Ranking of strategic management indicators in improvement of urban management by using multiple attribute decision method of TOPSIS

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Abstract
Planning, investment and city management have been surprisingly become so complex and difficult because of the massive growth of cities and the dual role they play. Not only Complexity and importance of the problem are facing planners to this reality but also make them to quit outdated methods of urban management, and accept new ideas and updated methods. In this study, urban development strategy was considered by emphasizing on public participation, local government power and urban vision. Because urban vision is an ideal situation which society hopes to achieve in future. Certainly one of the most important goals of this project was citizen's welfare. Thus we tried to explain and define these criteria's such as development strategy plan and urban management. At the end the existing approaches has been evaluated by considering urban approaches as parallel options and determining its basic indicators and their efficiency. By considering existing approaches as a multi- dimensional approach, the multi- dimensional decision method like TOPSIS method has been used and consequently existing application ranked generally and since our country is developing so this could be an efficient step to the self- help of the cities.

Keywords: cds (city development strategy), multiple-attribute-decision, making decision, TOPSIS.

1. Introduction
Planning, investment and city management have been surprisingly become so complex and difficult because of the massive growth of cities Not only Complexity and importance of the problem are facing planners to this reality but also make them to quit outdated methods of urban management, and persuade them to accept new ideas and updated methods, so urban development strategy was considered. City development is possible if different valuable vision and transforming them to development guidelines were considered by city development strategy.

since participation of all partners is one of the most important factors for succeeding of city development strategy project, in this study three important factors of project performance management were examined and they were compared with suitable indicators

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using Multiple Attribute Decision Method (MADM) and Technique for Order Performance by Similarity to Ideal Solution (TOPSIS), finally the most important factors were selected. Furthermore, for describing the aim of this article it's better we talk about CDS,CDS aim and features, vision and some other factors.

2. Cds Aims:
The most important aims of city development strategy project are:
1. Gaining the improved city sovereignty and management.
2. Omitting all growth hinders and developing in all cases.
3. Using all economics, social and cultural facilities for city developments.

3. Cds features:
After recognizing the aims of city development strategy project, now its better we talk about some of the most important of CDS features.
1.Examining and revising the all cases for a long time are so necessary for designing cds, but finally they are concluded to a short time plan.
2. Cds process and its results are assessed by city only, not by the superior government, international financial institution or other consultants.
3. Large participation of citizens in all stages of the project and accepting the results of the project are observed (city management).

4. Vision:
Gaining the valuable city vision is the first step for reaching to a city development.
Vision is a picture of total aim of one plan that it can reveal all the aims of this project to listeners at a same time. The relationship between the vision and the project aims are images. Urban vision is an ideal situation that the society hopes to achieve it in the future. City vision are future pictures of a city and reveals what the potential of a city are, so the vision is a factor that discriminate the cities from each other.

5. Strategy plan:
Strategy plan is a special way for achieving the main goal, it gives suitable ideas to point the institute for applying the chance, it clears the future ways of the institute and gives us a good future vision, this plan can help us to decide properly to do step by step of the project.

6. Urban development aim:
One of the most important aims of urban management and development is citizen welfare and comfort. A graceful and lovely space, beautiful vision and easy access, help citizen to live in a city easier. Science the strong native government by consulting with citizen are emphasizing in this project, so we have to consider to future necessity and different cultural, economic, social and human necessities in urban management and development.
Some clear difference between strategy schematization and other schematizations are:
1. Collecting the suitable data
2. Examining them with special goals
3. Recognizing the aims
4. Participation of decision maker
5. Examining the decision
6. Examining the future events
7. Emphasizing on the application of the project
    In global bank's opinion, stable cities are a kind of cities which have some criteria's such as:

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1. They're livable cities: livable cities have a high quality of living and all the citizens have the same chance for participating and beneficing of economical and political life in a city.
2. They're comparative cities: They aren't afraid of to be compared with other cities, they have a strong economics and their investments, income and preoccupation are growing.
3. They're bankable cities: they have a good and efficiency urban financial system.
4. They're managed and controlled properly: a good urban management is a kind of managements which:
1. Its responder.
2. it's so clear and obvious.
3. it's compared with other strong cities.
    Through the above information, these indicators as strategy management indicators can be mentioned:
1. Citizen participation
2. City open economic system
3. Decentralization
4. Responder urban management
5. Urban management with clear financial
6. Beneficing the equipments and facilities
For applying the urban strategy, these guidelines have to be considered:
1. The best actions have to be recognized then they're studied as an experience.
2. Dividing the described process
3. A good educational plan was selected for educating the workers.
4. Accumulation the coherent and related information through the user and partnerships.
5. The total duties were described by related experts for sagacity management.

7. MADM[1] method & TOPSIS[2] method

Multiple attribute decision method was applied in this study, the aims and indicators of urban management are assigned through filling the different forms and questionnaire by experts, and TOPSIS techniques are based on this definition, the selection solutions are far from the negative ideal solutions (as worst as it possible). TOPSIS technique in our study has eight steps:
First step: imagine that the phase decision matrix is like the equation (1):

$$D = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ . & . & & . \\ . & . & \cdots & . \\ . & . & & . \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix} \qquad (1)$$

i: Examined alternative numbers (m)
j: Considered indicators numbers (n)
in this study three different indicators of urban development strategy project by central government, native government and humanity institution (NGO) and basis on six different alternatives such as: citizen   participation, urban open economic system, decentralization,

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[1] multiple attribute decision method
[2] Technique for Order Preference by Similarity to Ideal Solution

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responder urban management with clear financial and beneficing of equipment and facilities, are compared.

