Identifying and classifying the factors affecting strategic alliance formation in urban environment management

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The quick and complicated changes of the recent decades have made the organizations increasingly try to welcome changes. Changes such as innovations, complication of decision making and management processes, necessity for spontaneous decision making and the experiences of different contracting companies have led the organizations to forming strategic alliances. Moreover the importance of investing in urban environment which is a vital element and has an important effect on maintaining and improving the urban life quality is known to everyone. Therefore this paper is aimed at identifying and classifying the factors affecting the formation of strategic alliances in urban environment of Tehran. Descriptive-survey research method was used in this research. Our population included academic experts and the managers of the 22 districts of Tehran municipality. Using Cochran method the sample size was defined to be 149. The data was collected through literature review and survey. Once the effective factors were extracted from the literature they were classified by the experts. The data was analyzed using phase hierarchical analysis and the software "Expert Choice" was used for this purpose. Nine factors were extracted from the literature and prioritized. At the end of the paper recommendations are presented about the factors.

Keywords: strategic alliance, environment management, the municipality of Tehran

INTRODUCTION

Some researchers view the subjects from management's perspective and claim that supports of the senior management of all companies involved in the strategic alliance is a key factor in the success of the alliance [1]. As a matter of fact in order for the alliances to be literally strategic, they must have a dominant effect on the strategic plans of companies and by the support of superior management the strategic alliances must be formed, executed, managed and controlled [1,2]. Companies cannot access the resources they need in absence of superior management support [3]. Another challenge that may affect the success of alliances is organizational goals. No matter how close the relations between two members are, combining the culture of separate organizations is difficult. This is more difficult when the mother-companies have different and sometimes contrasting strategic goals. The alliance must be in line with the strategies of each company. Superior

Moreover an alliance is dependent upon a delicate balance between cooperation and competition. Therefore an alliance must create autonomy for each member so that they are encouraged to share a certain degree of power and control and they do not assume that they are marginalized. In this case the marginalized company is reluctant to cooperate and the alliance begins to collapse [5,6]. The members' willingness to continue cooperation decreases when one of the members becomes superior over the others [7]. Bowersox et al. [8] believe, that a clear decision making process and setting the process in a way that is supports power and control balance are of the critical factors in the success of and strategic alliance.

management should create a clear link between its expectations from the future of the industry and the ways of receiving a bigger portion of the industry and also the places where the future plans must be proportionate [4]. An alliance becomes successful as long as the members have a common perspective of future [4].

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Compatibility of the members is also important. If communications and technology are compatible, strategic alliances are executed faster. Also managing the two factors may define the success of the alliance [9]. Convergence, similarity of interests, trusting the partners in ethics, policies, health, safety etc. are the headstone of an alliance. Optimistic perspective on compatibility demonstrates that compatibility is the basis for constant synergy and cooperation between the capacities and capabilities of companies in a win-win relationship [10].

Bruner&Spekman [11] believe that cultural similarities of the members are an important factor in forming alliances. Managerial culture is vital in cooperative communication and group management can be a unifying factor in interactions between members and familiarize them with the values and norms of the other members in an alliance [12]. Culture may be studied in different levels: national, occupational and organizational [13]. Organizational or corporate culture means the way of doing works in a company in a way that common values are shared between the members [14]. Das& Teng [15] believe that organizational culture management is both a potential for creating opportunities and a dreadful challenge. Therefore they consider coordination and cultural respect as vital factors for the success of an alliance. Some researchers believe that value creation can be the main goal of some organizations [16]. The member of a strategic alliance must have come to this conclusion that their strategic alliance is beneficial for them. Once they feel that they are in a win-win alliance and will benefit from the alliance, they will believe that the alliance is valuable and will like to maintain their membership [17]. In order for an alliance to be successful, the members must keep assessing and evaluating the performance of the other members for achieving common goals. In this way the alliance will not collapse as a result of not achieving the goals [18]. In order for strategic alliances to be successful, their performance must be constantly evaluated and compared against the missions and goals of the alliance. In order for the feedback monitoring system to work successfully, the goals of the alliance must be clearly defined and also be measurable. The focal logic of alliances, which is improving competitive situation of alliance members in the market, is highly focused on [19]. The extracted factors are mentioned in the Table 2.

