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JOB EXPECTATIONS AND SATISFACTION AMONG SCIENTISTS

OCZEKIWANIA WOBEC PRACODAWCY A ZADOWOLENIE Z PRACY NAUKOWCÓW

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ABSTRACT

The decreasing supply of qualified people ready to take up employment, observed for several years on the labour market, results in the strengthening of the employee's position. The consequences of this process affect not only the companies but also scientific institutions. The employee's market, which is shaped as a result of the following changes, forces employers to focus increasingly on activities aimed at attracting and retaining individuals who constitute their human capital. The aim of our article is to diagnose satisfaction levels of various job facets and differences in attachment to the workplace in groups of scientists with varied job expectation profiles. On this basis, it will be possible to indicate the job facets that scientific institutions should take into consideration in order to provide researchers with a high level of job satisfaction. To broaden knowledge about the subject, we used data collected by the National Information Processing Institute in 2017 in a nationwide representative sample of 840 scientists who were at various stages of their academic career, represented all areas of science and worked in all types of scientific units in Poland. By performing factor analysis and a clustering procedure on variables describing researchers' job expectations we were able to categorize the respondents into three groups: 1) *demanding*, 2) *aspiring* and 3) *unengaged*. The *demanding* employees have high expectations in all job facets that we examined, i.e.: economic and organizational matters, developmental and social opportunities as well as employment flexibility. The *aspiring* scientists above all appreciate developmental and social opportunities more than other groups. On the contrary, the *unengaged* employees value developmental and social opportunities the least while other job facets are moderately significant for them. The survey of satisfaction of particular groups of scientists with their current employer indicates the need to focus the scientific institutions employing them on different aspects of work. In the case of *demanding* employees, it is important to take care of their economic well-being. On the other hand, in order to increase satisfaction from work of scientists from the *aspiring* group, it will be important to provide them with a higher level of satisfaction from the development and social sphere. The greatest challenge may be the satisfaction of *unengaged*

employees who declare a relatively low general level of satisfaction with the workplace, and at the same time do not have well-established expectations towards the institutions employing them.

Keywords: scientists, scientific institutions, job market, job satisfaction, job expectations

ABSTRAKT

Obserwowana od kilku lat na rynku pracy malejąca podaż wykwalifikowanych osób gotowych podjąć zatrudnienie skutkuje umacnianiem się pozycji pracownika. Konsekwencje tego procesu dotyczą nie tylko przedsiębiorstwa, ale są również odczuwalne dla instytucji naukowych. Celem artykułu jest diagnoza poziomu zadowolenia z różnych aspektów pracy i przywiązania do miejsca zatrudnienia w grupach naukowców o odmiennych profilach oczekiwań wobec pracy. Na tej podstawie możliwe będzie wskazanie instytucjom naukowym tych aspektów pracy, o które powinny dbać, aby zapewnić naukowcom wysoki poziom satysfakcji z miejsca zatrudnienia. Aby dostarczyć wiedzy w tym zakresie, analizie poddano materiał empiryczny zgromadzony w ramach badania kwestionariuszowego przeprowadzonego przez OPI PIB w 2017 roku na reprezentatywnej próbie 840 naukowców zatrudnionych we wszystkich typach jednostek naukowych w Polsce. Pracownicy, którzy wzięli udział w sondażu, znajdowali się na różnych etapach kariery naukowej i reprezentowali wszystkie obszary nauki. Na podstawie deklaracji dotyczących oczekiwań wobec pracodawcy przeprowadzono analizę czynnikową i podzielono respondentów na trzy grupy: 1) *wymagających*, 2) *aspirujących* i 3) *niezaangażowanych*. Pracownicy *wymagający* wyróżniają się wysokimi oczekiwaniami w zakresie wszystkich badanych aspektów pracy: ekonomiczno-organizacyjnych, rozwojowo-społecznych oraz elastyczności zatrudnienia. Z kolei naukowcy *aspirujący* wyżej niż inne grupy cenią sobie przede wszystkim aspekty rozwojowo-społeczne. Ich przeciwieństwem są zaś pracownicy *niezaangażowani*, dla których aspekty rozwojowo-społeczne są najmniej ważne, a pozostałe kwestie umiarkowanie istotne. Badanie zadowolenia poszczególnych grup naukowców z obecnego pracodawcy wskazuje na konieczność koncentracji zatrudniających ich instytucji naukowych na odmiennych aspektach pracy. W przypadku pracowników *wymagających* ważne okazuje się zadbanie o ich dobrostan ekonomiczny. Natomiast dla podniesienia satysfakcji z pracy naukowców z grupy *aspirujących* istotne będzie zapewnienie im wyższego poziomu zadowolenia ze sfery rozwojowo-społecznej. Największe wyzwanie może stanowić usatysfakcjonowanie pracowników *niezaangażowanych*, którzy deklarują stosunkowo niski ogólny poziom zadowolenia z miejsca pracy, a jednocześnie nie mają ugruntowanych oczekiwań wobec zatrudniających ich instytucji.

Słowa kluczowe: naukowcy, instytucje naukowe, rynek pracy, zadowolenie z pracy, oczekiwania wobec pracy

Introduction

It is increasingly common to say that the most important resource in the 21st century is data which determine the development of artificial intelligence and drive the fourth industrial revolution. However, a person who can make use of this data is still needed. Therefore, it is not an abuse to say that people are still the most valuable resource of organizations, and in scientific institutions this resource is scientists.

This statement is additionally gaining in importance in the face of the current situation on the Polish labour market which is greatly influenced by the progressing demographic changes. On one hand, they are connected with the aging of the society, and on the other hand, with the entry of new generations that are characterized by a different approach to work and different expectations towards employers than previous generations. These trends are additionally influenced by the increase in labour mobility of people in the working age, which also includes emigration abroad. The aforementioned changes are reflected in the science sector in the form of aging of the scientific staff and the outflow of scientists to work abroad or outside the sphere of science. As a result, individual organisations, as well as the economy as a whole, have to struggle with the decreasing availability of employees including people who have the potential to perform scientific work. In addition, they are confronted with the need to create jobs that meet the expectations of teams of employees, which are characterized by multi-generationality and increasing diversity.