It's necessary to mention to this fact that all the considered indicators are positive and they're called beneficial indicators.

Second step: Make no scale decision matrix, so phase decision matrixes are transformed in to a phase no scale decision matrix (R), using equations 3 & 4 for achieving (R) matrix.

$$R = \left[r_{ij}\right]_{m \times n} \tag{2}$$

$$r_{ij} = \left(\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*}\right) \tag{3}$$

$$c_j^* = \max_i c_{ij} \tag{4}$$

The first and second step results are shown in table1.

Indicators ⟍ Approaches	Urban open economic (D)	Responder urban management (E)	Citizen participation (F)	Clear financial system (G)	Decentralization (H)	Using the equipments (I)
Local government (A)	0.080688	0.080688	0.081262	0.116233	0.080688	0.67397
native government (B)	0.245342	0.245342	0.156546	0.651441	0.245342	0.245342
humanity institution (C)	0.67397	0.67397	0.762192	0.232326	0.67397	0.080688

Table1. Optimized decision matrix

Step 3: Weighting Normalized Decision Matrix:

In this step, each attribute is assigned a weight based on experts' opinions and its importance in comparison with other attributes. The normalized and weighted decision matrix V is obtained by multiplying column (j) of matrix R at the relevant weight (Wj). It was calculated by equation (5), Table 2 shows the results.

$$V = R * W_j \tag{5}$$

Indicators ⟍ Approaches	D	E	F	G	H	I
A	0.0767	0.0605	0.0650	0.1046	0.0686	0.6403
B	0.2331	0.1840	0.1252	0.5863	0.2085	0.2331
C	0.6403	0.5055	0.6098	0.2091	0.5729	0.0767

Table2. Optimized weight matrix (V)

Forth step: Recognizing and observing all phase positive and negative ideal indicators. (All considered indicators have a positive point and they're beneficial indicators)

Indicator importance	+	+	+	+	+	+

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Indicators	D	E	F	G	H	I

Table3.Recognizing the negative and positive ideal phase.

Fifth step: Assigning the positive and negative ideal solutions, two virtual selections (positive and negative ideal selections) are defined as equations 6 & 7. A^+ (positive ideal solution), A^- (negative ideal solution), the results are shown in table 4.

$$A^+ = \left(\{(\max v_{ij} \,/\, j\varepsilon J)_{\,9}\, (\min v_{ij} \,/ j \in J')\}/i = 1,2,\dots,m\right) \qquad (6)$$

$$A^- = \left(\{(\min v_{ij} \,/\, j\varepsilon J)_{\,9}\, (\max v_{ij} \,/ j \in J')\}/i = 1,2,\dots,m\right) \qquad (7)$$

Rlated to beneficial indicators $\quad \leftrightarrow J = \{j = 1,2,\dots,n\}$
Related to expense indicators $\quad \leftrightarrow J' = \{j = 1,2,\dots,n\}$

Indicator / Ideal	D	E	F	G	H	I
A+	0.6403	0.5055	0.6098	0.5863	0.5729	0.6403
A-	0.0767	0.0605	0.0650	0.1046	0.0686	0.0767

Table4 .Assigning the negative and positive ideal solutions

Sixth step:
Distance calculation, the distance between each selection were calculated through equation (8),

$$S_{i+} = \sqrt{\sum_{j=1}^{n}(v_{ij} - v_j^+)^2} \;\rightarrow i=1,2,\dots, m \qquad (8)$$

The distance from I to negative ideal were calculated by equation (9):

$$s_{i-} = \sqrt{\sum_{j=1}^{n}(v_{ij} - v_j^-)^2} \;\rightarrow i=1,2,\dots,m \qquad (9)$$

Distance / Approaches	Si+	Si-
A	1.1396	0.5636
B	0.8958	0.5652
C	0.6782	1.0381

Table 5. The distance of negative and positive ideal

Seventh step: Calculating the relative approximation from I to positive ideal. It was calculated by equation (10); the results are shown in table 6:

$$CC_i = \frac{d_i^-}{d_i^* + d_i^-} \qquad (10)$$

$$i = 1,2,\dots,m$$

Approaches	Final grant

A	0.3309
B	0.3868
C	0.6048

Table6 .Relative approximation calculating

Eight step: Selection ranking: all the selections were ranked through the descending order (CCi), the results are shown in table 7.

Grants in delay decreasing	Approaches	Final grant
1	C	0.6048
2	B	0.3868
3	A	0.3309

Table7: Ranking the selections

5. Conclusion:
The results show that modulation of native government and humanity institution (NGO) had the first grade and citizen participation makes an open economic, so decentralization is caused. Since the citizens are responsible for their future, responder city management is made. The most important failures of this project are, not accessing to facilities and equipments and not a good supervision on open financial system. Native government and humanity are managed and assigned by citizens, so maximum participation of citizens is revealed in this institute.

Local government had the second grade, since it's so nearer to citizens than the central government, it has a better understanding about the citizens requests and it tries to consider to their requests in all cases, but unfortunately, all the citizens requests never achieved because the local government has to be linear to central government politics.

Central government has the third grade and it doesn't have enough information about the citizen necccessity because of its bigness and decentralization and this phenomenon is the most important factor for succeeding the plan, it causes that people never achieve to their requests and city centralization happen.

City management strategy isn't necessarily a linear process, it starts by examining the situations and ends by applying the plan, the steps of the plan are depended to the situation and condition of the city.

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