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Ranking Web Design Firms with the ORESTE Method

Web Tasarım Firmalarının Oreste Yöntemi ile Sıralanması

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ABSTRACT

Developing a website, creating an online presence and a brand image are difficult for the companies because of requiring research, thought and time. One of the ways to overcome this difficulty is hiring a web design firm. There are many web design firms in the market and it is critical to determine which one best meets a company's needs. In this paper one of the MCDM (Multi Criteria Decision Making) techniques, called ORESTE (Organization, Rangement Et Synthese De Donnes Relationnelles), has been applied to the selection of web design firm. This method is simple and does not require the quantification of criteria weights and alternatives, rather only their ordinal rankings. The application has demonstrated that the ORESTE method provides a structured, rational and consistent approach to complex decision problems.

Keywords: ORESTE (Organization, Rangement Et Synthese De Donnes Relationnelles), outranking, MCDM (Multi Criteria Decision Making), web design firm selection

ÖZET

İşletmeler için bir web sitesi tasarlamak, online varlık ve marka imajı yaratmak; araştırma, düşünme ve zaman gerektirdiği için zordur. Bu zorluğu aşmanın yollarından biri, bir web tasarım firması ile çalışmaktır. Piyasada birçok web tasarım firması vardır ve bunlardan hangisinin işletmenin ihtiyaçlarını en iyi şeklide karşılayacağını belirlemek önemlidir. Bu çalışmada ÇKKV (Çok Kriterli Karar Verme) tekniklerinden biri olan ORESTE (Organization, Rangement Et Synthese De Donnes Relationnelles) yöntemi, web tasarım firması seçiminde uygulanmıştır. Bu yöntem basittir ve kriter ağırlıkları ile alternatiflerin sayısal değerlerini gerektirmeyip, sadece sıralama yapmak yeterlidir. Yapılan uygulama, ORESTE yönteminin karmaşık karar problemlerine, yapısal, akılcı ve tutarlı bir yaklaşım sağladığını göstermiştir.

Anahtar Kelimeler: ORESTE (Organization, Rangement Et Synthese De Donnes Relationnelles), sıralama, ÇKKV (Çok Kriterli Karar Verme), web tasarım firması seçimi

1. INTRODUCTION

Nowadays being able to stand on the competitive markets is too difficult for the companies. They seek some solutions for maintaining their life in the intense market. One of these solutions is contuining their life in the virtual environment in other words online presence because of the advancement and growth of the internet. They have realized that with a website that belongs to them they introduce themselves, their products and services easily. They may not only increase their customer list but also widen the area of their business. At the same time a web site plays an important role as advertising. Because of these remarkable advantages companies start to find web design firms for their websites and concordantly this situation leads to the emergence of many web design firms. Hence comparing and selecting the best web design firm that meets or exceeds the company's goals through web site design are difficult tasks. These tasks may be handled as a selection problem and during selection process decision makers should consider presence of multiple conflicting selection criteria and performance measures. MCDM (Multi Criteria Decision Making) methods offer solutions for selection problems. There are several MCDM methods in the literature. Priority based, outranking, distance based and mixed methods are also applied to various problems (Fasanghari et al., 2009).

The outranking methods in MCDM are well suited to deal with multiple criteria decisions with qualitative as well as quantitative criteria. Applications of outranking methods enable the selection of alternatives based on relatively limited information. These and other features such as the recognition of

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incomparability of alternatives are only implicitly or not at all present in traditional decision models for selection problems. In other words outranking methods are only partially compensatory and capable of dealing with situations in which imprecision is present (Boer et al., 1998). ELECTRE (ELimination Et Choix Traduisant la REaite), PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluations) and ORESTE (Organization, Rangement Et Synthese De Donnes Relationnelles) methods are the main outranking methods in MCDM literature. In this paper ORESTE method is applied to the selection of the best web design firm for a given textile company. ORESTE is very attractive method in the absence of numerical evaluations, has been suffering from a lack of meaningful interpretation of the technical parameters (Pastijn and Leysen, 1989). Because ORESTE method only requires ordinal data and criteria rankings according to their importance and alternative rankings for each criterion. So it is particularly applicable to those situations where the decision maker is unable to provide crisp evaluation data and criteria weights (Chatterjee and Chakraborty, 2014; Leeneer and Pastijn, 2002).

