

Application of SWOT Technique in Assessing Pardis New Town in Connection with Spatial Expansion of Tehran

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Abstract: By the expansion of urban city of Tehran, the necessity of transferring the excessive population has led to the activities of national metropolitan city in the planning system in developing new cities such as Pardis that despite investments and planning of institutes and relevant organizations, this type of new cities have faced challenges that not only did not reduce the additional population of Tehran city, but also it has added its problems. Pardis New City despite location potentials lacks suitable planning as a balancing and supportive space for reducing spatial problems of Tehran; therefore, in this paper, first the weak and strong point and then, the opportunities and risks of Pardis New Town were identified by using Delphi, SWOT techniques, then, by using the resulted matrixes, suitable strategies have been set with the goal of achieving concerned results.

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Key words: Pardis New Town, Metropolitan region, spatial expansion, Delphi model, SWOT model

Introduction

Since the Second World War, new towns have been used as a model for assisting in solving social, economic and environmental problems of metropolitan cities. In Iran; too, the hasty urbanism of the last four decades and the straits resulting from it (housing, unemployment, margin settlement....) required adaptation of taking the policy of new towns establishment since mid 1980s. The policy of developing new towns has been confronting many challenges from the very beginning such as lack of legal and jurisdictional criteria, lack of policy of integrated management, lack of coordination and collaboration among organizations due to sectarian views, shortage of financial and credit sources for executing such a large scale project.

Research methodology:

Present research is applied and has been carried out in continuum-descriptive and case study method. The information has been collected in literature-documents review and field survey, though observation and interview. The descriptive (quality), quantity and graphic method are used for analyzing data. Since SWOT technique was used for proceeding in studies and determining strategies, first, that technique has been presented and the research findings were studied afterward.

Theoretic model of the research

With respect to the studies, in order to categorize internal and external factors of the city, Delphi model is used and for weighing and measuring factors, the SWOT model has been applied, each one of the two techniques are discussed in more details.

A: Delphi technique:

This technique is a method in which, decision making and prediction depends on conscious viewpoints and expertise contemplation. The structure of this technique varies based on status and subject. In this technique, following stages are taken to achieve shared views of specialists:

1. A number of experts are asked to give some probability to some events.
2. In this method, the collected views of experts are compared.
3. The frequency spread of points is classified based on abundance of opinions and if their opinions were not in compliance with others, they will write the reasons of no changes in their opinions. This stage is repeated as long as the general shared views of the group are obtained.

B: SWOT Technique

SWOT is the technique for the quality assessment of internal and external factors from the two dimensions of weak and strong points and opportunity and threat. In this line, first, the strong points and the weak points in connection with the internal factors, and the opportunity point and threats ahead are studied in connection of external factors, and each group of those factors is inserted in the relevant matrix. In this way, the matrix of strong and weak points, the opportunities and threats are among important tools that could be used for comparing information and present four types of strategies: The SO Strategies, the WO strategies, the ST strategies and WT strategies. This matrix in sum has nine boxes as follows: 4 boxes that include the major factors, including opportunities, threats and weak and strong

points, 4 boxes allocated for strategies, one white or black box (first box on top and right hand of table). Boxes that show strategies and are specified with topics such as WT, ST, WO and SO, after completing the 4 boxes that are related to major factors (that is, T, O, W, S boxes) are created. For making matrix of threats, opportunities, weak points and strong points, 8 stages are performed as follows:

1. A list of existing major opportunities in external environment should be prepared.
2. A list of existing major threats in the external environment should be prepared.
3. A list of internal strong points should be prepared.
4. A list of internal weak points of the organization should be prepared.
5. The internal strong points and external opportunities are compared and the result should be written in "SO Strategies" group.
6. The internal weak points should be compared with the existing external opportunities and the result should be written in the "WO Strategies" group.
7. The internal strong points should be compared to the external threats and the result should be written in "ST Strategies".
8. The internal weak points are compared to external threats and the result is written in "WT strategies" group. (Rajabi, 2004, P. 14).

Following, the procedure of preparing the matrix of internal and external factors and the relevant diagrams on determining the place of items subject of study are presented to determine the relevant strategy.