The answer to these challenges is talent management, which can be defined as a set of sustainable organizational strategies using human capital to achieve a competitive advantage for the organization (Claus, 2013). It uses concepts and tools from various disciplines, in particular human capital management (in terms of recruitment, implementation, training, motivation and evaluation of employees) and marketing and public relations (in terms of building the employer's image, employee segmentation and internal communication).

Efficient talent management is extremely important from the perspective of employees, for whom work is an important sphere of life

because it provides income, determines social position and can be a source of satisfaction. The employer's efforts in talent management to discover the needs of employees give the opportunity to redesign their experience according to their expectations and thus increase job satisfaction. The latter, as research shows, is positively related to employees' productivity, motivation, commitment and willingness to stay with their current employer (Alniacik et al., 2012; Aslan et al., 2014; Judge et al., 2001; Machado et al., 2011; Ng, Soresen and Yim, 2009; Rutherford et al., 2009; Yin-Fah et al., 2010).

Understanding the approach to scientists' work is particularly important because the social mission of scientific institutions, which is to provide knowledge and educate students, depends on the motivation of this group. Growing global competition in science and technology increases the pressure to attract and retain the best scientists. Counteracting the feeling of dissatisfaction with work by scientists and preventing the outflow of talent may indirectly affect the growth of excellence of science and higher education in Poland. Thus, leaving the science sector by talented individuals should be considered in the category of failure not only of these people, but also of the institutions employing them, and finally of the whole society (Sabharwal, 2011).

The aim of the article is to diagnose the level of satisfaction with various aspects of work and attachment to the place of employment in groups of scientists with different profiles of expectations towards work. It will enable to indicate to scientific institutions those aspects of work that they should take care of in order to provide scientists with a high level of satisfaction with the place of employment. In order to achieve the set goal, the authors conducted analyses on empirical material obtained from a survey carried out on a representative sample of professionally active employees of Polish scientific institutions.

Although job satisfaction has been the subject of study by scientists from various disciplines for more than half a century, relatively few studies concern workers from Central and Eastern Europe. Meanwhile, the approach to work in this part of Europe may be different from that of Western cultures, which are the subject of most research, for example due to historical circumstances, and especially the experience of

communism. Moreover, most of the research work focuses on the satisfaction survey in enterprises, while the issue of satisfaction of employees in science and higher education is extremely rarely raised. It may be wrong to relate the results of business studies directly to research work which has specific conditions such as the need to meet the requirements for successive promotions or (in most cases) to reconcile the burden of teaching and research. Even fewer studies are available on the satisfaction of scientists from Central and Eastern Europe, its level, sources and consequences. The authors' survey of scientists employed in Polish scientific institutions is an attempt to fill this gap. At the same time, it is supposed to provide both scientific institutions and legislators with knowledge that will allow them to take actions aimed at strengthening the Polish science system by improving the neglected aspects of work, reducing satisfaction and maintaining at a high level those that are perceived positively.

Job satisfaction and its determinants

In the literature, job satisfaction is defined in many ways, however, the definition formulated by Edwin A is most often cited. Locke (1976), who understood by this notion a pleasant and positive emotional state resulting from the assessment of his own professional experience. Thus, individual satisfaction with work does not depend solely on its objective conditions. Two employees performing work with the same characteristics may show completely different levels of satisfaction due to different aspirations (Stutzer, 2004). Individual satisfaction therefore depends on the size of the gap between these aspirations and the performance of the workers (Fernandez-Macia and Munoz de Bustillo Llorente, 2005). Aspirations about desired working conditions are shaped by comparisons with the social environment and future expectations, as well as by past experiences. As a result of these comparisons, workers determine the lower limits of their aspirations (minimum acceptable working conditions they are able to accept) as well as the upper limits of their aspirations (best working conditions they can

obtain on the labour market). Importantly, the gap between working conditions and the upper limits of aspirations has a stronger impact on job satisfaction than the gap between the lower limits of aspirations and reality on job satisfaction growth (Poggi, 2010).

Scientists consider job satisfaction as a whole (general satisfaction) or in relation to particular aspects of work (Knoop, 1995; Skalli, Theodossiou and Vasileiou, 2008; Tett and Meyer, 1993). Each specific aspect of work can contribute to overall job satisfaction in different ways. The latter, according to Susan Ambrose, Terese Huston and Marie Norman (2005), is, however, a weak predictor of scientists' decisions to stay or leave a scientific institution.

To fully understand job satisfaction, it is essential to identify factors that increase or decrease satisfaction. Linda Hagedorn (2000) divided the determinants of job satisfaction of scientists into two categories: mediators and triggers. The first group included: demographics, motivations and hygiene and environmental conditions. By triggers, she understood important life events (e.g. marriage, birth of a child, divorce, illness, change of position, transition to a new institution), under the influence of which job satisfaction may change.

Gender seems to be the most frequently researched feature in job satisfaction studies (Bender and Heywood, 2006; Bilimoria et al., 2006; Callister, 2006; Okpara, Squillace and Erundu, 2005; Saner and Eyüpoğlu, 2013). Although it is more often men who are more satisfied with their jobs than women, comparing the results of the research does not allow to draw clear conclusions. This shows how complex the dependencies on the test design can be and to what extent the results can be influenced by the specificity of the test group and its experiences.

The research also shows that married life has a positive effect on job satisfaction (Saner and Eyüpoğlu, 2013; Sharma and Jyoti, 2009). Moreover, scientists from older age groups are more satisfied with their work (Saner and Eyüpoğlu, 2012). The positive impact of age and marriage (which usually takes place at a more mature age) can be explained by the position of a higher education researcher, which is seen as an important determinant of job satisfaction in science and higher

education. The gradual increase in employee satisfaction with the development of research careers is indicated by the Wayne E study. Holden and Maureen M. Black (1996) and Titus Oshagbemi (2003). However, the results of Serife Zihni Eyüpoğlu and Tulen Saner (2009), according to which associate professors are the least satisfied compared to those at other levels of research careers, are not entirely consistent with these results.