In this paper, a decision model is developed to rank web design firms by using ORESTE method considering seven relevant criteria and seven decision alternatives. The solution is resulted with a complete ranking of the alternatives. The rest of this paper is organized as follows. In Section 2, general information about the ORESTE method is given. Section 3 is provided for the web design firm selection problem. ORESTE method is applied to rank the web design firms for the textile company in Denizli, Turkey. Lastly in Section 4 the results of the application are presented and recommendations for future studies are discussed.

2. ORESTE METHOD

Many MCDM methods require data about the criteria and alternatives of the MCDM problem such as weights, order relations, preference functions. Sometimes collecting these data may be difficult (Dinçer, 2011). To avoid these necessities the ORESTE (Organisation, Rangement Et Synthèse De Données Relationnelles) method was developed by Roubens (1979). The algorithm of the method was introduced in 1980 and the case study of computer system selection problem was presented in 1982 (Pastijn and Leysen, 1989). The aim of this method is finding a global preference structure on a set of alternatives by evaluating them on each criterion and the preference among the criteria (Pastijn and Leysen, 1989; Chatterjee and Chakraborty, 2014). This method generally defines criteria and alternatives, constructs the global complete and partial preorder of alternatives by performing indifference and conflict analysis (Dinçer, 2011; Fierek et al., 2012).

ORESTE method does not require the quantification of criteria weights and alternatives, rather only their ordinal assessment (ranking) while constructing global preference structure on alternatives (Leeneer and Pastijn, 2002; Eliseo, 2009). Hence the decision making process is speeded up by avoiding the lengthy discussions among the decision makers to set the criteria weights (Chatterjee and Chakraborty, 2014). ORESTE method can be divided into two categories as ORESTE I and ORESTE II. ORESTE I requires operations about finding out a global (complete) weak order on alternative set while ORESTE II requires an indifference and incomparability analysis (Delhaye et al., 1991).

Although the ORESTE method cannot find common usage area like ELECTRE and PROMETHEE which belong to outranking methods, it has been used in the solution of limited number of decision problems. In the literature the ORESTE method was used for the nuclear waste management problem (Delhaye et al., 1991), land mine detection strategies selection (Leener and Pastijn, 2002), ranking of the maintenance work contractors for mass transit systems renovation project (Zak, 2005), ranking of the information and communication technology research centers in Iran (Fasanghari et al., 2009), the typical use for military equipment acquisition (Pastijn and Leysen, 2009), the prioritization of sewer rehabilitation projects (Eliseo, 2009), ranking the Turkish manufacturing industry (Dinçer, 2011), ranking ports (Jafari et al., 2013), identification and prioritization of grain discharging operations risks (Jafari, 2013), personnel selection (Eroğlu et al., 2014), the selection of best advanced manufacturing system (Chatterjee and Chakraborty, 2013) and the flexible manufacturing system for a given manufacturing organization (Chatterjee and Chakraborty, 2014), ranking petrochemical projects (Ghasemi and Taherifar, 2015), insurance company selection (Tuş Işık, 2016). The ORESTE method was used to design an integrated virtual machine placement algorithm, called the ORESTE VM Placement (OVMP) which could reduce the number of running physical machines and lower the energy consumption to improve the performance of dynamic distributed networks (Jamali and Hourali, 2014).

Before applying steps of the ORESTE method firstly *A* which is a finite set of *m* alternatives (a_i; i =1,2,…,m) and *C* which is a set of *n* criteria (c_j; j =1,2,…,n) are taken into account. Preference structure which is defined as a weak order (or complete preorder) is used on the set of criteria for determining the relative importance of the criteria instead of weights as follows:

c_1 P c_2 I c_3 P c_4……..c_n

The relation S_j = (I_j or P_j) is complete and transitive, I_j (indifference) and P_j (preference) are symmetric and antisymmetric respectively. c_1 is the most important and preferred criterion, while c_2 and c_3 are tied as the intermediate important criteria and c_n is the least important criterion at the above the weak order of the criteria. At the same time for each criterion a weak order of the alternatives is needed as follows (Chatterjee and Chakraborty, 2014):

c_1: a_1 P a_2 P a_3……a_m

c_2: a_1 P a_2 I a_3……a_m

c_3: a_1 P a_2 I a_3……a_m

……………………

c_n: a_1 I a_2 P a_3……a_m

The objective is to find a global preference structure *G* on *A* which reflects the judgement on the alternatives for each criterion and the preference structure among the criteria. To satisfy this objective the ORESTE method operates in two distinct phases:

- At the first phase construction of a global (complete) weak order on *A* is acquired. This phase is known as the ORESTE I.
- At the second phase construction of an incomplete preference structure on *A* is acquired after an indifference and incomparability analysis. This phase is known as the ORESTE II.

2.1 Construction of a Global Weak Order

Ranking alternatives and criteria: In this step each alternative is given a Besson rank for each criterion starting from *n* weak orders related to the *n* criteria. Also each criterion is given a Besson rank related to its position in the weak order among the criteria. $r(c_j)$ is the Besson rank of criterion c_j and $rc_j(a_i)$ is the Besson rank of alternative a_i for criterion c_j.

Calculating the projection distances: Projection is the first aggregation of these positions. Projection distance $D_j(a_i)$ enables determination of the relative positions of alternatives according to the arbitrary origin point which is based on the rank value of criterion/alternative.

$$\text{If} \quad a_1 P_j a_2 \quad \text{then} \quad D_j(a_1) < D_j(a_2) \tag{1}$$

$$\text{If} \quad rc_1(a_1) = rc_2(a_2) \text{ and } c_1 P c_2 \text{ then } D_1(a_1) < D_2(a_2) \tag{2}$$

The smaller projection distance indicates the better position of the alternative (Chatterjee and Chakraborty, 2014). The projection may be performed in different ways. The ORESTE method uses a generalized distance proposed by Pastijn ve Leysen (1989):

$$DR_j(a_i) = \left[\frac{1}{2} rc_j^{\,R} + \frac{1}{2} rc_j(a_i)^R\right]^{1/R} \tag{3}$$

where $R \in R_0$ is a parameter to be chosen by the decision makers. For the following values of *R*, decision makers find the particular means:

R = 1: the average rank (arithmetic mean),
R = - 1: the harmonic mean rank,
R = 2: the quadratic mean rank,
$R = -\infty$: min(rc_j , $rc_j(a_i)$),
$R = +\infty$: max(rc_j , $rc_j(a_i)$).

A larger value of *R* will give more importance to which of the two terms rc_j and $rc_j(a_i)$ is larger (Delhaye et al., 1991).

Ranking the projections: Distance scores are converted into Besson ranks in order to keep the method fully ordinal. Ranking the projections means assigning a mean rank $r_j(a_i)$ to a distance $DR_j(a_i)$ such that $r_1(a_1) \le r_2(a_2)$ if $DR_1(a_1) < DR_2(a_2)$. These ranks are called global ranks. The global ranks are in the closed interval (1, mn).

Aggregation: The sum of the global ranks over the set of criteria is computed for each alternative by the following formula:

$$r(a_i) = \sum_{j=1}^{n} r_j(a_i) \tag{4}$$

Finally the alternatives are ranked in increasing order. For an alternative the less total sum gives the higher rank. Obtaining global weak order of the alternatives terminates the first phase of the ORESTE method (Pastijn and Leysen, 1989).

2.2. Construction of an Incomplete Preference Structure

The ranking of the alternatives may be useful in many applications. Nevertheless, this complete preorder of the alternatives does not include some situations. Therefore, the decision maker will often not be satisfied with this outranking relation (Delhaye et al., 1991). In this situation incomparabilities or indifferences which can exist between different alternatives are analysed in more details :

- Two alternatives are indifferent when both are (almost) good or (almost) bad for the same criteria.
- Two alternatives are incomparable when both are good or bad for different criteria, in other words when the first alternative is very good for those criteria for which the second alternative is very bad and vice versa (Leener and Pastijn, 2002).

