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Application of the Conceptual Model of Balanced Renovation in Distressed Urban decay

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Abstract

With the development of the systemic approach in urban planning that attempted to identify various activities that determine the nature of the human environment and the relationships between them, various techniques have been developed, one of the most important of which is the models. In fact, a models is a simple reformation of reality which reduces the apparent complexity of the real world and transforms it into an understandable form. Therefore, conceptual and perceptual models are used to understand, interpret, and reform the facts in everyday lives. With regard to the complexities of urban issues, the possibility of exploiting from past teachings and experiences in the renovation of distressed urban textures, especially the conceptual model, that is derived from a domestic theory and is compatible with the circumstances in our country is being felt even more than before.

As a domestic theory, "The theory of balanced renovation in distressed urban fabrics", which has been proposed with emphasis on producing an innovative pattern in response to today's needs for the renovation of these urban fabrics in Iran, has presented its conceptual model as a practical model in order to objectify and substantiate the principals of this theory. As a balance-based management, the balanced renovation conceptual model tries to guide towards bringing back the balance and to prevent deviating or getting out of balance in the renovation system of textures, areas and target districts.

The method of this research, with emphasis on the scientific research method, is to achieve the goal of balance while studying, recognizing and identifying the components that affect it. This is done by exploratory factor analysis and by identifying the factors affecting the nine networks and using successive dichotomies. The use of hierarchical cluster structure, in total, shapes a texture or neighborhood renovating system which is considered as a system derived from the general system of the city. The applicable-functional model is a two-dimensional model including index elements and model components, balance coefficients, deviation from balance, balance equation, and finally triple applications.

Keywords: *Application, Balanced renovation, Conceptual model, System, network, Distressed Urban decay.*

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Introduction

Distressed urban fabrics have emerged as a critical problem in our country in recent decades. On one hand we have the rapid growth of these fabrics and on the other hand, the slow procedure of unbalanced renovation has caused the emergence of new problems and in some cases has transformed renovation into an anti-renovation process. Becoming more and more distant from the fundamental goals of development along with the degradation and reduction of these targets to its lowest level has led to a decline in the quality of the action results and, thereupon, a decrease in the quality of life and the satisfaction of residents in distressed urban fabrics. This has led to the spread of misanthropy in renovation, which may be considered one of the most important damages to renovation. Such a phenomenon has exacerbated the problem of deteriorated urban textures.

Studies, researches, and evidence show that what has been done as a measure in the form of plans and renovation programs, in general, has not been able to balance the process of renovation with the deterioration trend, and by using the aggravating achievements of this balance, surpasses it, and so led to no significant success. This continues to be the case, as the current conditions indicate an imbalance between the deterioration process and the renovation of the fabrics, and implies the overcoming of the deterioration process against the renovation process. The result of the continuation of this situation was to only being an observer towards the deterioration process of modern and even new-built neighborhoods and, eventually, the gradual collapse of the city.

The pathology of the reasons for the failure to implement renovation plans and programs will determine a long list of factors and obstacles. In the meantime, the main subject and the most important issue can be considered in the lack of adequate response to the conceptual dimension and the ambiguities caused by knowledge weakness towards the issue of the unbalanced renovation of distressed texture renovation in the inner balance of the texture and balance with the rest of the city. In other words, despite the necessity of exploiting past experiences in Iran and other countries by people involved in the renovation of distressed urban fabrics, the lack of a conceptual model arising from domestic theories is quite perceptible.

Now that the balanced renovation theory as domestic theory based on four factors of "recognition of the need for understanding the context in the range of distressed urban textures of the country", "the support of field work experiences while confronting the problems and issues of these urban fabrics", "utilizing the domestic and foreign knowledge and experiences", "effort to change the existing inefficient patterns with the aim of producing an innovative model" is considered as a step forward towards responsiveness for the lack of scientific-theoretical support of renovation in Iran. Hence, the conceptual model resulting from it can be considered as as a practical model in order to objectify and substantiate the principals of the correct renovation taken notice in this theory.

In explaining the conceptual model of balanced renovation, the research questions are as follows:

1. How can one measure and recognize a neighborhood's balance condition in its current situation and status quo?
2. How can one analyze the increasing or decreasing trend of balance in a neighborhood renovation through different periods of time?
3. How can one propose the most optimized way for reaching maximum balance in a neighborhood, based on recognition and analysis?

Accordingly, looking at the problems and issues of worn-out urban fabrics, the present article has addressed the main issue that the conceptual model of balanced renovation is focusing on solving it, and has expressed the reasons on why we need to produce it and by mentioning the definition of the conceptual model, presents the components and elements which affect the balanced renovation process. The effective variables in the conceptual model and the basis for their determination, the description of the model's applications, and at the end its similarities and

differences with other similar models and diagrams are expressed.

Explaining the reason of change in pattern and the need to produce a conceptual model

Nowadays that the intellectual background of knowledge-based urbanism is ready to accept a constructive transformation in the field of renovation and expressing "pattern and understanding the principles of change in the renovation of urban distressed fabrics" is considered an important step in improving the current state of renovation. Producing a tool for substantiating this concept has been considered as one of the Important theoretical topics in this subject that can support many broad and profound actions. By relying on this mental support, [2]"the balanced renovation of deteriorated urban texture theory" works on defining the issue and how to face it in the form of "a new pattern" and in this way, it will draw more attention towards the need to "change the pattern" in the field of distressed urban fabrics renovation. Therefore, building the conceptual model of balanced renovation can be one of the first tools for changing renovation management pattern in Iran.[3]

Thus, the most important goal that the conceptual balanced renovation model of distressed urban fabrics is trying to deal with is to take a step towards changing the pattern in order to increase the possibility to have recognition and prevent the previous mistakes and to manage the development procedures from the unbalanced renovation stage, "what it is" to the balanced renovation stage, "what it should be".

Explaining the model and the method of the conceptual model of balanced renovation

The word model is derived from the latin word "Modus", meaning size, which guides the mind to the context and inside of the phenomena that can't be seen directly. A model is a small component or a small reconstruction of a large thing that is similar to the real object in terms of function (Gorji & Barkhordari, 2009: 184), in fact, it is a display of realities (Razzaghi, 2002: 184) and the connection between theory and the task of collecting and analyzing information (Irannezhad parizi, 2003: 50). But more precisely, the conceptual model is a set of related concepts that symbolically represents the mental image of a phenomenon (Hafeznia, 2008). Therefore, the conceptual model represents the relationships between the variables, their direction, and as far as possible, the positive and negative relationships between them. This model, which is often resulted from one theory and is based on it, has a two-sided relationship with its origin. On one hand, in every theory, at least there is a model, and the relations that govern the model must rely on the principles of the theory. On the other hand, the theory consists of relationships that are derived from the model.

The conceptual model resulting from the balanced renovation theory is also a model in terms of these definitions, based on knowledge, recognition of the need for local knowledge and experience, representing reality, and satisfying two expectations of reality and prediction, and eventually is considered as the basis for the balanced renovation theory.

The cluster structure of the balanced conceptual model of renovation

In one category, the top-down hierarchy of the model which will be the basis for further explanation of the model is expressed as follows:

The structure of the model in the balanced renovation theory is a cluster structure, that within each cluster, elements or nodes are conceivable. Somehow that each of these elements is also a cluster containing smaller elements. So in other words, while incorporating elements, at the same time, every element acts as a member within a larger cluster. This hierarchy in the cluster structure includes concepts, networks, dimensions, components, and thematic indicators in the balanced renovation theory, which together form a system that is also considered as a subsystem of the city (Fig. 1).

