Human Resource Management with the Support of Management Information Systems

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Abstract: *At present, new technologies are crucial in maintaining the competitiveness of businesses. In recent years, the application of management information systems has also increased in the field of human resource management, where they support many decisions concerning human resources. Emphasis is placed on employee training and the use of information systems in terms of achieving a competitive advantage. The practical part is focused on finding the dependence between employee training, the use of information systems and the competitiveness of the selected enterprise, where regression and correlation analysis is applied. Regarding the performed analysis, we confirm the significant impact between the costs spent on employee training, the costs spent on information systems and the accounting profit/loss, labour productivity in the selected enterprise. Based on the results of the research, generalized findings and suggestions are presented.*

1. INTRODUCTION

Competitiveness is a concept that has attracted the attention of economic theorists for decades (Šegota, Tomljanović, Hudek, 2017). The dynamics of the business environment creates pressure on the competitiveness of each enterprise (Lorincova, Vetrakova, Lizbetinova, 2018). The current business environment is characterized by globalization, open markets, an enormous amount of information and easy communication. These features make it a more difficult competitive environment (Marwan, 2014).

Human Resource Management (HRM) is one of the basic attributes of the success of any organization (Potgieter, Mokomane, 2020). The HRM function is considered by top managers as a significant source of competitive advantage, as it significantly contributes to the overall productivity and strength of the organization. It helps to build a more stable workforce through better system of recruitment, training and care of employees (Memeti, Azizi, Luma-Osmani, 2019). Human capital, as one of the internal resources, incorporates the knowledge and skills of employees, and in the new market environment is a great driving force for increasing the competitiveness of enterprises (Ma, 2018). The need to improve and update expertise requires lifelong education and training of professionals, as well as certification of qualifications. In particular, employee training of small and micro-enterprises is a key issue in conditions of crisis and constant change, as it leads to the implementation of innovative measures, the use of modern technologies, the offer of quality services and finally increased competitiveness (Tzamalis, 2015). Training is considered to be one of the main values, without which it is not possible to form a workforce in the current economy (Kapustina, Martynová, 2020). HRM has become a critical source for gaining a competitive advantage (Chahar, Hatwal, Sen, 2019). Increasing employee productivity and reducing human resource costs are two useful ways for an HRM manager to increase profits. The cost of human resources forms the maximum part of the total costs of organizations, and therefore it is necessary to pay increased attention to the implementation of information technologies in HRM (Begum et al., 2016).

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Over the last decades, advanced information technologies have become increasingly ubiquitous demands (Casalino et al., 2019). They are a direct source of increasing an enterprise′s competitiveness and are therefore particularly important for its long-term survival and development (Li, Wang, 2015). The introduction of information systems can help enterprises achieve greater efficiency and effectiveness (Loonam et al., 2014). They support sound business decision-making processes through the use of analytical tools (Antoniadis, Tsiakiris, Tsopogloy, 2015). Visual information has contributed to improving the information needs of managers, to more effective decision-making, and more effective control activities (Zhan et al., 2019).

Information technologies represent a benefit for every organization in increasing its productivity, which is exhibited through effective HRM, where information systems play a major role (Kushwaha, Yadav, Prasad, 2018). HRIS (Human Resources Information System – HRIS) has become a crucial tool for integrating human resource information into an organization's business strategy (Gedam, 2011). HRIS is an integrated system used to collect, store, and analyse data related to an organization's human resources, consisting of databases, computer applications, hardware, and software. The use of HRIS in organizations has many advantages for managers, especially in decision-making processes (Bal, Bozkurt, Ertemsir, 2012).

