The livability measurements in the old urban fabric of Zone 1 in District 9, Tehran

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Abstract

Ever-increasing population and urbanization have had a detrimental effect on the cities and the continuing urbanization resulted in the social, economic, and environmental problems of the cities which is a crisis and the warning for the cities' sustainability. This situation is also the case in many cities in Iran, which are faced with the consequences of urban rapid growth and the lack of sufficient financial and human resources in the management process. It is well understood that the livability based on the participation of residents in a neighborhood emphasizes on the social capital, public participation and the sense of belonging of the neighborhood residents. This, with an emphasis on the role of people and community in the neighborhood, can provide better outcome to the neighborhood in identifying neighborhood problems and subsequently decision making, planning and the related authorities in a neighborhood. Indicators of this study are socioeconomic, physical, and environmental indicators. The purpose of this research is to identify the threats, opportunities and capabilities of Zone1 in District 9 by using a survey in the form of a five-point Likert scale. This study was done by using the SWOT model and prioritizing them using a Quantitative Strategic Planning Matrix (QSPM). The results of the research show that the construction of class parking, the construction of a hangout, the rehabilitation of existing gardens and parks, defining of the incentive development projects in the state and municipal lands, are of the basic needs of the neighborhood and have the highest priority which are mostly physical and infrastructural.

Key words: SWOT, livability, livability index, zone 1, District 9.

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Introduction

One of the factors influencing humankind's sense of belonging is the quality of the living places. Environments that are low in terms of the quality of the living places are generally less likely to be considered livable. The term "livability" refers to the degree in which the needs of a community are based on the capacities of the people of that community. A non-livable society is indifferent to the needs of its people and does not respect their wishes. In recent years, with regard to the development of urbanization and the growing population of cities, attention has been paid to measuring the present situation of cities and neighborhoods. On the other hand, considering the change of views from pure standards to qualitative perspectives and the emergence of a sustainable development theory and approach rather than a macroeconomic perspective, the issues of quality of life and living city have been considered seriously (Mahdizadeh, 32: 1382).

Significance of the study

Cities today are faced with many challenges in terms of economic, social and environmental issues. At the same time, ever increasing populations and urbanization, have had damaging effects on cities. The continuation of this kind of urbanization with social, economic and environmental problems is a crisis and a warning to the sustainability of cities. In the meantime, problems such as a decay in the quality of life, air pollution, traffic, psychological problems reduce the livability of cities dramatically. Therefore, the necessity and importance of the debate about the livability of today in cities is quite clear (Sasan Poor and Others, 130: 1393).

Statement of problem

The livability of a city is determined by the extent to which the inhabitants of that city participate in decision-making process to meet their needs. livability is defined as the quality of life experienced by residents of a city, a region or neighborhood, which can be social, economic and environmental (physical and infrastructural) (Seymoar & Timmer, 2005: 2). Therefore, it can be said that the livability

that is based on the participation of residents of a neighborhood is in fact a bottom-up planning and management that focuses on social capital and community participation in neighborhoods.

Zone1 of District 9 is located in southwest of Tehran. This area consists of 3 homogeneous neighborhoods that are restricted by the highway of Yadgar, and by Elyah Sa'idi and Jay's Simetri. Due to high accessibility, price of land, the area has attracted the attention of the residents. Though, it faces problems such as lack of open space, lack of parking lots, the lack of service, high density and inadequate infrastructure, low security of nightlife and so on. This paper examines the dimensions and outcomes of the selected community, which includes two groups of people and officials. The strengths and weaknesses of each criterion that remarkably affects other criteria are examined and, finally, given the weighting of priorities, strategies are presented to resolve physical, infrastructural problems.

Research questions

The first research question is: What are the strategies and plans in accordance with the capabilities and potential of the region to improve the livability of the old urban fabric of District 1, which can be done with the involvement of citizens, civil institutions and authorities? And the second research question is: What is the relationship between independent variables (economic, social, physical, and infrastructural, etc.) and dependent variables (livability)?

Research methodology

The method used in this study is descriptive-analysis and the required information was collected through questionnaires, face to face interviews, as well as data provided by relevant institutions and agencies. The project was conducted using a survey in the form of a Likert five-point scale. This is done by using the SWOT model and prioritizing them using the Quantitative Strategic Planning Matrix (QSPM). The reliability and validity of the questionnaire was provided and the respondents of this study were both male and female in Zone1 of District 9 of Tehran municipality with 77,000 number of people. A

sample size of 200 people was selected according to the Cochrane formula. It should be noted that the assessment of livability and quality of life are measured for the first time in this area.

