

Motivation as the Pivotal Factor Influencing the Utilization of Human Capital in the IT Industry

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Abstract. Human capital is nowadays recognized as the basis for the creation of value for the stakeholder groups, especially within the knowledge-intensive industries, represented by the IT industry. The topic of knowledge, skills, abilities, talent, and experience as the components of human capital is very complex. One of the perspectives is the efficiency achieved in relation to the utilization of human capital. This is being influenced by multiple internal and external factors. However, the motivation of IT professionals themselves represents a necessary prerequisite. The motivation allows these highly qualified employees to fully use their intangible qualities when performing their job tasks, leading to successful attainment of the enterprise's goals. Moreover, IT professionals also need to be motivated to stay working for a certain enterprise. Otherwise, this enterprise loses a part of the valuable capital. The aim of this paper is to describe the current state of this issue with the implications for the management of IT enterprises. The research presented in this paper is based on two main data sources. The first one is the database of opinions of software developers from Europe, accessible by the Stack Overflow platform in 2018. Within the survey, there were questions pertaining to job satisfaction, desired benefits and the factors that software developers take into account when looking for a new job. The second source of data was the responses we collected within our original survey focused on human capital during autumn 2018. The respondents were HR managers of IT enterprises operating in the Slovak Republic. The two sources of data applied represent two points of view in relation to the issue of human capital. In terms of methodology, the data entries were processed using various methods of descriptive, correlation and exploratory analysis. The data entries were categorical which implied the application of tests of statistical independence. Via these, the statistically significant relations of dependence were identified. The results from the research presented in this paper were transformed into recommendations for the managers of IT enterprises. They will show them the particular areas on which they shall focus on the achievement of better outcomes within the utilization of human capital. Specifically, HR managers should focus more on the possibilities of learning and development because these are appreciated by software developers. Such changes can prevent talented employees from leaving the enterprise and taking their human capital elsewhere.

Keywords: human capital; motivation; IT industry; efficiency; benefits.

Introduction

Human capital belongs to key drivers of enterprises' success. It influences productivity and competitiveness which contributes to the economic growth of the enterprises. It is the reason why HR managers try to keep employees motivated. The presence of motivation leads to higher performance and higher competitiveness which influences productive resources of the enterprise. Human capital and its motivation are important especially for the industries where the value for the customers is mainly generated by utilizing intangible qualities the employees have – knowledge, skills, experience, creativity, and willingness to learn and develop one's components of human capital.

Theoretical background

The theoretical background of this paper consists of three main blocks. These include the definition and description of the concept of human capital, its management as an approach complementary to the human resources management, and motivation as a factor strongly influencing the effective and efficient utilization of human capital.

Human capital

From the theoretical point of view, human capital is usually defined as the sum of knowledge and skills that the enterprise has available, embodied in the employees it hires (Bontis, 2001; Grasenick & Law, 2004). Academics, authors, and scientists recognize that, nowadays, it has a significant position in the increase in employee's productivity (Heizer & Render, 2006, p.16). Human capital is built via the learning and training of employees as well as via appropriate healthcare, which makes the knowledge and skills useful for a longer period of time. These efforts support the employees' satisfaction, loyalty and productivity, leading to the overall profitability of enterprises gained from their high performance (Marimuthu, Akokiasamy, & Ismail, 2009, p.267).

Lazear (2009) distinguishes between two basic types of human capital – general and enterprise-specific, depending on whether the skills and knowledge are mostly applicable in the given enterprise or they are transferable. This is further researched by Coff and Raffiee (Coff & Raffiee, 2015; Raffiee & Coff, 2016). A more detailed description of human capital can be found in Russ's taxonomy (2015). The author defines several axes that divide human capital according to its value, transferability, origin (internal or external markets), and uniqueness.

Human capital management

Definitions for the concept of human capital management can be found in the works done by Baron and Armstrong (2007), Ingham (2007), Crook et al. (2011), and Armstrong and Taylor (2014). Based on the key ideas of these authors, human capital management can be defined as strategic management of people in enterprises, focusing on the individual components of their human capital (knowledge, abilities, skills, and the capacity for the development and innovation). The authors emphasize the linkage of human capital to the generation of value for the stakeholder groups. Another crucial aspect of the concept of human capital management is represented by the design and application of metrics and indicators that enable measurement of the contribution of the management of employees to the overall business outcomes. This is supported by the description of this concept from Stiles and Kulvisaechana (2011) who underline the role of data analysis and reporting in human capital management. This shall help direct the strategic investment in employees as well as the process of managerial decision making at all managerial levels.