However, scientists agree on the importance of the working environment for employee satisfaction (Mumford and Sechel, 2019; Raziq and Maulabakhsh, 2015). Workers need conditions that allow them to work smoothly. Lack of facilities, equipment and devices to work efficiently can cause stress and dissatisfaction, resulting in reduced productivity and a desire to move to another organisation offering better conditions (Munir and Rahman, 2016).

Relationships between colleagues remain an important source of satisfaction, especially for newcomers to the organisation (Aydin, Uysal and Sarier, 2012; Izvercian, Potra and Ivascu, 2016; Özpehlivan and Acar, 2015; Sageer, Rafat and Agarwal, 2012). These relationships determine the level of satisfaction of an employee's need for belonging, which is expressed in the desire to be associated with the group, to communicate, cooperate and share knowledge. If the team consists of members with similar attitudes and values, who go beyond their assigned responsibilities and support each other, it can be a source of job satisfaction. In turn, both conflicts and indifference in the relationship will result in lower employee satisfaction levels.

Other studies have shown a positive relationship between job satisfaction and the quality of the relationship with the supervisor (Baranik, Roling and Eby, 2010; Castillo and Cano, 2004; Edgar and Geare, 2005; Fila et al., 2014; Knoll and Gill, 2011; Özpehlivan and Acar, 2015; Raziq and Maulabakhsh, 2015; Stringer, 2006). The superior's characteristics such as availability, ability to connect employees, stimulation of creative thinking and openness and ability to communicate ensure a high level of job satisfaction. On the other hand, failure to meet the need for respect and appreciation on the part of the superior results in employees leaving for other organizations.

Md. Aminul Islam et al. (2011) stated in their survey that employees feel satisfied with their work not only when they are appreciated by their superiors, but also when the organisation guarantees them development opportunities. Similarly, in a study by Monici Izvercian, Sabina Potra, Larisa Ivascu (2016), ideal work was associated with providing opportunities to participate in training, acquire new skills and meet the need for achievement, as well as posing new challenges to employees. On the other hand, the lack of possibility to balance professional duties with family commitments and personal life may contribute to dissatisfaction (Haar et al., 2014; Qu and Zhao, 2012).

Dissatisfaction can also cause job instability, even with attractive salaries and promotion opportunities (Izvercian, Potra and Ivascu, 2016). Although some studies show that higher wages and non-financial benefits attract workers, keep them in work and minimize dissatisfaction (Özpehlivan and Acar, 2015; Phelps and Zoega, 2013), the findings of a meta-analysis conducted by Timothy A. Judge et al. (2010) suggest only a small positive relationship between remuneration levels and job satisfaction.

Insight into the complexity of these relationships in the science and higher education sector is provided by a study by Jürgen Janger and Klaus Nowotny (2016). It shows that scientists are willing to give up higher salaries in return for a more favourable research environment that enables higher productivity or provides intangible benefits. Particularly attractive to novice scientists are institutions that offer them independence and allow them to devote most of their time to their own research, which in the long run, thanks to their scientific achievements, may result in an independent position.

In the context of employee retention in an organisation, the concept of satisfaction is associated with the term *organizational commitment*, defined as the attitude of the individual to the organisation, which consists of three elements: faith in and acceptance of the organisation's goals and values, readiness to make efforts on its behalf, and a strong desire to remain its member (Porter et al., 1974). This attitude can be called *affective commitment* which is determined by a strong identification with the institution. Next to it, scientists (Alniaçik et al., 2012; Meyer and Allen, 1991) distinguish between normative commitment and continuous

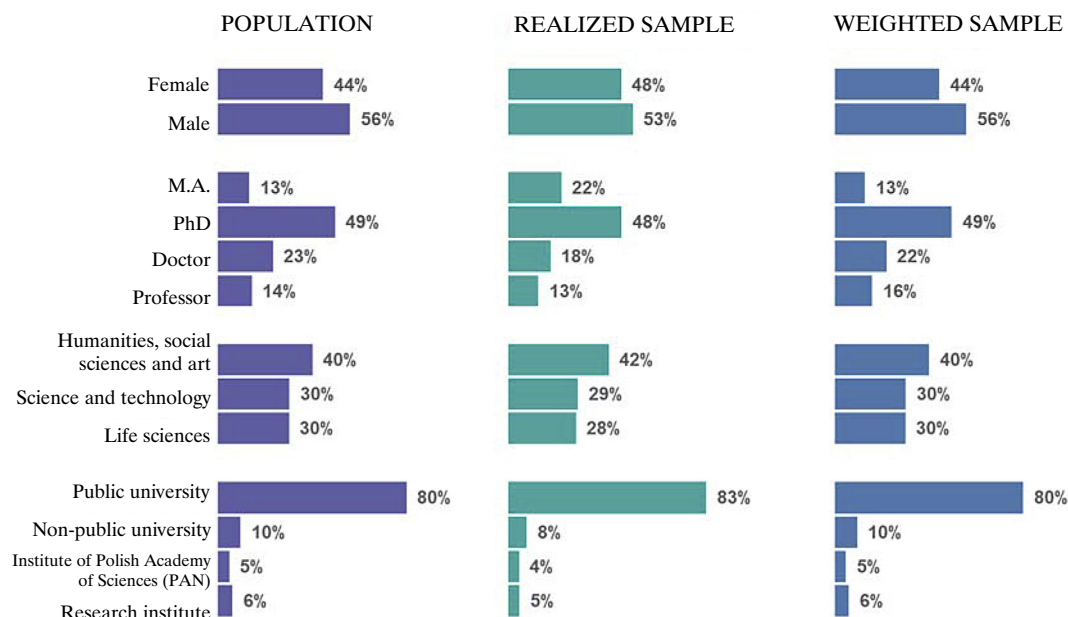
commitment. The former refers to the sense of duty to stay in the institution and continue to work. The commitment to continuity, on the other hand, stems from the awareness of the costs associated with leaving the organisation, which are at the root of the decision to stay in the organisation. As not all departures result from dissatisfaction, and on the other hand not all dissatisfied people decide to leave the employer, it is worth taking into account the aspect of attachment to the workplace in satisfaction surveys.

