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**APPROPRIATE DECISION MAKING MODEL UNDER ORGANIZATIONAL CRISIS
CONDITION USING ANP MULTIPLE CRITERIA DECISION MAKING
(CASE STUDY: GENERAL OFFICE OF SPORT AND YOUTH OF GOLESTAN
PROVINCE)**

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ABSTRACT

The present study was conducted to identify crisis management indices and to adopt the best crisis management strategy in sport and youth offices of Golestan province. This is an applied investigation conducted by a descriptive survey methodology. Statistical population includes experts of sport and youth office of Golestan province. Sample of the investigation in the first phase include right people and ten experts in the second phase. After identification of indices and criteria of decision making for selection of the best crisis management model, multiple criteria decision making technique was used. Expert questionnaire was used for data collection. Expert questionnaire is used to prioritize criteria and sub-criteria and crisis management models using analytical network process (ANP). The questionnaire was prepared based on Saaty's 9-point scale. After ensuring validity and incompatibility rate of the questionnaire, the collected data were analyzed using Super Decision software. ANP multi-criteria decision making techniques were used to analyze the information. Results indicated that crisis planning index weighting 0.178 had the highest priority; followed by quick response to crisis (weighting 0.167) and information collection index weighting 0.165 had relatively similar importance to latter index.

**Keywords: Crisis Management, Multiple Criteria Decision Making, Analytical Network
Process**

INTRODUCTION

Crisis management is now a fundamental part of strategic management. Before following long term goals, crisis management is necessary to ensure sustainability and permanent success of the organization. Organizations exposed to crisis need higher readiness against crisis. Effective crisis management requires a systematic and regular approach based on consciousness, managerial sensitivity and good understanding on importance of exact planning and organizational readiness. The only conspicuous issue in current business world is that managers should be ready for uncertainty. Crises are unfavorable events that can result in organization decline (Allen and Caillouet, 2011). Crisis management is an applied science dealing with systematic identification of observations and data analysis to find tools and solutions by which disaster can be avoided or fought from one hand; and in the case of disaster occurrence, necessary practices and rescue activities can be made on time (Ramezanzadeh, 2010). Indeed, crisis is an unexpected and surprising event in which there is very short time for decision making. Under such condition, ordinary methods of response can't be applied (Yarahmadi, 2007). No organization is secure against crisis.

Crises have been always a part of business; however current changes in today's business environment have exacerbated the situation. Crises are events that threaten the organizations in which they happen (Mitroff, 2010). Crisis is an issue every organizations and societies are encountered with according to their nature and activities. Occurrence of risks, problems and economic, social, political and military crises together with unexpected events are the facts that always have been present in human history. Industrialization of societies, extension of satellite communication, extensive information transfer, enlargement of social organizations and enormous social and technological successes not only have not been able to reduce occurrence of unexpected hazards, but also have increased the disasters in some cases. In the other words, crises have been embedded in organizations and an indispensable parts of organizations' intrinsic nature. Thus, the organizations have to enhance their ability to fight various crises along with enhancing their complexity and production power. This is only achieved via mid-term and long term planning (Yarahmadi, 2007).

Literature on crisis communication and crisis management is fragmented since authors

write about crises via different perspectives. Authors are often concentrated on their own proficiency and fail to communicate with other believes and concepts. This dispersion prevents from better understanding of crisis management which is resulting from various perspectives (Coombs, 2007). However, crisis management is a new research field and a new practice of a firm; thus it is not well identified and accepted (Mitroff, 2010).

Reger and Larkin maintained that crises happen in business as frequently as an ordinary cold in lifetime. The types of crisis are so extensive that it is impossible to enlist them. There are no two identical crises. Each crisis has its own causes, consequences, duration, cycle and unidentified factors (Dilenschneider, 2010). A crisis does not necessarily mean cause and effect relations or personal or other numerous damages. A crisis can be consequence of unfavorable conditions that can affect the organization (Pearson and Mitroff, 2011). Crisis brings about sever stress for emotional, physical and financial structures of the organization and even can threat organization's survival (Pearson and Mitroff, 2011). Many books have been compiled on crisis management but there is no acceptable definition for a crisis (Coombs, 2007). Inappropriate control of a crisis can

result in chain reactions of other crises (Mitroff, 2010; Pearson and Mitroff, 2011). There are numerous models and strategies for crisis management. In the present study, it is tried to identify the best crisis management style according to the most important criteria of crisis management. Since the current criteria have different measurement units sometimes in conflict or in contrast to each other. Thus, multiple criteria decision making approaches are used to identify the best model of crisis management.