Territory of study

Considering the division of Tehran into 22 Districts, the study area is located in District 9 located in southwest of Tehran. District 9 is located north of District 5 and 2, east of the District 10 and west of the District 21 and south of the District 18. The District 9 is in the current status of 2 zones and 8 neighborhoods. District 1 is limited to the north of Azadi Avenue, south of the Dastgheib Street, east to Yadgar Imam Street and Shahidan Street, and west to Ayatollah Saeedi Street. The neighbourhoods of Ostade Moein, Dr. Hoshyar and Dastgheib are covered by District 9 which is approximately 19.6 square kilometers. According to the population census of 1390, a population of 177 thousand people, most of whom live in neighborhoods such as Hoshyar, Shamshiri, Dastgheib, Mehrabad and Jay's Simetri. Zone1 is located in the north of the 9th District, which consists of three neighborhoods of the Ostad Moein, Dr. Hoshiar and Shahid Dastgheib. The dominant residential area is R122. The population of the region is about 77,000 according to the 1995 census.
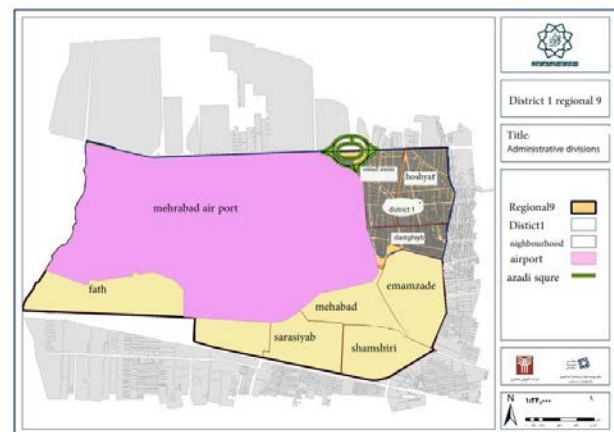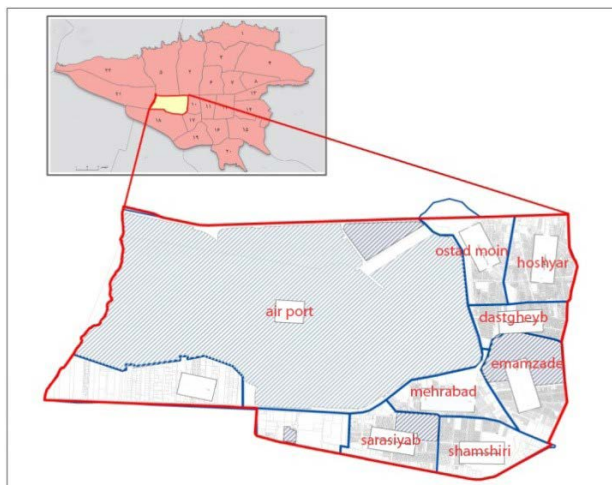

Figure 1: Location map of District 9, Tehran

Theoretical framework

Livability

Livability, in its general and general sense, is the concept of achieving livelihood and, in fact, it is the achievement of good urban planning quality or a stable place.

Livability is about a broad debate of sustainability, transportation, vibrant environments, various dimensions of the community, and so on, that is based on the achievement of urban livability, which is so called a successful city. Through environmental livability, ecological sustainability, social problems (poverty, class differences) economic problems (unemployment, addiction) environmental problems (pollution) and cultural problems (illiteracy) would be addressed (Perogordo and Madrid, 2007: 40).

In general, the definitions of livability and the livable community include a diverse range of topics that are expressed in a series of guidelines: equality and participation. The quality of life of citizens depends on the amount of access to infrastructure (transportation, water and sanitation), food, clean air, affordable housing, satisfying jobs and green spaces and parks. The affordability of a settlement also depends on the amount its resident's participation in the decision-making process to meet their needs

(Timmer and Seymour, 2005.p10).

Livability is a general concept associated with a number of other concepts and terminology such as sustainability, quality of life, quality of place and healthy communities (Norris and Pitman, 2000: Blassingame,1998).

Although the definition of livability varies from one community to another, social planning goals can be used to create indigenous livability criteria. Livability is often used to define the different dimensions of the community and the common experiences that shape it. Livability focuses on the human experience of the place and takes these experiences into account in a given time and place.

Livability in a urban system addresses the social, physical, and psychological well-being of all its residents (cities plus, 2003). Charles Landry explores the concept of livability in a different way; he defines the issue individually and deals with the problem with four major approaches. He identifies 9 effective criteria for identifying a livable city: usefulness, diversity, accessibility, safety and security, identity and differentiation, creativity, communication and collaboration, organizational capability, and competition. He examines the subject in a more comprehensive view of urban livability, and the following is a summary of the issues that Landry referred to:

Economic	occupation, net income and living standards of people in a surveyed area, the number of tourists, retail sales performance, land and property value are evaluated.
Social	It is measured by the levels of social activity and social interaction plus the nature of social communication. A vibrant and livable city can be socially driven by the low levels of deprivation, strong social cohesion, good communication and the dynamics between the social strata, collective spirit and civil pride, a wide range of lifestyles, balanced relationships, freshness of metropolitan society are described.
Environmental	Two aspects are including: first, ecological aspect is associated with variables such as air and noise pollution, waste and sewage disposal, traffic volumes, and green space. The second aspect is related to design that includes variables such as readability, sense of location, architectural differentiation, connection and communication between different departments, the city, the quality of lighting, and how friendly, safe and psychologically accessible the urban environment.
Cultural	It includes the viability, respect and celebration of the city and its people, identity, memories, traditions, social celebrations, production, distribution and consumption of man-made products and signs that express the distinctive nature of the city.