 Table 1. Identifying the factors affecting the successful formation of strategic alliances

Factors affecting th	ne formation of strategic
alliances/author	
[20-26]	Effective communication
[27-37]	trust
[38-45]	Superior management
	support
[46-53]	Clear organizational goals
[54-61]	Acceptable level of power
	and control
[39,44,43,47-59]	Coordination
[54,57,53,61-65]	Managing cultural
	differences
[49-62]	Members appreciation of the
	value of the alliance
[44,48,50,52-54]	Potential of reaching the
	expected performace

3. RESEARCH METHOD

This research is an applied research which is conducted through descriptive survey. The respondents of the questionnaires are academic experts and the managers of the 22 districts of the municipality of Tehran. Literature review and field studies were conducted for collecting data. In the first step the related concepts were extracted from the literature. Then the questionnaire was used for evaluating and classifying the factors. Our population included 350 people but using Cochran method it was defined that the sample size of 149 people is satisfactory. We used simple sampling method. Through the questionnaires the experts were asked to comment on the importance of each dimension. Phase hierarchical method was used for analyzing the results. Expert choice software was used for analyzing the data. Hierarchical analysis is a logical method for analyzing qualitative criteria and for defining the weight or importance of each option. This method is widely used in decision making area. Phase AHP method is a systematic approach to selecting alternatives and justifying the problem through using the concepts of the theory of phase collection and analyzing the hierarchical structure. Decision makers will notice that spatial judgments are more trustable and stable than value judgments. The process of hierarchical analysis includes: a) creating positive phase matrixes, b) combining the phase judgments of al decision makers in a collective or group matrix, c) calculating and analyzing coordination rate and d) calculating phase weights.

4. DATA ANALYSIS

4.1. Developing network diagram

The hierarchy of decision is depicted through the levels of factors.

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Fig. 1. Network diagram of decision tree for the factors affecting strategic alliances.

First a double comparative questionnaire was developed and was sent to the experts. Referring to phase logic, the words and phase numbers of table 3 were used in the questionnaire. Double comparatives were conducted and the amended method of Bruner & Spekman [11] defined the weighs of the factors and prioritized them.

 Table 2. Phase scale and double comparative verbal words.

Phase mumber	Verbal words	code
(1,1,1)	Same priority	1
(1,1.5,1.5)	Low to medium	2
	priority	
(1,2,2)	Medium priority	3
(3,3.5,4)	Medium to high	4
	priority	
(3,4,4.5)	High priority	5
(3,4.5,5)	High to very high	6
	priority	
(5,5.5,6)	Very high priority	7
(5,6,7)	Very high to totally	8
	high priority	
(5,7,9)	Totally high priority	9

4.2. Compatibility assessment method of Gogoos and Butcher

The Gogoos and Butcher's method is used in this paper to assess compatibility. The steps of assessing compatibility ratio of the phase matrixes of double comparatives are as follows:

Step 1: first divide the phase triangular matrix into two matrices. First matrix include the middle numbers of triangular judgments $A^m = [a_{ijm}]$ and the second one includes geometrical means, maximum and minimum limits of triangular numbers $A^g = \sqrt{a_{iju}.a_{ijl}}$

Step 2: calculate the weight vector of each matrix using clock method:

Equation 1:
$$w_i^m = \frac{1}{n} \sum_{j=1}^n \frac{a_{ijm}}{\sum_{i=1}^n a_{ijm}}$$
 where
 $w^m = [w_i^m]$

