

PROPOSAL OF EMPLOYEE TRAINING AND DEVELOPMENT SYSTEM IN A MIDDLE SIZE AUTOMOTIVE COMPANY BY UTILIZING COMPETENCY MODEL AND AHP AND WINGS METHODS

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Abstract

This paper is dedicated to the issue of employees' training and development system based on the competency modeling and utilization of the multiple criteria decision making methods. The objective of the work and used methods will be described in the introduction part. First part of the work will be dedicated to the theoretical backgrounds of employees' training and development and competency modeling. This chapter will be based on the research of Czech and foreign literature and other publications. Second chapter will be devoted to the description of multiple criteria decision making methods that will be used in this paper. Third part of the work will deal with the analysis of current employees' training and development system in a specific organization, i.e. middle size company producing automotive parts and will present the results of quantitative and qualitative research. Key role will be played by the WINGS – method for finding causal relations among criteria, in order to find if there are causal relationships among researched competencies.

Key words: Employees' training and development, competency models, key competencies, AHP, WINGS method.

JEL Code: C49, M12, M51

Introduction

Today, well-educated and trained employees present a significant value for any company. The activity of training and development does not represent only to manage some course or training; it is much more. Since, if our employees will be trained and developed towards something they do not really want or need, the training and development will not provide required results.

However, most of the companies exercise the training and development system where the training activities are based on the needs of employees, either based on needed

development or according to their development objectives determined at their annual appraisal.

In order to determine and provide needed activity which enables the employees to be more productive the author will use quantitative methods of economic analysis – methodology will be further described, to determine core competencies of key employees and then create a proposal for training and development program for the company. Key role will be played by the decomposition methods AHP (analytic hierarchy process) – to rank key competencies, WINGS – method for finding causal relations among criteria. In the conclusion of the paper, the author will provide recommendations that can improve the employees' training and development system. The research will be executed as a case study in a middle size company producing automotive parts based in the Moravian-Silesian region.

1 Literature Review

At the beginning of 20th century human resource managers have expressed the opinion that one of the main challenges they have to confront involve issues related to training and development, Boyatzis (2008). Barrett, O'Connell (2001) finds that employees are likely to place greater value on training programs that are highly respected by colleagues, supervisors and managers. Companies which are able to create an environment where training is valued and supported by employees will be able to achieve greater commitment outcomes. Training perceived by employees to be effective will likely have a positive impact on job satisfaction and motivation. Donovan et al. (2001) executed a research where he found that employees are more active and quick in responding and accepting changes, they build their inner confidence stronger and they develop understanding to the support of their peers once they have participated in different types of training programs. Comprehensive training and development programs help in deliberating on knowledge, skills and attitudes necessary to achieve company's goals and also to create a competitive advantage. Forrest and Peterson (2006) said that training and development objectives are to develop competencies such as technical, human, conceptual and managerial for the furtherance of individual and company's growth.

2 Competency and Competency Models

Competence can be defined as “functional analysis”, which determines what people in specific roles have to be able to do and what work standards are expected of them. (Bartoňková, 2010). Boyatzis, 2009 defines competency as a capability or ability. A

competency model is a framework, which lists the competencies required for effective performance in a specific job or group of jobs. When developing the competency model, the goal should be to identify the competencies, which are required for superior performance, not average or poor performance. People who are most likely to provide accurate data about the competencies that are required for superior job performance are those who perform the job the best (top performers). Depending on the objectives, some models are meant to identify core competencies that are relevant and necessary to all organization's members; however, the model can be designed for key employees only. (Sanghi, 2007)

3 Used Methods

The research presented in this paper is based on two methods, i.e. AHP and WINGS. These methods can be also used in comparison of regions or in finance. (Zmeškal, Dluhošová, 2015 or Minarčíková, 2015). Analytic hierarchy process is a framework of logic and problem solving that spans from the spectrum from instant awareness to fully integrated consciousness by organizing perception, judgments and feelings into hierarchy of forces which influence decision results. The method is based on innate human ability to utilize information and experience to estimate relative magnitudes through paired comparison. The hierarchy represents a complex problem in a multilevel structure, where the first level is the goal followed by levels of factors, criteria and subcriteria. It can decompose a complex problem in search of cause-effect explanations in steps which form a linear chain. For detailed description of AHP, see Kashi, Friedrich (2013).