In decision making science which selects a strategy out of the possible strategies or prioritize the strategies, multiple criteria decision making methods have gained a considerable position (Yazdanpanah, 2010). In such methods, many indices or goals that are sometime in contrast to each other are considered. If criterion is the same as index in MCDM methods, the method is then called multiple attribute decision making; and if the multiple criteria mean objective, then the method is called multiple objective decision making (MODM) technique (Ramezanzadeh, 2010).

ANP technique is used in the present study. This technique provides a wider perspective in selection of crisis management model by considering internal relations between criteria

and sub-criteria. The main goal of this study is to find out the appropriate decision making pattern under crisis condition using ANP multiple criteria decision making techniques in sport and youth offices of Golestan province.

METHODOLOGY

The main objective of the present study is to apply multiple criteria decision making models and ANP model to adopt the best pattern of crisis management. Thus, it is an applied study regarding the objective. On the other hand, since library and field methods such as interviewing and questionnaire are used, it can be said that it is a descriptive survey regarding the nature and methodology of the present investigation. Our goal was to adopt the best decision making pattern in crisis management. Many patterns have been proposed in this field. Numerous criteria should be considered in selection of the best pattern. There are many criteria about crisis management which are sometimes contradicting. Since selection of a solution out of the existing solutions is made based on multiple criteria, the best method for conducting this investigation is application of multiple criteria decision making (MCDM). Thus analytical hierarchy process (AHP) is used for this problem.

To select the best crisis management pattern using ANP, main criteria should be identified at the first step. Then internal relations among the main criteria should be identified and then, indices (sub-criteria) of measuring each main criterion are identified. Finally, crisis management patterns (items) are determined. After identification of criteria, sub-criteria, items and their internal relations, unweighted supermatrix (primary supermatrix) is achieved. General office of sport and youth of Golestan province is studied in the present study. Since ANP which is operation technique is used in this investigation, thus sampling techniques can't be used and hence, we used experts' comments for data collection. In the first phase, Delphi technique was used to identify and screen the criteria and sub-criteria. In the second phase, ANP technique was used to prioritize the criteria and sub-criteria. Data collection methods used in this study includes library and field methods. Library method was used to gather data on literature review and field method was applied for responding to the questions. Questionnaire 1 was Delphi scale used for screening and final classification of criteria and sub-criteria. Questionnaire 2 was expert questionnaire used to prioritize the criteria and sub-criteria and crisis management

models using analytical network process (ANP). This questionnaire was set based on Saaty's 9-point scale. Data were analyzed using multiple criteria decision making techniques. Special data were analyzed by multiple criteria decision making techniques using ANP method. Data analysis was performed by Super Decision software.

RESULTS

Identification of criteria and sub-criteria using Delphi technique

Sub-criteria of three stages of crisis management include:

- 1- Pre-crisis sub-criteria: sign diagnosis, crisis planning, organizing and creating management structure, education, training and maneuver
- 2- During crisis sub-criteria: identification of crisis, quick response, information collection, reducing negative consequences of crisis
- 3- Post-crisis sub-criteria: eliminating negative consequences, ensuring the security, learning from crisis

Kendall's concordance coefficient was used to estimate concordance among the experts.

Based on the results, Kendall's concordance coefficient in the first round of Delphi technique was 0.618 showing acceptable consensus among the experts. Moreover, significance level was estimated as 0.024

indicating that the results are reliable ($P < 0.05$). Thus, Delphi technique was stopped and the identified indices were used for final analysis.

Pairwise comparison of criteria, sub-criteria and items

After identifying criteria and sub-criteria, crisis management patterns were prioritized using ANP technique. This was performed by research conceptual model.

Pairwise comparison of the main criteria based on goal

At the first step of ANP technique, main criteria should be compared based on the goal. Main criteria for adopting crisis management strategy are categorized in to three groups including pre-crisis, during crisis, and post-crisis criteria. Results of pairwise comparison based on Super Decision output for prioritization of main criteria based on investigation goal indicated that the highest priority was devoted to pre-crisis criterion with normal weight of 0.635, followed by during crisis criterion (weighting as 0.252), and post-crisis criterion (weighting as 0.112). Therefore, eigenvalue W_{21} is as follows:

$$W_{21} = \begin{pmatrix} 0.636 \\ 0.252 \\ 0.112 \end{pmatrix}$$

Incompatibility rate was calculated as 0.0618 which is lower than 0.1, showing that the performed pairwise comparisons are reliable.

