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GRAPHICAL PRESENTATION OF A MEASURE OF AN EMPLOYEE'S COMPETENCE FOR A JOB POSITION

The main objective of this paper was to develop a graphical presentation of a measure of an employee's competence (ECVM) for a job position. In this context, the essence and formula for measuring the value of an employee's competences have been presented. This formula makes it possible to provide a definition of the method for determining the total value of all the competences in the competence profile and the value of an employee's competences. With regard to the graphical presentation of the measure, it was assumed that the most appropriate form will be a pie chart. The key assumption was such that each competence in the profile would be a segment (slice) of the pie chart. An example of the graphical presentation of the measure of the employee competencies has been presented.

Keywords: *competency-based management, competence profile, measure of an employee's competence*

1. Introduction

The issue of measuring the value of professional competences has been a subject of academic debate for a number of years. In the literature on the topic of competency-based management, the competence profile** of a position, as well as the competence profile of an employee are tools used in the processes of employee selection, evaluation [13, 19] and professional development [2, 8, 14, 18]. There have also been some attempts to use them in remunerating employees [15]. In this context *Competency-*

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**The competence profile should be understood as a set (portfolio) of competences, along with the required levels of their achievement and the weights defining specific competences ([7], p. 177).

based HRM [human resource management] is about using the notion of competency and the results of competency analysis to inform and improve the processes of performance management, recruitment and selection, employee development and employee reward. It therefore has an important part to play in all the major HR activities ([1], p. 202).

In numerous publications, the issue of the value of professional competences is considered mainly using a qualitative approach [1, 16]. However, sometimes authors touch upon the issue of quantitative measurements of the employees' competence. In this respect, a simple solution is offered by Filipowicz [11, 12] and Baladi, who developed a quantitative system for Ericsson Business Consulting [2]. Biesalski and Abecker proposed using direct and proportional measures for skill profiles at Daimler Chrysler's Truck Plant in Wörth/Rhein [8].

The scope of the discussion and solutions presented above is sufficient to achieve the informational function of competence profiles. With respect to achieving an organisation's objectives, the scope and the level of required competences in each organisational unit and in each position are defined. Moreover, after conducting a competence audit of employees, it is known what actual competences particular employees have and what the level of these competences is. This knowledge helps to make appropriate personal and organisational decisions. However, they are still based mostly on intuition and are not supported by precise quantitative criteria.

Golec and Kahya suggest applying fuzzy models for evaluating and selecting employees on the basis of competences [13]. The use of the concept of fuzzy sets with reference to both the individual competences of particular employees, as well as the organisation as a whole, is suggested by Pepiot et al. [17], as well as Shahhosseini and Sebt [19].

The value of an employee's competences is relative, as it depends on the competence profile they will be compared with. Against the background of the entire organisation, the same competence may have a different ranking (weight) in the corporate competence profile, and a different ranking (weight) as regards a particular position*.

*The issue of weights – rankings given to particular competences is connected mainly with their valuation, i.e. determination of the relative importance of competences in a defined context. This stems from the fact that not every competence taken into account in the relevant competence portfolio affects effectiveness, efficiency or the quality of achieved targets or performed tasks to the same extent. Weights may be defined by evaluating competences in the context of:

- the organisation's mission and strategy as a whole,
- the scope of the operations, objectives, importance of the given organisational unit,
- objectives and tasks assigned to an employee in a particular position.

The authors are not familiar with literature discussing particular manners of determining the rankings of competences, but expert and participatory methodologies used as part of the Management by Objectives method may be used for this purpose. It is HR employees and managers that possess the most exten-

This paper deals with the situation in which the value of an employee's competences is calculated based on the competence profile related to the employee's job position.

In the practice of management, competence profiles, in addition to their informational functions, can help to solve multi-criteria problems. Such problems occur in the process of comparing the evaluations of job candidates or in the process of comparing the evaluations of particular employees. Such comparisons become possible if a process of determining the total value of all the competences included in the position competence profile is established and the value of an employee's competences is defined. Solutions related to this issue were previously formulated by the authors of this paper [5, 7] but not the problem of the so-called graphical presentation of the measure of an employee's competence. Graphical presentations are important communication tools in a modern organisation. They make it possible to convey to all employees various kinds of information in a readable, easily interpretable and understandable form. Good examples here are Gantt charts, block diagrams, PERT diagrams, a variety of economic diagrams, Ishikawa cause-and-effect diagrams, Pareto diagrams, process maps [4].