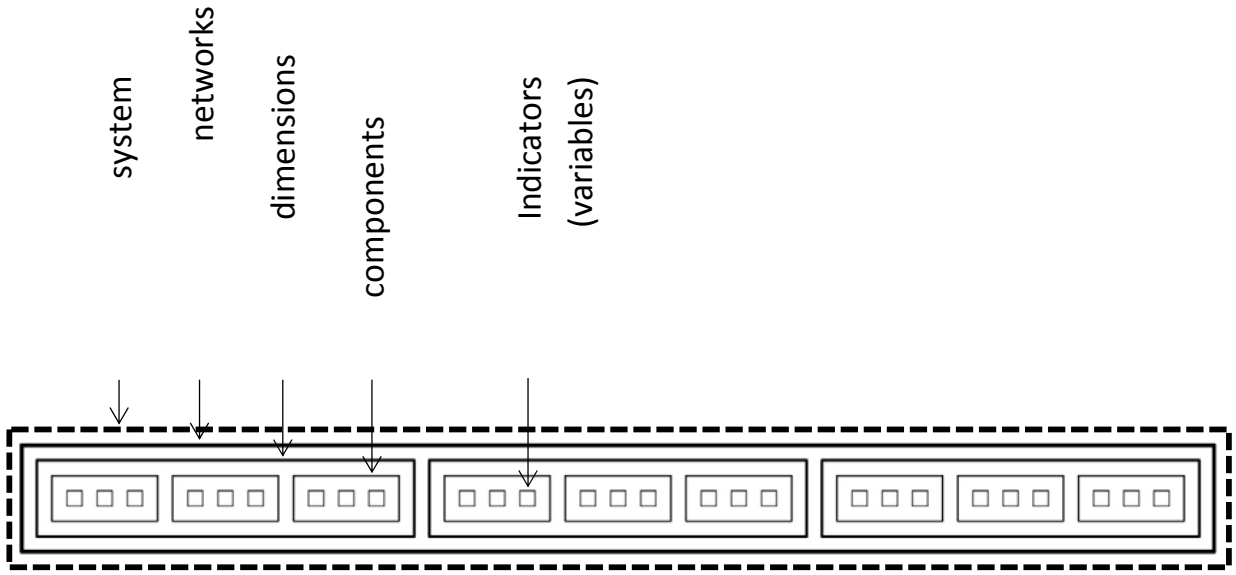


Fig. 1. components and elements of the balanced renovation system cluster structure. Source: authors.

The size of a system is not related to its physical size, but rather to the complexity of each system. To compare the complexity of systems, the variety notion is considered. Variety is defined as "the number of identifiable elements" in a set and it depends entirely on that set or sub-set which the elements are assumed to belong to. Even in a very small system, variety can be very high.

To reduce the complexity of these systems, different methods such as the successive dichotomies are used. Using this method, it is possible to answer a low-variety problem, which is a complement of the high-variety problem (that is, the problem which the operation begins with) (Abdi Daneshpour, 2007).

While focusing on sustainable, integrated, and comprehensive renovation, the main challenge of balanced renovation in distressed urban fabrics is to identify the most influential factors and face numerous variables and frequency indicators and so, firstly by using different techniques and methods, try to reduce the data or their dimensions (and waiver the data or dimension that have less effect on the results) and secondly, determine the most important indicators based on their priority, domestic and local conditions and background status (Andalib, 2017).

Nine networks, which have been discussed in various aspects in the views of thinkers of urban planning and renovation, the National Strategic Plan for Sustainable Rehabilitation of target areas and neighborhoods, also improvement, renovation, empowerment and related experiences, have been proposed and can be deduced and be found in the following networks:

1. Social - cultural network
2. Economic - financial network
3. Spatial – physical network
4. Visual – aesthetic network
5. Movement – access network
6. Environmental network
7. Activity – functional network
8. Juridical – legal network
9. Management – political network

In fact, in the "table of beneficial elements of the balanced renovation conceptual model" we can imagine the nine networks for the rows, and the dimensions, components and related indicators as the columns. This table can be somehow considered as the Mendeleev table of the balanced renovation theory model (Fig. 1). In this table, the emptiness of some cells does not mean that there is no relevant content but it rather shows the need for specifically studying the deteriorated areas and finding the right

content for each table cell. This is an incentive to find the beneficial dimensions, components and indicators of the hierarchy of balance interpretation in the present theory model. Therefore, the purpose of drawing the table of beneficial elements in the present article is merely familiarity with its morphology structure, rather than completing it. Because it is not included in the discussion and it can be the subject of separate research and studies and that it should be filled in for a specific purpose. For example, in which neighborhood and for what purpose has the model been prepared. Some vocabularies within the table also have the role of creating a mental image of the content that can be placed later on this table. The final point about not filling out the table is to avoid creating any rigorous mindset in finding proprietary and, of course, innovative content for a neighborhood.

Table 1. Beneficial elements of the balanced renovation system. Source: authors.

Indicators		components	dimensions	networks	system
proprietary	common				
	Level	Quantitative dimension of housing- quantitative dimension of services	Housing-services	Spatial-physical	Balanced renovation
Is continued	Per capita				
Is continued	Is continued				
Is continued	Access radius	Qualititative dimension of housing- qualititative dimension of services			
Is continued	Design quality				
Is continued	Build quality				
Is continued	Is continued				
Is continued	Is continued	Is continued			
Is continued	Is continued				
Is continued	Level	Quantitative dimension of mass- quantitative dimension of space	mass- space		
Is continued	Height				
Is continued	Density				
Is continued	Is continued				
Is continued	Volume	Qualitative dimension of mass- qualitative dimension of space			
Is continued	Style				
Is continued	Ratio of levels	Public domain-private domain			
Is continued	Is continued				
Is continued	Is continued	Is continued	The spatial structure of the neighborhood - the role in the city structure		
Is continued	Is continued				
Is continued	Is continued	Is continued			
Is continued	Is continued				
Is continued	Location	Individual - collective	Residence-employment	Activity-functional	
Is continued	Variety				
Is continued	access				
Is continued	Is continued				
Is continued	Is continued	Is continued			
Is continued	Is continued				
Is continued	Number of designs	Enhancement Plans Provided	Professional empowerment - Connect to the market		
Is continued	Variety of species				
Is continued	Number of designs	Implemented designs			
Is continued	Variety of species				
Is continued	Location	Individual-group	General interests - private interests	Social-cultural	
Is continued	Variety				
Is continued	access				
Is continued	Is continued				
Is continued	Residence history	Belonging to a place - belonging to a community			
Is continued	Level of ownership				
Is continued	Is continued				
Is continued	Is continued	Native - non-native			
Is continued	Is continued				
Is continued	Thematic damage	Vulnerability from outside the neighborhood - Sending damage out of the neighborhood	Decrease in Social harm - Increase in Social capital		
Is continued	Local injury				
Is continued	Thematic capital	Preserving existing social capital - its promotion			
Is continued	Local capital				
Is continued	Is continued	Is continued	continued	Economic - financial network	
Is continued	Is continued			Visual – aesthetic network	
Is continued	Is continued	Is continued		Movement – access network	
Is continued	Is continued			Environmental network	
Is continued	Is continued	Is continued	continued	Juridical – legal network	
Is continued	Is continued			Management – political network	
Is continued	Is continued	Is continued			
Is continued	Is continued				

Index components in the two-dimensional conceptual model of balanced renovation

As previously stated, the applicable functional model of this theory is a two-dimensional model in the form of a radar diagram and, of course, with a fundamental difference from it.This difference is the conventional radar diagrams being radius-centric and the chart or index of the present model being diameter-centric. An explanation of the radar diagrams, or radar charts, and the various methods of using them, is given below. The index elements of the model include the following:

Index and model components

In general, the mentioned index has a circular shape, because circle shows the required dimensions and characteristics. The shape of circle represents the highest level of balance, equilibrium, and evolution. The center of the circle has the same distance to the index perimeter, and has the ability to have infinite diameters, that are actually two corresponding radii, along one length, but in opposite directions and towards the perimeter
of the circle (Fig. 2).

