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RESEARCH ARTICLE

Identification and Evaluation of Sustainable Factors in Urban Construction Project Management Using SWOT Technique

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Abstract: This study aims to create a management framework for identifying and evaluating sustainable factors in construction project management through strengths, weaknesses, opportunities, and threats analysis, focusing on the Rasht urban. The research method in this study includes the four steps. Step 1: Identifying internal and external sustainable factors using the Delphi technique; Step 2: Designing an analytic hierarchy process and calculating the weights of internal and external factors using SPSS 26 software; Step 3: Creating the internal factor and external factor evaluation and determining the final weights; Step 4: Model design and the analysis of strengths, weaknesses, opportunities, and threats. Quantitative strategic planning matrix analysis has been used to prioritize and identify the attractiveness of each of the designed strategies. By forming a quantitative strategic planning matrix, the existing twelve strategies have been prioritized. Based on the quantitative strategic planning matrix analysis, the priority of strategy selection includes: 1) The scenario of the construction of resistant infrastructure and creating the necessary regulations to strengthen and support construction projects with a score of 1.94 was ranked first. 2) The scenario of applying creativity and human resources experience to increase the productivity of construction projects with a score of 1.90 was ranked second. 3) The scenario of human resource training in order to enhance the expertise in the construction management complex with a score of 1.89 was ranked third. In this study, sustainable factors have been evaluated very accurately through quantitative strategic planning matrix, which has not been done more research so far. The study recommends implementing strength-opportunities (SO) strategies to improve construction projects in the Rasht urban area.

KEYWORDS: strategic planning,sustainable development, SWOT analysis, urban construction project management

ABBREVIATIONS

AHP	Analytic Hierarchy Process
EFE	External Factor Evaluation
IFE	Internal Factor Evaluation
NGOs	Non-governmental organizations
O	Opportunities
QSPM	Quantitative Strategic Planning Matrix
S	Strengthen
SO	Strengthen - opportunities
SWOT	strengths, weaknesses, opportunities, and threats
T	Threats
W	Weakness.

1. Introduction

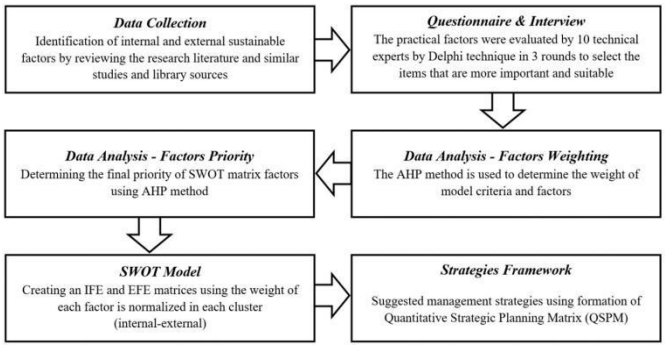
Sustainable development as a comprehensive approach to overcoming environmental and resource problems has been prioritized in developing countries (Chen et al., 2015; Salah et al., 2023). Sustainability is increasingly considered a necessary tool for

understanding social, economic, and environmental outcomes related to projects and project management (Nigjeh and Amani, 2022). However, the lack of a structure for sustainability analysis in projects and the absence of specific tools mean the lack of a framework that can be useful and applicable to the project (Shen et al., 2020). The results of the research show that the major problems are in the projects and their construction management. Sustainable development and its indicators are not considered a management model. The results of applying sustainable development in projects include facilitating future access to capital in project management (Bhaktikul and Phonphoton, 2024; Kuntiyawichai and Aksorn, 2024). The main goal of developing and implementing urban development projects is primarily to improve the quality and level of life of citizens and secondly to preserve and pay special attention to environmental issues (one of the important goals of sustainable urban development). The effort for development should be in a way that includes the interests of the majority of people (Tuydes-Yaman et al., 2024). By using strategic planning models, it covers a wide range of managerial, social, economic, environmental, and physical issues of cities, and finally, this strategy is transformed into executive plans (Tang et al., 2022, Wang et al., 2024; Camana et al., 2021). Therefore, the analysis of urban strategy factors will help the city to know its strengths and opportunities and strengthen them and to know its threats and weaknesses and avoid them or reduce them to the lowest possible level (Cui et al., 2022). Sustainable development is the concept of social and economic development along with the observance of environmental considerations and is a common solution of the international community to deal with the existing challenges such as the increasing destruction of the environment and the occurrence of numerous social damages as a result of economic development, and it is also a means to achieve prosperity and happiness at the national, regional and international levels (Zhe and Jing, 2011; Yu et al., 2024; Tuydes-Yaman et al., 2024; Ngu et al., 2020). Sustainable development requires providing the basic needs of everyone and creating opportunities for them to fulfill their desires for a better life. Sustainable development is inherently a process based on changes in which the use of resources, the direction of investments, the direction of development, technology, and institutional changes are all coordinated with each other and improves the ability of current and future generations to meet human needs (Nikkhah et al., 2023).The meaning of sustainable development is not only the protection of the environment, but a new concept of economic and social development, a development that considers justice and life facilities for all the people of the world (Yang, 2020; Kowalik *et al*., 2017). Strengths, weaknesses, opportunities, and threats (SWOT) analysis is one of the solutions of strategic planning that is used to evaluate the status of a plan or strategy and as its name suggests, it focuses on strengths, weaknesses, opportunities, and threats. Strengths describe which aspects of an issue or which part of an organization excels and what separates it from competitors. Weaknesses stop the effectiveness of a strategy at its desired level. Opportunities refer to favorable external factors that can give a competitive advantage to the target strategy. Threats refer to factors that have the possibility of harming the organization or its strategies. It should be remembered that this method is also used in general situation analysis in addition to strategic planning. In fact, this analysis should be considered an efficient tool to identify the environmental conditions and the internal ability of a system (Hergüner, 2021; Shakerian et al., 2016; Cobbinah et al., 2017). The objective of this study is management framework of identification and evaluation of sustainable factors in urban construction project management using the SWOT analysis in Rasht- Iran. The research method process in this study includes the four steps. Step 1: Identifying internal and external factors using the Delphi technique; Step 2: Designing an analytic hierarchy process and calculating the weights of internal and external factors using Statistical Package for Social Sciences software; Step 3: Creating the internal factor and external factor evaluation and determining the final weights; Step 4: Model design and the analysis of strengths, weaknesses, opportunities, and threats. Quantitative strategic planning matrix analysis has been used to prioritize and identify the attractiveness of each of the designed strategies. The current study has been carried out in Rasht- Iran in 2022.