Fitz-enz (2009) also treated human capital management from the perspective of metrics and indicators that could be adjusted and applied for specific enterprise conditions to better manage the intangible qualities of employees. Then there were other researchers emerging who were examining the relationship between the utilization of human capital and business results in various fields of business practice (Avninder, 2009; Kucharčíková, 2013; Kucharčíková, Koňušíková, & Tokarčíková, 2016; Meles, Porzio, Sampagnaro, & Verdoliva, 2016; Kucharčíková, Chodasová, & Ďurišová, 2017; Nourani, Chandran, Kweh, & Lu, 2017; Sardo & Serrasqueiro, 2017; Leon, 2016).

Finally, Blackman, O'Donnell, and Teo (2016) describe the concept of human capital management via the effort of managers to get the best possible results from their employees. They identified the understanding of employees' motivation and incentives for its enhancement as a prerequisite for the success of this effort.

Motivation

As it was implied earlier, motivation is a strong factor affecting the efficiency that can be achieved when utilizing human capital in enterprises. Shields (2007, p.42) sees the motivation as the "wellspring" of the behavior of employees that is oriented on the work tasks, or the strength of employees' willingness to perform these tasks. This perspective is supported by the description of motivation presented in the work of Gunnigle, Heraty, and Morley (2011, p.133). Yamoah (2014) develops the basic description of the

motivation and adds that well-trained employees tend to have higher motivation, resulting from their appreciation of the enterprise's investment in their development. However, what makes the field of employees' motivation more complex is the finding that different groups of employees tend to have different preferences in relation to motivational tools and benefits (Ližbetinová, Hitka, & Kleymenov, 2018; Lorincová et al., 2018). These differences can be attributed to numerous factors, including age and career aspirations (Hitka et al., 2018).

The process of motivating employees is one of the key HR processes that are ongoing in enterprises, necessary for their operation and achievement of their goals. The HR managers need to know which tools are the most suitable for increasing the motivation and maintaining it at a high level so that the employees deliver high performance and they want to stay working for the enterprise. Armstrong and Stephens (2005) distinguish four main steps within this process. These encompass the analysis of employees' needs, definition of goals, application of incentives and benefits, and the achievement of the goals set.

Methodology

The aim of this paper is to analyze relationships between benefits, motivational tools, priorities when looking for a new job and job satisfaction of software developers from European countries.

The underlying research utilizes two different data sources. The first data source is represented by a publicly available database from the Stack Overflow survey conducted in 2018. Within the scope of this research, we focused only on respondents from European countries. We excluded the countries with only a low number of respondents. From the survey, we selected 25 questions. We considered the answers to these questions to be relevant for our subject matter. The second data source was acquired via our own questionnaire survey that we performed in autumn 2018. This survey was focused on HR managers in IT enterprises in Slovakia. This paper presents the results related to motivational tools that are being used in these enterprises. The combination of these two data sources creates an intersection of two perspectives in relation to human capital and its efficient utilization.

The data collected was processed applying several techniques for statistical description and analysis. We mostly used frequencies and percentages that were presented in tables and charts. Since the data had a categorical nature, we used the test of independence to identify statistically significant patterns (Chi-square test).

Results

The results of our research include three main parts. These parts follow the data structure itself. Therefore, the first part presents the information related to the opinions of software developers across Europe. These opinions describe the current situation pertaining to job satisfaction, desired fringe benefits and priorities related to the selection of a new job. The second part adds the perspective of human resources managers (from IT enterprises in Slovakia). The HR managers are those making decisions affecting all of the above-mentioned issues. The third part compares these two perspectives and draws conclusions leading to improvement that can be made within this field in the future.

Results gained from the Stack Overflow survey

When evaluating the results, we achieved from data analysis, we assumed that if employees are satisfied with their jobs, they are highly motivated to be productive and fully achieved their partial objectives.