Index components are as follows:

O: the center of the index

C: perimeter of the index

a-a': two corresponding radii of successive dichotomies

A: the first value of dichotomies

A': the second value of dichotomies

P: balance curve (thematic or comprehensive)

G: the thematic balance index center of gravity or system balance

OG: the distance between the center of gravity and the center of the circle

G': symmetric point of the center of gravity relative to the center

Balance coefficient of the model

- Balance coefficient of successive dichotomies

The balance coefficient of each of the successive dichotomies is the ratio between the two values of A and Á is from the mentioned dichotomy. That is, if from the dimension in the successive dichotomy á-a, the value of A, as well as Á for the dimension á, is obtained from the same dichotomy, then, while each of the two values of A and Á can be shown on the corresponding radii, in addition, we can determine the balance coefficient of that successive dichotomy by dividing A by Á.

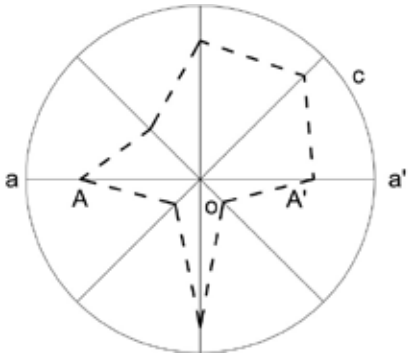


Fig. 2.index components in the conceptual model of balanced renovation.
Source: authors.

- Thematic balance coefficient (balance coefficient of each network)

After determining all the values in one of the networks and locating them on the corresponding radius, the sequential points should be connected one by one. The result is the formation of an index that the ratio of its area to the area of the circle shows the thematic balance coefficient (the balance coefficient of each network).

- System balance coefficient

After determining all the values in all the networks and locating them on the corresponding radius of "one circle", it was necessary to connect the consecutive points one by one. The result is the formation of an index that the ratio of its area to the area of the circle, represents the system balance coefficient and, in fact, the balance coefficient of the urban fabric renovation in a target area or neighborhood.

- Deviation from balance

The curve resulted from the indexing of each network or the curve obtained from the system index

(overlaying the collection of thematic networks) has a unique center of gravity that can be determined and drawn. The distance between the center of gravity in each curve, from the center of the circle, is called the "deviation from the balance".

- Balance equation

Since, the coefficient of balance and the deviation of the curve degree in a thematic network or network system (texture renovation in a target area or neighborhood) none alone can provide a proper analysis of the thematic balance equation or system, therefore, with the combination of these two analysis together, we can reach definable triple states from the balance condition of a thematic network or system network as follows.

- Perfect balance (balanced equation)

As previously stated, if all the values of successive dichotomies are located on C, that is the circle perimeter, it means that in spite of the inner balance between each of the dichotomies (deviation from balance equals zero), the whole index also possesses balance and the highest balance coefficient, which here it is said that "perfect balance" or "balance equation" has been established. Full balance can be applied both in thematic networks and in the system index. To generalize this concept, we can briefly say: The perfect balance is achieved when the "balance coefficient is high and the deviation from balance is low"(Fig. 3).

- Relative Balance

If the system index has a circular shape but is relatively smaller than the outer circle, then the indices of each network must also be checked. Under these conditions, there are two possible states: First of all, each of the thematic networks also have circular shapes. This means that the system index has a low level of "relative growth" and in fact has a "relative balance". But if any of the networks or some of them have no circular indexes then we should determine and express the deviation of the balance in each of the networks. This means that the distance between the center of gravity and the center in each of the networks should be determined. In other words, it's important to note that the zero or small deviation from balance in the system index is valid and reliable when the deviations from balance in all the curves related to thematic networks are also zero or small. Otherwise, deviations from equal balance, but in the opposite direction (compared to the center of the circle), may neutralize the effects of each other. In fact, it's not that only the closeness of the center of gravity to the center is the sign of a desirable balance status, but the outcome of two imbalanced networks which have center of gravities in two opposite directions, can also create a similar situation. So, briefly, it can be said that relative balance can be achieved when the "balance coefficient and deviation from balance is low" (Fig. 3).

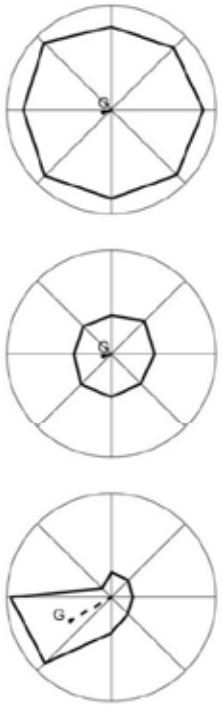


Fig. 3. Different states of balance equation. Source: authors.

- Imbalance (imbalanced equation)

If the system index has a non-circular, distorted, and irregular form, this indicates a deviation from the balance and in this case, the deviation of the center of gravity appears from the circle center. This may occur both in the thematic network curves and in

the system curves. So, in summary, the imbalance (the imbalanced equation) occurs when the "balance coefficient is low and deviation from balance is high"(Fig. 3).

Determining the state of the balance equation in the matrix table of the balance equation model status is considered with five degrees from low to high with values of coefficients and deviations based on the Likert method (Fig. 4). So, in general, different states of the combination of "balance coefficient" and "deviation from balance" can be shown in the following matrix table. We must explain that the curves can never have a high balance coefficient while having high deviation from balance, since the distance of the center of gravity of a curve inscribed in the circle whose area is close to the circle's area, is very close to the center of the circle.

If the table of the above matrix is simplified and the possible and less likely items are eliminated, then the

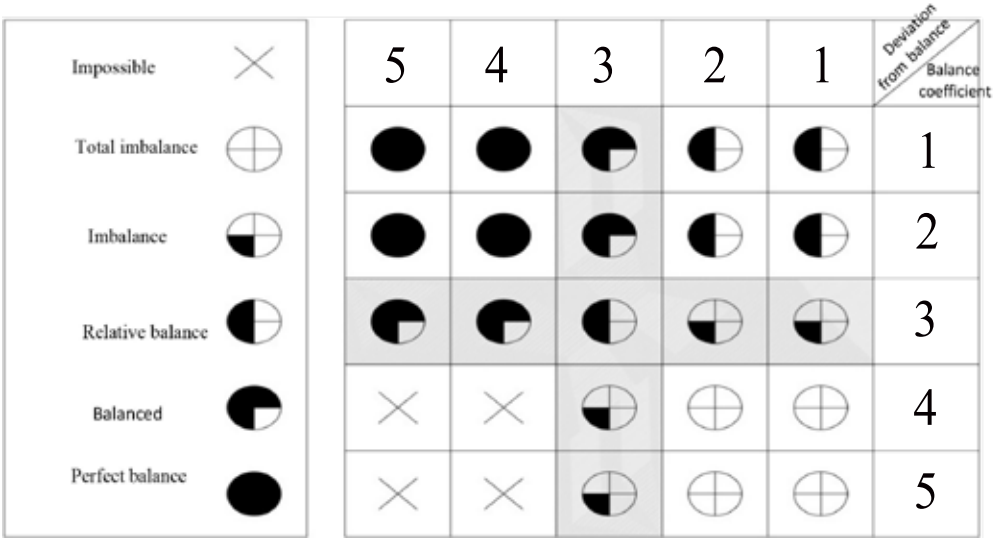


Fig. 4. Matrix of different states of the model balance equation. Source: authors.

table of balance ratios will show three states. If the balance coefficient is high and deviation from balance is low, the equation is balanced. If the balance coefficient is low and the deviation from balance is also low, the equation balance will be relative. Finally, if the balance coefficient is low and the deviation from the balance is high, the equation is imbalanced (Table 2).

Applications of the balanced renovation conceptual model

Presenting the triple application of the balancing renovation conceptual model requires the study

Table. 2. Simplification of the model balance equation. Source: authors.

