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THE ANALYTIC HIERARCHY PROCESS AS A SUPPORT FOR DECISION MAKING

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The first part of this text deals with a convention site selection as one of the most lucrative areas in the tourism industry. The second part gives a further description of a method for decision making – the analytic hierarchy process. The basic characteristics: hierarchy constructions and pairwise comparison on the given level of the hierarchy are allured. The third part offers an example of application. This example is solved using the Super – Decision software, which is developed as a computer support for the analytic hierarchy process. This indicates that the AHP approach is a useful tool to help support a decision of convention site selection.

Keywords: analytical hierarchy process (AHP), attributes, convention, site selection

INTRODUCTION

Tourism is one of the largest and fastest growing industries in the world, today. It is an increasingly important source of income, employment and wealth in many countries. However, its rapid expansion also has a detrimental and environmental (and socio-cultural) impact in many regions.

Tourism can be considered as one of the most remarkable socio-economic phenomena of the twentieth century. From an activity "enjoyed by only a small group of relatively well-off people" during the first half of the last century, it gradually became a mass phenomenon defined as "the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for vacation, business and other purposes not related to the exercise of an activity remunerated from within the place visited" during the post-World War II period, particularly from the 1970s onwards (UN 2001a, World Tourism Organization (WTO) 2000). The consequence of this phenomenon now reaches an increasingly large number of people throughout the world and can be considered as a vital dimension of global integration.

The convention sector is one of the fastest growing and most profitable areas of the tourism industry. Solving the most salient determinants in selecting or organizing a destination for conventions and monitoring following up on their success is an important research topic.

The convention industry is globally recognized for its valuable economic contribution to tourist destinations and its significant growth potential. The attractiveness of convention tourism has spurred destinations to proactively pursue the meetings and conventions market.

The convention site selection was considered by several authors. They denoted that the conventions may be hosted almost anywhere in the world. This fact is a result of an intensive competition among potential host destination sites. So, it is of great importance to those competing to understand the crucial factors affecting the convention site selection process. The past studies related to the convention site selection mainly focus on identifying important attributes for the desirable location in the process of selecting convention destinations. Professional judgment and factor analysis are the main methods used, but although these studies have helped to identify many factors, little has been learned about the relative importance of each one. This makes it difficult for destination managers to know where and how they should invest resources to enhance a destination's competitiveness.

Priority factors and attributes affecting the convention site decision making can be viewed as a complex multi-criteria decision-making (MCDM) problem. The convention site selection for every convention in particular is also multi-criteria decision making based on assemblage of those attributes. The analytic hierarchy process (AHP) as a new approach to the MCDM methods is offered as a possibility tool for the convention site selection to be understood as a decision-making process. This could further assist decision makers in allocating limited resources for strategic investment such as marketing, positioning, and so on. The AHP is a pairwise comparison procedure designed to capture relative judgments in a manner that ensures consistency. This article presents a decision-making model based on the AHP for the convention site selection. By using the proposed model, it is not only possible to provide a general understanding of decision factors, but also to determine the relative value significance of critical attributes affecting site selection.

Preview of the past studies on convention site selection is given in Section 2. Section 3 presents the AHP method in details. Section 4 describes the development of the AHP model, then reports and discusses the estimation results from the proposed AHP model. Finally, Section 5 provides some concluding remarks.

CONVENTION SITE SELECTION

Introduction

As stated in the introduction, tourism is a vital dimension of global integration today. Consequently, it is a way of developing the local environment, with all the welfare and complex problems which immerge. The convention industry is globally recognized for its valuable economic contribution to tourism destinations and its significant growth potential [9], [18]. The attractiveness of convention tourism has spurred destinations to proactively pursue the meetings and conventions market. Conventions may be hosted almost anywhere in the world, resulting in keen competition among potential host destination sites. Because of the growing competition, it is of great importance to those competing for business to understand the crucial factors affecting the convention site selection process. Comparing alternatives for every particular convention can then be considered.

Convention site selection was considered by authors like Crouch and Louviere [8], Clark and Mc Cleary [6], Kim and Kim [15], Chacko and Fenich [4] and many others.

Crouch and Louviere denoted in [8] that the conventions may be hosted almost anywhere in the world. This fact is a result of an intensive competition among potential host destination sites. Because of the growing intensity of competition, it is of great importance to those competing for business to understand the crucial factors affecting the convention site selection process. Past studies related to convention site selection mainly focus on identifying important attributes for the desirable location in selecting convention destinations. Professional judgment and factor analysis are the main methods used [6], [15]. Analysis of these studies helped in identifying many factors, but little has been learned about the relative importance of each one [4]. This makes it difficult for destination managers to know where and how they should invest resources to enhance a destination's competitiveness.

Prioritizing factors and attributes affecting convention site decision making can be viewed as a complex multi-criteria decision-making (MCDM) problem. The analytical hierarchy process (AHP), a widespread MCDM method, could facilitate understanding of the decision-making process and thus assist determining the relevant characteristics, such as membership characteristics, executive characteristics, past experience, association policies, environmental conditions, and convention objectives. Previous studies have contributed to identify many of this topic's selection factors ([2], [4], [6], [7], [10], [13], [15], [17], [19], [21]). In [7] it is found that most information on site selection from the past studies was based on anecdotal and experiential evidence and industry experience. So, although identification of important site selection factors are central in most publications little is known about the relative importance of each factor [4].

Convention site selection models

The convention site selection process is potentially very complex because of many variables that influence the decision [6].

Based on their comprehensive review of the site selection literature, the 5-step - conceptual model of the site selection process is proposed in [7] and it is identified by several categories of site selection factors, together with various antecedent conditions and competing sites influences. The five steps are:

convention preplanning,

site selection analysis and recommendations,

site selection decision,

convention held, and

post convention evaluation.

The factors affecting the site selection decision can be broadly divided into site-specific and association factors and there is a relationship between the importance of site selection factors and the structure of association.

The conceptual model of convention site selection proposed in [7] consists of eight primary factors along with several dimensions, resulting in the identification of 36 attributes that govern the choice of a convention site. The eight factors are:

4. accessibility (including cost, time, frequency, convenience, and barrier attributes),
5. local support (including local chapter, convention and visitors' bureau/convention center, and subsidies attributes),
6. extra conference opportunity (including entertainment, shopping, sightseeing, recreation, and professional opportunities attributes),
7. accommodation facilities (including capacity, cost, service, security, and availability attributes),
8. meeting facilities (including capacity, layout, cost, ambiance, security, availability, and experience attributes),
9. information (including reputation and marketing attributes),
10. site environment (including climate, setting, and infrastructure attributes), and
11. other criteria (such as risks, profitability, association promotion, and novelty attributes).

In [11] the convention site selection criteria are classified into two primary categories: the convention destination site's environment addressing a city's capacity to host an international convention, and the meeting facilities.

In [15] a summary review of the major criteria for convention site selection is provided concluding that meeting room facilities, service quality, restaurants, transportation, and attractiveness of the destination are the major attributes. Because the AHP and the choice model tap the nature of decision making in different ways, it is reasonable to expect results from the two methods to be useful, to complement and not to contradict each other.

ANALYTIC HIERARCHY PROCESS

Introduction

Establishing criteria for decision-making is a difficult and responsible task. In the past a single criterion optimization has usually been debated, that single criterion being – economic. Today we almost always deal with multi-criteria optimisation i.e. the decision making with respect to more than one criterion. For solving those problems various mathematical methods were developed [20]. In those methods the decision - maker has to define the structure preference for making a choice. The definition of the structure of preference is a separate problem within the multiple criteria optimisation.

Psychology shows that the human brain's reaction is one - dimensional, i.e. that the brain is capable of comparing elements only two by two; that is why it is so difficult to subjectively rank lots of objects simultaneously. The problem is becoming even worse if there is more than one criterion. It is believed that humans generally are not capable of making a choice from a set that is infinite.

As a completely new approach to solving decision making problems, mathematician *Saaty T (1980)* developed a new method which he named the Analytic Hierarchy Process (AHP).

The AHP approach is one of the more extensively used MCDM methods. The AHP has been applied to a wide variety of decisions and the human judgment process [16]. The approach is used to construct an evaluation model and has criterion weights. It integrates different measures into a single overall score for ranking decision alternatives. Applying it usually results in simplifying a multiple criterion problem by decomposing it into a multilevel hierarchical structure. Obtaining solutions in the AHP is not a statistical procedure, because it can help either a single decision maker or a decision group to solve an MCDM problem. Description of the basic Saaty's method is given in detail bellow, together with some of its extensions and the appropriate references.

The basic characteristic

As stated in the introduction, mathematician *Tomas Saaty* [22] developed, during 1980s, a completely new approach to solving decision - making problems, and named it *Analytic Hierarchy Process* (AHP). It is considered that the AHP method is mathematically well expounded. As a method for multiple criteria decision – making, AHP is closely related to the way an individual intuitively solves complex problems by decomposing them to more simple ones.

Applying the AHP procedure involves three basic steps:

1. decomposition, or the hierarchy construction;
2. comparative judgments, or defining and executing data collection to obtain pairwise comparison data on elements of the hierarchical structure; and
3. synthesis of priorities, or constructing an overall priority rating.

