



ANALYSIS OF THE PERSONNEL'S CONSISTENT READINESS FOR CHANGES AS ILLUSTRATED BY THE EXAMPLE OF AN EXPORT-ORIENTED BIOTECHNOLOGICAL ENTERPRISE

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The biotechnology industry is currently one of the most dynamically developing sectors of the pharmaceutical industry, that is why it requires improvement in the personnel management system aimed at increasing the flexibility and adaptability of the organization.

The aim of the research is to determine the degree of readiness of the organization's employees for innovations as illustrated by the example of an export-oriented enterprise.

Materials and methods. The source information was collected from the employees of the biotechnological enterprise through a questionnaire survey. The representative sample included 588 respondents. The statistical processing of data was carried out using the specialized software IBM SPSS STATISTICS (IBM, USA, 2017). The consistent readiness of the organization's employees for innovations was determined using I.O. Zagashv's methods. To assess the reliability of the psychological test, an internal consistency model with Cronbach's alpha was applied. Statistical hypotheses were tested by comparing the central tendencies of two independent samples using Student's t-test and the Mann-Whitney nonparametric test.

Results. The distribution results of key motivating factors for personnel showed that motivating factors such as an adequate salary and sustainable employment took the leading positions. However, the assessment of the employees' consistent readiness for innovations according to I.O. Zagashv's methods shows a high degree of the personnel's readiness for changes due to positive emotional perception of any innovations.

Conclusion. The results obtained make it possible to arrive at the conclusion that the established team favorably responds to all innovations, and is ready to support them in the future being aware of the organization's desire for innovations. In the future, the results will be used to determine the required management functions and goals and to develop the personnel management strategy in the context of the knowledge transfer, technology and export policy of the pharmaceutical enterprise.

Keywords: personnel management; motivation; biotechnological company; export; immunobiologicals

Abbreviations: VHI – voluntary health insurance

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АНАЛИЗ СИСТЕМНОЙ ГОТОВНОСТИ ПЕРСОНАЛА К ИЗМЕНЕНИЯМ НА ПРИМЕРЕ ЭКСПОРТНО ОРИЕНТИРОВАННОГО БИОТЕХНОЛОГИЧЕСКОГО ПРЕДПРИЯТИЯ

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Биотехнологическая промышленность на сегодняшний день является одним из наиболее динамично развивающихся секторов фармацевтической отрасли, поэтому требует совершенствования системы управления персоналом, направленной на повышение гибкости и адаптивности организации.

Цель. Определение степени готовности сотрудников организации к инновациям на примере экспортно ориентированного биотехнологического предприятия.

Материалы и методы. Первичная информация была собрана методом анкетирования сотрудников биотехнологического предприятия. Репрезентативная выборка составила 588 респондентов. Статистическая обработка данных проводилась с использованием специализированной программы IBM SPSS STATISTICS (IBM, USA, 2017). В определении системной готовности сотрудников организации к инновациям использовалась методика И.О. Загашева. С целью оценки надежности психологического теста применялась модель внутренней согласованности с использованием коэффициента Альфа Кронбаха. Проверка статистических гипотез в рамках сравнения центральных тенденций двух независимых выборок проводилась с использованием критерия Стьюдента и непараметрического метода Манна-Уитни.

Результаты. Результаты распределения ключевых мотивирующих факторов для персонала показали, что лидирующие позиции заняли такие мотивационные факторы, как достойная заработная плата и стабильная работа, однако оценка системной готовности сотрудников к инновациям по методике И.О. Загашева указывает на высокую степень готовности персонала к изменениям на основе позитивного эмоционального восприятия всего нового.

Заключение. Полученные результаты позволяют сделать вывод о том, что сложившийся коллектив хорошо воспринимает все нововведения и готов поддерживать их в дальнейшем в условиях осознания стремления организации к новшествам. Полученные результаты в дальнейшем позволят определить требуемые управленческие функции и цели, а также разработать стратегию управления персоналом в условиях трансфера знаний, технологий и экспортной политики фармацевтического предприятия.

Ключевые слова: управление персоналом; мотивация; биотехнологическая компания; экспорт; иммунобиологические лекарственные препараты

INTRODUCTION

As a part of the state policy of the Russian Federation for the development of the pharmaceutical industry, one of the key tasks is to create an export-oriented potential and increase the volume of exports of pharmaceutical products to foreign markets [1, 2]. Today, many Russian pharmaceutical companies are already focused on the international cooperation, Russian companies are increasingly opening their branches and subdivisions abroad, while the J07 group "Vaccines" occupies a leading position of finished medicinal products in export volumes from Russia [3]. It should be notified that

since 2013, the Saint Petersburg Research Institute of Vaccines and Sera and Manufacturer of Bacterial Preparations has been actively developing a project to introduce Russian immunobiological products and relevant production technologies in the markets of Central and Latin America. And since 2015, the Russian Federation has been implementing a project to create a joint Russian-Nicaraguan venture – Instituto Latinoamericano de Biotecnología MECHNIKOV, S.A., which will meet the needs of the Latin American region in vaccines, currently being acquired by the Pan American Health Organization Revolving Fund [1, 4].

