

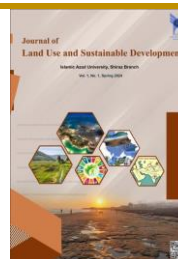


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Original Research Paper

Formulating a Development Strategy for the Coastal Cities of Bushehr Province with Emphasis on Addressing Existing Challenges

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Abstract

The strategic urban development plan is a tool for managing and improving the quality of life, economy, infrastructure, and environment of cities. The coastal cities of Bushehr province have not been able to fully utilize their capacities due to challenges such as weak infrastructure, environmental issues, and unemployment. Therefore, formulating an urban development strategy based on a thorough analysis of these problems is essential. This study is applied in terms of its objective and descriptive-analytical in nature, with data collected through both library and field methods. Data analysis was conducted using structural equation modeling with Smart PLS software. The findings indicate that the research model has good quality, and its fit was positively confirmed using communality and redundancy validity indices. The explained variance (0.68) demonstrates the simultaneous impact of three criteria—employment and economic strategies, environmental preservation, and expansion of trade relations—on sustainable urban development in the coastal cities of Bushehr province. Hypothesis testing also showed a positive and significant effect of implementing employment and economic sustainability strategies, environmental strategies, and trade expansion on sustainable urban development. Finally, the goodness-of-fit index (GOF) was 0.732, indicating the desirability of the structural model. The results suggest that policymakers should design programs tailored to the real needs of the region to achieve both economic growth and environmental preservation, providing a comprehensive vision for the development of Bushehr's coastal cities and identifying investment priorities.

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Introduction

Urban development is a dynamic and continuous process through which the physical boundaries and spatial structures of cities expand both horizontally and vertically in terms of quantity and quality. If this process occurs rapidly and without proper planning, it will not result in a suitable physical composition of urban spaces (Kiani & Salari Sardari, 2020: 33). The development of a city entails both quantitative and qualitative increases in land use within the urban space (Zand Moghadam, 2022: 35). Moreover, urban development includes any human interventions or modifications to the land aimed at creating a livable and comfortable environment, manifested through human activities or land uses in cities and towns (Liu et al., 2020: 21). Urban development can also be understood as the coordinated and balanced expansion of areas allocated to residential buildings in a city, alongside the necessary levels of other land uses, equipped with standard and acceptable facilities and infrastructure (Eakin et al., 2022: 5). In other words, urban development requires balancing the quality and quantity of constructed spaces with the size and density of the urban population residing in these areas. Additionally, urban development is often equated with the physical expansion of the city, which is influenced by the socioeconomic status and economic development of urban residents (Safaei Pour & Arianjad, 2023: 351). On the other hand, the rapid growth of cities has posed numerous challenges for most countries worldwide, especially developing nations. Although population growth is considered the primary cause of rapid urban expansion, its irrational sprawl has adverse effects on the natural environment and cultural fabric of societies (Zhang et al., 2023: 2095). In fact, population increase, urban development, and their associated issues have become major concerns in many countries, as urban growth and its consequences leave detrimental impacts on the environment (Ubilla Bravo, 2024: 694). Bushehr Province, as one of Iran's strategic regions along the Persian Gulf, possesses significant economic and natural potentials (Saghaei et al., 2016: 112). With its oil and gas

reserves, favorable geographical location for maritime trade, and important ports, this province plays a crucial role in Iran's economic and commercial development. However, the development of its coastal cities faces multiple challenges that hinder optimal utilization of these potentials (Gankhaki et al., 2020: 7).

Compared to the cities of the Arab states on the southern coast of the Persian Gulf, the development of Bushehr's coastal cities has been much slower and confronted with more difficulties (Motevalli et al., 2022: 46). These disparities underscore the necessity for an in-depth examination of the internal and external factors influencing the strategic management and planning of these cities' development (Eggert et al., 2024). Key challenges include weak tourism infrastructure, unemployment, environmental problems, water scarcity, and inadequate sewage disposal systems (Hosseini et al., 2021: 140). Additionally, lack of coordination in urban planning, insufficient participation of local stakeholders, and neglect of sustainable development principles are other obstacles to the growth of these cities (Ziari et al., 2022: 44).

Urban development strategy, as a comprehensive framework to guide sustainable and efficient urban growth, plays a vital role in enhancing the quality of life and competitiveness of cities. In the coastal cities of Bushehr Province, formulating an urban development strategy that emphasizes damage assessment and SWOT (strengths, weaknesses, opportunities, and threats) analysis can help identify and address existing problems. This strategy must be developed through inclusive stakeholder participation to ensure sustainable and effective urban development for Bushehr's coastal cities.

The present study aims to formulate urban development strategies for the coastal cities of Bushehr Province, representing an important step toward enhancing their competitiveness and sustainable development. By employing a strategic planning model and thoroughly analyzing internal and external factors, this research seeks to open new horizons for the development of these coastal cities. The central question of this study is on what basis an

efficient, damage-based urban development strategy can be designed for Bushehr's coastal cities. This issue is essential not only for addressing developmental inequalities and optimizing resource use but also for boosting the regional and international competitiveness of these cities.

In this regard, identifying and analyzing the internal and external factors affecting urban development—including economic, social, cultural, and environmental aspects—is crucial.

Furthermore, reviewing the experiences of other coastal cities regionally and globally can aid in crafting an effective and sustainable urban development strategy. Considering these points, this research endeavors to develop comprehensive and participatory urban development strategies for the coastal cities of Bushehr Province that contribute to their sustainable development and competitiveness at regional and international levels.

