European Research Studies Journal
Volume XXIV, Special Issue 1, 2021

pp. 906-935

Academic Staff in the Context of Known Theories of Motivation

Submitted 11/01/21, 1st revision 03/02/21, 2nd revision 28/02/21, accepted 23/03/21

Iwona Zdonek[1], Beata Hysa[2], Dariusz Zdonek[3]

Abstract:

Purpose: *The main goal of the research is to identify the motivators used in the work of public university employees in relation to known theories of motivation, and to determine the importance of individual motivators for their involvement in work.*
Design/methodology/approach: *The article uses qualitative research with the participation of experts and quantitative research using a survey among academic staff. Data analysis was made in the context of three theories of motivation and a simplified structure of the studied motivators was established during the analysis of factors.*
Findings: *The research results indicated that motivators connected with the theory of self-determination (SDT) and Herzberg's theory (HT) are of the greatest importance for the involvement of academic staff in Polish universities. Motivators that result from the internal motivation of an academic staff member should be most often used in universities. The most important for scientists are motivators regarding mutual internal relations (superiors, colleagues, administration) or organization of working time and job security. In another important motivating group for academic staff, there were motivators related to funding scientific research and access to knowledge.*
Practical Implications: *Applying an appropriate motivation system in universities is not possible without knowledge of the theory of motivating people. A properly applied motivator can improve the effectiveness of scientists' work, which in turn increases the ranking of universities in terms of competitiveness with others. Therefore, it is important to construct an appropriate incentive system, adequate to the needs and capabilities of employers, and at the same time meeting the expectations of employees.*
Originality/value: *The article presents an attempt to match the identified motivators to individual motivation theories. In addition, the importance of individual motivators in relation to these theories and their application was determined.*

Keywords: *Motivation, motivation theories, academic staff.*

JEL codes: *M30.*

Paper type: *Research article.*

[1]*Silesian University of Technology, Faculty of Organization and Management, Poland, e-mail: iwona.zdonek@polsl.pl*
[2]*Corresponding author, Silesian University of Technology, Faculty of Organization and Management, Poland, e-mail: beata.hysa@polsl.pl*
[3]*Silesian University of Technology, Faculty of Organization and Management, Poland, e-mail: dariusz.zdonek@polsl.pl*

1. Introduction

The source of competitive advantage of a university is primarily the intellectual potential of the academic staff. An important element is the measurable research achievements (preferably internationalised) that are expected from academics in precise time frames and at specific stages of their academic careers (Kwiek, 2017). Therefore, it is important for university authorities to create favourable conditions for academic staff and to manage and motivate them accordingly.

The motivation of university academic staff to work significantly influences the direction, intensity, and durability of the academic's behaviour. Despite the constant and considerable attention paid to the general motivation to work of different groups of staff, little time or effort is devoted to researching motivation in the environment of university staff. Very few empirical studies explain the academics' motivation to work (Jindal-Snape and Snape, 2006; Fijat, 2016) and the relationship between work motivation and their results of research (Maloletko, 2018), work efficiency (Ryan, 2014) or even satisfaction with work (Szromek and Wolniak, 2018). The motivation of academic staff to work may relate to various areas of activity of the staff.

These include, among others, motivation for scientific research, motivation to work in each institution, motivation to teach, motivation to serve the community, motivation to participate in various governmental organisations, motivation related to the prestige of work at the university, motivation to remain as a faculty member in higher education (Machado-Taylor *et al.*, 2011; 2016). An important factor and motivation to work is job satisfaction or the lack of it. As the research conducted among over 3,000 staff of Portuguese universities shows, the correlation between motivation and satisfaction is exceptionally large. In addition, it also seems relevant whether academic staff are employed in public or private institutions. The goals of these two areas of activity are different from the point of view of the employer's interests.

Academic staff employed in public universities are somehow employees of public services, hence the motivating factors may differ from those employed in private institutions. The pressure on results and a sense of calling to social work are just one of the not many differences that can affect motivation. (Bakker, 2015). The place of work, a position held, time and type of work performed may also determine its effectiveness through the influence of monetary motivation. Conducted experiments indicate that additional monetary motivators do not always have a positive impact on increasing efficiency and commitment. They weaken internal motivation, i.e., satisfaction and enjoyment of their work (Zhang, 2018).

Motivation to work is also associated with the attitudes of academic staff towards changes. In the studies of Meltsev and Klyushnikov (2017), seven types of attitudes of academic staff towards changes in the organisation were distinguished. For each

of them, it was proposed to use appropriate methods related to motivation limiting negative attitude towards changes in the organisation.

Nowadays, organisations are forced to look forever in newer ways to motivate academic staff. A properly applied motivator can improve the efficiency of academic staff's work, which consequently raises the university's ranking in competitiveness with others. The ability to motivate effectively requires managers to have adequate psychological knowledge, including knowledge of the underlying theories of motivating people. Constructing the right incentive system, adequate to the needs and capabilities of employers, while meeting the expectations of employees is not easy at present. Difficulties result from constant changes in universities and its surroundings. The needs and preferences of academic staff and management are changing. The number and variety of pay and non-pay components of the incentive system are growing.

The main goal of the research in this article was to identify the motivators applied in the work of public university employees in relation to known theories of motivation and to determine the importance of individual motivators for their involvement in work. In the first section, a critical analysis was made of the literature on the theory of motivation, including research conducted among academic staff. The second section describes the research methodology and research tools used. The third section presents the results of analyses of the research carried out together with a discussion focused on comparing the results obtained with the results of other researchers. All of which is summarised by formulating the conclusions and indicating further directions for research.

2. Literature Review

The adopted motivation models help create effective incentive systems in the organisation. The main literature on the subject lists three main models of motivation (Stoner *et al.*, 2011; Osuch, 2012):

- the traditional model, which is associated with Taylor and the school of scientific organisation,
- the model of cooperative relations, with a representative of Mayo,
- the model of human resources where the main researchers were McGregor, Maslow.

Generally speaking, it can be stated that the traditional model of work motivation is based on the use of wage incentives. The cooperative model requires that the social needs of employees be considered in the work process. In turn, the human resources model of effective motivation to work suggests that managers apply an increased scope of responsibility to their subordinates (Osuch, 2012). In the management sciences literature, authors most often divide motivation theories into three groups (Stoner *et al.*, 2011; Osuch, 2012):

1. Theories of content, which emphasise the importance of internal factors that make a person act in a certain way (they relate to a person's needs). The most popular content theories include, hierarchy of needs A.H. Maslow (1954), a theory of ERG C.P. Alderfer (1972), the two-factor theory of the needs of F. Herzberg (1959), the theory of the three needs of McClelland *et al.* (1953), achievement theory of J.W. Atkinson (1958), the theory of X and Y of D. McGregor (1960), the theory of 12 motivational factors of S. Ritchie and P. Martin (1999) and the theory of 'motives for professional activity' of A.A. Litwinyuk (1997).
2. Process theories, which determine in what way and as a result of what goals individual employees are motivated (they relate to the process of choosing the direction and pattern of behaviour). The most popular theories in this group are, the drive theory proposed by Clark L. Hull (1943), the theory of the value of expectations developed successively by such authors as E.C. Tolman (1932), R. Likert (1961), K. Lewin (1938), V.H. Vroom and J.W. Atkinson (1964) and E. Lawler and L.W. Porter (1968), the theory of justice described, among others by L. Festinger (1957), G.C. Homans (1961) and J.S. Adams (1963) and the theory of goal setting presented by Ch. Earley and Ch. Shalley (1984) and E.A. Locke and G.P. Latham (1990).
3. Reinforcement theories, presenting how the effects of previous conduct have an impact on future behaviour in the employee's learning process (they relate to the use of reinforcements and past experience). The following theories can be included in this group, B.F. Skinner (1969), W.C. Hammer (1974), A. Bandura (1977) and S.M. Havercampa and S. Reiss (1996).

Based on the above theories, scientists develop motivation theories with new elements and factors identified during the conducted studies. They consider the changing working conditions and the conditions of functioning of contemporary people in the organisation. Most often in these theories, motivational factors are divided into external and internal.

2.1 Theories of Content and its Exemplifications

Trying to understand the motivation of Kamalanabhan scientists and colleagues (Kamalanabhan *et al.*, 1999), they used Maslow's *hierarchy of needs theory* in their research. Their results indicate that scientists have a lot of enthusiasm for self-fulfilment, but it is neutralised by barriers in meeting lower-order needs. The potential for scientific achievement is therefore diminished if scientists excessively focus on satisfying basic needs rather than concentrating their energy on higher-order needs. Therefore, if the organisational structure of the university and its remuneration policy does not meet the basic needs of the scientist, then their behaviour will be focused on satisfying these needs first, and only then on satisfying higher-order needs, which may lead to the fact that the scientific goals will not be implemented very ambitiously. In turn, a qualitative study of the motivations of government scientists in Great Britain was conducted by Jindal-Snape and Snape (Jindal-Snape and Snape, 2006).

Through a series of interviews, they interpreted the motivation of scientists using two main motivational theories: McClelland's *theory of needs* from 1961 and Herzberg's *two-factor theory* from 1968. Based on McClelland's theory, researchers have identified 'the need for achievement' as a major driving force for many scientists with additional evidence of recognition of the importance of 'the need for belonging' and 'the need for power' (Ryan, 2014). This means that academic staff should be motivated by entrusting them tasks that go slightly beyond their qualifications, increasing the autonomy of activities, offering training, emphasising the contribution of individual employees with the achieved goals, and congratulating them for their accomplishment. The results of the work of Jindal-Snape and Snape are also reflected in the work of Gallus and Frey (2016), who indicate awards as factors significantly affecting employee motivation, which in the case of academic staff is related to satisfying the 'need for achievement'. In turn, based on Herzberg's two-factor theory, Jindal-Snape and Snape stated that this concept is useful in understanding how factors such as poor management, lack of recognition and organizational instability can reduce employee motivation and performance.