"The matrix of internal factor indicates the strong and weak points. In preparing this matrix, the major emphasize is on the observations and field studies of the researcher and in order to prepare it, five stages as follows should be performed:

1. Study the factors and listing them
2. Weighing (coefficient) to the listed factors from zero to one.
3. Ranking, with the rank of one to four. For strengths, ranks 3 and 4 and for the weaknesses, ranks 1 and 2 are considered.
4. The coefficient of each factor is multiplied in the relevant rank to give final score.
5. Of total final scores belonging to each factor, the sum of scores of internal factors is determined.

In order to prepare a assessment matrix of external factors too, the five stages above should be performed with the difference that in this matrix, on one hand factors that in future cause opportunities and development situation, and on the other hand, the external factors that threat that development are listed in that matrix.

In next stage, after coding each factor inserted in internal and external matrices, by taking systemic view to those factors as per the following diagram, the suitable strategies are determined as a combination of mentioned factors in template of SWOT 9-box table and are developed based on the frequency of strategies determined in the relevant box and its place is determined in the SWOT 4-box table in terms of determining the general policy for taking suitable strategy for development. In the internal and external 4-box matrices, the total final scores on axis Xs from 1 to 2.5 show internal weakness and scores 2.5 to 4 show amount of strength. In the same way, the sum of final scores of the matrix of assessing external factors, scores of 1 to 2.5 indicate the amount of threats and 2.5 to 4 indicate the amount of opportunities. Placement in each one of the boxes of internal and external matrices with 4 boxes has specific strategic concepts.

Table No 1:

Internal conditions		Ground	Strong points (S)	Ground	Weak points (W)
Eternal conditions			0000.1 000.2		000.1 000.2
Ground	Opportunities (O)	(SO) Note: 1-Maximum- maximum 2- Development strategies are recommended (aggressive)		(W) Note: 1-Minimum- minimum 2-Restorative-protective strategies are recommended (conservatives)	
Grounds	Threats (T)	(ST) Note: 1-Maximum-minimum 2-Developmental and organizing strategies are recommended (competitive)		(WT) Note: 1-Minimum-minimum 2-Restorative-protective and changes strategies are recommended (defensive)	
	000.1 000.2 000.3				

In this way, the matrix of strong and weakness points, opportunities and threats are among important tools that could be used for comparing information and by using it, four types of strategies are presentable: SO strategies, WO strategies, ST strategies and WT strategies.

Comparing the major internal and external factors are of the most difficult parts of developing threats and opportunities matrix and the weak and strong points and require careful and good judgments. In the meantime, in fact, there is nothing as the best complex comparable factors.

“In executing SO strategy, in fact, the external opportunities are utilized and always the preference is to utilize the internal strong points of external events and processes. Usually, in order to reach such situation, in the beginning, the ST, WO or WT strategies should be used.

When a plan or program has major weak points, it tries to remove those weak points or change them into strong points. The goal of WO strategies is to utilize the existing opportunities in external environment and try to improve internal weakness points. Sometimes there are highly suitable opportunities in external environment; however, due to internal weakness, those opportunities could not be utilized. One of the ways of using WO strategies is to benefit from opportunities to take advantage of opportunities and the other way is to try in providing necessary grounds for using opportunities.

In executing ST strategies, it must be tried to use the strong points of oneself to reduce the effects of existing threats in external environment or remove them completely. Of course, it does not mean that a strong plan or project in external environment will face some threats.

In executing WT strategies, a defensive state should be taken, the internal weak points should reduce and the threats resulting from external environments should be prevented. The plan or project that has internal weakness points and faces high threats in external environment is in a risky situation and in fact, to achieve success in proceeding towards its goals or in another word, having subjectivity, it is forced to reduce its activities (the strategies of reduction or release) and make a full revision in its acts or ultimately, become non-executable.” (Ziviar, 2008).

Findings of research

Since the techniques raised in the research theories have been tested in Pardis New Town, Pardis New Town has been introduced and the resulted findings are presented.

In location term, Pardis New Town is one of the satellite towns of Tehran metropolitan city. In political division, this zone is a part of Shemiranat, district Lavasanat and Siahroud village. Its average altitude from sea level is 1850 meters in average. This zone is mainly bordered by natural factors (mountain and river) and it is predicted that those factors in future will prevent the continuum spatial expansion and the connection of the New town to Tehran.

Based on strategic studies for location of New Town, after performing location studies of new towns in urban zone of Tehran, the slopes of south walls of Alborz in east Tehran Province and in west of Boumehen city, adjacent to the two sub regional Tehran-Roudehen Free Way and Damavand in Firouzkouh, on the land known as Abanjirak was selected. The area of the city in preliminary feasibility studies was assessed to be around 2000 hectares and in next revisions, 3817 hectares.

