How can the company choose the best web designer? Decision-making application within a company

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ABSTRACT

The demand for web designers is currently increasing, and HR managers are looking for the most suitable candidates for this position. Consequently, HR departments need to thoroughly assess such job seekers in the admission process. The purpose of this paper is to help HR managers to identify criteria for best web designers and evaluate their relevance for the admission process. The admission process is based on a questionnaire, interview and tests. Generally, the role of HR manager is to summarize information from the Curriculum Vitae. The aim of this paper is to choose the criteria for the web designer position in the admission process and evaluate them according to the utility and risk. As a result, the best applicant for the position is chosen on the basis of a decision-making process which follows several assessment criteria. This process ensures an objective assessment of the main criteria among a number of choices. HR managers do not use these objective and quantitative methods, which evaluate the choices according to a set of criteria. Such an evaluation will shorten the time required to judge the appropriate candidate. Then the subsequent interview may be focused only on assessing the candidate´s social and managerial competencies. The most appropriate applicant is chosen according to the evaluation of seven main criteria defined in this article.

1. Introduction

Many companies strive to gain a dominant position in the market. They are trying themselves visible by running web applications. Web applications are applications which are served to customers from the web server by using Internet or Intranet. Web applications have become tremendously popular. They have one big advantage - we do not have to distribute special software for them. The potential user can connect to them via a web browser. It does not depend on which device – tablet, PC, notebook, etc. The company maintains a close relationship with customers through it – existing and potentials. Companies build their marketing social strategies through these platforms. For the implementation, the online marketing strategy is very important. A good, well-crafted, well-structured web design is what distinguishes the company from its competitors. According to Purcarea et al. (2017) the emphasis will be on quality, relevance, and design of the posts, the added value they bring to the work and company's productivity. The process begins with the following steps: The basis of the web designer's work is to know the needs and goals of the organization, its products and services to choicely analyze the current status and behavior of visitors on an existing e-shop site and then follows a draft information and functional structure. A so-called wireframe is created. It is a wireframe representing the structure of the design, the layout of individual elements and the overall concept of operation.

That is why the role of the web designer is very important. The results of his work will influence how customers will perceive this online strategy and how they will accept it. Web designer identifies and prepares graphic design, layout of information on the page and basic structure of web pages on the Internet. Using graphical hardware and software, it creates a graphical look of web pages. Together with the project, he leads the project documentation, prepares and implements designs, reproductions, and website layouts. He creates graphical symbols and libraries of such graphic elements for further use. He cooperates with other experts in the team to

finalize the website. So the position of web designer in the company is so important and the IT management should assess web designer seeker in the admission process thoroughly. In these cases, HR managers can help with the objectivizing decision-making process by quantifying the main criteria for his acceptance. The aim of this paper is to choose and assess the criteria in an admission process for the web designer position with including potential risks.

2. Decision-making process

Speaking theoretically, we conceptualize the decision making as a process of selection between minimal two possibilities or choices. Charlesworth (2017) stated that the decision analysis is time-tested set of tools which can help to develop and examine choices, analyze risks and uncertainty systematically and achieve the goals. As a result of it we get a selection of the best version, which best complies with the specified criteria (aspects of the target of the decision making). The decision-making has multi-criterial dimension; it means that we make decision not on the basis of one criterion, but on the basis of several criteria. Pineda et al. (2018) stated that there large number of complex factors which will be involved and created the multi-criteria decision making (MCDM) to the problem. Factors should be evaluated by experts. The decision-making has similar and characteristic features, for example the decision-making stages, procedures and methods. It is a matter of the formal-logical aspect.

The decision-making is one of the most important activities executed by managers. They use decision making to solve complex problem with many criteria. That is why we speak about the multi-criteria decision making where there are a large number of tools and solutions available. Anderson et al. (1988) emphasized that the problem is complex, and the manager cannot develop a good solution without the help of quantitative specialists.

Decision-making is the process of few crucial steps. Some of the problems cannot be solved without the qualitative analysis based upon managerial experience and quantitative analysis based upon mathematical tools. Therefore it is necessary that the subject of the decision-making uses a creative attitude, extensive knowledge and experience, as well as formalized methods and procedures, i.e. heuristics. These problems can´t be solved by means of a single-shot decision-making.