However, at present, many Russian companies with foreign subdivisions face a number of problems associated not only with mastering improved technology, creating a new product required by the market in the region of presence, but also with improving organizational structures. According to the statistics, 70-80% of innovations are not implemented in organizations due to a failure to improve the organization's Management of Change System, including personnel recruitment and management. As illustrated by the example of Saint Petersburg Research Institute of Vaccines and Sera and Manufacturer of Bacterial Preparations, which is a parent company under the project above, a number of problems arise. The analysis of the Nicaraguan labor market shows a lack of specialists with necessary qualifications, therefore, in addition to the technology transfer, another key task is the transfer of knowledge [4]. Lack of professional competencies in a subsidiary's evolving team requires maximum strength from the parent company in performing its key management functions – planning, organization and control in the host environment and motivating the personnel by Saint Petersburg Research Institute of Vaccines and Sera and Manufacturer of Bacterial Preparations. A high level of the employees' resistance to changes due to assignment of new job functions should be taken into account. In this context, the personnel management needs a specific approach and adaptation of existing experience to the organizational changes. Considering the foregoing, the improvement of the personnel management system aimed at increasing the organization's flexibility and adaptability is a key vector in such projects.

For the purpose of competent planning of management mechanisms, at the first stage, it is advisable to timely assess the current state and determine the degree of readiness of the organization's employees for changes as illustrated by the example of an export-oriented biotechnological enterprise Saint Petersburg-Research Institute of Vaccines and Sera and Manufacturer of Bacterial Preparations, which was **THE AIM** of this study.

MATERIALS AND METHODS

The source information was collected from the employees of Saint Petersburg-Research Institute of Vaccines and Sera and Manufacturer of Bacterial Preparations through a questionnaire survey in March 2021. The representative sample included 588 respondents.

The worked out questionnaire consisted of an introduction, personal details that would depict a respondent's personality, and the main part structured in 2 blocks. In the first block of 14 proposed factors motivating an employee to work, the respondent was asked

to rate them in the order of increasing importance. The second block of questions was aimed at determining the employees' consistent readiness for innovation using I.O. Zagashchev's methods, which included 56 statements encouraging the respondents to express their attitudes on a 4-point scale. The methods analyzes 7 aspects, such as readiness to follow the leader, readiness due to a material reward, readiness due to an opportunity to take responsibility for innovation, readiness in the context of personal and professional self-realization, readiness in the absence of major changes, readiness based on the past experience, readiness due to positive emotional perception of novelties [5].

Statistical data analysis

The statistical processing of data was carried out using the specialized software IBM SPSS STATISTICS (IBM, USA, 2017). In order to assess the reliability of the psychological test according to I.O. Zagashchev's methods an internal consistency model using Cronbach's alpha was applied, which was based on the scale homogeneity and calculated as the sum of correlations between respondents' answers to the questions within the same aspect [6].

To test statistical hypotheses, within the framework of comparing central tendencies of two independent samples, Student's test (*t*-test) and the Mann-Whitney nonparametric test (*U*-test) were used. The differences were considered significant at $p < 0.05$.

RESULTS

The survey involved respondents aged from 21 to 73, the average age was 38 years, they were mostly women (63%). According to the survey results, the distribution of respondents burdened and not burdened with family obligations, was 57% and 43%, respectively, which may indicate a sufficient contingent of employees with a stable approach to work and those who are ready to assume additional job responsibilities, are interested in business trips and mastering new competencies. The sample of respondents was represented by specialists (46%), workers (36%) and managers (20%). The income level is mostly represented by the categories of 30,000-50,000 RUB. and 50,000–75,000 RUB. The distribution of respondents by divisions showed that, according to the current organizational structure, 65% of the employees belong to the production and technical division, 20% – to the support division, 10% – to the development division, and 5% represent other areas. The distribution of respondents by work experience indicates the prevalence of those with 1 to 6 years of experience (49%), emphasizing a significant share of employees with work experience of up to 1 year (20%), which is explained by

a high pace of the organization's development and, consequently, the need for new employees. It should be notified that the company has employees with experience of more than 15 years, who may be involved in guidance and mentorship. It is also important to notify that at the time of the survey, a significant proportion (57%) of the employees were actively engaged in the implementation of the above said project. Herewith, it is noteworthy that almost half of the personnel (49%) not involved in the project, showed interest in the innovations implemented in the organization and expressed their desire to take part in them.