Although the information about the ORESTE method given above resembles the ELECTRE methods, two methods are processed in a completely different way: ELECTRE I constructs an outranking relation whereas ELECTRE II aggregates a weak order based on the outranking relation of ELECTRE I. ORESTE I constructs a weak order whereas ORESTE II invalidates some parts of the weak order with the conflict (incomparability) analysis. In ELECTRE, the antisymmetric part of the outranking relation is not transitive, whereas in ORESTE, this part obtained after the conflict analysis is transitive. Thanks to this property the ORESTE method does not suffer from the Condorcet effect unlike ELECTRE. This effect causes problems for decision makers while interpreting these intransitivities (Pastijn and Leysen, 1989).

In ORESTE method for the indifference and incomparability analysis firstly preference intensity of alternative "a_1" on alternative "a_2" is computed by the following formula:

$$C(a_1,a_2) = \sum_{j:a_1 P_j a_2} [r_j(a_2) - r_j(a_1)] \qquad (5)$$

The upper bound of preference intensities must be $(m-1)n^2$. The preference intensities are divided by the upper bound for the normalization. After normalization $0 \le C(a_1,a_2) \le 1$ and $0 \le C(a_1,a_2) - C(a_2,a_1) \le 1$ are satisfied. Then indifference and incomparability analysis are performed successively according to the following IPR (Indifference Preference Incomparability) principles:

- If $\left|C(a_1,a_2) - C(a_2,a_1)\right| \le \beta$ then $C(a_1,a_2)$ and $C(a_2,a_1)$ are checked. If $C(a_1,a_2)$ and $C(a_2,a_1)$ $\le C^*$ then $a_1\ I\ a_2$; otherwise $a_1\ R\ a_2$.
- If $\left|C(a_1,a_2) - C(a_2,a_1)\right| > \beta$ then $\dfrac{C(a_2,a_1)}{\left|C(a_1,a_2) - C(a_2,a_1)\right|}$ is checked. If $\dfrac{C(a_2,a_1)}{\left|C(a_1,a_2) - C(a_2,a_1)\right|} \ge \gamma$ then $a_1\ R\ a_2$; otherwise $a_1\ P\ a_2$ if $C(a_1, a_2) > C(a_2,a_1)$ and also $a_2\ P\ a_1$ if $C(a_1,a_2) < C(a_2,a_1)$.

Detail information about thresholds ***β, C**** and γ can be found in Pastijn and Leysen (1989). Obtaining final outranking relation between the alternatives terminates the second phase of the ORESTE method. Figure 1 summarizes the steps of the two phases of the ORESTE method.