2. Materials and Metholds

At first, in order to identify and classify internal and external factors, the Delphi questionnaire and mean test were used. Also, the Analytic Hierarchy Process (AHP) method has been used to determine the priority of research criteria and sub-criteria using Statistical Package for Social Sciences (SPSS) software. The sustainable factors were collected based on the four dimensions of SWOT including strength, weakness, opportunity, and threat. In the following, the Internal Factor Evaluation and External Factor Evaluation (IFE and EFE) Matrices are designed. Finally, by determining the final weights of the factors to design a quantitative matrix, the strategic planning phases of the SWOT analysis have been completed. Therefore, in this analysis, the following four steps have been taken (**Figure 1**):

Figure 1: Flowchart of research method process



2.1 Identification of internal and external sustainable factors

At first, the factors studied in the present study in order to identify and evaluate sustainable factors in construction project management were recognized by reviewing the research literature and similar studies and library sources. Based on the research literature and previous studies, a total of 37 factors were identified, which are mentioned in **Table 1**.

Table 1: Sustainablity factors based on strength, weakness, opportunity, Threats

Criteria	Sub-criteria	Sources
Strengths	The presence of committed and expert human resources in the project management group	Sepasi Zangabadi *et al.* (2020)
	The ability to transform new and sustainable ideas for the development of economic activities	Shams *et al*. (2018); Zhao et al., (2020); Zhao et al., (2021)
	Allocation of dedicated budgets to construction projects in times of crisis	Sisto *et al*. (2020)
	Transparency in terms and conditions of construction projects	Manouchehri Miandoab *et al*. (2020)
	Efforts to create effective collaborative project management in times of crisis	Zalqi 2021
	Using the capacity of the local young and educated workforce	Du et al., (2024)
Weaknesses	Delay in the timely implementation of construction project plans	Saberi (2017)
	Increase in energy consumption during the construction period due to more processes	Heravi and Laika, 2017; Amani, 2020 Aghazadeh et al., (2021)
	Non-observance of safety points and use of low quality and low durability materials	Salehipour (2018); Bajjou and Chafi (2022)
	General weakness in terms of management, expansion and optimization of infrastructure in the region	Monjezi (2020); Stanitsas et al., (2021)
	Lack of suitable people in project management	Hasanimehr., & Asghari. (2021)
	Lack of specific infrastructure facilities in project management	Sadegh *et al*. (2018)
	The existence of worn-out fabric in the city center and the need to make setbacks in many urban passages	Shamaei *et al.* (2017)
	Low control and supervision of urban project activities	Gholipour and Sayyadi (2019); Nana Ato Arthur and Victor Mensah (2006)
	Unilateral decision-making without the use of project people's opinions	Osuizugbo and Adenuga (2022)
	The existence of a person-centered and partial attitude in contrast to a program-oriented attitude	Xu et al., (2023)
	Weakness of the facility structure and appropriate equipment	Bazrafshan and Samani (2019)
Opprotunities	Promoting strong, comprehensive and sustainable economic growth and creating jobs for everyone	Wang *et al*. (2024); Olawumi and Chan (2020)
	A suitable context for the investment of all people in the project	FallahTabar (2018); Bathrinath et al., (2022)
	Existence of potentials and potential geographical infrastructures for development and convergence in the regional space	Nosrati *et al*. (2016); Essa and Fortune (2008)
	Existence of a suitable slope for the construction of sewage system and surface water collection in urban roads	Bahramnia and Malek Hosseini (2018); Zalqi (2021)
	Attracting upstream resources to complete unfinished projects in urban construction plans	Feizollahi *et al*. (2020)
	Increasing the employment rate and creating continuous jobs, which reduces social damage	Moharramzadeh *et al.* (2020); Musonda and Gambo (2021)