Given the fact that the development of innovative processes in the organization requires an employee to acquire additional new competencies and skills and be ready for changes. The second stage of the study was the analysis of personnel's motivation, the results of which are advisable to be applied by the management in the process of organizing activities, so that each process participant strives to perform their professional duties as well as possible [7]. The incentive and motivation system in an organization is presently an important and efficient tool of personnel management, the efficiency of which depends on a multitude of factors including the communication system and the style of work of the organization's management. Modern incentive systems require proper development and correct use in practice [8].

The data analysis showed (Fig. 1) that the leading positions were taken by such motivating factors as an adequate salary, stable employment, interest in work, relationships in the team, comfortable conditions and opportunities for professional growth. The intangible motivation (a labor union activity, efficiency of VHI (voluntary health insurance) programs, corporate culture, team atmosphere, relationships with colleagues), training opportunities (improving and expanding the range of professional skills, learning foreign languages) were rated lower. Other factors (opportunities to work with foreign colleagues, abroad, working with professionals and the best scientists, relative discretion in performing duties, participation in the implementation of the company's strategy, development of leadership qualities, and achievement of leadership positions) did not overcome the 5% barrier. At the same time, attention should be paid to the low extent of participation in innovation projects, which points out at low staff awareness in terms of benefits for each participant of the innovation process. The results of the distribution of key motivating factors for personnel, depending on their participation in the project, indicate the prevalence of the same criteria that had been identified in the analysis by personnel categories (Fig. 2).

The development and implementation of readiness formation mechanisms of an organization to change, make it possible to enhance the efficiency of implementing innovative processes, and the precise assessment tools make it possible to identify the employees involved in the change, actively supporting, resisting or conservatively inclined employees, and then to develop action plans with various groups of employees [8, 9].

The analysis results of Saint Petersburg Research Institute of Vaccines and Sera and Manufacturer of Bacterial Preparations employees' consistent readiness for innovations, indicate a high degree of readiness due to positive emotional perception of novelties and make it possible to arrive at the conclusion that the existing team favorably responds to all innovations and is ready to support them in the future being aware of the organization's desire for innovations (Fig. 3, 4). In principle, the employees perceive innovations well, and at the early stages of introducing an innovation, they will support it if they feel its novelty.

Moreover, the aspect of readiness in the context of personal and professional self-realization, especially among specialists, was a significant share. The employees are ready to support novelties and innovations if they are perceived as being associated with personal and professional self-realization and make them feel more competent at work.

Readiness due to a material reward occupies an insignificant share, in contrast to direct questionnaires, which showed a high share of an adequate salary as a motivating factor. Thus, an intermediate conclusion can be made that the methods discover hidden motivational components of the staff's readiness for innovation.

The factor of readiness to follow the leader was better manifested among the working employees: an employee supports an organizational novelty, provided there is a leader who will offer explanations, accept responsibility and take control.

The aspect of readiness under the condition of being capable of accepting responsibility for an innovation is predominant among leaders, which speaks of highly manifested leadership qualities of the leaders who are able to support novelties that help them to fulfil themselves as leaders, to take responsibility for a matter. Readiness under the condition of there being no serious change is characteristic of the employees who are ready to support an innovation, if it does not, in their opinion, bring noticeable change in customary activities. Readiness on the basis of past experience, is characteristic of the leaders who support innovations, since they are related to the success of participating in innovations in the past.