Among the reasons and factors of location finding, selecting this zone (Abanjirak lands) for establishing Pardis New Town with 200 thousand people capacity, in terms of population consultants, followings are notable:

- Suitable distance to Tehran (around 35 Klm)
- Location in the path of one of the main roads of the country.
- Existence of topography barriers that prevents connection of this zone to Tehran.
- Very low population density in this zone which is lower than average population density of the country by deducting desert lands.
- Existence of suitable environmental conditions and beautiful natural perspective (Atak Consulting Engineers, 1990, P. 65)

In order to study and assess Pardis New Town, the internal and external factors are zoned (weighed and scored) based on Delphi and SWOT theories. Then, based on that stage, tables of suitable strategies and table of SWOT factors and axes is developed and the suitable strategies and approaches are presented accordingly.

Table No 2: Matrix for assessing weak and strong points of internal factors (IEF) based on the Comprehensive Plan and existing situation of New Town

No.	Weak points	Factors	Coefficient	Score	Final scores
1	Weak points	Definite view in relation with predicting land application	0/02	2	0/04
2		Prolonged process of preparing and approving comprehensive project	0/02	2	0/04
3		Inefficiency in assessing actual need of the society	0/02	2	0/04
4		Disregarding the role and participation of people in formation of the New Town in comprehensive plan	0/02	2	0/04
5		Lack of welfare, educational, medical and recreational services, shopping centers...	0/03	1	0/03
6		High density of buildings (residential)	0/01	2	0/02
7		Lack of urban services offices	0/01	2	0/02
8		Unsuitable spatial distribution of facilities	0/02	2	0/02
9		Lack of people participation in planning, design, execution,...in present conditions	0/03	2	0/04
10		Approach of centralization in urban management (non-participative management)	0/01	2	0/06
11		Disconnection of horizontal connection of northern and southern parts of the city due to Tehran- Amol road	0/01	2	0/02
12		Disconnection of residential and non-residential usage	0/01	2	0/02
13		Lack of sewage networks	0/03	2	0/02
14		Inefficiency of absorption wells of the region due to impenetrable rocky textures	0/02	1	0/06
15		Evasion to river margins and other lands by releasing sewage in them	0/03	2	0/02
16		Air and sound pollution along major road (Tehran-Amol road)	0/01	2	0/06
17		Seismic characteristic of the zone	0/04	2	0/02
18		Non-coordination of the architecture and environmental specifications	0/01	2	0/08
19		Tall buildings in unsuitable places	0/01	2	0/02
20		Unbalanced and unclear sky zone	0/01	2	0/02
21		Existence of volume and compact buildings	0/01	2	0/02
22		Amount of light and air reduction in some points	0/02	2	0/04
23		Visual monotony in some points	0/02	2	0/04
24		Lack of suitable installations for sidewalks in squares and city corridors	0/01	2	0/02
25		Problem of financial sources of Omran Company	0/02	2	0/04
26		Lower occupation rate	0/02	1	0/02
27		Slope of some passages and problems resulting from that in super structure operations and execution	0/02	2	0/04
28		Destruction of asphalt of passages due to climatic conditions and mountainous environment	0/02	2	0/04
29		Lack of completion of optic fiber telephone network	0/02	1	0/02
30		Low population threshold for forming service centers	0/01	2	0/02
31		Anxiety and social stress of families for occupation and trips of their adult children outside Pardis New Town	0/02	2	0/04
32		Unsafe situation of Tehran-Pardis New Town connection roads (in present conditions)	0/03	2	0/06
33		Unsuitable land and housing rates and applicants' power	0/03	2	0/06
34		Increase in residential use surface to other land usage	0/04	2	0/08
35		High cost price of houses in new towns than surrounding points of mother city	0/02	2	0/04