Description of the sample and test method

The empirical material used in the analysis was collected in a questionnaire survey conducted by NIPI in 2017 in the form of computer-aided individual interviews (CAPI). The choice of the research technique was dictated by the desire to maintain a personalized approach to the respondent, which ensures that the entire questionnaire is completed, while maintaining the possibility of computer verification of the correctness of the data entered. The survey was conducted on a representative sample of 840 scientists employed in all types of scientific institutions in Poland. The employees who took part in the survey were at different stages of scientific career and represented all areas of science. A description of the sample used in the survey with respect to gender, degree or title, area of science and type of scientific institution is presented in Figure 1.

In order to identify the expectations for professional work in the scientific sector, the analysis included the declarations of scientists, specifying how important the selected aspect of work is for them. The answers were represented on a five-grade Likert scale from 1 — completely unimportant, to 5 — very important. Data gaps were filled in accordance with the MICE procedure. Using the method of main components with varimax rotation and Keiser normalization, three factors were distinguished, corresponding to the main areas of work expectations. The first one reproduces 22.8% of the variability of the output set, the second one — 21.6%, and the third one — 15.8%. In total, the obtained model reproduces 60.2% of the initial variance.

Figure 1. Structure of the population of scientists in Poland and the structure of the completed and weighted sample by gender, degree or title, area of science and type of scientific institution



The values in the chart do not add up to 100% due to rounding of the data to whole values.

Source: own elaboration.

The solution obtained, containing a matrix of factor loads binding the indicators to the main areas of expectations from the work, is presented in Table 1. High values of parameters (factor loads) in the Table prove strong correlation of the analysed variable with a separate component (area of expectations), while low values prove weak correlation. For example, the variable describing *the availability of additional non-financial benefits* is strongly related to the first component, as evidenced by the load value of 0.757. Similarly, the variable describing *the possibility of developing knowledge or improving skills* is strongly related to the second component (load value of 0.837), while the variable describing *the possibility to work remotely* is strongly related to the third component (load value of 0.860).

Table 1. Areas of work expectations: three-dimensional solution factor load matrix

Indicator	Component		
	economic and organisational aspects	developmental and social aspects	work flexibility
Availability of additional non-financial benefits	0.757	-0.061	0.101
Amount of remuneration	0.657	0.022	0.225
Sense of job stability	0.641	0.272	0.142
Organisation of the workspace	0.629	0.239	0.002
Showing appreciation by superiors for a job well done	0.582	0.396	0.051
Possibility of developing knowledge or improving skills	0.089	0.837	0.150
Possibility of pursuing one's own scientific aspirations	0.083	0.816	0.198
Human relations	0.249	0.666	0.073
Possibility to work remotely (i.e. outside the scientific unit)	0.120	0.135	0.860
Flexible working hours	0.186	0.209	0.828

Source: own elaboration.

On the basis of the results obtained, three variables were created, corresponding to each of the components of the solution presented in Table 1, and they were given an interpretation relating to employment expectations in the science sector. The first area of expectations represents the *economic and organisational aspects of work*, and is strongly linked to such indicators as the availability of additional non-financial benefits, the amount of remuneration, the sense of stability of employment, the organisation of the workspace, and the recognition by superiors for a job well done. The second area, representing the *development and social aspects of work*, is strongly connected with such indicators as: the possibility of developing knowledge and improving skills, possibility of pursuing one's own scientific aspirations and human relations. The last, third area representing *flexibility of work* is strongly connected with indicators describing the possibility of remote work and the possibility of choosing working hours. The values of each of the three created variables calculated for the respondent represent the level of his/her economic, organisation, development and social expectations

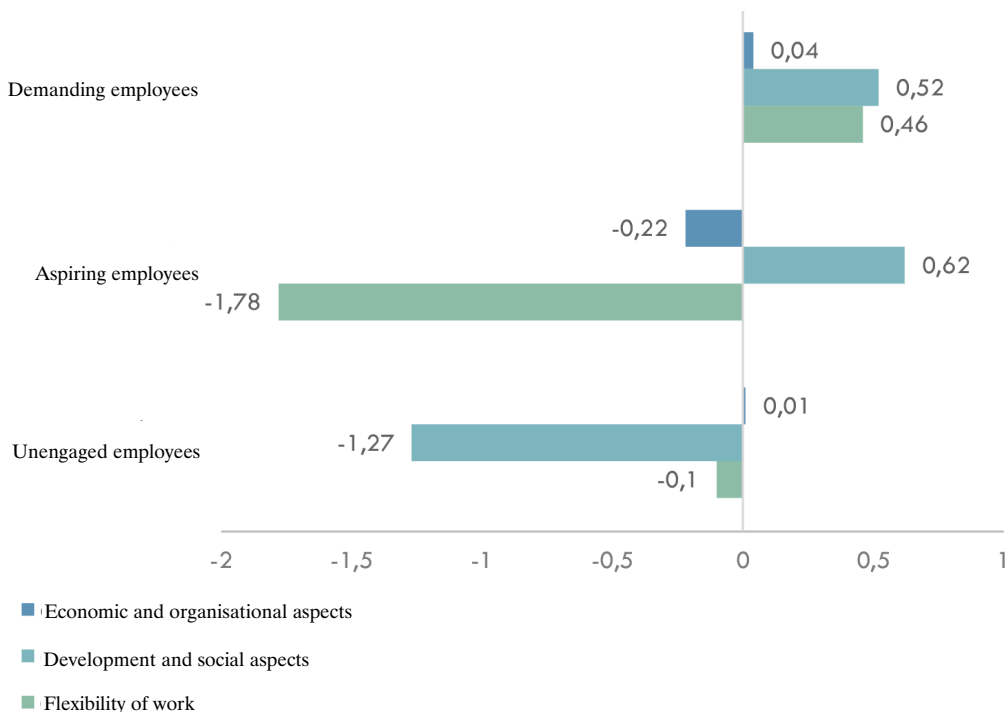
related to work flexibility. Low values of these variables will prove the low importance of a given area for an employee of the science sector, while high values will prove that the given aspects related to employment are very important for them.