High	Low	Deviation from balance / Balance coefficient
Perfect balance	Relative balance	Low
-	Imbalance	High

of the neighborhood as a system and in order to achieve these applications, initially, two steps should be defined. These steps are a tool for defining and drawing the indexes that help us achieve our applications based on the model.

●**First step:** Defining the beneficial elements of the balanced renovation table and determining the numerical ratios of successive dichotomies

In this step, the beneficial elements of the table including dichotomies and the determination of the numerical ratios between them, is defined in accordance with the specific conditions of the context and the distressed fabric. Due to the basics and criteria for choosing the dichotomies of each of the nine networks, we can explain a top-down hierarchy for them. Thus, in explaining the application of the balanced renovation conceptual model the amount of attention payed for choosing the dichotomies and the quality of their measurement is extremely important, because with the help of the information and status of each element in the balanced renovation table, we can draw the components of their indexes in the second step. Therefore, at first, it is necessary to prepare tables for dichotomies values separately. These indicators can quantitatively define and describe the constituent components of dimensions in each of the nine networks in the above system. For a better understanding of this issue, pay attention to the component column in the beneficial elements of the balanced renovation system table. We assume that the table contains a large number of dimensions that have a dual-axis arrangement and belong to one of the networks in the form of multiple sets (Table 3).

In this table, you can assign a number between zero and one based on the indicator to each of the values of the dichotomies. For example, in housing - services dichotomies, to calculate the number of houses, we should consider the number of existing new houses

Table .3. Some networks and their constituent dimensions. Source: authors.

dimensions	networks
Housing-services	**Spatial-physical**
Mass-space	
The spatial structure of the neighborhood - the role in the city structure	
Residence - Employment	**Activity-functional**
Professional empowerment - Connect to the market	
General interest - private interests	**Social-cultural**
Reducing Social Damage - Increasing Social Capital	

compared to the number of houses needed, as well as to calculate the quantity of services, the existing per capita services provided should be compared to the required per capita services. If, for example, this ratio is equal to one tenth for housing, it means that at the moment, only ten percent of the area or number of residential units required for the neighborhood population has been provided and renovated. And if this ratio is five tenth for services it indicates that the neighborhood per capita service should double the current number. Defining the dichotomies is done through interviewing the elite and determining their values based on the area's existing information and by using related components and indicators that they also can be done using the Delphi technique and questioning the elite.

Drawing the indexes of thematic and general networks of the deteriorated urban fabric system

The indexes of thematic networks and the general index of the texture renovation system in the target districts or areas will be used as navigator and

guidance in further stages and triple applications. Drawing this index in the framework of the conceptual model's rules and regulations that will be described in the form of an example is according to the index components that have been explained previously. The quality of the dichotomies selection and their measurement in the model and focusing on this stage is very important. Implementing this stage will have fundamental and basic applications in any analysis and interpretation, assessment and neighborhood development planning both in terms of time and conceptual and thematic matters. Thus, after passing the two steps above, we can achieve the balanced renovation conceptual model applications in the desired texture.

In the example below, with mentioning the fact that the presented numbers are all hypothetical, we should first explain the rule of drawing the balance curve so we can use this rule for each application. But first and foremost, it's important to note that, as explained in the description of the index and components of the model, the meaning of á-a is defining 2 vectors, and A' and A is defining 2 values on the mentioned vectors that in order to prevent mistakes with G and Ǵ, which are indexed by the curvature of the curve and are symmetric to the center of the circle, It should be used to display values of numeric indices as well as to avoid the density of letters and lines in the drawings and their possibility to be illegible, it is contracted that the name of the values is written instead of inserting on the index outside the circle perimeter.

Now it is assumed that in the study area, dichotomies are derived as in the following table with the values of each component of the dichotomy (Table 4).

The balance coefficient of each of the dichotomies (which is a positive integer and smaller than one) is calculated in the following table (Table 5).

In order to draw the balance curve, all values, regardless of which dichotomies they are among, must be inserted in a one-column table in an ascending order, the same order as the unique balance coefficient of their dichotomy (Table 6).

The arrangement obtained is shown in the following table (Table 7).

But the values should be displayed in the form of

Table.4. Numerical Values of dichotomies. Source: authors.

Name of the first part of the dichotomy	Quantity of the first part of the dichotomy	Name of the second part of the dichotomy	Quantity of the second part of the dichotomy
A1	0.1	A2	0.2
B1	0.3	B2	0.6
C1	0.5	C2	0.7
D1	0.7	D2	0.4
E1	0.4	E2	0.1
F1	0.1	F2	0.5
G1	0.2	G2	0.1
H1	0.6	H2	0.3

Table. 5. balance coefficient of dichotomies. Source: authors.

Name of the first part of the dichotomy	Quantity of the first part of the dichotomy	Name of the second part of the dichotomy	Quantity of the second part of the dichotomy	Balance coefficient of dichotomy
A1	0.1	A2	0.2	0.50
B1	0.3	B2	0.6	0.50
C1	0.5	C2	0.7	0.71
D1	0.7	D2	0.4	0.57
E1	0.4	E2	0.1	0.25
F1	0.1	F2	0.5	0.20
G1	0.2	G2	0.1	0.50
H1	0.6	H2	0.3	0.50

dichotomies, therefore, the second component of each dichotomy is eliminated from the table. These values are shown with darker colors in the next table. (Table 8)

By eliminating the mentioned values, the following table is obtained. (Table 9)

In drawing the balance index, the order of table 9 is used from the top of the circle and in the clockwise direction for the ordering of the dichotomies (Fig. 5).

Obviously, the second part of each dichotomy, which was removed from the table above, will be in front of the relevant component when drawing the circle and this arrangement will be fixed for how the dichotomy is arranged in all applications. (Fig. 6)

To begin the preparation of the first application, each value is shown on the corresponding radius and the curve is drawn. (Fig. 7)

To find the G center of gravity, the red curve in the AutoCAD software runs the "region" command and transforms the drawn curve into a "region". Then, using the "mass prop" command, the coordinates

Table. 6. The arrangement of balance coefficient values. Source: authors.

Name of the first or second part of the dichotomy	Quantity of the first or second part of the dichotomy	Balance coefficient of dichotomy
F1	0.1	0.20
E2	0.1	0.25
A1	0.1	0.50
G2	0.1	0.50
G1	0.2	0.50
A2	0.2	0.50
B1	0.3	0.50
H2	0.3	0.50
E1	0.4	0.25
D2	0.4	0.57
F2	0.5	0.20
C1	0.5	0.71
H1	0.6	0.50
B2	0.6	0.50
D1	0.7	0.57
C2	0.7	0.71

Table.7. Arrangement of dichotomy components based on values. Source: authors.

Arrangement of dichotomy components in terms of values
F1
E2
A1
G2
G1
A2
B1
H2
E1
D2
F2
C1
H1
B2
D1
C2

Table.8. Removing the values of the corresponding components of the dichotomy. Source: authors.

Arrangement of dichotomy components in terms of values
F1
E2
A1
G2
G1
A2
B1
H2
E1
D2
F2
C1
H1
B2
D1
C2

Table.9. The arrangement of one component of each dichotomy based on values. Source: authors.

Arrangement of one component of each dichotomy in terms of values
F1
E2
A1
G2
B1
H2
D2
C1

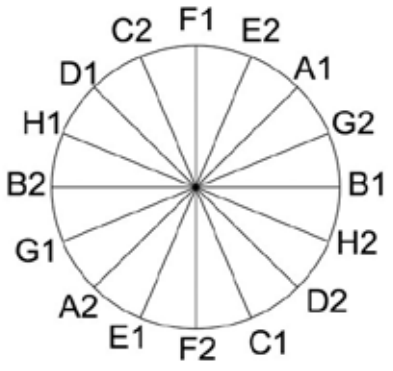


Fig. 5. The ordering arrangement of dichotomies. Source: authors.

of the center of gravity will be obtained by the name of "centroid ". In the above coordinates, using the "point" command, the G point is drawn (Fig. 8)

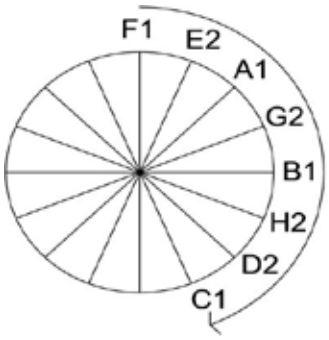


Fig.6. The ordering arrangement of dichotomies. Source: authors.