Table 1. Variables and Indicators of Urban Development Strategy

Dimension	Variables	Indicators
Economic	Investment, Job creation, Urban income	Unemployment rate, per capita income of citizens, amount of investment in urban infrastructure, number of jobs created
Social	Quality of life, Public services, Social participation	Access to educational and health services, social welfare index, level of citizen satisfaction
Environmental	Air pollution, Natural resources, Waste management	Concentration of air pollutants, percentage of urban green space, waste recycling, stormwater management
Cultural	Cultural heritage, Cultural activities	Number of cultural events, preservation of historical buildings, accessibility to cultural centers
Infrastructure and Technical	Transportation, Energy, Information technology	Coverage of public transportation network, access to high-speed internet, consumption of renewable energy
Managerial and Policy	Planning, Local governance	Transparency and accountability index, implementation of strategic programs, level of private sector participation

Source: authors, 2025

Theoretical Foundations

Urban Development Strategy

An urban development strategy is a practical plan aimed at balanced, sustainable development in cities, achieved through participation to improve the quality of life for all citizens. It rests on four pillars: livability, bankability, competitiveness, and good urban governance. The premise of urban development strategies is that strategic interventions by the private sector, public sector, and civil society, when appropriately and timely implemented, can significantly influence the trajectory of urban development (Alliance Cities, 2006: 9).

Damage Assessment (Urban Diagnosis)

Urban development damage assessment serves as the primary guide for planning. Urban plans must be reviewed both from a macro-system perspective—viewing the city as part of the national planning system—and from a subsystem perspective—considering development plans as components of the city system and other variables involved in urban development. Ultimately, this assessment leads to proposals for correcting inappropriate trends.

Damage assessment encompasses multiple dimensions, including environmental, physical, social, economic, political, and institutional aspects (Weston, 2004; Wang et al., 2008).

Urban Development

Urban development is a complex process occurring through interactions among biophysical and human factors across space and time at various scales. It can take place anywhere and in diverse forms, occurring at the same density within existing built-up areas or at higher or lower densities (Kaya & Curran, 2019: 21). Generally, urban development perspectives are categorized based on the direction and pattern of expansion into:

1. Theories of horizontal urban development
2. Theories of vertical urban development

Key Principles of Urban Development Strategy

1. **Inclusive Participation:** Engaging all stakeholders including government, private sector, NGOs, and citizens in decision-making processes.

2. **Focus on Sustainability:** Addressing development that meets present needs without compromising future generations' ability to meet theirs.
3. **Integration and Coordination:** Ensuring synergy among various programs such as transportation, housing, and environmental planning.
4. **Data-Driven Planning:** Utilizing comprehensive data and rigorous analysis to set priorities and formulate plans.
5. **Flexibility and Innovation:** Adapting to changes and leveraging innovative solutions.

Based on the above, urban development strategy is a participatory process involving all stakeholders and urban beneficiaries as well as all societal components. Although each city's Comprehensive Development Strategy (CDS) is unique, experience shows that nearly all successful cities address five key areas: livelihood, environmental quality and service provision, energy efficiency, spatial form and infrastructure, financial resources, and governance (Cities Alliance, 2020; Ziari et al., 2022).

Characteristics of an Effective Urban Development Strategy Plan

An efficient urban development strategy planning process possesses the following outputs and features:

- The strategy plan includes a limited number of strategies, each derived from logical and sustainable choices, with none being equivalent to another.
- The strategy plan has a high likelihood of success.
- The strategy plan is realistic while simultaneously challenging.
- Its achievements are measurable and evaluated using powerful, outcome-oriented, and cost-effective indicators.
- The strategies depend on the types of existing activities and institutions and function as practical shortcuts.
- Implementation responsibilities are clearly defined for each sector, with precise objectives and a fully developed timeline. Incentives and motivators are applied where they can accelerate efficiency.
- Incentives and motivators may take various forms, including financial, credit-based, or community-recognized mechanisms.
- The strategic framework is sufficiently flexible to adapt to changing conditions and tactics, though the overall vision generally remains stable over a medium-term period (Arabi & Talier, 2013).

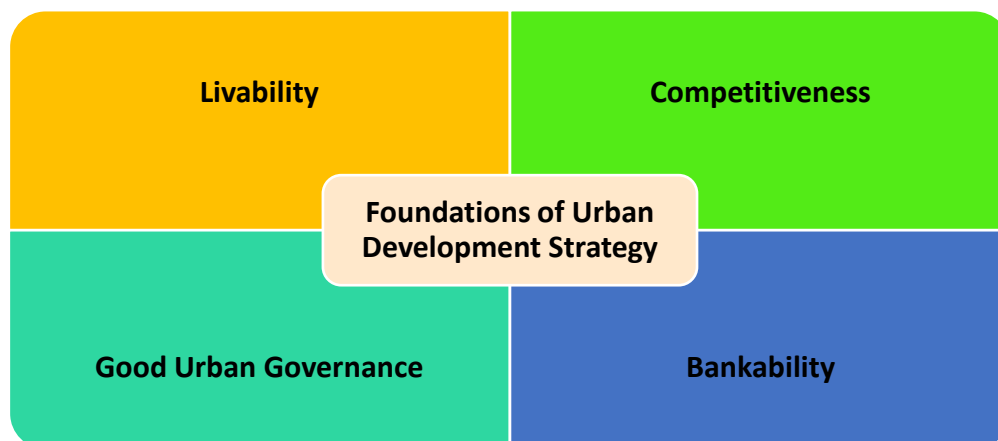


Figure 1. Foundations of Urban Development Strategy

Source: Anderson, 2005; Ziari et al., 2022

Literature Review

Safaei Pour and Arianezhad (2023), in their study titled "Foresight of Key Factors Affecting Urban Development: Case Study of Dezful City," concluded that among 20 branches examined for the physical development of Dezful, ten components—creative human resources, literacy rate, modern technology, quality of the Dez River water, transportation, per capita production, infrastructure quality, urban security, integrated city management, and access to city services—had the greatest direct impact on other variables. Overall, these ten factors play a fundamental role in enhancing Dezful's urban development, and planning focused on the top three factors (creative human resources, literacy, and modern technology) can effectively influence the city's future development.

