several key components, especially regarding infrastructure development and basic service delivery. As shown in Table 5, both groups rated Infrastructure Development and Connectivity as one of the most influential positive factors (Experts $M = 4.50$; Government $M = 4.40$), and the chi-square test confirms no statistically significant difference between groups ($\chi^2 = 0.53$, $p = 0.767$). This consensus underscores the widespread recognition that mobility networks, transport infrastructure, and efficient urban connectivity are preconditions for tourism development, market access, community welfare, and overall socioeconomic resilience in the Red Sea Islands.

Significant divergences, however, emerge in perceptions of Cultural Preservation and Heritage. Experts rated this factor highly ($M = 4.33$), emphasizing its value in supporting cultural tourism, identity preservation, and place-based development strategies. Government officials, in contrast, expressed a more neutral stance ($M = 2.50$), leading to a highly significant χ^2 result ($\chi^2 = 19.67$, $p < 0.001$). This difference reflects a broader institutional tension between heritage conservation and modernization priorities, a tension frequently documented in Island development literature. Experts tend to frame cultural assets as strategic economic resources, while government actors may view them as secondary to infrastructure expansion and regulatory reform. This finding suggests the need for greater policy alignment and stronger integration of cultural heritage within LED strategies.

Negative urban factors also highlight important areas of consensus and divergence. Limited Access to Resources received high mean scores from both groups (Experts $M = 4.11$; Government $M = 4.10$), with no statistically significant difference ($\chi^2 = 4.59$, $p = 0.204$), indicating shared acknowledgment of constraints related to land availability, materials, utilities, and essential services. In contrast, Inadequate Infrastructure and Services produced one of the most significant divergences in the urban category. Experts rated this factor as extremely severe ($M = 4.61$), whereas government officials assigned a lower yet still high rating ($M = 4.20$). The chi-square test confirms a highly significant difference ($\chi^2 = 20.57$, $p < 0.001$), reflecting differing perceptions of service delivery quality, operational challenges, and implementation readiness. Experts appear more focused on technical implementation challenges, while government officials emphasize planned improvements and Vision 2030 initiatives.

Overall, the chi-square results reveal a nuanced pattern: while both groups share strong agreement on structural enablers such as connectivity and resource access, substantial gaps persist in areas involving heritage stewardship and the adequacy of current urban services. These findings emphasize that effective SLED in the Red Sea Islands requires not only infrastructure investment but also culturally sensitive urban policy frameworks and improved coordination mechanisms between technical experts and government agencies. Addressing these gaps is essential for building more resilient, inclusive, and sustainable Island communities.

Table 5. Urban Factors Affecting LED in Island Communities (Experts vs. Government Officials), Including χ^2 Tests ($N=54$ for experts; $N=40$ for government officials)

Urban Factor	Mean	χ^2	df	p-value	Significance
1. Infrastructure Development & Connectivity					
Expert vs Government	4.50 / 4.40	0.53	2	0.767	Not Significant
2. Cultural Preservation & Heritage					
Expert vs Government	4.33 / 2.50	19.67	2	<0.001	Highly Significant
3. Limited Access to Resources					
Expert vs Government	4.11 / 4.10	4.59	3	0.204	Not Significant
4. Inadequate Infrastructure & Services					
Expert vs Government	4.61 / 4.20	20.57	2	<0.001	Highly Significant

Social Factors

Social factors constitute a critical pillar of Sustainable Local Economic Development (SLED), especially within Island communities where human capital strength, community participation, and social cohesion directly influence development capacity and long-term resilience (Roseland, 2000; Loh & Shear, 2015; Tandrayen-Ragoobur et al., 2024). The results reveal both areas of alignment and statistically significant differences between experts and government officials regarding the social readiness of the Red Sea Island communities.