Equation 2:
$$w_i^g = \frac{1}{n} \sum_{j=1}^n \frac{\sqrt{a_{iju}.a_{ijl}}}{\sum_{i=1}^n \sqrt{a_{iju}.a_{ijl}}}$$
 where:
 $w^g = [w_i^g]$

Step 3: calculate the maximum special amount for each matrix as follows:

Equation 3:
$$\lambda_{\max}^m = \frac{1}{n} \sum_{i=1}^n \sum_{j=1}^n a_{ijm} \left(\frac{w_j^m}{w_i^m} \right)$$

Equation 4: $\lambda_{\max}^g = \frac{1}{n} \sum_{i=1}^n \sum_{j=1}^n \sqrt{a_{iju} \cdot a_{ijl}} \left(\frac{w_j^g}{w_i^g} \right)$

Step 4: calculate compatibility ratio using the following equations:

Equation 5:
$$CI^m = \frac{(\lambda_{\max}^m - n)}{(n-1)}$$

Equation 6:
$$CI^{g} = \frac{(\lambda_{\max}^{g} - n)}{(n-1)}$$

Step 5: in order to calculate the incompatibility ratio, CI is divides by random indicator. If the result is less than 0.1then the matrix is compatible and usable. In order to calculate the random indicators 100 matrices are made of random numbers- the matrices must be reciprocal- and then the incompatibility values and the means are calculated. Since the numerical results of phase comparisons are not always integer, and if they are their geometrical mean will not necessarily be integer, the 1-9 scale cannot be used for random indicators table. Therefore Gogoos and Butcher recalculated random indicators table for the phase double comparative matrices by producing 400 random matrices.

RI^{g}	RI^{m}	Matrix value
0	0	1
0	0	2
0/1796	0/4890	3
0/2627	0/7937	4
0/3597	1/0720	5
0/3818	1/1996	6
0/4090	1/2874	7
0/4164	1/3410	8
0/4348	1/3793	9
0/4455	1/4095	10
0/4536	1/4181	11
0/4776	1/4462	12
0/4691	1/4555	13
0/4804	1/4913	14
0/4880	1/4986	15

Table 3	. Random	indicators
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In order to create random matrices, first the mean value of triangular phase number is randomly and reciprocally selected in the scale of $[\frac{1}{9},9]$. Then the lowest limit of triangular number in the scale of [the mean value calculated and $\frac{1}{9}$] and the highest limit of the scale of $[\frac{1}{9}$ the mean calculated] are picked randomly and then the final random matrix is divided by the two matrices of lowest and highest limits to calculate the random indicator. It should be noted that the incompatibility value in the column RI^m is higher than RI^g . The difference is due to

the fact that the scale of random numbers calculated for the mean limit is $\left[\frac{1}{9},9\right]$ but the scale for the random numbers of maximum and minimum limits are restricted by the mean value and accordingly the probability for incompatibility is lower.

After calculating the incompatibility ratio for both matrices using the following equations, we compare them with the threshold of 0.1:

Equation 7:
$$CR^{g} = \frac{CI^{g}}{RI^{g}}$$

Equation 8: $CR^{m} = \frac{CI^{m}}{RI^{m}}$

If both indicators are lower than 0.1 then the phase matrix is compatible. If both are higher than 0.1, the decision maker is asked to change their minds about the priorities and if the $CR^m(CR^g)$ is higher than 0.1 the decision maker is asked to change their minds only about mean values (limits) of phase judgment.

4.3. Conducting phase AHP steps

Step 1: combining the view of experts: in this step the geometrical mean of double comparatives of respondents is calculated.

Step 2: calculating the geometrical mean of lines: in this step the means of lines of each table of double comparatives is calculated using equation 9:

Equation 9:
$$\tilde{z}_i = \left[\prod_{j=1}^n \tilde{t}_{ij}\right]^{\frac{1}{n}} \quad \forall i$$

Where $\tilde{t}_{ij} = (a_{ij}, b_{ij}, c_{ij})$ is a phase triangular number which exists in the tables of the means of the view of experts. The geometrical mean of the views of experts is presented in table 5 and the right column of the table includes the geometrical average of each line. M.M. Anvari et al.: Identifying and classifying the factors affecting strategic alliance formation in urban environment...