Criteria	Sub-criteria	Sources
	Existence of laws and regulations to support construction projects	Mohammadzadeh *et al.* (2020)
	Increasing people's awareness and their increasing demand to participate in managing the living environment	Hosseinzadeh *et al*. (2020a); Amani and Soroush (2021); Dalirazar and Sabzi (2022)
	Playing a collaborative role with NGOs in city management and planning	Hosseinzadeh *et al*. (2020c)
	Existence of expert and experienced personnel in construction project management	Gazabizadeh *et al.* (2019)
	The potential of creating popular participation due to the young population	Hosseinzadeh *et al*. (2020b)
	Government support and participation in construction projects	Taghilo *et al*. (2020)
Threats	Occurrence of social conflict caused by the difference in opinions of project managers	Khorasani Anari *et al*. (2020)
	Lack of skilled human resources in the construction industry and project management	Afshari (2020)
	High costs of repair and maintenance of construction equipment	Oke *et al*. (2022)
	Lack of integrated and coordinated management in the project	Nti et al., (2023); Warnock (2007)
	The fragility of the environment in terms of the limitation of population settlement and economic activities	Sahani (2021)
	The intervention of various organizations and legal abuses	Sarkheili *et al*. (2018)
	Sudden changes in the laws of economic standards and imposing unnecessary costs in the project	Garri and Konstantopoulos (2013); Zhong et al., (2024)
	Lack of sufficient financial ability in the implementation of construction projects	Poriamehr (2021)

2.2 Data screening for analysis of internal and external factors with the Delphi technique

The identified factors were checked using experts' opinions. The practical factors were evaluated by 10 technical experts who were serving the Research Center of Environment and Sustainable Development of Iran (RCESD) as manager of data and information analysis, manager of environmental engineering research group, manager of the center for education and communication with industry in the construction industry. These experts have had more than 20 years experience in the field. The assigned scores are between 1 and 5, and factors with scores below 4 were removed. The Delphi technique was continued in 3 rounds to select the items that are more important and suitable (**Appendix A**). The sustainability factors were identified based on the response to the questions and the interview. A combination of group and individual interviews were undertaken with qualitative methods of analysis to develop an integrated process model. The results of the first round of these surveys through questionnaire and interview showed that out of 37 factors, 14 factors did not receive the required assessment from the experts' point of view and were removed in the first phase. So, with the primary screening and removing duplicates, the second questionnaire consisting of 23 factors was prepared and presented. In the second round, 23 factors scored above 4. Next, in order to coordinate and agree on the opinions of the experts, the remaining factors were again transferred to the third round and surveyed. Since all the mean scores are higher than 4 at this phase, as a result, these 23 factors were selected as the final factors. Therefore, the Delphi technique was stopped and the identified factors were used for the final analysis.

3. Results and Discussion

The results of the final round of the Delphi technique are given in **Table 2**.

Table 2: The results of the final round of the Delphi technique

Criteria	Sub-criteria	Experts										Mean
		1	2	3	4	5	6	7	8	9	10	
Strengths	The presence of committed and expert human resources in the project management group	5	5	4	5	4	4	4	5	4	3	4.3
	Allocation of dedicated budgets to construction projects in times of crisis	4	5	4	5	3	4	5	4	3	4	4.1
	Transparency in terms and conditions of construction projects	4	5	5	5	5	4	5	4	5	4	4.6
	Efforts to create effective collaborative project management in times of crisis	5	3	5	5	5	4	3	5	5	5	4.5
	Using the capacity of the local young and educated workforce	5	4	4	5	4	5	4	5	4	5	4.5
Weaknesses	Increase in energy consumption during the construction period due to more processes	4	5	5	4	3	5	5	5	5	4	4/5
	Non-observance of safety points and use of low quality and low durability materials	5	4	4	4	4	4	4	5	3	5	4.2
	General weakness in terms of management, expansion and optimization of infrastructure in the region	5	5	5	4	5	5	5	5	5	4	4.8
	Lack of specific infrastructure facilities in project management	4	4	5	4	5	5	4	4	5	4	4.4
	The existence of worn-out fabric in the city center and the need to make setbacks in many urban passages	4	4	3	5	4	5	4	5	5	5	4.4
	The existence of a person-centered and partial attitude in contrast to a program-oriented attitude	5	3	5	5	5	4	5	4	4	5	4.5
Opportunities	Existence of potentials and potential geographical infrastructures for development and convergence in the regional space	5	4	5	4	4	5	5	4	3	4	4.3
	Attracting upstream resources to complete unfinished projects in urban construction plans	5	4	5	3	5	4	4	4	5	4	4.3
	Existence of laws and regulations to support construction projects	3	5	3	4	5	5	5	5	5	4	4.4
	Playing a collaborative role with NGOs in city management and planning	4	5	5	4	5	5	5	4	5	5	4.7
	Existence of expert and experienced personnel in construction project management	4	4	5	4	5	4	4	4	5	5	4.4
	The potential of creating popular participation due to the young population	5	5	4	4	5	3	5	4	4	5	4.4
	Government support and participation in construction projects	5	5	5	4	5	5	4	5	4	4	4.6
Threats	High costs of repair and maintenance of construction equipment	3	4	4	5	4	3	4	5	5	4	4.1
	Lack of integrated and coordinated management in the project	4	5	5	5	4	5	4	5	5	5	4.7
	The fragility of the environment in terms of the limitation of population settlement and economic activities	3	4	5	4	5	4	5	4	4	4	4.2
	The intervention of various organizations and legal abuses	4	5	4	4	4	5	5	5	4	5	4.5
	Lack of sufficient financial ability in the implementation of construction projects	4	5	4	5	4	4	5	5	4	4	4.4

The AHP method has been used to determine the weight of model criteria and factors (**Equation. 1, 2, 3**).

$$CI = \frac{\lambda_{\max} - n}{n-1} \quad (1)$$

CI: Consistency Index
n: The number of options in the problem
$\lambda_{max} = L$: Geometric mean approximation method

$$L = \frac{1}{n}\left[\sum_{i=1}^{n}(AW_i / W_i)\right] \quad (2)$$

AW_i : The product of the matrix of pairwise comparison of criteria × the eigenvector
W_i : Special vector or priority vector of criteria

Calculate the random index (**Table 3**):

Table 3: Random Index

N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0	0	0/52	0/88	1/10	1/24	1/34	1/4	1/44	1/48	1/51	1/53	1/55	1/57	1/58

$$CR = CI / RI \quad (3)$$

CR: Consistency Ratios
CI: Consistency Index
RI: Random Index

This test is based on compatibility ratios (C.R) of the comparison matrix. C.R of a comparison matrix pair is equal to the ratio of its compatibility degree to the corresponding random value. The AHP pattern of criteria and sub-criteria of the model is presented in **Table 4**.