Table 1: Types of livability

Sustainability and livability

Sustainability and livability is the relationship between social, economic and environmental dimensions (Knox, 2011). The interrelationship between these two dimensions be plotted in a prism, which is the main dimension of sustainability is at the intersection of the three sides of the charter. All three sides are connected by axes at the top of the pyramid, that are respected in the three dimensions of social, economic, and environmental values. Livability is recognized as the ultimate goal of any society in achieving the desired living conditions. Based on this, livability can be considered as a subset of the general sustainability concept that seeks to achieve sustainability goals at the local community level.
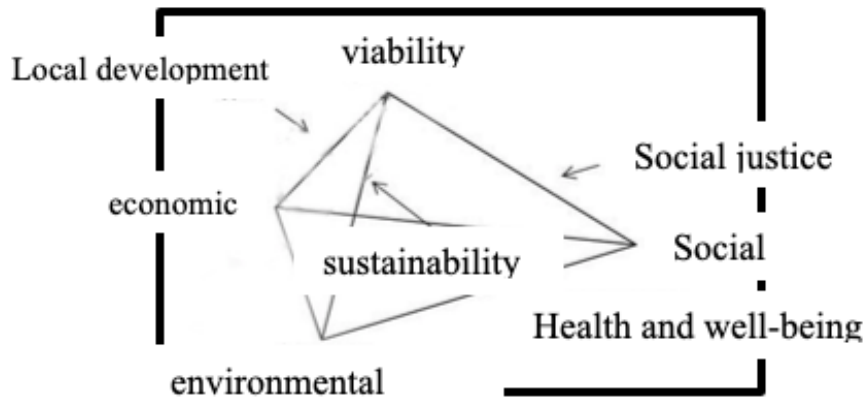
Figure 2: Theoretical framework

Given the wide range of indicators of survival based on the theoretical literature of the research, the indicators studied in this research are based on Landry which are environmental, physical-structural, social-cultural, aesthetic and economic.

Dimensions	Indicators	Indices
environmental	Contaminations	Satisfaction with noise pollution (noise)
		Air quality satisfaction
	Environmental health status	Satisfaction of waste and waste disposal system
		Satisfaction with cleaning and disposal of surface water
	Housing Properties	Satisfaction rate of residential unit size
		Satisfaction level of home lighting
Physical and Infrastructure	Accessibility	Satisfaction with access to educational centers (such as kindergarten, elementary, guidance, etc.)
		Satisfaction with access to shopping malls
		Satisfaction with access to sports centers
		Satisfaction with access to health centers
		Satisfaction with access to nearby centers, parks and green spaces
	Transportation neighborhood level	Satisfaction with access to public transportation
		Satisfaction with access to pedestrian routes
		Satisfaction with access to public and class parking
		Satisfaction with access to bike routes
	Transit status	Satisfaction with the lighting of the passageways
		Satisfaction with marginal parks inside the neighborhood
		Satisfaction with the quality of the passageways

Social	Social interaction	Satisfaction level of interactions and community relations at the neighborhood level
		Satisfaction level of the neighborhood program and services
		Satisfaction with urban quit spaces at the neighborhood
		The tendency to lasting at the neighborhood level
		Satisfaction level of neighborhood participation
		The degree of satisfaction with the activities of popular groups and institutions
	Social Security	Satisfaction with neighborhood credit
		Satisfaction level of security in public places at night
	Visual quality	Satisfaction with the presence of homogeneous and uniform views at the neighborhood level
Aesthetic	Landscape	Satisfaction with the beauty of the neighborhood
		Satisfaction of the cinema and the wall
Economical	Household cost	Satisfaction with household income
		Satisfaction level of household expenses
		Satisfaction with shipping costs

Figure 2: Theoretical framework

characteristics of respondents were in the form of officials and experts in Zone 1 in District 9. Then, in order to assess the livability, we first examine the internal and external factors of Zone 1. For this purpose, first, the strengths and weaknesses as internal factors and the points of opportunity and threat as external factors are extracted, then the internal and external factors are given to the authorities and are prioritized in the steps that are addressed within the text. In the end, strategies for zone 1's livability are presented.

The statistical community in this research is Zone 1 of District 9, which has 77,000 number of people. The number of 200 statistical samples was given by Cochrane Formula. In relation to the research questionnaires, 63% of respondents were male and 37% were female and in terms of age, 40% of the respondents were from 30 to 35 years old, and 50% of respondents were in graduate and postgraduate education.

Research Findings

By studying the studies on livability and considering that few studies were done on livability, the indices of research have been localized, which are indicators in terms of environmental, physical-infrastructural, socio-economic and aesthetic was determined.

Considering the wide range of livability indicators based on the theoretical literature of the research, the indicators studied in this research are derived from Landry, which has the following environmental, structural, social, aesthetic and economic dimensions.