As shown in Table 6, the factor Access to Education and Skills Development demonstrates one of the most pronounced perceptual gaps. Experts reported strong consensus on its positive influence ($M = 4.11$), with a highly concentrated distribution of responses in the “Effective” and “Strongly Effective” categories. Government officials also viewed this factor as important ($M = 3.70$), but their responses were more widely distributed, including higher levels of neutrality and a notable proportion rating the factor as “Ineffective.” The chi-square test confirms these differences to be statistically significant ($\chi^2 = 11.36$, $p = .0099$), indicating that the two stakeholder groups do not share the same level of confidence in existing educational and capacity-building structures. This divergence may reflect differing institutional vantage points: while experts assess human capital gaps based on strategic development needs, government officials may be responding to operational constraints, resource limitations, or uneven program performance in Island settings.

A similar pattern, though less statistically pronounced, emerges for Community Engagement and Empowerment. Experts assigned a moderate mean score ($M = 3.72$), indicating ongoing concerns about limited community participation in planning and development processes. Government officials rated this factor more positively ($M = 4.10$), suggesting greater confidence in outreach efforts, emerging participation platforms, or the Island communities’ readiness to engage in decision-making. The chi-square test reveals a borderline but not statistically significant difference ($\chi^2 = 7.21$, $p = .066$). This near-significance underscores an important qualitative insight: while both groups value community engagement, experts perceive deeper structural limitations, whereas government officials adopt a more optimistic interpretation of current engagement levels.

Together, the results suggest that social development remains one of the least consolidated dimensions of SLED, with challenges related to skills shortages, uneven participation, and evolving community empowerment structures. Statistical evidence highlights a need for improved policy coordination, sustained investment in human capital, and enhanced participatory governance frameworks to ensure that Island communities can effectively contribute to, and benefit from, emerging development opportunities aligned with Vision 2030 and the Blue Economy agenda.

Table 6. Social Factors Affecting LED in Island Communities, Including χ^2 Tests ($N=54$ for experts; $N=40$ for government officials)

Group	Strongly Effective	Effective	Neutral	Ineffective	Strongly Ineffective	Mean	χ^2	df	p-value
1. Access to Education & Skills Development									
Experts	12	39	0	3	0	4.11	11.36	3	0.009*
Government	8	20	4	8	0	3.70			
2. Community Engagement & Empowerment									
Experts	6	30	15	3	0	3.72	7.21	3	0.066
Government	12	20	8	0	0	4.10			

Notes: Significance Levels: * $p < 0.05$

Narrative Synthesis Linking All Factor Categories

The integrated analysis across all factor categories, economic, environmental, e-governance, urban, and social, reveals a multidimensional yet interconnected landscape shaping Sustainable Local Economic Development (SLED) in the Red Sea Island communities. A central insight emerging from this synthesis is the coexistence of broad stakeholder alignment on strategic development priorities with targeted areas of divergence that reflect

differences in institutional roles, lived experience, and expectations for implementation. Collectively, the findings point to a development environment where structural opportunities are clear, but the pathways toward achieving them remain uneven across governance, social readiness, and operational capacity.

Environmental factors stand out as the strongest area of consensus, with no-statistically significant χ^2 differences across any of the positive or negative indicators. Both experts and government officials consistently rate renewable energy potential, conservation imperatives, sustainable tourism practices, and climate resilience as critical components of Island development. This convergence highlights an important foundation: stakeholders recognize that environmental integrity is the primary asset upon which tourism, fisheries, and community well-being depend. Vulnerability to climate change, in particular, received the highest mean ratings across the entire dataset, underscoring the urgency of adaptive planning and the centrality of environmental stewardship in shaping future development frameworks.

In contrast, economic and urban categories reveal several statistically significant divergences, illustrating differentiated understandings of institutional readiness and development feasibility. Experts demonstrated heightened concern over constraints related to access to finance, technology adoption, economic diversification, and overdependence on single industries, each confirmed by significant χ^2 results. These patterns suggest that experts perceive systemic structural barriers that may inhibit the realization of Blue Economy opportunities. Similarly, urban factors such as cultural preservation and inadequate service infrastructure exhibited significant divergence, with experts assigning more critical evaluations than government officials. These differences point to gaps between strategic aspirations and the operational or regulatory realities experienced by practitioners and community-facing officials.