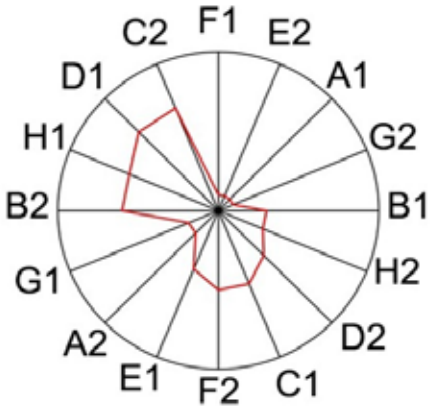


Fig.7. Drawing the index curve. Source: authors.

First application: Balance detection; Assessment of the neighborhood renovation balance at a time interval and its interpretation before, during and after renovation

In this application, the current status of a neighborhood's renovation balance and its status quo is assessed and the evaluation of the balance is relevant at a certain time point. This assessment can also be used as an introduction to the interpretation of the balance before, during and after the renovation. For assessing the renovation balance in one area or texture in a certain period of time, different variables must be considered. For example, if the target is to assess renovation in the past decade, it is clear that

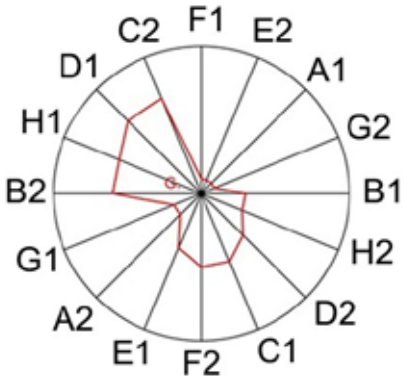


Fig.8. Index curve center of gravity. Source: authors.

the first challenge would be the plurality of variables that are ramified from related networks. According to Fig. 8, the first application of the balanced renovation model can be extracted. Based on the data used in this example, the evaluation of texture renovation balance at one point and its interpretation will be possible which we can obtain many useful analyses from, some of which are as follows:

1. In two parts of the obtained balance curve, we see a concavity that represents a totally amoebic shaped curve.
2. The shape of the curve indicates that in addition to covering a small surface of the circle, it also has a center of gravity with distance from the center of the circle, and by referring to the matrix table of the equation status, we understand that the balance curve of the studied neighborhood has low balance coefficient and also low deviation from balance. Therefore, the curve has relative balance.
3. As can be seen, despite the relatively higher amounts compared to others, because of low values of their corresponding components, C2, D1, H1 and B2 have been effective in taking out the area's renovation from balance. Also, the ability to draw and analyze the model before, during, and after the renovation of an area is also applicable, and we can also reach conclusions and analyses by comparing

the three obtained charts.

Second application:Balance Analysis; Analyze and interpret the evolution process of balance in different periods and points of time

This application compares the state of the renovation balance of a neighborhood in equal time intervals, which is defined in two ways:

-In order to prevent: This means that by analyzing and reviewing the balance in different time periods in a neighborhood (not necessarily deteriorated), it can be discriminated that to what extent and speed is the mentioned area going towards deterioration so we must take action to stop the process. This neighborhood will be among the distressed areas in the next few years.

- In order to treat: This means that by analyzing and reviewing the balance at different time intervals in a neighborhood, we can recognize that the neighborhood is passing an acceptable process in the course of exiting the deterioration process and will leave the circle of deteriorated areas in a certain period of time. And if there is a gap in some time intervals or situations in some cases (whether in dichotomies or the speed of achieving balance), then we can think of a solution to solve it. Also, on the contrary, meaning in some cases despite the various measures taken in the neighborhood to renovate, the area is going towards having less balance, which needs to be reformed on the agendum.

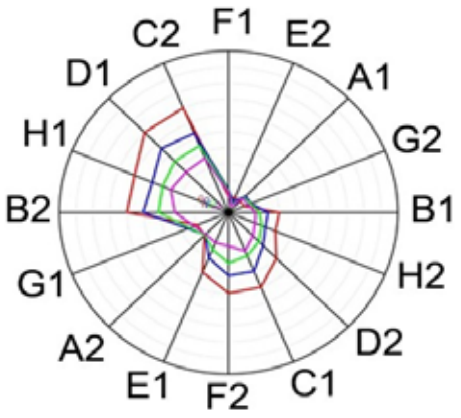


Fig.9. Drawing the curves of 4 consecutive time intervals.

Source: authors.

To prepare the second application, the same steps are performed for equal time intervals. It is assumed that the first application is prepared for the beginning of 2016, and the values of the dichotomies for the beginning of the years 2011, 2006, and 2001 are available. Then we can draw both the curve and the gravity center of each and see the result of their overlay in a single circle (Fig. 9).

The pink, green, blue and red circles respectively represent the years 2001, 2006, 2011, and 2016. Spotting the gravity center of each curve is done in the software and according to the mentioned steps. Based on application 2, the G getting farther away from the circle's center shows that if the studied area isn't a deteriorated neighborhood, it is becoming one according to the first paragraph of application 2, and if it is a deteriorated area and is being renovated, according to the second paragraph, the overall actions are leading towards less balance or in others terms, suffers from "anti – renovation".

In this application, along with a general analysis, we can also analyze the status of each of the components, which is in the following example:

1. Through a decade and a half, A1 in addition to its negligible initial value has remained almost with no growth.
2. During the study years, both B1 and D1 show a constant trend in their values and growth.
3. In addition to a relatively good growth, C2 and H1 have also had an increasing trend.
4. The result of all developments for A1, F1, G1, and G2 has undergone severe recession over the course of 5 years. The G1-G2 dichotomies must be specifically studied and pathologically tested.

Such cases like this are considered as balancing requirements for the renovation of the neighborhood and not its balancing priorities. Maybe the growth of each one out of the model will put the gravity center farther away from the center of the circle. The significance of monitoring this issue will be explained in application 3.

Third application: Prescribing balance; presenting a neighborhood renovation balance management model

In this application, that is defined with the aim of managing the renovation balance in an area, the results of the first two applications that are balance detection and balance analysis are also used, so by deducing the results and overlaying them with the results of the third application, it would be possible to determine and prescribe optimal strategies with priority as well as recognizing different aspects of giving balance to the renovation of a neighborhood. This application is also divided into two parts:

Introducing the priorities that affect the renovation of a neighborhood

This means that by preparing the first application (balance recognition), which is the current state of renovation balance and the status quo and also the preparation of the second application (balance analysis) at different and equal time intervals (for example, in 4 intervals of 5 years), the priorities affecting the maximum and optimal balancing of the neighborhood with acceptable speed on the area's renovation will be extracted and introduced.

Introducing requirements that affect the renovation of a neighborhood

This means that apart from the prioritized priorities derived from analysis of the first and second applications, some aspects may be raised not in the form of priorities but in the form of requirements.

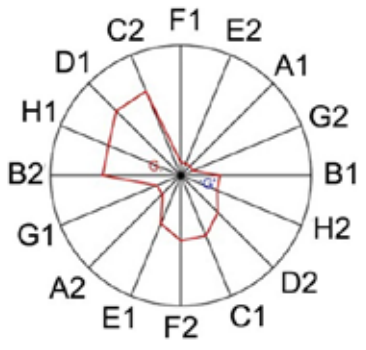


Fig.10. Drawing the G' point in the third application. Source: authors.