2.2 The Theory of Self-Determination (SDT) and its Derivatives

Considering the aspect of employee performance depending on motivational factors, Sauermann and Cohen reported interesting research results (Sauermann and Cohen, 2008). By researching over 11,000 scientists and industrial engineers, they discovered that internal motivation significantly affects the innovative productivity of employees. However, Deci and Ryan (2008), creators of the *Self-Determination Theory* (SDT), have the greatest contribution in understanding the mechanisms of the theory of internal and external motivation. This theory offers a multidimensional view of motivation, distinguishing between internal and external motivation and proposing a continuum of external motivation.

Thus, a person's behaviour can be motivated externally and internally, considering the innate needs of autonomy, competence, and relationships with others. The need for competence is the desire to feel your own effectiveness in the environment and a sense of meaning in the actions taken. A person, due to this need, is interested in their own activity, open to new experiences and willing to learn new things. The need for autonomy is associated with the feeling of a person, that they are the cause of events. They can create these events considering personal values. At the same time, they do not exclude dependence on other people, but it is rather understood as the possibility of making choices. The need for a relationship refers to interaction with other people, feelings of attachment and experience of being cared for, concern and interest from others. Accomplishing this need takes place through various activities, e.g., building and maintaining relationships or helping others. Consequently, in addition to gaining social support and acceptance, humans develop interpersonal trust positively which relates to the quality of life (Wojtowicz, 2013).

External motivation from the lowest to the highest level of self-determination is divided into *external regulations* (awards and punishments), *introjection* (internalisation) and *identification*. Internal motivation is also not homogeneous and includes internal motivation *focused on knowledge*, internal motivation *focused on achievement* and internal motivation *towards stimulation of sensations.* The third motivational type, complementing the theory and occurring at the beginning of the continuum of external motivation, is *amotivation* or lack of motivation. It occurs when a person does not see the relationship between action and result. They are not externally or internally motivated and believe that their behaviour and action is caused by factors beyond their control, i.e., force majeure (Deci and Ryan, 1985).

Amotivation is a state in which a person does not feel any need to undertake activity, which is most often due to a lack of sense of effectiveness and control over it. A person does not undertake an activity or performs it without thinking. Amotivation results from the fact that a person does not value a given activity, does not feel competent to perform it, or believes that an activity will not lead them to their desired goals.

In addition, the basic premise of SDT theory is the distinction between *autonomous and controlled motivation.* Autonomy means acting according to your own will and with a sense of choice. An example of autonomous motivation is internal motivation, thanks to which individuals engage in an activity because it is interesting and satisfying. On the contrary, being controlled means acting under pressure, feeling you must get involved in something. Thus, action for external awards produces controlled motivation.

According to SDT then, you can specify the degree of autonomy or control for each behaviour. Autonomous and controlled motivation are intentional and conflict with amotivation, which is associated with a lack of intention and motivation. And so, Deci and Ryan have proved in their research that controlling individual motivation by typically financial factors as well as a system of awards and punishments destroys internal motivation. In this way, external motivation becomes a short-term impact, because individuals need a strong turn towards competence, autonomy, and purpose. Ryan in other studies supplemented their research by diagnosing the motivation of British scientists and confirmed the importance of internal motivation. Ryan studied (2014) motivation among scientists for 5 dimensions (sources) of work motivation: instrumental motivation, intrinsic motivation, goal internalisation motivation, internal self-concept motivation, external self-concept motivation.

Instrumental motivation refers to physical awards associated with workplace activities. This type of motivation results from the relationship between behaviour in the workplace and achieving measurable results (awards), i.e., salary, bonuses, and promotion. Intrinsic motivation refers to the relationship between activities in the workplace and fun (pleasure) derived from this activity. In this case, it is the work itself that provides a sense of joy and an inherent reward that preserves behaviour in

the workplace. Goal internalization motivation represents the motives resulting from the compliance of the individual's value system with the values in the workplace.

In this case, matching the employee's personal values and goals to the organization's values and goals is a source of motivation in the workplace. Internal self-concept motivation is the motivation of the individual to abide by internal standards of qualities, competences, and values. The internal self-concept serves as a guide to reinforcing behaviour that is consistent with your individual view of yourself. Motivation of external self-perception sees others as a benchmark for acceptable or preferred behaviour. In this case, expectations about the role of 'others' in the workplace act as a motivator when individuals seek confirmation of their traits and competences from the reference group.

The motivational profile of British scientists presented in Ryan's research (Ryan, 2014) identifies motivation based on an internal concept as the strongest motivational force for scientists. Motivation through internal self-concept focuses on the individual's willingness to adhere to their internal standards, competences, and values. In this way, the scientist is motivated by the belief in the value of the work they do and the standards of the scientific process in which they were trained in conjunction with the values they confess as a member of the scientific community.

Instrumental motivation is the rarest source of motivation in the scientist's profile. This motivation focuses on the individual's pursuit of financial awards, bonuses, salary increases, etc. It is worth noting that based on these findings, the use of a simple monetary incentive policy may be the least effective method of motivating academic staff. In addition, Ryan (2014) has highlighted the relationship between intrinsic motivation and research results from scientists. It has a positive effect on the results of work, as the scientist sets internal standards that become the basis of the ideal self; standards then become the benchmark that reinforces the perception of competence. The driving force for people motivated by internal self-concept is task feedback.

Based on the SDT theory, Firat (2016) investigated the motivational factors of young scientists from eight universities in Turkey. Firat studied which factors motivate scientists to work the most. They therefore considered 1) contribution to science, 2) contribution to human life, 3) scientific curiosity, 4) prestige, 5) career, 6) money. Research results indicate that the least important motivating factor for young scientists is money, while the largest sources of motivation are the following, contribution to human life, science, scientific curiosity, and career. These four motivation factors can therefore be considered as the internal motivation of the scientist.

Firat also described how modern Information Communication Technologies (IT) and changing methodological paradigms (research methods) affect scientist's research and productivity. It turned out that scientists who did not have high competence in

the use of ICT tools more often chose money as a motivating factor. Scientists with high-quality publications (high publication rankings) saw prestige and career as motivation for research much more often than scientists from universities with low-level publications. In addition, three basic aspects of the research paradigm were analysed[4] qualitative, quantitative, and mixed. Young scientists base their research on a 37% quantitative paradigm, then a 30% mixed paradigm, and a 33% qualitative paradigm. More often, scientists with more experience and a scientific degree chose quantitative methods as a better standard in carrying out their research than scientists with a lower degree.

2.3 Internal Motivation of Academic Staff

The fact that money is not the main source of motivation of academic staff and should not be used as the sole stimulus for the increase of productivity of this professional group has also been demonstrated by Maloletko (2018). The researcher confirmed some regularities by comparing the results of the Hawthorne experiment conducted by Mayo in the years 1924-1932 with the results of the publication activity of a large team of scientists in the years 2014-2018. It should be added that the time of research of the team of scientists was a time of major changes in their working conditions, i.e., mass relocation of departments, faculties, teachers, researchers, and students from one place to another.

While the financial compensation of employees who placed their publications in Scopus databases began, the number of their publications indexed in this database increased fourfold. Later it remained stable. Then some elements of the so-called 'soft style' leadership, the Science and Technology Council was created, which included leading researchers. At the meetings of this council, the results of the research were discussed, recommendations were issued regarding monograph publication. The current development of research activities was discussed in a friendly environment. The productivity of scientists during this period increased significantly. However, the following year the Science and Technology Council was closed and replaced by a 7-member commission that took over administrative functions. After this reform, the productivity of scientists remained at the same level for some time but dropped considerably over time. Maloletko drew the following conclusions from their observations:

[4] *In a methodological sense, the paradigm includes strategies, actions and criteria that should be used to explain the research problem. According to the literature, we can point to a quantitative, qualitative and mixed approach in scientific research. At the same time, Johnson and Onwuegbuzie (2004) define research on mixed methods as 'a class of research in which the researcher mixes or combines quantitative and qualitative techniques, methods, approaches, concepts or language in one study' (p. 17). According to Fırat, Kabakçı Yurdakul and Ersoy (2014), mixed method research is not considered a simple combination of qualitative and quantitative methods, but as comprehensive integration research that requires the strengths of these methods to be used.*

1. the scientist's work productivity largely depends on social factors,
2. scientists need good cooperation and communication with colleagues, and isolation deprives researchers of motivation,
3. there is no direct correlation between the improvement of working conditions and the productivity of scientists in the field of social sciences and humanities,
4. relationships between researchers in a research team have a great impact on the productivity of their work,
5. leadership's 'soft style' helps increase productivity,
6. the system of material incentives for scientists should be as simple as possible and should not focus the researcher's attention on pay but should be worth enough and meet their expectations.

The results of Moletko's work are consistent with the results of Kanat-Maymon, and Reizer (2017) and Nikolova *et al.* (2019), who also indicated the large role of social factors on work productivity. They showed that employee productivity increases if they perceive their superiors as those who reinforce their autonomy, and this is important not only at an early stage of work, but also at later stages (Kanat-Maymon, and Reizer, 2017).

The internal motivation of scientists and their well-being can affect the amount of time the scientist devotes to individual professional activities (Inigo and Raufaste, 2019). As part of their duties an academic teacher performs various tasks related to the teaching, research and scientific or organizational process. Therefore, a very important element is the distribution (allocation) of time between individual professional activities. Although scientists enjoy some degree of freedom in designating time between work activities, time remains their limited resource. Academic teachers are often either successful in scientific research or in the teaching process, less often in both fields simultaneously (Bucheit *et al.*, 2001; Chow and Harrison, 1998). It results from the fact that the time devoted to teaching limits the time left for scientific research and vice versa (Hardré *et al.*, 2011).