Continuation of table number 2

No.	Strong points	Factors	Coefficient	Score	Final scores
1		Possibility of using suitable lands for making necessary usages	%1	3	0/03
2		Existence of conditions for developing tourism (road and space)	%1	3	0/03
3		Exiting open spaces (in evens and increase in land usage)	%1	3	0/03
4		Existence of natural views and perspectives in the zone	0/01	3	0/03
5		Special environmental situation of the zone for being in upper Tehran	0/01	3	0/03
6		High percent of using desirable materials in New town buildings	0/01	3	0/03
7		Healthy water	%04	3	0/012
8		Expansion of roads networks	0/004	3	0/012
9		Reinforcing buildings	0/02	3	0/06
10		Desirable climate	0/02	4	0/08
11		High share of sub regional usages (scientific, tourism, workshop, economic)	0/03	4	0/012
12		Zoning the usages	0/01	3	0/03
13		Systematizing all activities (scientific, residential, recreational)	0/01	3	0/03
14		Regularizing all quantitative and qualitative needs through per capita	0/01	3	0/03
15		Establishment of grounds for balanced and coordinated structural development	0/02	3	0/06
16		Development of protective limits in its establishment and organization	0/01	3	0/03
17		Existence of potential job applicants for developing tourism and other roles	%3	3	0/09
18		Possibility of development of intermediate city in the zone	0/03	4	0/012
19		As a place to take population waves (migrants and travelers)	0/02	3	0/06
20		Little distance with major city	0/02	3	0/06
21		Tax exemption in clean technology (for activities applicants)	0/02	3	0/06
Total			1	132	1.66

Findings resulted from analyzing first stage

As it could be observed, in the matrix of SWOT assessing the internal factors, the advantages

of Pardis New town is less than 2.5 that shows organizational weakness and it is considered among effective factors in non- success of this project.

Table No 3: Matrix for assessing opportunities and threats points by external factors (EFE) based on the comprehensive pan and existing status of Pardis New Town

No.	opportunities	Factors	Coefficient	Score	Final scores
1		Administrative and political ;centralization in major city	0/01	4	0/04
2		Population density in major city	0/01	4	0/04
3		Communication with tourism global organizations via WTO	0/04	3	0/12
4		Possibility to use underground water beds of Latian and Jajroud rivers	0/02	3	0/06
5		Establishments and implementations of Tehran-Pardis New Town Free Way	0/01	4	0/04
6		Uneveled cross section with accessibility opportunity	0/01	3	0/03
7		Floods canals around the city that controls and guides floods.	0/03	3	0/09
8		Existence of Kamard and Khorramdasht Industrial zones that provides population movement.	0/02	3	0/06
9		Mountain view of the region	0/03	3	0/09
10		Continuation of subway railroad from Tehran to the region in future	0/01	3	0/03
11		Increase and expansion of protection borders to control construction and performing probable operations in future	0/01	3	0/03

12		Idea of establishing councils in region for popular participation	0/02	3	0/06
13		Passage of main road of the country	0/02	3	0/06
14		Tehran as the major city to supply various demands	0/03	3	0/09
15		Approval of sub regional map (scientific and tourism)	0/02	4	0/08
16		Little distance between mother city and new town	0/03	3	0/09
17		The Act of establishing new towns, passed by Islamic Legislative Assembly on Jan. 6, 2012	0/01	4	0/04

Continuation of table 3

No.		Factors	Coefficient	Score	Final scores
1	threats	Formation of competitor residential centers in form of city, town and shacks	0/08	2	0/10
2		Change of villages to town around the major city	0/08	2	0/10
3		Negligence of urban management of urban region of Tehran to new towns	0/06	2	0/08
4		Weakness of realization of upstream designs	0/03	2	0/06
5		Unsafe Tehran-Amol road	0/04	2	0/08
6		Domination of the patter of separation of work place from living place	0/02	2	0/04
7		Low price of lands around mother city than major city	0/04	2	0/08
8		Domination of series of living complexes (villages) into new town	0/04	2	0/08
9		Increase in price of lands in Pardis New Town (penetration district) and prevention or lack of their cooperation in the plans of new town managers	0/04	2	0/08
10		Dependence of new town to surrounding places (cities and major city) in administrative, service...terms	0/04	2	0/08
11		Probable increase in migration from Pardis New Town region to Pardis New Town	0/03	2	0/06
12		Existence of sound and air pollutions	0/04	2	0/08
13		Spread of plans systems across the country and lack of inter-sector systems (despite new towns establishment Act)	0/03	2	%6
14		Little distance between New Town and Major city (hostel nature)	0/02	2	%4
15		Lack of supervision over construction in the limit of major city	0/02	2	0/04
16		Increase in construction density in major city	/02	2	0/08
17		Approval of 120- Klm diameter	%4	2	%8
Total			1	90	2/27

Source: Author

Findings of second stage

In the matrix of external factors, the final scores of Pardis New Town was 2.27 that shows undesirable situation of the Organization; however, difference of score is 0.61 percent in favor of external factors, showing that the status of the new town in connection with internal factors is slightly worse than external factors and the scores obtained in connection with external factors reveal that threats exceed opportunities. In this regard, this town has risky

situation in terms of internal and external situation and in order to change from the present situation to an active status, it requires special strategies in connection with the weak point and threats mentioend above. In this part, according to table 4 and 5 and diagram 3, the type of strategy is determined with respect to largest number based on the final score from combination of internal and external factors in SWOT model.