Safar Alizadeh et al. (2023) studied key drivers of urban development in border areas using a foresight approach. Their findings identified seven critical variables: meritocracy in selecting urban managers, coordination of related organizations' programs with urban management, constructive interaction among governmental and private institutions, implementation of appropriate measures for managerial accountability, the influence of social networks in civil society participation, cooperation of private sectors, and consultation between city managers and citizens in decision-making. These factors were selected as the most important for achieving sustainable development in urban governance.

Farshad et al. (2023), in their article "Formulating Scenarios and Strategies for Rural Development in Iran by 2040 with a Foresight Approach," found that improving local authorities' capacity to meet the growing rural population's needs, aligning rural and urban policies, modernizing rural areas through smart villages, securing financial resources and banking services, enhancing productivity across the agricultural value chain, and expanding rural education and investment participation are key scenarios and strategies for rural development. Their study provides a foundation for revising policies and strategies to strengthen and develop Iran's rural future.

Alamati et al. (2022) identified the main drivers of urban development in Tehran using a foresight approach. Among 51 factors examined, 12 key drivers—integrated urban management, economic conditions, poverty, good urban governance, social and spatial justice, security, unemployment, sanctions, economic diversification, citizen participation, responsibility, and enhancement of education and culture—were found to play the most significant roles in Tehran's future development and prosperity.

Safaei Pour et al. (2022), through a strategic foresight approach, identified key drivers of development in Ahvaz metropolis. Their results highlighted the importance of three drivers: oil and gas, knowledge-based economy, and political participation of citizens and elites. They also noted that Ahvaz's urban development system is unstable.

Mollazadeh et al. (2022) applied a foresight approach to identify vital drivers affecting the spatial development of the Aras Free Zone. They concluded that 13 key factors—including investment attraction, international sanctions, development of agricultural plains and greenhouses, industrial sector growth, exports, land prices, urban and rural development, diplomatic relations with Caucasus countries, regional competition with other free zones, tourism infrastructure, trade facilitation, and the Nagorno-Karabakh conflict and peace process—play critical roles in the future spatial development of the Aras Free Zone.

Fontana et al. (2023) analyzed future urban growth and development at the regional scale using remote sensing. Their findings provide valuable insights for policymakers to promote more informed and conscientious urban development and enhance management techniques.

Mallick et al. (2021) studied future urban growth in small cities using forecasting and foresight approaches. Their results indicated that alongside urban development, citizens are experiencing increasing hostile urbanization and vulnerability. This study aids local management in maintaining good urban

governance and developing appropriate planning and strategies to achieve balanced development.

Han and Jia (2020) examined physical changes and urban development in Foshan, China, using a 20-year development model and environmental parameters to forecast trends for 2025.

A review of the literature reveals that recent studies have extensively addressed urban development and foresight. For example, Safaei Pour and Arianezhad (2023) emphasized the critical role of creative human resources, literacy, and modern technology in Dezful's urban development. Safar Alizadeh et al. (2023) highlighted meritocracy and organizational coordination as key drivers in border urban areas. However, these studies have predominantly focused on non-coastal cities and have paid limited attention to the specific challenges and opportunities of coastal cities.

The present research aims to fill this gap by focusing on the coastal cities of Bushehr Province. Due to their strategic location and economic and environmental capacities, these cities require special consideration in development planning. The innovation of this study lies in integrating damage assessment and foresight approaches to propose a comprehensive urban development strategy tailored to the unique conditions of Bushehr's coastal cities. This strategy not only addresses economic and social factors but also pays attention to environmental and cultural issues, employing a participatory approach that seeks

the engagement and cooperation of all stakeholders.

The Area under Study

Bushehr Province is located in southwestern Iran, bordered to the north by Khuzestan and Kohgiluyeh and Boyer-Ahmad provinces, to the south by the Persian Gulf and Hormozgan Province, to the east by Fars Province, and to the west by the Persian Gulf. According to the 2016 census, the population of the province is approximately 1,052,120. Its area is about 23,197.46 square kilometers, with 865 kilometers of coastline along the Persian Gulf. Due to its strategic location on the Persian Gulf coast, the province holds significant strategic and economic importance through maritime exports and imports, fishing industry, oil and gas reserves (including the Khark Island oil export terminal, South and North Pars gas fields), agriculture, and the presence of a nuclear power plant.

Bushehr is the seventeenth largest province in Iran by area and is situated along the Persian Gulf. The provincial capital is the city of Bushehr, and the province comprises 10 counties and 37 cities (Ministry of Interior, 2019). Fifteen cities in this province are coastal—Bushehr, Ahram, Borazjan, Khormoj, Bandar Dayyer, Bandar Kangan, Bandar Genaveh, Kaki, Jam, Ab Pakhsh, Choghadak, Vahdatiyeh, Benak, Nakhil Taghi—and each has a population exceeding 10,000 (Statistical Center of Iran, 2016). Figure 1 illustrates The Area under Study.