However, how scientists divide their time between different professional duties results from their internal motivation and well-being (Inigo and Raufaste, 2019). According to Inigo and Raufaste (2019), the internal motivation of scientists as well as the well-being can affect the allocation of scientists' time between individual professional activities. What internally motivates scientists should be based on their well-being at work (welfare at work). To study the well-being of scientists, Inigo and Raufaste chose the PERMA Seligman model (2011), consisting of five basic elements of psychological well-being and happiness: (P) Positive Emotions - refer to spending a pleasant time with such feelings as satisfaction or pleasure, in the context of work this element refers to 'job satisfaction'. (E) Engagement - corresponds to engagement in an activity or project, it is important to be completely absorbed in the task of developing. This kind of commitment is important to increase intelligence, skills, and emotional abilities. (R) Positive Relationships - good interpersonal

relationships with colleagues and superiors are very important in the pursuit of job satisfaction. (M) Meaning - having a purpose and a sense in performing work, understanding the influence and impact of the effects of your work on others makes them feel more satisfied and happier. (A) Accomplishment - a sense of self-realisation by achieving the goals previously defined by scientists. Having goals and life ambitions helps to reach for matters that give a sense of accomplishment. You should set realistic goals that you can achieve. Setting goals and achieving them leads to a sense of satisfaction, personal pride, and fulfilment.

Achievements in life are important, they give a sense of meaning, build confidence, and satisfy the need for self-realisation. Inigo and Raufaste (2019) in their research developed a scale of motivators of higher education academic staff related to their professional activity (i.e., science and research, teaching, organizational classes) and linked them to time allocation profiles (based on the measure of relative time-distribution for individual activities) and the PERMA well-being model. The results showed significant differences in time allocation profiles between some elements of PERMA's well-being and confirmed that well-being motivates certain areas of the employee's scientific activities.

The above-presented query of both Polish and foreign literature regarding different ways of motivating scientists at universities allowed us to conclude that scientists are motivated to work by factors mainly derived from the theory of needs and based on internal motivation. It was decided to conduct a study of motivational factors of Polish university employees. The main goal of the research is to identify the convergence of motivators used in the work of public university employees to know motivation theories and to determine the importance of individual motivators for their involvement in work. In pursuing the main goal, the following research questions were posed:

1. What theory is the motivation system used in universities based on?
2. Which motivators are the most important for academic staff?
3. Which motivators are most often used?
4. Which motivators are most often not used?

4. Research Methods

Studies on the motivation of university employees have been divided into three stages. In the first stage, a questionnaire was constructed, and experts' opinions were used to determine the convergence of motivators with the considered theories of motivation. In the second stage, the created questionnaire was used to collect quantitative data to determine how often individual motivators are used at universities and what importance individual motivators have for scientists. At the third stage, the obtained results of quantitative research (and hence the use and importance) were analysed in the context of the results of the first stage of research (and thus the convergence of individual motivators with the theories of motivation).

As part of the third stage, the structure of the importance of motivators based on factor analysis was also simplified.

4.1 Questionnaire Construction and Qualitative Research

The first stage of the research was to separate possible motivators that can be used to motivate university employees. Based on the analysis of 3 motivation theories, i.e., Herzberg (HT), self-determination (SDT), McClelland's needs (MT), a list of all noticed motivators was created. Persons involved in creating the list were those holding managerial positions in the structures of the university and employees in a teaching, research and teaching and research positions. Then they were analysed and grouped, preliminary research was carried out in terms of their importance among the research and teaching employees, and finally, a list of 55 motivators was created, which was subjected to full quantitative research (Table 1).

Table 1. *List of motivators*

ID	Incentive
Q01:	cash allowances for work on Saturdays and Sundays (conversion from part-time studies)
Q02:	cash allowances for teaching in a foreign language (conversions)
Q03:	bonuses/allowances for issued scientific publications
Q04:	bonuses/allowances for acquired funds for scientific research
Q05:	bonuses/allowances for activities aimed at commercializing research results
Q06:	bonuses/allowances for teaching publications (notes, textbooks)
Q07:	bonuses/allowances for conducting classes in the e-learning system
Q08:	bonuses/allowances for preparing new education programs (new field of study, new specialty)
Q09:	bonuses/allowances for opening a new laboratory, workshop
Q10:	bonuses/allowances for the care of the science club
Q11:	bonuses/allowances for grades obtained in the process of student surveys
Q12:	bonuses/allowances for above-average involvement in organizational work (e.g. participation in promotional activities, organization of scientific conferences, etc.)
Q13:	discretionary bonuses - depending on the decision of the immediate superior
Q14:	Chancellor’s annual cash prize
Q15:	social services: holidays, trips, festivals, cultural events etc.
Q16:	payment of additional (except compulsory and social) personal insurance
Q17:	payment of additional (except compulsory pension insurance contributions) pension programmes
Q18:	payment of (except for compulsory health contributions) healthcare
Q19:	financing academic publications (fees, translations, technical editing etc.)
Q20:	financing participation in domestic conferences/seminars
Q21:	financing participation in conferences/seminars abroad
Q22:	total or partial financing of vocational training (participation in post-graduate studies, courses, training)
Q23:	financing fees for obtaining the academic degree/title
Q24:	internal (faculty or university) post-doctorate grants

Q25:	internal (faculty or university) professorial grants
Q26:	owning a business computer
Q27:	financing or co-financing of scientific internships from internal funds (faculty or university)
Q28:	additional paid leave for scientific purposes
Q29:	disclosure rules for the pay of teaching and research employees
Q30:	possibility of obtaining a managerial position
Q31:	praise/recognition of the immediate superior
Q32:	flexible working hours
Q33:	employment security
Q34:	having an academic mentor involved in employee development
Q35:	the possibility of reconciling professional and personal life,
Q36:	intra-organisational communication (information flow, meetings, intranet etc.)
Q37:	good atmosphere at work (positive informal relations with colleagues)
Q38:	formal support from the administration of the indoor organisation (department)
Q39:	formal support from the university administration
Q40:	possibility of work in highly innovative conditions (modern equipment, access to new technologies)
Q41:	respecting the rights to your intellectual/copyright property by your colleagues
Q42:	respecting the rights to your intellectual/copyright property by your superiors
Q43:	initiating internal relations (faculty) by external authorities (contacts with enterprises; cooperation between scientific and academic units; internationalisation of activities; etc.)
Q44:	initiating external relations by university authorities (contacts with enterprises; cooperation between scientific and academic units; internationalisation of activities; etc.)
Q45:	possibility to freely express opinions/views
Q46:	ability to talk to your immediate supervisor about problems or conflicts
Q47:	possibility of scientific or teaching consultations during internal meetings/seminars
Q48:	access to the latest domestic and foreign academic publications
Q49:	possibility of using foreign teaching and research relationships of the unit (faculty or university) to internationalise the results of your scientific work
Q50:	opportunity to use the relationship and infrastructure of the unit (faculty or university) to commercialise the results of your scientific work
Q51:	help and support of direct superiors
Q52:	transparent rules of employee evaluation
Q53:	employee appraisal rules based on quantitative criteria (criteria with a specific score)
Q54:	rules of employee evaluation based on qualitative criteria (descriptive evaluation prepared by the direct superior)
Q55:	formal, codified incentive system (including most of the above-mentioned motivators with a description of the rules for their use)

Source: *Own study.*

Based on the created list of motivators, an attempt was made to match each of them with the theory of motivation on a scale of 0 to 1. With 1 being a full relationship with the theory and 0 with no relationship. To avoid subjective assessments, the study involved 5 independent experts with significant scientific achievements in the field of motivation theory. The agreement of expert assessments was checked with Kendall's W coefficient. For 5 experts, the agreement coefficient ranged from 0.274

to 0.639 depending on the theory of motivation it concerned. After rejecting one of the most disagreeing experts, Kendall's W coefficient of concordance for Herzberg's theory (HT) was 0.536, for McClelland's theory (MT) 0.632, while for the self-determination theory (SDT) 0.567. Further analysis was carried out based on the assessments and opinions of the 4 most agreeable experts (Table 2).

Table 2. *Agreement of experts*

Variables	Result by ranking					
Theory	HT	MT	SDT	HT	MT	SDT
N	5	5	5	4	4	4
Kendall's W	0.274	0.639	0.511	**0.536**	**0.632**	**0.567**
Chi-Square	73.903	172.484	137.941	115.703	136.448	122.436
df	54	54	54	54	54	54
Asymptotic Significance	0.037	0	0	0	0	0

Source: *Own study.*

The assessment of motivators for individual theories was determined based on the average expert ratings. The following rule has been applied, the higher the average (the better the match between the motivator and theory), the higher the number in the ranking column. In the case of the same average values for a given group of motivators, the AHP pairwise comparison method (Saaty, 2004) was used to determine their order in the ranking. Then the obtained ranking was divided into 4 parts using quartiles (q). Motivators located in the 1st quartile means a worse match to a given theory, motivators located in the 4th quartile means the best match to a given theory.

4.2 Collecting Quantitative Data

The second stage of the study involved collecting quantitative data and determining how often identified motivators are used in universities and which are their importance for the involvement of scientists. Thus, the developed questionnaire was sent to randomly selected academic staff and teaching and research staff of Polish universities. In this way, quantitative data on the use and importance of motivators for employees of Polish universities was obtained. The survey was conducted in November 2019 and was participated in by 1,478 employees of universities in Poland. Table 3 presents the characteristics of the research group.

