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# Select televised sportscasters for Olympic Games by analytic network process

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## Abstract

**Purpose** – The purpose of this paper is to show how a multiple criteria decision-making method, the analytic network process (ANP) is applied to help Taiwanese TV companies to effectively select optimal televised sportscasters for the Olympic Games.

**Design/methodology/approach** – After interviewing 44 practitioners, criteria for the selection of the Olympic Games televised sportscasters were collected. To avoid the complicated computing process from additional pairwise comparisons of the ANP, the 12 critical criteria that were mentioned more than 30 times by theses respondents were retained. After discussions with 18 senior executives these were classified in three perspectives to structure the hierarchy for the selection of the Olympic Games televised sportscasters.

**Findings** – After discussions with the 18 senior executives, it is found that the selection criteria for televised sportscasters are interrelated. Unlike former contributors who ignored the interdependence among factors, a more feasible and accurate approach, the ANP, which captures the dependent relationship, is applied in this paper to handle such problems.

**Practical implications** – According to the hierarchy base on three perspectives and 12 important criteria, Taiwanese TV companies could select the optimal Olympic Games televised sportscasters more effectively. A practical application of the ANP presented is generic and could be exploited for Taiwanese TV companies.

**Originality/value** – The Olympic Games are one of the most important and most popular sporting events in the world. This paper contributes to a more effective selection of the optimal Olympic Games televised sportscasters.

**Keywords** Olympic Games, Television, Decision making

**Paper type** Research paper

## Introduction

The 29th Olympic Games were held in China, from 8 to 24 August 2008. Around 10,500 athletes participated in the games, with approximately 20,000 accredited media bringing the games to the world (Shaw *et al.*, 2008). Expert televised sportscasters fully described, analyzed, and commented on the games. The televised sportscaster is a vital contributor to the audiences' appreciation of televised sports (Comisky *et al.*, 1977). As a result, selecting optimal televised sportscasters is important for those accredited media. Though selecting the televised sportscasters is crucial, few attempts have so far been given to this specific point.

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In this paper, we first present the literature review of the personnel selection. Next, the ANP as a personnel selection tool is described. The method within the context of the Olympic Games televised sportscasters selection process is shown in the fourth section. This is followed by the conclusion.

## Personnel selection

Personnel selection is a procedure of identifying, weighting, and evaluating the candidates against job requirements. Organizations are clear about the qualities, the skills, the competencies, and the knowledge needed for candidates (Gibney and Shang, 2007). If hiring the wrong person, it is very difficult to rectify the consequences.

In the previous literature regarding the personnel selection, Jabri (1990) designed a two-stage program which is user-friendly, based on the concept of an analytic hierarchy process (AHP) to facilitate the personnel selecting process. Taylor *et al.* (1998) present the AHP to deal with the difficulties in evaluating candidates: rating candidates and generating the weights of criteria. They propose some practical problems in applying the AHP in their paper. The first problem is that large matrices had to be generated from input forms. The other one is the calculation of the eigenvectors, due to the large matrices. They suggest that the grouping procedure could reduce the number of comparisons. By this way, the decision makers would react well to the method. Additionally, the number of candidates being compared should be limited to eight or less. Chen and Cheng (2005) propose a new ranking method of fuzzy numbers; and a computer-based group decision support system is also developed. An example of information system personnel selection is shown to compare the proposed method with other fuzzy number ranking approach.

Jereb *et al.* (2005) employ a specialized expert system shell, DEXi, supporting the decision-making process in human resource management and a practical use is also illustrated to select the top manager. The benefits of DEXi are easy construction and user friendly. Seol and Sarkis (2005) apply AHP for internal auditor selection. Shih *et al.* (2005) combine many decision techniques to establish more effective and efficient analytic tools under a computerized environment for group decision making in the recruitment and selection process of human resource. Timor and Tüzüner (2006) employ the AHP to select the sales representative of pharmaceutical firms. They find that there are some differences between the preferences of national and international pharmaceutical companies in selecting sales representatives. Chang (2007) utilizes the ANP for selecting the hosts of the Taiwanese TV-shopping channels. Gibney and Shang (2007) use AHP in the dean selection procedure. They contrast the AHP recommendation with the top manager's choice. Finally, they express that the AHP is a good way to thoroughly approach the problem and save time in decision making.