Many authors used the decision-making in material engineering and manufacturing process (Zaman et al, 2018). It is usually used not only in the company management, but also in the strategic management, the organizational design and the personnel sphere. Khan (2018) implemented it together with SWOT analysis by prioritizing the strategy in Iranian gas industry. Castro-Nuño and Arévalo-Quijada (2018) applied the decision-making to minimize traffic accidents.

The quality of the manager´s decision influences the effectiveness of separate activities and operation of the enterprise itself, the company's position, as well as prestige and recognition of the manager within this enterprise. If the manager is experienced and has the leadership skills, it contributes to the better performance of the department and whole organization (Řeháček, 2015).

Multi-criteria decision-making is one of universal heuristic methods applicable in every part of managers´ activities. Ministr (2013) claimed that human resources and their optimal utilization contribute to achievement of the aims of IT department and also of the entire company (Ministr, 2013). Phases of decision-making process are displayed in Fig. 1.

2.1. Managerial problem, its definition and goal setting

Decision-making process starts with the identification and recognition of the problem. The problem should be described clearly. It is necessary to specify the goal that we want to achieve.

2.2. Determination of criteria

After closing of previous step, it is necessary to create the list of criteria. Criteria are the point of view that we judge choices. We distinguish between revenue and cost criteria. The criteria should be compared and we should estimate the criteria importance. There are a large number of methods available for mutual comparison of criteria, such as Fuller´s triangle, Saatys´ matrix, etc. Saaty´s matrix will be applied in this case study that is why it will be described in more details.

2.3. Evaluation of criteria by Saaty´s matrix

Saaty´s method supports the evaluation of preferences among criteria and it has been used in this case study. Table 1 shows the comparison of criteria using Saaty´s matrix.

$$\begin{pmatrix} s_{11} & s_{12} & s_{1n} \\ 1/s_{12} & 1 & s_{2n} \\ 1/s_{1n} & 1/s_{12} & 1 \end{pmatrix} \quad (1)$$

Saaty´s matrix is the quadrat matrix, $S = \{s_{ij}\}$, where i, j = 1, 2, …, n.

Table 1: An example of a table

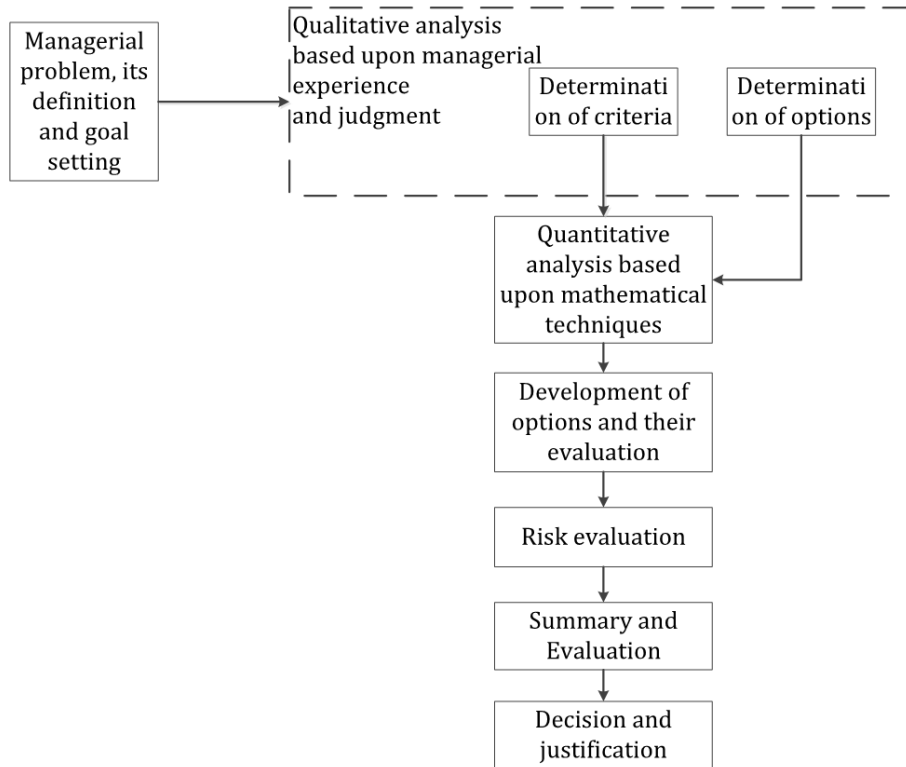| Value	Criteria Evaluation
1	equal importance among elements i and j
3	moderate importance of i element before j element
5	strong importance of i element before j element
7	very strong importance of i element before j element
9	the extreme importance element i before j

Fig. 1: Framework of decision-making process. Source: adapted according to the Anderson et al. (1988)

Saaty and Vargas (2001) used the 9-escalate scale of the criteria evaluation (Table 1). We compare criteria mutually and determine the preferences. The element of the matrix s_{ij} expresses the weights of i-th and j-th criterion. The weight expresses how much is the the i- criteria preferred than the j-criteria. On the diagonal, there are displayed notes 1.

$$s_{ij} \approx \frac{w_i}{w_j}, \tag{2}$$

where w_i is weight of i-th criterion and w_j is weight of j-th criterion.

2.4. Development of options and their evaluation through the utility calculation

Options should be described and evaluated. We can use to summarize the information into simple table. The framework for processing of the decision-making by using Saaty´s matrix and matrixes of utilities has been implemented. For the evaluation of the options, 3 matrixes are used - matrix of absolute utilities, matrix of simple utilities and matrix of weighted utilities.

Matrix of absolute utilities enables to define criteria, express them in original units and express evaluating of each option based on each criterion (Table 2).

Table 2: Description of quantitative and qualitative criteria and options

Criteria	Criteria expression	O_1	O_2	O_n
C_1	verbal (scale)	excellent	bad	good
C_2	numerically	100 €	120 €	130 €
...	value	truth/ yes	untruth/ no	truth/ yes

Matrix of simple utilities transforms the matrix of absolute utilities. All options are converted into the same uniform variable in the matrix of simple utilities. The best option is evaluated as 100 %. Other options have lower evaluation (Table 3).

Table 3: Weighted criteria

C_m		verbal (scale)	excellent	very good	good
C	W	WO_1	WO_2	WO_n	WO_{max}
C_1	5	500	50	300	500
C_2	1	50	60	100	100
C_m	2	80	200	20	200
TU		$\sum WO_1$	$\sum WO_2$	$\sum WO_n$	$\sum WO_{max}$
RU		$\frac{\sum WO_1}{\sum WO_{max}}$	$\frac{\sum WO_2}{\sum WO_{max}}$	$\frac{\sum WO_n}{\sum WO_{max}}$	

*C = Criteria; **W = Weight

There are shown evaluated options with the weight in matrix of weighted utilities in the Table 4, where the utility is expressed as

$$U_i = u_i \times w_j. \tag{3}$$

The relative utility is expressed as

$$RU_i = \frac{\sum_{i=1}^{n} WO_i}{WO_{max}}. \tag{4}$$

2.5. Risk evaluation

After the evaluation of the options it is necessary to evaluate the risk. Business risks are high risks and enterprise decisions and funding for the development and deployment of new products are the biggest business risks. Risk can be managed, minimized, shared, transferred or accepted but it cannot be ignored (Řeháček, 2018).

It is necessary to identify and evaluate it in the companies. There are many insurance companies on the market that offer insurance against business risks. Horita et al. (2018) claimed that risk is the pillar of multi-criteria decision-making.

They have applied and evaluated the disaster risk by monitoring and early-warning in Brazil. For people assessment, the Assessment centre and Development centre were developed. These methods, such as Krulis (2011) have noted, are considered to be the most comprehensive and thorough assessment method for people. They bring complex view on abilities, skills and reserves of evaluated persons (Krulis, 2011).

2.6. Summary and evaluation

According to the results of total or relative utility and after the risk evaluation is necessary to assess the options. It can be used the simple table which summarize achieved results.

2.7. Decision making and justification

Justification represents the manager's rationale for the decision. It must be accepted by all stakeholders.

3. Application of decision making in web developer position

3.1. Managerial problem description and characteristics and goal setting

The problem will be described as the case study in human resources department of the company, which wants to be and stay competitive on the market. It wants to increase the amount of sales. For sales increasing, it is necessary to have customer-oriented web sites. That is why the company is looking for hiring the highly reliable and experienced employee at the IT department who will be responsible for the content and functionality of the web sites. The task for the HR department is to find a responsible web designer. The company has advertised a tender for the position of web designer in the IT department.

3.2. Analysis of decision-making factors, determination of criteria and rules

Web applications providing is a very important tool that is necessary for successful trading. Web designer should know how to organize the data on the web page, how to control the flow of the web application by analyzing the structure and relationships of the widgets in the mockup, etc. There are many reasons why to choose the web designer carefully - many subjects can attack the running application, affect the functionality of the web site, disable access to harm the provider and the entire company.

3.3. Determination of criteria

The following criteria were determined from the curriculum vitaes: experience in the branch (C1), achieved education level (C2), hard skills (C3), such as knowledge of web design platform e.g. HTML language, Java language, JavaScript, PHP, other hard skills (C4) such as graphical tools knowledge, such as the Corel or Gimp, etc., knowledge of coding and testing of the web functionality (C5), such as the Sbi or Silenium, social skills (C6) such as the working under stress and foreign language proficiency (C7), especially English.

3.4. Determination and development of options

The following facts were identified from the CVs and motivation letters:

3.4.1. Option No. 1: Applicant No. 1

Experience in the industry: 4 years, achieved education level: Bachelor, knowledge of HTML, Java language and JavaScript, PHP knowledge, knowledge of graphical tools: Adobe Photoshop, coding and testing, social skills: working under stress, reliability: satisfactory, foreign language proficiency: English - at communication level.

3.4.2. Option No. 2: Applicant No. 2

Experience in the industry: 2 years, achieved education level: technical university, experience with web pages creating, knowledge of platforms: HTML, Java, JavaScript, PHP knowledge, Pinnancle studio, Corel, language R, Adobe Photoshop, coding, social skills: responsibility, working under stress, problem solving, excellent, foreign language proficiency: English - speaking and writing.

3.4.3. Option No. 3: Applicant No. 3

Experience in the industry: none, achieved education level: high school, knowledge of HTML, Java platforms, PHP, ASP.Net; social skills: reliability – good, testing, foreign language proficiency: English – speaking and writing, 1 year internship in the USA. The information above was summarized in the following criteria:

- Praxis – criteria C1
- Education level – C2
- Hard skills – C3
- Other hard skills – C4
- Coding and testing – C5
- Social skills – C6
- Foreign languages – C7

Above mentioned criteria have been evaluated and processed by using the matrixes of absolute utilities, simple utilities, Saaty´s matrix and matrix of weighted utilities which are detailed in Tables 4-7.

Table 4: Matrix of absolute utilities

Criteria	Applicant No. 1	Applicant No. 2	Applicant No. 3
C_1	4 years	2 years	none
C_2	Bachelor	Master´s digree	High school
C_3	HTML, Java, JavaScript, PHP	Java, JavaScript, PHP, HTML	HTML, Java, JavaScript, PHP, ASP. net
C_4	Adobe Photoshop, Plug in, Site Manager	Pinnancle Studio, Corel, language R	Corel, language R,
C_5	coding and testing	coding	testing
C_6	satisfactory	excellent	good
C_7	at communication level	speaking and writing	at communication level

Table 5: Weights of criteria – application of the Saaty´s matrix

	Weight
C1	0.355
C2	0.025
C3	0.213
C4	0.077
C5	0.055
C6	0.124
C7	0.150

Table 6: Matrix of simple utilities

Criteria	Option 1	Option 2	Option 3
C_1	100	80	0
C_2	80	100	0
C_3	100	100	50
C_4	80	100	60
C_5	100	50	50
C_6	80	100	90
C_7	70	90	100