The conducted procedure made it possible to determine the level of expectations of each respondent in the selected three areas, and thus to create for the scientists participating in the survey profiles of expectations for work, corresponding to their preferences concerning economic, organization and developmental aspects, developmental and social ones, as well as flexibility of work in the science sector.

In order to identify groups of scientists with similar expectations towards work, on a reduced set of three areas important for professional work, a cluster analysis with Ward grouping was conducted. As a result of this procedure, referring to average levels of work preferences, respondents were divided into three groups: 1) *demanding*, 2) *aspiring* and 3) *unengaged*. The average values of variables describing the expectations of scientists from these three groups in the selected three areas are presented in Figure 2. High average values indicate high expectations of a given group in relation to the analysed aspects of professional work, low — of little importance for this group. On the basis of the obtained results, it can be concluded that *demanding* employees who constitute the most numerous group (N = 479), are distinguished by high expectations concerning all the examined aspects of work: economic-organizational, development-social ones, and flexibility of work. On the other hand, *aspiring* scientists, who are the least numerous in the sample (N = 108), value above all developmental and social aspects more than other groups. Their opposite is true for *unengaged* employees (N = 253), for whom developmental and social aspects are the least important, and the remaining issues are moderately important.

The distinction between *demanding*, *aspiring* and *unengaged* scientists was not linked to the characteristics of the scientists: gender, degree or title, area of science and type of research institution employing the researcher. This is evidenced by the distribution of these characteristics in the studied groups and low values of the Cramer's V coefficient, presented in Table 2.

Figure 2. Average values of variables corresponding to the expectations of *demanding*, *aspiring* and *unengaged* employees in terms of economic and organisational, developmental and social aspects and flexibility of work



Source: own elaboration.

In order to examine the level of satisfaction and differences in the perception of the work environment by *demanding*, *aspiring* and *unengaged* scientists, analyses of declarations concerning the level of satisfaction with the analysed aspects of their professional work were carried out. As in the case of job expectations, the answers to the questions about job satisfaction were represented on a five-level Likert scale from 1 — I am definitely dissatisfied, to 5 — I am definitely satisfied. The analysis also included statements concerning attachment to the place of employment, which were also represented on a five-grade Likert scale from 1 — I strongly disagree, to 5 — I strongly agree. For

the averages in the subgroups, the t-test pair comparison method was used for independent samples¹ to indicate significant differences between workers' profiles in the way their workplace was evaluated.

Table 2. Distribution of scientists' characteristics among *demanding*, *aspiring* and *unengaged* employee groups

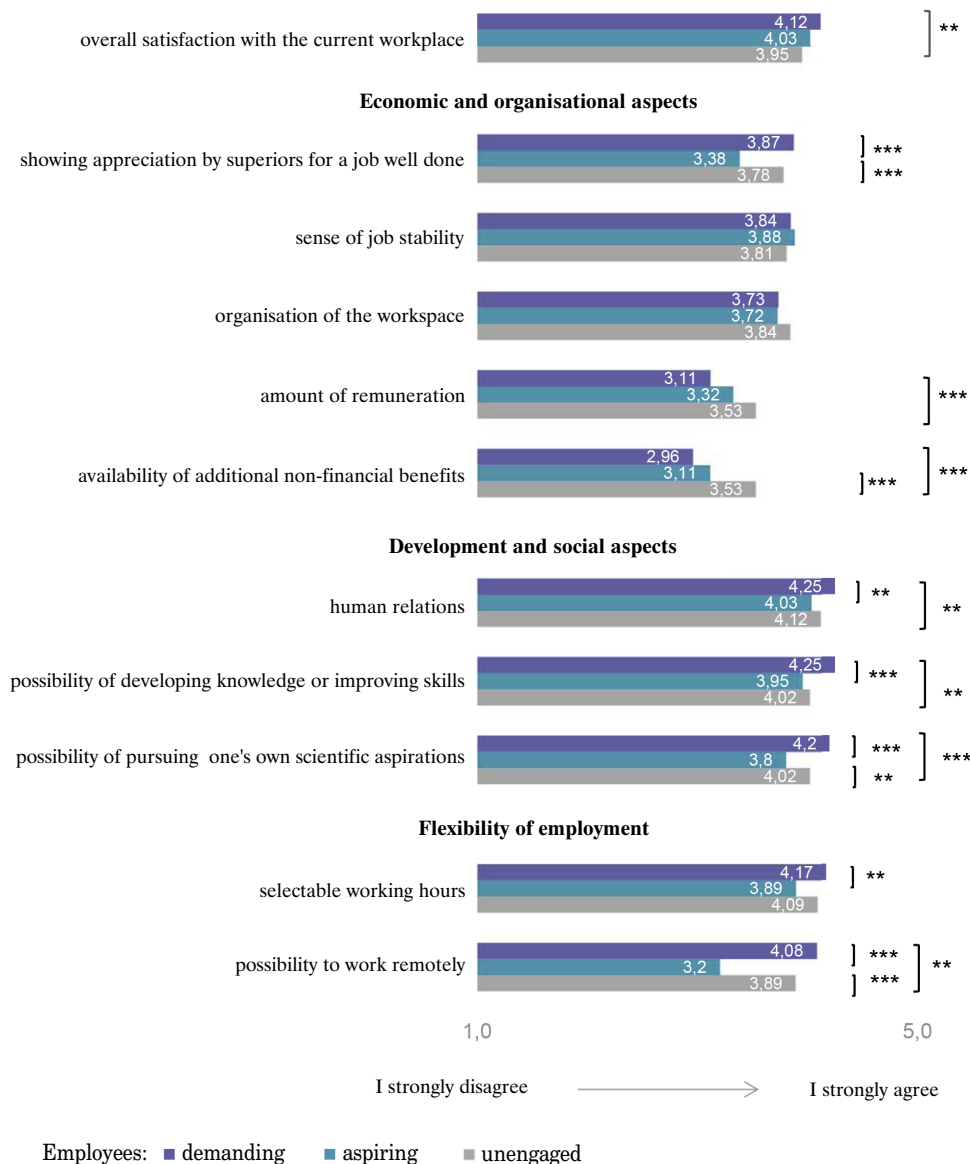
Variable	Categories	Demanding employees N = 479)	Aspiring employees (N = 106)	Unengaged employees (N = 253)	Cramer's V
Gender	female	46.7%	45.4%	39.5%	0.176
	male	53.3%	54.6%	60.5%	
Degree or title	M.A.	11.9%	9.3%	15.9%	0.278
	PhD	49.4%	56.5%	46.4%	
	doctor	23.5%	20.4%	19.4%	
	professor	15.2%	13.9%	18.3%	
Field of study	humanities, social sciences and art	43.4%	37.0%	34.8%	0.103
	science and technology	28.6%	26.9%	34.4%	
	life sciences	28.0%	36.1%	30.8%	
Research institution	public university	81.3%	70.6%	80.2%	0.077
	non-public university	9.2%	10.1%	10.3%	
	institute of Polish Academy of Sciences (PAN)	4.4%	6.4%	4.3%	
	research institute	5.2%	12.8%	5.1%	