As mentioned above, we find that the personnel selection process can be aided by some decision-making techniques. Except for program design, most of the contributors apply the AHP concept. The AHP, proposed by Saaty in the 1970s, is designed to structure a decision process in a scenario affected by independent factors (Saaty, 1980). In other words, the AHP method assumes that factors in the hierarchy are independent. From the literatures of personnel selection, no contributor had discussed the interrelationship among factors. In other words, they did not prove that their hierarchies would fit in with the assumption of the AHP.

In this paper, after discussions with the 18 senior executives, we find that the selection criteria are interrelated. For example, the expertise of a televised sportscaster would affect his comment ability. Unlike previous contributors who ignored the interdependence among factors, in this paper, the ANP, which captures the interdependence, appears to be one of the more feasible and accurate solutions for us to handle such problems. The ANP is described in the next section.

## Method: analytic network process

Recently, contributors apply the ANP in many managerial areas. Yurdakul (2003) use the ANP for measuring the long-term performance of a manufacturing firm. The disadvantages of the ANP are also described in this paper, such as more calculations and additional pairwise comparison matrices, as compared with the AHP. Nakagawa and Sekitani (2004) utilize the ANP for the supplier selection and supply-chain performance evaluation. Niemira and Saaty (2004) use the ANP for financial-crisis forecasting. They indicate that the ANP is a favorable approach for predicting the likelihood of event-driven cycles. Poonikom *et al.* (2004) apply the ANP for selecting those universities which offer an undergraduate program in engineering. In their opinion, the advantage of the ANP is its ability to link dynamic factors. Cheng and Li (2005) demonstrate the example to illustrate the steps of the ANP for project selection. Cheng *et al.* (2005) compare the findings from the AHP with those of the ANP for the shopping mall location selection. They express that the ANP is a more powerful tool under the interdependent relationships. Chung *et al.* (2005) construct a hierarchy based on interactive factors to select the product mix for efficient manufacturing in a semiconductor fabricator. As a result, the ANP is applied to incorporate experts' opinions to generate the priority index for every product mix. Ravi *et al.* (2005) combine the balanced scorecard (BSC) and the ANP to conduct reverse logistics operations for end-of-life (EOL) computers. Additionally, they describe the advantages and disadvantages of the ANP. As to the advantages, the ANP can include relevant criteria, more complex relationships, and qualitative and quantitative factors in the decision-making process. On the other hand, the ANP needs extensive discussion and brainstorming to identify the relevant attributes, to compute complex calculations and to generate more pairwise comparison matrices.

Agarwal *et al.* (2006) express that the ANP is a powerful decision-making technique for compounding the factors governing the supply-chain performance. Güngör (2006) use the ANP to evaluate the connection types from a design for disassembly (DFD) point of view. Leung *et al.* (2006) use the AHP and the ANP to facilitate the implementation of BSC. They point out that these two approaches can be tailor-made for specific situations and can be utilized to overcome the traditional problems of BSC implementation, such as the dependency relationship. Chang (2007) utilizes ANP for selecting the hosts of Taiwanese TV-shopping channels. Chang *et al.* (2007) compare the AHP with the ANP to identify the most appropriate digital video recorder system. They conclude that the ANP is more effective for providing a right solution. Cheng and Li (2007) compare the relative weights of the critical factors generated by the AHP with the ANP for strategic partnering, to ensure the utility of the ANP. They indicate that the ANP is more proper. Gencer and Gürpinar (2007) apply the ANP in an electronic firm for supplier selection. They also suggest that the user-friendly software would help managers apply the ANP more easily in decision making. Jharkharia and Shankar