The survey asked respondents to determine whether, in their opinion, a given motivator is used in their workplace or not. A three-point scale was used, where 1 meant that the motivator *is not used*, 2 - *do not know* if it is used and 3 – *yes*, it is used. In addition, respondents were asked to determine the importance of a given motivator for their involvement in the work. A five-point scale was established, where a given motivator for employees is *not important* - 1, of *little importance* - 2,

medium importance - 3, *high importance* - 4, *very high importance* - 5. The reliability of the scale was checked using the Cronbach's alpha coefficient (Table 4).

Table 3. *Profile of respondents (n=1478)*

Demographic items		Frequency	Percentage (%)
Gender			
	Female	755	51.1
	Male	696	47.1
	omissions	27	1.8
Age			
	< 25	1	0.1
	25-34	259	17.5
	35-44	536	36.3
	45-54	423	28.6
	55-64	166	11.2
	>=65	63	4.3
	omissions	30	2
Type of institution			
	University	1,013	68.5
	Technical University	323	21.9
	Higher Vocational College	39	2.6
	Academy	85	5.8
	omissions	18	1.2
Title of employment			
	Professor	82	5.5
	Associate Professor	307	20.8
	Lecturer	780	52.8
	Assistant	213	14.4
	Assistant Professor	60	4.1
	omissions	36	2.5

Source: *Own study.*

Table 4. *Cronbach's alpha coefficient*

	Cronbach's alpha	Number of items	N of items
All motivators (use) *- Yes; - No; - Do not know*	*,880*	*55*	*1244 (84%)*
All motivators (importance) *- Not important; - Little importance; - Medium importance; - High importance; - Very high importance*	*,959*	*55*	*1162 (79%)*

Source: *Own study.*

Then the responses were assigned to the following numerical values. This made it possible to obtain results in the range of 0 to 1 for all values used in further analysis (Table 5).

Table 5. *Assignment of responses to numerical values*

Importance	Z
1 - not important	0
2 - little importance	0.25
3 - medium importance	0.5
4 - high importance	0.75
5 - very high importance	1

Source: *Own study.*

4.3 Dimension Reductions of Tested Variables

Due to the fact that the importance of motivators was assessed on a 5-point scale, in order to simplify the structure, a dimension reduction of the 55-element structure of questions was carried out using Factor Analysis. Before the factor analysis was performed, a measure of the adequacy of the Kaiser-Mayer-Olkin sample was calculated, which value was 0.953, which indicated that it was possible to carry out factor analysis. The main components method with Oblimin rotation was chosen as the method of extracting factors (groups). Six groups were obtained, which explained 52% of the total variance.

4.4 Interpretation Scheme of Results

The results of quantitative research (and therefore collected in the survey) were always analysed in the context of the convergence of motivators with theories of motivation (and thus the results obtained through research involving experts) as well as in the context of the simplified structure of motivators obtained during factor analysis. Thus, both contexts determined the way the research results were presented.

5. Results and Discussion

5.1 The Convergence of Motivators with Theories of Motivation

In the first stage of research, based on analysis of literature and invited experts, a list of 55 motivators was identified, which can be used in universities. After experts matched individual motivators to the theory of motivation, the average assessment and standard deviation were calculated. The obtained data was further analysed (Table 6). It was noticed that experts were the easiest to match motivators to Herzberg's theory (HT). The match level was (0.32 for motivators + 0.54 for hygiene factors) in total 0.86. In the case of self-determination theory (SDT) and McClelland theory (MT) the match level was (qSDT = 0.43, qMT = 0.43). This difference was

because experts at HT matched motivators both in terms of motivators and hygiene factors. Without considering hygiene factors, the value of matching the motivator to the theory for HT was 0.32.

Table 6. *Convergence of motivators with selected theories of motivation*

ID	HTm	HTh	MT	SDT	ID	HTm	HTh	MT	SDT	ID	HTm	HTh	MT	SDT	ID	HTm	HTh	MT	SDT
Q01:	0.00	0.88	0.00	0.06	**Q15:**	0.06	0.44	0.00	0.08	**Q29:**	0.13	0.75	0.00	0.31	**Q43:**	0.25	0.63	0.41	0.49
Q02:	0.06	0.88	0.13	0.13	**Q16:**	0.10	0.31	0.00	0.08	**Q30:**	0.75	0.25	1.00	0.94	**Q44:**	0.25	0.63	0.41	0.49
Q03:	0.25	0.53	0.76	0.22	**Q17:**	0.10	0.31	0.06	0.08	**Q31:**	0.75	0.25	0.69	0.65	**Q45:**	0.50	0.38	0.63	1.00
Q04:	0.38	0.49	0.56	0.12	**Q18:**	0.16	0.31	0.06	0.08	**Q32:**	0.31	0.63	0.13	0.49	**Q46:**	0.50	0.38	0.65	1.00
Q05:	0.48	0.46	0.66	0.59	**Q19:**	0.19	0.81	0.06	0.20	**Q33:**	0.25	0.75	0.31	0.33	**Q47:**	0.63	0.31	0.71	0.88
Q06:	0.23	0.56	0.35	0.22	**Q20:**	0.25	0.56	0.34	0.53	**Q34:**	0.50	0.38	0.56	0.46	**Q48:**	0.25	0.75	0.36	0.60
Q07:	0.16	0.50	0.34	0.22	**Q21:**	0.31	0.56	0.41	0.65	**Q35:**	0.25	0.63	0.13	0.60	**Q49:**	0.38	0.56	0.75	0.88
Q08:	0.23	0.56	0.41	0.22	**Q22:**	0.31	0.50	0.64	0.49	**Q36:**	0.25	0.75	0.33	0.44	**Q50:**	0.38	0.63	0.60	0.53
Q09:	0.23	0.66	0.41	0.13	**Q23:**	0.31	0.49	0.81	0.44	**Q37:**	0.25	0.75	0.63	0.44	**Q51:**	0.25	0.69	0.59	0.78
Q10:	0.38	0.50	0.81	0.27	**Q24:**	0.44	0.44	0.81	0.44	**Q38:**	0.25	0.63	0.43	0.44	**Q52:**	0.25	0.75	0.24	0.55
Q11:	0.56	0.31	0.58	0.42	**Q25:**	0.44	0.44	0.81	0.44	**Q39:**	0.25	0.69	0.43	0.44	**Q53:**	0.25	0.69	0.26	0.61
Q12:	0.44	0.50	0.81	0.24	**Q26:**	0.06	0.81	0.13	0.09	**Q40:**	0.48	0.46	0.53	0.59	**Q54:**	0.38	0.56	0.26	0.33
Q13:	0.69	0.25	0.69	0.26	**Q27:**	0.31	0.31	0.00	0.20	**Q41:**	0.38	0.50	0.75	0.83	**Q55:**	0.33	0.55	0.20	0.38
Q14:	0.63	0.31	0.56	0.48	**Q28:**	0.19	0.75	0.13	0.21	**Q42:**	0.38	0.50	0.56	0.77					
															q:	**0.32**	**0.54**	**0.43**	**0.43**

Source: *Own source.*

However, hygiene factors are an important part of Hertzberg's two-factor theory and the full value (qHT = 0.86) was considered in further studies. The match value was calculated as the arithmetic mean of the match values of all motivators for a given theory. After assigning a given motivator to the theory of motivation, they were sorted from the lowest to the highest values.

The ranking of motivators (r) was determined for individual theories, according to the average of expert assessments (Table 7). The following rule has been applied: the higher the average (the better the match between the motivator and theory), the higher the number in the ranking column. In the case of the same average values for a given group of motivators, the AHP pairwise comparison method (Saaty 2004) was used to determine their order in ranking. Then the obtained ranking was divided into 4 parts using quartiles (q). Motivators located in the 1st quartile means a worse match to a given theory, motivators located in the 4th quartile means the best match to a given theory:

X = {HTm, HTh, HT, MT, SDT} - the higher the number, the better the match between the motivator and the theory;
r(X) - the higher the ranking position, the better the match between the motivator and the theory;
q(X) - quartile number.

Table 7. *Matching motivators to theory - ranking*

ID	HTm	HTh	HT	MT	SDT	rHTm	rHTh	rHT	rMT	rSDT	qHTm	qHTh	qHT	qMT	qSDT
Q01:	0.00	0.88	0.88	0.00	0.06	1	54	14	4	1	1	4	1	1	1
Q02:	0.06	0.88	0.94	0.13	0.13	4	55	33	11	8	1	4	3	1	1
Q03:	0.25	0.53	0.78	0.76	0.22	28	27	7	49	16	2	2	1	4	2
Q04:	0.38	0.49	0.86	0.56	0.12	41	20	13	32	7	3	2	1	3	1
Q05:	0.48	0.46	0.94	0.66	0.59	46	18	43	43	42	4	2	4	4	4
Q06:	0.23	0.56	0.79	0.35	0.22	14	34	9	22	14	1	3	1	2	1
Q07:	0.16	0.50	0.66	0.34	0.22	9	21	6	20	13	1	2	1	2	1
…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
Q55:	0.33	0.55	0.88	0.20	0.38	34	28	22	14	23	3	2	2	1	2
				Total		1,540	1,540	1,540	1,540	1,540	137	137	137	137	137