Table 4: Criteria and sub-criteria of the research

Criteria	Sub-criteria	Symbol
Strengths	The presence of committed and expert human resources in the project management group	S1
	Allocation of dedicated budgets to construction projects in times of crisis	S2
	Transparency in terms and conditions of construction projects	S3
	Efforts to create effective collaborative project management in times of crisis	S4
	Using the capacity of the local young and educated workforce	S5
Weaknesses	Increase in energy consumption during the construction period due to more processes	W1
	Non-observance of safety points and use of low quality and low durability materials	W2
	General weakness in terms of management, expansion and optimization of infrastructure in the region	W3

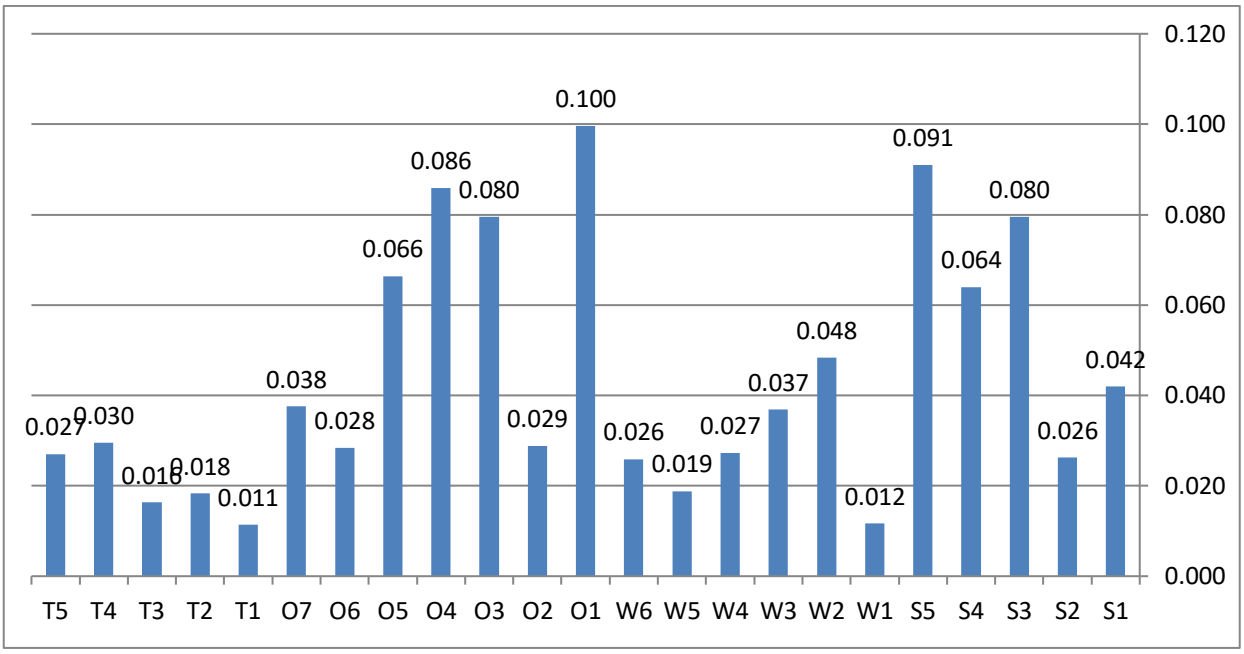
Criteria	Sub-criteria	Symbol
	Lack of specific infrastructure facilities in project management	W4
	The existence of worn-out fabric in the city center and the need to make setbacks in many urban passages	W5
	The existence of a person-centered and partial attitude in contrast to a program-oriented attitude	W6
Opportunities	Existence of potentials and potential geographical infrastructures for development and convergence in the regional space	O1
	Attracting upstream resources to complete unfinished projects in urban construction plans	O2
	Existence of laws and regulations to support construction projects	O3
	Playing a collaborative role with NGOs in city management and planning	O4
	Existence of expert and experienced personnel in construction project management	O5
	The potential of creating popular participation due to the young population	O6
	Government support and participation in construction projects	O7
Threats	High costs of repair and maintenance of construction equipment	T1
	Lack of integrated and coordinated management in the project	T2
	The fragility of the environment in terms of the limitation of population settlement and economic activities	T3
	The intervention of various organizations and legal abuses	T4
	Lack of sufficient financial ability in the implementation of construction projects	T5

At this phase, the final priority of SWOT matrix indices factors is calculated. The results of the comparison of research sub-criteria and their respective weights form the SWOT matrix. To determine the final priority of SWOT matrix factors using the AHP method, the weight of the factors based on each criterion should be multiplied by the weight of the main criteria. By having the weight of each of the main criteria and sub-criteria, the weight of each of the factors is calculated. The results of the calculation and the weights related to SWOT matrix factors are shown in **Table 5** and **Figure 2**.