(2007) employ the ANP for logistics service provider selection. They also indicate that the ANP not only enables the decision makers a better understanding of the complex relationships among factors, but also improve the reliability of decision. Wu and Lee (2007) point out that the ANP is quite a new method which can deal with the dependences. In their paper, they use the ANP for knowledge management strategies selection. Yüksel and Dağdeviren (2007) apply the ANP for SWOT analysis. That is because the AHP is not appropriate to take into account the dependency among the factors. Lin *et al.* (2008) utilize the ANP to find the most optimal dispatching method. They claim that the application of the ANP would improve the limitations of the AHP, which assumes the factors must be independent.

From the previous literature, we know that the ANP is widely applied in decision making. Compared with the AHP, the ANP is more accurate and feasible under interdependent situations. This is the reason we choose the ANP as our method for the Olympic Games televised sportscasters selection. The ANP (Saaty, 1996) is a comprehensive decision-making technique that captures the outcome of dependency between the factors. The AHP serves as a starting point of the ANP. Priorities are established in the same way that they are in the AHP using pairwise comparisons. The weight assigned to each perspective and criterion may be estimated from the data or subjectively by decision makers. It would be desirable to measure the consistency of the decision makers' judgment. AHP provides a measure through the consistency ratio (C.R.) which is an indicator of the reliability of the model. This ratio is designed in such a way that the values of the ratio exceeding 0.1 indicate inconsistent judgment.

## Application

The ANP approach is applied to solve the Olympic Games televised sportscasters selection problem. The ANP comprises four major steps (Saaty, 1996).

*Step 1. Model construction and problem structuring*

In the beginning, we interview the 44 executives and televised sportscasters from Taiwanese TV companies to collect the selecting criteria. The data for 44 respondents are shown in Table I.

The ANP needs more calculations and additional pairwise comparisons. The computing process would be complex if there are too many criteria (Yurdakul, 2003; Ravi *et al.*, 2005). As the result, we retain the 12 criteria that are mentioned more than 30 times by theses respondents. These 12 criteria are shown in Table II. Finally, according to the literature (Jereb *et al.*, 2005) and discussions with the 18 senior executives, we take these criteria into three perspectives to structure the hierarchy for the Olympic Games televised sportscasters selection, as shown in Figure 1. There are four accredited Taiwanese TV companies which could broadcast the 2008 Olympic Games. In this paper, we take one accredited company which was founded in 1971 to

**Table I.** The data of 44 respondents

| | Position | | | | |
|---|---|---|---|---|---|
| | General manager | Vice premier | Manager of news department | Manager of program department | Televised sportscaster |
| Number | 2 | 1 | 16 | 11 | 14 |

| Criteria | Definition |
|---|---|
| Description | Describe the game as it is taking place |
| Explanation | The ability to analyze. For example: why implement this tactic? |
| Expertise | Professional knowledge of sports |
| Comment | Comment the game, such as the performance of tactics |
| Order | The ability to finish orders |
| Cognition | The ability to resolve problem by oneself |
| Adaptation | Adapt to the external environment |
| Language | Familiar with foreign languages |
| Teamwork | Cooperate with others to finish work |
| Experience | Past experience about sports |
| Attitude | Conscientious toward work |
| Response | React appropriately to emergency |