Decomposition into a hierarchy is based on previous studies and empirical experiences. Note that AHP demands that the problem be structured by the participants in the decision-making process, although it is not essential that all participants in the planning process agree on every component of the problem [23].

In addition, it is important that all essential elements relevant to the problem are covered within the hierarchy structure. In its most typical form, a hierarchy is very often structured from the top (objectives from the managerial standpoint) through the intermediate level (criteria and sub-criteria that subsequent levels depend on), and on to the lowest level (which is usually a list of alternatives). AHP uses information from the literature and empirical experiences to define a general structure, and implements pairwise comparison information from decision makers to model decision making.

Once a hierarchy has been developed, it can be moved to data collection, thus having the pairwise comparisons needed to determine the relative importance of the elements in each level. The decision makers begin the prioritization procedure to determine the relative importance of the elements in each level.

The criteria and sub-criteria are not equally important to the decision at each level of the hierarchy, and each alternative rate differently in each criterion. AHP can provide an analytical process that is able to combine and consolidate the evaluations of the alternatives and criteria by either an individual or a group involved in the decision-making task.

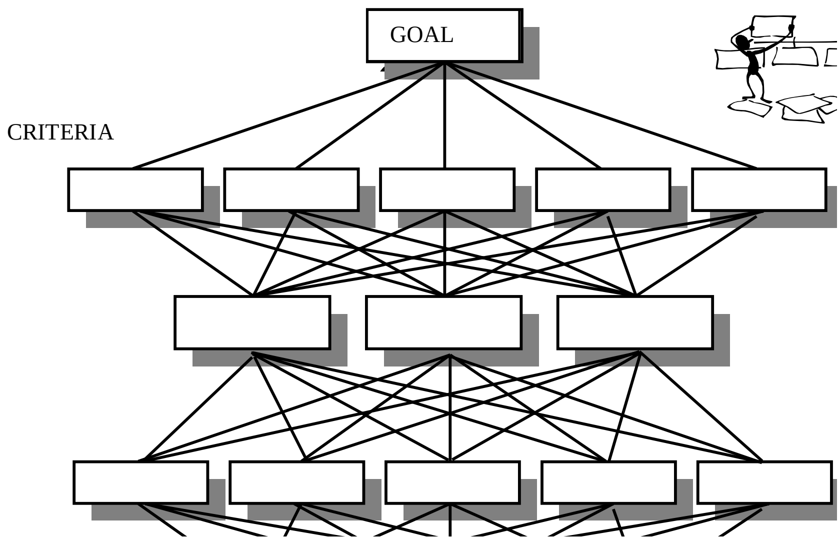

Figure 1. Abstract Representation of a decision Hierarchy

It is noted that two elements being compared at a given time greatly reduce the conceptual complexity of an analysis. This simplification involves assumptions that are considered reasonable. Given a pairwise comparison, the analysis involves three tasks:

4. developing a comparison matrix at each level of the hierarchy starting from the second level and working down,
5. computing the relative weights for each element of the hierarchy, and
6. evaluating the consistency ratio to check the consistency of the judgment.

AHP handles the problem of multiple criteria decision - making as a hierarchy of elements that are important for reaching a decision. The goal is on the top of that hierarchy, the criteria are on the level below it, and the alternatives are at the bottom (figure 1).

Since the psychological experiments (Miller, 1956.) indicated that an individual cannot simultaneously compare more than seven elements (plus or minus 2 elements), Saaty defined a scale of pairwise comparisons with values ranging 1 to 9, with step 1. Saaty's scale is considered to be a standard for AHP (although there are other scales - linear, potential, exponential etc). The hierarchy does not need to be complete, any given middle-level element is not necessarily a criterion for all the elements below it.

Each level can represent a different aspect of the problem. The decision-maker can add or leave out some levels and elements in order to clear out the priorities or to concentrate on the specific segment of the problem. The general criteria can appear at higher levels of the hierarchy and the more specific ones can be unfolded deeper down.

This method elicits preferences through pairwise comparisons in which the decision maker considers the relative importance of two factors at a time with respect to a common higher-level criterion evaluating relative weights. For each comparison the decision maker indicates the intensity of preference of one factor over another as a point estimate on an appropriate scale. Pairwise comparisons (on the same hierarchy level) are semantic or numeric in nature as defined by Saaty's scale in table 1. A final aggregation of local weights is preformed to rank and choose alternative.

Table 1: Conventional and fuzzy scales

$$S = \left\{ \frac{1}{9}, \frac{1}{8}, \frac{1}{7}, \frac{1}{6}, \frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, 1, 2, 3, 4, 5, 6, 7, 8, 9 \right\}$$

Conventional scales	Definition	Fuzzy scale
1	Equally preferred	$\tilde{1} = (1-\delta, 1, 1+\delta)$
3	Weakly preferred	$\tilde{3} = (3-\delta, 3, 3+\delta)$
5	Strongly preferred	$\tilde{5} = (5-\delta, 5, 5+\delta)$
7	Very strongly preferred	$\tilde{7} = (7-\delta, 7, 7+\delta)$
9	Absolutely preferred	$\tilde{9} = (9-\delta, 9, 9+\delta)$
2,4,6,8	Intermediate values	$\tilde{2}, \tilde{4}, \tilde{6}, \tilde{8}$

For solving in additional problems caused by qualitative elements that are difficult to include into normative methods, versions of the AHP are developed in interval [1] and fuzzy environments ([3], [12], [24]). The „fuzzyfication” of the basic Saaty's method is performed using triangular fuzzy numbers (as they are more simple than trapezoidal) and fuzzy arithmetic. A very good preview of techniques in AHP in fuzzy triangular case can be seeing in [24] for example, and in [14] a fuzzy case application is offered.

The complete process is fuzzyficated: from the Saaty's scale (see columns 1 and 3 in table 1) and pairwise comparisons to all the operations with matrixes. Various fuzzy versions of AHP differ in methods of fuzzyfication of the scales and the method of de-fuzzyfication of the results.

De-fuzzyfication is performed using the methods of centroid, different types of geometric comparisons of triangular fuzzy numbers, or various methods of integration combined with **α** – scalarisation and using **λ** – index of optimism of the decision-maker [15].

Eigenvector method and the consistency

Under the semantic preference from the second column of the table 1 the appropriate numerical values from the first column could be written in square matrix of comparison $A = (a_{ij}) \in R^{n \times n}$, whose elements are taking one of possible 17 values in the table 1. If we denote the priority vector as $w = (w_1 \quad w_2 \quad w_3 \quad \ldots \quad w_n)^T$, than the next formula holds:

Note that if the element E_i preferred to the element E_j totally a_{ij} times in total, it can

$$A = \begin{bmatrix} 1 & a_{12} & . & . & . & a_{1n} \\ \frac{1}{a_{12}} & 1 & . & . & . & a_{2n} \\ . & . & . & . & . & . \\ . & . & . & . & . & . \\ . & . & . & . & . & . \\ \frac{1}{a_{1n}} & \frac{1}{a_{2n}} & . & . & . & 1 \end{bmatrix} = \begin{bmatrix} \frac{w_1}{w_1} & \frac{w_1}{w_2} & . & . & . & \frac{w_1}{w_n} \\ \frac{w_2}{w_1} & \frac{w_2}{w_2} & . & . & . & \frac{w_2}{w_n} \\ . & . & . & . & . & . \\ . & . & . & . & . & . \\ . & . & . & . & . & . \\ \frac{w_n}{w_1} & \frac{w_n}{w_2} & . & . & . & \frac{w_n}{w_n} \end{bmatrix} \quad (1)$$

be expected that the element E_j will be preferred to the element E_i $\frac{1}{a_{ij}}$ times in total. Since $a_{ji} = \frac{1}{a_{ij}}$ and $a_{ii} = 1$ holds for all $i, j \in \{1,2,...,n\}$, matrix ***A*** is positive and the elements from its „upper triangular sub-matrix" are reciprocal to those from its „lower triangular sub-matrix". The following equation could be constructed:

$$Aw = nw \qquad (2)$$

The solution of this equation is the right eigenvector of the matrix A, consists of positive elements of the matrix A and it is unique, disregarding possible multiplicative constants. It could be made as the additive normalization in a way to unification the eigenvector. If all the elements of the matrix A are known, the evaluation system can be established and the solution is the normalized version of any column of matrix A.

In practice, the matrix A is very often inconsistent, in fact almost always; in this case the solution of the following equation:

$$A \cdot w = \lambda_{max} \cdot w \qquad (3)$$

is vector

$$w = \lim_{k \to \infty} \frac{A^k e}{e^T A^k e}, \; e = (1 \quad 1 \quad ... \quad 1)^T \quad (4)$$

The matrix $W = \left(\frac{w_i}{w_j} \right), \; i, j = 1,2,...,n$ is the consistent approximation of the matrix A. It means that the expert evaluations are given with a small account error. The appropriate eigenvalue λ_{max} is not n, furthermore it holds that $\lambda_{max} \geq n$ (equality stands in case of consistency). Deviation of expert evaluation for consistent approximation is expressed by $\lambda_{max} \geq n$. *Saaty* suggests the following as a measure of inconsistency:

$$CI = \frac{\lambda_{\max} - n}{n - 1} \qquad (5)$$

CI is called the consistency index. *Saaty* compares this value with random index, denoted with RI (see table2) an average CI of a large number of randomly generated reciprocal matrix of the same order. The calculated vector w is accepted if the ratio $CI : RI$ is les than or equal to 0.1, otherwise the preferences are considered not to be consistent enough to serve as a basis for decision- making.