The next stage of the study was to assess the reli-

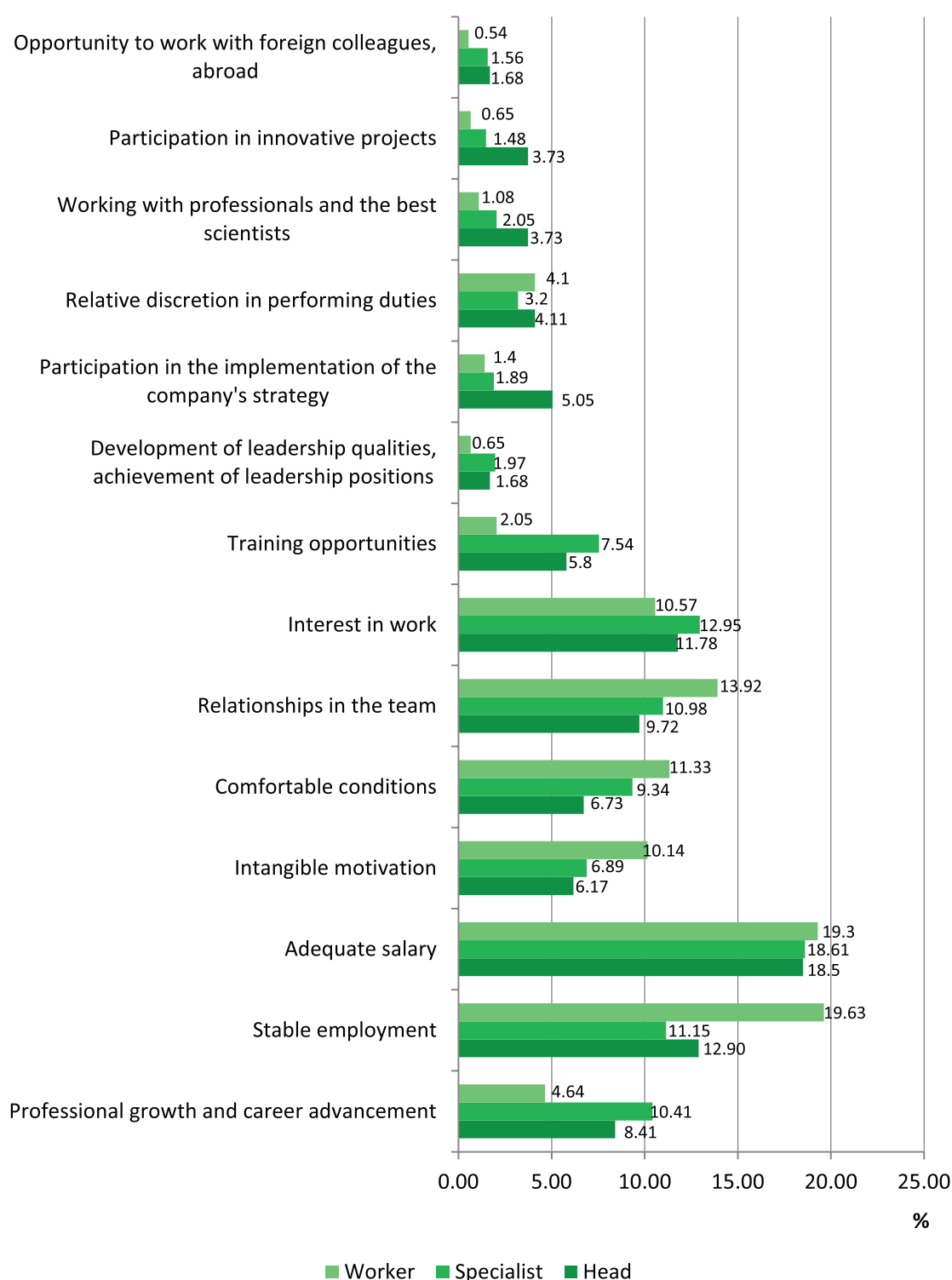


Figure 1 – Analysis of the personnel motivation system

Note: breakdown by personnel categories

ability of the psychological test using Cronbach's alpha test, which increases as the mutual correlations of variables grow, and reflects the internal consistency of the reliability assessment of test results.

As the obtained data show, for most aspects, the internal consistency coefficient has values close to "1", which indicates an acceptable and high reliability of the

internal consistency for aspects No. 2, 3, 4, 5, 6 and the leading aspect No. 7 (Table 1). The comparison of central tendencies of two independent samples using Student's t test (t test) and the nonparametric Mann-Whitney test in most cases showed $p < 0.05$, which indicates significant differences between distributions in the corresponding samples (specialist, manager, worker).