**Table II.**
Description of the selection criteria

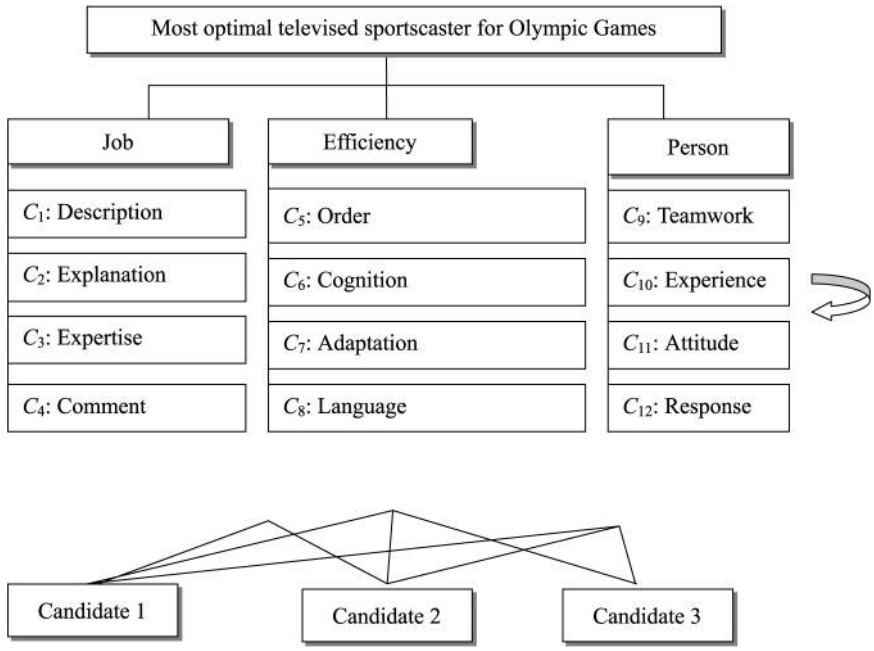


**Figure 1.**
Hierarchy for Olympic Games televised sportscasters selection

illustrate how the ANP applied for such selection problem. In this case, there are three candidates. The decision-making committee includes three managers of the news department.

*Step 2. Determine the perspectives and criteria weights*

In this step, the decision-making committee makes a series of pairwise comparisons to establish the relative importance of perspectives. In these comparisons, a 1-9 scale is

applied to compare the two perspectives. The pairwise comparison matrix and the development of each perspective priority weight are shown in Table III.

According the interdependency of criteria, we apply pairwise comparisons again to establish the criteria relationships within each perspective. The eigenvector of the observable pairwise comparison matrix provide the criteria weights at this level, which will be used in the supermatrix. With respect to description, for example, a pairwise comparison within the job perspective can be shown in Table IV. According to this way, we can derive every criterion weight to obtain the supermatrix.

*Step 3. Construct and solve the supermatrix*

The criteria weights derived from step 2 are used to get the column of the supermatrix as shown in Table V. Finally, the system solution is derived by multiplying the supermatrix of model variables by itself, which accounts for variable interaction, until the system's row values converge to the same value for each column of the matrix, as shown in Table VI.

| | Job $\lambda_{max} = 3.0556$ | Efficiency CR = 0.0421 | Person | Priority weight |
|---|---|---|---|---|
| Job | 1 | 2 | 1 | 0.4126 |
| Efficiency | 1/2 | 1 | 1 | 0.2599 |
| Person | 1 | 1 | 1 | 0.3275 |

**Table III.** The pairwise comparisons of perspectives

| | Explanation $\lambda_{max} = 3.0537$ | Expertise CR = 0.0407 | Comment | Priority weights |
|---|---|---|---|---|
| Explanation | 1 | 2 | 2 | 0.4934 |
| Expertise | 1/2 | 1 | 2 | 0.3108 |
| Comment | 1/2 | 1/2 | 1 | 0.1958 |