Table 2: Random index (RI) for matrices of order (n) 1 to 15

N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

Software support

Several computer programs are developed as a support for analytic hierarchy process. One of them, the Super-Decision, is developed in 2003 by William J. Adams from Embry Riddle Aeronautic University, Daytona Beach from Florida and Rosanne W. Saaty from Creative Decisions Foundation from Pittsburgh.

A hierarchical decision model has a goal, criteria that are evaluated for their importance to the goal and alternatives that are evaluated for the level of preferences in respect to the each criterion

A hierarchical decision model has a goal, criteria that are evaluated for their importance to the goal, and alternatives that are evaluated for their importance with respect to the each criterion. The goal, the criteria and the alternatives are all elements in the decision problem, or nodes in the model. A *Super-Decisions* model consists of clusters of elements (or nodes), rather than elements (or nodes) arranged in levels. The simplest hierarchical model has a goal cluster containing the goal element, a criteria cluster containing the criteria elements and an alternatives cluster containing the alternative elements as shown in the Error! Reference source not found.. It is necessary to input names for every level particularly, and there is possibility to describe each of them. When the clusters are connected by a line it means the nodes in them are connected. The pairwise comparisons are being done after that. Several methods of prioritizing are offered. The checking consistency as a tool is offered, too.

A few types of models are offered, and they could be appropriate for usage in those forms, or could be a little modified. New models can be created easily. The set of the offered models consist of application examples in car industry, education, fishery resource allocation, water reservoirs, national missile defense etc. The new idea to applying this software is appeared as a result. For the application purposes, it would be interesting to consider the case of convention site selection as follows.

CASE APPLICATION

Development the evaluation hierarchy

The convention site selection evaluated by five factors divided into seventeen attributes applied in Taiwan is chosen as **a**n application case in our environment for this paper. The case aims to evaluate how academic professors and directors of tourist agencies prioritize the elements affecting convention site selection. A simple four-level hierarchical structure is constructed first, and the fourth level consists of destinations for convention. Of course, initial determination of the number of levels and variables is a research problem and it can be various in every particular case. Based on reviewing the literature on convention site selection and opinions of a smaller group of academic professors and tourist agency's directors a proposed hierarchy is constructed as shown in the figure 2 (basic levels without alternatives).

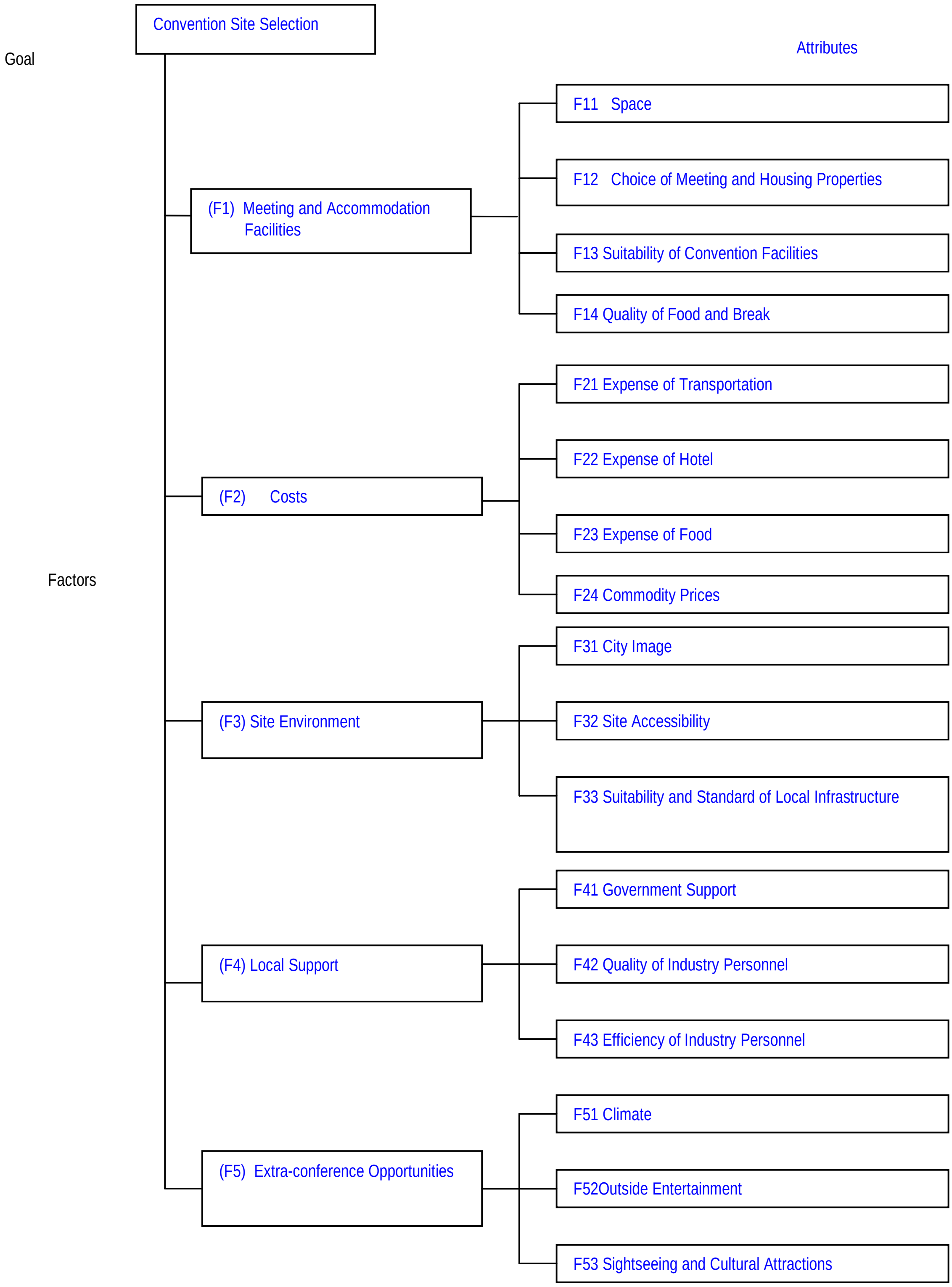

Figure 2. The hierarchy of convention site selection

The highest level of the hierarchy is the overall goal: to construct an evaluation structure for convention site selection with weights corresponding to criteria. Under the overall goal, the second level represents the criteria (i.e., factors) affecting convention site selection, including meeting and accommodation facilities, costs, site environment, local support, and extra conference opportunities. Various sets of sub-criteria (i.e., attributes) associated with each factor in the second level are linked to the third level. The meeting and accommodation facilities factor consists of four attributes (space, variety of meeting and accommodation properties, suitability of convention facilities, and quality of food and beverage). The costs factor is subdivided into four attributes (transport expense, accommodation expense, food and beverage expense, and commodity prices). The site environment factor is made of three attributes (city image, site accessibility, and suitability and quality of local infrastructure). The local support factor includes three attributes (government support, quality of convention personnel, and efficiency of convention personnel). Finally, the extra-conference opportunities factor includes three attributes (climate, entertainment opportunities, and sightseeing and cultural attractions).

Finally, on the bottom of this hierarchy some destinations are offered, and it can be seen in figure 3.

Prioritization procedure

Once the hierarchy structure of the convention site selection has been constructed, the prioritization procedure begins to determine the relative importance of the elements on each level. A questionnaire survey was designed for academic professors and directors of tourist agencies in order to collect the data of pairwise comparisons. The respondents are asked to make judgments about the relative importance of the element with respect to the overall goal of selecting the convention site. For example, when asked, “With respect to meeting and accommodation facilities with costs, which is more important?” the verbal judgment from equal importance to extreme importance was then translated into the corresponding number in the relative importance scale in the table 3.

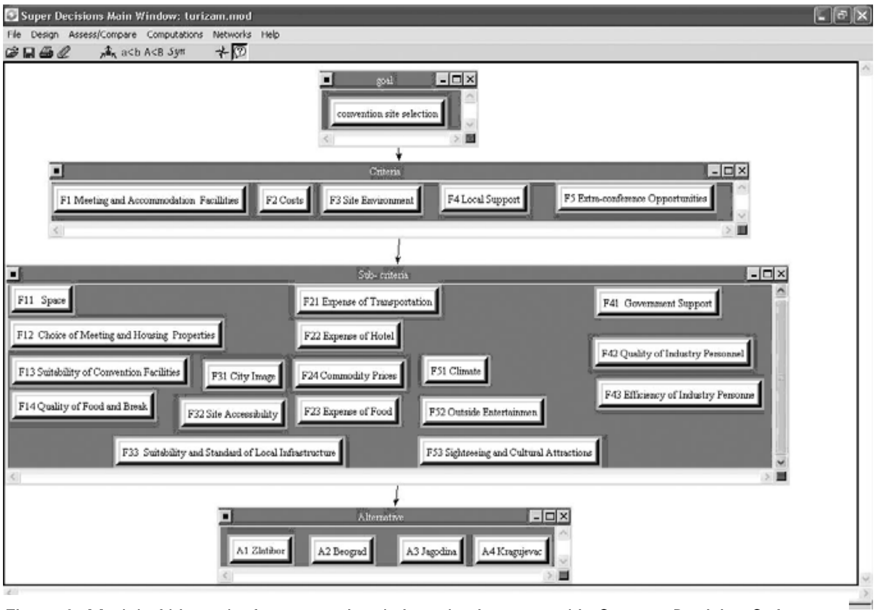

Figure 3: Model of hierarchy for conventional site selection created in Super – Decision Software

Table 3: Nine-point intensity of relative importance scale

Intensity of Relative Importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to objective 1.
3	Moderate importance of one over another	Experience and judgment slightly favor one activity over another.
5	Essential or strong importance	Experience and judgment strongly favor one activity over another.
7	Demonstrated importance	An activity is strongly favored, and its dominance is demonstrated in practice.
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation.
2, 4, 6, 8	Intermediate values between the two adjacent judgments	When a compromise is needed

After doing all pairwise comparisons on the level 2, the pairwise comparison matrix is constructed. Similarly, the pairwise comparison procedure is then applied to all factors with respect to the second level. At the end four destinations are offered: Zlatibor, Beograd, Jagodina and Kragujevac. The dates put in the Super-Decision give the result which is shown in the figure 4.