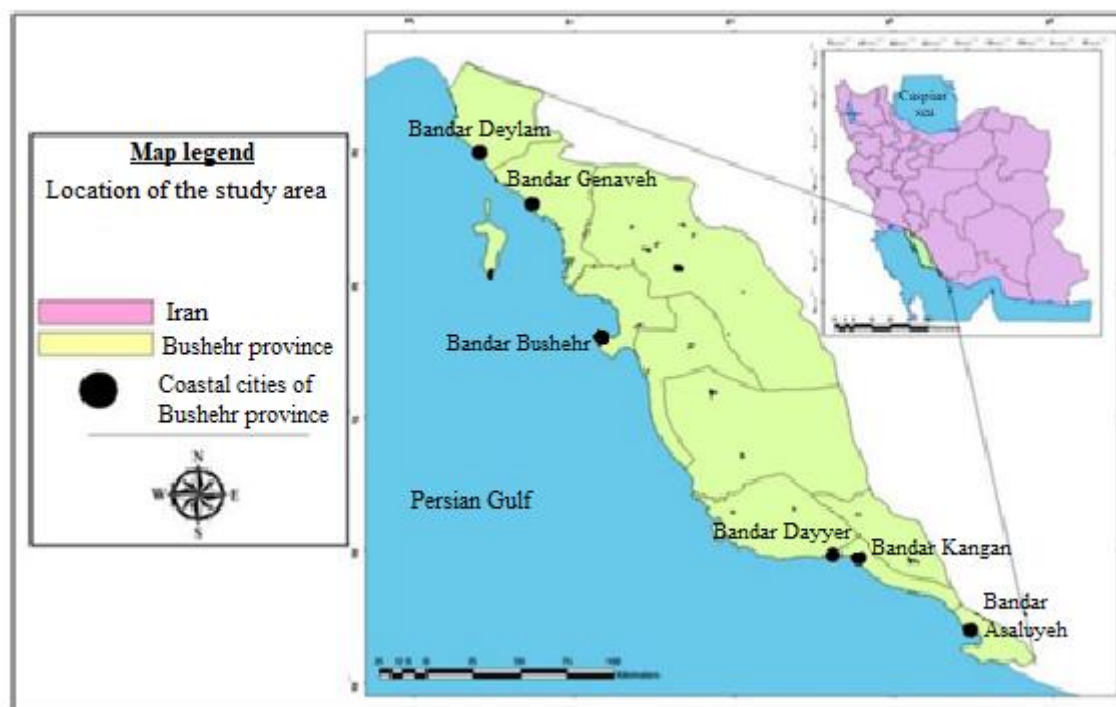


Figure 2. Study Area of Bushehr Province
Source: Authors, 2025

Methodology

This study is applied in terms of its objective and descriptive-analytical in nature, with data collected through both library and field methods. Data analysis was conducted using structural equation modeling with Smart PLS software.

Research Findings

The measurement model test in the PLS method precedes the evaluation of the structural model. At this stage, the model is examined based on

reliability and validity. The content validity of the research questionnaire was confirmed by experts in the subject area and possesses the necessary validity and reliability. Convergent validity was assessed using the Average Variance Extracted (AVE) statistical method. Table 2 presents the results of the convergent validity of the measurement model. The results show that the AVE for all four constructs is greater than 0.5, confirming their convergent validity.

Table 2. Results of Convergent Validity Test of Measurement Model by Research Constructs

Construct	Average Variance Extracted (AVE)
Environmental Protection	0.510
Employment and Economic Sustainability	0.537
Sustainable Urban Development	0.574
Expansion of Trade Relations with Regional and Extra-Regional Countries	0.511

Source: Research Findings, 2025

For the reliability analysis of the questionnaire items, internal consistency was examined using Cronbach's alpha, composite reliability (CR), and confirmatory factor analysis (factor loadings). Since Cronbach's alpha provides a more stringent estimate of internal reliability for latent variables, PLS path models also use

composite reliability or Dillon-Goldstein's rho (ρ). When ρ exceeds 0.7, it indicates unidimensionality of the block and is considered a better indicator of reliability and unidimensionality than Cronbach's alpha. Table 3 shows the reliability results of the measurement model variables.

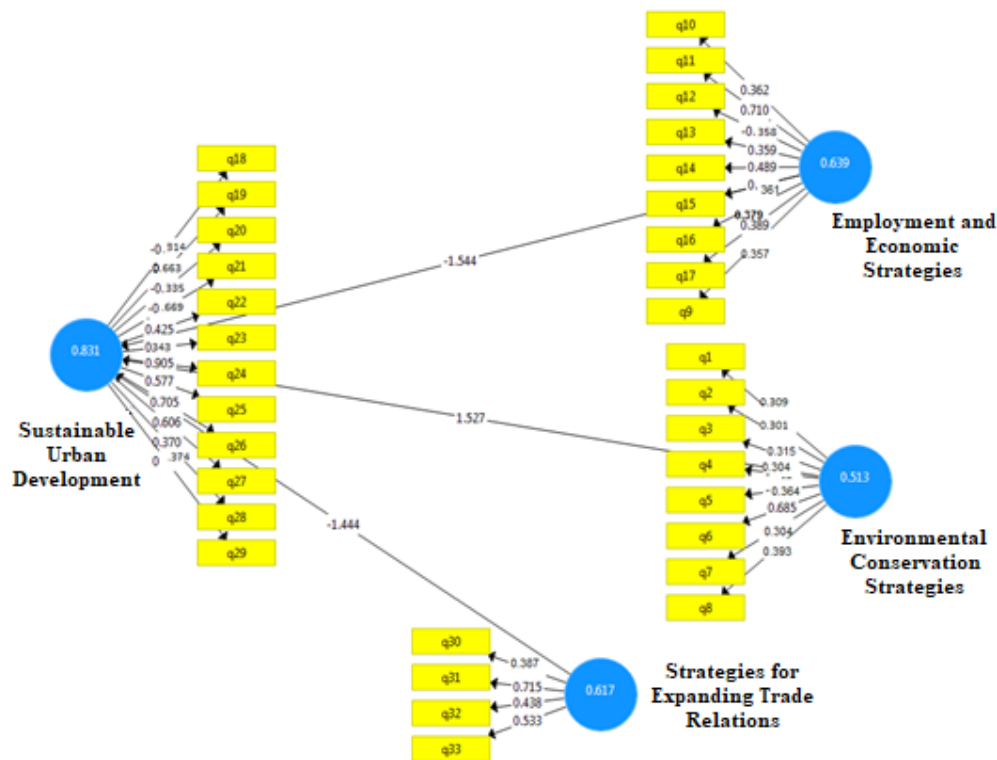
Table 3. Measurement Model Reliability Results by Research Constructs

