Employee engagement in HR analytical systems

Abstract. Employee engagement is an important resource for the development of modern organizations and enterprises. Effective management of employee engagement leads to an increase in labour productivity, achievement of goals and sustainable development of the managed object. Despite the considerable accumulated domestic and foreign research on employee engagement as a factor of growth and economic efficiency, many areas relating engagement diagnostics and assessment of the relation between engagement and results of financial and economic development remain understudied. In a digital economy, personnel knowledge and competences are recognized as a strategic resource for the development, which mainstreams research in the area of employee engagement and assessment of its impact on development processes and results. It is possible to assess engagement objectively and measure its resource potential by using HR analytics.

HR analytics is a system of mathematical, statistical and heuristic methods for assessing, forecasting and decision-making aimed at developing competitive advantages of personnel, and increasing labor productivity and economic efficiency of an enterprise.

The purpose of the article is a theoretical and methodological substantiation and practical use of employee engagement diagnostics indicators in the system of HR analytics.

The article uses methods of engagement research, as well as economic, statistical, sociological, psychological tools of HR analytics.

The outcome of the article is a practically applicable technique of employee engagement estimation and research of its interrelation with indicators of economic efficiency of enterprise development.

Based on the received results, it is possible to draw a conclusion about the necessity to enhance employee engagement in order to create conditions for sustainable development and growth of economic efficiency of enterprises.

Keywords: Engagement; HR Analytics; Development Effectiveness; Labour Productivity; Personnel Management; Statistical Methods; System

JEL Classification: J01; M50; M52

Acknowledgements and Funding: The authors received no direct funding for this research.

Contribution: Each author contributed equally to the research.

DOI: https://doi.org/10.21003/ea.V186-11

Belyaeva T. O.
PhD (Economics), Associate Professor,
Southwest State University
94, 50 Let Oktyabrya Str., Kursk, 305040, Russian Federation
bta.77@mail.ru
ORCID ID: http://orcid.org/0000-0002-4916-2882

Kozieva I. O.
PhD (Economics), Associate Professor,
Southwest State University
94, 50 Let Oktyabrya Str., Kursk, 305040, Russian Federation
i.a.kozieva@mail.ru
ORCID ID: http://orcid.org/0000-0001-7547-3978
накопичений вітчизняний та зарубіжний досвід дослідження залученості персоналу як фактора росту економічної ефективності, багато напрямків діагностики залученості та оцінки взаємозв'язку залученості з фінансово-економічними результатами розвитку залишаються недостатньо вивченими. У цифровій економіці саме знання і компетенції персоналу визнаються стратегічним ресурсом розвитку, що актуалізує дослідження залученості персоналу та оцінки її впливу на процеси й результати розвитку. Об'єктивно оцінити залученість і виміряти її ресурсний потенціал можливо з використанням системи кадрової аналітики.

Кадрова аналітика – це системаї система сукупність математичних, статистичних та евристичних методів оцінки, прогнозування й прийняття рішень щодо формування конкурентних переваг персоналу, підвищення продуктивності праці та зростання економічної ефективності підприємства. Метою статті є теоретико-методичне обґрунтування й практичне використання показників діагностики залученості персоналу в системі кадрової аналітики.

У статті використано методи дослідження залученості персоналу, а також економічні, статистичні, соціологічні, психологічні інструменти кадрової аналітики.

Результатом статті є практична технологія оцінки залученості персоналу й дослідження її взаємозв'язку з показниками економічної ефективності розвитку підприємства.

На основі отриманих результатів можна зробити висновок про необхідність інвестування в підвищення залученості персоналу для створення умов сталого розвитку й росту економічної ефективності підприємства.

**Ключові слова**: залученість; кадрова аналітика; ефективність розвитку; продуктивність праці; управління персоналом; статистичні методи; система.

Беляева Т. А.
кандидат економічних наук, доцент,
Юго-Западний національний університет, Курськ, Російська Федерація

Козьева І. А.
кандидат економічних наук, доцент,
Юго-Западний національний університет, Курськ, Російська Федерація

**Ісследование вовлеченности персонала в системе кадровой аналитике**

**Аннотация.** Вовлеченность персонала является важным ресурсом развития современных организаций и предприятий. Эффективное управление вовлеченностью персонала приводит к повышению производительности труда, достижению поставленных целей и устойчивому развитию управляемого объекта. Несмотря на значительный накопленный отечественный и зарубежный опыт исследования вовлеченности персонала как фактора роста экономической эффективности, многие направления диагностики вовлеченности и оценки взаимосвязи вовлеченности персонала с финансово-экономическими результатами развития остаются недостаточно изученными. В цифровой экономике именно знания и компетенции персонала признаются стратегическим ресурсом развития, что актуализирует исследования в области вовлеченности персонала и оценки её влияния на процессы и результаты развития. Объективно оценить вовлеченность и измерить ее ресурсный потенциал возможно с использованием системы кадровой аналитики.