It is evaluated that the attributes of suitability of convention facilities (0.079616%), commodity prices (0.023021%), suitability and quality of local infrastructure (0.04931%), government support (0.182667%), and sightseeing and cultural attractions (0.313266%) show the highest importance with respect to each factor in the order of meeting and accommodation facilities, costs, site environment, local support, and extra conference opportunities, respectively. The derived weights for every factor in respect to the goal are: meeting and accommodation facilities (0.142%), costs (0.038%), site environment (0.072%), local support (0.267%), and extra conference opportunities (0.481%).

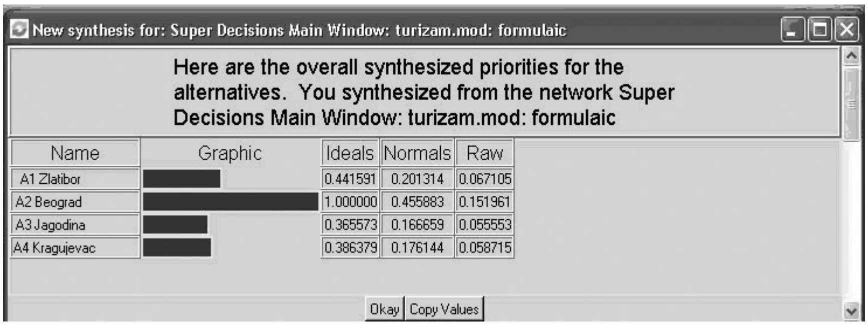

Figure 4: Priorities of proposed model created in Super – Decision Software

CONCLUSIONS

Selecting a suitable and attractive site destination is essential for creating a successful convention for associated decision makers and meeting planners. Although the literature has contributed to identifying many of the selection factors, little is known about the relative importance of each factor.

Viewing the selection of a convention site as a MCDM problem, the relative importance of each affecting factor can be effectively obtained using the MCDM approaches. This article examines proposal of the AHP model for decision makers to evaluate convention site selection in every particular case.

In addition to an application to destination competitiveness, this article shows the suitability of the AHP model to be applied in the meeting, incentive, convention, and exposition (MICE) industry for site selection by allowing decision makers to structure their unique problems into priority weights, which can reflect their own priority considerations.

The main conclusions of this article are: first, the proposed evaluation model by this study demonstrates the sensitivity and efficiency in evaluating convention site selection, and second, the site factors extra – conference opportunities and local support reveal their dominating importance. Although it contributes to the introduction of a convention site selection model, the result is limited to specific academic related associations.

In spite of the fact that a smaller group of specialists answered the questionnaire, this example should be considered as illustrative one, and that is why the given results can not be quantified in any different way.

It is very important that one or more comparision judgment within considering problem can be changed in the Super-Decision software , and the new ranking immediately can be seen according that. This makes the programm ideale for applaying as a tool in decision making problems

Further studies with respect to regional characteristics and types of conventions would be very interesting to analyze for model generalization purposes.

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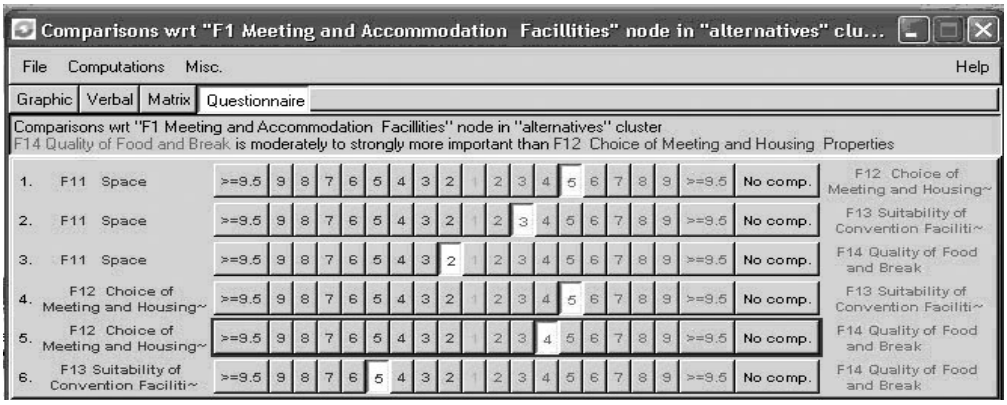
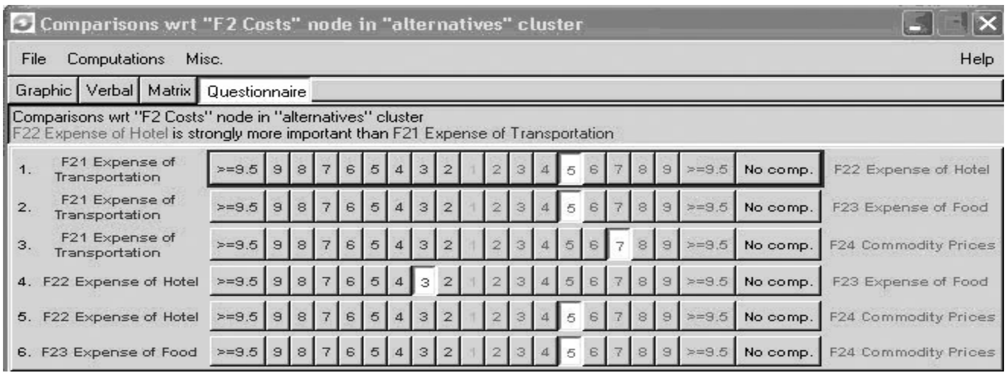
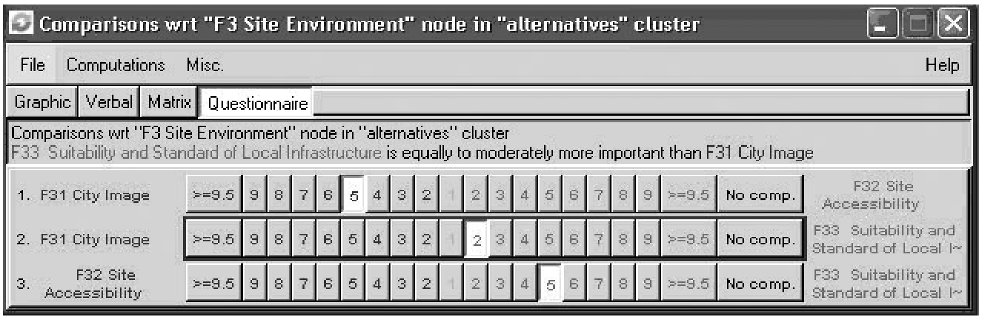
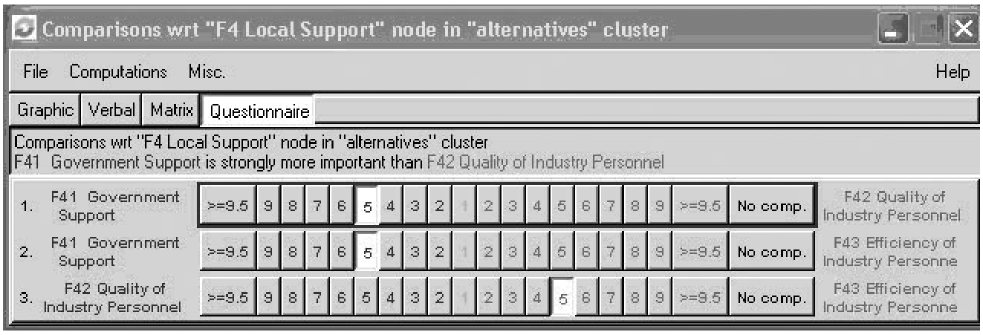
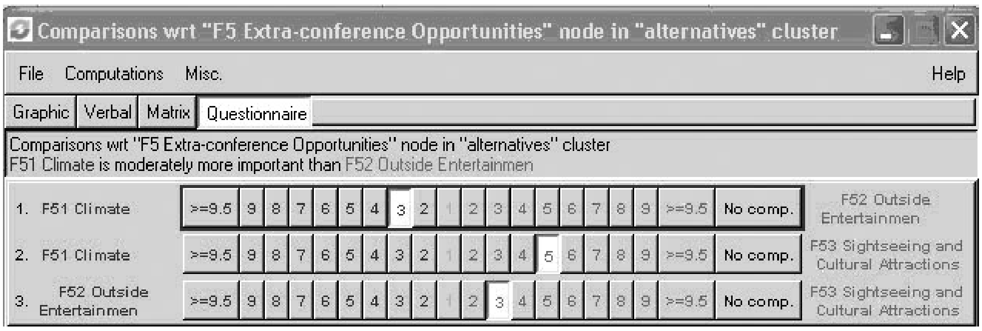
APPENDIX