Table 5: Determining the final priority of SWOT matrix factors using AHP method

Criteria	Criteria weight	Sub-criteria	Symbol	Sub-criteria weight	Final weight	Ranking
Strengths	0.303	The presence of committed and expert human resources in the project management group	S1	0.139	0.042	9
		Allocation of dedicated budgets to construction projects in times of crisis	S2	0.087	0.026	17
		Transparency in terms and conditions of construction projects	S3	0.263	0.080	4
		Efforts to create effective collaborative project management in times of crisis	S4	0.211	0.064	7
		Using the capacity of the local young and educated workforce	S5	0.301	0.091	2
Weaknesses	0.169	Increase in energy consumption during the construction period due to more processes	W1	0.069	0.012	22
		Non-observance of safety points and use of low-quality and low-durability materials	W2	0.286	0.048	8
		General weakness in terms of management, expansion, and optimization of infrastructure in the region	W3	0.219	0.037	11
		Lack of specific infrastructure facilities in project management	W4	0.161	0.027	15
		The existence of worn-out fabric in the city center and the need to make setbacks in many urban passages	W5	0.112	0.019	19
		The existence of a person-centered and partial attitude in contrast to a program-oriented attitude	W6	0.153	0.026	18
Opportunities	0.426	Existence of potentials and potential geographical infrastructures for development and convergence in the regional space	O1	0.234	0.100	1
		Attracting upstream resources to complete unfinished projects in urban construction plans	O2	0.068	0.029	13
		Existence of laws and regulations to support construction projects	O3	0.187	0.080	5
		Playing a collaborative role with NGOs in city management and planning	O4	0.201	0.086	3
		Existence of expert and experienced personnel in construction project management	O5	0.156	0.066	6
		The potential of creating popular participation due to the young population	O6	0.066	0.028	14
		Government support and participation in construction projects	O7	0.088	0.038	10
Threats	0.102	High costs of repair and maintenance of construction equipment	T1	0.111	0.011	23
		Lack of integrated and coordinated management in the project	T2	0.178	0.018	20
		The fragility of the environment in terms of the limitation of population settlement and economic activities	T3	0.159	0.016	21
		The intervention of various organizations and legal abuses	T4	0.288	0.030	12
		Lack of sufficient financial ability in the implementation of construction projects	T5	0.263	0.027	16

Figure 2: Determining the final priority of SWOT matrix factors using AHP method



3.1 Creating an IFE and EFE matrices

To prepare the IFE matrix, the strengths and weaknesses are listed, and the weight coefficient of each factor is inserted using the AHP method (**Table 6**). It is necessary to explain that the weight of each factor is normalized in each cluster (internal-external). Also, the score of the current status of each factor from the point of view of the strategic management team is inserted. To determine the final score of each factor, the coefficient of each factor is multiplied by its score, and the sum of the final scores of each factor is calculated to determine the final score. The same is done to prepare the EFE matrix (**Table 7**).

Table 6: IFE matrix

internal factors	Sub-criteria	Weight	Status Score	Weighted score
Strengths	S1	0.089	4	0.356
	S2	0.056	3	0.167
	S3	0.169	4	0.675
	S4	0.136	4	0.543
	S5	0.193	3	0.579
Weaknesses	W1	0.025	2	0.049
	W2	0.102	3	0.307
	W3	0.078	2	0.157
	W4	0.058	1	0.058
	W5	0.040	2	0.080
	W6	0.055	1	0.055
Total		1		3.025

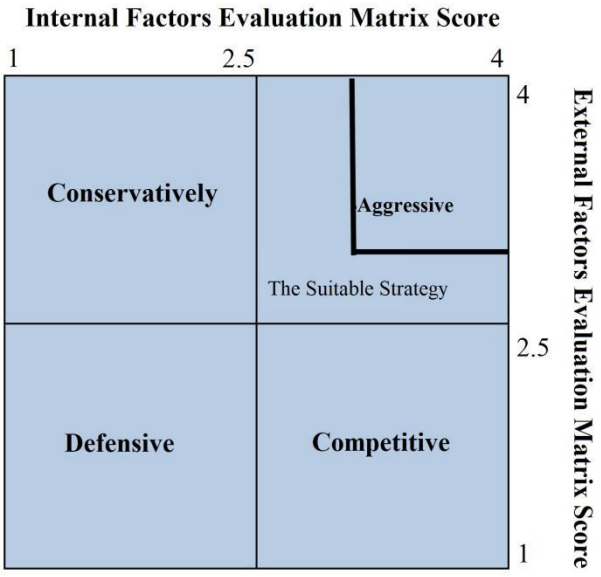
The number of 3.025 obtained from the IFE matrix indicates the dominance of the strengths over the weaknesses of the organization.

Table 7: EFE matrix

External factors	Sub-criteria	Weight	Status Score	Weighted score
Opportunities	O1	0.189	3	0.566
	O2	0.054	2	0.109
	O3	0.151	4	0.602
	O4	0.162	4	0.650
	O5	0.126	3	0.377
	O6	0.054	2	0.107
	O7	0.071	2	0.142
Threats	T1	0.021	1	0.021
	T2	0.035	2	0.069
	T3	0.031	2	0.062
	T4	0.056	3	0.168
	T5	0.051	2	0.102
Total		1		2.974

The score of 2.974 obtained from the EFE matrix indicates the dominance of opportunities over environmental threats. To determine the situation, the scores obtained from the IFE and EFE matrices should be placed in its vertical and horizontal dimensions and appropriate strategies can be specified for it. This matrix, which corresponds to the SWOT matrix and identifies appropriate strategies for construction project management, is presented in **Fig. 3**.