Construct	Cronbach's Alpha	Composite Reliability (CR)
Environmental Protection	0.702	0.789
Employment and Economic Sustainability	0.733	0.777
Sustainable Urban Development	0.793	0.831
Expansion of Trade Relations with Regional and Extra-Regional Countries	0.762	0.761

Source: Research Findings, 2025

Since both Cronbach's alpha and composite reliability values for all constructs exceed 0.7, the questionnaire's reliability is confirmed based on these methods. Factor loadings related to questionnaire items, as observed variables measuring latent variables, are presented in Table 2 and chart1 for confirmatory factor analysis. The strength of the relationship

between a latent factor and an observed variable is indicated by the factor loading, which ranges from 0 to 1. Factor loadings below 0.3 indicate a weak relationship and are disregarded. Loadings between 0.3 and 0.6 are acceptable, while values above 0.6 are considered very desirable.

**Chart 1:** Adjusted R² Coefficient for Each Construct, Path Coefficients, and Confirmatory Factor Loadings of Items

Source: Research Findings, 2025

Table 4: Confirmatory Factor Analysis Related to Questionnaire Items

Construct	R ²	Item	Factor Loading	Strength
Environmental	0.513	1. Design and construction of wastewater treatment plants in coastal cities using advanced technologies to reduce environmental pollution	0.309	Acceptable
		2. Development of research projects to combat climate change and increase agricultural resilience to climatic conditions	0.301	Acceptable
		3. Implementation of strict environmental standards for continuous monitoring of industries and imposing heavy penalties for pollution	0.315	Acceptable
		4. Establishment of sustainable environmental infrastructure alongside port development, especially for natural resource protection and pollution reduction	0.304	Acceptable
		5. Advancement of drought-resistant agricultural technologies and cultivation with low water consumption	0.364	Acceptable
		6. Implementation of watershed and aquifer management projects to reduce soil erosion and floods and restore groundwater resources	0.685	Desirable
		7. Regional and international cooperation with neighboring provinces and countries for water resource management and dust storm control	0.304	Acceptable
		8. Development of ecotourism to preserve natural resources and environment, especially pristine coasts and natural landscapes against unsustainable tourism	0.393	Acceptable
Employment and Economic Sustainability	0.639	9. Development of ancillary fisheries industries and support for R&D in marine ecosystems	0.357	Acceptable
		10. Promotion of domestic and international tourism during Nowruz through diverse tourism packages and targeted advertising	0.362	Acceptable
		11. Improvement of tourism infrastructure including hotels, restaurants, and recreational centers to attract tourists in coastal cities considering seasonal and moderate winter temperatures	0.710	Desirable
		12. Encouragement of new petrochemical complexes and development of modern technologies in these industries	0.358	Acceptable
		13. Enhancement of social and economic programs to create employment and equal opportunities for natives and immigrants	0.359	Acceptable
		14. Encouragement of private sector investment through incentives for participation in tourism and cultural redevelopment	0.489	Acceptable
		15. Development of jobs related to the oil industry in research, technical services, engineering, and downstream industries	0.361	Acceptable
		16. Creation of industrial clusters near oil and gas resources to attract investment and expand production capacity	0.379	Acceptable
		17. Support for port-related industries such as transportation, processing industries, and technical services to strengthen regional economic growth	0.389	Acceptable
Sustainable Urban Development	0.831	18. Development of welfare infrastructure in coastal cities and improvement of health, educational, and communication services to reduce migration	0.314	Acceptable

		19. Development of water and wastewater management plans to optimize consumption and improve water quality in coastal areas	0.663	Desirable
		20. Development of sustainable urban programs focusing on preserving historical values and enhancing residents' quality of life	0.335	Acceptable
		21. Targeted budgeting through creation of special funds for restoration and reconstruction of worn urban textures in coastal cities	0.669	Desirable
		22. Design and implementation of comprehensive regional plans to coordinate industrial and urban development	0.425	Acceptable
		23. Creation of special zones for industrial and energy infrastructure to reduce occupation of residential and agricultural lands, focusing on non-arable or sparsely populated areas	0.343	Acceptable
		24. Integration of economic activities among different islands and ports of the province using sustainable development models	0.905	Desirable
		25. Protection and restoration of historic textures in port cities to preserve cultural identity and attract tourists interested in history and culture	0.577	Acceptable
		26. Creation of coastal tourism routes that enable tourists to enjoy natural beauties	0.705	Desirable
		27. Establishment of transparent legal frameworks to guarantee citizens' property rights and strict supervision of urban and industrial projects	0.606	Desirable
		28. Establishment of new industrial and residential towns to relocate industrial units to more suitable areas and develop urban infrastructure to reduce pressure on existing areas	0.370	Acceptable
		29. Development of resilient infrastructure against natural hazards: construction of flood- and earthquake-resistant structures and improvement of water supply networks	0.374	Acceptable
Expansion of Trade Relations with Regional and Extra-Regional Countries	0.617	30. Strengthening maritime transport networks by constructing and improving sea routes, especially for connections between the province's ports and regional countries	0.387	Acceptable
		31. Strengthening commercial ports by developing transportation facilities and logistical infrastructure to facilitate international trade	0.715	Desirable
		32. Establishment of free trade zones near major ports to attract foreign investment and facilitate trade processes	0.438	Acceptable
		33. Strengthening trade relations with the UAE and Gulf countries by developing joint commercial and industrial centers and improving customs conditions	0.533	Acceptable