In this context, the objective of this study is to offer a graphical interpretation of the measure of an employee's competence for a specific job position. The presented graphical interpretation will correspond – to a certain degree – to the assumptions of the authors' previously offered proposal, which was an alternative to Filipowicz's polar chart, presented in the paper by Bieńkowska and Brol [4]. However, it will also consider all the requirements that the measure of an employee's competence has to meet. It will also relate to the examples included in the work by Bieńkowska and Brol [6]. This method of graphical presentation will be a useful tool in the process of personnel selection and employees' evaluation. It will also have a chance to be used in a wider context as an instrument of competence-based management [10], as well as personnel controlling [3].

2. The formula for the measure of an employee's competence for a job position

The authors of this paper consistently use the formula for the measure of an employee's competence for position j ($ECVM_j$) [5, 6] that assumes the following formula:

$$ECVM_j = 0 \quad \text{when} \quad \bigcup_{i \in \{1, \dots, m\}} pij < cij \quad (1)$$

sive knowledge in this scope, but it is also possible to take into account the opinions of experienced employees employed in a given group of positions for which competence profiles are created.

$$ECVM_j = \sum_{i=1}^m vsij \times \left(\frac{sjj}{aij} \right) \times 100\% \quad \text{when} \quad \bigcap_{i \in \{1, \dots, m\}} pij \geq cij \quad (2)$$

where: i – the i -th competence in the profile for a given position, j – job position index, cij – the desired minimum level of achievement for the i -th competence assigned to the competence profile of the j -th position – that is the minimum level of achievement related to this competence necessary to properly perform job position j , aij – the desired level* of achievement for the i -th competence assigned to the competence profile of the j -th position – that is the level of competency deemed to be required for an employee to be very efficient in carrying out tasks related to competence i in the profile for job position j , vij – the weights determining the significance of the i -th competence assigned to the competence profile of the j -th position from the point of view of its influence on the work performed in the j -th position, showing the significance of these competences to achieving the targets of the j -th position**, for example, their value can be from the range $\langle 1, 10 \rangle$, $vsij$ – the standardised weight of the i -th competence in the set of weights for the j -th position is denoted $vsij$ and calculated according to the following formula:

$$vsij = \frac{vij}{\sum_{i=1}^n vij}$$

pij – the level of achievement of an employee for the i -th competence in the context of the j -th position, sjj – the conditional level of achievement of a given employee for the i -th competence in the competence profile of the j -th position:

*There are many advantages of defining these two levels. For example, in the process of selecting personnel a candidate should not be employed if he/she does not possess the minimum competence level, while the evaluation of a candidate's competence is aimed at selecting the candidate that meets the competence requirements to the greatest extent with regard to the desired level. In the event of the use of competence profiles in the periodic assessment of an employee, differentiation between the minimum and the desired competence level is also justified. It may be assumed that the employee must have met the minimum requirements already in the selection process, but he/she did not necessarily have to achieve the desired level; thus, the competence evaluation of an employee with regard to the desired level allows us to identify the employee's competence gap and to recommend relevant training. Moreover, one should remember that the competence portfolio for a given position changes as time goes by, which is why an employee employed in a given position may not have particular minimum competences. An important argument in favour of using these two levels, as regards meeting competences in a given position, is the fact that such competence profiles may be used for valuing positions and building a competence tariff for positions and pay scales.

**The values of particular weights can be equal; this indicates that the corresponding competences have the same significance in the competence profile of a position.

$$s_{ij} = \begin{cases} p_{ij} & \text{for } p_{ij} \leq a_{ij} \\ a_{ij} & \text{for } p_{ij} > a_{ij} \end{cases}$$

The use of the conditional level of achievement for the i -competence deals with situations in which the employee holding a particular position has “over-competences” * [5, 6].

Such a measure of an employee's competence shows how close (in percentage terms) the evaluated employee is in his/her competences to the desired level for a given position. This measure allows comparing employees in the same positions, as well as creating a ranking of the candidates for a job in a given position. It is obvious that the employee (candidate) is “better” than another – that is – more appropriate for a given position when his/her aggregated competence measure is greater.

3. Assumptions for the graphical presentation of the measure of an employee's competence for a job position

In defining a graphical interpretation of a measure, the authors made the following assumptions:

- The interpretation has to be a reliable presentation of both the quantities included in the measure and the value of the measure and it should convey different kinds of information in a readable, easily interpretable and understandable form. Graphical presentation should not mislead the information receiver in any way.