E-governance factors, by comparison, occupy a middle ground, highly rated by both groups but with differences that, while statistically significant, are less pronounced than those observed in economic or urban dimensions. Experts placed greater emphasis on challenges related to institutional coordination, transparency, and knowledge-sharing, whereas government officials demonstrated stronger confidence in ongoing digital transformation initiatives. This divergence likely reflects varying perspectives on the maturity of governance systems, experts assessing systemic coherence, and officials evaluating programmatic improvements.

The social dimension reveals the most critical human-centered gaps, particularly in education, skills development, and community empowerment. The factor of Access to Education & Skills Development produced a statistically significant χ^2 result, with government officials expressing more varied and less positive assessments of human capital capacity. This suggests persistent structural limitations in technical training, vocational pathways, and skills alignment with emerging economic sectors such as eco-tourism, aquaculture, renewable energy, and conservation. Meanwhile, community empowerment produced a borderline χ^2 difference, reflecting divergent expectations regarding community readiness and engagement in development processes. These findings reinforce that social readiness is both a foundation and a bottleneck for sustainable LED, requiring targeted intervention in capacity-building, participatory governance, and inclusion mechanisms.

Synthesizing these patterns reveals a coherent insight: environmental priorities align strongly across stakeholder groups, providing a stable foundation for SLED, whereas economic, urban, governance, and social factors expose critical capacity gaps that must be addressed to operationalize development visions. Experts and government officials reflect complementary perspectives, one focusing on systemic analysis and the other on implementation progress. This divergence is not contradictory but rather complementary; together, they reflect the dual realities of strategic ambition and implementation challenges.

Overall, the combined findings suggest that SLED in Saudi Arabia's Red Sea Islands requires an integrative development model that:

1. Anchors economic growth in environmental stewardship,
2. Strengthens governance coordination and regulatory clarity,
3. Invests in resilient infrastructure and essential urban services,
4. Builds human capital and fosters community inclusion, and
5. Ensures that Blue Economy diversification is matched with institutional and social readiness.

Such a model aligns with global Island development best practices and provides a robust foundation for policy design under Vision 2030. It positions the Red Sea Islands not only as emerging economic zones but as resilient, sustainable, and community-centered development spaces capable of balancing environmental preservation with economic transformation.

Taken together, the economic, e-governance, environmental, urban, and social factors present a multidimensional portrait of the conditions shaping Local Economic Development in the Red Sea Island communities. The analysis reveals strong areas of consensus, particularly the centrality of environmental protection and the shared recognition of infrastructure gaps, alongside meaningful divergences in perceptions of governance readiness, social capacity, and economic constraints. These findings highlight that while stakeholders broadly agree on the strategic direction for Island development, they differ in their assessments of institutional effectiveness and

community preparedness, underscoring the need for targeted reforms and capacity-building. Importantly, the collective insights from both experts and government officials affirm that SLED in Island contexts cannot be advanced through single-domain interventions; rather, it requires an integrated, cross-sectoral strategy that aligns environmental integrity, governance modernization, inclusive human development, and Blue Economy-driven diversification. This integrated understanding provides the empirical foundation for the subsequent sections, where these factors are interpreted through theoretical frameworks and translated into a comprehensive SLED model tailored to the unique socio-ecological conditions of Saudi Arabia's Red Sea Islands.

DISCUSSION

This study assessed the determinants of Sustainable Local Economic Development (SLED) in Saudi Arabia's Red Sea Island communities through a comparative analysis of expert and government stakeholder perceptions. The findings confirm that LED outcomes in Island contexts are shaped by the interaction of economic, environmental, governance, social, and infrastructural factors rather than by isolated sectoral drivers. This multidimensional pattern aligns with LED theory, resilience theory, the Triple Bottom Line (TBL) framework, and Blue Economy principles, while also reflecting Saudi-specific dynamics associated with Vision 2030's accelerated development agenda.