Source: Research Findings, 2025

As shown by the findings of Chart 1 and the results of Table 4, all questionnaire items (indicators) have factor loadings greater than 0.3; therefore, the reliability of the questionnaire is also confirmed through confirmatory factor analysis. Hypothesis testing in PLS is conducted using the bootstrapping method. Based on the proposed structural model, significant relationships between observed and latent variables are

examined using Partial Least Squares (PLS) via the SmartPLS software. The software output provides path coefficients along with t-value statistics. Since the defined error level in the tests is 0.05, a t-value greater than 1.96 indicates acceptance of the hypothesis. Ultimately, acceptance or rejection of hypotheses depends on the significance levels (t-values) and path coefficients, which are presented in Chart 2 and Table 5.

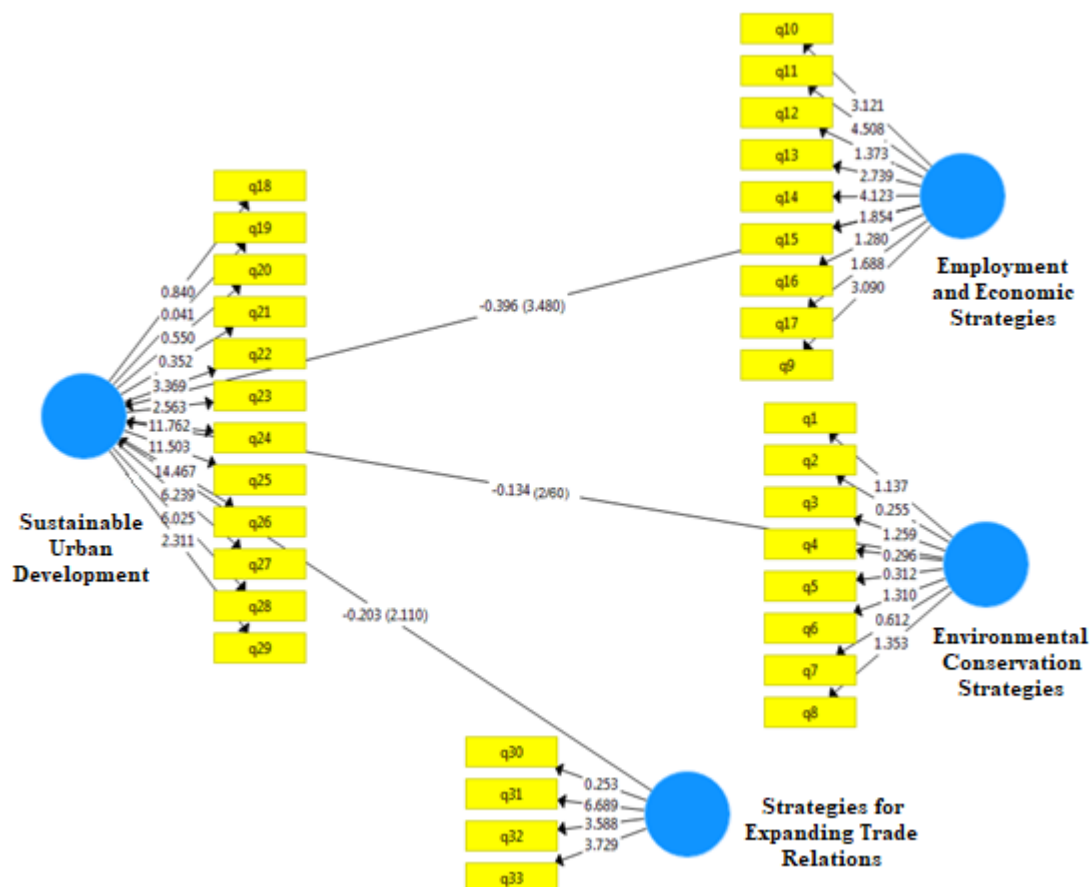


Chart 2: Path Coefficients and Significance Levels (t-value)

Source: Research Findings, 2025

Table 5: Hypothesis Testing Results Based on Path Coefficients and Significance Levels (t-value) in PLS Method

Path Analysis		t-value	Path Coefficient	Hypothesis Acceptance Status
From Variable	to Variable			
Employment and Economic Strategies	Sustainable Urban Development	2.840	0.396	Accepted
Environmental Protection Strategies	Sustainable Urban Development	2.060	0.134	Accepted
Expansion of Trade Relations with Regional and Extra-Regional Countries	Sustainable Urban Development	2.110	0.203	Accepted

Source: Research Findings, 2025

Since the significance values (t-values) for employment and economic strategies, environmental protection strategies, and expansion of trade relations with regional and extra-regional countries are all greater than 1.96, their relationships with sustainable urban development are significant, and the research hypotheses are confirmed. In other words,

implementing these strategies impacts sustainable urban development.