Source: *Own source.*

5.2 The Importance of Motivators

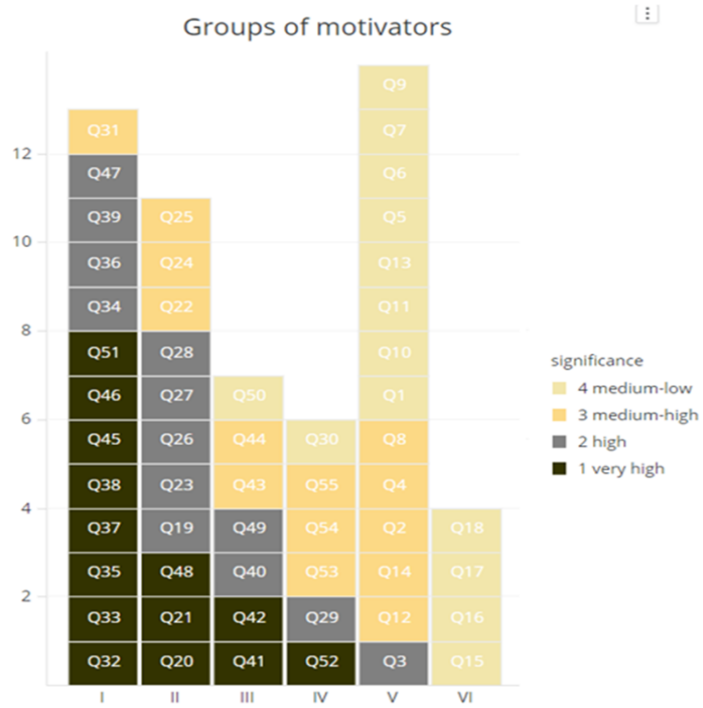
The second stage of the research consisted in conducting surveys among university employees. The survey was completed by 1,478 employees. Respondents determined whether a given motivator is used in their workplace or not. The obtained results allowed the ranking of all motivators according to their importance and according to their use.

5.2.1 Motivator Groups of Importance

In the first place, the importance of motivators was analysed. To simplify the structure of the 55 motivators analysed, factor analysis was used. It allowed identifying six groups of motivators, which explained 52% of the total variance. Due to the fact that the importance of motivators was measured on a 5-point scale, the average assessment was calculated for each motivator. In the studied set of motivators, none were found that would have been of low importance (the motivator with the lowest importance is 0.505).

Then the motivators were arranged in descending order according to the calculated average. The resulting set was divided into four parts using quartile division. The importance of motivators in the first quartile was defined as medium-low, in the second as medium-high, in the third as high and the fourth as very high. After assigning the importance to each motivator, the structure of motivators' importance in each of the groups identified at the factor analysis stage was determined. On this basis, the importance of the group was determined. In this way, groups were assigned numbers from I - the most important group to VI - the least important group. These results are presented in Figure 1 and Tables 8-13.

Figure 1. *Motivator groups by the importance*



Source: *Own source.*

Table 8. *Group I - Relationships within the organisation and working conditions*

Group	Item	Description	Factor Loadings	Importance
I	Q46:	ability to talk to your immediate supervisor about problems or conflicts	0.721	1 very high
I	Q51:	help and support of direct superiors	0.695	1 very high
I	Q37:	good atmosphere at work (positive informal relations with colleagues)	0.672	1 very high
I	Q38:	formal support from the administration of the indoor organisation (department)	0.648	1 very high
I	Q45:	possibility to freely express opinions / views	0.645	1 very high
I	Q35:	the possibility of reconciling professional and personal life,	0.625	1 very high
I	Q39:	formal support from the university administration	0.611	2 high
I	Q47:	possibility of scientific or teaching consultations during internal meetings / seminars	0.607	2 high
I	Q36:	intra-organisational communication (information flow, meetings, intranet etc.)	0.592	2 high
I	Q32:	flexible working hours	0.545	1 very high
I	Q33:	employment security	0.532	1 very high
I	Q31:	praise / recognition of the immediate superior	0.496	3 medium-high
I	Q34:	having an academic mentor involved in employee development	0.423	2 high

Source: *Own source.*

Table 9. *Group II - Financing research and access to knowledge*

Group	Item	Description	Factor Loadings	Importance
II	Q20:	financing participation in domestic conferences / seminars	-0.801	1 very high
II	Q21:	financing participation in conferences / seminars abroad	-0.801	1 very high
II	Q19:	financing academic publications (fees, translations, technical editing etc.)	-0.77	2 high
II	Q24:	internal (faculty or university) post-doctorate grants	-0.703	3 medium-high
II	Q27:	financing or co-financing of scientific internships from internal funds (faculty or university)	-0.698	2 high
II	Q25:	internal (faculty or university) professorial grants	-0.68	3 medium-high
II	Q23:	financing fees for obtaining the academic degree/title	-0.635	2 high
II	Q28:	additional paid leave for scientific purposes	-0.634	2 high
II	Q22:	total or partial financing of vocational training (participation in post-graduate studies, courses, training)	-0.529	3 medium-high
II	Q48:	access to the latest domestic and foreign academic publications	-0.513	1 very high
II	Q26:	owning a business computer	-0.496	2 high

Source: *Own source.*

Table 10. *Group III - External scientific and business relations as well as respecting intellectual property*

Group	Item	Description	Factor Loadings	Importance
III	Q43:	initiating internal relations (faculty) by external authorities (contacts with enterprises; cooperation between scientific and academic units; internationalisation of activities; etc.)	-0.755	3 medium-high
III	Q44:	initiating external relations by university authorities (contacts with enterprises; cooperation between scientific and academic units; internationalisation of activities; etc.)	-0.731	3 medium-high
III	Q50:	opportunity to use the relationship and infrastructure of the unit (faculty or university) to commercialise the results of your scientific work	-0.67	4 low
III	Q40:	possibility of work in highly innovative conditions (modern equipment, access to new technologies)	-0.638	2 high
III	Q41:	respecting the rights to your intellectual/copyright property by your colleagues	-0.602	1 very high
III	Q42:	respecting the rights to your intellectual/copyright property by your superiors	-0.6	1 very high
III	Q49:	possibility of using foreign teaching and research relationships of the unit (faculty or university) to internationalise the results of your scientific work	-0.585	2 high

Source: *Own source.*

Table 11. *Group IV - Assessment and professional promotion rules*

Group	Item	Description	Factor Loadings	Importance
IV	Q53:	employee appraisal rules based on quantitative criteria (criteria with a specific score)	0.77	3 medium-high
IV	Q52:	transparent rules of employee evaluation	0.767	1 very high
IV	Q55:	formal, codified incentive system (including most of the above-mentioned motivators with a description of the rules for their use)	0.714	3 medium-high
IV	Q54:	rules of employee evaluation based on qualitative criteria (descriptive evaluation prepared by the direct superior)	0.688	3 medium-high
IV	Q29:	disclosure rules for the pay of teaching and research employees	0.574	2 high
IV	Q30:	possibility of obtaining managerial position	0.507	4 medium-low

Source: *Own source.*

Table 12. *Group V - Bonuses and allowances for teaching, commercialisation of research results, organisational work, academic publications issued*

Group	Item	Description	Factor Loadings	Importance
V	Q6:	bonuses / allowances for teaching publications (notes, textbooks)	-0.804	4 medium-low
V	Q8:	bonuses / allowances for preparing new education programmes (new field of study, new specialty)	-0.798	3 medium-high
V	Q10:	bonuses / allowances for the care of the science club	-0.789	4 medium-low
V	Q9:	bonuses / allowances for opening a new laboratory, workshop	-0.777	4 medium-low
V	Q7:	bonuses / allowances for conducting classes in the e-learning system	-0.767	4 medium-low
V	Q4:	bonuses / allowances for acquired funds for scientific research	-0.744	3 medium-high
V	Q5:	bonuses/allowances for activities aimed at commercializing research results	-0.74	4 medium-low
V	Q12:	bonuses/allowances for above-average involvement in organizational work (e.g., participation in promotional activities, organization of scientific conferences, etc.)	-0.73	3 medium-high
V	Q3:	bonuses / allowances for issued scientific publications	-0.69	2 high
V	Q11:	bonuses/allowances for grades obtained in the process of student surveys	-0.662	4 medium-low
V	Q2:	cash allowances for teaching in a foreign language (conversions)	-0.648	3 medium-high
V	Q1:	cash allowances for work on Saturdays and Sundays (conversion from part-time studies)	-0.636	4 medium-low
V	Q13:	discretionary bonuses - depending on the decision of the immediate superior	-0.562	4 medium-low
V	Q14:	Chancellor's annual cash prize	-0.528	3 medium-high

Source: *Own source.*

Table 13. *Group VI - Social benefits*

Group	Item	Description	Factor Loadings	Importance
VI	Q17:	payment of additional (except compulsory pension insurance contributions) pension programmes	0.846	4 medium-low
VI	Q16:	payment of additional (except compulsory and social) personal insurance	0.846	4 medium-low
VI	Q18:	payment of (except for compulsory health contributions) healthcare	0.832	4 medium-low
VI	Q15:	social services: holidays, trips, festivals, cultural events etc.	0.549	4 medium-low

Source: *Own source.*

5.2.2 Ranking of Importance Motivators in the Context of Motivation Theory

As already mentioned at the stage of reducing the dimension of the 55-element structure of questions, motivators, thanks to the average responses of respondents, were arranged according to their importance. Each of the motivators was compared with expert assessments to be able to discern the convergence of a given motivator with selected motivation theories. The details of this comparison for the most important motivators are presented in Table 14.