As illustrated in Figure 3, the results reveal a system of interdependent development factors in which progress in one domain depends on complementary advances in others. Infrastructure deficits, governance weaknesses, and limited human capital capacity generate cascading constraints that reduce the effectiveness of economic diversification efforts (Kautsary, 2017; OECD, 2029). This systems-based perspective underscores the inadequacy of linear or sector-specific policy approaches for Island development and highlights the need for integrated SLED strategies.

From an LED theory perspective, the findings strongly support the importance of place-based development, local resource mobilization, and coordinated stakeholder action (). Both experts and government officials recognize the economic potential of tourism, aquaculture, and marine-based activities, yet emphasize that this potential remains underutilized due to infrastructure gaps, regulatory constraints, and workforce limitations. These results reinforce Meyer-Stamer's argument (2008) that LED success depends on addressing local market failures and institutional bottlenecks. While government respondents highlight ongoing reforms, experts point to persistent implementation gaps, indicating a disconnect between national policy ambitions and Island-level realities.

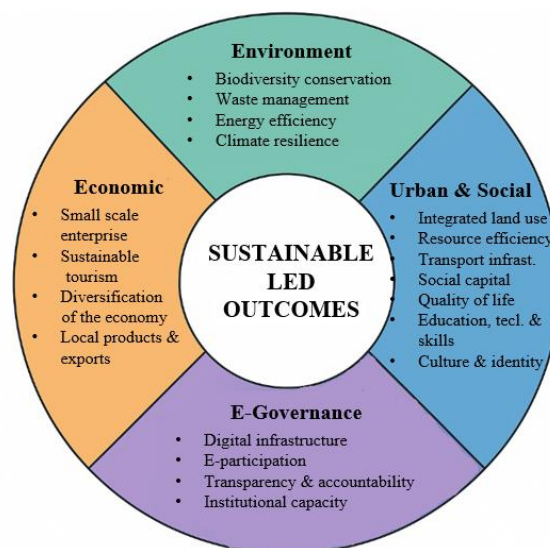


Figure 3. Integrated Interaction Model of Factors Affecting Local Economic Development (LED) in Island Communities

Environmental sustainability emerged as the most consistently prioritized dimension across stakeholder groups, confirming the centrality of the Planet pillar within the TBL framework (Elkington, 1997; Hubbard, 2009; Hammer & Pivo, 2017; Rabbi, 2025). Environmental fragility, particularly climate exposure, coral reef degradation, and ecosystem sensitivity, was widely viewed as a binding constraint on development. These findings mirror global Island evidence showing that ecological degradation directly undermines economic viability (Messerli et al., 2019; Shivakoti et al., 2022; Rabbi, 2025). In the Red Sea context, rapid tourism expansion intensifies the need for strict

environmental safeguards, including carrying-capacity limits, marine protection zones, and enforceable regulatory frameworks. Governance quality was also identified as a decisive enabling factor. Experts highlighted the need for enhanced regulatory coherence and improved coordination mechanisms tailored to Island development contexts, while government officials expressed greater confidence in institutional modernization efforts. This divergence reflects differing institutional perspectives but is consistent with resilience theory (Holling, 1973; Rizzi et al., 2018; Rabbi, 2025), which identifies governance adaptability as essential for managing uncertainty and enabling sustainable development. Weak governance not only constrains investment but also undermines environmental protection and infrastructure delivery (Polman et al., 2016).

Infrastructure deficiencies, particularly in transportation, utilities, digital connectivity, and waste management, were identified as the most immediate constraints on LED. These deficits restrict tourism growth, increase operational costs, and weaken community resilience (Loh & Shear, 2015; Tandrayen-Ragoobur et al., 2024). The findings confirm resilience literature that positions infrastructure as both a physical foundation and a strategic lever for adaptation and diversification, especially in isolated Island settings (Kautsary, 2017; OECD, 2029).