Generally, in Structural Equation Modeling (SEM), including Partial Least Squares (PLS), after hypothesis testing, it is advisable to assess the quality of the inner (structural) model. The quality of the structural model refers to whether independent (exogenous) variables can predict dependent (endogenous) variables. For this

purpose, redundancy validity index, Stone-Geisser's Q^2 , communalities validity index, and explained variance (R^2) are used as goodness-of-fit and model strength tests. The R^2 value indicates the model's ability to explain

constructs and shows the percentage of variance in the latent (dependent) variable explained by the observed (independent) variables. The goodness-of-fit test results are presented in Table 6.

Table 6: Goodness-of-Fit Evaluation Indices

Variable	Communality Validity Index (CV COM)	Redundancy Validity Index (CV RED)	Explained Variance (R^2)	GOF (Goodness of Fit)
Employment and Economic Strategies	0.66	0.64	-	0.732
Environmental Protection Strategies	0.35	0.61	-	
Expansion of Trade Relations with Regional and Extra-Regional Countries	0.67	0.80	-	
Sustainable Urban Development	-	-	0.68	

Source: Research Findings, 2025

The above table shows that the values of communalities and redundancy validity indices are positive, indicating that the model fit has acceptable quality. Based on the explained variance (0.68), it is observed that the realization of sustainable urban development in the coastal cities of Bushehr Province results from the simultaneous functioning of three criteria: employment and economic strategies, environmental protection strategies, and expansion of trade relations with regional and extra-regional countries. Finally, the goodness-of-fit index (GOF) of 0.732 indicates that the structural model of the research is desirable.

The questionnaire was designed based on strategic development axes for coastal cities, including environmental strategies, employment and economic sustainability strategies, sustainable urban development, and expansion of trade relations with regional and extra-regional countries, using a 5-point Likert scale. To answer the fourth research question, a structural model with three hypotheses was formulated and tested using Partial Least Squares (PLS) via SmartPLS software. The PLS test included three parts: measurement model testing, structural model testing, and goodness-of-fit testing.

Based on the measurement model test results, the reliability and validity of the criteria and questionnaire items were confirmed as follows:

- The Average Variance Extracted (AVE) for environmental protection, employment and economic sustainability, sustainable urban development, and expansion of trade relations with regional and extra-regional countries were all above 0.5, confirming convergent validity.
- Cronbach's alpha and composite reliability for all four criteria were above 0.7, confirming reliability.
- Factor loadings for all questionnaire items ranged from 0.3 to 0.6, confirming item reliability.

According to the structural model test results related to hypothesis testing and the effects of latent variables on each other:

- The hypothesis on the impact of employment and economic sustainability strategies was confirmed with a t-value of 2.840 and a path coefficient of 0.396.
- The hypothesis on the impact of environmental protection strategies on sustainable urban development was confirmed with a t-value of 2.060 and a path coefficient of 0.134.

- The hypothesis on the impact of expansion of trade relations with regional and extra-regional countries on sustainable urban development was confirmed with a t-value of 2.110 and a path coefficient of 0.203.

The goodness-of-fit results showed positive communalities and redundancy validity indices for the four criteria, indicating acceptable model fit quality. The GOF index of 0.732 further confirmed the desirability of the structural model.

Conclusion

The results of the SWOT analysis of development in the coastal cities of Bushehr Province have led to the formulation of development strategies focused on four main axes: environmental protection, employment and economic sustainability, sustainable urban development, and expansion of trade relations with regional and extra-regional countries.

The environment in coastal areas, especially in Bushehr Province, is affected by human and industrial activities. To preserve this environment, it is necessary to design development programs with an environmental sustainability approach.

In the field of employment and economic sustainability, strengthening commercial and logistical infrastructure and establishing free trade zones provide opportunities to attract foreign investment and develop international trade, which can transform Bushehr's coastal cities into an economic hub of the country. Overall, employment remains one of the most critical social challenges in Bushehr Province. To strengthen the labor market and increase job opportunities, attention should be given to developing a sea-based economy considering the province's geographical position, investing in sea-related sectors such as marine tourism, fisheries, and maritime industries. Additionally, tourism development in the coastal cities can significantly contribute to economic growth and employment.

Regarding sustainable urban development, important factors include improving health, educational, and communication services to reduce migration; optimizing water consumption and improving water quality in

coastal areas; enhancing quality of life and preserving historical values in urban development; allocating budgets for the restoration of old urban textures; coordinating industrial and urban development; creating industrial zones to prevent encroachment on residential lands; economic integration through coordination among islands and ports of the province; and establishing transparent legal frameworks to ensure property rights and supervision.

Bushehr's coastal cities, as strategic points in terms of geography, economy, and culture, have high potential for sustainable development. Based on the proposed strategies, it can be concluded that success in developing these areas requires multidimensional planning and coordination among various sectors.

Comparing the present study's findings with previous research reveals consistency and complementarity. This article focuses on urban development strategy formulation with an emphasis on vulnerability analysis and future studies in Bushehr's coastal cities. Its results highlight the importance of improving quality of life, strengthening the urban economy, and establishing sustainable infrastructure. These findings align with other studies such as Safaei Pour and Aryanezhad (2023), who identified key components for physical development in Dezful, emphasizing creative human resources and modern technology. Similarly, Safar Alizadeh et al. (2023) pointed to the interaction between governmental and private institutions and meritocracy, which resonates with this study's emphasis on institutional collaboration for sustainable development. Farshad et al. (2023) stressed the need for modernization and policy coordination for sustainable development, consistent with the current study's environmental sustainability approach. Alammati et al. (2022) identified key factors for urban development in Tehran, emphasizing good governance, which aligns with this article's findings. Safaei Pour et al. (2022) discussed drivers of development in Ahvaz metropolitan area, focusing on economic and social drivers, closely related to this study. Furthermore, Mollazadeh et al. (2022) examined key factors for spatial development in Aras Free Zone, highlighting investment

attraction and infrastructure development, consistent with this research. Internationally, Fontana et al. (2023) analyzed urban growth using data-driven approaches, Mallick et al. (2021) emphasized good governance and urban planning, and Han and Jia (2020) studied morphological changes and development forecasting, all supporting the importance of data, informed decision-making, and future studies emphasized here.