Factors related to the theory of self-determination (SDT) and Herzberg (HT) (in particular in the field of hygiene factors) are of the greatest importance for the involvement of academic staff. The most motivators with the most important for university employees were:

Table 14. *The importance of motivators for employees and their relationship with the theory of motivation*

id	Z	ID	HTm	HTh	HT	MT	SDT	rHTm	rHTh	rHT	rMT	rSDT
1	**0.893**	**Q33:**	0.25	0.75	1.00	0.31	0.33	26	51	52	18	21
2	**0.889**	**Q35:**	0.25	0.63	0.88	0.13	0.60	25	38	20	10	43
3	**0.887**	**Q32:**	0.31	0.63	0.94	0.13	0.49	29	39	38	13	36
4	**0.874**	**Q48:**	0.25	0.75	1.00	0.36	0.60	18	48	49	23	44
5	**0.864**	**Q37:**	0.25	0.75	1.00	0.63	0.44	23	49	50	40	28
6	**0.832**	**Q21:**	0.31	0.56	0.88	0.41	0.65	33	30	21	27	46
7	**0.822**	**Q46:**	0.50	0.38	0.88	0.65	1.00	47	11	28	42	55
8	**0.815**	**Q20:**	0.25	0.56	0.81	0.34	0.53	27	29	11	21	38
9	**0.814**	**Q51:**	0.25	0.69	0.94	0.59	0.78	17	43	36	37	49
10	**0.814**	**Q52:**	0.25	0.75	1.00	0.24	0.55	16	47	48	15	40
11	**0.812**	**Q42:**	0.38	0.50	0.88	0.56	0.77	38	23	23	33	48
12	**0.805**	**Q45:**	0.50	0.38	0.88	0.63	1.00	48	12	29	39	54
13	**0.801**	**Q38:**	0.25	0.63	0.88	0.43	0.44	22	37	19	29	26
14	**0.801**	**Q41:**	0.38	0.50	0.88	0.75	0.83	39	24	24	47	50
	Total		4.38	8.44	12.81	6.14	8.99	408	**481**	448	394	**578**

Source: *Own source.*

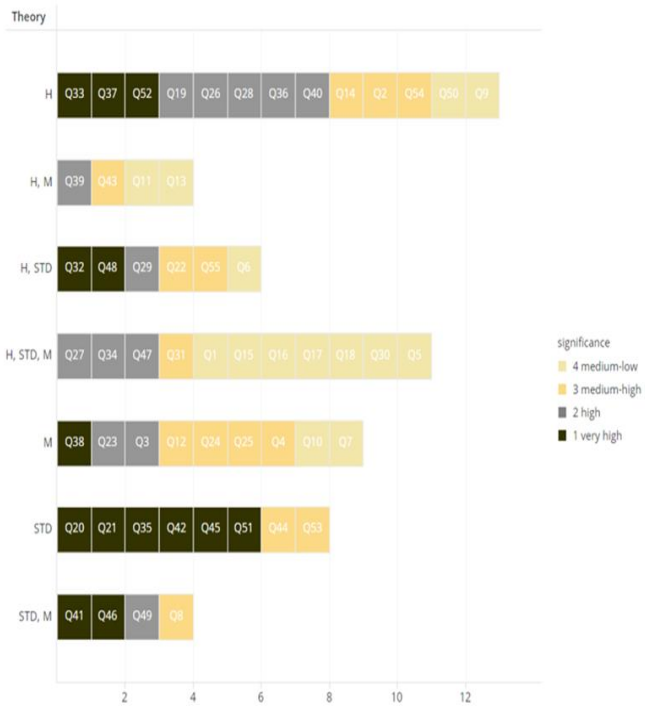
- Q33 - employment certainty,
- Q35 - the possibility of reconciling professional and personal life,
- Q32 - flexible working hours,
- Q48 - access to the latest domestic and foreign academic publications,
- Q37 - good atmosphere at work (positive informal relations with colleagues),
- Q21 - financing participation in conferences/seminars abroad,
- Q51 - help and support of direct superiors,
- Q52 - transparent rules for employee evaluation,
- Q42 - respecting the rights to intellectual/copyright property by your superiors,
- Q45 - possibility to freely express opinions.

The presented results confirm the findings of Gallus and Frey (2016) that for academic staff it is important to increase their autonomy, emphasise the contribution of individual employees to the achieved goals and congratulate them on achieving them. In addition, the results refer to the identified important need of the Deci and Ryan relationship, (2008), which here refers to the relationship with superiors, the experience of being cared for, concern and interest.

Analysing the importance of motivators in the context of motivation theory (Figure 2), it can be stated that the most significant (very high) motivators are assigned to the theory of self-determination (SDT), followed by Herzberg's theory (HT). In Herzberg's theory, there are many motivators with important factors (high). In addition, Herzberg's theory is most diverse in the importance of factors, but most of them are important (very high and high). McClelland's theory (M) varies, but most

of the motivators assigned to it have medium-high or medium-low importance. Many motivators are difficult to attribute to a particular theory, but most of them are of medium-low importance.

Figure 2. *The importance of motivators in the context of motivation theory*



Source: *Own source.*

5.3 The Importance of Motivators and their Use

5.3.1 The Importance of the Most Commonly Used motivators

When analysing the use and importance of motivators in the context of the selected importance groups of motivators, Table 15 was prepared. It presents the 14 most commonly used motivators along with their assignment to the theory of motivation.

Table 15. *The most commonly used motivators at work and their relationship with the theory of motivation.*

id	S.YES	ID	HTm	HTh	HT	MT	SDT	rHTm	rHTh	rHT	rMT	rSDT
1	**0,886**	**Q32**	0,31	0,63	0,94	0,13	0,49	29	39	38	13	36
2	**0,859**	**Q15**	0,06	0,44	0,50	0,00	0,08	3	14	4	2	3
3	**0,832**	**Q46**	0,50	0,38	0,88	0,65	1,00	47	11	28	42	55
4	**0,821**	**Q20**	0,25	0,56	0,81	0,34	0,53	27	29	11	21	38
5	**0,817**	**Q48**	0,25	0,75	1,00	0,36	0,60	18	48	49	23	44
6	**0,808**	**Q36**	0,25	0,75	1,00	0,33	0,44	24	50	51	19	25
7	**0,804**	**Q14**	0,63	0,31	0,94	0,56	0,48	52	10	45	35	33
8	**0,794**	**Q21**	0,31	0,56	0,88	0,41	0,65	33	30	21	27	46
9	**0,756**	**Q41**	0,38	0,50	0,88	0,75	0,83	39	24	24	47	50

10	**0,754**	**Q37**	0,25	0,75	1,00	0,63	0,44	23	49	50	40	28
11	**0,735**	**Q26**	0,06	0,81	0,88	0,13	0,09	2	52	15	9	6
12	**0,717**	**Q35**	0,25	0,63	0,88	0,13	0,60	25	38	20	10	43
13	**0,713**	**Q51**	0,25	0,69	0,94	0,59	0,78	17	43	36	37	49
14	**0,712**	**Q42**	0,38	0,50	0,88	0,56	0,77	38	23	23	33	48
	Suma		4,13	8,25	12,38	5,55	7,76	377	**460**	**415**	358	**504**

Note: *r(x) - the higher the ranking position, the better the match between the motivator and theory, q(x) - the higher the number, the better the match between the motivator and theory*.
Source: *Own source.*

Table 15 shows that the most commonly used motivators in public universities are those related to Herzberg's theory (HT) and self-determination theory (SDT) (see sum r(X)). The six most common motivators used at universities are:

- Q32 - flexible working hours,
- Q15 - social services: holidays, trips, festivals, cultural events etc.,
- Q46 - ability to talk to your immediate supervisor about problems or conflicts,
- Q20 - financing participation in domestic conferences/seminars,
- Q48 - access to the latest domestic and foreign academic publications,
- Q36 - intra-organisational communication (information flow, meetings, intranet etc.).

To examine the relationship between the use of a given motivator and its importance for an employee, Pearson correlation coefficients between full data sets (i.e. containing 55 motivators) were calculated. The results are presented in Table 16.

Table 16. *Pearson coefficients between sets*

	S.YES	S.NO	Z	HTm	HTh	HT	MT	SDT	rHTm	rHTh	rHT	rMT	rSDT
S.YES	1,000												
S.NO	-0,916	1,000											
Z	**0,701**	-0,607	1,000										
HTm	0,039	-0,065	0,018	1,000									
HTh	0,274	-0,254	0,375	-0,661	1,000								
HT	0,379	-0,387	**0,476**	0,415	0,408	1,000							
MT	-0,053	-0,025	0,024	0,735	-0,405	0,402	1,000						
SDT	0,458	-0,495	**0,495**	0,591	-0,205	0,472	0,552	1,000					
rHTm	0,039	-0,073	0,115	0,950	-0,620	0,404	0,770	0,597	1,000				
rHTh	0,296	-0,267	0,407	-0,610	0,989	0,458	-0,373	-0,165	-0,578	1,000			
rHT	0,342	-0,349	0,293	0,528	0,143	0,816	0,354	0,450	0,449	0,207	1,000		
rMT	-0,060	-0,022	0,031	0,724	-0,391	0,407	0,993	0,537	0,764	-0,360	0,356	1,000	
rSDT	0,459	-0,507	0,519	0,585	-0,165	0,512	0,551	0,975	0,593	-0,124	0,471	0,538	1,000

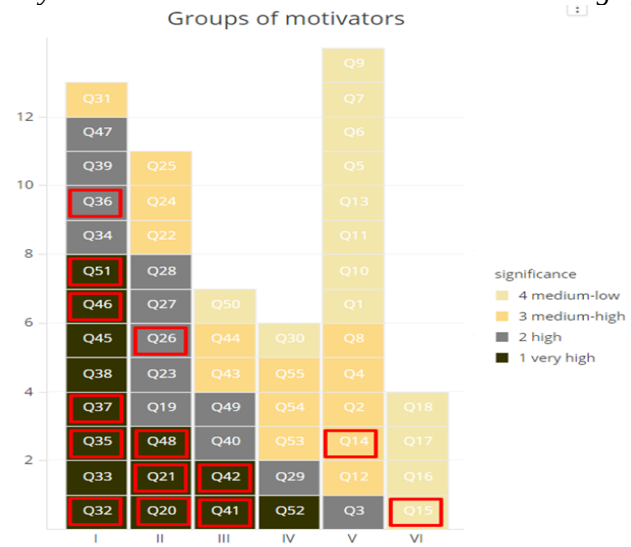
Source: *Own source.*

The correlation between the importance of a given motivator for an employee and its use by universities was 0.701. This suggests that motivators of the greatest

importance are most often used. The highest correlation between the meaning of motivators (Z) and a given theory of motivation was obtained in the case of SDT (0.495) and HT (0.476) theories. Similarly, results were obtained between the use of a given motivator (S.YES) and a particular theory. The lowest correlation was obtained when using (S.YES) and the McClelland theory considering both point values (-0.053) and ranking (0.060). To explore the nature of the correlation between the importance and the use of motivators, Figure 3 was made. It presents motivators and their groups of importance and shows which motivators are most commonly used. From the analysis of this drawing, it can be concluded that 10 out of 14 motivators of the highest importance are used, i.e., 4 important motivators are not used often enough. These are motivators such as transparent evaluation rules, the possibility to freely express opinions, employment certainty and formal support from the internal administration of the university (faculty).