These requirements are those dimensions of networks that do not come in the form of priorities, but focusing on them is necessary. There are several reasons for this issue, including the fact that the amount of a dichotomy may remain constant for a long time, or have a meaningful and fast growth, or vice versa, meaning a sharp fall.

Considering the requirements is also important in terms of priorities, and by re-examining the objectives of the theory and its model we reach this point that we are not just looking for a closer G point to the center of the model circle, but at the same time, we need to increase the area of the curve as much as possible so the perimeter of the curve gets closer to the circle perimeter and eventually matches it. Therefore, it is obvious that the higher priority values get, and the curve finds a more consistent center of gravity at the point O, yet again the requirements such as the value of a dichotomy being constant for example, over 20 years (4 periods of 5 years), or more, it practically prevents an increase in the area of the curve. That is, while the balancing has been taken place, but the development is still not desirable. Therefore, the kind of development that is considered for the model is something with the least complication and side effects, that goes along the path to balance along going towards development. So, it can be said that resources have been spent for the priorities and from the requirements, accurate and realistic pathology will take place with the aim of having a place in the plan.

- Developing a system for monitoring the renovation balance of a neighborhood at present and in the future dynamic conditions

This means that by preparing all the applications for the conceptual model of the balanced renovation theory of a neighborhood, we cannot be ensured that everything goes as expected in the applications. In fact, different and numerous external conditions can ruin the initial predictions and even prevent their realization. Actually, the system for monitoring the renovation balance of a neighborhood is a managerial-specialized dashboard that guarantees

maximum realization and also shows the degree to which the decisions and prioritizations derived from all previous applications will be implemented. In application 3, which refers to the management of the renovation balance of the neighborhood and is called the balance prescription application, first, we find point G′ according to the curve and center of gravity in application 1. This point is the symmetry of G compared to O as the center of the circle (Fig. 10).

The effect of G′ is to move G towards O, and obviously increasing the values of the nearest radius to G' can lead us to this goal and more access to resources and the availability of various managerial and professional capacities will allow selecting more radii. Suppose we can choose 3 to 5 radii. These 5 radii in proximity to G′are H2, B1, D2, G2 and C1. With the first five priorities and the balancing requirements outlined above determined, the managerial priorities and requirements for balancing the renovation of our selected neighborhood will be highlighted.

But the question is why three priorities? Or four priorities and...? In the first year of planning with an optimistic possibility coefficient, several priorities (e.g., seven priorities, which are a significant number for a strategic planning) are considered. The first years of the program, and even the first five, is assigned for monitoring the realization rate of this initial number of priorities, so we could deduct a number of priorities from the initial number each year, based on the achieved amount of resources and operational capacities. For example, each year, a priority will be eliminated in order to achieve recognition of the number of optimal and achievable priorities with high approximation in the third or fourth year, and in the fifth year, we will identify the true and accurate number of priorities, and will use them as the basis for the coming years and the next five-year development plans. Of course, the best and most ideal way is to somehow have the capabilities and resources of "all administrations" assimilated and operated in a way that does not require the reduction of any number of the initial predefined and optimistic priorities, and in the next five-year development plans, the same seven priorities will be considered and can even be added to their number.

This section is part 1 of application 3, and part 2 of the same application describes the last part of the description of the conceptual model application as the balance monitoring system, which is discussed here.

By identifying the priorities and requirements, and as same that was said about the balance analysis application, the balance situation is monitored and observed in specific periods of time, such as annual, seasonal, monthly, or even weekly periods, so that the regular motion of G towards O can be assured and appropriate decisions and actions will be taken when facing the slow movement of the G or its possible stops.

Obviously, in order to improve the downward trend of the speed that G has towards O, the radii close to G′ must always be monitored, and the reasons for the decrease in the values of the radius close to that should be studied.

Also, those values on other radii that despite the desirable process of values increasing on the adjacent radius of G' have a negative effect on the G motion with a significant decrease in their values are considered as requirements for balance development or model balancing. In other words, the most important results of the third application can be explained as follows:

Determining the priorities of model balancing that the radii near G 'form the titles of the above-mentioned priorities.

Determining the requirements of model balancing, which are raised in line with the priorities, and those values that particular behavior is observed from them. Including that they have remained stable during consecutive periods, or they have experienced a sudden drop or values that are zero.

Monitoring the balance through the definition and management of the balance monitoring system, or the so-called "Renovation Balance Observatory", in which the two subjects of paragraphs 1 and 2 are

observed, and this is observed in a continuous cycle. The significance of this application is because of the dynamic and complex factors affecting each dimension of the distressed neighborhoods renovation and, consequently, the neighborhood studied in the present example, different external factors can disrupt this process or affect it at each moment and by using this part of the third application, it is possible to greatly ensure the realization of the conceptual model and its applications in order to achieve a balanced renovation of our neighborhood.

Common areas and differences of the balanced renovation conceptual model with radar diagrams

Radar diagram or spider or spider web diagram or stellar diagrams or unconventional polygons or polar graphs are a graphing method for displaying multivariate data in the form of a two-dimensional graph from three or more qualitative variables displayed on the axis and starting at the same point (Fig. 11) Relative position and angle of axis is unique. The radar chart has other names such as web charts, spider diagrams, stellar charts, irregular polygons, polar graphs, or Kiwiat charts. These types of analytical charts in general morphology consist of concentric radii that according to the subject of each radius are assigned to a specific variable, and values of each of the variables are displayed on them. Obviously, each of the radii is graded with a constant scale, which can be indicated or not. Generally, a sequential connection of the marker points of each of the values on radii forms a closed polygon, which will be used in analyzes for a variety of applications. Each radius can show more than one value for a variable. So by drawing the corresponding values, various curves can be made. These values, for example, can be changes made in the values of a variable in different time periods (Fig. 12).

The diversity of using this graphing technique is applicable to almost all topics and studies. As shown in the following 8 illustrations, examples of variations in the use of such diagrams are shown (Figs. 13 to 20).

So far, only a few examples have been introduced for familiarizing with different forms drawn of the radar chart, and their content analysis was ignored.

Here is an example in the field of analyzing data on organizational readiness assessment and analysis that can be obtained from a radar diagram.

In this example, there are 8 indicators in the form of constituent variables of radar chart radii that for each indicator, five levels from elementary level to optimized level are considered (Fig. 21).

An analysis of the example here has been done in

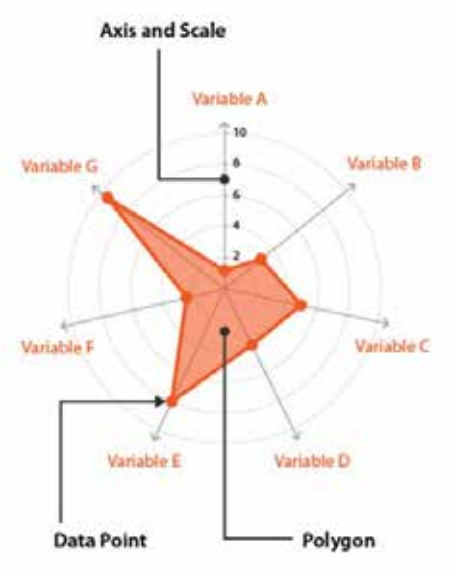


Fig. 11. Elements and components of a radar chart. Source: authors.