Кадровая аналитика – это система совокупность математических, статистических и евристических методов оценки, прогнозирования и принятия решений по формированию конкурентных преимуществ персонала, повышению производительности труда и росту экономической эффективности предприятия.

Целью статьи является теоретико-методическое обоснование и практическое использование показателей диагностики вовлеченности персонала в системе кадровой аналитики.

В статье использованы методы исследования вовлеченности персонала, а также экономические, статистические, социологические методы оценки вовлеченности персонала и исследования её взаимосвязи с показателями экономической эффективности развития предприятия.

На основе полученных результатов можно сделать вывод о необходимости инвестирования в повышение вовлеченности персонала для создания условий устойчивого развития и роста экономической эффективности предприятия.

**Ключевые слова:** вовлеченность; кадровая аналитика; эффективность развития; производительность труда; управление персоналом; статистические методы; система.

1. **Introduction**

Personnel is the main asset of the development of an organization or enterprise. It is the personnel that integrates the employment of all resources, ensures the interaction of business units and production processes within an organization, meets challenges and achieves goals. Every organization strives to use all resources to the fullest extent and increase its operating profitability. However, personnel is not only a resource fostering development, but also the main internal client.
of the organization. Employee engagement can significantly improve the effectiveness of an organization, but only under professional, focused and continuous management.

The issues of engagement have been studied by modern science and practice since the 1990s. The interest in employee engagement and management has been maintained and increased for more than three decades, driven by many interrelated factors.

Firstly, the impact of constant changes in the external and internal environment of the organization regarding the transformation of employees’ mindset requires a constant search for new approaches and methods for managing engagement (Israfilova, 2019).

Secondly, the development of the digital economy opens up new opportunities for HR management in general and engagement monitoring in particular. In the digital environment, the processes of forming, training and developing personnel, as well as creating teams and corporate culture, special aspects of motivation and many other processes are changing (Krasnikova, 2020).

Thirdly, in the context of the pandemic and the mass transfer of employees to remote work, it is necessary to enhance employee engagement (Gurova, 2020; Ignatyuk & Manzurova, 2020; Kolobov, Igumnov, & Naumov, 2020).

In the present-day conditions, these and other factors determine the engagement of personnel as the most relevant direction of theoretical, methodological and practical HR research. Issues of employee engagement are the center of discussion at many scientific conferences, forums and workshops (National HSE conference «Personnel policy of Universities: engagement management practices» (Higher School of Economics, 2020), VIII Practical HR Forum «Motivation 2020: Lessons of the crisis and HR solutions to improve employee engagement» (HR Directors Summit, 2020), the conference «Managing personnel engagement» for employees of the nuclear industry (Rosatom Corporate Academy, 2020), etc.).

Many large corporations regularly measure the level of employee engagement and, basing on the results of the monitoring, develop a set of measures to fully unlock the employees’ potential by increasing their engagement. For this purpose, special methods are developed and implemented in the personnel management system, the results of which are analyzed and used to improve HR management. Engagement assessment is also becoming popular in the HR services market. At the same time, a single approach to assessing engagement and determining the degree of its impact on the effectiveness of the organization’s activities has not been developed yet. On the one hand, it is hindered by the industrial and economic differentiation of organizations, and on the other hand, by the debatable nature of many of the issues considered in the study of employee engagement.

This article is devoted to a comprehensive assessment of employee engagement in the process of developing an HR analytics system. The article includes a brief review of the literature, the purpose of the study, and the results of the analysis, based on the conclusions of the research, the directions for future work in this area.

2. Brief Literature Review

In domestic and foreign economic science, there is a significant potential for theoretical, methodological and applied research in the field of employee engagement. At the same time, the development of an HR analytics system is a relatively new direction, formed as a result of the integration of HR management, economics, statistics, mathematics, sociology and psychology.