These motivators are mainly Herzberg's hygiene factors (1959), who acknowledged the work environment as a source of resources to meet people's needs, and thus, as a source of employee satisfaction or dissatisfaction (Osuch, 2012). A satisfied person always works better and more productively, because satisfying their needs positively affects their attitudes and behaviour and increases their internal motivation. In addition, it was also observed that 2 out of 13 motivators of high importance are not used very often (i.e., 10 important motivators should be used more often). In addition, among the motivators of medium-low and medium-high importance, very often only 2 are used, which suggests that it would be better to use motivators of higher importance instead.

Figure 3. *Motivator groups of importance in the context of their frequency of use (the most commonly used motivators are marked with a red rectangle)*



Source: *Own source.*

5.3.2 The Importance of the Most Commonly Not Used Motivators

An important analysis was the diagnosis of motivators most often not used at universities. To this end, a summary was also prepared in which a variable was created by multiplying the importance of a given motivator by the level of its lack of use (and thus the difference between S.NO and S.YES). This way, a ranking of the motivators most often not used was created. The 14 motivators most often not used are presented in Table 17.

Table 17. *The most commonly used motivators at work and their relationship with the theory of motivation*

id	ZN* (S.NO-S.YES)	ID	ZN	S.NO	S.YES	S.NO-S.YES	HTm	HTh	HT	MT	SDT	rHTm	rHTh	rHT	rMT	rSDT
1	**0.408**	**Q11:**	0.572	0.785	0.072	0.71	0.56	0.31	0.88	0.58	0.42	50	8	31	36	24
2	**0.353**	**Q18:**	0.580	0.696	0.087	0.61	0.16	0.31	0.48	0.06	0.08	8	6	3	7	5
3	**0.288**	**Q06:**	0.609	0.591	0.119	0.47	0.23	0.56	0.79	0.35	0.22	14	34	9	22	14
4	**0.287**	**Q09:**	0.571	0.544	0.041	0.50	0.23	0.66	0.89	0.41	0.13	12	41	32	28	9
5	**0.285**	**Q08:**	0.621	0.593	0.134	0.46	0.23	0.56	0.79	0.41	0.22	13	33	8	24	15
6	**0.273**	**Q55:**	0.689	0.571	0.175	0.40	0.33	0.55	0.88	0.20	0.38	34	28	22	14	23
7	**0.263**	**Q17:**	0.508	0.584	0.067	0.52	0.10	0.31	0.41	0.06	0.08	5	4	1	6	4
8	**0.258**	**Q07:**	0.505	0.567	0.057	0.51	0.16	0.50	0.66	0.34	0.22	9	21	6	20	13
9	**0.223**	**Q12:**	0.646	0.590	0.244	0.35	0.44	0.50	0.94	0.81	0.24	44	26	41	54	17
10	**0.218**	**Q16:**	0.506	0.593	0.163	0.43	0.10	0.31	0.41	0.00	0.08	6	5	2	1	2
11	**0.196**	**Q05:**	0.588	0.443	0.109	0.33	0.48	0.46	0.94	0.66	0.59	46	18	43	43	42
12	**0.195**	**Q10:**	0.555	0.530	0.178	0.35	0.38	0.50	0.88	0.81	0.27	40	25	25	51	19
13	**0.190**	**Q25:**	0.614	0.389	0.079	0.31	0.44	0.44	0.88	0.81	0.44	42	15	26	52	30
14	**0.181**	**Q04:**	0.692	0.512	0.251	0.26	0.38	0.49	0.86	0.56	0.12	41	20	13	32	7
	Total						4.19	6.48	10.66	6.08	3.47	**364**	284	262	**390**	224

Source: *Own source.*

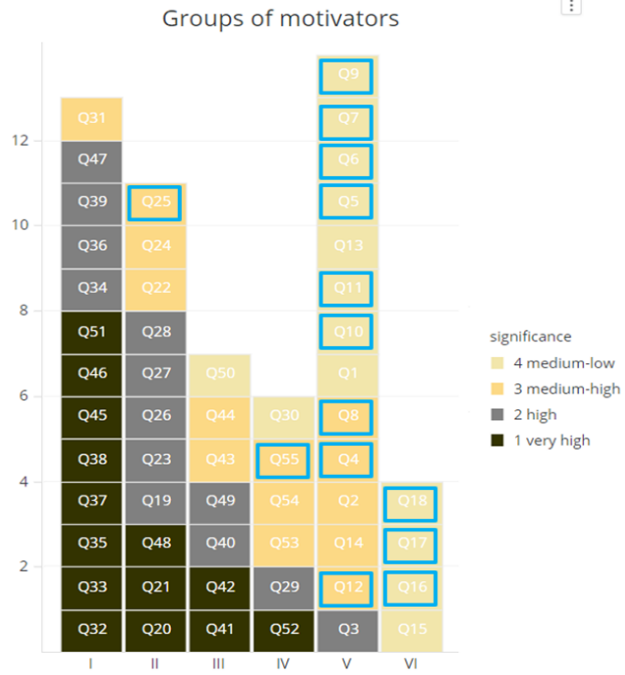
Among the motivators most often not used were:

- Q11 - bonuses/allowances for grades obtained in the process of student surveys,
- Q18 - paying (in addition to compulsory health contributions) for health care,
- Q06 - bonuses/allowances for teaching publications,
- Q09 - bonuses/allowances for opening a new laboratory, workshop,
- Q08 - bonuses/allowances for preparing new education programs,
- Q55 - formal, codified incentive system (including most of the above-mentioned motivators with a description of the rules for their use),
- Q25 - internal (faculty or university) professorial grants.

In addition, the results from Table 17 were placed on the important groups presented in Figure 4. Figure 4 shows that most of the motivators that are most often not used have medium importance for academic staff. The results of the analysis confirm previous studies of Deci and Ryan (2008) and Maloletko (2018) that typically financial factors, as well as the system of awards and punishments, destroy internal motivation. Still, in the case of academic staff, as emphasised in their research by

Jindal-Snape and Snape (2006) and Gallus and Fray, (2016), awards significantly affect employee motivation and have a connection with satisfying the 'need for achievement'.

Figure 4. *Motivator groups of importance in the context of their non-use (the blue rectangle is motivators for which the greatest lack of use was diagnosed)*



Source: *Own source.*

6. Conclusion

Based on the results presented with the participation of experts, it can be stated that the unambiguous assignment of motivators to the selected motivation theory is a relatively difficult task. This may suggest that the motivators used in Polish universities result from the interpenetration of the theory of motivation. Despite the mentioned difficulties, however, it was found that the most commonly used motivators at universities are those that can be attributed to Herzberg's theory (in particular in the field of hygiene factors) and the self-determination theory SDT. The results obtained are consistent with the findings of Ryan (2014) and Firat (2016), in which the motivation profile of the scientist is based on internal motivation.

In turn, analysing the importance of motivators for scientists, it was found that motivators associated with the theory of self-determination (SDT) and Herzberg (HT) (in particular in the field of hygiene factors) have the greatest importance for the involvement of academic staff. These results confirm the research of Inigo and Raufaste (2019) where professional achievements are important, give a sense of

meaning, build confidence, and satisfy the need for self-realisation. In turn, the concept of Herzberg's hygiene factors makes it easier to understand how factors such as poor management, lack of recognition and organisational instability can weaken employee motivation and productivity.

The use of factor analysis allowed to examine the structure of motivators and determine the groups of motivators' importance. Motivators regarding mutual internal relations (superiors, colleagues, administration) or organisation of working time and employment certainty (Group I) are of the greatest importance for university employees. These results are consistent with the research of Moletko (2018), who said that scientists need good cooperation and communication, and the relationships between researchers in the research team have a large impact on the productivity of their work. Similarly, as in the research of Kanat-Maymon, and Reizer (2017) and Nikolova *et al.* (2019), who also indicated the large role of social factors on work productivity. They showed that employee productivity increases if they see their superiors as those who reinforce their autonomy. In addition, motivators related to funding scientific research and access to knowledge (Group II) were another group of motivators important for academic staff.

According to the theory of self-determination, Deci and Ryan (2008), they are motivators covering internal motivation focused on knowledge or scientific achievements and the need for self-development.

