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## The use of information systems in human resource management of a mining enterprise

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### ABSTRACT

In recent years IT technologies certainly have significantly influenced the way human resources are managed. One should remember that using new solutions in the area of IT first of all they should analyse relevance of introduced changes. It should be remembered that using new solutions in the field of IT should first of all analyse the validity of the introduced changes. The article shows that IT systems can also be an important factor improving human resource systems in Polish mining enterprises. Accordingly, in order to reduce the work outsourced, it was proposed to introduce a database enabling the migration of employees within the enterprise. Therefore, a survey was conducted among employees of coal companies in order to check whether the application of the offered database will be accepted by the company's workers and whether currently used IT systems are sufficient.

**Keywords:** mining, human resources management, outsourcing, IT systems

### 1. INTRODUCTION

Surviving and development of an enterprise in new market conditions will undoubtedly depend on whether it can adapt to these changes and take advantage of new solutions in the area of IT technologies or human resources management [1].

There are used various strategies for gaining live labour resources in human resources management, i.e. outsourcing, which can be defined as contracting out with an external service provider to manage and perform a specific job, for a given period of time, cost and level of services. Currently, organizations use outsourcing quite often, and for a variety of reasons. Nevertheless, this is usually dictated by cost reduction objectives [2]. The idea of outsourcing is also supported by the fact that a competitive advantage can be obtained when products or services are produced more efficiently and effectively by external suppliers [3, 4]. Despite of the fact that employees often prefer to be self-employed or want to have a more flexible relationship with an employer than on the basis of a standard employment contract [5] outsourcing is not always well perceived by employees as most people do not accept the loss of standard jobs or consider such practices as reasons of worries and practical problems [6]. [The European Guide to Outsourcing, Institute Esprit Service, Comite de Liaison des Services du MEDEF, MEDEF 2002].

On the other hand, considering IT technologies, it can be concluded that IT systems are nowadays indispensable for the efficient functioning of human resources management. Of course, on the assumption that they will be used in the right way. Therefore, before deciding on the introduction of a new IT system, there should be carried out an analysis of the organization concentrated on the IT needs of employees who are going to use this system [7] [Picture 1].



**Picture 1.** The management of computing in the field of computing

## **2. MATERIALS AND METHODS**

Pertaining to Polish mining industry, analysis of the hard coal market in Poland showed seasonality which is characterized by an increase in hard coal consumption in the heating season

and its decline in the summer [8]. Therefore, in order to maintain an appropriate level of production, taking into account the seasonal demand for coal, mining companies are increasingly using employee outsourcing. This solution probably protects them from problems related to the excess of production factors in the so-called ‘dead season’, as well as a shortage of these factors in periods of increased demand for hard coal. However, this solution is negatively perceived by employees. It was confirmed by research carried out among mining workers in mining enterprises [9].

This is why arose a question if commissioning underground work is the best solution or maybe there are other better solutions that reduce the costs of a company. Such a solution could be better management of human resources within an enterprise. All the more so, as Polish coal companies have multidivisional structures which may contribute to inefficient use of human resources in the scale of the entire enterprise and, as a result, commissioning outsourced works to external companies.

Therefore, in order to prevent such practices and to increase efficiency in human resources management, it would be advisable to allow the migration of employees within the enterprise.

Therefore, a new database should be created or the existing one should be modified in order to allow to plan employment at the scale of the whole enterprise. The main purpose of such a database would therefore be to enable the employees to be delegated to individual mines depending on the demand resulting from the size of the projected extraction. Assuming, of course, that the migration of employees within the enterprise will be limited only to the necessary minimum [Picture 2].



**Picture 2.** Mining deposits

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As it has already been mentioned, in the case of any changes in the area of IT an analysis of the organization should be carried out referring to the IT needs of employees using the IT systems. In addition, before introducing the possibility of employee migration within the enterprise, it is also good to learn whether they will be ready to change such things in the area of human resources management. The more so, because of trade unions operating in mining companies and thus the implementation of changes without general acceptance of the crew is rather impossible.

For this reason, in order to get to know employees' opinions on the implementation of changes in human resources management and the introduction of a new IT system (or modification of the existing one), a survey was conducted among randomly selected underground employees of PGG Sp. z o.o. and JSW SA.

Firstly, there was calculated the minimum random sample size  $n$ . For this purpose, a formula for a finite general population of  $N$  elements was used [10]:

$$n = \frac{N}{1 + \frac{d^2(N-1)}{z_\alpha^2 pq}}$$

where:

$z_\alpha$  – 1,64 for  $\alpha = 0,10$   
1,96 for  $\alpha = 0,05$   
2,28 for  $\alpha = 0,01$

$N$  - the size of the general population,

$p$  - expected order of magnitude for estimated fraction,

$q$  - equals  $1 - p$ ,

$d$  - permissible error of estimate of fraction  $p$  (given in decimal fraction).

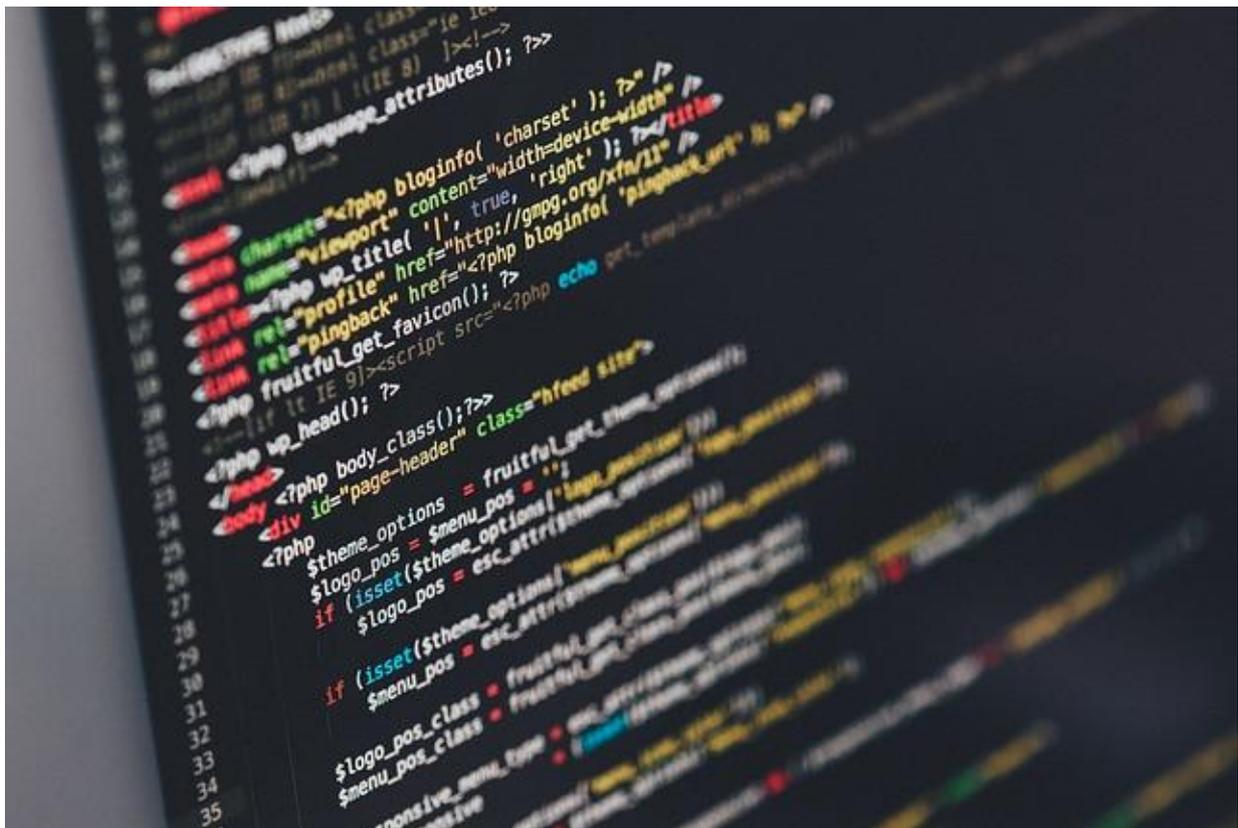
The calculations assumed:

- 1) the confidence coefficient  $1 - \alpha = 0.95$ , hence  $z_\alpha = 1.96$ ,
- 2) maximum error (statistical)  $d = 0.10$ ,
- 3)  $p = 0.5$ ,
- 4) the minimum sample size of PGG employees, size  $N = 32,000$  (number of all employees in PGG Sp. z o.o.)

- 5) the minimum sample size of JSW employees, size  $N = 20887$  (number of all employees in JSW SA)

As it resulted from calculations and assumptions made earlier, the questionnaire should be responded by 96 people employed at PGG Sp. z o.o. Having rounded this value to 100 persons, the maximum (statistical) error of estimate of the fraction of elements distinguished in the finite general population of  $N$  elements was calculated. It was 9.78%. Therefore, the survey was conducted among 100 randomly selected mining employees of a coal company. The maximum error is 9.78%.

In the case of JSW, it turned out that questionnaire should also be responded by 96 people employed in this company. Therefore, the number of questionnaires was also rounded up to 100 gaining a 10% maximum error (Picture 3).

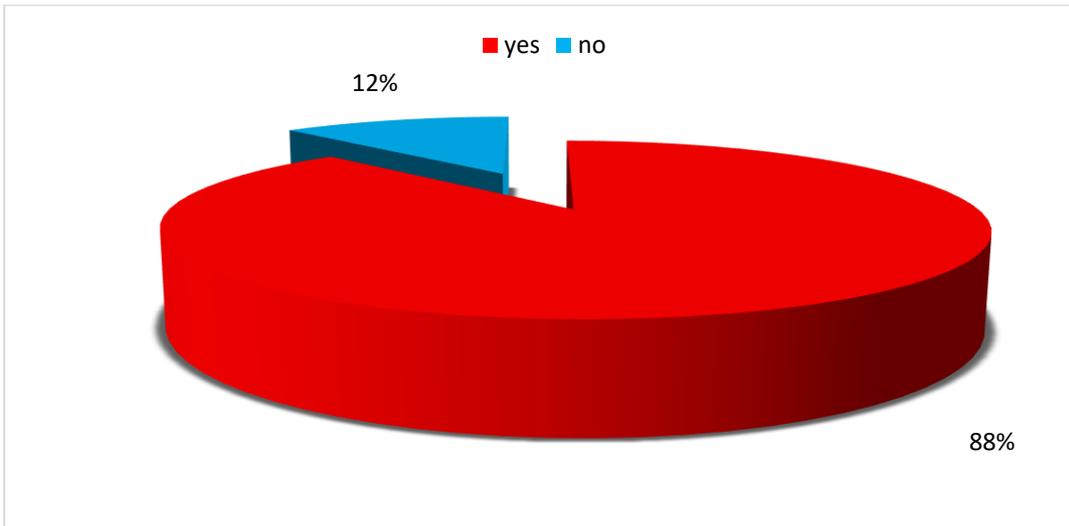


Picture 3. Computer coding for calculations

The surveyed employees were first asked whether a program/computer system which facilitates human resource management is being used at their company. All respondents answered “yes” to this question, indicating the SZYK2 program and the employee portal.

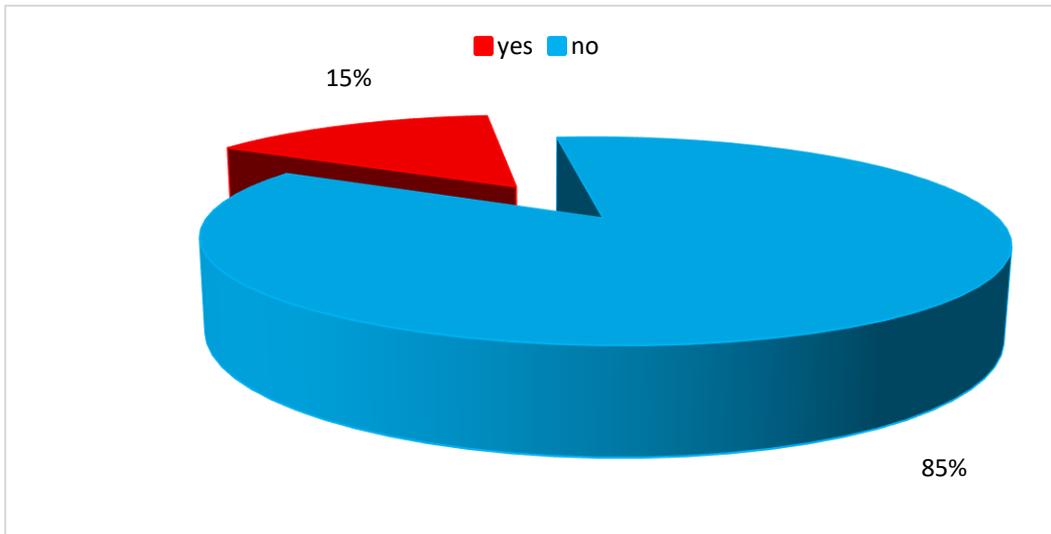
Next, a question was asked if any new technologies should be introduced in order to improve the work and, possibly, what these technologies should be. All respondents gave a negative answer to this question. The next two questions concerned the employee portal. First,

whether the employee portal is transparent and easy to use (Figure 1) and whether some changes should be made in it (Figure 2).



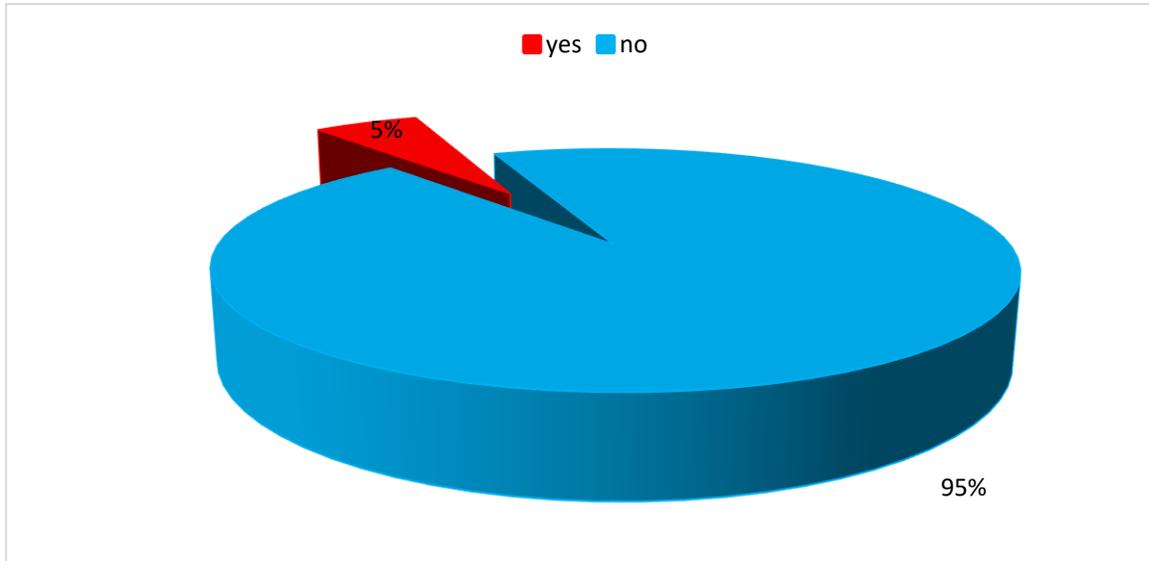
**Figure 1.** Question regarding the construction and operation of the employee portal

Based on the respondents' answers, it can be considered that the portal is well-designed and user-friendly.

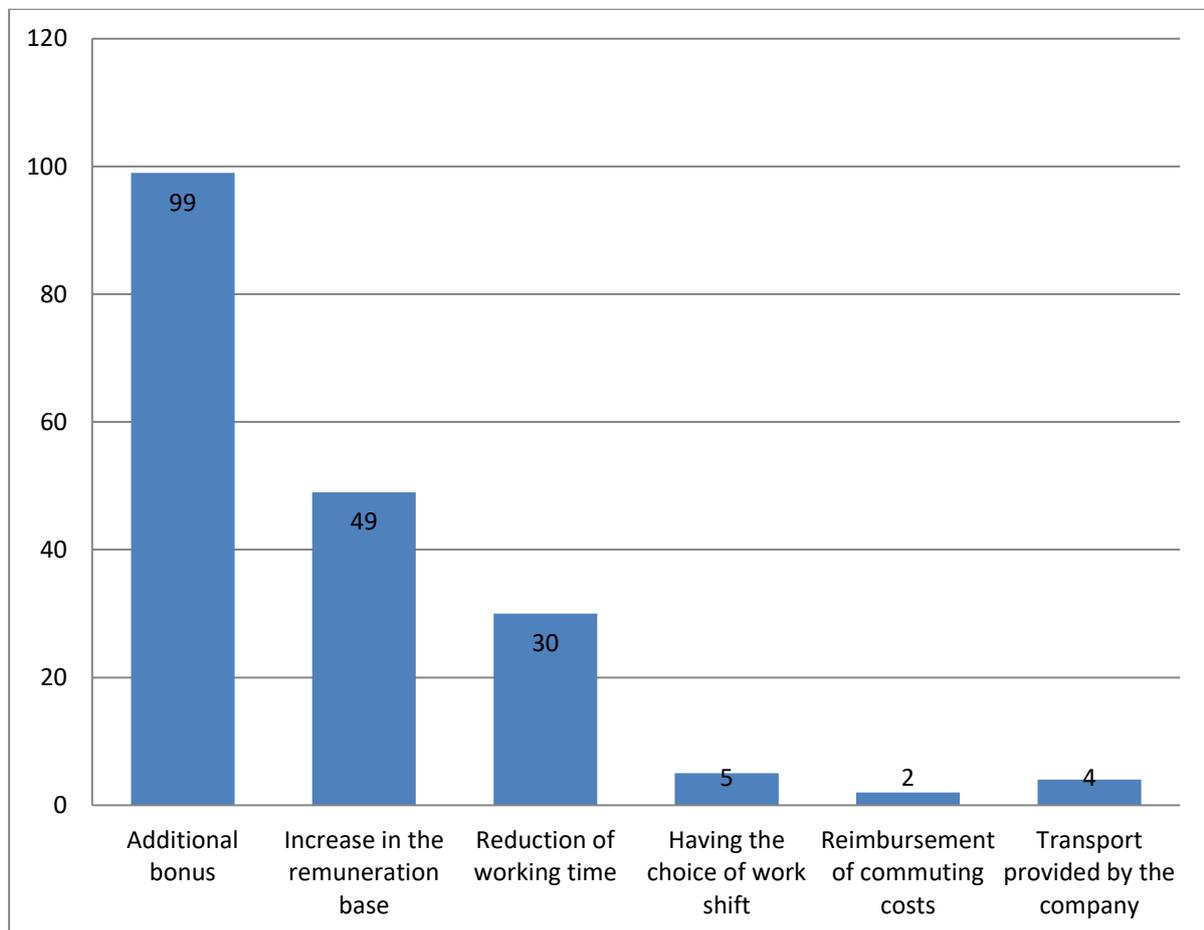


**Figure 2.** Question about the need to make changes in the employee portal

Most of the respondents replied that there was no need to make any changes to the employee portal. However, 15% of the respondents decided that changes should be made by introducing employee workload distribution functionality.