3.2 WINGS Method

The WINGS method (Weighted Influence Non-linear Gauge System) has been published recently (Michnik, 2013) and it is not widely known yet. That's why it will be shortly described, all steps of WINGS procedure during the process of solution of the model (the full description of the method and its theoretical background can be found in (Michnik, 2013). The basic input in WINGS comprises two features of the studied system's components: internal strength of each component and influence that one component exerts on another one.

The following scale for the influence evaluations has been chosen: 0 no influence, 1 low influence, 2 medium influence, 3 high influence, 4 very high influence. Similarly, the evaluations for internal strength (importance) of system components span from no strength (0) to very high (4) with values computed from the initial AHP weights, that were acquired before. The strength (importance) dimension in WINGS can have different meanings, thus it

is possible to use AHP estimated priorities converted into WINGS scale. The preferences of importance are a result of Saaty pairwise comparison instead of direct input made by decision makers suggested in the original WINGS procedure as of Michnik (2013). Following description of WINGS is composed of following steps.

All evaluations are inserted into a square matrix **D** called the direct strength-influence matrix. This matrix is a $n \times n$ type with components d_{ij} . Values that represent the strength (importance) of components are inserted on the main diagonal ie. d_{ii} = importance of the component i . Values representing influences are inserted into the matrix so that $i \neq j$, d_{ij} = influence of the component i on the component j .

Matrix **D** is then calibrated according to the formula

$$C = \frac{1}{s} D \quad (1)$$

where calibrating factor s is defined as a sum of all elements of matrix **D**, ie.

$$s = \sum_{i=1}^n \sum_{j=1}^n d_{ij} \quad (2)$$

The calibration ensures the existence on total strength-influence matrix **T** defined in (3) if there exist at least two positive elements in the matrix **D** and both are not in the same row. Opposite situation can be excluded from the analysis, because it does not represent any system. As well as in the DEMATEL it will ensure that the results are stable according to homothetic transformation $d_{ij} \rightarrow d'_{ij} = \alpha d_{ij}$, $\alpha > 0$, for $i, j = 1, \dots, n$. In the next step the total strength-influence matrix **T** is calculated:

$$T = C + C^2 + C^3 + \dots = \frac{C}{I - C} \quad (3)$$

The way of calibration ensures that the series in above equation converge, and consequently the total strength-influence matrix **T** exists in almost all cases besides some exotic ones that can be excluded from the consideration. Then, for each element in the system the row sum r_i and column sum c_j of the matrix **T** are calculated:

$$r_i = \sum_{j=1}^n t_{ij}, \quad c_j = \sum_{i=1}^n t_{ij}, \quad (4)$$

where t_{ij} are elements of the matrix **T**. The r_i and c_i represent the total impact and the total receptivity of component. Finally, for each element in the system $r_i + c_i$ and $r_i - c_i$ are

calculated. $r_i + c_i$ shows the total engagement of the component in the system; $r_i - c_i$ indicates the net position (role) of the component in the system: its positive sign means the component belongs to the influencing (cause) group, negative sign means that the component belongs to the influenced (result) group. Therefore, we can create a graph XY ($r_i + c_i$ and $r_i - c_i$), that it is called engagement-position map, that together with a numerical output helps with the analysis and discussion.