The Blue Economy was widely recognized as a key pathway for economic diversification, with strong potential in sustainable tourism, aquaculture, renewable marine energy, and maritime research (Lee et al, 2020; EU-GCC, 2021). However, stakeholders emphasized that regulatory gaps, skills shortages, and environmental risks currently limit implementation. These findings align with international evidence that Blue Economy strategies succeed only when supported by strong governance, environmental safeguards, and human capital development. Social factors, particularly education, skills, and community participation, were also rated as comparatively weaker, reflecting limited local capacity to engage in diversified economic activities. This pattern mirrors global Island research highlighting small labor markets and the importance of community empowerment (Roseland, 2000; Loh & Shear, 2015). Strengthening human capital and participatory planning is therefore not only a social objective but a strategic requirement for enabling entrepreneurship and inclusive development.

Overall, the discussion demonstrates that SLED in Saudi Arabia's Red Sea Islands requires integrated, system-wide interventions. As depicted in Figure 3, infrastructure enables Blue Economy activities, governance shapes environmental outcomes, social capacity influences entrepreneurship, and ecological conditions define development boundaries. This integrated understanding provides a robust foundation for designing Island-specific SLED strategies aligned with Vision 2030 and global best practices.

CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH DIRECTIONS

This study assessed the determinants of Sustainable Local Economic Development (SLED) in the Red Sea's Island communities through a comparative analysis of expert and government stakeholder perceptions. The empirical findings reveal a highly interconnected development landscape in which economic diversification, environmental stewardship, governance quality, human capital, and infrastructure collectively shape LED outcomes. Across both stakeholder groups, there is strong agreement that the Red Sea Islands possess significant development potential, particularly in Blue Economy sectors such as eco-tourism, aquaculture, marine conservation, and renewable energy. However, this potential remains constrained by infrastructure limitations, coordination challenges, environmental sensitivity, and evolving community capabilities.

By integrating LED theory, resilience theory, the Triple Bottom Line framework, and contemporary Blue Economy scholarship, the study provides a holistic understanding of how Island development dynamics operate within Saudi Arabia's broader Vision 2030 transformation agenda. Findings highlight that sustainable development in Island contexts cannot rely on sector-specific interventions; rather, it requires a systemic approach that aligns governance reforms, resilient infrastructure, ecological protection, social inclusion, and investment facilitation. The integrated SLED model developed in this study offers a practical and conceptual foundation for policymakers seeking to design balanced, adaptable, and forward-looking development pathways for Saudi Arabia's Island territories. Despite its valuable contributions, the study is subject to several limitations that should be acknowledged.

- First, the analysis is based on purposive sampling of experts and government officials, which, while appropriate for specialized Island development research, may limit generalizability to broader populations.
- Second, the study relies on self-reported perceptions, which may be influenced by professional backgrounds, institutional roles, or policy expectations.
- Third, the cross-sectional design captures stakeholder views at a specific point in time, during a period of rapid national transformation, meaning that perceptions may evolve as Vision 2030 initiatives progress.
- Fourth, the study does not incorporate direct field-based environmental or economic measurements; thus, the findings reflect perceived conditions rather than observed

performance indicators.

- Lastly, limitations in available demographic and sectoral data for remote Islands constrained the integration of more advanced statistical modeling techniques.

Future research can expand and deepen the analytical scope in several important ways. Longitudinal studies would help track how stakeholder perceptions and development conditions evolve as large-scale projects such as the Red Sea Development (RSD) initiatives mature. Mixed-methods case studies incorporating field data, such as ecological assessments, tourism flows, cost structures, and community livelihood indicators, would provide stronger empirical grounding for SLED models. Comparative research across Gulf or global Island regions could also offer insights into best practices, policy transferability, and culturally adapted development models. Additionally, applying advanced quantitative tools such as Structural Equation Modeling (SEM) or GIS-based suitability analysis could help map interdependence and spatial variations in Island development potential. Finally, future studies should explore community-level perspectives in greater depth, particularly regarding social inclusion, youth engagement, cultural heritage preservation, and participatory governance, areas that remain underexamined but are central to sustainable Island futures.