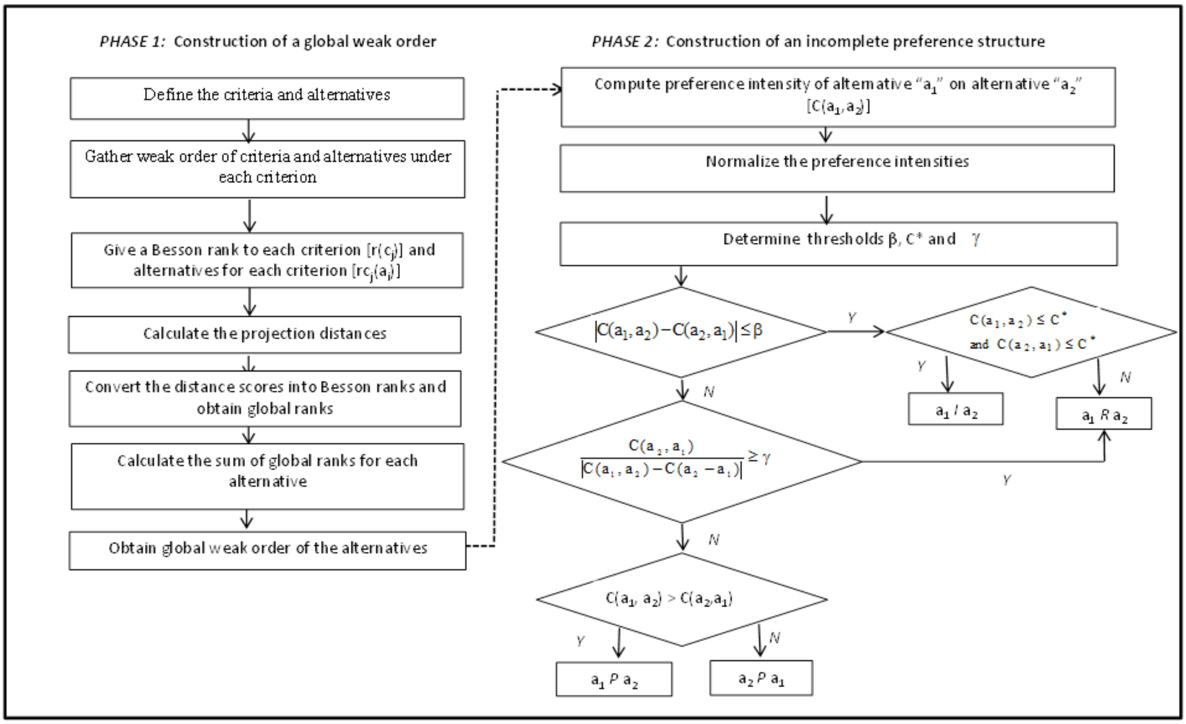

Figure 1: The Steps of the Two Phases of the ORESTE Method (Pastijn and Leysen, 1989)

3. APPLICATION

In order to demonstrate the applicability of the ORESTE method, the textile company situated in the west of Turkey is considered. This company has decided to move forward with launching a new website that will accurately represent their products and services. But they don't have the time to manage all the procedures and processes for a new website. So they have decided to hire a professional web design firm to handle the day-to-day activities involved in launching an effective website. Before selecting the ideal firm falling their requirements, company has considered seven criteria affecting their selection decision as price, technical skills, communication skills, reference, time, experience and technical support. Brief explanations of criteria are given below:

Price (c_1): Price is an important criterion that should be considered while comparing the web design firms. Every web design firm offers different services at different prices. The goal of the textile company is getting needed services at a reasonable amount in terms of suiting its budget.

Technical Skills (c_2): This criterion focuses on the firm's technology service rather than its customer service. It includes the portfolio that is an important tool of any web design firm to reflect its capability. The colours, logos and designs presented in the portfolio show the creativity of the web design firm. The textile company should hire the web desing firm which uses different design techniques, different web tools and the latest technologies to solve their problems. Some vital features of the web site like user friendly features, easy navigation links and fast page loadings, backup policy and security efforts should be considered.

Communication Skills (c_3): The textile company wants to hire web design firm that they can communicate with clearly and easily. Because communication between the textile company and the web design firm is so important for a successful working relationship. Firstly it requires expressing the company's requirements in an effective manner to get exactly what the company wants. Then how accessible web design firm to the textile company is an important issue in terms of continuing the business relationship. The communication should continue through phone calls, emails and personal meetings.

Reference (c_4): References involve a list of satisfied customers and a valuable record of successful designs. It reflects the credibility and reputation of the web design firm. A capable web design firm should be willing to provide the textile company with a list of at least 3-5 customers that can vouch for their service or they should publish these information on their site. So the textile company should consider the number of the satistifed customers of the the web desing firm and follow previous customers to learn working strategies of it.

Time (c_5): Time is treated as the capability of the web design firm accomplishing the web site design within the given time period. A web design firm should spend a reasonable amount of time performing the needs and objectives of the textile company.

Experience (c_6): Experience is the exact year a company started to design websites. Work experience is a relevant criterion when checking the credibility and reputation. The textile company should discover the web design firm in terms of history of design, development and marketing. Work experience helps to ensure about the method of information they offer, the websites which are easy to navigate, providing proper guidance on availing required information, using good color, text patterns and font, etc.

Technical Support (c_7): Technical support involves after launch support like maintenance, free technical support for 7 days and 24 hours, customer care services, service guarantees etc. So textile company should consider how web design firms approach customer service and how they keep their customers happy.