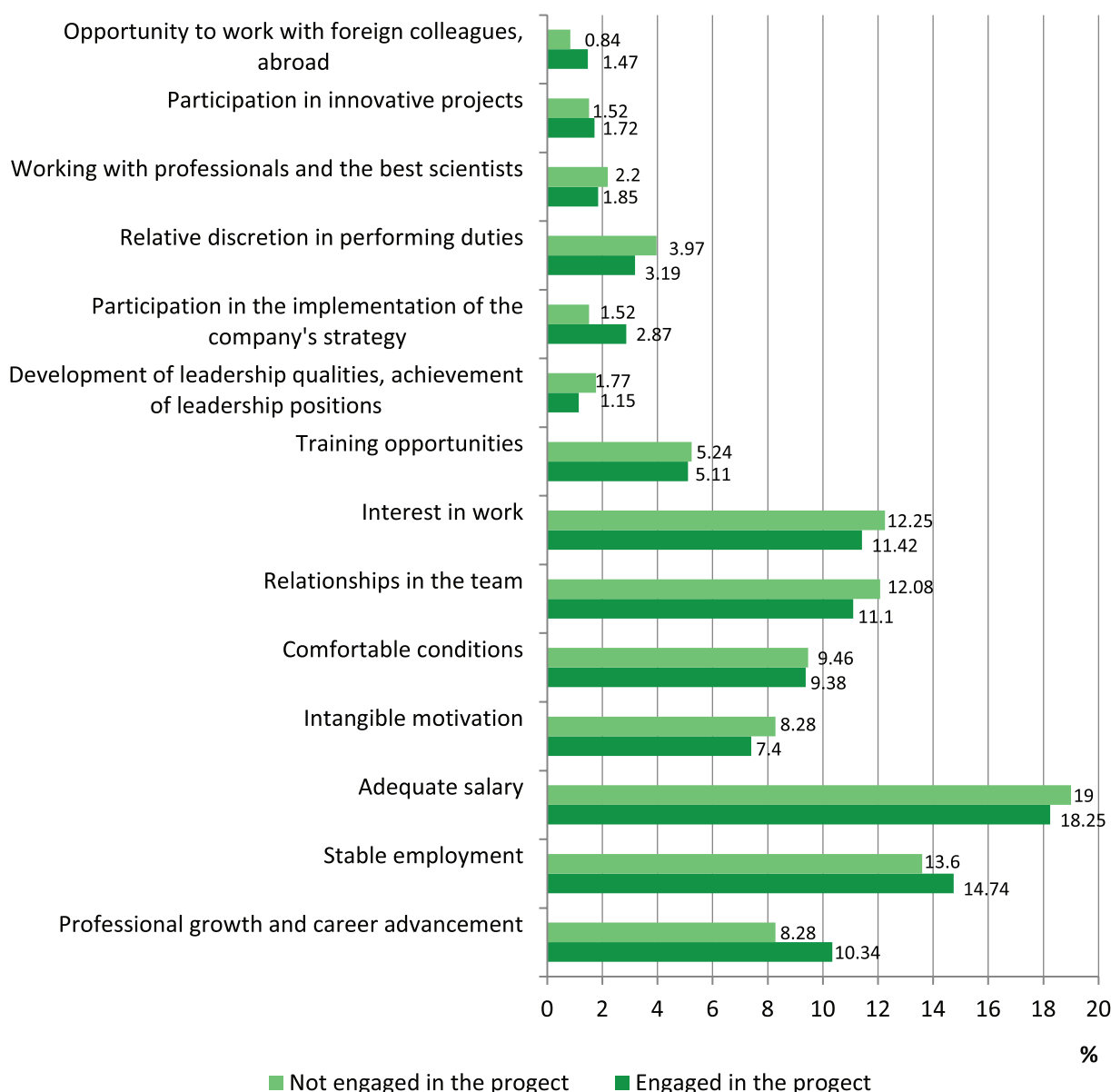


Figure 2 – Analysis of the personnel motivation system

Note: breakdown by project partition

DISCUSSION

At present, all pharmaceutical companies, including biotechnology ones, are subject to changes. In view of the above, the development of innovation activities and the executive managers' ability to use them efficiently in the administration process is relevant. According to a number of authors, almost all large companies are required to apply "auxiliary" projects in change management, with a mandatory assessment use of rational components of organisation's readiness and development of a change implementation plan [10].

Under the conditions of organisational changes, the key management functions include planning. This fact involves development of a future vision and preparation of necessary resources, the organisation providing for

the establishment of a structured approach to transformation of systems and strategies, staffing aimed at providing the organisation with necessary human resources, leadership and control. It is important to notify that changes in the company management should be implemented at individual, group and system levels. Organisations should pay particular attention to human and organisational development measures in order to support their employees and create the organisational culture focused on development [11–14]. In order to maximise the changes acceptance at the individual level, models are widely used in practice today. Such a model presupposes a company employee's awareness of the need for change, their willingness to participate in it and support the change, their knowledge of ensuing changes as well