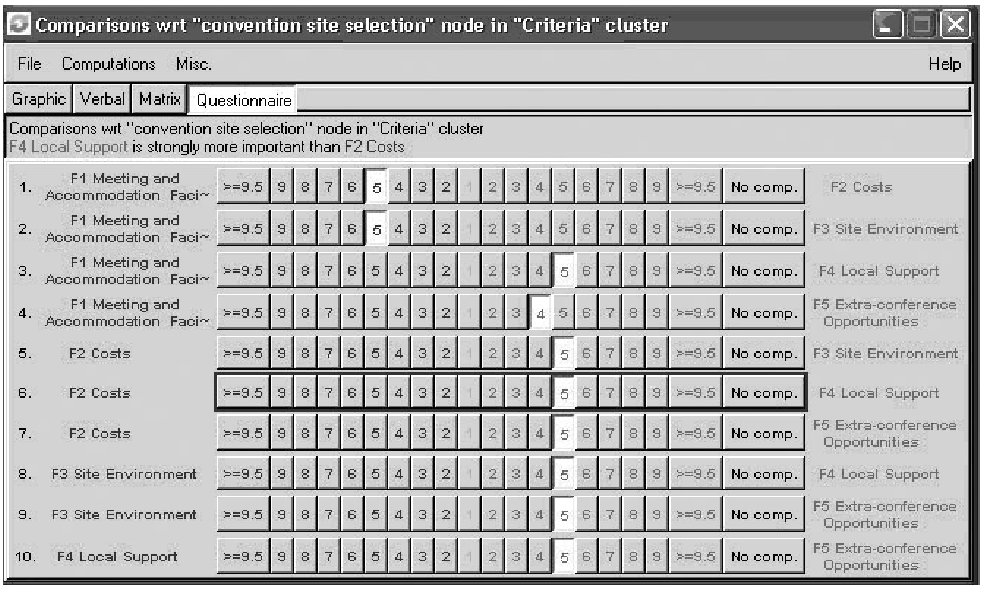


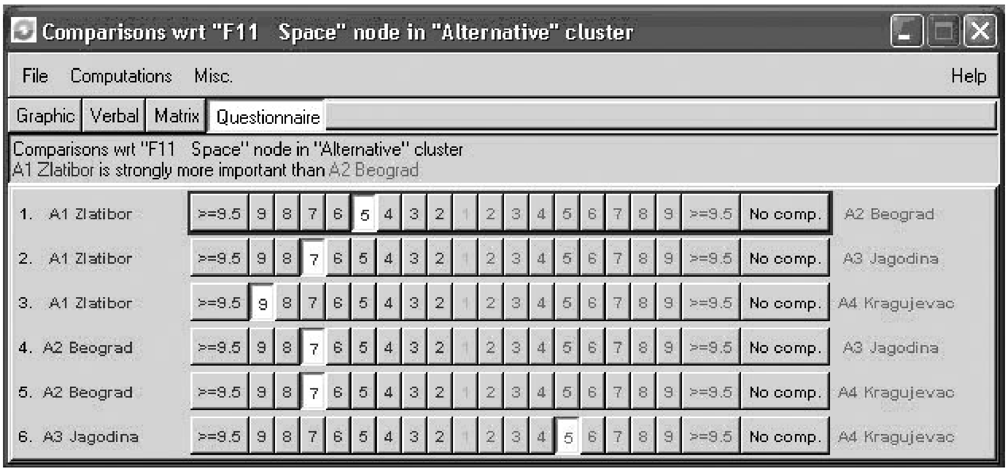


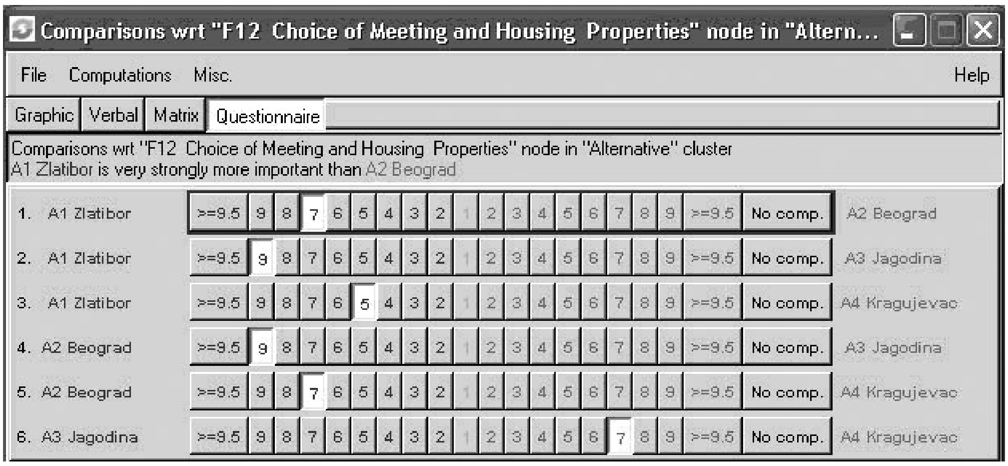

Comparisons wrt "F3 Site Environment" node in "alternatives" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F3 Site Environment" node in "alternatives" cluster
F33 Suitability and Standard of Local Infrastructure is equally to moderately more important than F31 City Image
1. F31 City Image
F32 Site Accessibility
2. F31 City Image
F33 Suitability and Standard of Local I~
3. F32 Site Accessibility
F33 Suitability and Standard of Local I~
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.

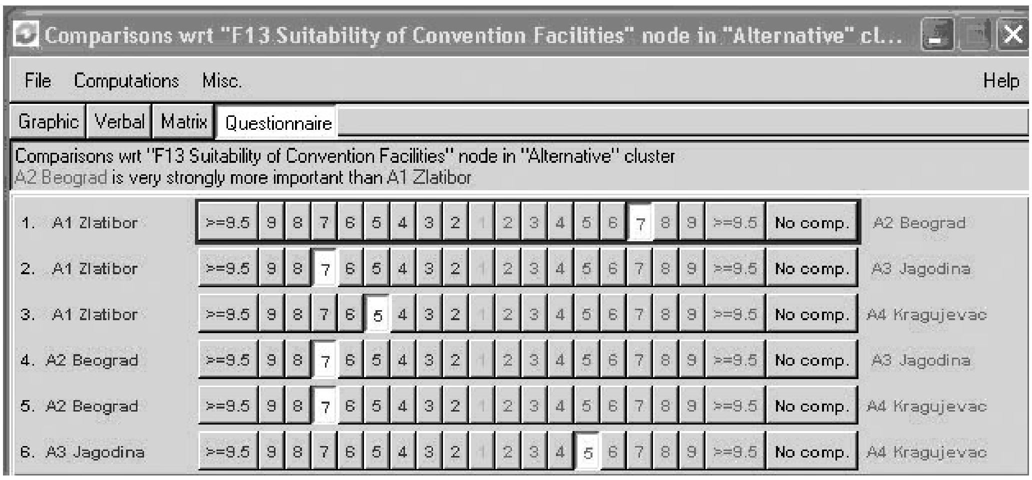

Comparisons wrt "F4 Local Support" node in "alternatives" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F4 Local Support" node in "alternatives" cluster
F41 Government Support is strongly more important than F42 Quality of Industry Personnel
1. F41 Government Support
F42 Quality of Industry Personnel
2. F41 Government Support
F43 Efficiency of Industry Personne
3. F42 Quality of Industry Personnel
F43 Efficiency of Industry Personne
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.

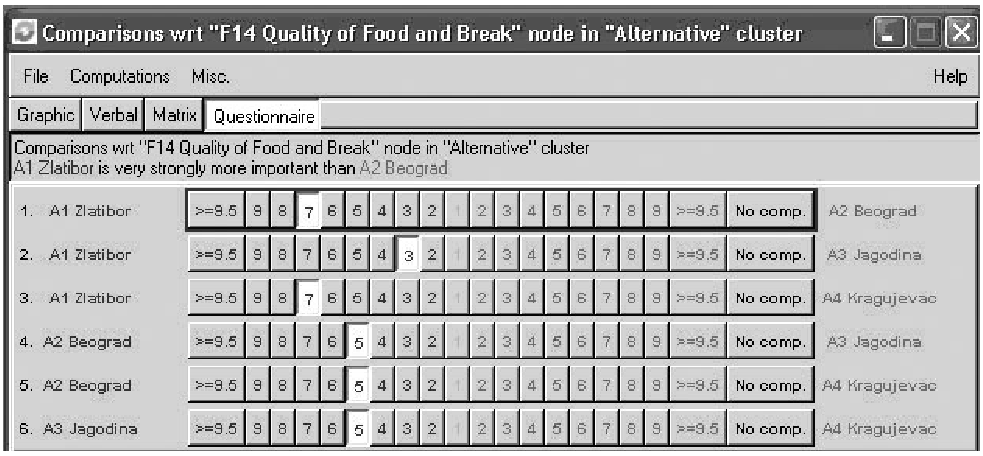

Comparisons wrt "F5 Extra-conference Opportunities" node in "alternatives" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F5 Extra-conference Opportunities" node in "alternatives" cluster
F51 Climate is moderately more important than F52 Outside Entertainmen
1. F51 Climate
F52 Outside Entertainmen
2. F51 Climate
F53 Sightseeing and Cultural Attractions
3. F52 Outside Entertainmen
F53 Sightseeing and Cultural Attractions
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.