Table No 5- Combination of internal and external factors

Factors	W	T	S	O
	0.67	0.59	0.33	0.33
Total coefficients of factors	WT	WO	ST	SO
	1.26	1	0.92	0.66

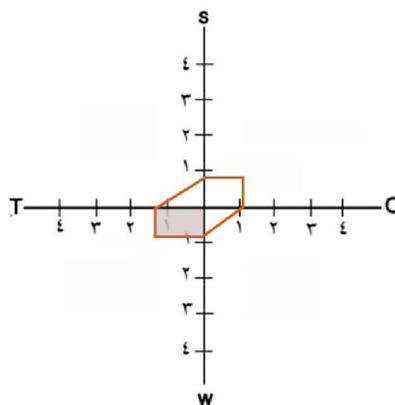


Diagram No 1

Conclusion and suggestion

As it could be observed, the largest score which is obtained in for WT factors in which conditions, the organization (Pardis new Town) should take defensive strategies in order to reduce its weak point and withdraw from threats of external environments; as the situation and condition of this organization in SWOT term is risky and in order to continue the project, it seems necessary to review the policies which have been adopted so far.

In analyzing SWOT in matrix template 5, the strategy is illustrated and later, based on the data, the strategy core is defined and ultimately, the weak and threat points of the project have been identified, on which basis, suitable approaches are discussed for removing obstacles and problems.

In general summation with a systemic view between strong and weak points in internal environment on one side and opportunities and threats from external environment on the other hand, it could be stated that in the internal environment, the weak point is more than strong points; therefore, the new town in internal environment is facing a series of functional- services gaps and to remove them, some strategies should be adopted to remove weak points. In external environment too, threats are more than opportunities; therefore, the city did not have necessary compatibility with the environment and strategies should be adopted to remove threats and change them into opportunities. With this view, with a systemic view to the weak and strong points, and opportunities and threats of above-mentioend tables,

it should be concluded that that although Pardis New town has relatively suitable power, which could change into a region with the predicted role and performances; however, on the other hand, due to weaknesses in the space of New town, it could be observed that part of it has sent it away from considered plan in some extent; therefore, as the most important step in executing the plans and goals of establishing Pardis New Town, arranging the priority of the extracted strategies especially in connection with absorbing populations and additional performances of Metropolitan Tehran in above-mentioend table and to utilize from strategies for execution and closeness to the realities.

With respect to the existing table in quality assessment from realization of the comprehensive Pardis New Town, the strategy of this plan was put in WT position or “defensive strategy” or in an interpretation, restorative- protective. In this regards, one could note following suggestions:

1. With respect to the abundant weak points and threats of comprehensive and detailed plan of Pardis New Town, the strategy of this complex is to change the method of preparing comprehensive plan and restoring it to the structural- strategic plan in direction of realization of the goals of New Towns goals.
2. Transfer and replacing state roads from inside Pardis New Town
3. Regularization of construction in mother city

4. Flexibility and revision in legal index of city definition (statistics) or postponing improvement of residential complexes into city in the scopes that face the phenomena of new town for the progress and realization of goals of new town
5. Efforts in coordinating between ministries and organizations for executing plans (goals) of comprehensive project of Pardis new town;
6. To accelerate the plans under establishment such as scientific, educational, service, tourism...
7. Transfer parts of administrative roles from major city to new city
8. Providing financial and legal support from government for the realization of goals of comprehensive plan of Pardis New Town
9. Intervention of private sector and people in new town plans from regulation to execution
10. Establishment of processing industries related to the resources in the region and in general, accessible resources in the zone for entrepreneurship and job creation
11. Efforts to remove obstacles of development from intervention scopes such as (Pollutions of sewage and garbage)
12. Efforts in creating urban identity in the region

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