Source: own elaboration.

Results

The conducted statistical analyses indicated that there are differences between the analysed groups of scientists in terms of job satisfaction and a sense of attachment to the place of employment. Averages of the analysed answers together with a note about the level of statistical significance (0.05 was assumed) of intergroup differences are presented in Figures 3 and 4.

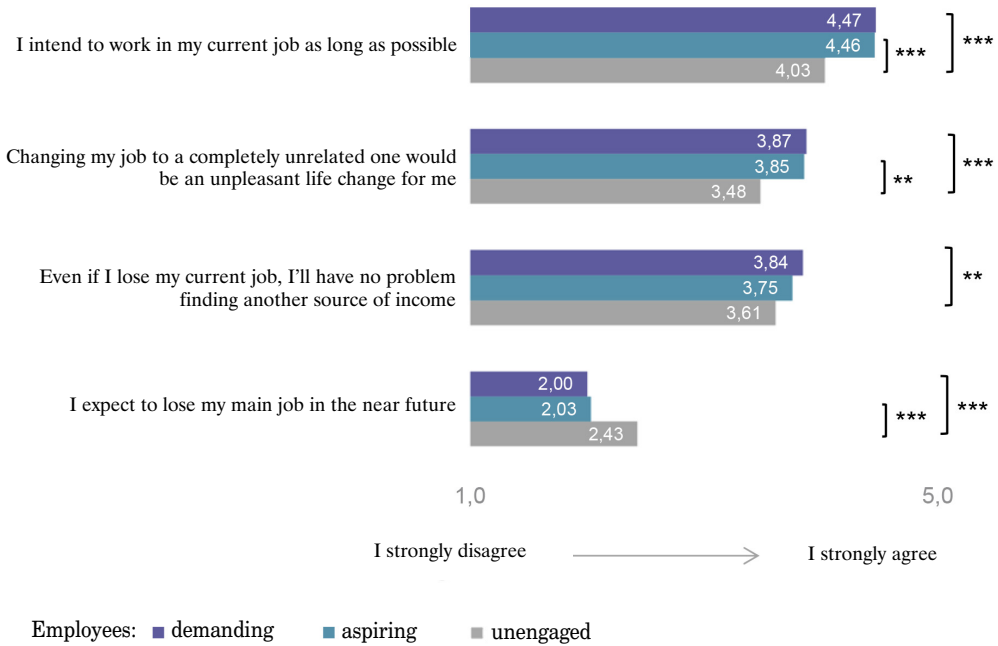
Figure 3. Average satisfaction levels of *demanding*, *aspiring* and *unengaged* scientists in various aspects of their work



*** a statistical significance level below 0.01; ** a statistical significance level below 0.05.

Source: own elaboration.

Figure 4. Average scores of *demanding*, *aspiring* and *unengaged* scientists on their commitment to the workplace



*** a statistical significance level below 0.01; ** a statistical significance level below 0.05.

Source: own elaboration.

Scientists classified in the cluster of *demanding* employees are those who are least satisfied with the economic aspects of work: availability of additional non-financial benefits (average response 2.96) and the amount of remuneration (average for group 3.11), to which they gave a neutral rating. In terms of the level of satisfaction in these areas, they differ significantly from unengaged employees ($t = 5.70, p = 0.000$ and $t = 3.69, p = 0.000$ respectively). On the other hand, the scientists with the highest professional expectations give the highest marks to the social and developmental aspects of the current workplace: human relations (mean score of 4.25), the possibility of developing knowledge or improving skills (mean score of 4.25) and the possibility of pursuing one's own scientific aspirations (mean score of 4.20). In this respect, they differ significantly

from *aspiring* scientists ($t = 2.18, p = 0.031$; $t = 2.79, p = 0.006$ and $t = 3.84, p = 0.000$ respectively) as well as those *unengaged* ($t = -2.00, p = 0.046$; $t = -2.14, p = 0.032$ and $t = -2.68, p = 0.007$ respectively). *Demanding* scientists are also distinguished from other groups by the level of satisfaction with the possibility to work remotely ($t = 5.73, p = 0.000$ for *aspiring* scientists and $t = -2.11, p = 0.035$ for *unengaged* scientists), and from *aspiring* scientists also by the satisfaction with the possibility to choose working hours ($t = 2.15, p = 0.033$).

Scientists classified as *aspiring* workers, for whom development and social aspects are particularly important, show a lower level of satisfaction than other groups in this area of their professional work. Among the developmental and social aspects, the lowest rating is given to the possibility of pursuing one's own scientific aspirations (mean score of 3.80), differentiating them from *demanding* ($t = 3.84, p = 0.000$) and *unengaged* scientists ($t = 2.01, p = 0.045$). *Aspiring* workers also show a neutral attitude towards the possibility of remote work (mean score of 3.20) and moderate satisfaction with the possibility of choosing working hours (mean score of 3.89). However, the expectations formulated by them in terms of employment flexibility indicate that this area of work is not important for them. In the case of the economic aspects of work, their neutral relation to the amount of received remuneration and a moderate level of satisfaction with the organisation of workspace and stability of employment do not differ from the assessment of other groups of scientists in this respect. Less satisfied than *demanding* and *unengaged* employees are, however, satisfied with the recognition by their superiors for a job well done ($t = 3.96, p = 0.000$ and $t = 3.03, p = 0.003$ respectively).