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REFERENCES

- Alhawaish, A. K. 2025. "The Blue Economy in the Arabian Gulf: Trends, Gaps, and Pathways for Sustainable Coastal Development." *Sustainability* 17: 8809. <https://doi.org/10.3390/su17198809>
- Alhawaish, A. K., & Alkubur, F. S. (2025). Unlocking the potential of the circular economy at municipal levels: A study of expert perceptions in the Dammam Metropolitan Area. *Sustainability*, 17(10), Article 4323. <https://doi.org/10.3390/su17104323>
- Almutlaq, F. (2025). *Toward a Conceptual Framework for Sustainable Local Economic Development of Island Communities in KSA: The Case of the Virgin Islands in the Red Sea*. [PhD Dissertation, Imam Abdulrahman Bin Faisal University].
- Androshchuk I. O., and Riedrieiev R. A. (2024). The conception of local economic development as an instrument for sustainable economic growth of territories: Ukrainian aspect. *UDC* 332.1:338.2. <https://doi.org/10.32983/2222-4459-2024-7-124-137>
- Ashby, J., Cox, D., McInroy, N., and Southworth, D. (2009), Delivering economic success: An international perspective on local government as stewards of local economic resilience, Norfolk Trust Fellowship. <https://cles.org.uk/wp-content/uploads/2011/01/An-international-perspective-on-local-government-as-stewards-of-local-economic-resilience.pdf>
- Baldacchino, G. (2006). Islands, Island Studies, Islandness: The Challenges and Prospects of Island Research. *Island Studies Journal*, 1(1), 3–18.
- Balzan, M. V., Potschin-Young, M., and Haines-Young, R. (2018). Island ecosystem services: insights from a literature review on case-study island ecosystem services and future prospects. *Int. J. Biodiv. Sci. Ecosyst. Serv. Manag.* 14, 71–90. doi: 10.1080/21513732.2018.1439103
- Blakely, E. J., & Leigh, N. G. (2010). *Planning Local Economic Development: Theory and Practice* (4th ed.). Sage Publications
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Bush, M. J. (2018). *Climate change adaptation in small island developing states*. Oxford, UK: John Wiley & Sons.
- Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research* (3rd ed.). Sage Publications.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage Publications.
- Defilippis, J. (2001). Economic development of Croatian islands. *Sociologija Sela* 39(1/4), 83 - 95.
- Denscombe, M. (2007). *The Good Research Guide For Small Scale Research Projects*. Maidenhead: Open University Press
- Elkington J. (1997). *Cannibals With Forks: The Triple Bottom Line of 21st Century Business*. Oxford, United Kingdom: Capstone Publishing Limited.
- EU-GCC. 2021. *Assessment of the Challenges and Opportunities for the Development of Blue Economy Projects in GCC Member Countries*. Brussels, Belgium: Centre for European Policy Studies.