Indices	Sub-indices			
	Strength	Weakness	Opportunities	Threatens
Environmental	Proximity to Azadi Square Al-Mahdi Park with artificial lake	Unpleasant smell of sewage due to inappropriate slope of East-West passages Problems associated with the system for the disposal of surface waters and the lack of connection to the sewage network The presence of noise pollution	Provide urban amenities such as trash bins along the axis	The loss of landscape around the area
Physical-infrastructural	The existence of shopping malls and complexes Infrastructure and services The presence of parks and space Proximity to the terminal and Mehrabad airport	Lack of class parking The existence of marginal parks Public transportation weakness	The existence of coarse-grained properties in the range The possibility of developing urban services and equipment Access to the Ostad Moein metro station	Traffic and busy streets
Socio-cultural	The presence of the neighborhood and active councils The existence of residential units commensurate with the household size in the neighborhood Conducting training and empowerment classes in the neighborhood Available training quality and availability of libraries	The presence of addicts in parks and green spaces of the neighborhood The lack of neighborhood relations Insecurity of public places at night	Utilizing community participation in neighborhood affairs Representation of the institutions of the people in identifying neighborhood problems Possibility to create more interactive spaces The possibility of creating groups and institutions Neighborhood credit to other neighborhoods	The existence of defenseless urban spaces Social insecurity and robbery in the neighborhood Low partnerships
economic	The existence of commercial centers and Moein Shopping Mall The presence of commercial complexes and shopping centers Available gold bullion orders Low public transportation costs Definition of aggregated and profitable projects -	Absence of redundancy insurance The high cost of households	Valuable land prices and commercial properties Possibility to provide shopping complexes Possibility to provide investment areas	Loss of assets due to promises of property

Aesthetic	Creating one-handed views with the Iranian Islamic pattern in the neighborhood, according to the rules of the committee There is a beautiful landscape in the neighborhood	Extras in construction facades such as air conditioner	Create neighborhood-specific elements Creating incentives for residents in order to create smooth views of worn out texture	Improvement and restoration of eligible works and exhibits in the neighborhood

Table 3: Indices and Sub-indices

Opportunities	Threatens
O1 The existence of coarse-grained property in the range for the provision of services per head	T1 scenery loss around the range
O2 Possibility of developing city services and equipment	T2 crosses highways and highways and threatens the area
O3 Access to Ostad Moein Metro Station	T3 Traffic and busy streets
O4 Use of community participation in neighborhood affairs	T4 The existence of defenseless urban spaces
O50 utilizes NGOs to identify neighborhood problems	T5 Social insecurity and the presence of addicts
O6 makes it possible to create more interactive spaces	T6 Low social contributions
O7 Creates the activities of groups and institutions	T7 adjacent to Mehrabad Airport and West Terminal as a result of increased environmental pollution
O8 neighborhood credit to other neighborhoods	T8 Gun barrier due to reduced communication and closure of the neighborhood
O9 valued land prices and commercial properties	T9 Little owner's willingness to engage with public organs, such as the municipality
O10 Possibility to provide shopping complexes	
O11 Provide opportunities for investment	
O12 Create neighborhood-specific elements	
O13 Create neighborhood-specific views	
O14 Performing renovation and improvement of the opportunity to organize urban landscape	

Table 4: External factors affecting the livability of District 1 in the region

Strengths	Weakness
S1 The existence of shopping malls and complexes	W1 Lack of equipping and organizing the natural landscape of the neighborhood
S2 Infrastructure and Services	W2 Problems associated with surface water disposal
S3 The presence of parks and space	W3 There are noise pollution due to Mehrabad airport
S4 Presence of the neighborhood and active councils	W4 class parking deficiency
S5 The existence of residential units commensurate with the household size in the neighborhood	W5 There are marginal parks
	W6 Public transit weakness
	W7 The presence of addicts in parks and green spaces of the neighborhood
S6 Conducting training and empowerment courses in the neighborhood	W8 Neighborhood Nexus
	W9 Unsafe public places at night
	W10 was high on household spending
S7 Suitable training and libraries	W11 Existence of extras in building facades
	W12 presence of incompatible industrial activities
S8 Investment in construction of commercial complexes and shopping centers	W13 Indoor inert water and lack of access to pavement surface water.
	W14 There are tooth-shaped openings