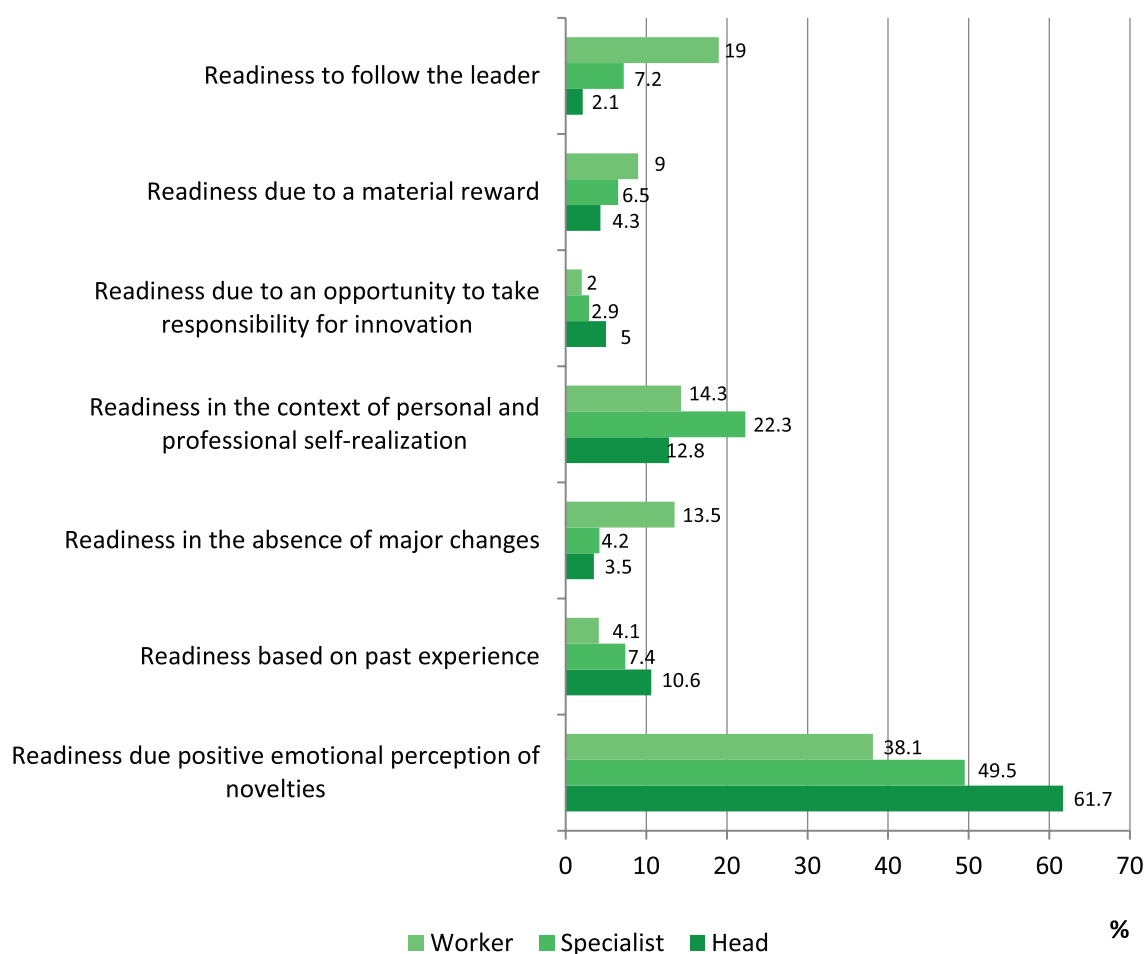


Figure 3 – The staff's consistent readiness for innovation

Note: breakdown by personnel categories

as subsequent benefits, risks and consequences of the changes implementation, as well as the ability to implement these changes. Managing innovations implementation requires modifying the management style, which needs to be adapted, defining the types of mechanisms to be involved, distributing roles and job responsibilities.

Today, innovation activities are understood, inter alia, as targeted changes in the system of interaction within an organisation, which promotes its performance. The management of changes and innovations is becoming an important administration objective, not only to ensure the organisation survival, but also to achieve sustainable success [15]. In order to achieve this goal, the primary objective is change implementation diagnostics; its results help to assess the company's readiness for changes, to identify resources and develop a strategy. The inability to assess readiness for organisational and individual changes may result in expenditures of the organisation, including time expenditures on combating resistance to change. When assessing a company's readiness for changes, it is necessary to consider the human factor, to maximise the use of the situational ap-

proach and a system factor analysis, to actively develop the training organisation concept, to apply mechanisms of self-organisation in management [10]. The company's readiness for changes depends on the degree the company's employees appreciate the changes, and whether they positively evaluate (and to what extent) the three key factors accounting for the possibility of realisation: goal-specific requirements, availability of resources and situational factors.

However, it should be notified that despite a rather high level of the development in this area, for the most part, the scholarly sources to date provide discrete practical methods for assessing organisational readiness for changes [16]. In addition, it is important to emphasise that there is not any coordinated concept of organisations' readiness for changes, while the readiness of company employees to innovations in terms of export-oriented biotechnology enterprises has not been studied so far.