Table 4. Geometrical mean

Identifying and prioritizing the factors affecting strategic success	Effective communications	Senior management support	Clear organizational goals	Acceptable level of control and power	Members' appreciation of the value of alliance	Trust	Ability to achieve expected performance	Compatibility	Managing cultural differences
Effective communication s	(1,1,1)	(0. 289,0. 45,0. 744)	0. 294, 0. 315, 0. 372)	(0. 17,0. 351,0. 459)	(0. 289,0. 45,0. 744)	(0. 294 , 0. 315 ,0. 372)	(0. 17,0. 351,0. 459)	(2. 952,3. 059,2. 456)	(0. 258,0. 38,0. 922)
Senior management support	(1. 52,3. 102,1. 439)	(1,1,1)	(0. 258,0. 38,0. 922)	(0. 125,0. 266,0. 436)	(4. 18,3. 142,6. 156)	(5. 12, 4. 867 ,6. 45)	(2. 952,3. 059,2. 456)	(4. 18,3. 142,6. 156)	(0. 258,0. 38,0. 922)
Clear organizational goals	(4. 18,3. 142,6. 156)	(5. 12,4. 867,6. 45)	(1,1,1)	(2. 952,3. 059,2. 456)	(0. 258,0. 38,0. 922)	(0. 125 ,0. 266 ,0. 436)	(4. 18,3. 142,6. 156)	(4. 18,3. 142,6. 156)	(5. 12,4. 867,6. 45)
Acceptable level of control and power	(4. 18,3. 142,6. 156)	(5. 12,4. 867,6. 45)	(2. 952,3. 059,2. 456)	(1,1,1)	(0. 258,0. 38,0. 922)	(0. 125 ,0. 266 ,0. 436)	(4. 18,3. 142,6. 156)	(0. 258,0. 38,0. 922)	(0. 125,0. 266,0. 436)
Members' appreciation of the value of alliance	(0. 258,0. 38,0. 922)	(0. 125,0. 266,0. 436)	(4. 18,3. 142,6. 156)	(4. 18,3. 142,6. 156)	(1,1,1)	(0. 258 ,0. 38, 0. 922)	(0. 125,0. 266,0. 436)	(4. 18,3. 142,6. 156)	(5. 12,4. 867,6. 45)
Trust	(0. 258,0. 38,0. 9 <u>2</u> 2)	(0. 125,0. 266,0. 4 <u>36)</u>	(4. 18,3. 142,6. 1 <u>56)</u>	(0. 258,0. 38,0. 922)	(0. 125,0. 266,0. 436)	(1,1,1,1)	(0. 258,0. 38,0. 922)	(0. 125,0. 266,0. 4 <u>3</u> 6)	(4. 18,3. 142,6. 156)
Ability to achieve expected performance	(4. 18,3. 142,6. 156)	(5. 12,4. 867,6. 45)	(0. 258,0. 38,0. 922)	(0. 125,0. 266,0. 436)	(4. 18,3. 142,6. 156)	(0. 258 ,0. 38, 0. 922)	(1,1,1)	(4. 18,3. 142,6. 156)	(5. 12,4. 867,6. 45)