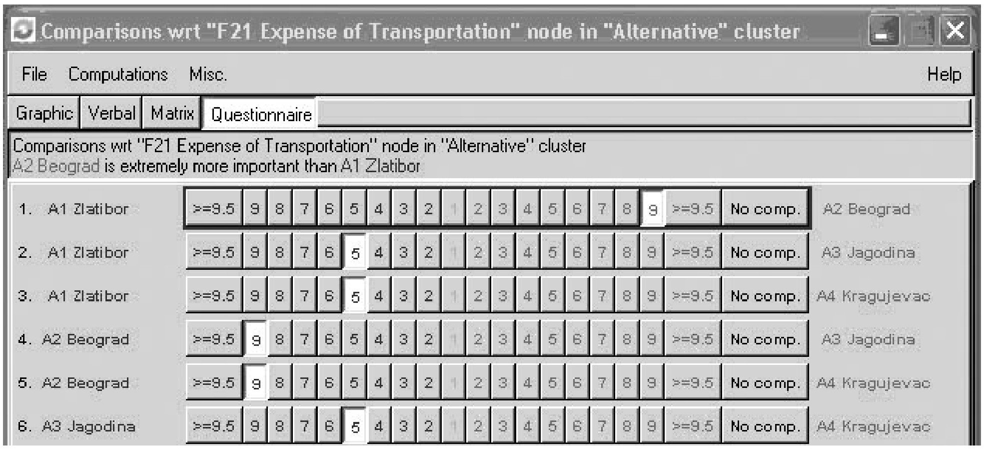

Comparisons wrt "convention site selection" node in "Criteria" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "convention site selection" node in "Criteria" cluster
F4 Local Support is strongly more important than F2 Costs
1. F1 Meeting and Accommodation Faci~
F2 Costs
2. F1 Meeting and Accommodation Faci~
F3 Site Environment
3. F1 Meeting and Accommodation Faci~
F4 Local Support
4. F1 Meeting and Accommodation Faci~
F5 Extra-conference Opportunities
5. F2 Costs
F3 Site Environment
6. F2 Costs
F4 Local Support
7. F2 Costs
F5 Extra-conference Opportunities
8. F3 Site Environment
F4 Local Support
9. F3 Site Environment
F5 Extra-conference Opportunities
10. F4 Local Support
F5 Extra-conference Opportunities
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.

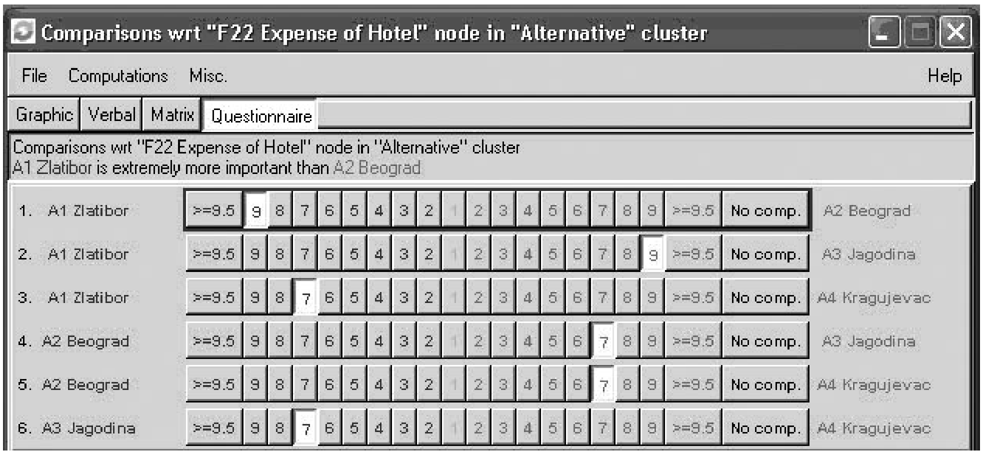

Comparisons wrt "F11 Space" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F11 Space" node in "Alternative" cluster
A1 Zlatibor is strongly more important than A2 Beograd
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

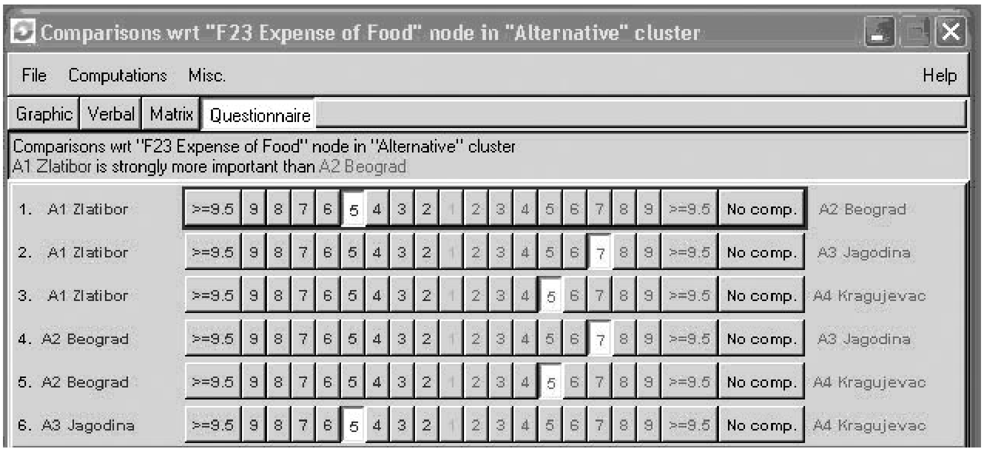

Comparisons wrt "F12 Choice of Meeting and Housing Properties" node in "Altern...
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F12 Choice of Meeting and Housing Properties" node in "Alternative" cluster
A1 Zlatibor is very strongly more important than A2 Beograd
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

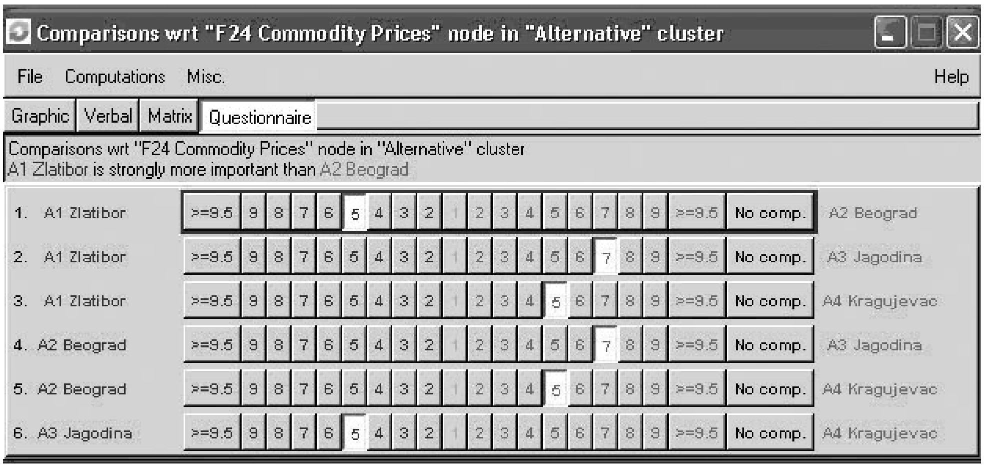

Comparisons wrt "F13 Suitability of Convention Facilities" node in "Alternative" cl...
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F13 Suitability of Convention Facilities" node in "Alternative" cluster
A2 Beograd is very strongly more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