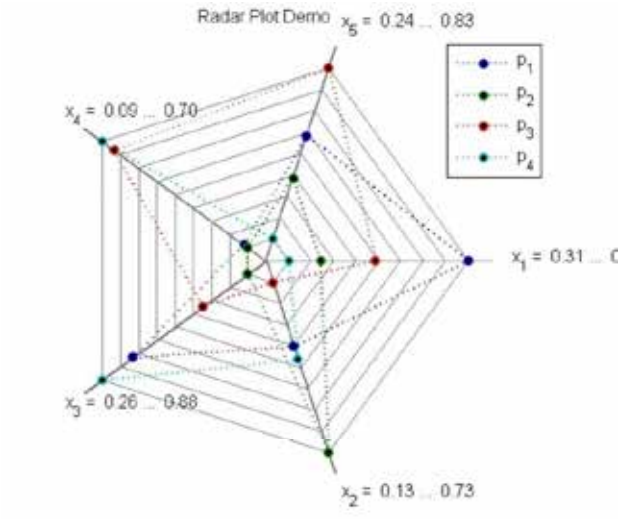


Fig.12. Ability to display different values of a variable. Source: authors.

two deputies from an organization as well as for the organization itself. Suppose that the organization chart is as follows. (Fig. 22)

In this case, the values of the variables in the software and hardware domain (northwest part of the graph)

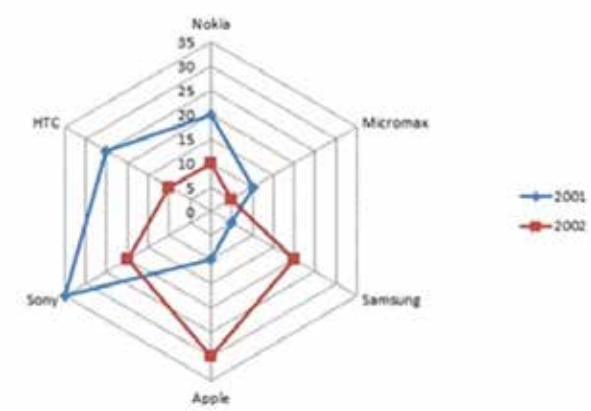


Fig.13. The number of mobile phones produced by 6 brands in 2001 and 2002. Source: authors.

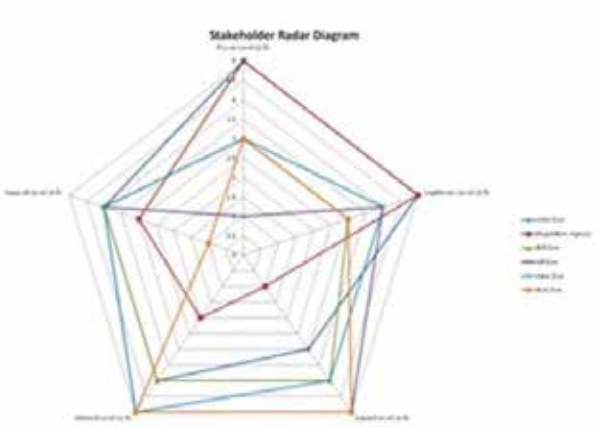


Fig.14. A chart on the development of coastal tourism in Algeria. Source: authors.

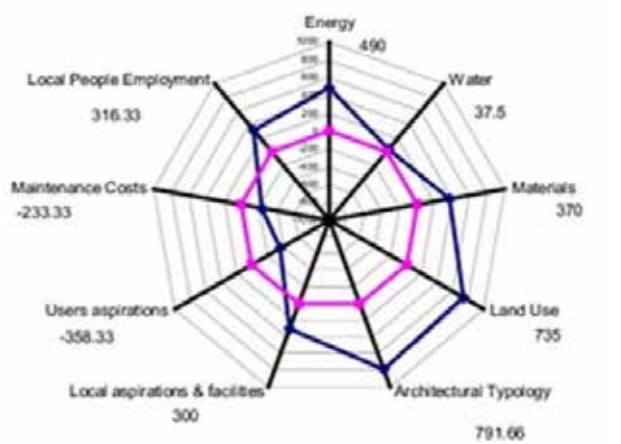


Fig.15. The chart comparing 5 characters among 6 shareholders of a company. Source: authors.

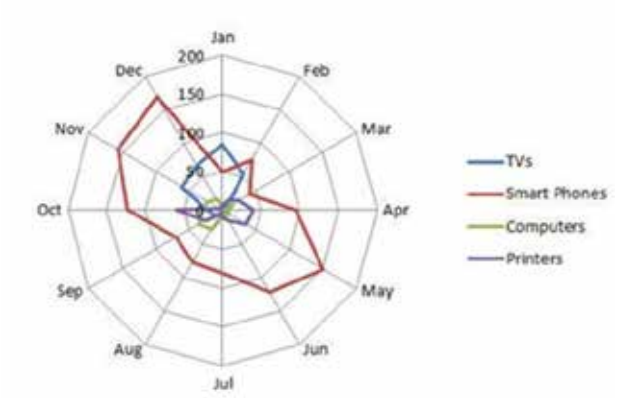


Fig.16. An Example of a Cost – Benefit chart and estimating real expenses. Source: authors.

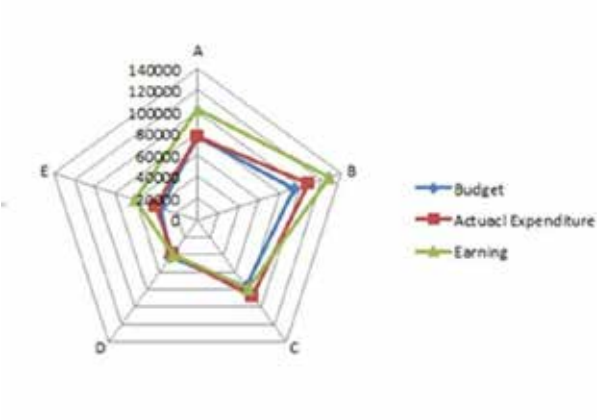


Fig.17.A store radar chart to compare TV, smartphone, computer, and printer sales in 12 months of a year. Source: authors.

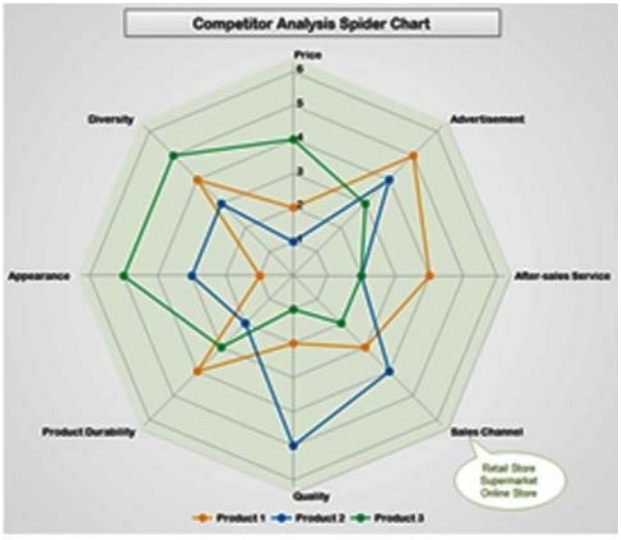


Fig. 18. Radar chart for analyzing competitors in one sport field. Source: authors.

Fig.19. Ranking of 7 private clinics in implementing guid authors.

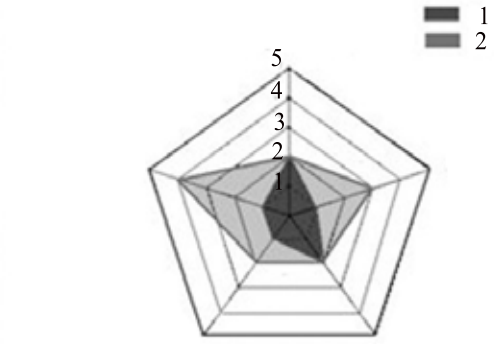


Fig.20. A radar chart of a strategic study in a regional area. Source: authors.

Fig. 21. An example of organizational preparedness assessment indicators. Source: authors.