- The value of a measure will be the area of a geometric figure. This area can be presented in a radar or bar chart. Owing to the popularity and readability of radar charts, it is just this form of presentation that has been adopted.

Both assumptions are significant since some graphical presentations of competence profiles offered in the literature on this subject have certain shortcomings. They can hinder, or even in extreme cases prevent, the correct interpretation of information.

For example, Baladi suggests presenting a competence profile on a polar chart [2]: *the polar chart can be used to show the gap between actual and needed competencies.*

*Sometimes an excessive competence level of an employee compared with the desired level for a given position may lead to negative consequences for the employee himself/herself, e.g. frustration caused by the impossibility of demonstrating his/her skills at work, because of under appreciation of the employee's competences by the employer, or insufficient remuneration for the competences possessed by the employee. Frustration and stress negatively affect the employee's behaviour in the work place. It is often the case that an employee who is not offered an opportunity of promotion to another position in which he/she might use his/her competences leaves the organisation. Such events have negative consequences for the employer, such as the need to conduct another recruitment process, damage to the employer's reputation on the labour market.

(...) *It shows an employee's actual competence and her/his planned competence development, based on »personal development discussion« with his/her manager* ([2], p. 25). In a similar fashion, Filipowicz [11, 12] places the competences required for a specific job and the employee's actual competences on a polar chart. However, both these methods pose a risk of inappropriate interpretation. These methods do not define a sequence for placing the competences on the chart. They also suggest connecting adjacent competencies with lines. This can lead to inappropriate quantitative interpretation. The lines connecting the competencies form a geometrical shape. But neither the perimeter nor the area of this shape can be used to quantify the level of competence, because the shape and its area are determined by the order in which competences are placed on the chart [4].

In order to correctly reproduce both the quantities included in the measure, as well as the values of the measure themselves, the authors have to provide answers to the following questions:

1. What is the interpretation of the particular competences in the profile?

Each competence in the profile is illustrated by a segment of the pie chart, defined in point 2.

2. What does the most profitable situation (that is – the situation in which all the competences required from the employee are achieved at the desired level) look like?

It is assumed that the possession of all the desired levels of achievement of the competences in a given position is represented by a circle of a free but defined – for the needs of graphical interpretation – radius R . The value R is an auxiliary quantity – it has no interpretational attributes. It is used solely to correctly illustrate the area representing the desired and real level of achievement of a given competence, as appropriate.

3. How to interpret the desired level of achievement of the i -th competence in the j -th position, aij , and the real level of competence, p_{ij} , achieved by a given employee?

The desired level of achievement of a particular competence, aij , is represented by the area of a slice from a circle with radius R . At the same time, attention should be paid to the fact that for each competence a maximum level of achievement – for example $A_{ij} > a_{ij}$ – could be defined. However, the graphical presentation does not consider the level A_{ij} , but a_{ij} . If A_{ij} were represented by a slice of a circle of radius R , then – when $a_{ij} < A_{ij}$, that level of competence might be “discriminated against” in relation to other competences, because of the fact that the position requires a “lower level” of competency than the maximum possible. Thus, this would cause erroneous interpretation of the graphical presentation.

The real level of achievement of a given competence, p_{ij} , achieved by a given employee is depicted by a slice of a circle of radius $r_i \leq R$, where:

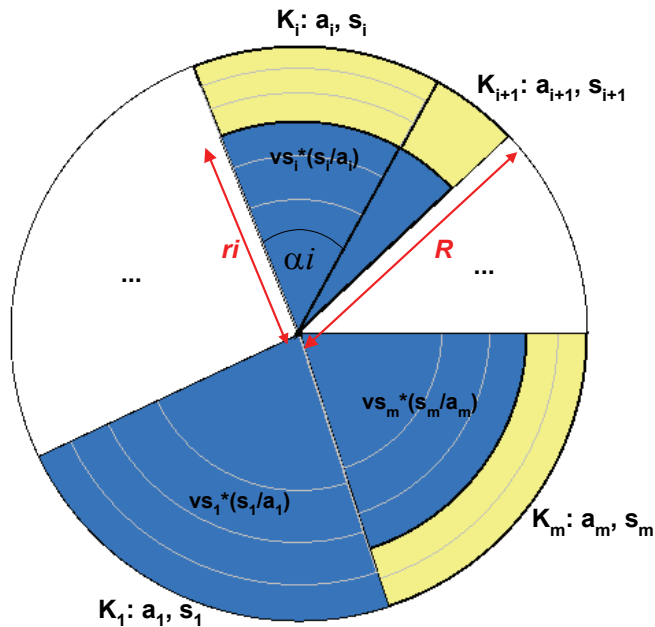
$$r_i = \sqrt{\frac{s_{ij}}{a_{ij}}} R^2$$

4. How to illustrate the weights of particular competences?

The weights of particular competences are illustrated by the angle α_i between the arms of the slice representing a given competence. The bigger the angle, the more significant the corresponding competence in the profile of a given position is. The value of this angle is calculated according to the following formula:

$$\alpha_i = v_{s_{ij}} \times 360$$

Taking the above assumptions into consideration, the graphical interpretation of the measure of the competences of an employee for a particular position – from a general perspective – is presented in Fig. 1.