Fig 3: IFE and EFE matrices analysis



The results obtained from the IFE and EFE matrices indicate that the situation of construction project management is in an aggressive state and this situation is caused by the dominance of internal strengths over internal weaknesses and opportunities over environmental threats of the bank. Therefore, by implementing Strength-Opportunitie (SO) strategies, it is possible to make maximum use of external opportunities by using internal strengths.

3.2 Formation of quantitative strategic planning matrix (QSPM)

According to the IFE and EFE matrices, the strategies that should be considered are the strategies of using strengths to reach opportunities (SO). In addition, QSPM analysis has also been used to identify the attractiveness of each of the proposed strategies in this field. Existing strategies have been prioritized by forming a QSPM. A summary of the scores for each strategy is provided. Therefore, in order to implement this, 12 strategies have been presented, which are mentioned in **Table 8**.

Table 8: Suggested management strategies

Symbol	Strategies
SO1	Creating an engineering staff and their presence in the entire project and creating a construction management activities follow-up office
SO2	Strengthening and updating equipment and parts using educated workforce
SO3	The allocation of more government funds and investment in the private and civil sectors
SO4	Use of banking facilities to complete unfinished projects
SO5	Use of indigenous and young forces in order to reduce costs
SO6	Human resource training in order to enhance the expertise in the construction management complex
SO7	Applying creativity and human resources experience to increase productivity of construction projects
SO8	Construction of resistant infrastructure and creating the necessary regulations to strengthen and support construction projects
SO9	Having transparency and setting tasks for how to implement the role of construction management and use of equipment
SO10	Determining method or methods to facilitate systems maintenance
SO11	Improving the quality of equipment and devices using appropriate geographical potential
SO12	The proper organizational structure and the precise definition of a person's responsibility description

QSPM analysis has been used to prioritize and identify the attractiveness of each of the designed strategies. By forming a QSPM, the existing twelve strategies have been prioritized. Based on the QSPM analysis mentioned in **Table 8**, the priority of strategy selection is given in **Table 9**.

Table 9: The priority of choosing management strategies

Strategy	SO1	SO2	SO3	SO4	SO5	SO6	SO7	SO8	SO9	SO10	SO11	SO12
Score	1.85	1.88	1.59	1.38	1.77	1.89	1.90	1.94	1.86	1.71	1.42	1.88
Rank	7	4	10	12	8	3	2	1	6	9	11	5

According to **Table 8**:

1). The scenario of the construction of resistant infrastructure and creating the necessary regulations to strengthen and support construction projects with a score of 1.94 was ranked first.

2). The scenario of applying creativity and human resources experience to increase the productivity of construction projects with a score of 1.90 was ranked second.

3). The scenario of human resource training in order to enhance the expertise in the construction management complex with a score of 1.89 was ranked third.

4. Importance and Limitation of Study

Looking at pervious studies can be found that there are not any comprehensive researches to study the identification and evaluation of sustainable strategies in the urban construction project management. Many studies were conducted to develop the identification of sustainable factors through a small statistical population. There has been no comprehensive and detailed strategic planning for the strategic development of sustainable factors for the management of urban construction projects. In this study, sustainable factors have been evaluated very accurately through quantitative strategic planning matrix, which has not been done more research so far. The studies conducted by Afshari (2020); Bahramnia and Malek Hosseini (2018); Sepasi Zangabadi et al. (2020); Shams et al. (2018); Heravi and Laika, 2017; Salehipour (2018); Hasanimehr., & Asghari (2021); Shamaei et al. (2017); Gholipour and Sayyadi (2019); FallahTabar (2018); Nosrati *et al*. (2016); Feizollahi et al. (2020); Moharramzadeh *et al*. (2020); Mohammadzadeh et al. (2020); Hosseinzadeh *et al*. (2020a); Hosseinzadeh et al. (2020b); Hosseinzadeh et al. (2020c); Taghilo et al. (2020); Khorasani Anari et al. (2020), focused on defensive or offensive strategies with SWOT technique, and basic factors and sub-factors were not specifically evaluated. In the present research, the factors and sub-factors of the study were collected from a variety of infrastructure projects in the areas of urban, agriculture, mining, construction, and road construction, while other research (Afshari (2020); Bazrafshan and Samani (2019); Manouchehri Miandoab et al. (2020); Zalqi 2021; Monjezi (2020); Gazabizadeh et al. (2019), focused only on one specialized field. In this study, factors and sub-factors were screened from three aspect of economical, social, and environmental. These factors were carefully evaluated and showed that factors related to human resources are the main challenges and opportunities for success in urban construction projects (Table7). Strictness in obtaining permits to conduct interviews with experts and having a time limit to collect experts' opinions was one of the most important limitations that the current research has faced.