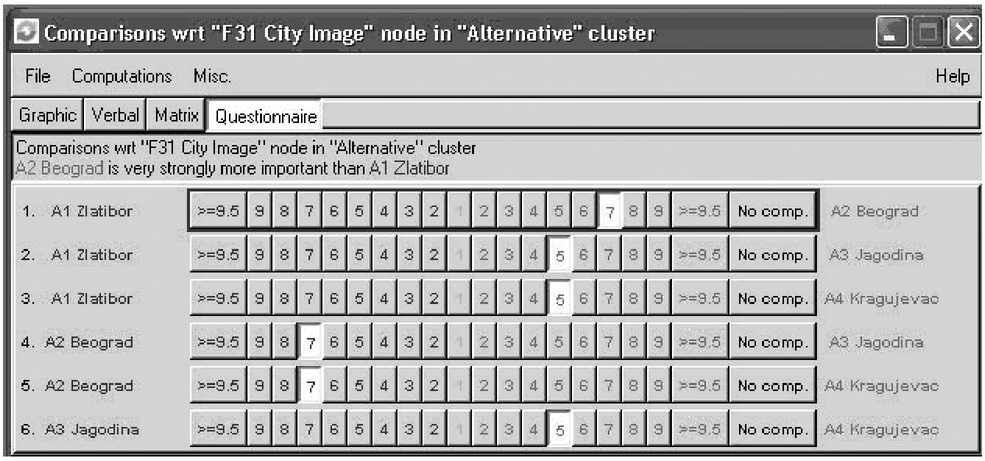

Comparisons wrt "F14 Quality of Food and Break" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F14 Quality of Food and Break" node in "Alternative" cluster
A1 Zlatibor is very strongly more important than A2 Beograd
1. A1 Zlatibor 7 A2 Beograd
2. A1 Zlatibor 3 A3 Jagodina
3. A1 Zlatibor 7 A4 Kragujevac
4. A2 Beograd 5 A3 Jagodina
5. A2 Beograd 5 A4 Kragujevac
6. A3 Jagodina 5 A4 Kragujevac

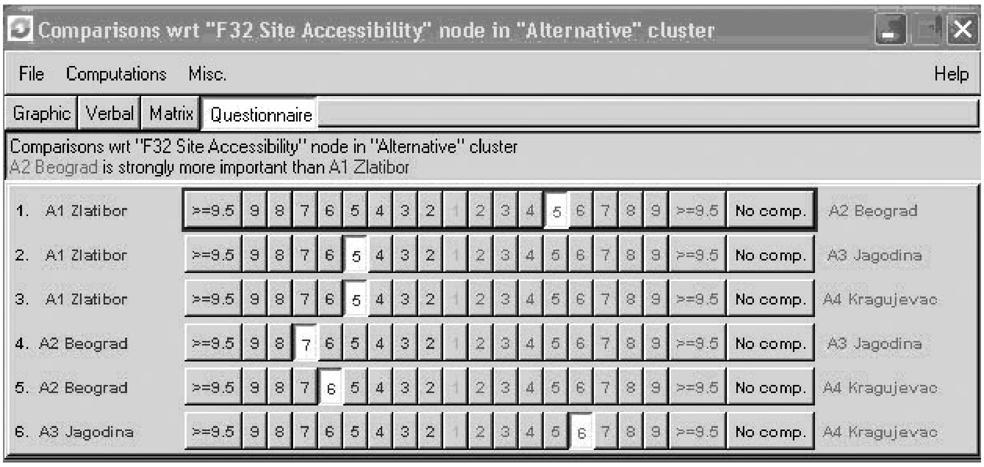

Comparisons wrt "F21 Expense of Transportation" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F21 Expense of Transportation" node in "Alternative" cluster
A2 Beograd is extremely more important than A1 Zlatibor
1. A1 Zlatibor 9 A2 Beograd
2. A1 Zlatibor 5 A3 Jagodina
3. A1 Zlatibor 5 A4 Kragujevac
4. A2 Beograd 9 A3 Jagodina
5. A2 Beograd 9 A4 Kragujevac
6. A3 Jagodina 5 A4 Kragujevac

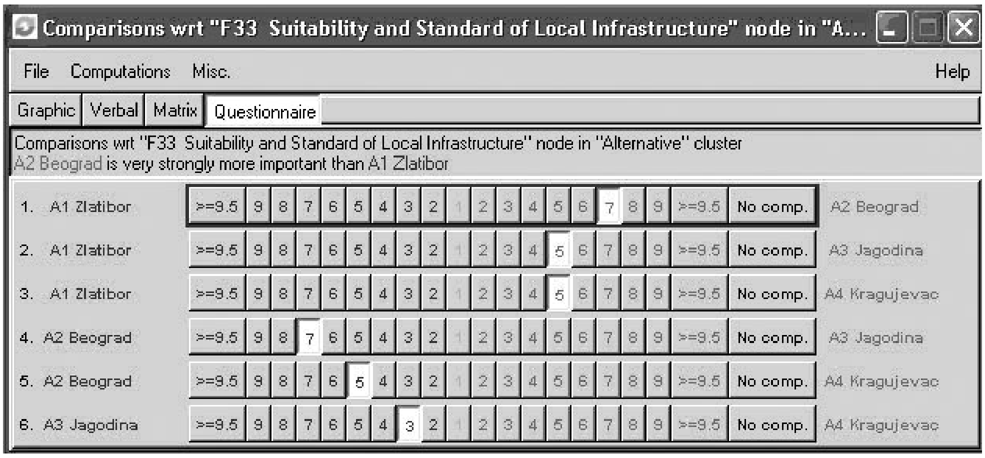

Comparisons wrt "F22 Expense of Hotel" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F22 Expense of Hotel" node in "Alternative" cluster
A1 Zlatibor is extremely more important than A2 Beograd
1. A1 Zlatibor 9 A2 Beograd
2. A1 Zlatibor 9 A3 Jagodina
3. A1 Zlatibor 7 A4 Kragujevac
4. A2 Beograd 7 A3 Jagodina
5. A2 Beograd 7 A4 Kragujevac
6. A3 Jagodina 7 A4 Kragujevac

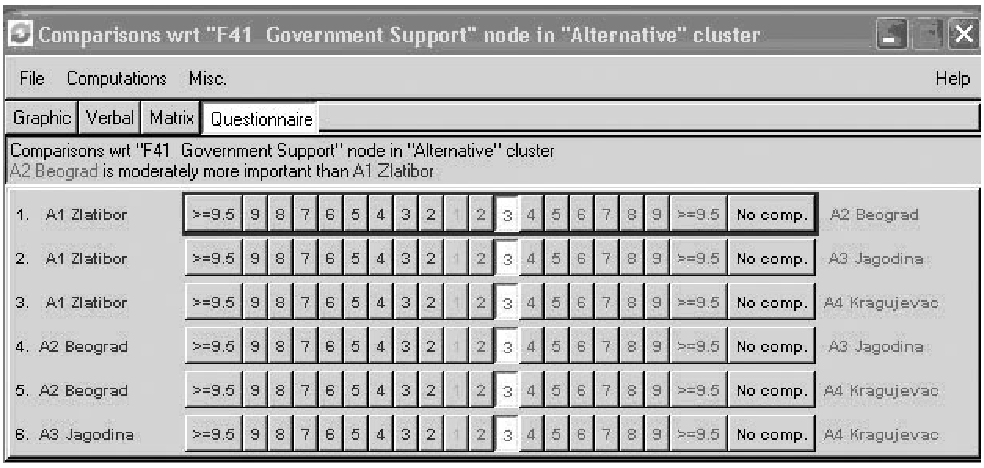

Comparisons wrt "F23 Expense of Food" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F23 Expense of Food" node in "Alternative" cluster
A1 Zlatibor is strongly more important than A2 Beograd
1. A1 Zlatibor — A2 Beograd
2. A1 Zlatibor — A3 Jagodina
3. A1 Zlatibor — A4 Kragujevac
4. A2 Beograd — A3 Jagodina
5. A2 Beograd — A4 Kragujevac
6. A3 Jagodina — A4 Kragujevac

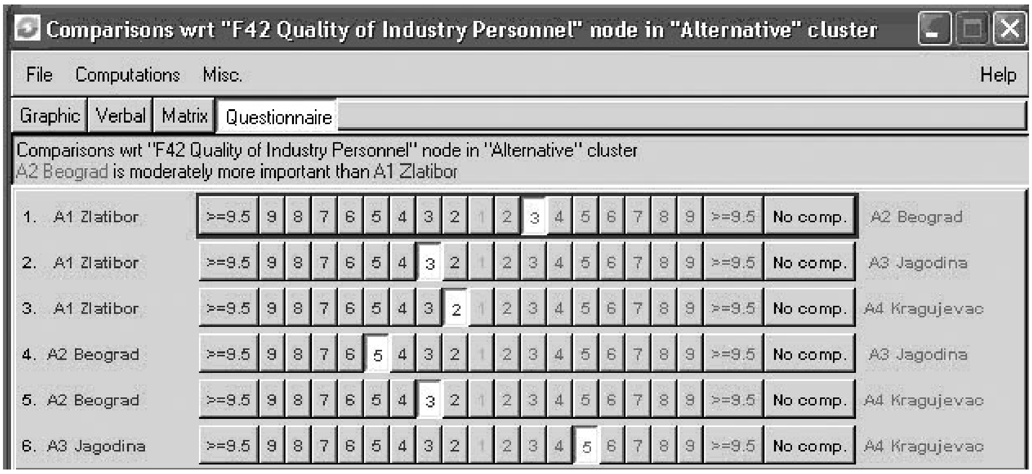

Comparisons wrt "F24 Commodity Prices" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F24 Commodity Prices" node in "Alternative" cluster
A1 Zlatibor is strongly more important than A2 Beograd
1. A1 Zlatibor — A2 Beograd
2. A1 Zlatibor — A3 Jagodina
3. A1 Zlatibor — A4 Kragujevac
4. A2 Beograd — A3 Jagodina
5. A2 Beograd — A4 Kragujevac
6. A3 Jagodina — A4 Kragujevac