Table 7: Matrix of weighted utilities

Criteria	Weight	Option 1	Option 2	Option 3	Option max
C_1	0.355	35.476	28.381	0.000	35.476
C_2	0.025	1.986	2.483	0.000	2.483
C_3	0.213	21.348	21.348	10.674	21.348
C_4	0.077	6.191	7.739	4.644	7.739
C_5	0.055	5.515	2.758	2.758	5.515
C_6	0.124	9.914	12.393	11.154	12.393
C_7	0.150	10.533	13.542	15.047	15.047
TU	1.000	90.963	88.643	44.275	100.000
RU		90.963	88.643	44.275	

3.5. Risk evaluation

This study consists of identification of the 5 risks which forecast option selection consequences. The risks are listed below:

R1 – Low performance of the employee
R2 – Conflicts with managers
R3 – Inability to work under pressure
R4 – Inability to work due to high sickness absence level
R5 – Will not fit in the collective due to absence at company events

The pairwise comparison of risks was determined by Saaty´s matrix and is shown in Table 8. The most importance of the risk factor has the low performance of the employee.

Table 8: Weights of different risk factors

Type of risk	Weight
R1	0.293
R2	0.235
R3	0.235
R4	0.189
R5	0.047

To express the total and percentage share of risk posed by the different options, the risk degree must be calculated - shown in Table 9.

Results by application the decision analysis showed, that advantage of the first applicant is his experience in the industry, knowledge of HTML, Java language and JavaScript, knowledge of graphical tools and coding and testing. For that reason it would not be difficult to provide induction training to him. The company can offer him the English course. This applicant had the best result according to the utility assessment and second best result according to the risk assessment, as indicated in Table 10.

Table 9: Matrix of risk factors

Criteria	W*	Lik**	L1	Lik**	L2	Lik**	L3	Lik**
R1	0.293	0.3	0.0879	0.1	0.0293	0.5	0.1465	0.1465
R2	0.235	0.3	0.0705	0.3	0.0705	0.3	0.0705	0.0705
R3	0.235	0.2	0.047	0.4	0.094	0.5	0.1175	0.1175
R4	0.189	0.2	0.0378	0.2	0.0378	0.2	0.0378	0.0378
R5	0.047	0.2	0.0094	0.1	0.0047	0.1	0.0047	0.0094
Total			0.2526		0.2363		0.377	0.3817
Risk			66.18		61.91		98.77	

*W = Weight; **Lik = Likelihood

4. Results and discussion

Applicant No. 2 has advantage in amount of hard skills and graphical tools, good English speaking and writing skills and his education (but we can see low importance of these criteria). The language skill is actually of importance for the company because it has entered into contracts with foreign partners and intends to implement foreign projects.

Applicant No. 3 is a person with secondary education and without any experience. The company would have to provide several months' induction training to him. However, his advantage is his young age so he can be expected to quickly fit in the collective and, in addition, to present opinions and attitudes not conflicting with the director. His advantage is the experience in the USA, that's why it is expected excellent English and understanding the software manuals will be easier.

Applicant no. 1 was selected as the most appropriate applicant for the position specified above based on objective assessment, i.e. application of decision-making process. Applicant No.1 meets the defined criteria best and poses the second lowest risk. The problem has been solved. The multi-criteria decision process has been implemented for selection of the most appropriate applicant for the position of web designer. There are many models of HR managers, which are described by Armstrong (2006). The advantage of this survey is that an innovative HR manager can quickly acquire rating of the seeker and immediately compare his knowledge and skills from the curriculum vitae. The second advantage is that the HR manager can evaluate the risk factors of the candidate also. Armstrong (2006) prefers the assessment centre for the evaluation of the applicants on different work positions. He prefers evaluation of the applicant according to a questionnaire, interview and references. This way of evaluation seems to be open-minded, but expensive, and sometimes lengthy and ineffective, as the interviewees may not tell the true.

Table 10: Evaluation of order according to utility and risk

Order	1.	2.	3.
According to utility (U)	1.	2.	3.
According to risk (R)	2.	1.	3.

5. Conclusion

The above mentioned example is a proof of that the decision-making can be used during determination of criteria and selection of option between separate candidates for a job position and can become an integral part of the selection procedure. The manager assessed the applicants not only from the utility view but risk view too. The usage of multi-criteria decision-making process in human resources management is unambiguous.

Acknowledgement

Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

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