Employees classified as *unengaged* declare the lowest overall level of job satisfaction among the analysed groups (average 3.95), and at the same time have no established expectations towards the institutions employing them. Scientists from this group feel relatively the highest level of satisfaction with non-financial elements of remuneration ($t = 5.70, p = 0.000$ for *demanding* employees and $t = 2.93, p = 0.004$ for *aspiring* employees), as well as a higher level of satisfaction with the amount of received remuneration ($t = 3.69, p = 0.000$). On the other hand, the declared level of satisfaction with regard to developmental and social aspects and flexibility of employment does not indicate areas which would

be of particular importance for *unengaged* scientists, and which would distinguish them from other groups.

The analysis of respondents' answers to the questions about attachment to the place of employment indicates that its general level in the science sector is high: scientists in general do not plan to change jobs, and are unlikely to fear losing them. However, when examining how scientists with different job expectation profiles respond, differences between the selected groups emerge. The least certain of the maintenance of the current job is for the *unengaged* employees. To the greatest extent (average 2.43) among the analysed scientists, they agree with the statement that they may lose their current job in the nearest future ($t = 4.31$, $p = 0.000$ for *demanding* employees, and $t = 2.66$, $p = 0.008$ for *aspiring* scientists). Maintaining the current job also seems to be less important for them than for *demanding* and *aspiring* scientists: to a lesser extent than the other employees (average 3.48), they consider that changing to a non-scientific job would be an unpleasant life change for them ($t = -3.80$, $p = 0.000$ for *demanding* and *aspiring* employees and $t = -2.34$, $p = 0.020$ for *aspiring* scientists), and to a lesser extent (average 4.03) declare their intention to work long term in their current workplace ($t = -5.97$, $p = 0.000$ for *demanding* employees and $t = -3.88$, $p = 0.000$ for *aspiring* scientists). *Unengaged* employees are also less convinced than *demanding* scientists that it is not difficult to find a new source of income when losing their current job ($t = -2.42$, $p = 0.016$).

The lack of statistically significant differences between the averages of the answers to the questions about loyalty to the workplace between *demanding* and *aspiring* employees indicates that these scientists have a similar sense of stability in employment and are equally attached to the current workplace.

The diagnosed differences in the level of job satisfaction and the sense of attachment to the place of employment between scientists with different profiles of job expectations allow to formulate recommendations for scientific institutions that fit into internal talent management strategies. These recommendations relate to suggested actions that organizations can take in order to increase job satisfaction among their staff.

Discussion

Increasing competition makes it a pressing problem for the organization to attract and retain talented employees who are highly qualified, motivated and loyal to the employer. Global competition is also taking place in the area of science. Thus, it may be more and more difficult for Polish scientific institutions to acquire talents to work. Due to the growing mobility of scientists, they do not compete for employees only among themselves or with the business sector, but also with foreign entities which are often able to provide better conditions for scientific work than those available in Poland. Therefore, the ability to manage talents and, through such activities, build the satisfaction and long-term involvement of scientists in the development of the organisation will be decisive for the success of these institutions in the future. Achieving this goal in the science and higher education sector may be more difficult than in other sectors, as the specific nature of scientific work means that a scientist is often mentally at work without even being in the workplace, for example, by considering the research problem she/he is currently working on. Therefore, the relatively new concept of work-life integration (also known as work-life blending) may be applied especially to this professional group (Friedman, 2014). This concept assumes the improvement of quality of life as a result of combining the interpenetrating spheres of private and professional life. It thus contrasts with the work-life balance concept formulated at the turn of the 1970s and 1980s, according to which it is desirable to separate work from other areas of life.

Moreover, the results of the study indicate that talent management should be based on a set of strategies tailored to the needs of specific employee segments in order to achieve the desired effect. In the Polish science and higher education sector, we have identified three segments of scientists who differ in their expectations of work. Employees from the *demanding* segment report large needs in all analysed aspects of work, i.e. economic and organisational, development and social aspects and flexibility of work, while *aspiring* employees have significant expectations mainly in terms of development and social aspects. On the other hand, *unengaged* scientists, as compared to other employee segments, do not report any

significant expectations towards work. Moreover, the first two groups, unlike *unengaged* employees, are characterised by high attachment to the current workplace.

Confronting the scientists' needs with their declared level of satisfaction with particular aspects of their work allows for an optimal selection of talent management strategies based on their preferences. Therefore, the most important thing is to ensure the economic well-being of *demanding* employees, as they are least satisfied with this aspect of work. In order to meet these expectations, when it is impossible to offer a permanent increase in salaries, it is worth looking for ad hoc solutions, and at least partly responding to the reported need, such as prizes and bonuses for special achievements or non-financial benefit packages in line with employees' preferences. On the other hand, scientists in the *aspiring* segment should be guaranteed the opportunity to develop and implement their scientific ambitions and create conditions for building satisfactory interpersonal relations. The most difficult thing is to select an appropriate management strategy for the segment of *unengaged* employees who do not have crystallized expectations from work. In the latter group, however, it proves necessary to develop attachment to the workplace.

In order to effectively adapt their activities to the scientists' needs, institutions should periodically conduct employee satisfaction surveys at the level of their organisations, because both expectations and satisfaction levels change over time (Spagnoli, Caetano and Santos, 2012). In understanding scientists and responding adequately to their needs, it may be helpful to use the experience and solutions implemented for this purpose in the business sector. In companies, one can already meet such positions as happiness manager or employee experience expert. However, it is not about introducing a new nomenclature, which in the case of most institutions of the science and higher education sector would sound unnatural, but above all about emphasizing the importance that the employer attributes to the issue of job satisfaction.