3.1. Construction of a Global Weak Order

After defining the criteria, the textile company specifies seven web design firm alternatives which comply with the criteria in the market. The ORESTE method starts with determining the weak order of the criteria indicating their relative importance. Weak order of the criteria is given as follows:

$c_2 \; P \; c_1 \; P \; c_4 \; P \; c_5 \; I \; c_3 \; P \; c_7 \; P \; c_6$

According to this order technical skills (c_2) is the most preferred criterion and experience (c_6) is the least important criterion. Then for each criterion, a weak order of the alternatives is determined as follows:

c_1 : $a_2 \; P \; a_3 \; I \; a_4 \; P \; a_6 \; P \; a_7 \; P \; a_5 \; P \; a_1$

c_2 : $a_5 \; P \; a_1 \; P \; a_3 \; P \; a_4 \; I \; a_7 \; P \; a_6 \; P \; a_2$

c_3 : $a_5 \; I \; a_7 \; P \; a_6 \; P \; a_1 \; I \; a_3 \; P \; a_4 \; P \; a_2$

c_4 : $a_1 \; I \; a_2 \; I \; a_4 \; P \; a_3 \; I \; a_7 \; P \; a_5 \; I \; a_6$

c_5 : $a_1 \; P \; a_3 \; I \; a_4 \; I \; a_6 \; I \; a_7 \; P \; a_2 \; P \; a_5$

c_6 : $a_2 \; P \; a_6 \; P \; a_4 \; P \; a_1 \; I \; a_3 \; P \; a_5 \; I \; a_7$

c_7 : $a_3 \; P \; a_5 \; I \; a_6 \; P \; a_1 \; I \; a_7 \; P \; a_4 \; P \; a_2$

The Besson ranks of all the web design firm selection criteria and also the Besson ranks of the considered web design firm alternatives are obtained and given in Tables 1 and 2 respectively.

Table 1: Besson Ranks of the Criteria $r(c_j)$

Criteria	c_1	c_2	c_3	c_4	c_5	c_6	c_7
Besson ranking	2	1	4,5	3	4,5	7	6

In Table 1 it is seen that Besson rank of c_2 is 1 ($r(c_2) = 1$). Because c_2 is the first at the weak order of the criteria. At the same order c_3 and c_5 are indifferent and placed at the fourth and fifth positions. So the Besson ranks of c_3 and c_5 are computed by averaging their positions ($r(c_3)$=4,5 and $r(c_5)$=4,5).

Table 2: Besson Ranks of the Alternatives $rc_j(a_i)$

Criteria	a_1	a_2	a_3	a_4	a_5	a_6	a_7
c_1	7	1	2,5	2,5	6	4	5
c_2	2	7	3	4,5	1	6	4,5
c_3	4,5	7	4,5	6	1,5	3	1,5
c_4	2	2	4,5	2	6,5	6,5	4,5
c_5	1	6	3,5	3,5	7	3,5	3,5
c_6	4,5	1	4,5	3	6,5	2	6,5
c_7	4,5	7	1	6	2,5	2,5	4,5

A weak order of the alternatives with respect to each criterion is considered while finding the Besson ranks of the alternatives. If the first row of Table 2 is considered, the Besson rank of a_2 is 1. Because a_2 is the first at the weak order of alternatives with respect to c_1. Similarly a_3 and a_4 are indifferent and placed at second and third positions at the same order. Their Besson ranks are computed by averaging their positions ($rc_1(a_3)$=2,5 and $rc_1(a_4)$=2,5).

The corresponding projection distances are computed through Eq. (3) and shown in Table 3. In this paper, *R* value is assumed as 1 so the average rank method is used for the calculation of the projection distance. For example the projection distance of a_1 with respect to c_1 is calculated as averaging Besson rank of c_1 and Besson ranks of a_1 for c_1. If $r(c_1)$=2 and $rc_1(a_1)$=7 then $DR_1(a_1)$=4,5.

Table 3: Projection Distances of Alternatives $DR_j(a_i)$

Criteria	a_1	a_2	a_3	a_4	a_5	a_6	a_7
c_1	4,5	1,5	2,25	2,25	4	3	3,5
c_2	1,5	4	2	2,75	1	3,5	2,75
c_3	4,5	5,75	4,5	5,25	3	3,75	3
c_4	2,5	2,5	3,75	2,5	4,75	4,75	3,75
c_5	2,75	5,25	4	4	5,75	4	4
c_6	5,75	4	5,75	5	6,75	4,5	6,75
c_7	5,25	6,5	3,5	6	4,25	4,25	5,25

Projection distances of alternatives given in Table 3 are ranked and converted into Besson ranks. The results are global ranks and given in Table 4. For example project distance of a_5 with respect to c_2 is at the first position at projection distance order. So the global rank of a_5 with respect to c_2 is 1. Then the project distance of a_1 with respect to c_2 and the project distance of a_2 with respect to c_1 is at the second and third positions. So the global rank of a_1 with respect to c_2 and a_2 with respect to c_1 is calculated by averaging their positions and found as 2,5. The other global ranks in Table 4 are calculated similarly.