**Table IV.** The pairwise comparisons within job perspective with respect to description

| | $C_1$ | $C_2$ | $C_3$ | $C_4$ | $C_5$ | $C_6$ | $C_7$ | $C_8$ | $C_9$ | $C_{10}$ | $C_{11}$ | $C_{12}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $C_1$ | 0.0000 | 0.5936 | 0.1692 | 0.2402 | | | | | | | | |
| $C_2$ | 0.4934 | 0.0000 | 0.4434 | 0.2098 | | | | | | | | |
| $C_3$ | 0.3108 | 0.2493 | 0.0000 | 0.5499 | | | | | | | | |
| $C_4$ | 0.1958 | 0.1571 | 0.3874 | 0.0000 | | | | | | | | |
| $C_5$ | | | | | 0.0000 | 0.3333 | 0.4665 | 0.4434 | | | | |
| $C_6$ | | | | | 0.4934 | 0.0000 | 0.4330 | 0.3874 | | | | |
| $C_7$ | | | | | 0.3108 | 0.3333 | 0.0000 | 0.1692 | | | | |
| $C_8$ | | | | | 0.1958 | 0.3333 | 0.1005 | 0.0000 | | | | |
| $C_9$ | | | | | | | | | 0.0000 | 0.1692 | 0.4126 | 0.4161 |
| $C_{10}$ | | | | | | | | | 0.3669 | 0.0000 | 0.2599 | 0.4579 |
| $C_{11}$ | | | | | | | | | 0.4979 | 0.3874 | 0.0000 | 0.1260 |
| $C_{12}$ | | | | | | | | | 0.1352 | 0.4434 | 0.3275 | 0.0000 |

**Table V.** The supermatrix before convergence

**Table VI.**
The supermatrix after convergence

| | $C_1$ | $C_2$ | $C_3$ | $C_4$ | $C_5$ | $C_6$ | $C_7$ | $C_8$ | $C_9$ | $C_{10}$ | $C_{11}$ | $C_{12}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $C_1$ | 0.2599 | 0.2599 | 0.2599 | 0.2599 | | | | | | | | |
| $C_2$ | 0.2845 | 0.2845 | 0.2845 | 0.2845 | | | | | | | | |
| $C_3$ | 0.2595 | 0.2595 | 0.2595 | 0.2595 | | | | | | | | |
| $C_4$ | 0.1961 | 0.1961 | 0.1961 | 0.1961 | | | | | | | | |
| $C_5$ | | | | | 0.2872 | 0.2872 | 0.2872 | 0.2872 | | | | |
| $C_6$ | | | | | 0.3085 | 0.3085 | 0.3085 | 0.3085 | | | | |
| $C_7$ | | | | | 0.2228 | 0.2228 | 0.2228 | 0.2228 | | | | |
| $C_8$ | | | | | 0.1815 | 0.1815 | 0.1815 | 0.1815 | | | | |
| $C_9$ | | | | | | | | | 0.2472 | 0.2472 | 0.2472 | 0.2472 |
| $C_{10}$ | | | | | | | | | 0.2641 | 0.2641 | 0.2641 | 0.2641 |
| $C_{11}$ | | | | | | | | | 0.2548 | 0.2548 | 0.2548 | 0.2548 |
| $C_{12}$ | | | | | | | | | 0.2339 | 0.2339 | 0.2339 | 0.2339 |

*Step 4. Select the best alternative*

The weight of each alternative with respect to the criteria is shown in Table VII. According to Table III, Table VI and Table VII, we can aggregate the total weight of each alternative as shown in Table VIII.

Therefore, it is obvious that the ranking for the optimal 2008 Olympic Games televised sportscasters is Candidate 3, Candidate 1 and Candidate 2. We provide the result to the case company for consultation. Now, the case company would take the first two candidates as televised sportscasters for 2008 Olympic Games, according to our conclusion.

## Conclusion

The 29th Olympic Games were held in Beijing, China, from 8 to 24 August 2008. Around 20,000 accredited media brought the games to the world. While the 2008 Olympic Games came, with more TV sports programs, more people paid close attention. Selecting optimal televised sportscasters is important for those accredited media. Though selecting the televised sportscasters is crucial, few attempts have so far been given to this specific point.