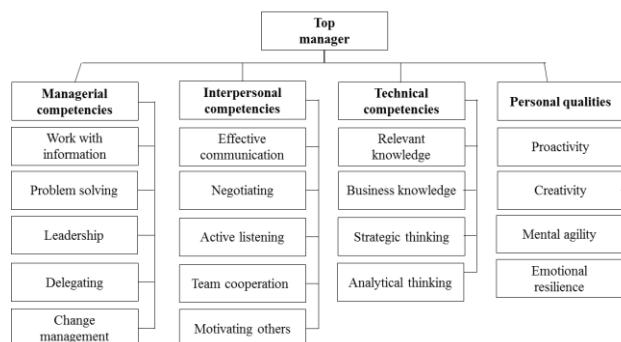
4 Results

Based on the results from the research executed by the author in 2014, where employees of one manufacturing company located in the Czech Republic were asked about the satisfaction with the performance appraisal system and the choice of evaluated competencies, the following competencies were mentioned the most often: work with information, problem solving, leadership, change management, effective communication, active listening, negotiating, team cooperation, motivating others, relevant professional knowledge, business knowledge, strategic thinking, analytical thinking, proactivity, creativity, mental agility and emotional resilience. To be able to identify key competencies, one position (the top manager – who is a top manager in the company) was chosen for this illustration. To determine key competencies for top manager, the method AHP was used. Based on the consultation with the company's HR manager, director, and financial manager, these competencies were divided into the four following groups (criteria): managerial, interpersonal, technical competencies and personal qualities.

Next these competencies were compared in pairs based on modified Saaty's scale (1-9 i.e. A - I) and a scale was assigned to each competency group (criteria) and each competency (sub criteria). This evaluation was done by an oral interview, where a table has been printed and the author has interviewed and wrote the results into the table, where the assessors rated each competency based on his/her personal knowledge, experience, etc. The interview has been done with the HR manager, director (direct supervisor of top manager) and one top manager – financial manager. An average scale was calculated from all of the collected data for each competency. Then an evaluation was executed to find out which group of competencies (criteria) has the most value for given position. Next the specific competencies (sub criteria) were arranged in the order of importance.

Sample illustration of the decomposition of competencies for the utilization of AHP is shown in fig. 1.

Fig. 1: Proposal of the decomposition of competencies for the utilization of AHP



Source: Kashi, Friedrich 2013

The above competencies were pair-wise compared by three experts based on a scale A-I, see Table 1. The author has purposely changed the scale from 1 – 9 to letter scale in order to eliminate rating score with the average number, i.e. 5.

Tab. 1: Paired comparison matrix for groups – example for middle size company

Objective	Managerial	Interpersonal	Technical	Personal
Managerial	A	B	C	B
Interpersonal	B	A	1/C	B
Technical			A	C
Personal				A

Source: Kashi, Friedrich, 2013

Then the weights for individual group of competency were calculated based on the formulas. Global weights are shown in Table 2.

Tab. 2: Global weights for competencies for the position of top manager

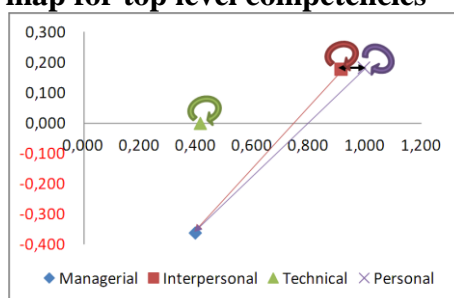
Ranking	Competency	Global weight	Ranking	Competency	Global weight
1	Strategic thinking	19.04%	10	Analytic thinking	3.66%
2	Business know.	13.30%	11	Negotiating	3.23%
3	Change manag.	8.81%	12	Stress resilience	3.00%
4	Proactivity	7.77%	13	Effective communic.	2.59%
5	Mental agility	6.83%	14	Active listening	1.67%
6	Professional know.	6.76%	15	Creativity	1.52%
7	Leadership	6.62%	16	Motivating others	1.34%
8	Delegating	6.62%	17	Work with info	1.24%
9	Problem solving	5.31%	18	Team cooperation	0.69%

Source: Kashi, 2013a

Utilization of WINGS method for the Determination of Necessary Training

The existing WINGS model of interrelationships and influences was used as a starting point and importance measure was added to the matrix as characterized by (1). Then the following sequence of (2) to (4) was used to determine the total strength-influence matrix **T**. Then values of $r_i + c_i$ and $r_i - c_i$ were calculated to draw the engagement-position maps for each of the levels of the model.