5. Conclusion

According to the purpose of this research, the current research is in the field of applied research. On the other hand, considering that library study methods and field methods such as questionnaires were used in this research, it can be stated that the current research is a descriptive research based on its nature and method. The results showed that the strategy of building resistant infrastructure and creating the necessary regulations to strengthen and support construction projects with a score of 1.94 is the first priority, the strategy of using creativity and human experience to increase the productivity of construction projects with a score of 1.90 In the second priority, and the scenario strategy of manpower training in order to increase expertise in the construction management complex is in the third priority with a score of 1.89. From the findings of the research, it can be concluded that the appropriate strategy in this research is a combination aggressive (Strength -opportunity) that includes the following:

1) Conducting management skills training courses for managers;
2) Government helps to invest in private and construction sectors;
3) Using bank facilities to complete unfinished projects;
4) Using local and young workers in order to reduce costs;
5) Manpower training in order to increase expertise in construction management;
6) Creating resilient infrastructure and creating the necessary regulations to strengthen and support construction projects;
7) Having transparency and defining the duties for how to implement the role of construction management.

Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

Data available on request from the corresponding author upon reasonable request.

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Appendix A

Delphi Technique / First Round

Criteria	Sub-criteria	Experts										Mean
		1	2	3	4	5	6	7	8	9	10	
Strengths	The presence of committed and expert human resources in the project management group	5	5	4	4	5	4	4	5	4	5	4.5
	The ability to transform new and sustainable ideas for the development of economic activities	3	4	4	3	2	3	4	4	3	4	3.4
	Allocation of dedicated budgets to construction projects in times of crisis	4	5	4	5	3	5	5	4	3	4	4.2
	Transparency in terms and conditions of construction projects	5	5	4	3	5	4	5	4	4	4	4.3
	Efforts to create effective collaborative project management in times of crisis	5	3	5	4	4	4	3	4	5	5	4.2
	Using the capacity of the local young and educated workforce	5	4	4	5	5	4	4	5	5	5	4.6
Weaknesses	Delay in the timely implementation of construction project plans	3	2	2	4	3	2	1	3	4	5	2.9
	Increase in energy consumption during the construction period due to more processes	4	5	4	5	3	5	4	4	5	4	4.3
	Non-observance of safety points and use of low quality and low durability materials	5	5	4	3	4	5	3	5	2	5	4.1
	General weakness in terms of management, expansion and optimization of infrastructure in the region	5	3	5	4	5	4	5	5	4	4	4.4
	Lack of suitable people in project management	4	3	4	4	3	5	3	2	3	5	3.6
	Lack of specific infrastructure facilities in project management	4	5	5	4	3	5	4	5	5	5	4.5
	The existence of worn-out fabric in the city center and the need to make setbacks in many urban passages	4	4	3	4	4	4	4	5	5	5	4.2
	Low control and supervision of urban project activities	4	3	4	3	3	4	2	4	2	4	3.3
	Unilateral decision-making without the use of project people's opinions	4	3	4	3	3	4	3	3	2	3	3.2
	The existence of a person-centered and partial attitude in contrast to a program-oriented attitude	5	4	5	5	3	4	5	4	4	3	4.2
	Weakness of the facility structure and appropriate equipment	4	4	4	3	4	4	3	5	2	5	3.8
Opportunities	Promoting strong, comprehensive and sustainable economic growth and creating jobs for everyone	4	3	2	4	1	2	5	3	3	4	3.1
	A suitable context for the investment of all people in the project	5	2	5	2	2	4	3	3	3	4	3.3
	Existence of potentials and potential geographical infrastructures for development and convergence in the regional space	3	5	4	5	4	4	5	5	5	4	4.4
	Existence of a suitable slope for the construction of sewage system and surface water collection in urban roads	3	3	4	4	4	3	5	3	3	4	3.6
	Attracting upstream resources to complete unfinished projects in urban construction plans	4	5	4	3	5	4	4	5	3	4	4.1
	Increasing the employment rate and creating continuous jobs, which reduces social damage	3	2	3	4	4	3	4	3	2	3	3.1
	Existence of laws and regulations to support construction projects	4	5	3	3	5	5	4	5	5	4	4.3
	Increasing people's awareness and their increasing demand to participate in managing the living environment	3	2	3	4	4	3	4	2	4	3	3.2
	Playing a collaborative role with NGOs in city management and planning	5	5	4	4	5	5	3	4	3	5	4.3
	Existence of expert and experienced personnel in construction project management	3	4	4	4	5	4	4	5	5	5	4.3
	The potential of creating popular participation due to the young population	4	5	4	5	5	3	5	4	4	5	4.4

	Government support and participation in construction projects	5	3	5	4	5	4	2	5	4	5	4.2
Threats	Occurrence of social conflict caused by the difference in opinions of project managers	3	2	4	2	3	3	2	3	2	4	2.8
	Lack of skilled human resources in the construction industry and project management	2	3	4	4	4	3	2	4	4	4	3.4
	High costs of repair and maintenance of construction equipment	4	3	5	4	5	4	5	3	4	4	4.1
	Lack of integrated and coordinated management in the project	4	5	5	5	4	3	4	4	5	5	4.4
	The fragility of the environment in terms of the limitation of population settlement and economic activities	3	4	3	4	5	4	5	5	4	4	4.1
	The intervention of various organizations and legal abuses	4	5	4	5	4	5	4	5	4	5	4.5
	Sudden changes in the laws of economic standards and imposing unnecessary costs in the project	1	3	3	3	2	4	3	2	3	4	2.8
	Lack of sufficient financial ability in the implementation of construction projects	4	5	5	3	4	4	5	4	4	4	4.2

Delphi Technique / Second Round												
Criteria	Sub-criteria	Experts										Mean
		1	2	3	4	5	6	7	8	9	10	
Strengths	The presence of committed and expert human resources in the project management group	5	4	4	5	4	4	4	5	4	3	4.2
	Allocation of dedicated budgets to construction projects in times of crisis	4	4	4	5	3	4	5	4	3	4	4
	Transparency in terms and conditions of construction projects	4	5	4	5	5	4	5	4	5	4	4.5
	Efforts to create effective collaborative project management in times of crisis	5	3	5	4	3	4	3	5	5	5	4.2
	Using the capacity of the local young and educated workforce	5	4	4	5	4	4	4	5	4	5	4.4
Weaknesses	Increase in energy consumption during the construction period due to more processes	4	5	5	4	3	5	5	3	5	4	4.3
	Non-observance of safety points and use of low quality and low durability materials	5	4	4	4	4	5	5	5	3	5	4.4
	General weakness in terms of management, expansion and optimization of infrastructure in the region	5	5	5	4	5	4	5	5	5	4	4.7
	Lack of specific infrastructure facilities in project management	4	4	5	4	4	5	4	4	5	4	4.3
	The existence of worn-out fabric in the city center and the need to make setbacks in many urban passages	5	4	3	4	4	5	4	5	5	5	4.4
	The existence of a person-centered and partial attitude in contrast to a program-oriented attitude	5	5	5	5	5	4	5	4	4	5	4.7
Opportunities	Existence of potentials and potential geographical infrastructures for development and convergence in the regional space	4	4	5	4	4	5	5	4	3	4	4.2
	Attracting upstream resources to complete unfinished projects in urban construction plans	5	5	5	3	5	4	4	5	5	4	4.5
	Existence of laws and regulations to support construction projects	4	5	3	3	5	5	4	5	5	4	4.3
	Playing a collaborative role with NGOs in city management and planning	4	5	4	4	5	5	4	4	5	5	4.5
	Existence of expert and experienced personnel in construction project management	4	4	4	4	5	4	4	4	5	5	4.3
	The potential of creating popular participation due to the young population	5	5	4	5	5	5	5	4	4	5	4.7

	Government support and participation in construction projects	5	4	5	4	5	4	4	5	4	4	4.4
Threats	High costs of repair and maintenance of construction equipment	3	4	4	5	5	3	4	5	5	4	4.2
	Lack of integrated and coordinated management in the project	4	5	5	5	5	5	4	5	5	5	4.8
	The fragility of the environment in terms of the limitation of population settlement and economic activities	3	4	4	4	5	4	5	4	4	4	4.1
	The intervention of various organizations and legal abuses	4	5	4	4	4	5	5	5	4	5	4.5
	Lack of sufficient financial ability in the implementation of construction projects	4	5	5	5	5	4	5	5	4	4	4.6

Delphi Technique / Third Round												
Criteria	Sub-criteria	Experts										Mean
		1	2	3	4	5	6	7	8	9	10	
Strengths	The presence of committed and expert human resources in the project management group	5	5	4	5	4	4	4	5	4	3	4.3
	Allocation of dedicated budgets to construction projects in times of crisis	4	5	4	5	3	4	5	4	3	4	4.1
	Transparency in terms and conditions of construction projects	4	5	5	5	5	4	5	4	5	4	4.6
	Efforts to create effective collaborative project management in times of crisis	5	3	5	5	5	4	3	5	5	5	4.5
	Using the capacity of the local young and educated workforce	5	4	4	5	4	5	4	5	4	5	4.5
Weaknesses	Increase in energy consumption during the construction period due to more processes	4	5	5	4	3	5	5	5	5	4	4.5
	Non-observance of safety points and use of low quality and low durability materials	5	4	4	4	4	4	4	5	3	5	4.2
	General weakness in terms of management, expansion and optimization of infrastructure in the region	5	5	5	4	5	5	5	5	5	4	4.8
	Lack of specific infrastructure facilities in project management	4	4	5	4	5	5	4	4	5	4	4.4
	The existence of worn-out fabric in the city center and the need to make setbacks in many urban passages	4	4	3	5	4	5	4	5	5	5	4.4
	The existence of a person-centered and partial attitude in contrast to a program-oriented attitude	5	3	5	5	5	4	5	4	4	5	4.5
Opportunities	Existence of potentials and potential geographical infrastructures for development and convergence in the regional space	5	4	5	4	4	5	5	4	3	4	4.3
	Attracting upstream resources to complete unfinished projects in urban construction plans	5	4	5	3	5	4	4	4	5	4	4.3
	Existence of laws and regulations to support construction projects	3	5	3	4	5	5	5	5	5	4	4.4
	Playing a collaborative role with NGOs in city management and planning	4	5	5	4	5	5	5	4	5	5	4.7
	Existence of expert and experienced personnel in construction project management	4	4	5	4	5	4	4	4	5	5	4.4
	The potential of creating popular participation due to the young population	5	5	4	4	5	3	5	4	4	5	4.4
	Government support and participation in construction projects	5	5	5	4	5	5	4	5	4	4	4.6
Threats	High costs of repair and maintenance of construction equipment	3	4	4	5	4	3	4	5	5	4	4.1
	Lack of integrated and coordinated management in the project	4	5	5	5	4	5	4	5	5	5	4.7

	The fragility of the environment in terms of the limitation of population settlement and economic activities	3	4	5	4	5	4	5	4	4	4	4.2
	The intervention of various organizations and legal abuses	4	5	4	4	4	5	5	5	4	5	4.5
	Lack of sufficient financial ability in the implementation of construction projects	4	5	4	5	4	4	5	5	4	4	4.4