Investments in the new information system should be made by following the strategic management. The profitability of an information system depends on its usefulness in managing and improving key strategic areas of business. Not only the quality of the information system itself but also the strategy of introduction and implementation of the information system has a positive impact on the enterprise's financial results (Pérez-Méndez, Machado-Cabezas, 2015). The successful implementation of the information system for HRM depends on various factors, including corporate culture, managerial skills, as well as the suitability of the technology concerning business processes (Memeti, Azizi, Luma-Osmani, 2019). The key factor is the support of top management. Top managers who support a positive approach to information systems can build a strong coalition and create a vision that is consistent with the enterprise's strategy (Loonam et al., 2014). Many enterprises are unable to successfully implement new technologies due to disinterest and resistance to change (Memeti, Azizi, Luma-Osmani, 2019). The main obstacles to the implementation of the information system for HRM include insufficient financial support from the enterprise (Ramírez, Tejada, 2020).

Businesses that transfer as much HRM activity as possible to information systems are becoming more efficient. This is especially true for larger enterprises operating in larger markets that are in a phase of growth or stagnation (Barišić, Poór, Bach, 2019).

2. DATA AND METHODS

A large number of different factors affect the competitiveness of enterprises. One of them is the Human Resource Management (HRM) area. The main aim of the paper is to point out the relevance of employee training, management information systems and the competitiveness of enterprises.

The object of research is the area of HRM in the selected enterprise. It is a large enterprise operating in the field of industrial production. Due to the sensitivity of economic data, we call it with the fictitious name ABC. The enterprise's management has expressed interest in improving its current state of management processes and information systems, from which they expect to

strengthen its competitiveness in the market. A substantial part of the HRM budget is the cost of employee training, so we have set the following sub-objectives to meet the main goal:

1. find out the dependence between employee training and the competitiveness of the selected enterprise,
2. find out the dependence between the use of information systems and the competitiveness of the selected enterprise.

In this paper, we applied regression and correlation analysis. For statistical evaluation, we set the following research hypotheses:

Hypothesis One: The costs of employee training have an impact on the growth of accounting profit/loss and labour productivity.

Hypothesis Two: The costs of information systems have an impact on the growth of accounting profit/loss and labour productivity.

An important indicator for assessing an enterprise's competitiveness is the accounting profit/loss, which is used in the calculation of financial indicators related to competitiveness. An important indicator is also labour productivity, which we measured through added value (Majdúchová, Neumannová, 2008):

$$PP = (added\ value\ /\ average\ number\ of\ employees) \tag{1}$$

The research is carried out for the period 2009 – 2019. The basis for the calculations was data on the accounting profit/loss, labour productivity, costs of employee training and costs of IS/IT for all centres. The enterprise monitors the costs incurred in the analytical accounts (518300 – Training, 013100 – Software, 518100 - IT and software, 518200 - IT leasing of devices). We performed the analysis using MS Excel and Gretl programs. For the final output, we determined a linear model for multiple dependencies (Matejková, Pietriková, Poláková, 2018):

$$y_j = b_0 + b_1\,x_j + b_2\,x_j + b_n\,x_j \tag{2}$$

where:

y_j – jth value of the dependent variable (accounting profit/loss, labour productivity)

x_j – jth value of the independent variable (Training, Software, IT and software, IT leasing of devices)

b_0 – locating constant

$b_1, b_2, ... b_n$ – regression coefficient

As part of the statistical research, we combined several options and gradually eliminated insignificant variables, we worked our way to the final model. Subsequently, after selecting the most suitable model of the regression function, we dealt with its quality - the strength of dependence. We verified the explanatory power of the model by calculating numerical characteristics. The linear model had to meet several assumptions, based on which the least-squares estimation of the model was unbiased and efficient. These assumptions that we verified in GRETL include heteroscedasticity, autocorrelation and multicollinearity.

3. RESULTS

The field of HRM is very important, as human resources are involved in creating value that affects the competitiveness of the enterprise. The requirements for the information system in the field of HRM depend on the number of employees and the requirements for their training.

Employee training as an important agenda within HRM is becoming a lifelong need in the current business environment. This is a relatively wide area, which includes many activities. Employee training represents a significant part of the HRM budget. For effective management, it becomes important to implement a suitable MIS, which will allow:
- improvement of the employee training processes,
- reduction of HRM costs.