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Compatibility	(0. 258,0. 38,0. 922)	(0. 125,0. 266,0. 436)	(4. 18,3. 142,6. 156)	(0. 258,0. 38,0. 922)	(0. 125,0. 266,0. 436)	(2. 952 ,3. 059 ,2. 456)	(0. 258,0. 38,0. 922)	(1,1,1)	
Managing cultural differences	(0. 294,0. 315,0. 372)	(0. 17,0. 351,0. 459)	(0. 294,0. 315,0. 372)	(0. 17,0. 351,0. 459)	(0. 289,0. 45,0. 744)	(0. 294 ,0. 315 ,0. 372)	(0. 125,0. 266,0. 436)	(4. 18,3. 142,6. 156)	(1,1,1)
total	(0. 294,0. 315,0. 372)	(0. 17,0. 351,0. 459)	(0. 294,0. 315,0. 372)	(5. 12,4. 867,6. 45)	(0. 258,0. 38,0. 922)	(0. 125 ,0. 266 ,0. 436)	(5. 12,4. 867,6. 45)	(0. 258,0. 38,0. 922)	(0. 125,0. 266,0. 436)
CRm =0. 052 Compatible	CRg	=0.073							

Step 3: normalizing the geometrical means: in this step the results of the step 2 are normalized. The values of \tilde{Z}_i are normalized for each matrix.

Equation 10:
$$\tilde{r}_{ij} = \tilde{w}_i = \frac{\tilde{z}_i}{\sum_{i=1}^n \tilde{z}_i}$$

If these normalized weights are related to the comparatives the items, $\tilde{\mathbf{r}}_{ij}$ the weight of the ith item in relation to jth criterion and if they are related to the comparison of the criteria they are called $\widetilde{\mathbf{w}}_i$. The normalized values are presented in Table 6.

 Table 5. The normalized geometrical mean based on identifying and prioritizing the factors affecting successful implementation of open innovation

Identifying and prioritizing the factors	Normalized geometrical means			
affecting the success of strategic alliances				
Effective communications	(0. 081,0. 206,0. 356)			
Senior management support	(0. 426,0. 294,0.904)			
Clear organizational goals	(0. 855, 0.361, 0. 91)			
Acceptable level of control and power	(0. 081,0. 206,0. 356)			
Members' appreciation of the value of	(0. 426,0. 294,0.904)			
alliance				
Trust	(0. 081,0. 206,0. 356)			
Ability to achieve expected performance	(0. 081,0. 206,0. 356)			
Compatibility	(0. 426,0. 294,0.904)			
Managing cultural differences	(0. 855,0.361,0.91)			

Step 4: combining the weights: the total weights are calculated through combining the weights of items (compared to the criteria) and the weights of the criteria:

Equation 11: $\widetilde{U}_i = \sum_{j=1}^n \widetilde{w}_i \widetilde{r}_{ij} \quad \forall i$

Step 5: de-phasing. In this step the phase weights are de-phased using equation 12.

$$Crisp(\tilde{U}) = \frac{(u_1 + 2 \times u_m + u_r)}{4}$$

Equation 12:

Where
$$\tilde{U} = (u_l, u_m, u_r)$$
 and $Crisp(\tilde{U})$ are the dephased \tilde{U} .

The calculations define the total weights that are presented in the following tables:

Total absolute	Total phase weight	Factor
weight of factors		
0.716	(0. 081,0. 206,0. 356)	Effective communications
0.674	(0. 426,0. 294,0.904)	Senior management support
0.447	(0. 081,0. 206,0. 356)	Clear organizational goals
0.423	(0. 081,0. 206,0. 356)	Acceptable level of control and power
0.324	(0. 081,0. 206,0. 356)	Members' appreciation of the value of alliance
0.303	(0. 081,0. 206,0. 356)	Trust
0.265	(0. 081,0. 206,0. 356)	Ability to achieve expected performance
0.211	(0. 426,0. 294,0.904)	Compatibility
0.115	(0. 081,0. 206,0. 356)	Managing cultural differences

Table 6. The matrix of the total weights of the criteria for identifying and prioritizing the factors affecting the success of strategic alliances.



Fig. 3. the graph of the total weights of the criteria for identifying and prioritizing the factors affecting the success of strategic alliances.