- https://www.eeas.europa.eu/eeas/assessment-challenges-and-opportunities-development-blue-economy-projects-gcc-member-countries_en (Accessed December 4, 2025).
- Funke, N., Claassen, M., Nortje, K., Meissner, R., Steyn, M., & Kemp, M. (2016). A Research and Policy Agenda for Developing Resilient Coastal and Marine Socio-Ecological Systems in South Africa. *Water SA*, 42(4), 653–662.
- Grydehøj, A., & Kelman, I. (2017). The eco-Island trap: Climate change mitigation and conspicuous sustainability. *Area*, 49(1), 106–113.
- Gulf Cooperation Council (GCC). 2024. Framework for Marine and Coastal Environmental Governance in the Gulf Region. Riyadh, Saudi Arabia: GCC Secretariat. <https://gcc-sg.org/ar/MediaCenter/DigitalLibrary/Documents/GCCPOL%20EE.pdf> (Accessed December 4, 2025).
- Hammer, J., & Pivo, G. (2017). The triple bottom line and sustainable economic development theory and practice. *Economic Development Quarterly*, 31(1), 25–36. <https://doi.org/10.1177/0891242416674808>
- Holling, C. S. (1973). Resilience and Stability of Ecological Systems. *Annual Review of Ecology and Systematics*, 4(1), 1–23.
- Hubbard G. (2009). Measuring organizational performance: beyond the triple bottom line. *Bus Strateg Environ*.18:177–91. <https://doi.org/10.1002/bse.564>.
- International Labour Organization (ILO). (2006). A Local Economic Development Manual: Strengthening Local Economies. ILO Publications.
- Israel, M., & Hay, I. (2006). Research ethics for social scientists. Sage Publications.
- Kautsary J. (2017). Public Infrastructure Problem For Developing Tourism Destinations In Coastal And Small Islands Areas Case Study In Karimunjawa Archipelago. Proceedings of International **Conference**: Problem, Solution and Development of Coastal and Delta Areas. 625–633
- Lee, K.; Noh, J.; and Khim, J.S. (2020). The Blue Economy and the United Nations’ sustainable development goals: Challenges and opportunities. *Environ. Int.* 137, 105528
- Loh, P., & Shear, B. (2015). Solidarity economy and community development: Emerging cases in three Massachusetts cities. *Community Development*, 46(3), 244–260. <https://doi.org/10.1080/15575330.2015.1021362>
- Luijendijk AP, Kras E, Dagalaki V, Morelissen R, Hoteit I and Ranasinghe R. (2022). Regime Shifts in Future Shoreline Dynamics of Saudi Arabia. *Front. Mar. Sci.* 8:798657. <https://doi.org/10.3389/fmars.2021.798657>
- Martin, R. (2012). Regional Economic Resilience, Hysteresis and Recessionary Shocks. *Journal of Economic Geography*, 12(1), 1–32.
- Messerli, P, Murniningtyas, E, Eloundou-Enyegue, P, Foli, EG, Furman, E, Glassman, A, et al. (2019). Global sustainable development report 2019: the future is now—science for achieving sustainable development.
- Meyer-Stamer, J. (2008). Systemic Competitiveness and Local Economic Development. Mesopartner, Duisberg, Working Paper No. 14.
- Mycoo, M., Wairiu, M., Campbell, D., Duvat, V., Golbuu, Y., Maharaj, S., et al. (2022). “Small islands” in IPCC WGII sixth assessment report.
- OECD. (2019), Good Governance for Critical Infrastructure Resilience, OECD Reviews of Risk Management Policies, OECD Publishing, Paris, <https://doi.org/10.1787/02f0e5a0-en>
- Pathirana A (2025) Small islands: living laboratories revealing global climate and sustainable development challenges. *Front. Clim.* 6:1445378. <https://doi.org/10.3389/fclim.2024.1445378>
- Polman, N., Reinhard, S., van Bets, L. K., & Kuhlman, T. (2016). Governance of ecosystem services on small islands. *Island Studies Journal*, 11(1), 265–284.
- Pouponneau, A., Bridgland, J., and Schramm, A. (2024). Riding the Blue Wave: Unlocking finance for the Sustainable Blue Economy. The Global Ocean Accounts Partnership (GOAP), 8. Available online: <https://www.oceanaccounts.org/riding-the-blue-wave-unlocking-finance-for-the-sustainable-blue-economy/> (accessed on September 30, 2025).
- Rabbi, M.F. (2025). A Dynamic Systems Approach to Integrated Sustainability: Synthesizing Theory and Modeling Through the Synergistic Resilience Framework. *Sustainability*, 17, 4878. <https://doi.org/10.3390/su17114878>
- Rasheed, A. A. (2019). Role of small islands in UN climate negotiations: a constructivist viewpoint. *Int. Stud.* 56, 215–235. <https://doi.org/10.1177/0020881719861503>
- Rizzi, P., P. Graziano and A. Dallara (2018), A capacity approach to territorial resilience: the case of European regions, Springer Verlag, <https://doi.org/10.1007/s00168-017-0854-1>.
- Robitzsch, V., A. Kattan, A. Dunne, and D. J. Coker. 2023. “Saudi Arabia Case Study: The Development of Saudi Arabia’s Red Sea Coastline: Challenges Facing Sustainable Resource Use.” In *Challenges in Tropical Coastal Zone Management*, edited by M. Wolff, S. C. Ferse, and H. Govan. Springer. https://doi.org/10.1007/978-3-031-17879-5_6