**Figure 3.** Question regarding the introduction of a new solution in HR management.

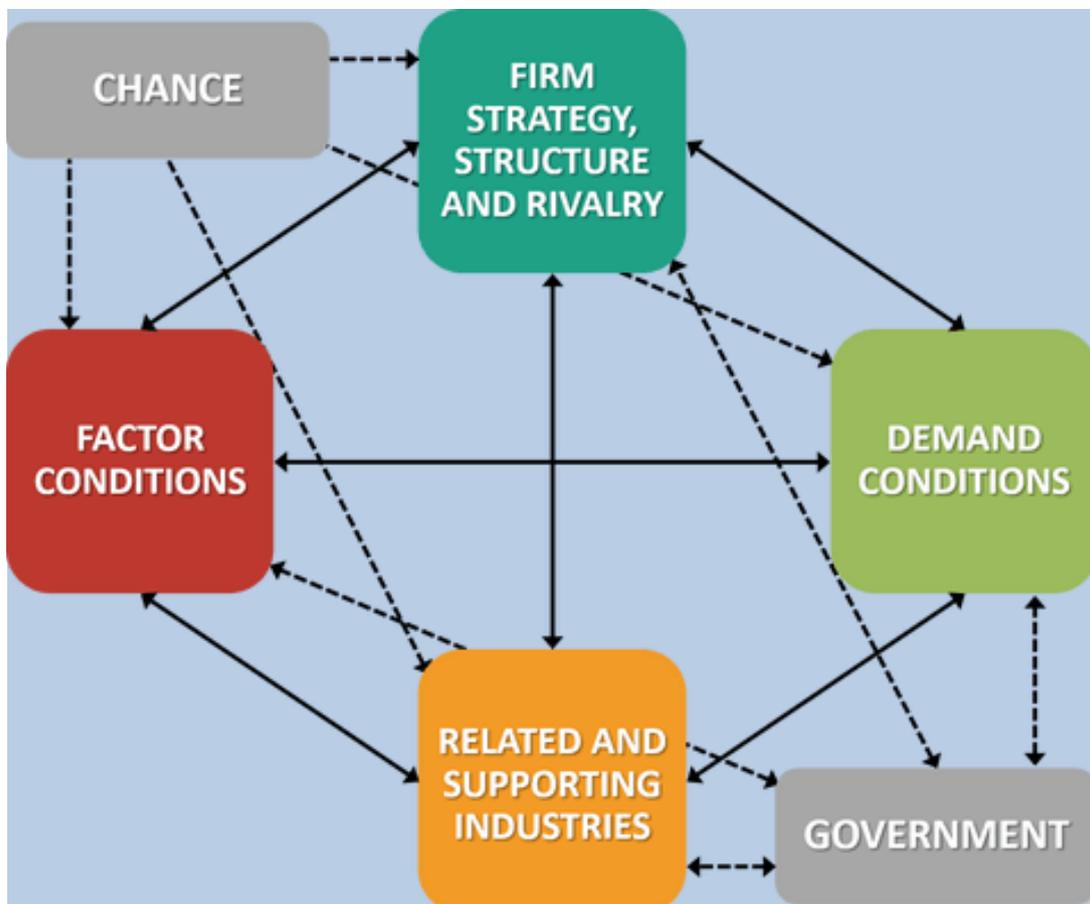


**Figure 4.** Factors influencing the change of respondents' decisions %

Then, the respondents were asked if, in case of resignation of outsourcing to external companies, they were offered a database for employees to be delegated between individual plants of the company, would they be willing to accept such a change? (Figure 3) In other words, if they agreed to perform work within the entire enterprise and not just a specific plant. Of course, assuming that this rotation will be limited to the necessary minimum. Moreover, considering that respondents may not be willing to migrate inside the company, the questionnaire included a question about what would possibly convince them to introduce such a solution (Figure 4).

The vast majority of respondents did not express readiness to introduce this solution. Only 11 respondents would be willing to do so. However, people who indicated a negative answer would be willing to introduce the proposed system after obtaining certain benefits. These benefits are summarised in Figure 4.

Most of the respondents would be ready to introduce these changes if they received an additional bonus. 51 people considered that increasing the base of their remuneration could convince them to migrate within the company, another 30 people would expect reducing their working time. However, 5 people would be ready to do their work in various mines of the company if they had the opportunity to choose work shifts. Another 4 people in this situation would require company transport to be provided and remaining 2 would expect travel expenses to be reimbursed.



**Figure 5.** Porter's Diamond Model

The national context in which companies operate largely determines how companies are created, organized and managed: it affects their strategy and how they structure themselves. Moreover, domestic rivalry is instrumental to international competitiveness, since it forces companies to develop unique and sustainable strengths and capabilities (Figure 5) [11-22].

### **3. CONCLUSIONS**

In recent years IT technologies have significantly influenced the way of running a business and created new expectations of customers. Therefore, the competitive advantage is achieved by these enterprises that can select their IT tools necessary for their operations better than other players in the market. In addition, IT systems can also be an important element in improving human resources management.

In the case of Polish mining enterprises, due to their specific organizational structure, it is possible to use new technologies to improve human resources management. In order to achieve this, an existing database could be modified, or a new one created to facilitate employee migration within the entire enterprise.

However, a survey on opinions of employees showed that the proposed solution is not necessarily well perceived by employees of coal companies. On the one hand, they are not satisfied with outsourcing to external companies, but on the other hand, they are not ready for a change to reduce these practices. They could make such concessions provided they receive certain benefits. As a consequence the proposed solution may not be profitable enough to implement these changes. Therefore, it would be necessary to check first what level of remuneration growth should be considered to ensure that this solution is accepted by employees when planning the use of a database enabling employee migration within an enterprise. Only then it will prove whether the solution is financially viable. In addition, the conducted study showed that, according to the surveyed, the currently used IT human resource management system does not require any changes. The only functionality which was indicated was the need to extend the system with the option of introducing employee workload distribution.

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