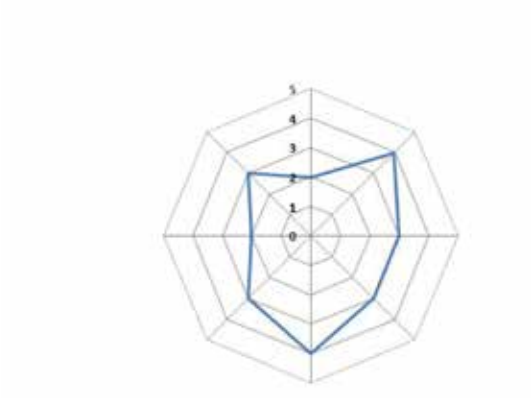


Fig.22.An example of an organizational readiness assessment chart. Source: authors.

can be analyzed weaker than the rest of the sectors. However, by overlaying the organization chart and its studied deputies, more meaningful analysis will be obtained (Fig. 23), some of which are:

1. The status of deputy B is better than the deputy A and even the overall situation of the organization.
2. Deputy A only has a better status than the average of an organization in three indicators, which includes awareness and education, software integration and trustee unit, but the same deputy has a much worse condition in all studied indicators compared to deputy B.
3. Deputy B has shown an egregious superiority in the organization but has not been able to achieve this superiority in three indices and is equal to the organization average which include standards, alignment, and the BPMS tool, which of course, do not count as a defect, as it should be like this in these three issues.

Multiplicity of variables is also seen in some radar diagrams, which are more similar to the radar chart of the balanced renovation model. However, the main difference between these diagrams and the model's index is that the number of radii in the index is never an odd number of the balanced model of modernization (due to being twofold-axis) and so the model index can be called "Dichotomy Radar Diagram".

Conclusion

In the theory of the balanced modernization of deteriorated urban fabrics, the principle has been defining new entities consisting of a meaningful sum

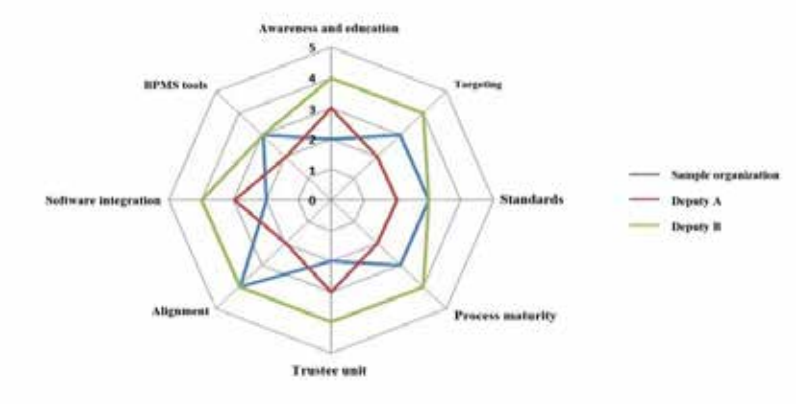
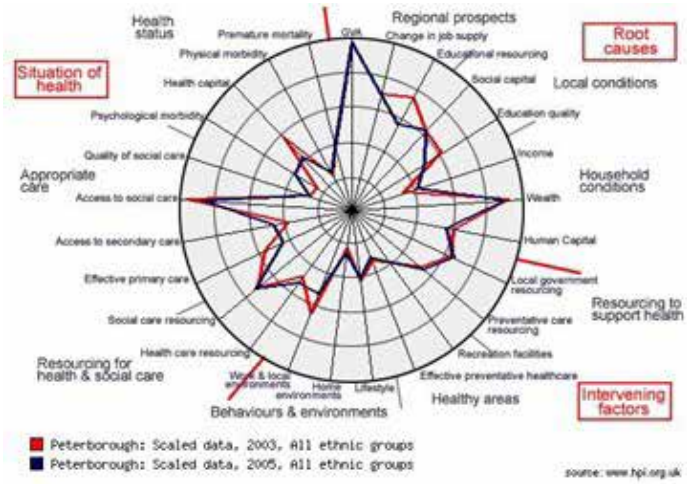
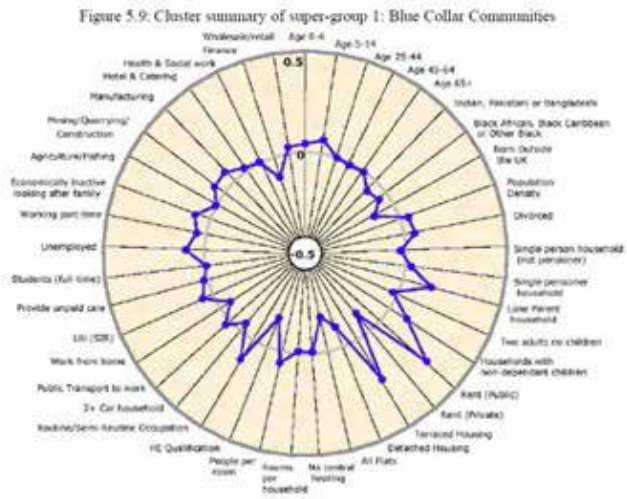


Fig.23. Assessment of organizational readiness of an organization and its deputies





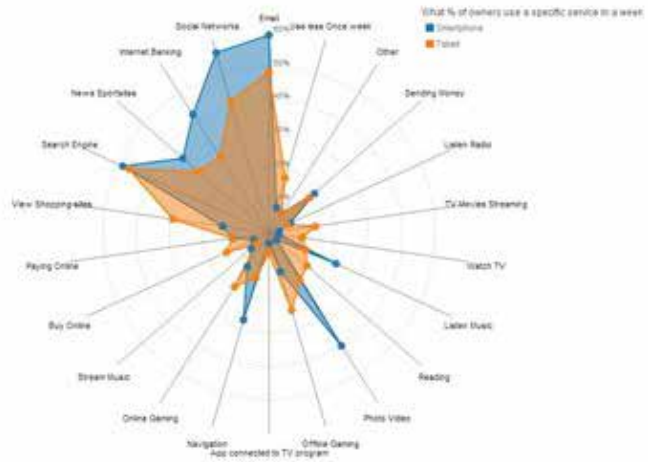


Fig.24, 25, and 26. Examples of multiple variables in a radar chart. Source: authors.

of two distinct entities, in which in the conceptual model are referred to as successive dichotomy. In the various diagrams mentioned in the article as the closest available models, all are based on the measurement and applying the values as single and so-called radius-centric while the basis of the model

being twofold-centric leads to the formation of so-called diameter-centric diagrams (and not radius-centric). This issue is the most important difference in comparing the model of the balanced renovation theory with other models, which should be considered and followed in all applications of the model. The triple applications of the model are as follows:

First application: Balance detection; Assessment of the neighborhood renovation balance at a time interval and its interpretation before, during and after renovation

Second application: Balance Analysis; Analyze and interpret the evolution process of balance in different periods and points of time

- In order to prevent
- In order to treat
- Third application: Prescribing balance; presenting a neighborhood renovation balance management model
- introducing the priorities that affect the renovation of a neighborhood

determining balancing requirements of the model that are considered alongside priorities

Developing a system for monitoring the renovation balance of a neighborhood at present and in the future dynamic conditions

In fact, the above-mentioned applications try to make the concept of balance in the development of neighborhood-centric renovation in distressed urban fabrics more and more functional and considers the comprehensive and managed development of all effective factors optimally ideal in which incidental, cross-sectional and unstable events are minimized and eliminated, and parallelization, redoing, and even the occurrence of anti-renovation is avoided maximally.

Endnote

1. In order to abbreviate in this article, from now on, the term "balanced modernization" is used instead of "the balanced renovation of distressed urban fabrics".
2. The present research is developed and based on empirical observations. The formation of the balanced renovation theory has in fact been based on more than a decade of practical, management, expertise and professional experiences in the distressed urban texture of Tehran.

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