Table 5: Internal factors affecting the livability of District 1 in the region

Indices	External factors				
	Authorities				
		Sum	Normalized	Score	Final score
Environmental	O1	125	0.0378	4	0.151
	O2	128	0.0387	4	0.155
	O3	124	0.0375	4	0.150
	O4	124	0.0375	3	0.112
Physical infrastructural	O5	129	0.0390	4	0.156
	O6	132	0.0399	4	0.160
	O7	131	0.0396	4	0.158
	O8	132	0.0399	4	0.160
Social cultural	O9	117	0.0354	2	0.071
	O10	116	0.0351	2	0.070
	O11	123	0.0372	1	0.037
	O12	124	0.0375	2	0.075
	O13	120	0.0363	2	0.073
Economic	O14	116	0.0351	1	0.035
	O15	114	0.0345	1	0.034
	O16	113	0.0342	1	0.034
Aesthetic	O17	130	0.0393	3	0.118
	O18	131	0.0396	3	0.119
Environmental	T1	108	0.0326	3	0.098
Physical infrastructural	T2	129	0.0390	4	0.156
	T3	133	0.0402	4	0.161
Social cultural	T4	123	0.0372	1	0.037
	T5	125	0.0378	1	0.038
	T6	118	0.0357	1	0.036
Economic	T7	102	0.0308	1	0.031
	T8	109	0.0330	1	0.033
Aesthetic	T9	132	0.0399	4	0.160
Total		3308	٠.٠٠٠		2.617

Table 6: Evaluation matrix of external factors in the community of authorities

Internal factors					
Authorities					
		Sum	Normalized	Score	Final score
Environmental	S1	121	0.0317	4	0.095
	S2	125	0.0320	3	0.096
	S3	121	0.0317	4	0.095
	S4	122	0.0320	3	0.096
Physical infrastructural	S5	124	0.0325	4	0.130
	S6	128	0.0335	4	0.134
	S7	129	0.0338	4	0.135
	S8	123	0.0322	4	0.129

Social cultural	S9	130	0.0341	2	0.068
	S10	118	0.0309	2	0.062
	S11	123	0.0322	2	0.064
	S12	116	0.0304	2	0.061
	S13	121	0.0317	2	0.063
Economic	S14	123	0.0322	2	0.032
	S15	124	0.0325	2	0.032
	S16	127	0.0333	3	0.033
Aesthetic	S17	128	0.0335	4	0.134
	S18	127	0.0333	4	0.133
Environmental	W1	120	0.0314	3	0.094
	W2	119	0.0312	3	0.094
	W3	117	0.0307	3	0.092
Physical infrastructural	W4	134	0.0341	4	0.136
	W5	133	0.0348	4	0.139
	W6	119	0.0312	4	0.125
Social cultural	W7	117	0.0307	2	0.061
	W8	116	0.0304	1	0.030
	W9	120	0.0314	2	0.063
Economic	W10	128	0.0335	2	0.067
	W11	115	0.0301	2	0.060
Aesthetic	W12	127	0.0333	4	0.100
	W13	129	0.0338	4	0.101
Total		3817			

Table 7: Matrix of evaluation of internal factors in the community of authorities

Offensive Strategies (SO)	Revision Strategy (WO)
So1 - Use of neighborhood power in the direction of the stability and livability of the neighborhood So2- Definition and implementation of development stimulus projects So3- Improvement and reconstruction of streets and buildings and the coordination of new buildings with them from different aspects. So4- Construction of commercial centers and commercial texture to create livability So5- Construction of a hangout and equipping and restoration of parks and gardens	Wo1- Definition and implementation of development incentive projects for economic prosperity and the value of finding property in the neighborhood Wo2- Review of environmental advertising and awareness-raising activities in the media for introduction Wo3- Organize and promote public transport system in order to reduce traffic in the neighborhood (w5-w4-w6- - o6- o7-8) Wo4- Utilize institutions and groups of the people with a participatory approach to solving social problems and harm. Wo5- Create interactive spaces to improve neighborhood relationships

Competitive strategies or diversity (ST)	Defensive Strategies (WT)
St1 Control of marginal parks and class parking in order to solve the parking problem and marginal park in the main axis of the area	Wt1 - Improve security by improving the lighting conditions of the streets and organizing defenseless urban spaces
St2 - Promoting social security through environmental physical activity	Wt2 - Improve the traffic situation by preventing marginal parks and winding up the parking rate by 100% per residential building at the time of licensing.
St3- Using private and public investments to use the potential of the region	Wt3- Arranging passages in terms of providing lighting and improving the residential environment in terms of urban defensive points and providing social security to public and public spaces.
St4 - The use of elements and elements that are appropriate to the cultural and social conditions of the neighborhood and to enhance the accountability of the inhabitants.	Wt4- Adoption of rules and regulations regarding compliance with a homogeneous pattern in accordance with natural and climatic and cultural conditions.

Table 8: Strategies for livability in Zone 1 District 9

In the final stage of the quantitative evaluation matrix by comparing the sum of the sum of the score of each of the strategies, they are selected from the high score to the low score, according, to improve the livability rate, three priorities are categorized. Every strategy must be implemented according to their priority. In this way, the major strategies in priority order are as shown in Table 10.