Pairwise comparison of main criteria relations

In the second step of ANP technique, internal relation of main criteria should be evaluated to calculate W_{22} matrix. Thus, there are three comparisons in the present study by combination of which, final matrix W_{22} . The relations among the variables are evaluated based on literature review and experts' comments who believe that there is relation among all steps of crisis management. Therefore, final matrix W_{22} based on eigenvalue of each pairwise comparison will be as follows:

$$W_{22} = \begin{pmatrix} 0.488 & 0.715 & 0.475 \\ 0.512 & 0.285 & 0.255 \end{pmatrix}$$

In contrast to previous step, weights of pre- and post-crisis criteria are very close to each other. Since only one comparison was performed in each cluster, then incompatibility rate will be zero.

Pairwise comparisons among sub-criteria

In the third step of ANP technique, sub-criteria of each crisis management step should be compared in pairwise. Since there are three criteria, thus three comparisons should be made in sub-criteria cluster.

- Pre-crisis sub-criteria

Incompatibility rate of matrix comparisons of the first cluster was estimated as 0.064. Thus the comparisons are reliable. Based on Super Decision outputs for prioritization of main criteria based on goal, it was observed that: crisis planning weighting 0.332 has the highest priority. Organizing and creating management structure weighting 0.240 has the second priority, followed by education, training and maneuver weighting 0.222. The sub-criteria sign diagnosis has the lowest priority with weight as 0.206.

- During crisis sub-criteria

Incompatibility rate of matrix comparisons of the first cluster was estimated as 0.003. Thus the comparisons are reliable. Based on Super Decision outputs for prioritization of main criteria based on goal, it was observed that: quick response weighting 0.360 has the highest priority. Information collection weighting 0.280 has the second priority, followed by crisis identification weighting 0.205. The sub-criteria reduction of negative

consequences of crisis has the lowest priority with weight as 0.155.

- Post-crisis sub-criteria

Incompatibility rate of matrix comparisons of the first cluster was estimated as 0.019. Thus the comparisons are reliable. Based on Super Decision outputs for prioritization of main criteria based on goal, it was observed that: ensuring security weighting 0.403 has the highest priority. Eliminating negative consequences weighting 0.319 has the second priority. Learning from crisis has the lowest priority with weight as 0.155.

Prioritization of crisis management indices

Based on the results obtained in this study, (Table 1) crisis planning which is a pre-crisis criterion has the highest importance. Ensuring security which is a post-crisis criterion is rated second place. Organizing and creating management structure which is a pre-crisis criterion has the third priority. Moreover, crisis encountering indices has median importance and are put in the fourth and fifth places.

Prioritization of crisis management models

After final prioritization of crisis management indices, final priorities of crisis management models are as follows:

Results indicated that crisis planning index with normal weight of 0.178 has the highest

priority, followed by quick response to crisis with normal weight of 0.167, and information collection with normal weight of 0.165 which has a similar weight to the latter. Eliminating crisis negative consequences with normal weight of 0.135 is rated at the fourth place and ensuring security with normal weight of 0.103 is put at the fifth place. Crisis signs diagnosis, creating crisis team, learning from crisis and reducing negative consequences are rated in the next places.

Based on **Figure 1**, it can be concluded that:

- Barnet model (M1) with normal weight of 0.306 has the highest priority.
- Pearson model (M3) with normal weight of 0.220 has the second priority.
- Rabiei model (M5) with normal weight of 0.178 has the third priority.
- Gonzales model (M2) with normal weight of 0.155 has the fourth priority.
- Fink model (M4) with normal weight of 0.139 has the lowest priority.

Many models have been proposed for crisis management. The most popular crisis management models used in other studies include Gonzales and Pratt model, Pearson and Mitroff model, Fink model, and Barnet model. Finally, using a questionnaire, various crisis management models were compared in pairwise based on each index. In the present

study, five models including Barnet, Gonzales, Pearson, Fink and Rabiei native model were used. To adopt suitable model, ten pairwise comparisons were made. Results of the final analysis showed that Barnet model with normal weight of 0.306 has the highest priority; Pearson model with normal weight

of 0.220 has the second priority; Rabiei model with normal weight of 0.178 has the third priority; Gonzales model with normal weight of 0.155 has the fourth priority; Fink model with normal weight of 0.139 has the lowest priority.