In order to make changes that will be groundbreaking for scientists, scientific institutions, like companies, must use modern tools to design the employee's experience. Among innovative methods used in talent management are: e.g. design thinking and employee experience mapping. The design approach in talent management comes down to three elements:

understanding employees and their problems, creating various solutions, and then testing these solutions in real conditions and improving them on the basis of feedback (Mazor et al., 2017). Mapping, in turn, aims at presenting the employee's experience during the full life cycle of the organisation (from applying for a position, through employment, to leaving the institution). The development of the experience map allows to learn and redesign the way employees experience talent management processes at different points of contact with the organisation (Claus, 2019).

These innovative projects should be accompanied by thoughtful communication activities which, by strengthening organisational identification, also foster job satisfaction and employee involvement (Jiang and Men, 2015; Karanges et al., 2014; Lemon and Palenchar, 2018; Ruck and Welch, 2012). Internal communication within talent management is used to build dialogue with employees, signal understanding of their needs and explain the validity of decisions. However, it must be conducted with great sensitivity and relate to specific actions. Otherwise, instead of encouraging satisfaction, it may be perceived by scientists as a propaganda tube for the organisations employing them.

The conclusions of the research should be reflected not only in the actions of decision-makers in scientific institutions, but also in the decisions of science policy-makers, especially in view of the progressing reform related to the entry into force of the Act of 20 July 2018. — Act on higher education and science (Journal of Laws, item 1668 as amended), called the Constitution for Science, and denial of the changes taking place by part of the environment. The aim of the reform is to achieve greater scientific excellence by Polish scientists and to mark their presence on the international arena. On the other hand, the means to achieve the goal is to modify, among other things, the criteria for evaluation of scientific institutions, which indirectly affect the expectations towards scientists and ways of evaluating their individual achievements. Thus, from the point of view of scientists, certain mechanisms are created which are more repressive than encouraging. Achieving a qualitative change may be difficult without a simultaneous significant increase in the resources spent on science. Meanwhile, according to Eurostat data, in 2018 in Poland the share of gross national expenditure on research and development (GERD) amounted to only 1.21% of GDP, which remains

well below the average for the European Union (EU-28), which constitutes 2.12% of GDP, and below the value of 1.7% assumed for Poland in the Europe 2020 strategy². As any change raises many concerns and may cause a decline in sentiment in the initial period, it seems reasonable to conduct a satisfaction audit of the sector's employees to assess the impact of the reform in this dimension.

The only change related to the Constitution for Science, which meets the expectations of scientists, expressed in the study, is the increase in remuneration. According to the new regulations, from 2019 onwards, the salaries of the academic staff refer to the minimum basic salary of a full professor at a public university and cannot be lower than 50% of this amount. According to the Ordinance of the Minister of Science and Higher Education of 25 September 2018 on the minimum monthly basic salary for a professor in a public higher education institution (Journal of Laws, item 1838), from January 2019, the minimum salary of a professor has increased to 6 410 PLN gross. Thus, an adjunct professor shall earn not less than 4 679.30 PLN (73% of the basic amount mentioned above) and an assistant not less than 3 205 PLN. Similarly, the minimum salary of research workers employed in the institutes of the Polish Academy of Sciences is also established. The legislator has also met the needs of young scientists by setting a scholarship for each of the participants of newly established doctoral schools. Before the mid-term evaluation, it will be 2 104.65 PLN net, and after the evaluation 3 242.29 PLN net. Taking into account the results of this research and the diagnosed needs of Polish scientists, these are undoubtedly steps that go in the right direction, although the mentioned rates still remain at a lower level than the earnings in the enterprise sector and the remuneration of research workers abroad.

However, the results of the study also show that remuneration increases alone will not guarantee a higher level of satisfaction for all groups of scientists. Therefore, action beyond this initiative is necessary. A serious problem in Polish scientific institutions is their current organisational culture, which is associated with feudalism and "farm relations". (Hryniewicz, 2012; Antonowicz, 2015; Kwiek, 2016). When allocating resources and making personnel decisions, the hierarchy of

scientific positions and titles is of greatest importance. This phenomenon increases inequality between employees (Swabian, 2014). Therefore, in a hierarchical world such as scientific institutions, it is necessary to build better interpersonal relations and appreciate each employee. Good relations and an atmosphere of mutual support can translate into an increase in the sense of value of each individual and, as a result, into greater efficiency of entire teams. Not only the appreciation shown by superiors but also by colleagues is important. For this to become natural, it is necessary to create a culture of appreciation in scientific institutions.

Summary

The study fills a gap in knowledge about job satisfaction of scientists in Poland and contributes to contemporary literature on employee satisfaction. Its results are of significant practical importance as the scientific and technical capital that scientists are for the knowledge-based economy is important for the whole society. Meanwhile, Poland is facing a brain drain of highly talented scientists outside the scientific sector and abroad. It is necessary to halt this trend and create opportunities for the development of a satisfactory scientific career in the country not only for domestic scientists, but also for qualified specialists from around the world. In this respect, the results concerning the satisfaction of scientists working in Polish scientific institutions may be important for other countries in this part of Europe.

The study clearly shows that job satisfaction is quite a complex construction. It refers to both the level of satisfaction of scientists and the most important factors that determine it. The results presented raise awareness of issues relevant to the well-being of this professional group. They also provide practical guidance for action in shaping the rewarding experience of scientists. In this respect, it is essential to develop management strategies tailored to their varying expectations. This allows scientists to better perceive their workplaces and consequently to be more willing to continue working for current employers.

The findings of the study should be reflected in the activities of scientific policy makers and policy makers in scientific institutions. Low levels of job satisfaction may have a negative impact on the achievement of the objectives that underlie the introduction of the Constitution for Science.

Footnotes

¹ The assumption about the normality of the distributions of the analysed variables was examined using the criterion of the value of the diagonal and kurtosis statistics (Tabachnick and Fidell, 2013).

² Europe 2020 targets: statistics and indicators for Poland, https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester/european-semester-your-country/poland/europe-2020-targets-statistics-and-indicators-poland_en (9.01.2020).

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