- Roseland, M. (2000). Sustainable community development: Integrating environmental, economic, and social objectives. *Progress in Planning*, 54(2), 73–132. [https://doi.org/10.1016/S0305-9006\(00\)00003-9](https://doi.org/10.1016/S0305-9006(00)00003-9)
- Saudi Green Initiative (SGI). 2021. Saudi Green Initiative Roadmap: Embedding Circular Economy Principles for landfill Diversion and Climate Action. <https://www.saudigreeninitiative.org>
- Saudi Vision. (2016). Saudi Vision 2030. <https://www.vision2030.gov.sa> (Accessed December 4, 2025).
- Sharma, R. N. (2023). Sustainable Development in Island Countries: Challenges and Opportunities. *Advocacy Unified Network*. <https://doi.org/10.57939/XBJY-0J12>
- Shivakoti, B. R., Shiiba, N., and King, P. (2022). “Capacity-building around indigenous and local knowledge (ILK) systems for effective climate adaptation in the low-lying coasts and Small Islands” in *Assessing, mapping and modelling of mangrove ecosystem services in the Asia-Pacific Region* (Singapore: Springer Nature Singapore), 251–261.
- Smith-Godfrey, S. (2016). Defining the Blue Economy. *Marine Policy*, 67, 147–152. <http://dx.doi.org/10.1080/09733159.2016.1175131>
- Tandrayen-Ragoobur, V., Banerjee, S., Fauzel, S., and Matadeen, J. (2024). “Climate change, equity and sustainable development in small island developing states” in *Equity and sustainability* (Singapore: Springer Nature Singapore), 67–90.
- Thankachan, K. (2024). The blue economy: Navigating sustainable seas for prosperity. *J Manag Res Anal*, 11(2), 63–65. <https://doi.org/10.18231/j.jmra.2024.012>
- UN, Department of Economic and Social Affairs Sustainable Development. (2023). Small island developing states: sustainable development knowledge platform. United Nations. Available at: <https://sustainabledevelopment.un.org/topics/sids> (Accessed December 4, 2025).
- UN-Habitat. (2005). Promoting Local Economic Development through Strategic Planning. UN-Habitat. <https://unhabitat.org/sites/default/files/download-manager-files/Promoting%20Local%20Economic%20Development%20through%20Strategic%20PlanningThe%20Local%20Economic%20Development%20%28LED%29%20series2.pdf> (Accessed December 4, 2025).
- Vanderpool-Wallace, V. (2007). Foreword. In L. M. Dixey (Ed.), *Competing with the best: Good practices in community-based tourism in the Caribbean*. St. Michael, Barbados: Caribbean Tourism.
- Walker, B. T., Lee, T. J., and Li, X. (2021). Sustainable development for small island tourism: developing slow tourism in the Caribbean. *J. Travel Tour. Mark.* 38, 1–5. <https://doi.org/10.1080/10548408.2020.1842289>
- World Bank. (2003). *Local Economic Development. Developing and Implementing Local Economic Development Strategies and Action Plans*. Washington, D. C.
- World Wide Fund for Nature (WWF). (2015). *Principles for a Sustainable Blue Economy*. WWF International. https://wwfint.awsassets.panda.org/downloads/15_1471_blue_economy_6_pages_final.pdf (Accessed December 4, 2025).