	Score	Strategy	Score	Strategy	Score	Strategy	Score	Strategy
1st priority	57/2	WT2	29/3	WO1	32/3	SO5	36/3	St1
2nd priority	48/2	WO2	49/2	SO42	50/2	SO3	51/2	So2
3rd priority	34/2	SO1	35/2	ST3	44/2	WO3	47/2	Wo4

Table 9: Final Prioritization of Strategies based on Final Attraction Score

Conclusion

The criteria for livability in Zone1 of District 9 whether are there or not, each strength or weakness could reduce or increase livability in the neighborhood. According to the proposed strategies, prioritization of these strategies was considered in terms of their importance and it is concluded from the results that according to the obtained priorities, the strategy of constructing Parking Garage in order to solve the parking problem, and marginal parks, considering the existence of commercial complexes and the highways and highways passing from the neighborhood, are the first priorities in terms of physical and infrastructural aspects to make the neighborhood livable. There is heavy traffic in the streets of Hashemi and Dampezeshki due to marginal parks in these areas. The lack of Parking Garage in a 250-mile radius of these axes has been one of the main problems in parking. Considering the use of incentive packages in the old urban fabric of District 1 in relation to parking regulations and the change in the parking-supply rate from 100% to 50% in aggregated projects to the basic-density of 180% has caused the parking shortage which needed land ownership by the municipality for construction of Parking Garage.

One of the main problems in each of the three neighborhoods in Zone1 Districts is the lack of green space. Providing green spaces and the creation of hangouts plays has an important role in the livability of the residents of the neighborhood, which should utilize the existing potential green spaces and parks and hangouts to be restored in favor of livability of these neighborhoods. Establishing a stop point by installing the benches at the neighborhood near shopping malls and commercial complexes for

the social interactions purpose and creating an interactive environment in the neighborhood will address the issue of the neighborhood in order to make the community more socially , culturally and physically friendly.

Definition and implementation of incentive development projects due to the low land prices for economic prosperity and the value of property in the neighborhood can be another strategy that can be effective in the economic livability of the neighborhood. Large scale projects that can be at the neighborhood-level has an impact on the economic, social and cultural sectors and can be effective in providing the services needed by the residents. The Sisatnica project, with merging 105 blocks and about one hectare is an example of such projects that have an impact on the various aspects of the life of the inhabitants of the neighborhoods.

Regarding the promotion of social security in the neighborhood, the strategy for promoting security by improving the lighting conditions of the streets and organizing defenseless urban spaces is another strategy that influences the livability of the neighborhood. In this regard, the importance of nightlife can be improved the security of the neighborhoods which is effective. The large number of alleys, their impenetrability and lighting problems in Dastgheib street, and the incentives for commercial edges that are subject to high incidence (such as the Dampezeshki axis) can be a good step to accelerate renovations. Implementing the rehabilitation projects with public participation can be an effective step to make the neighborhoods livable for the residents.

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Appendix 1: Strategic quantitative assessment plan for zona l, District 9

Factors	Importance coefficient	Strategies for viability rate									
		SO1		SO2		SO3		SO4		SO5	
		Score	SUM	Score	SUM	Score	SUM	Score	SUM	Score	SUM
S1	0.0317	3	0.0951	1	0.0317	3	0.0951	1	0.0317	4	0.1268
S2	0.032	3	0.0951	1	0.032	3	0.0951	3	0.096	4	0.1268
S3	0.0317	4	0.1268	4	0.1268	4	0.1268	2	0.0634	4	0.1268
S4	0.032	3	0.0951	3	0.096	2	0.0634	3	0.096	4	0.1268
S5	0.0325	2	0.0634	1	0.0325	4	0.1268	3	0.0975	4	0.1268
S6	0.0335	3	0.0951	3	0.1005	4	0.1268	3	0.1005	4	0.1268
S7	0.0338	1	0.0317	3	0.1014	4	0.1268	3	0.1014	4	0.1268
S8	0.0322	3	0.0951	3	0.0966	4	0.1268	3	0.0966	4	0.1268
S9	0.0341	2	0.0634	2	0.0682	1	0.0317	2	0.0682	2	0.0634
S10	0.0309	2	0.0634	1	0.0309	1	0.0317	1	0.0309	2	0.0634
S11	0.0322	2	0.0634	1	0.0322	2	0.0634	1	0.0322	2	0.0634
S12	0.0304	2	0.0634	2	0.0608	2	0.0634	1	0.0304	2	0.0634
S13	0.0317	2	0.0634	1	0.0317	2	0.0634	1	0.0317	3	0.0951
S14	0.0322	2	0.0634	2	0.0644	2	0.0634	1	0.0322	3	0.0951
S15	0.0325	2	0.0634	2	0.065	2	0.0634	2	0.065	2	0.0634
S16	0.0333	3	0.0951	3	0.0999	2	0.0634	2	0.0666	3	0.0951
S17	0.0335	3	0.0951	3	0.1005	2	0.0634	4	0.134	4	0.1268
S18	0.0333	2	0.0634	3	0.0999	4	0.1268	2	0.0666	4	0.1268
O1	0.0378	3	0.0951	3	0.1134	4	0.1268	2	0.0756	4	0.1268
O2	0.0387	2	0.0634	4	0.1548	4	0.1268	2	0.0774	4	0.1268
O3	0.0375	3	0.0951	4	0.15	2	0.0634	2	0.075	4	0.1268
O4	0.0375	3	0.0951	3	0.1125	1	0.0317	3	0.1125	4	0.1268
O5	0.039	1	0.0317	2	0.078	2	0.0634	4	0.156	3	0.0951
O6	0.0399	2	0.0634	4	0.1596	1	0.0317	3	0.1197	4	0.1268
O7	0.0396	3	0.0951	1	0.0396	4	0.1268	4	0.1584	3	0.0951
O8	0.0399	2	0.0634	2	0.0798	3	0.0951	2	0.0798	4	0.1268
O9	0.0354	1	0.0317	2	0.0708	1	0.0317	2	0.0708	1	0.0317
O10	0.0351	1	0.0317	1	0.0351	1	0.0317	1	0.0351	2	0.0634
O11	0.0372	1	0.0317	1	0.0372	1	0.0317	1	0.0372	3	0.0951
O12	0.0375	2	0.0634	1	0.0375	2	0.0634	2	0.075	2	0.0634
O13	0.0363	2	0.0634	1	0.0363	1	0.0317	1	0.0363	2	0.0634
O14	0.0351	1	0.0317	1	0.0351	1	0.0317	1	0.0351	1	0.0317
O16	0.0345	1	0.0317	1	0.0345	1	0.0317	1	0.0345	1	0.0317
O17	0.0342	1	0.0317	1	0.0342	1	0.0317	1	0.0342	1	0.0317
O18	0.0393	1	0.0317	1	0.0393	1	0.0317	1	0.0393	3	0.0951
Total			2.3458		2.5187		2.5043		2.4928		3.3285