$K_1, \dots, K_i, \dots, K_m$ - the competences required in a given position
 $a_1, \dots, a_i, \dots, a_m$ - the desired level of competences in a given position
 $s_1, \dots, s_i, \dots, s_m$ - the employee's level of achievement of competences
 $v_{s_1^*}, \dots, v_{s_i^*}, \dots, v_{s_m^*}$ - the standardised weight of competences

- the graphical presentation of the measure of employee's competence for a given position

Fig. 1. The assumptions for the graphical presentation of the measure of an employee's competence in a given position. Source: the authors' own study

4. Interpretation of the graphical presentation of the measure of an employee's competence for a job position

The following example presents a situation in which the competences of employee 1 employed in position A (Customer Service Specialist) were evaluated. Table 1 lists the basic information, which allows us to calculate the value of the measure of competence for this employee.

The following competences are required in position A*:

K1 – building relations in an organisation. Desired level 5. Builds positive relations with colleagues which contributes to a good atmosphere at work and the effectiveness of the entire team.

K2 – customer and result orientation. Desired level 4. Performs sales tasks (qualitative and quantitative) and builds relations with customers at a level meeting the organisation's expectations.

K3 – professionalism and development orientation. Desired level 6. Uses knowledge and professional skills and strives to improve qualifications and self-improvement.

K4 – functioning in difficult situations. Desired level 6. Controls his/her emotions, which allows him/her to maintain effectiveness and good relations with others.

K5 – independence and creativity. Desired level 5. Definition: Performs assigned tasks independently, without the need for the permanent monitoring of work progress, and demonstrates initiative when undertaking standard activities.

In rows 1 and 4, the desired and minimum levels of achievement of the particular competences are defined, respectively. In row 2, those competences have been highlighted for which the level of achievement by a given employee is lower than the desired level of achievement of this competence for this position. In this way, the competence gap is identified for a given employee. It turns out that employee 1 does not achieve the desired level in position A with respect to the competences K1–K4. However, this employee achieves the minimum level (hence, the condition $p_i \geq c_i$ in relation to each competence in the profile is fulfilled). The conclusion that can be drawn here is as follows: Employee 1 can still work in position A, because he/she has acquired the minimum required competences, but he/she should develop these competences in order to eliminate the competence gap as measured by the difference between the level of an employee's competence and the desired level of this competence.

In row 3, we indicated that the level of competence achieved by a given employee is higher than the desired level of achievement for this competence. As regards employee 1, his/her level of independence and creativity is higher than desired (K5). This

*These competences and their descriptions were based on the practice of LUKAS BANK S.A., which implemented competence-based periodic assessment of employees in the Customer Service Office.

is not beneficial to the employee's motivation, as a lack of opportunity to demonstrate creativity may weaken his/her involvement in the performance of repeated routine tasks. On the other hand, if the employee wanted to meet his/her aspirations and, for example, made efforts to make improvements at work, this may turn out to be harmful to the performance of obligatory standard procedures.

Table 1. The calculation of the ECVM for employee 1 in position A

No.	Topic	Notation	Competences in the profile for position A for which the desired level is higher than zero				
			K1	K2	K3	K4	K5
1	Desired level of achievement for the i -th competence in a given position	a_i	5	4	6	6	5
2	Level of achievement for the i -th competence by a given employee	p_i	3	3	2	3	6
3	The trimmed level of achievement for the i -th competence by a given employee	s_i	3	3	2	3	5
4	The threshold (minimum) level of achievement for the i -th competence in a given position	c_i	3	3	2	2	3
5	Indicator of the event $p_i \geq c_i$ (0 not achieved, 1 achieved, – non-applicable)	$p_i \geq c_i$	1	1	1	1	1
6	The weight of the i -th competence in terms of its influence on the work performed in a given position	v_i	7	8	9	5	6
7	The standardised weight of the i -th competence in the set of weights of a given position in terms of its influence on the work performed in a given position	v_{si}	0.2	0.2286	0.2571	0.1429	0.1714
8	Additional computations	s_i/a_i	0.6	0.75	0.33	0.5	1
9	Additional computations	$v_{si} \frac{s_i}{a_i}$	0.12	0.1714	0.0857	0.0714	0.1714
10	Measure of the competence of employee 1 in position A	$ECVM_A$	62%				