The aggregate results (figure 1) show that almost 57 percent of software developers can be considered satisfied with their current positions. On one hand, the extremely dissatisfied employees represent only about 3 percent within the sample. On the other hand, the percentage of at least moderately satisfied employees still has a huge space for improvement when we take into account that these employees are highly qualified, enterprises invest in their development, and they are crucial for the generation of value for the stakeholders.

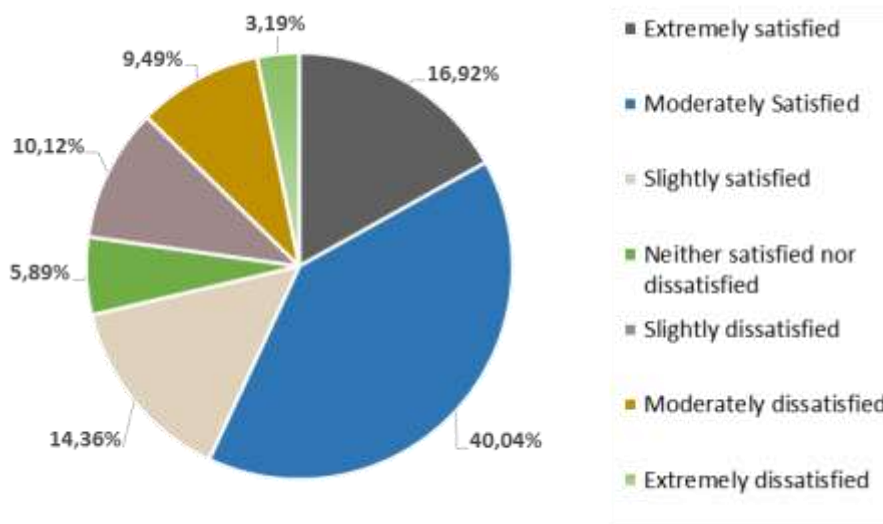


Figure 1. Job satisfaction – aggregate results

Job satisfaction was studied in a more detailed way to reveal differences among individual countries. Within the European countries, we used only the data from those that had a sufficient number of respondents. In table 1 there are the percentages within individual degrees of satisfaction.

Table 1. Differences in satisfaction based on the country

Country	Extremely satisfied (%)	Moder. satisfied (%)	Slightly satisfied (%)	Neutral (%)	Slightly dissatisfied (%)	Moder. Dissatis. (%)	Extremely dissatis. (%)
Austria	25,83%	33,33%	14,17%	5,00%	10,83%	5,83%	5,00%
Belgium	21,21%	40,15%	12,12%	8,33%	9,85%	6,82%	1,52%
Czech Republic	18,92%	43,24%	13,51%	6,76%	6,76%	8,11%	2,70%
France	21,72%	38,18%	15,24%	4,20%	7,71%	10,51%	2,45%
Germany	17,23%	39,92%	12,71%	6,03%	10,26%	10,64%	3,20%
Ireland	14,29%	37,86%	17,14%	7,86%	9,29%	10,00%	3,57%
Italy	12,81%	35,12%	14,05%	6,20%	12,40%	14,05%	5,37%
Netherlands	20,19%	42,55%	10,56%	5,90%	8,70%	9,01%	3,11%
Poland	13,16%	40,76%	16,56%	5,73%	13,16%	8,49%	2,12%
Romania	11,76%	39,71%	16,18%	6,86%	10,78%	11,76%	2,94%
Russian Federation	10,16%	43,38%	17,24%	6,17%	10,53%	10,53%	2,00%
Spain	9,11%	45,82%	14,94%	3,54%	10,38%	11,39%	4,81%
Sweden	14,42%	54,81%	12,02%	3,37%	5,77%	7,21%	2,40%
Switzerland	21,33%	40,00%	10,67%	6,00%	10,00%	5,33%	6,67%
Turkey	6,63%	24,10%	28,92%	11,45%	13,25%	10,84%	4,82%
Ukraine	9,20%	39,46%	21,84%	7,28%	9,20%	10,34%	2,68%
United Kingdom	23,01%	37,43%	12,23%	5,39%	9,84%	8,91%	3,19%

To improve interpretation of the results gained we present them using techniques of exploratory analysis (figure 2). The results indicate that the countries with least satisfied software developers are Italy, Turkey and Ukraine (based on the % of at least moderately satisfied software developers compared to the percentage of neutral or dissatisfied software developers). The opposite side of the spectrum with the most satisfied developers is represented by Austria, the Netherlands, Switzerland and the United Kingdom. An interesting situation was observed in Switzerland. This is a country with a high percentage of extremely satisfied developers but also with a high percentage of extremely dissatisfied developers. This finding implies the potential for further research.

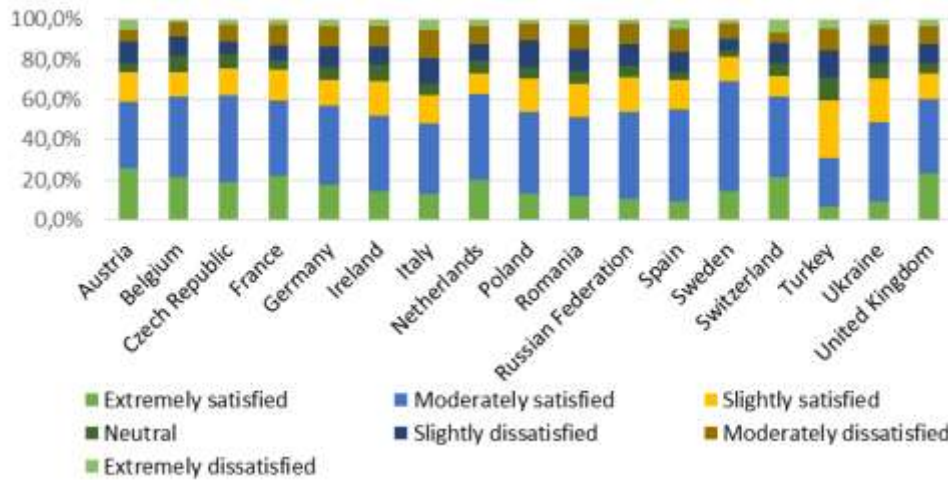


Figure 2. Differences in satisfaction based on the country

To test whether the differences we described earlier are statistically significant we performed the Chi-square test. The test confirmed dependence between job satisfaction and the country in which the developers work (Chi-square: 278.306; 96 degrees of freedom; critical value: 119.871; significance level: 0.05).

Based on the data available our assumption was that the developers who perceive coding as their hobby have higher job satisfaction. The relevant results in the form of frequency and percentages are captured in the following table (table 2).

Table 2. Differences in satisfaction based on the hobby

Satisfaction	Hobby			
	Yes	%	No	%
Extremely satisfied	1034	17,37%	277	15,42%
Moderately Satisfied	2360	39,65%	742	41,31%
Slightly satisfied	848	14,25%	265	14,76%
Neutral	332	5,58%	124	6,90%
Slightly dissatisfied	617	10,37%	167	9,30%
Moderately dissatisfied	575	9,66%	160	8,91%
Extremely dissatisfied	186	3,13%	61	3,40%

Our assumption was not confirmed as it can be seen in the table. To support this conclusion, we performed the Chi-square test again. The results were as follows: Chi-square: 11.118; 6 degrees of freedom; critical value: 12.592; significance level: 0.05.

Valuable pieces of information were also extracted from the respondents' answers in relation to factors which they take into consideration when looking for a new job. The respondents were supposed to assign priority to individual factors. The most important factors are listed below:

1. the languages, frameworks and other technologies the developer would be working with,
2. the compensation and benefits offered,
3. opportunities for professional development

These priorities indirectly show what is important for the developers even in their current jobs and make them satisfied and motivated.

The most desired benefits are then directly linked to the employees' satisfaction and motivation as a prerequisite for the high utilization of human capital. The developers chose these four benefits as the most compelling:

1. salary and/or bonuses,
2. health insurance,
3. computer/office equipment allowance,

4. conference or education budget.

Even though the developers assigned high priority to the above-listed benefits, the dependence between their satisfaction and these benefits was not generally confirmed. The only exception was the parental leave as a form of benefit which was not included in the list of top four benefits. The Chi-square test for the dependence between the parental leave and job satisfaction had the following results: Chi-square: 93.111; 60 degrees of freedom; critical value: 79.082; significance level: 0.05. The effect of the dependence identified via the test can be seen in the relevant frequency and percentages (Table 3).

Table 3. Satisfaction of developers perceiving parental leave as the most important benefit

Satisfaction	Number of respondents	%
Extremely satisfied	34	27,87%
Moderately Satisfied	45	36,89%
Slightly satisfied	15	12,30%
Neither satisfied nor dissatisfied	5	4,10%
Slightly dissatisfied	7	5,74%
Moderately dissatisfied	11	9,02%
Extremely dissatisfied	5	4,10%

Results gained from own survey conducted

The motivation of software developers is one of the direct consequences of their satisfaction with the position they are working at in enterprises. At the same time, motivation can be perceived as a pivotal factor within the internal enterprise environment, which affects the utilization of human capital available. This was the reason for focusing on motivation within our survey. Specifically, we asked HR managers what motivational tools they apply in relation to their highly qualified employees. This way the managers can positively influence the employees' performance and loyalty.

The structure of the motivational tools being applied in IT enterprises is depicted in the following chart (Figure 2).

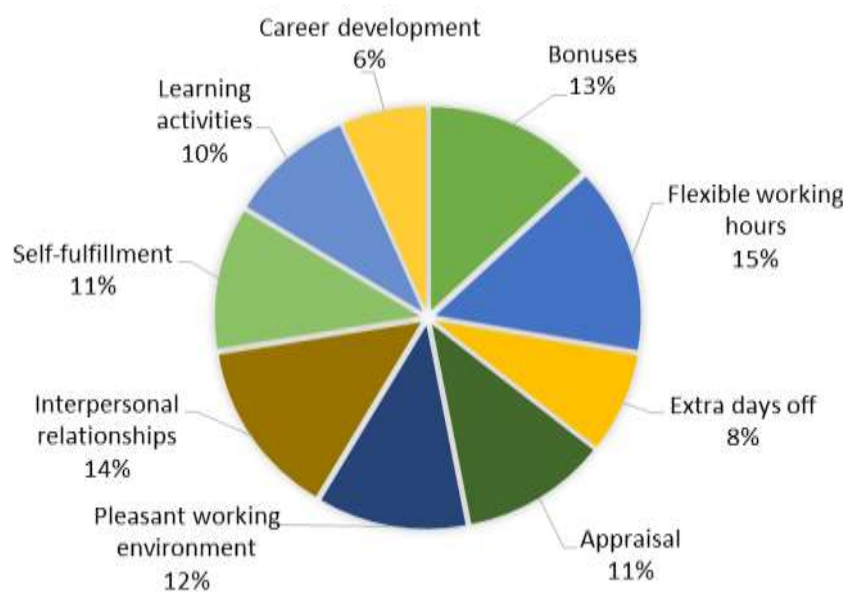


Figure 2. Percentage of individuals' motivation tools being applied in IT enterprises in Slovakia

The results show relatively evenly distributed utilization of individual motivational tools. The highest percentage within all responses was reached by the benefit in the form of flexible working hours (15%).

On the other hand, the lowest percentage was reached by the possibility of career growth for developers (6%).

An important perspective is represented by the identification of dependence of the motivational tools being applied to the enterprise's size. This was tested via the χ^2 test of independence. This test revealed statistically significant differences based on the enterprise's size for the following tools:

- Extra days off (χ^2 : 14.28; 3 degrees of freedom; critical value: 7.815; significance level: 0.05),
- Pleasant working environment (χ^2 : 14.663; 3 degrees of freedom; critical value: 7.815; significance level: 0.05),
- Interpersonal relationships (χ^2 : 10.402; 3 degrees of freedom; critical value: 7.815; significance level: 0.05),
- Learning activities (χ^2 : 8.419; 3 degrees of freedom; critical value: 7.815; significance level: 0.05),
- Career development (χ^2 : 21.808; 3 degrees of freedom; critical value: 7.815; significance level: 0.05).

For all the differences identified, the utilization of the corresponding tools was statistically significantly higher in larger enterprises.

The comparison of the results from the data sources we used are limited by the fact the opinions of HR managers related to the motivational tools they use were collected only in Slovakia. The two perspectives studied are mostly aligned in the area of bonuses or extra payments as a form of compensation and in the area of the working environment and equipment. Another contributive finding was that the software developers see their learning opportunities as a valuable benefit, but the HR managers do not pay sufficient attention to it.

Discussion

After analyzing the results of our research, we compared them with various opinions, points of view and empirical results from several recent, relevant scientific research works. These broaden the scope of motivation, job satisfaction, fringe benefits and their relationship to the strengthened utilization of human capital available.

Blaskova et al. (2018) studied the motivation of employees as an outcome of processes performed by HR managers. In their research, the authors corroborated that motivation can be desirably influenced by the selection of suitable motivational tools and their appropriate application, together with the realization of key human development processes. If we define software developers as creative workers, we can then add the opinion and research results achieved by Morawski (2018). He presents creativity as the origin of innovation, emphasizing the merit of talented and competent employees. Conventional management systems do not suffice for the management of value generation in such industries. Therefore, the author puts stress on the concept of human capital management and the process of motivating employees within complex enterprise management. This is in concordance with the findings presented by Guest (2017). He builds on a thorough literature review within the field of employees' well-being, job satisfaction, HR management systems and individual performance. His conclusion was that it is necessary to establish a new framework within the HR field that connects the activities (e.g., the process of motivating employees) and policies related to employees with business results. This is also the main objective of the HCM concept. Even researchers and academics who do not explicitly use the term "human capital management" study this connection from different perspectives. Here belongs Ababneh et al. (2019) who worked with the construct of employee engagement, focusing on the possibilities of its measurement so that it can be managed properly.

In our paper, we approached the topic of human capital and motivation via job satisfaction and fringe benefits. However, these issues are more complex, as it is shown in the works of Lee et al. (2016) and de la Torre-Ruiz et al. (2017). The first group of authors broadens the topic of motivation by adding the aspect of appropriate organizational culture. Only when the organizational culture and suitable stimuli are in alignment, the motivation can be enhanced and maintained at a high level so that the performance of employees and the enterprise as a whole is near its maximum and stable. Then, Torre-Ruiz et al. (2017) focused on employees' personalities. Their conclusion was that the benefits systems need to be flexible enough to motivate different types of personalities. When these differences are suitably addressed in the benefits systems, these become more effective as a source of employees' satisfaction. The existence of

various personalities that can work together in enterprises and working teams implies also the existence of different motivation profiles of these employees. These profiles were studied by Howard et al. (2016). In our paper, we focused on a specific group of employees – software developers. Their human capital is the main source of the generation of value for customers and other stakeholder groups.

Finally, all the attention paid to human capital in the form of strengthened motivation and loyalty of highly qualified employees brings also the outcome represented by sustained competitive advantage. Such implication is described by Fedotova and Polzunova (2018) who researched the sector of high-tech industrial enterprises. The overall competitiveness of an enterprise can be achieved via high utilization of the human capital available, supported by the strong motivation of employees to provide consistently high performance.

Conclusion

The aim of this paper was to analyze relationships between job satisfaction of software developers and different kinds of factors influencing this satisfaction. After analyzing the survey results, we identified differences between the satisfaction of developers in different countries. Higher satisfaction was identified mostly in west European countries. We can assume that better working conditions and higher wages may be the main reasons for this finding. When we compare the results from the Stock overflow survey and the survey from Slovakia, we can see the difference between the benefits that employees want and the motivational tools being used by HR managers. Employees consider learning activities as an important benefit but HR managers in Slovakia use this kind of benefit as a motivational tool very little. This finding can help HR managers in Slovakia to improve their motivational practices in the future. The last part of the results was focused on the benefit – parental leave. Although this benefit was not placed at the top of the list of developers, we identified the dependence between this benefit and job satisfaction of developers. These findings represent valuable recommendations for the HR managers that can help them improve the utilization of human capital in their enterprises. However, this paper shows only one possible perspective to be considered in relation to human capital and its efficiency. As it was described and summarized in the discussion section, there are numerous other aspects of motivation that can be treated in further research works.

***Acknowledgments:** This paper has been written with the support of VEGA 1/0382/19 – The building of a sustainable relationship with the enterprise's stakeholder groups via the creation of value with the application of information-communication technology.*

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