As a part of the statistical survey, we combined several options for determining the dependence of accounting profit/loss and labour productivity on the employee training costs and the information systems costs in the selected enterprise.

For the final output, we determined the most suitable model and transformed the general equation of the linear model according to the output as follows:

$$VH = b_0 - b_1 \cdot 10{,}51 + b_2 \cdot 109{,}98 + b_3 \cdot 10{,}74$$

Based on the statistical survey using regression and correlation analysis, we came to the results listed in Table 1.

Table 1. Regression and correlation analysis – accounting profit/loss

Regression statistics	
R-squared	0.9948
Adjusted R-squared	0.9917
S.E. of regression	1.1093
Observations	9

	Coefficient	Standard Err.	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-1.1936 3e+06	345148	-3.46	0.0181	-2.0808 6e+06	-306399
Software	-10.5125	2.06094	-5.10	0.0038	-15.8103	-5.2147
IT a software	109.9810	5.96908	18.43	<0.0001	94.6370	125.3250
Training	10.7386	3.85153	2.79	0.0385	0.8380	20.6393

Source: own calculation, internal data ABC´s enterprise

The value of the coefficient of determination is 0.9948. The chosen regression function explains the accounting profit/loss variability to approximately 99.48 %. The remainder represents unexplained variability, the influence of other random factors, and unspecified influences. The number of observations represents a period of 9 years.

Based on the P value < 0,05, we claim that all coefficients are statistically significant. The biggest positive impact on accounting profit/loss and labour productivity has the costs of IT and software, which are charged to a separate analytical account 518100. This account monitors intangible assets with a value equal to or less than 2.400 euro, as well as services related to information systems in the researched enterprise - consultations, updates, configurations, repairs and maintenance, Internet services.

If the cost of IT and software increases by 1 euro, we can expect the accounting profit/loss to increase by an average of 109.98 euro If the cost of IT and software increases by 1 euro, then with a 95 % probability we can expect the accounting profit/loss to increase from 94.64 to 125.33 euro. We interpret training similarly.

As part of the statistical survey, we also combined several options for determining the dependence of the employee training costs and the information systems costs on labour productivity. For the final output, we determined the most suitable model and transformed the general equation of the linear model according to the output as follows:

$$PP = b_0 + b_1 \cdot 0{,}83 + b_2 \cdot 0{,}14$$

Table 2 contains the results of regression and correlation analysis between costs on information systems and labour productivity, as well as between costs on employee training and labour productivity.

Table 2. Regression and correlation analysis – labour productivity

Regression statistics	
R-squared	0,9887
Adjusted R-squared	0,9842
S.E. of regression	1,7575
Observations	8

	Coefficient	Standard Err.	t Stat	P-value	Lower 95%	Upper 95%
Intercept	5905,45	2257,23	2,62	0,0473	103,06	11707,80
IT a software	0,8287	0,0521	15,90	<0,0001	0,6948	0,9627
Training	0,1364	0,0535	2,55	0,0512	0,0010	0,2738

Source: own calculation, internal data ABC´s enterprise

The value of the coefficient of determination is 0.9887. The selected regression function explains the accounting profit/loss variability of approximately 98.87 %. The remainder represents unexplained variability, the influence of other random factors, and unspecified influences. The number of observations represents a period of 8 years.

Based on the P value <0,05, we claim that all coefficients are statistically significant. As with accounting profit/loss, IT and software costs have the greatest positive impact on labour productivity too. If the cost of IT and software increases by 1 euro, then we can expect that labour productivity will increase by an average of 0.83 euro If the cost of IT and software increases by 1 euro, then with a 95 % probability we can expect the labour productivity to increase from 0.69 euro to 0.96 euro We interpret training similarly.