Table 4: Global Ranks

Criteria	a_1	a_2	a_3	a_4	a_5	a_6	a_7
c_1	32,5	2,5	5,5	5,5	25	14	17
c_2	2,5	25	4	11	1	17	11
c_3	32,5	43,5	32,5	39,5	14	20	14
c_4	8	8	20	8	35,5	35,5	20
c_5	11	39,5	25	25	43,5	25	25
c_6	43,5	25	43,5	37	48,5	32,5	48,5
c_7	39,5	47	17	46	29,5	29,5	39,5

As a last step of this method, the sum of the global ranks is computed for the web design firm alternatives and the final ranking is shown in Table 5. The ranking of the web design firm alternatives is a_3-a_1-a_4-a_6-a_7-a_2-a_5 by referring to Table 5. Finally a_3 is the best and a_5 is the worst alternative for the textile company.

Table 5: Final Ranking

Alternatives	a_1	a_2	a_3	a_4	a_5	a_6	a_7
Sum of Global Ranks	169,5	190,5	147,5	172	197	173,5	175
Rank	2	6	1	3	7	4	5

3.2. Construction of an Incomplete Preference Structure

For the indifference and incomparability analysis firstly the preference intensities of the alternatives are calculated by Eq. (5). If preference intensity of a_1 on a_2 is handled, a_1 is preferred to a_2 on the basis of c_2, c_3, c_5 and c_7 by considering global ranks in Table 4. Firstly the differences between global ranks are computed and then preference intensity of a_1 on a_2 are found by adding these differences. The same procedure is repeated for all alternative pairs. Then the preference intensities are divided by the upper bound for the normalization. The upper bound of preference intensities must be $(7-1)7^2$. The normalized preference intensities are shown in Table 6. After normalization $0 \leq C(a_1, a_2) \leq 1$ and $0 \leq C(a_1, a_2) - C(a_2, a_1) \leq 1$ are satisfied.

Table 6: The Normalized Preference Intensities

Alternatives	a_1	a_2	a_3	a_4	a_5	a_6	a_7
a_1	0,000	0,236	0,094	0,122	0,221	0,190	0,134
a_2	0,165	0,000	0,114	0,051	0,264	0,158	0,170
a_3	0,168	0,260	0,000	0,146	0,241	0,168	0,156
a_4	0,114	0,114	0,063	0,000	0,262	0,143	0,119
a_5	0,128	0,241	0,073	0,177	0,000	0,075	0,068
a_6	0,177	0,216	0,080	0,138	0,155	0,000	0,099
a_7	0,116	0,223	0,063	0,109	0,143	0,094	0,000

Indifference and incomparability analysis are performed successively according to the IPR (Indifference Preference Incomparability) principles. In this paper thresholds are determined as β=0,02, C^*=0,05 and γ=2,5. Three examples of performing IPR principles are as follows:

- If $C(a_1, a_2) = 0{,}236$ and $C(a_2, a_1) = 0{,}165$ then $|C(a_1,a_2) - C(a_2,a_1)|$ is greater than β. In this situation $\frac{C(a_2,a_1)}{|C(a_1,a_2) - C(a_2,a_1)|}$ is checked. $\frac{C(a_2,a_1)}{|C(a_1,a_2) - C(a_2,a_1)|}$ is less than γ. So $C(a_1, a_2)$ and $C(a_2, a_1)$ are compared. For these alternatives $C(a_1, a_2) > C(a_2,a_1)$. It means that a_1 is preferred a_2 (a_1 *P* a_2). This result is shown as ">" at the intersection row a_1 and column a_2 of Table 7.
- If $C(a_1, a_3) = 0{,}094$ and $C(a_3, a_1) = 0{,}168$ then $|C(a_1,a_3) - C(a_3,a_1)|$ is greater than β. $\frac{C(a_3,a_1)}{|C(a_1,a_3) - C(a_3,a_1)|}$ is less than γ. After comparing $C(a_1, a_3)$ and $C(a_3, a_1)$ it is seen that $C(a_1, a_3) < C(a_3,a_1)$. It means that a_1 is not preferred a_3 (a_3 *P* a_1). This result is shown as "<" at the intersection of row a_1 and column a_3 of Table 7.
- If $C(a_1, a_4) = 0{,}122$ and $C(a_4, a_1) = 0{,}114$ then $|C(a_1,a_4) - C(a_4,a_1)|$ is greater than β. It is seen that $\frac{C(a_4,a_1)}{|C(a_1,a_4) - C(a_4,a_1)|}$ is greater than γ. This situation means incomparability exists between a_1 and a_4 (a_1 *R* a_4). This result is shown as "*R*" at the intersection of row a_1 and column a_4 of Table 7.

The other comparisons between alternatives are performed similarly. Results are shown in Table 7.

Table 7: The Final Outranking Relation Matrix

	a_1	a_2	a_3	a_4	a_5	a_6	a_7
a_1	I	>	<	R	>	R	R
a_2	<	I	<	<	R	R	R
a_3	>	>	I	>	>	>	>
a_4	R	<	<	I	>	R	R
a_5	<	R	<	<	I	<	<
a_6	R	R	<	R	>	I	R
a_7	R	R	<	R	>	R	I

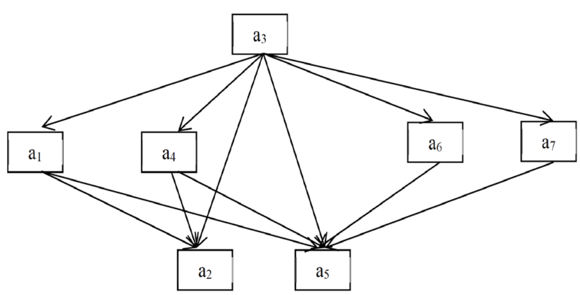

Figure 2: IPR Structure

Figure 2 is constructed by using data in Table 7. From Figure 2 it is clear that a_3 has to be selected. Then a_1, a_4, a_6 and a_7 follow a_3. At the same time there are incomparability situations between a_1, a_4, a_6 and a_7. The least preferred alternatives of this application are a_2 and a_5. There are also incomparability situations between a_2 and a_5.

4. CONCLUSION

Websites of the companies are important tools to enhance the companies' image or brand in terms of reflecting the first impression of the company's business and its professionalism. For developing a website and creating an online presence, the companies usually hire a web design firm. But choosing a proper web design firm is an overwhelming task and time consuming because of the conflicting criteria. In this paper the selection of web design firm problem of the textile company has been solved with the ORESTE method. After determining weak orders of the criteria and alternatives under each criterion, Besson ranks of them are determined. Aggregation of the posisitons are made by the projection formula and mean global Besson rankings of the projections are calculated. Finally overal ranks are obtained by adding mean ranks. According to the final ranking, a_3 is the best web design firm for the textile company. After performing indifference and incomparability analysis, IPR structure of the problem is obtained and a_3 is also selected as the best alternative.

Application of the ORESTE method to the selection problem provides some advantages to the company. First of all this method is simple to understand and apply in terms of technical parameters. It does not require the quantification of criteria weights and alternatives in other words numerical data does not need for the method. Both quantitative and qualitative criteria may be considered. The method is very flexible. The decision maker can observe the changes in result if the ordinal rankings of criteria and alternatives change. If the evaluation criteria and the alternatives remain unchanged and weak orders of them change then the decision maker may update the method easily. The thresholds used in the method is not arbitrary so this situation helps the decision makers in interpreting the ranking easily. Discriminatory power of the method is strong in terms of conflictual alternatives and decision makers may consider incomparabilities of the alternatives.

In future studies, while calculating projection distances different R values may be performed and differences between the ranking results may be discussed. The number of the evaluation criteria, the alternatives and weak orders of them may be changed according to the needs of the company for the web design firm. The ORESTE method may be applied to other selection problems of the company.

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