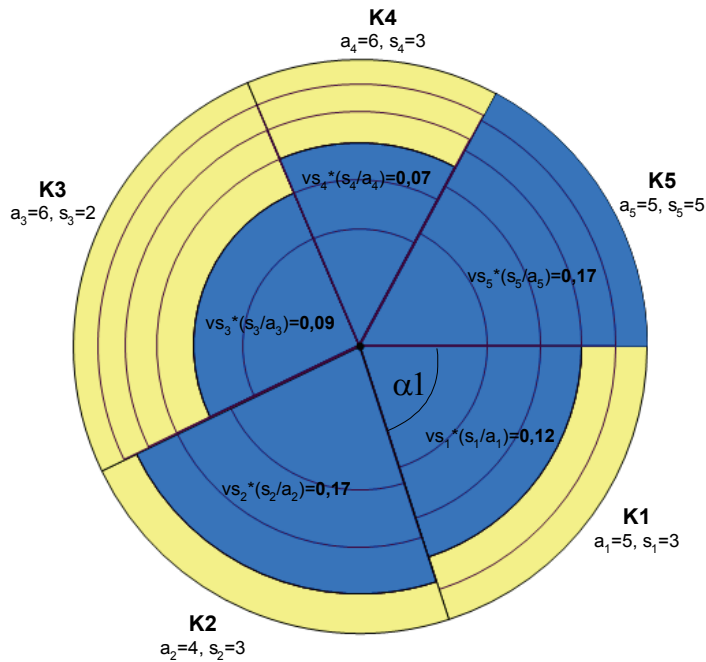
Source: Authors' study based on [6].

In the case of competence K5, we have identified employee 1's achievement of so-called "excess" competence. This, however, should not be taken into consideration in the calculations referring to the measure of competence. Therefore, for the purpose of our calculations, we adopted "only" the desired level of achievement for this competence in position A (the trimmed level).

In row 6 (as well as row 7), we indicated the competences with the lowest and highest weights (in row 7 – the standardised weights) for a given position from the point of view of their influence on the work performed in a given position. In this case, the competence with the highest weight for position A is K3. From the point of view of the work performed in position A, competence K4 is of the least significance.

Row 10 gives the measure of the employee’s competence. For employee 1, this amounts 62%, which means that this employee is relatively close to the level of competence which is regarded as desired, but the employee also has a competence gap (measured as 38%) to the achievement of such a level of competence which would allow him/her to have the highest work effectiveness and efficiency.

The graphical presentation of the measure of the competence of employee 1 in position A is shown in Fig. 2. The area marked dark presents the real value of the employee’s competence, whereas the lighter area the value of the competence gap for this employee in relation to position A.



$K1, \dots, K5$ - the competences required in POSITION A
 a_1, \dots, a_5 - the desired level of competences in POSITION A
 s_1, \dots, s_5 - the level of EMPLOYEE 1's achievement of competences
 vs_1, \dots, vs_5 - the standardised weight of competence

- the graphical presentation of the measure of the competence value of EMPLOYEE 1 in POSITION A

Fig. 2. The graphical presentation of the measure of employee 1’s competences in position A. Source: the authors’ own study

5. Conclusions

A new way of graphically presenting an employee's competence value for a job position has been described. The method enables simple and clear interpretation of this graphical presentation in relation to the values of individual competences and the aggregated measure of competence defined in such a way that it is presented as the area of a set of circle segments. Using this method, it is possible to compare – in a very readable way and according to the required level of the achievement of competence – employees employed in the same positions. As already pointed out, this method of graphical presentation also makes it possible to solve the multi-criteria decision problem of determining the ranking of employees (candidates) on the basis of the results of the assessment of all the competences required in a given position.

This approach may be used not only for analysing the value of an employee's competences in the assigned position, but also for analysing and interpreting the value of desirable competences in a given position as compared to other positions; it is a starting point for the competence-based valuation of positions.

This concept will thus contribute to employees' development of competences, which is so significant that Currie and Darby identified a lack of competence development as the major problem of modern competence-based management [9].

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