Factors	Importance coefficient	Strategies for viability rate									
		WO1		WO2		WO3		WO1		WO5	
		Score	Score	SUM	Score	SUM	Score	SUM	Score	SUM	Score
W1	0.0314	3	0.0942	1	0.0314	1	0.0314	2	0.0628	1	0.0314
W2	0.0312	4	0.1256	4	0.1256	3	0.0942	4	0.1248	4	0.1248
W3	0.0307	4	0.1256	4	0.1256	4	0.1256	4	0.1228	2	0.0614
W4	0.0341	4	0.1256	2	0.0628	3	0.0942	2	0.0682	1	0.0341
W5	0.0348	4	0.1256	4	0.1256	4	0.1256	4	0.1392	4	0.1392
W6	0.0312	4	0.1256	2	0.0628	2	0.0628	2	0.0624	3	0.0936
W7	0.0307	3	0.0942	2	0.0628	2	0.0628	2	0.0614	2	0.0614
W8	0.0304	3	0.0942	3	0.0942	3	0.0942	3	0.0912	3	0.0912
W9	0.0314	3	0.0942	2	0.0628	2	0.0628	2	0.0628	2	0.0628
W10	0.0335	4	0.1256	2	0.0628	3	0.0942	2	0.067	3	0.1005
W11	0.0301	3	0.0942	3	0.0942	2	0.0628	2	0.0602	2	0.0602
W12	0.0333	4	0.1256	4	0.1256	4	0.1256	4	0.1332	4	0.1332
W13	0.0338	4	0.1256	2	0.0628	2	0.0628	2	0.0676	2	0.0676
O1	0.0378	4	0.1256	4	0.1256	4	0.1256	3	0.1134	4	0.1512
O2	0.0387	4	0.1256	2	0.0628	2	0.0628	2	0.0774	2	0.0774
O3	0.0375	4	0.1256	2	0.0628	2	0.0628	2	0.075	2	0.075
O4	0.0375	4	0.1256	4	0.1256	4	0.1256	4	0.15	4	0.15
O5	0.039	4	0.1256	2	0.0628	2	0.0628	2	0.078	1	0.039
O6	0.0399	4	0.1256	2	0.0628	2	0.0628	2	0.0798	1	0.0399
O7	0.0396	4	0.1256	4	0.1256	4	0.1256	4	0.1584	4	0.1584
O8	0.0399	4	0.1256	2	0.0628	2	0.0628	2	0.0798	2	0.0798
O9	0.0354	2	0.0628	2	0.0628	2	0.0628	2	0.0708	2	0.0708
O10	0.0351	3	0.0942	2	0.0628	2	0.0628	1	0.0351	2	0.0702
O11	0.0372	3	0.0942	2	0.0628	2	0.0628	2	0.0744	2	0.0744
O12	0.0375	3	0.0942	3	0.0942	3	0.0942	1	0.0375	1	0.0375
O13	0.0363	3	0.0942	3	0.0942	3	0.0942	3	0.1089	2	0.0726
O14	0.0351	3	0.0942	3	0.0942	3	0.0942	1	0.0351	3	0.1053
O15	0.0345	2	0.0628	1	0.0314	1	0.0314	1	0.0345	1	0.0345
O16	0.0342	2	0.0628	2	0.0628	1	0.0314	2	0.0684	1	0.0342
O17	0.0393	2	0.0628	1	0.0314	1	0.0314	1	0.0393	1	0.0393
O18	0.0396	3	0.0942	3	0.0942	3	0.0942	1	0.0396	2	0.0792
Total			3.297		2.4806		2.4492		2.479		2.4501