The concept of engagement is described in the works by foreign scientists such as W. Kahn, Ch. Maslach, M. Armstrong, R. Wagner, J. Harter, P. Drucker, K. Thompson, J. Hellevig, B. Shuck, A. M. Saks and others. Among Russian researchers, we can highlight R. A. Dolzhenko, M. I. Magura, V. V. Travin, M. B. Kurbatov, A. A. Egorov, L. M. Cheglakov, V. I. Kabalin, A. N. Onuchin, T. V. Suvvalova, I. I. Frolov, S. M. Gvozdev and others.

The term «engagement» was first defined by William Kahn as the employee’s state, characterized by the degree of realization of his personal potential in the course of performing his work role, as well as the degree of his physical, cognitive and emotional expression during role performance (Kahn, 1990, 2017).

C. Maslach, a well-known American specialist in the field of social psychology and health psychology, believes that engagement is a stable positive phenomenon that characterizes the high activity of employees and their getting conscious pleasure in the process of work (Maslach & Leiter, 1997; Maslach, 2000). Employee engagement, according to this author, is a factor of preventing professional burnout and stress in the workplace.
M. Armstrong and S. Taylor note that personnel engagement is people’s dedication to both their work and their organization, and their focus on high performance (Armstrong & Taylor, 2006). R. Wagner and J. Harter define engagement as individual immersion in the work with enthusiasm during the work process (Harter, Schmidt, & Hayes, 2002; Harter & Wagner, 2009). In these definitions, engagement is interpreted more as high job satisfaction, involvement in processes and work enthusiasm.

P. Drucker, describing the process of managing engaged employees, argues that personnel management should be arranged so that employees work voluntarily. Building a motivation system, one should not focus primarily on meeting employees’ needs and motives. The motivation system should be one of the effective tools for managing employee satisfaction and engagement (Drucker, 2015).

An interesting point of view is that of K. Thompson, a professor at the University of Birmingham, who characterizes an employee as an internal consumer as important as the external one. The essence of employee engagement according to Thompson is expressed in the following thesis: to convey the brand’s promise to a consumer, the employee must fully understand and share the values of the business (Thomson, 1990).

The author of the book «How to build a corporate culture on engagement, customer focus and innovation», Jon Hellevig, believes that engagement can be formed by certain motivating actions: one of the objectives of the company’s management is to create such conditions, in which employees can have an internal motivation, a desire to make all possible efforts not under external pressure (positive or negative) and not under the control of management, but a conscious, internal, personal desire to work better (Hellevig, 2019).

B. Shuck, a representative of the Florida International University (USA), summarized the points of view on the analysis of engagement (Figure 1), highlighting 4 approaches to the interpretation of this concept (Shuck, 2011).

In the Russian science, the publication activity based on the results of research on personnel engagement has grown significantly over the past 10-15 years.

Based on the results of a theoretical analysis conducted in one of the first monographs in the field of personnel engagement, R. A. Dolzhenko concluded that personnel engagement is formed under the influence of many factors and is a complex indicator of activity, enthusiasm, responsibility of employees, involvement in processes and changes in the organization (Dolzhenko, 2014).

M. I. Magura, V. V. Travin, and M. B. Kurbatova define engagement as a desire to contribute to solving tasks and achieving goals of the organization. Engaged employees are beyond job responsibilities, they are always ready to do extra work. They develop a sense of self-respect based on the achieved professional results. These authors interpret engagement as an interest in achieving the goals of the organization and responsibility for the effectiveness of work (Magura, Travin, & Kurbatova, 2016).

Anna Egorova, a Business Result Group Director, in her book «Employee Engagement. 7 steps to understanding» defines engagement as the willingness of employees to work beyond their job responsibilities. Such employees recommend the company as the best employer and do not look
for another job. Engagement is the desire of a specialist to make maximum contribution to the development and success of the joint activity. Engagement results in the increase of the level of service, labour productivity and reduced turnover in the organization (Egorova, 2014).

A detailed analysis of the essence of the concept of engagement is performed in the monograph by I. I. Frolova (2020). According to this author, employee engagement is a key area of HR management. It is the engaged employees who ensure the quality of processes and the continuous improvement of economic results, QMS functioning, the increase in employee productivity and the efficiency of the organization.

N. A. Pleshkova, G. A. Podzorova and E. G. Pershina, describing employee engagement as a tool to improve the efficiency of their activities, argue that engagement contributes to the competitiveness of the company, since employees are satisfied with the functional component of their work and are interested in their own professional growth (Pleshkova, Podzorova, & Pershina, 2015).