Based on the performed regression and correlation analysis in the examined enterprise ABC, we accept the established hypotheses:
1. IT and software costs and employee training costs have a significant impact on accounting profit/loss growth,
2. IT and software costs and employee training costs have a significant impact on labour productivity growth.

Accounting profit/loss and labour productivity are indicators that are significantly used in assessing the competitiveness of enterprises.

4.   FUTURE RESEARCH DIRECTIONS

In recent years, there has been an increase in the implementation of MIS in the field of HRM (HRIS), where it supports many human resource decisions, such as staff information gathering, recruitment and selection, staff training and development, evaluation and rewarding of employees. Human resources costs form a significant part of the total costs of companies, and therefore it is necessary to pay special attention to the implementation of IS/IT in the field of HRM, which help increase employee productivity and reduce human resources costs. Technology has an increasingly significant impact on HRM. As technology evolves, it will also force HRM to take on new contours in its processes and procedures. HRIS was created in response to the need to make this change in the most fruitful way possible, taking into account increased accuracy, fast access to information, increased competitiveness and efficiency, and the redesign of the HR function. However, its role in HRM allows us to respond more quickly to changes and needs in human resource management, such as budget control, monitoring and screening, skills allocation, evaluation, feedback, workforce planning, succession planning, skills monitoring, analysis training needs and global analysis. In the light of these trends, it is important to conduct future research.

5.   CONCLUSION

In today's business environment, there is an increasing emphasis on the availability of fast, high-quality and accurate data for managers. The timely provision of the right data, and the information obtained from them for the subsequent decision-making of managers, can greatly affect the enterprise's position in the market, its financial situation, as well as its competitiveness. It is therefore important that the enterprise has an effective database and a suitable MIS in place. The information system for HRM also has an important position within the MIS. Employee training costs usually forms the largest part of the HRM budget and with the help of a comprehensive information system, it can be one of the factors in maintaining and increasing the competitiveness of enterprises.

In determining the research issues, we based our analysis on the real requirements of the enterprise and we pointed to the relevance of education, management information systems and competitiveness.

To find out the dependence between employee training and the use of information systems on the competitiveness of enterprises, we applied regression and correlation analysis in the paper. Based on the results of the analysis, we can say that there is a statistical dependence between accounting profit/loss and costs on employee training, costs on information systems, as well as between labour productivity and costs on employee training, costs on information systems. Costs on information systems – IT and software significantly affect accounting profit/loss and labour productivity, and thus ultimately the competitiveness of the selected enterprise.

The veracity of the results of our regression and correlation analysis is also confirmed by the results of research by other authors. Ramírez and Tejada (2020); Siengthai and Udomphol (2016) in their researches accept a hypothesis of positive correlation between the use of HRIS and operating cost and time savings. Begum et al. (2016) also confirm in their research that the use of HRIS brings higher efficiency in terms of employee productivity and reduced human resources costs. They further state that the use of IS/IT in HRM related activities may allow managers and employees to focus more on strategically important activities than on HRM-related administrative activities. Similarly,

Barišić, Poór, Bach (2019) state from the results of their research that enterprises that have HRIS are generally more productive, more innovative and have a better quality of services, which results in an overall higher profitability. In addition, Chiu (2015) leads to the relationship between education and innovation. He states that investing in employee training has a positive impact on innovation.

A large number of different factors affect the competitiveness of enterprises. According to the results of our research, as well as the statements of several authors mentioned in this paper, the field of HRM is one of the important areas where the enterprise can achieve a long-term competitive advantage by using IS/IT. Based on the generalization of the results, we recommend enterprises to invest in the areas of employee training. In order to spend training costs effectively, it is necessary to have a suitable information system that will improve the operation of the HRM department. As we showed in the analysis, the above facts have a positive effect on accounting profit/loss and labour productivity. At the same time, we can consider employee training as increasing the skills of employees, their performance and providing them with space for new ideas. This can be another factor for business prosperity and maintaining competitiveness.

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