In the framework of the research, it has been shown that at all levels, the role of managers is significant in the context of an increased risk in the course of realisation of

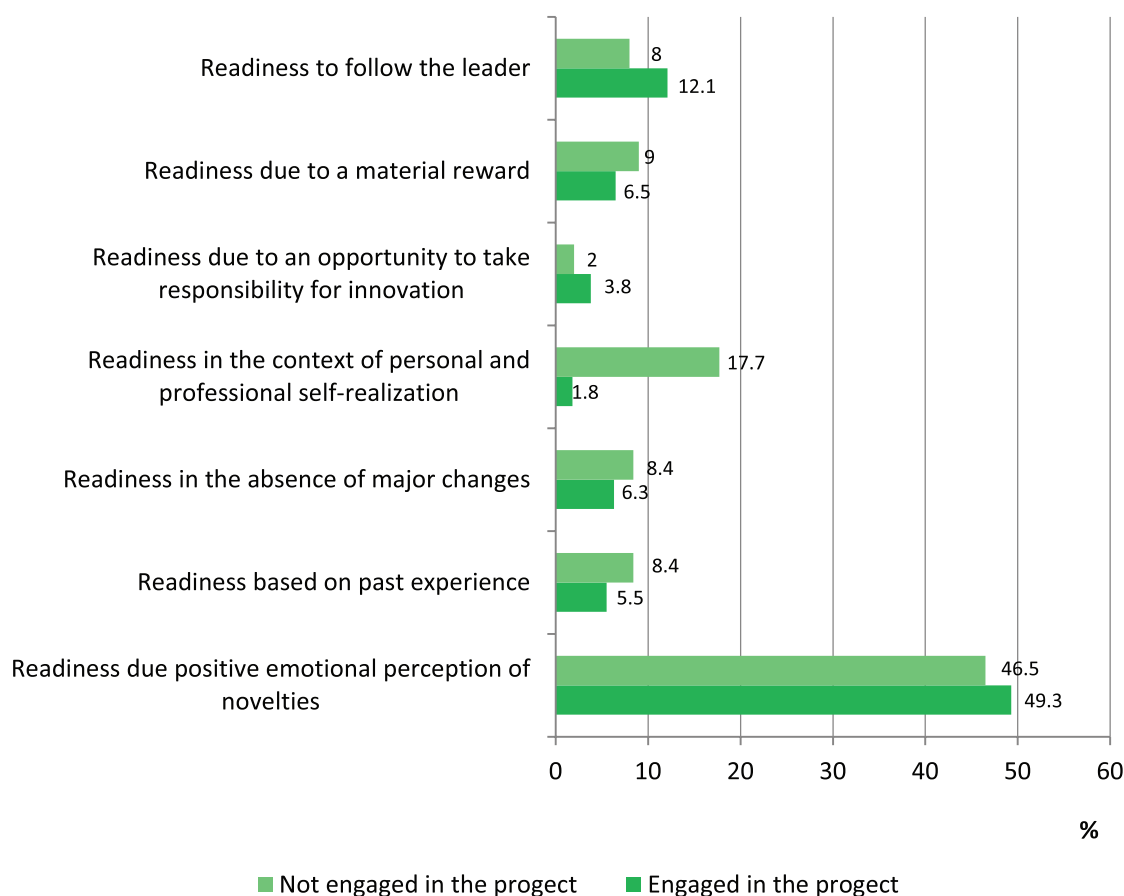


Figure 4 – The staff's consistent readiness for innovation

Note: breakdown by project partition

innovation processes that are usually related to change processes. These can be, for instance, increased uncertainty, an inflated level of stress, a high probability of failures. The obtained results confirm the idea expressed by a number of authors on the key role of leaders in the development of employees' creativity and innovations [15, 17]. It has been established that in order to implement any planned changes successfully, true leaders need to create readiness for changes in their employees, which, in turn, will develop their commitment to change and behavioural support for changes [18]. The leaders' role presupposes creation of readiness and strengthening of institutionalisation in respect of relatively large-scale organisational changes towards corporate sustainability [19]. Considering that the leadership behaviour contributes to the organisational identity at periods of uncertainty, it is recommended to shift the vector of managers' activities to such competencies as organisational change management, team management, development of communication skills [20, 21]. In addition, it should be notified that the manager's special attention should be aimed at the identification and subsequent motivation of change agents that serve as an organisation's transformation catalysts through support, development and

control of practical innovation, take part in team building, provide intergroup interaction [22].

Under the conditions of organisational changes, human resource policy requires mandatory research of psychological readiness of the staff, which goes through specific emotional stages in the context of innovations implementation, such as denial and anger, bargaining, depression, revision and acceptance [23]. It has been proven in practice that the carried out organisational changes contribute to the development of psychosocial risks. As a consequence of it, many initiatives do not lead to the desired results [24]. Furthermore, when implementing a labour protection management system, the administration should consider possible risks [25].