Overall, these studies converge on the importance of institutional collaboration, infrastructure improvement, sustainable

development, and good governance, each addressing complementary aspects of urban development.

Bushehr's coastal cities, as strategic locations geographically, economically, and culturally, hold significant potential for sustainable development. According to the proposed strategies, it can be concluded that successful development of these areas requires multidimensional planning and coordination among different sectors, as illustrated in the chart 3.

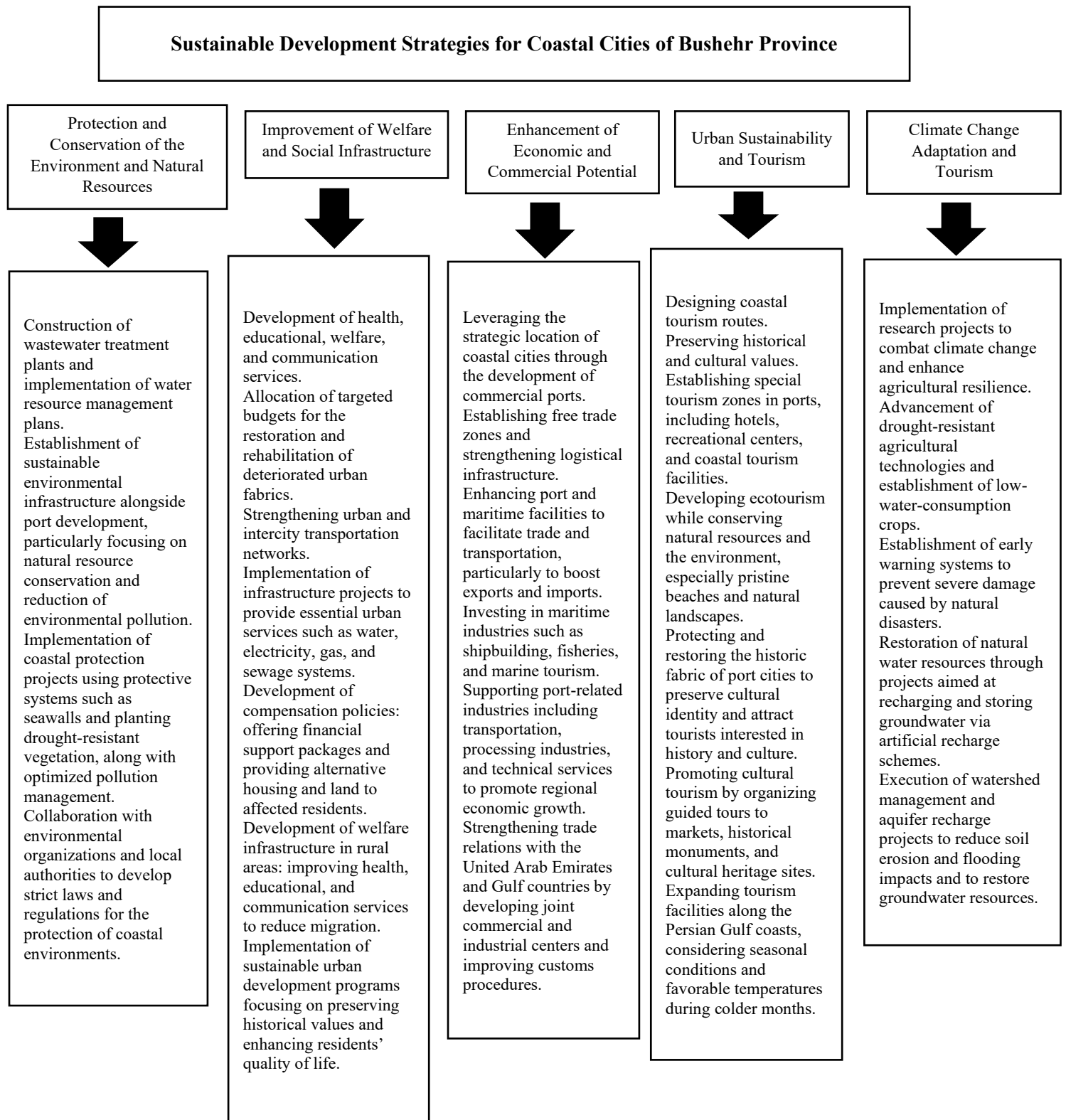


Chart 3. Sustainable Development Strategies for Coastal Cities of Bushehr Province
Source: Research Findings, 2025

Suggestions:

- **Development of Marine Tourism:** Considering the high potential of coastal cities in Bushehr Province in the field of marine tourism, it is recommended to develop this industry by establishing appropriate infrastructure and providing high-quality services. This can contribute to creating new job opportunities and increasing income generation in these cities.
- **Support for Marine Industries:** Marine industries, including shipbuilding, ship repair, and

related sectors, can play a significant role in the economic development of coastal cities in Bushehr Province. It is suggested to support these industries by offering necessary facilities and incentives.

- **Strengthening Urban Infrastructure:** Coastal cities in Bushehr Province require adequate urban infrastructure to effectively meet the needs of their residents. It is recommended to invest in transportation, water and wastewater, electricity, and communication sectors to enhance urban infrastructure.

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