5. CONCLUSION AND RECOMMENDATIONS

The factors affecting successful formation strategic alliances were extracted from the literature on strategic alliances. The factors are taken from over 20 models. Considering the overlaps the factors can be classified into: effective communication, trust, control power, compatibility, cultural respect, appreciating the importance of the alliance, ability to achieve the expected performance, senior management supports, and clear organizational goals. Based on the factors a questionnaire was developed that was aimed at prioritizing the factors using phase hierarchical analysis. Therefore the double comparative questionnaires were developed and distributed among the experts first. Then

Gogoos and Butcher's method was used for assessing compatibility and the ground was prepared for doing phase AHP. The results demonstrated that the experts consider the "senior management support" factor with the total absolute weight of 0.716 as the most important factor in forming strategic alliances. The factor of "cultural differences management" with the total absolute weight of 0.674 came second. Based on the experts' views the factor "trust" with the total absolute weight of 0.447 came third. In terms of importance the factors "effective communication" with the total absolute weight of 0.423, "compatibility" with the total absolute weight of 0.324, "ability to achieve the expected performance" with the total absolute weight of 0.265, "control and power level" with the total absolute weight of 0.211 and "members' appreciation of the importance of the alliance" with the total absolute weight of 0.115 came next respectively.

In current paper the aforementioned factors are examined in forming strategic alliances in managing urban environment in private sectors in Tehran. Therefore due to the differences in the form, type and procedure of the alliances, the factors may have similarities with and differences from other researches in this area. Researchers have applied different approaches for developing models of forming a strategic alliance. Some researchers have studied the effectiveness of strategic alliances e.g. [9-14]. Another group of researchers have studied the obstacles and failure factors of strategic alliances e.g. [22-28]. Some other researchers have focused on the factors affecting the selection of the appropriate form of strategic alliances and the structure of strategic alliances e.g. [13, 17-20]. Finally the last group has focused on the factors affecting the formation of strategic alliances e.g. [28-33]. Current research, which is focused on the strategic alliance model, examines the factors that affect the formation of strategic alliances in the population.

In fact this study has taken one step forward compared to the studies of [12, 16]. Karagiannidis's model includes 6 factors namely effective communication, trust and commitment, controllable power, compromise, cultural respect, and the value the members consider for the alliance. Vipel and Frankel's model includes five dimensions namely trust and commitment, compromise, senior management support, clear goals, ability to achieve the expected performance.

Organizational culture is highlighted in many studies about formation of strategic alliances [6-9]. Organizational culture is highlighted in this paper and also in prioritizing and hierarchical analysis it has higher total absolute weight than others do. Therefore it can be claimed that the results of this research are in consistency with the previous researches. Senior management support is a factor that has a high total absolute weight and is in the first place in this research. This result is consistent with the study of [13], as in their model this factor is highly emphasized on. Other studies such as [30, 35] have mentioned senior management support as an important factor in forming strategic alliances. This factor has been neglected in the study of [490] therefore different results have achieved. Many studies have been conducted about the role and importance of "trust" in forming strategic alliances. This factor has been neglected in the study of [49]

therefore different results have achieved. Many studies have been conducted about the role and importance of "trust" in forming strategic alliances e.g. [51-53]. The results of this paper also put emphasis on "trust" and its indicators. It is the third important criterion. Based on the results of this paper and the importance of strategic alliances in strategic planning for big organization, it is suggested that in decision making and primary assessments the organizations pay special attention to the factors affecting strategic alliances and the way the factors influence them. Since the strategic decisions are made by senior managers, forming strategic alliance is dependent on their views. Therefore the managers with positive attitudes towards strategic alliance will encourage strategic alliance formation. On the other hand strategic alliances may be hazardous threats if they are not based on logical and well-founded assessments. As the literature and results of this study demonstrated cultural compromise is crucial in and maintaining strategic alliances. forming Therefore it is recommended that cultural differences be taken seriously for assessing the possibility of forming or maintaining a sustainable alliance

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