Comparing the list of motivators that are used in universities and those that are most important for academic staff, one can identify a group of motivators that are significant to employees and are not yet used. This is a very important group of motivators that university decision-makers should pay attention to. These are, for example, awards in the form of bonuses/allowances for issued publications or disclosure rules of pay of employees for their work. The importance of awards among academic staff is emphasized in their research by Jindal-Snape and Snape (2006) and Gallus and Fray, (2016), awards significantly affect the internal motivation of employees and have a connection with meeting the 'need for achievement'. Therefore, the system of material incentives for scientists should be as simple as possible and should not focus the researcher's attention on pay, but should be worthy, meet their expectations and boost their internal motivation (Maletko, 2018).

The presented studies do not fully cover the issue presented. In the future, it is worth considering the analysis of the results of the identified motivators depending on the age, gender, or form of employment of academic staff. It may turn out that there are significant differences in this respect. Thus, further studies will be conducted in this direction.

References:

Adams, J.S. 1963. Toward an understanding of inequality. The Journal of Abnormal and Social Psychology, 67(5), 422-436.

Alderfer, C.P. 1972. Existence, relatedness, and growth. Free Press: New York.

Atkinson, J.W. 1958. Towards experimental analysis of human motivation in terms of motives, expectancies, and incentives. In: Motives in fantasy, action and society, Atkinson J. (ed.), Van Nostrand: Princeton, 288-305.

Atkinson, J.W. 1964. An introduction to motivation. Van Nostrand: Princeton.

Bakker, A.B. 2015. A job demands–resources approach to public service motivation. Public Administration Review, 75(5), 723-732.

Bandura, A. 1977. Social Learning Theory. Prentice Hall: Englewood Cliffs.

Bucheit, S., A.B., Collins, D.L. 2001. Intra-institutional factors that influence accounting research productivity. Journal of Applied Business Research, 17, 17-32. 10.19030/jabr.v17i2.2070.

Chow, C.W., Harrison, P. 1998. Factors contributing to success in research and publications: Insights of influential accounting authors. Journal of Accounting Education, 16, 463-472. 10.1016/S0748-5751(98)00030-X.

de Lourdes Machado-Taylor, M., Meira Soares, V., Brites, R., Brites Ferreira, J., Farhangmehr, M., Gouveia, O.M.R., Peterson, M. 2016. Academic job satisfaction and motivation: findings from a nationwide study in Portuguese higher education. Studies in Higher Education, 41(3), 541-559.

Deci, E.L., Ryan, R.M. 1985. Intrinsic motivation and self-determination in human behavior. New York, Plenum Press.

Deci, E.L., Ryan, R.M. 2008. Self-Determination Theory: A Macrotheory of Human Motivation, Development, and Health. Canadian Psychology, 49(3), 182-185.

Earley, Ch., Shalley, Ch. 1984. New Perspectives on Goals and Performance: Merging Motivation and Cognition. In: Research in Personal and Human Resources Management, Ferris, G., Rowland, K. (ed.), JAI Press: Greenwich, 121-126.

Festinger, L. 1957. A theory of cognitive dissonance. Row, Peterson, Evanston.

First, M. 2016. Examination of scientific research motivation and methodological paradigms of ICT oriented young education researchers. Education and Science, 41(187), 221-237. DOI: 10.15390/EB.2016.4480.

Gallus, J., Frey, B.S. 2016. Awards as Strategic Signals. Journal of Management Inquiry, 1-10. DOI: 10.1177/1056492616658127.

Hammer, W.C. 1979. Reinforcement Theory and Contingency Management in Organizational Settings. In: Motivation and Work Behaviour, Steers, R.M., Porter, L.W. (ed.). McGraw-Hill.

Hardré, H., et al. 2011. Faculty motivation to do research: Across disciplines in research-extensive universities. Journal of the Professoriate, 5, 35-69.

Havercamp, S.M., Reiss, S. 1996. The Sensitivity Theory of Motivation: Implications for Psychopathology. Behaviour Research and Therapy, 34(8), 621-632.

Herzberg, F. 1968. One more time: how do you motivate employees? Harvard Business Review, 46(1), 53-62.

Herzberg, F., Mausner, B., Snyderman, B.B. 1959. The Motivation to Work (2nd ed.). John Wiley & Sons, New York.

Homans, G.C. 1961. Social Behaviour: Its Elementary Forms. New York.

Hull, C.L. 1943. Principles of behavior: an introduction to behavior theory. Appleton-Century-Crofts, New York.

Inigo, M., Raufaste, E. 2019. Academics' motivations explain time-allocation and well-being at work. Revue Européenne de Psychologie Appliquée, 69(1), 19-30. https://doi.org/10.1016/j.erap.2018.11.002.

Jindal-Snape i Snape. 2006. Motivation of scientists in a government research institute: scientists' perceptions and the role of management. Management Decision, 44(10), 1325- 1343.

Kamalanabhan, T.J., Uma, J., Vasanthi, M. 1999. A DELPHI study of motivational profile of scientists in research and development organizations. Psychological Reports, 85(3), 743-749.

Kanat-Maymon, Y., Reizer, A. 2017. Supervisors' autonomy support as a predictor of job performance trajectories. Applied Psychology, 66(3), 468-486.

Kwiek, M. 2017. Kariera akademicka w Europie: niestabilność w warunkach systemowej konkurencji. Nauka i Szkolnictwo Wyższe, 1(47). DOI: 10.14746/nsw.2016.1.9.

Lawler, E., Porter, L.W. 1968. Managerial attitudes and performance. Dorsey Press, Homewood.

Lewin, K. 1938.The conceptual representation and the measurement of psychological forces. Duke University Press, Durham.

Likert, R. 1961. New Patterns of Management. McGraw–Hill, New York.

Likert, R. 1961. The Human Organization: Its Management and Value. McGraw–Hill, New York.

Litvinyuk, A.A. 1997. Motivational complexes of work in the management system (on the example of retail businesses). Doctoral dissertation.

Locke, E.A., Latham, G.P. 1990. A theory of goal setting and task performance. Prentice Hall: Englewood Cliffs.

Machado de Lourdes, Soares, V.M., Brites, R., Ferreira, J.B., Gouveia, O. 2011. A look to academics' job satisfaction and motivation in Portuguese higher education institutions. Procedia-Social and Behavioral Sciences, 29, 1715-1724.

Machado-Taylor, M.L., Soares, V.M., Brites, R., Ferreira, J.B., Farhangmehr, M., Gouveia, O., Peterson, M. 2016. Academic job satisfaction and motivation: findings from a nationwide study in Portuguese higher education. Studies in Higher Education, 41(3), 541-559.

Maloletko, A. 2018. Motivation of researchers and reassessment of management methods: the case of one university. In: Economic and Social Development (ed.) Maloletko, A., Rupcic, N., Baracskai, Z. 34th International Scientific Conference on Economic and Social Development - XVIII International Social Congress (ISC-2018)– Moscow, 18-19 October 2018, Book of Proceedings, Varazdin Development and Entrepreneurship Agency, Varazdin, Croatia / Russian State Social University, Moscow, Russia / Faculty of Management University of Warsaw, Warsaw, Poland / University NorHT, Koprivnica, Croatia / Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat, Morocco, 918-925.

Maltseva, A., Klyushnikova, E. 2017. Motivation of resistance to change in creative research teams: issues of scientists' typology. The Turkish Online Journal of Design Art and Communication, 7, 1916-1928.

Maslow, A.H. 1954. Motivation and Personality. Harper & Row, New York.

McClelland, D. 1961. The Achieving Society. Princeton, NJ, Van Nostrand Reinhold.

McClelland, D., Atkinson, J., Clark, J., Lowell, E. 1953. The achievement motive. Appleton-Century-Crofts, New York.

McGregor, D. 1960. The Human Side of Enterprise. McGraw-Hill Book Comp, New York.

Nikolova, I., Schaufeli, W., Notelaers, G. 2019. Engaging leader – engaged employees? a

cross-lagged study on employee engagement. European Management Journal, 37(6), 772-783. DOI: 10.1016/j.emj.2019.02.004.
Osuch, J. 2012. Motivation as a management factor. Acta Scientifica Academiae Ostroviensis. Sectio A, No 1, 101-120.
Ritchie, S., Martin, P. 1999. Motivation Management. Gower: London.
Ryan, J.C. 2014.The work motivation of research scientists and its effect on research performance. R&D Management, 44(4), 355-369.
Saaty, T.L. 2004. Decision making—the analytic hierarchy and network processes (AHP/ANP). Journal of systems science and systems engineering, 13(1), 1-35.
Sauermann, H., Cohen, W.M. 2008. What makes them tick? Employee motives and firm innovation. NBER Working Paper Series, 14443.
Seligman, M.E. 2011. Flourish: A Visionary New Understanding of Happiness and Well-being, Simon & Schuster, New York.
Skinner, B.F. 1969. Contingencies of Reinforcement. A Theoretical Analysis. Appleton-Century-Crofts, New York.
Stoner, J.A.F., Freeman, E.R., Gilbert, D.R. 2011. Kierowanie, PWE.
Szromek, A.R., Wolniak, R. 2018. Satisfaction of scientific work among polish researchers. Gliwice, Wydawnictwo Politechniki.
Tolman, E.C. 1932. Purposive behavior in animals and men. Century: New York.
Vroom, V.H. 1964. Work and motivation. Wiley: New York.
Wojtowicz, E. 2013. Cele życiowe ojców i ich dzieci: perspektywa teorii autodeterminacji. Forum Oświatowe, 1(48), 73-85. Retrieved from: http://forumoswiatowe.pl/index.php/czasopismo/article/view/3.
Zhang, X. 2018. Motivation of Enterprise Motivation Management Mechanism Based on Neuromanagement. NeuroQuantology, 16(5), 158-164.