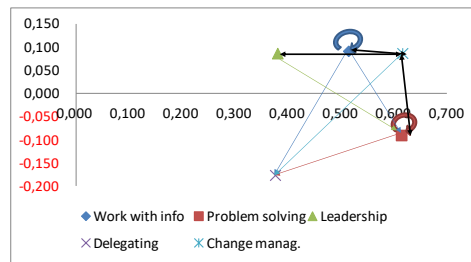
Fig. 2: Engagement-position map for top level competencies



Source: Own elaboration

As can be seen from Figure 2 the personal and interpersonal competencies highly affect the managerial competencies, so it means that the attention should be paid to the development of these competencies, i.e. the personal and interpersonal competencies should be developed the most, since they affect the most the other ones. Technical competencies are independent, and they are neither affected nor affecting any other competencies and should be developed as well.

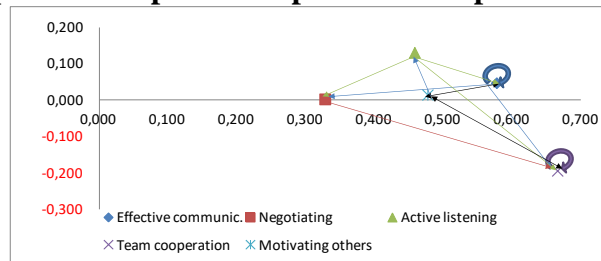
Fig. 3: Engagement-position map for managerial competencies



Source: Own elaboration

The structure of managerial competencies is shown in Figure 3. It is evident that work with information, change management and leadership are the crucial competencies within the managerial competencies, since they highly affect the problem solving and delegating. Next, the problem solving affects the change management and delegating is only the receiver and does not affect any other competency.

Fig. 4: engagement-position map for interpersonal competencies



Source: Own elaboration

As can be seen in Figure 4 the effective communication affects all other competencies apart from active listening. Team cooperation is affected by all four competencies and therefore if the four competencies are improved the team cooperation should improve as well.

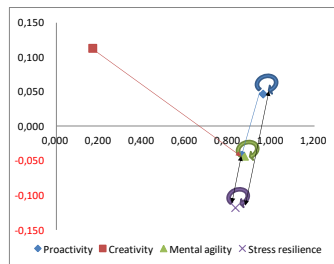
Fig. 5: Engagement-position map for technical competencies



Source: Own elaboration

From Figure 5 it is evident that the professional knowledge is the most important since it affects the other three competencies. If professional knowledge, strategic thinking and analytic thinking are improved then business knowledge will be positively affected.

Fig. 6: engagement-position map for personal competencies



Source: Own elaboration

As can be seen from Figure 6 the creativity is the key competency, since it influences mental agility and stress resilience. Creativity further affects mental agility. Stress resilience can be improved by developing proactivity and mental agility.

Conclusion

This work briefly describes the competency models, its development and utilization. It also deals with the description of WINGS method and its utilization in competency modeling. The results from WINGS imply that among the employees' interpersonal, personal and managerial competencies are cause and effect relationships that show how those competencies are interrelated. This insight should help the company's management to concentrate on improving particular competencies that are most influential to the others. The technical competencies were found to be not affecting nor affected by other competencies. When comparing results from AHP and WINGS we have to look for an intersection. The most important competency according to prioritization using AHP is professional knowledge followed by analytic thinking. Using WINGS, it was found that these competencies are independent to other competencies and are interrelated only within technical competencies themselves. This means that company HRM will not be able to influence them by enhancing other competencies and also that better technical competencies shall not be influential to for example managerial ones. Since the technical competencies are important the employees selected for the position have to have these competencies at higher level than the others that can be somehow influenced and steadily improved. AHP method helped to scale down the number of measures and helped to determine the most important competencies which lead to the achievement of firm's strategic goals. Because of the inherently inter-related nature of the attributes, the determination process of priorities can be quite complex. According to study's

findings, one may use the AHP and the WINGS to study the design of competency models as a HR strategic management system.

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