Depending on the priority area of engagement, A. Onuchin distinguishes two possible aspects in its content: commitment to one’s work (a person’s enthusiasm for work), and commitment to the company (personal interest and responsibility for the company’s success) (Onuchin, 2013).

One of the most topical issues in many organizations is a decrease in employee engagement, since successful development largely depends on the effectiveness of the engaged employees (Chulanova & Pripasaeva, 2016). If engagement is an employee’s motivation of to achieve goals, then a decrease in engagement is the reverse side, the process by which the employee’s desire to act decreases. The effect of the psychological concernment of the personnel about effective activities requires constant efforts (Suvalov & Suvalova, 2020).

The lack of consensus and the diversity of views on possible interpretations of the concept of engagement, the ambiguous assessment of the impact of engagement on the results and effectiveness of the organization’s activities indicate the need for additional research in this area. HR analytics as a modern information system allows us to collect and analyze information about the company’s personnel regularly. Based on HR analytics, it is possible to evaluate the engagement of labour resources, the effectiveness of the organization, the quality of managerial decisions and other areas of HR management (Tikhonov, 2020).

3. Purpose
The purpose of the article is theoretical and methodological substantiation and application of indicators for diagnosing employee engagement in an HR analytical system, as well as development of recommendations for managing employee engagement in order to increase the efficiency of the organization. To achieve this goal, the article examines the evolution of personnel engagement management based on foreign and domestic sources, considers methods for measuring engagement, analyzes the possibilities of using the obtained results in personnel management, and proves the relation between personnel engagement and labour productivity on the example of an industrial enterprise.

4. Results
The main sources of information about methods for assessing engagement are practice-oriented publications, research of consultancies, theoretical and methodological concepts in the scientific literature on employee engagement management.

In the study of the level of employee engagement of an organization in the global market, it is possible to identify large HR providers that annually publish reports on the results of their studies, determine the main trends in the field of engagement, and confirm the dependence of the effectiveness and success of organizations on the level of engagement of their employees. Each provider has its own measurement methodology and employee engagement model. Almost all methods are used to study the impact of engagement on the final results of the organization’s activities (Cheglakova & Kabalina, 2016).

The most well-known and common models and methods for measuring engagement are presented in Table 1.

At the chemical enterprise LLC «Kurskkhimvolokno», operating in the market of chemical fibers and yarns, a survey was conducted to measure the level of employee engagement and assess its impact on economic results.

The company’s management decided to analyze the engagement of their employees. Problems with employee engagement arise when both the parties break the conditions - the employee...
To identify and analyze the problems of employee engagement, a questionnaire survey of various categories of employees in business units of the enterprise was conducted.

Anonymous questionnaires were distributed to the respondents and collected after they were completed (the survey was conducted online by e-mail). The questionnaire presented all the aspects of work that the respondents were to evaluate. The questionnaire included 10 questions by engagement groups: remuneration and recognition (3 questions), interaction with management (1 question), interaction with colleagues (1 question), labour organization (1 question), conditions for success (2 questions), and commitment to the organization (2 questions). The content of the questionnaire was developed taking into account the current situation in the company. 327 employees took part in the survey, which is one fifth of those who worked for the organization’s with its 1,811 persons. The survey was conducted within 11 structural divisions of the company in 10 working days.

To assess satisfaction, a six-figure scale was used - 1, 2, 3, 4, 5, 6 (1 - strongly dissatisfied (completely disagree); 2 - dissatisfied (disagree); 3 - rather dissatisfied (rather disagree); 4 - rather satisfied (rather agree); 5 - satisfied (agree); 6 - completely satisfied (completely agree)).

The results of the survey, aimed at assessing the engagement of the personnel in the work of the enterprise, were analyzed by calculating and comparing the mean values of employee satisfaction.

The mean score \( S_m \) of the respondents’ answers to each question was calculated by using the arithmetic mean formula:

\[
S_m = \frac{(1 \times n_1 + 2 \times n_2 + 3 \times n_3 + 4 \times n_4 + 5 \times n_5 + 6 \times n_6)}{N},
\]  

(1)

where:

- \( n_1, n_2, n_3, n_4, n_5, n_6 \) - the number of respondents who chose the corresponding answer;
- \( N \) - the total number of respondents.

We determined the level of engagement \( E \) for each of the characteristics by taking into account their weight and using the following formula:

\[
E = W_i \times S_m,
\]  

(2)

Source: Compiled by the authors using the sources mentioned in Table 1

does not perform the required duties to achieve the goals of the organization, and the employer does not provide material remuneration and non-material rewards.

<table>
<thead>
<tr>
<th>Engagement model (Kincentric) (Aon Hewitt of Spencer Stuart Company) (Kotlobov, Gumnov, &amp; Naumov, 2020)</th>
<th>Engagement concept</th>
<th>Engagement measurement</th>
<th>Engagement impact assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement is described with three behaviour patterns: an employee «speaks», «stays», «strives».</td>
<td>The questionnaire includes questions that allow assessing the level of engagement and satisfaction of the personnel with factors divided into groups: management, effectiveness, work, quality of life, company’s practice, brand.</td>
<td>Correlation with business indicators is studied: personnel management (holding on employees, absenteeism, and productivity), operating performance (efficiency, safety), customer-oriented approach (satisfaction, holding on customers, net promoter score), finances.</td>
<td></td>
</tr>
</tbody>
</table>

| Engagement assessment model by Gallup | Engagement as a total of involvement, satisfaction and enthusiasm. | In Gallup’s questionnaire (Q12) question about: career and development, organization’s mission and goals, recognition and value, interpersonal relations. | Correlation with indicators is studied: efficiency, profitability, holding on and personnel turnover. |

| Exponential model of engagement (Cheglakova & Kabalina, 2016) | Engagement as a rational acceptance of objectives and values of the company, emotional binding, readiness to invest efforts (engaged, able, imbued with enthusiasm). | The questionnaire includes questions measuring the degree of devotion to the company, striving to make efforts and do more; assessment of the ambience of productive labour; labour management and emotional climate. | Correlation with labour productivity is studied. |

| A. Saks’ three-dimensional model (Saks, 2006) | Engagement as a three-dimensional aggregation of cognitive, emotional and behavioral constituents. | The method is developed to measure two types of engagement: engagement into work and organizational engagement. | Correlation with economic performance is studied. |

| Engagement model «ECOPSY Consultancy» (Onuchin, 2013) | Engagement as employee’s inwardness enthusiasm, devotion to work, initiative. | Measurement is performed for 13 key organizational indicators. The results allow revealing the interrelation between employee’s satisfaction with different factors and engagement. | Correlation with economic performance is studied. |
where:

$W_i$ - the weight (importance) of each characteristic.

An example of calculating the level of employee engagement in a business unit of an enterprise (10 respondents) is presented in Table 2.

The level of employee engagement calculated on the basis of the answers to the 10 questions was 0.45, which is the average value for the organization (Table 2). The final value of the engagement index is calculated as the ratio of the level of employee engagement to its maximum possible value (0.6). The employee engagement index of this business unit was 0.75.

S. M. Gvozdeva recommends using nonparametric statistical methods when evaluating employee engagement (Gvozdeva, 2014). In this interpretation, Spearman’s rank correlation coefficient can be used as an indicator of the impact of personnel engagement on economic results.

$$r = 1 - \frac{6 \sum_{i=1}^{n} \Delta_i^2}{n^2 - n},$$

(3)

where:

$n$ - the number of row elements;

$\Delta_i$ - the difference of the ranks of levels of rows.

As an indicator of economic results, we chose the rate of growth (decline) of labour productivity of employees ($T_p$). The calculation of Spearman’s rank correlation coefficient is presented in Table 3.

<table>
<thead>
<tr>
<th>Engagement factors</th>
<th>Respondents</th>
<th>Total scores</th>
<th>Mean $\text{score} (\text{Sm})$</th>
<th>Weight in the total score ($W_i$)</th>
<th>Level of engagement (weight based score $E$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wages at the enterprise correspond to the market level</td>
<td>3 4 4 4 5 5 4 3 5 6</td>
<td>43</td>
<td>4.3</td>
<td>0.10</td>
<td>0.43</td>
</tr>
<tr>
<td>The management team strives to give incentives to employees</td>
<td>3 4 4 4 4 4 4 5 5 5</td>
<td>41</td>
<td>4.1</td>
<td>0.09</td>
<td>0.37</td>
</tr>
<tr>
<td>The remuneration depends on the results of the work</td>
<td>4 5 5 5 5 5 5 5 5 5</td>
<td>49</td>
<td>4.9</td>
<td>0.11</td>
<td>0.54</td>
</tr>
<tr>
<td>I understand the objectives set for me by the management team</td>
<td>3 4 4 5 5 6 6 6 6 6</td>
<td>51</td>
<td>5.1</td>
<td>0.12</td>
<td>0.61</td>
</tr>
<tr>
<td>The interaction in the organization is well-established</td>
<td>3 4 4 4 4 4 4 5 6 6</td>
<td>44</td>
<td>4.4</td>
<td>0.10</td>
<td>0.44</td>
</tr>
<tr>
<td>I am completely satisfied with the arrangement and equipment of my workplace</td>
<td>4 4 4 5 5 4 4 4 4 4</td>
<td>45</td>
<td>4.5</td>
<td>0.10</td>
<td>0.45</td>
</tr>
<tr>
<td>The organization creates excellent conditions for career growth</td>
<td>4 4 4 5 5 5 5 5 5 5</td>
<td>47</td>
<td>4.7</td>
<td>0.11</td>
<td>0.52</td>
</tr>
<tr>
<td>The organization creates conditions for learning and development</td>
<td>2 2 3 3 3 3 4 4 4 4</td>
<td>31</td>
<td>3.1</td>
<td>0.07</td>
<td>0.22</td>
</tr>
<tr>
<td>I am completely satisfied with my work in the organization</td>
<td>3 4 4 4 4 4 4 4 5 5</td>
<td>42</td>
<td>4.2</td>
<td>0.09</td>
<td>0.38</td>
</tr>
<tr>
<td>I recommend our organization unquestionably</td>
<td>3 4 5 5 5 5 5 5 5 6 6</td>
<td>49</td>
<td>4.9</td>
<td>0.11</td>
<td>0.54</td>
</tr>
<tr>
<td><strong>Overall score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>0.45</strong></td>
</tr>
</tbody>
</table>

Source: Compiled by the authors

Table 3:

<table>
<thead>
<tr>
<th>Business units</th>
<th>$T_p$ of business units</th>
<th>Rank</th>
<th>LE</th>
<th>Rank (LE)</th>
<th>$\Delta_i$</th>
<th>$\Delta_i^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.12</td>
<td>6</td>
<td>0.77</td>
<td>4</td>
<td>-2</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>0.97</td>
<td>10</td>
<td>0.65</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1.13</td>
<td>5</td>
<td>0.75</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>1.21</td>
<td>3</td>
<td>0.81</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>1.01</td>
<td>8</td>
<td>0.68</td>
<td>9</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>0.87</td>
<td>11</td>
<td>0.64</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>0.98</td>
<td>9</td>
<td>0.71</td>
<td>8</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>1.31</td>
<td>2</td>
<td>0.67</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>1.02</td>
<td>7</td>
<td>0.74</td>
<td>6</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>1.43</td>
<td>1</td>
<td>0.88</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>1.15</td>
<td>4</td>
<td>0.73</td>
<td>7</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

**Total** 16

Source: Compiled by the authors

Belyaeva, T., & Kozieva, I. / Economic Annals-XXI (2020), 186(11-12), 94-102
Spearman’s rank correlation \((r)\) coefficient is 0.93, which indicates a strong direct relation between employee engagement and productivity growth rates:

\[
r = 1 - \frac{6 \sum_{i=1}^{n} A_i^2}{n(n^2-1)} = 1 - \frac{6 \times 16}{11^3-11} = 0.93.
\]

5. Conclusions and directions for future research

The conducted research has many directions for further development. HR analytics should make a significant contribution to the development of employee engagement monitoring and the study of its correlation with performance indicators (Tikhonov, 2020).

In managing employee engagement in the HR analytics system, there is a need for quantitative diagnostics and predictive measurements enabling timely HR management adjustments and introduction of reasonable changes (Adelfinsky & Kirillov, 2017).

The specifics of the management of employee engagement at industrial enterprises allows us to measure the relationship between personnel engagement and labour productivity for business units and the enterprise as a whole in order to assess the impact of employee engagement on the final financial results and other business indicators of the economic activity. In both the uncertain external environment and the ongoing pandemic, it is important to create conditions for economic, social and health protection of personnel in order to maintain the employee engagement at large industrial enterprises. The personnel management system should control this process in order to ensure the appropriate level of the company’s labour capacity and effective management of employee engagement.

The incorporation of employee engagement studies into the HR analytics system will enable an objective and adequate factual and predictive assessment of such engagement. Also it will increase the efficiency of the organization’s development and the quality of HR solutions.

References


Received 24.10.2020
Received in revised form 23.11.2020
Accepted 26.11.2020
Available online 28.12.2020