Table 1: Final priorities of crisis management indices

Rank	Final weight	Index	Symbol	Criterion
6	0.0902	Sign diagnosis	C11	Pre-crisis criteria C1
1	0.1454	Crisis planning	C12	
3	0.1051	Organizing and creating management structure	C13	
5	0.0972	Education, training and maneuver	C14	
10	0.0583	Crisis identification	C21	During crisis criteria C2
4	0.1024	Quick response	C22	
8	0.0797	Data collection	C23	
11	0.0441	Reducing negative consequences	C24	
7	0.0886	Eliminating negative consequences	C31	Post-crisis criteria C3
2	0.1119	Ensuring the security	C32	
9	0.0769	Learning from crisis	C33	

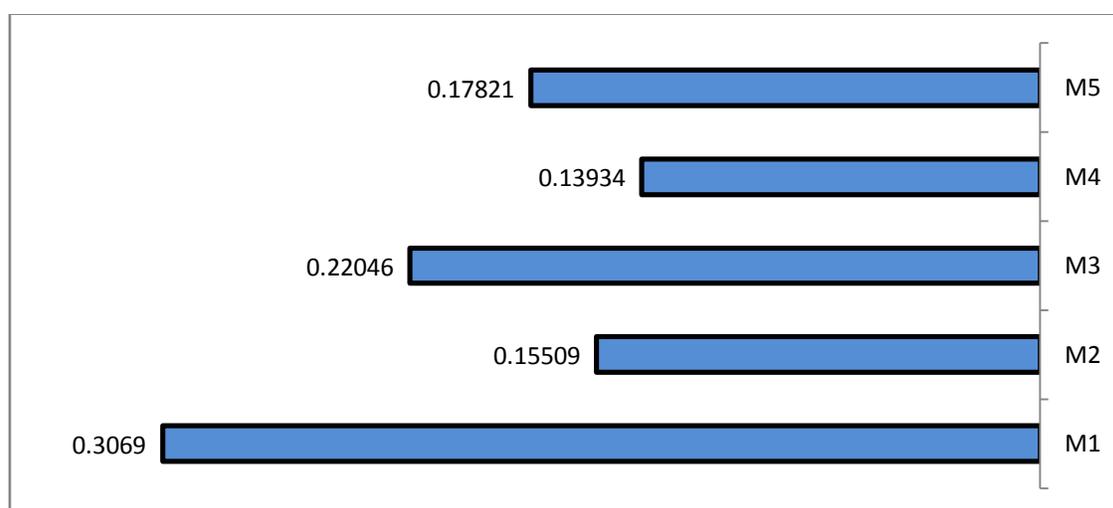


Figure 1: Prioritization of crisis management models

DISCUSSION AND CONCLUSION

Crisis is an issue which is more or less present in all organizations and societies based on their nature and activities. Occurrence of risks, problems and economic, social, political and military crises together with unexpected events are the facts that always have been present in human history. There are many models and strategies for crisis management. Regarding the most important criteria of crisis management, we tried in this study to identify the best crisis management style. Since current criteria are measured with different units and are sometimes in contrast to each other, thus multiple criteria decision making approaches were used in the present study to identify the best crisis management model. Results obtained in the present study indicated that pre-crisis management indices include crisis sign diagnosis, crisis planning and creating crisis team. The main criteria during crisis include crisis identification, quick response, information collection and reduction of crisis negative consequences. Eliminating negative consequences, ensuring security and learning from crisis are the most important indices at post-crisis period. Moreover, it was revealed that based on comparison of pre-crisis sub-criteria, crisis planning index has the highest priority;

followed by sign diagnosis and creating crisis team. Based on comparisons of during crisis sub-criteria, quick response has the highest priority; followed by information collection, crisis identification and reduction of crisis negative consequences. Based on comparisons of post-crisis sub-criteria, eliminating negative consequences has the highest priority, followed by ensuring security, and learning from crisis. Generally, crisis planning is the most important index among crisis management indices, followed by quick response to crisis, information collection and possessing a rich and consistent database about crisis management, and reduction of crisis negative consequences. Many models have been so far proposed for crisis management. The most popular crisis management models used in other studies include Gonzales and Pratt model, Pearson and Mitroff model, Fink model, and Barnet model. Results of final analysis showed that Barnet model has the highest priority, followed by Pearson model, rabeiei model, and Gonzales model. Fink model has the lowest priority. These findings are in accordance with those reported by Arazmju (2010), Yazad Panah (2010), Ramezanzadeh (2010), Mazlumi (2010), Vafadar (2009), Rezvani (2009), Mehri (2013), Yarahmadi

Khorasani (2012), Duk H Jeong (2012), Lee (2013) and Dulanpi (2011).

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