**Table VII.**
The weight of each alternative with respect to criteria

| | Candidate 1 | Candidate 2 | Candidate 3 |
|---|---|---|---|
| $C_1$ | 0.3333 | 0.3333 | 0.3333 |
| $C_2$ | 0.5469 | 0.3445 | 0.1085 |
| $C_3$ | 0.3333 | 0.3333 | 0.3333 |
| $C_4$ | 0.2385 | 0.1365 | 0.6250 |
| $C_5$ | 0.3333 | 0.3333 | 0.3333 |
| $C_6$ | 0.3333 | 0.3333 | 0.3333 |
| $C_7$ | 0.5499 | 0.2402 | 0.2098 |
| $C_8$ | 0.2385 | 0.1365 | 0.6250 |
| $C_9$ | 0.4126 | 0.2599 | 0.3275 |
| $C_{10}$ | 0.1692 | 0.4434 | 0.3874 |
| $C_{11}$ | 0.3333 | 0.3333 | 0.3333 |
| $C_{12}$ | 0.1692 | 0.4434 | 0.3874 |

| | Weights from perspectives | Weights from supermatrix after convergence | Candidate 1 | Candidate 2 | Candidate 3 |
|---|---|---|---|---|---|
| $C_1$ | 0.4126 | 0.2599 | 0.0357 | 0.0357 | 0.0357 |
| $C_2$ | 0.4126 | 0.2845 | 0.0642 | 0.0404 | 0.0127 |
| $C_3$ | 0.4126 | 0.2595 | 0.0357 | 0.0357 | 0.0357 |
| $C_4$ | 0.4126 | 0.1961 | 0.0193 | 0.0110 | 0.0506 |
| $C_5$ | 0.2599 | 0.2872 | 0.0249 | 0.0249 | 0.0249 |
| $C_6$ | 0.2599 | 0.3085 | 0.0267 | 0.0267 | 0.0267 |
| $C_7$ | 0.2599 | 0.2228 | 0.0318 | 0.0139 | 0.0122 |
| $C_8$ | 0.2599 | 0.1815 | 0.0112 | 0.0064 | 0.0295 |
| $C_9$ | 0.3275 | 0.2472 | 0.0334 | 0.0210 | 0.0265 |
| $C_{10}$ | 0.3275 | 0.2641 | 0.0146 | 0.0383 | 0.0335 |
| $C_{11}$ | 0.3275 | 0.2548 | 0.0278 | 0.0278 | 0.0278 |
| $C_{12}$ | 0.3275 | 0.2339 | 0.0130 | 0.0340 | 0.0297 |
| | | Aggregated weights | 0.3384 | 0.3161 | 0.3455 |

**Table VIII.**
The aggregated weight of each alternative

In this paper, we interviewed 44 executives and televised sportscasters to collect the selection criteria. To avoid the complicated computing process from additional pairwise comparisons of the ANP, we retained the 12 criteria that are mentioned more than 30 times by theses respondents. The 12 criteria are:

(1) description;
(2) explanation;
(3) expertise;
(4) comment;
(5) order;
(6) cognition;
(7) adaptation;
(8) language;
(9) teamwork;
(10) experience;
(11) attitude; and
(12) response.

Finally, according to the literature and discussions with 18 senior executives, we took these important criteria into three perspectives to structure the hierarchy for the Olympic Games televised sportscasters selection.

After discussions with the 18 senior executives, we found that those criteria are interrelated. Unlike previous contributors who ignored the interdependence among criteria, a more feasible and accurate approach, the ANP, which captures the outcome of dependency among the criteria, was applied in this paper to handle such problems. The ANP extends the AHP to deal with dependence and utilizes the supermatrix. Priorities are established in the same way they are in the AHP, using pairwise comparisons.

We employed specialized Excel software to compute the data made by the decision makers to derive the optimal alternative. In this paper, we found that the consistency

ratio of each pairwise comparison was less than 0.1, which means that the reliability of data was accepted. Moreover, a practical application to select the Olympic Games televised sportscasters presented above is generic and also suitable to be exploited for Taiwanese TV companies.

The hierarchy proposed in this paper for the Olympic Games televised sportscasters selection considers 12 critical criteria. We suggest that future research studies can incorporate more criteria in order to conduct more accurate estimates. Additionally, the ANP ignores the fuzziness of executives' judgment during the decision-making process. We suggest that follow-up researchers could analyze this topic with the concept of fuzzy sets.

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