A staff motivation commitment is defined as a perceived need for a change or its inevitability. The more the company members value the change, the more they wish to realise it. The labour motivation system study results obtained in the course of work over the subject in question, lead to an intermediate conclusion that both intrinsic and extrinsic employee motivation methods can be applied in the organisation, with the use of both persuasive and persevering management strategies. It should be notified that the given strategies are feasible

Table 1 – Assessment of reliability of the psychological test according to I.O. Zagashv's methods

Aspect	Personnel category	X	p_t	p_u	σ	α	α_{gen}	N
No. 1 Readiness to follow the leader	worker	31.55	**/**	**/**	5.68	0.43	0.44	8
	specialist	30.27	*	*	4.74	0.46		
	manager	29.97	*	*	4.58	0.40		
No. 2 Readiness due to a material reward	worker	28.75	**/**	**/**	6.39	0.60	0.62	8
	specialist	27.25	*	**/**	6.02	0.66		
	manager	26.03	*	**/**	5.21	0.63		
No. 3 Readiness due to an opportunity to take responsibility for innovations	worker	25.66	**/**	**/**	8.14	0.79	0.78	8
	specialist	30.56	**/**	**/**	6.61	0.76		
	manager	34.66	**/**	**/**	5.17	0.74		
No. 4 Readiness in the context of personal and professional self-realization	worker	30.73	**/**	**/**	7.02	0.69	0.71	8
	specialist	35.25	*	*	5.74	0.72		
	manager	36.06	*	*	5.27	0.68		
No. 5 Readiness in the absence of major changes	worker	29.92	**/**	**/**	6.64	0.65	0.69	8
	specialist	26.25	**/**	**/**	6.18	0.65		
	manager	22.92	**/**	**/**	6.57	0.74		
No. 6 Readiness based on past experience	worker	24.53	**/**	**/**	7.94	0.83	0.84	8
	specialist	30.26	**/**	**/**	7.35	0.83		
	manager	34.95	**/**	**/**	6.38	0.84		
No. 7 Readiness due to positive emotional perception of novelties	worker	33.86	**/**	**/**	7.35	0.77	0.79	8
	specialist	37.06	**/**	**/**	6.11	0.80		
	manager	39.94	**/**	**/**	5.12	0.77		

Note: X – arithmetical mean responder score; σ – mean square deviation; α – Cronbach's alpha; n – number of observations; p_t – Student's t-test; p_u – Mann-Whitney U-test; * – <0.05 in comparison with worker; ** – <0.05 in comparison with specialist; *** – < in comparison with manager

to use in formation of internal corporate social responsibility. The psychological climate factors include transparency of mission and goals, team cohesion, communication, openness to changes. The analysis of scholarly sources shows that well-being of employees is a fundamental factor in efficiency of an organisation, including pharmaceutical companies. Organisations with a high level of corporate social responsibility can achieve success through employees' innovative behaviour [26–28].

The change process evaluation results showed that a current participation in innovative projects is not a significant factor for organisation employees. Such results of the research revealing a staff attitude towards a participation in organisational change, require development of a modern approach to management aimed at changing staff beliefs, appropriate assessment of opinions and attitudes of organisation employees, development and inculcation of relevant marketing strategy focused on reduction of risks and subsequent enhancement of viability and competitiveness of the organisation [10, 16].

Thus, the study conducted and presented in the es-

say, as to analysing organisational readiness for changes, makes it possible to predict the ability of employees to participate in proposed innovations, and subsequently to apply appropriate incentive methods and reward systems with respect to certain staff categories. In addition, similar studies show how far the proposed changes are applicable for a given organisation, reveal the leaders' commitment to ongoing activities and help to develop due corporate culture [8].

The results obtained in this paper, will form a basis for the development of an adaptive model of human resource management in the conditions of organisational changes. It was found out that incorporating the principles of motivational interviewing for change readiness, can help individual employees to accept the change process, increasing achievements in terms of initiatives on changes. The forehanded analysis shows that the anticipatory phase before the introduction of innovations represents not only a passive waiting stage for company members, but also an active process of comprehension and positioning of the company's future [13, 29–31].

CONCLUSION

The degree of the organization employees' readiness for changes has been analyzed. It included the analysis of motivating factors, and the factors that impede or contribute to the development of innovative processes. They have been identified as illustrated by the example

of an export-oriented biotechnological enterprise. The results can be further used to determine the required management functions and goals, and to develop the personnel management strategy in the context of the knowledge transfer, technology and export policy of the pharmaceutical enterprise.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

Elena V. Kazakova – selection of the research area, idea, development of the research algorithm, literature review, conducting all research stages, processing results, writing the article; Viktor P. Trukhin – formulation of the aim and objectives of the research; Igor A. Narkevich – consulting on the conduct of certain research stages; Irina I. Basakina – consulting on the conduct of certain research stages.

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