Factors	Importance coefficient	Strategies for viability rate							
		ST1		ST2		ST3		ST4	
		Score	SUM	Score	SUM	Score	SUM	Score	SUM
S1	0.0317	4	0.1268	3	0.0951	3	0.0951	3	0.0951
S2	0.032	3	0.0951	3	0.096	2	0.064	3	0.0951
S3	0.0317	4	0.1268	2	0.0634	3	0.0951	2	0.0634
4 S	0.032	4	0.1268	2	0.064	2	0.064	3	0.0951
S 5	0.0325	4	0.1268	2	0.065	2	0.065	2	0.0634
S6	0.0335	4	0.1268	2	0.067	2	0.067	1	0.0317

S7	0.0338	4	0.1268	2	0.0676	2	0.0676	2	0.0634
S8	0.0322	3	0.0951	3	0.0966	3	0.0966	3	0.0951
9 S	0.0341	4	0.1268	2	0.0682	3	0.1023	2	0.0634
10 S	0.0309	4	0.1268	4	0.1236	4	0.1236	4	0.1268
11 S	0.0322	4	0.1268	4	0.1288	4	0.1288	4	0.1268
12 S	0.0304	4	0.1268	3	0.0912	3	0.0912	3	0.0951
13 S	0.0317	4	0.1268	4	0.1268	4	0.1268	4	0.1268
14 S	0.0322	4	0.1268	4	0.1288	4	0.1288	4	0.1268
15 S	0.0325	4	0.1268	3	0.0975	4	0.13	3	0.0951
16 S	0.0333	4	0.1268	3	0.0999	3	0.0999	3	0.0951
17 S	0.0335	4	0.1268	3	0.1005	3	0.1005	3	0.0951
S18	0.0333	4	0.1268	3	0.0999	3	0.0999	3	0.0951
T1	0.0326	4	0.1268	1	0.0326	1	0.0326	1	0.0317
2 T	0.039	4	0.1268	2	0.078	1	0.039	2	0.0634
3 T	0.0402	4	0.1268	2	0.0804	2	0.0804	2	0.0634
4 T	0.0372	4	0.1268	4	0.1488	4	0.1488	4	0.1268
5 T	0.0378	4	0.1268	1	0.0378	1	0.0378	1	0.0317
6 T	0.0357	4	0.1268	1	0.0357	1	0.0357	2	0.0634
7 T	0.0308	4	0.1268	3	0.0924	3	0.0924	3	0.0951
8 T	0.033	4	0.1268	2	0.066	2	0.066	2	0.0634
9 T	0.0399	4	0.1268	2	0.0798	2	0.0798	2	0.0634
Total			3.3602		2.3314		2.3587		2.2507

Factors	Importance coefficient	Strategies for viability rate							
		WT1		WT2		WT3		WT4	
		Score	SUM	Score	SUM	Score	SUM	Score	SUM
w1	0.0314	3	0.0936	4	0.1256	3	0.0942	3	0.0942
w2	0.0312	3	0.0936	4	0.1256	3	0.0942	2	0.0628
w3	0.0307	3	0.0936	4	0.1256	4	0.1256	4	0.1256
4 w	0.0341	4	0.1248	4	0.1256	4	0.1256	3	0.0942
w 5	0.0348	4	0.1248	4	0.1256	4	0.1256	4	0.1256
w6	0.0312	4	0.1248	4	0.1256	4	0.1256	4	0.1256
w7	0.0307	2	0.0624	3	0.0942	4	0.1256	3	0.0942
w8	0.0304	1	0.0312	4	0.1256	1	0.0314	1	0.0314
9 w	0.0314	2	0.0624	4	0.1256	2	0.0628	2	0.0628
10 w	0.0335	2	0.0624	4	0.1256	4	0.1256	4	0.1256
11 w	0.0301	2	0.0624	3	0.0942	4	0.1256	4	0.1256
12 w	0.0333	4	0.1248	4	0.1256	4	0.1256	4	0.1256
13 w	0.0338	4	0.1248	4	0.1256	4	0.1256	4	0.1256
T1	108	3	0.0936	3	0.0942	3	0.0942	3	0.0942
2 T	129	4	0.1248	4	0.1256	4	0.1256	4	0.1256
3 T	133	4	0.1248	4	0.1256	4	0.1256	4	0.1256
4 T	123	1	0.0312	3	0.0942	1	0.0314	1	0.0314
5 T	125	1	0.0312	3	0.0942	1	0.0314	3	0.0942

6 T	118	1	0.0312	3	0.0942	1	0.0314	1	0.0314
7 T	102	1	0.0312	4	0.1256	1	0.0314	3	0.0942
8 T	109	1	0.0312	4	0.1256	1	0.0314	1	0.0314
9 T	132	4	0.1248	4	0.1256	4	0.1256	4	0.1256
Total			1.8096		2.5748		2.041		2.0724