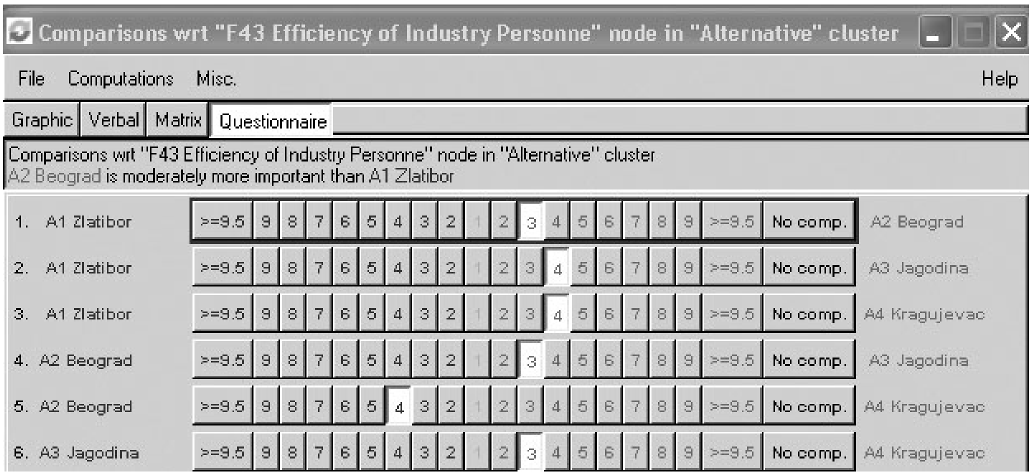

Comparisons wrt "F31 City Image" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F31 City Image" node in "Alternative" cluster
A2 Beograd is very strongly more important than A1 Zlatibor
1. A1 Zlatibor — A2 Beograd
2. A1 Zlatibor — A3 Jagodina
3. A1 Zlatibor — A4 Kragujevac
4. A2 Beograd — A3 Jagodina
5. A2 Beograd — A4 Kragujevac
6. A3 Jagodina — A4 Kragujevac

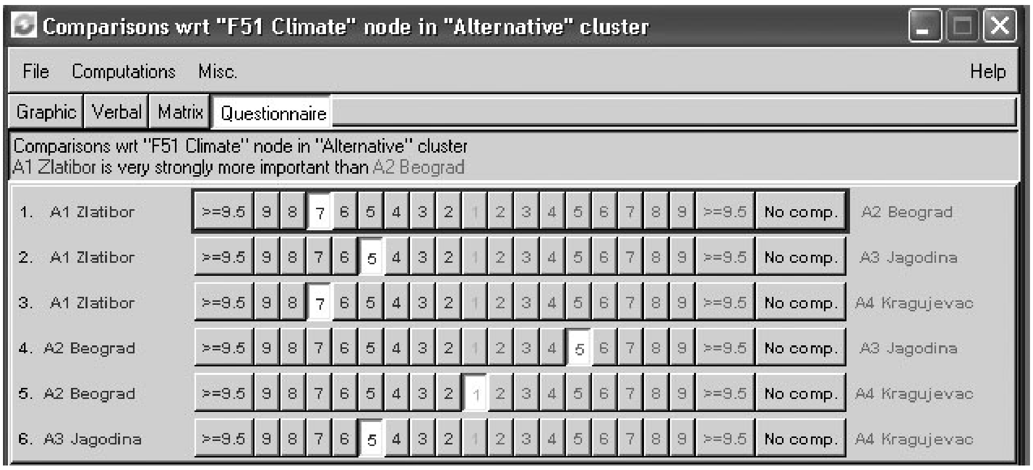

Comparisons wrt "F32 Site Accessibility" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F32 Site Accessibility" node in "Alternative" cluster
A2 Beograd is strongly more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

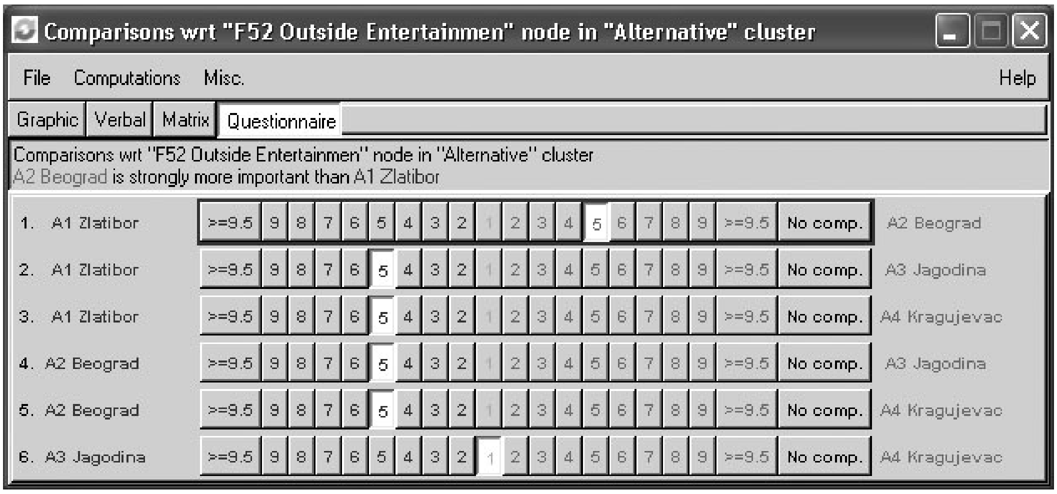

Comparisons wrt "F33 Suitability and Standard of Local Infrastructure" node in "A...
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F33 Suitability and Standard of Local Infrastructure" node in "Alternative" cluster
A2 Beograd is very strongly more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

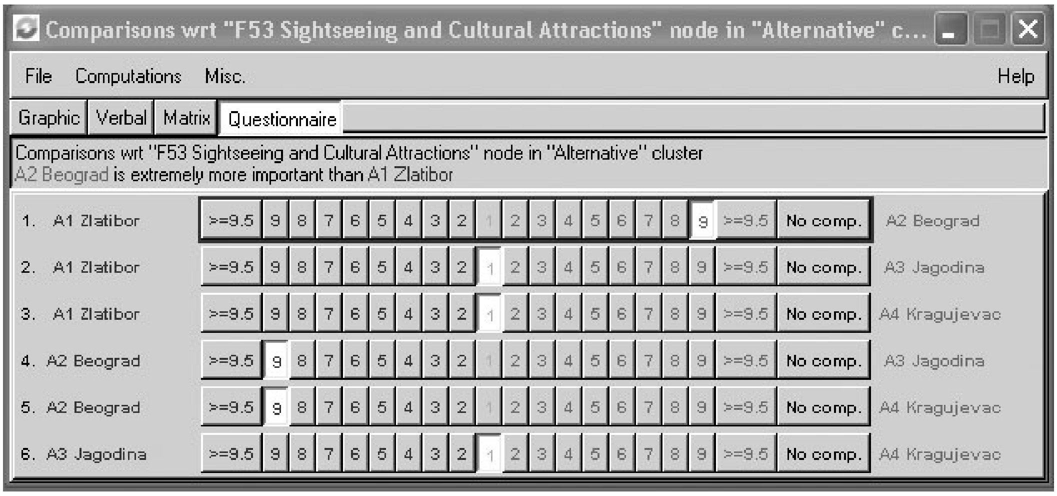

Comparisons wrt "F41 Government Support" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F41 Government Support" node in "Alternative" cluster
A2 Beograd is moderately more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac


Comparisons wrt "F42 Quality of Industry Personnel" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F42 Quality of Industry Personnel" node in "Alternative" cluster
A2 Beograd is moderately more important than A1 Zlatibor
1. A1 Zlatibor — A2 Beograd
2. A1 Zlatibor — A3 Jagodina
3. A1 Zlatibor — A4 Kragujevac
4. A2 Beograd — A3 Jagodina
5. A2 Beograd — A4 Kragujevac
6. A3 Jagodina — A4 Kragujevac
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.


Comparisons wrt "F43 Efficiency of Industry Personne" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F43 Efficiency of Industry Personne" node in "Alternative" cluster
A2 Beograd is moderately more important than A1 Zlatibor
1. A1 Zlatibor — A2 Beograd
2. A1 Zlatibor — A3 Jagodina
3. A1 Zlatibor — A4 Kragujevac
4. A2 Beograd — A3 Jagodina
5. A2 Beograd — A4 Kragujevac
6. A3 Jagodina — A4 Kragujevac
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.


Comparisons wrt "F51 Climate" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F51 Climate" node in "Alternative" cluster
A1 Zlatibor is very strongly more important than A2 Beograd
1. A1 Zlatibor — A2 Beograd
2. A1 Zlatibor — A3 Jagodina
3. A1 Zlatibor — A4 Kragujevac
4. A2 Beograd — A3 Jagodina
5. A2 Beograd — A4 Kragujevac
6. A3 Jagodina — A4 Kragujevac
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.


Comparisons wrt "F52 Outside Entertainmen" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F52 Outside Entertainmen" node in "Alternative" cluster
A2 Beograd is strongly more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac


Comparisons wrt "F53 Sightseeing and Cultural Attractions" node in "Alternative" c...
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F53 Sightseeing and Cultural Attractions" node in "Alternative" cluster
A2 Beograd is extremely more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac