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Application for conducting the habilitation procedure

in the field of technical science

discipline: Mining and Engineering Geology

specialisation: Mining Organisation and Economics

ATTACHMENT NO. 2

Self-Presentation

February, 2018

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1. Name and Surname:

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2. Diplomas and scientific degrees held:

Master of Science, Engineer (specialisation: Solid Minerals Processing) – Faculty of Mining, Silesian University of Technology in Gliwice, October 1991

Doctor of Technical Science in the field of mining (specialisation: Mining Organisation and Economics), Faculty of Mining and Geology, Silesian University of Technology in Gliwice, November 2001

3. Information on hitherto employment in scientific units:

1991-1992 engineering and technical employee, Department of Economics and Organisation of Mining, Faculty of Mining, Silesian University of Technology in Gliwice;

1992-2000 assistant, Department of Economics and Organisation of Mining, Faculty of Mining and Geology, Silesian University of Technology in Gliwice;

2000-2001 lecturer, Department of Economics and Organisation of Mining, Faculty of Mining and Geology, Silesian University of Technology in Gliwice;

2001- 2017 assistant professor, Department of Mining Management and Safety Engineering, Faculty of Mining and Geology, Silesian University of Technology in Gliwice;

2017 – nadal older lecturer, Department of Safety Engineering, Faculty of Mining and Geology, Silesian University of Technology in Gliwice.

4. Indication of research and scientific achievement under Art. 16 Section 2 of the Act of 14th of March 2003 on Scientific Degrees and Titles in the field of Arts (Journal of Laws 2016, Item 882 as amended in Journal of Laws 2016, Item 1311)

a) Title of scientific achievement:

Identification of internal factors related to behaviour of miners and organization of work in hard coal mines

b) Cycle of subject-related publications documenting scientific achievement: (Impact Factor according to JCR base; number of points according to the Ministry of Science and Higher Education; participation)

1. **Tobór-Osadnik K.**, 2012: Identification of Employee's Attitudes in Various Cultures on the Basis of Mining Enterprise, published by Silesian University of Technology, Gliwice, z. 432, ss.258, works cited 182 poz., ISBN 978-83-7880-061-3 (dissertation thesis), number of sheets 18, Ministry of Science and Higher Education score: 25 points, (reviewers: Prof. dr hab. inż. Roman MAGDA, dr hab. inż. Joachim FOLTYS, Prof. PO), My contribution to the publication included a subject literature review as well as conducting and presentation of the research results. I estimate my percentage participation at 100%;
2. **Tobór-Osadnik K.**, Wyganowska M., Korski J., 2016: Selected sources of crisis and repair ideas for polish coal mines. LAP LAMBERT Academic Publishing, Saarbrucken, Germany, ISBN 978-3-659-90730-2, number of sheets 6, Ministry of Science and Higher Education score: 25 points, my contribution to the publication included both a literature review of the subject, as well as conduct and presentation of scientific research results, especially in relation to the organization of work of miners employed in restructured Polish hard coal mines and it amounted to 30% of the whole project (including 2 chapters written in 100% by me);
3. **Tobór-Osadnik K.**, Wyganowska M., Manowska A., 2017: Employee attitudes to work safety in Poland's coal mining companies. Journal of the Southern African Institute of Mining and Metallurgy, vol. 117, s. 1-6, ISSN 2225-6253, **Impact Factor: 0,300**, Ministry of Science and Higher Education score: 15 points, My contribution to the publication included a subject literature review as well as conducting and presentation of the research results. My participation in the publication included, in particular, developing the method and analysis of the results of identifying employee attitudes (OHS), and I estimate it at 35%;
4. Korski J., **Tobór-Osadnik K.**, Wyganowska M., 2016: Reasons of problems of the Polish hard coal mining in connection with restructuring changes in the period 1988-2014. Resources Policy, vol. 48, s. 25-31, ISSN 0301-4207, **Impact Factor: 2,618**, Ministry of Science and Higher Education score: 35 points, my

contribution to the publication included a subject literature review as well as an analysis of indicators concerning human resources in Polish hard coal mines, and I estimate it at 30%;

5. **Tobór-Osadnik K.**, 2016: Selected employee attitude in the context of teamwork behavior on the example of Polish hard coal mining companies. *Przegląd Górniczy*, No 8, p. 83-87, ISSN0033-216X, Index Copernicus 46,78, Ministry of Science and Higher Education score: 7 points, my contribution to the publication included a subject literature review as well as conducting and presentation of the research results. I estimate my percentage participation at 100%;
6. **Tobór-Osadnik K.**, 2013: The competence profile of the team from the 'X' Mine in the light of desirable characteristics of a member of the mining company's team. [in:] Bluszcz A. (ed.): *Opportunities and barriers to the development of the mining industry*. Publisher 'Śląsk', Katowice, p. 138-152, ISBN 978-83-7164-766-6, Ministry of Science and Higher Education score: 5 points, number of sheets 0,6, my contribution to the publication included a subject literature review as well as conducting and presentation of the research results. I estimate my percentage participation at 100%;
7. **Tobór-Osadnik K.**, Wyganowska M., 2013: Security in the organizational identity of enterprises as an element of the value system. [in:] Bluszcz A. (ed.): *Opportunities and barriers to the development of the mining industry*. Publisher 'Śląsk', Katowice, p. 164-176, ISBN 978-83-7164-766-6, Ministry of Science and Higher Education score: 5 points., number of sheets 0,5, my participation in the publication included, apart from literature introduction, development of assumptions for the research and its analysis and evaluation, and I estimate it at 90%;
8. **Tobór-Osadnik K.**, 2009: Corporate identity and safety as multi-aspect value. [in:] Martiakovoj E.V. (ed.): *Upravlenie social`no-ekonomiceskimi sistemami: problem i resenia*. Donieckij Nacional`nyj Techniczieskij Universitet, Donieck, s. 576-581, Ministry of Science and Higher Education score: 5 points, number of sheets 0,5, My contribution to the publication included a subject literature review as well as conducting and presentation of the research results. I estimate my percentage participation at 100%.

c) Discussion of the scientific objective and results obtained

Identification of internal factors in hard coal mines will be a source of economical and organisational effectiveness of their functioning. It allows for effective use of material, financial, human, organizational, technological, information, legal and

marketing resources. Mine resources can also be divided into tangible and intangible assets. The latter include competences of the staff, management style, ways of motivation, organizational culture, trust between employees and their loyalty in relation to the organization which is a mine. According to the first division in human resources, we distinguish such factors as: attitudes and behaviour of employees, competence, trust in management, readiness to change and the application of mining plant rules, including work safety. It should be noted that competences of employees, especially understood as an entirety of knowledge, skill of collective work and mutual learning, are the internal factors distinguished in the literature as essential for the development of a mining company. The internal factors which determine the development of a mining enterprise as far as the organizational resources are concerned include management efficiency, organization of task teams and effective use of miners' working time. In the collected series of publications that shall constitute the habilitation achievement, I would like to draw attention to such internal factors as (Figure 1):

- identification of selected attitude characteristics of miners in terms of teamwork and work safety in hard coal mines,
- miners' behaviour in the aspect of compliance with health and safety regulations,
- teamwork in hard coal mines,
- effective use of mining time potential,
- internal factors of technical and safety culture in hard coal mines.

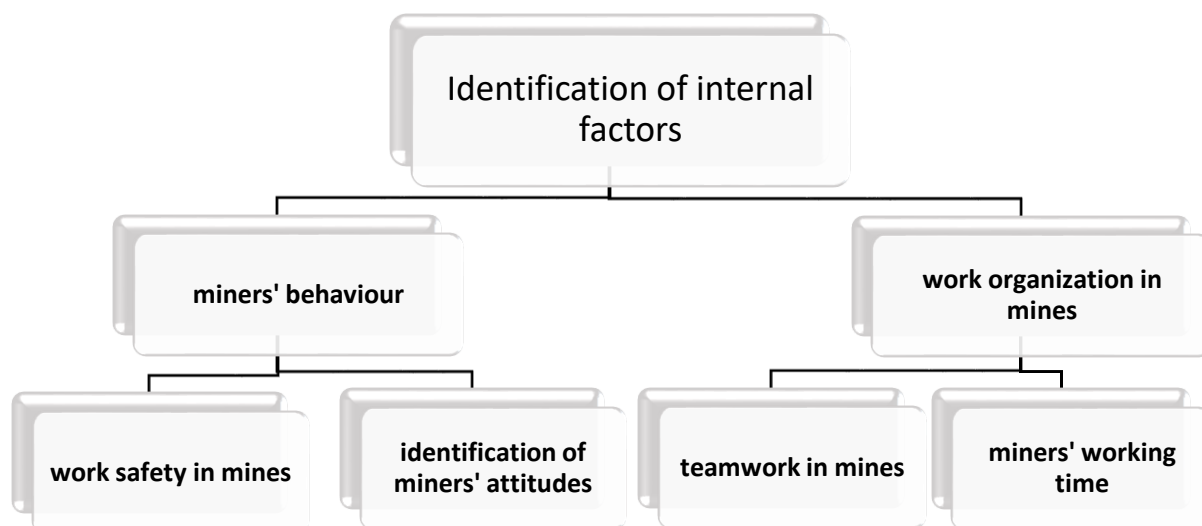


Fig. 1. Scheme presenting issues covered by the series of publications constituting the habilitation achievement (own study)

While investigating the behaviour of miners, I assumed that employees are both a source of success and failure of the company. Modern Polish hard coal mining companies, such as: KHW S.A. (currently included in PGG S.A.), PGG S.A. (formerly KW S.A.) or JSW S.A. have applied and continue to apply increasingly integrated management systems in various areas of their activity. All of them have emphasizes and continue to emphasize in their business plans that the employees and safe work are their key strategic goals.

We should remember that employee management is a constant process which must take into account both organisation's needs as wells as these of an employee. Creating effective tools of employees' management is, in my opinion, one of the challenges of the contemporary hard coal mining in Poland.

Research on the behaviour of miners and identification of desirable features of an employee of a Polish coal mine drew my attention to the 'externally-controlled' attitude which is the exact opposite to the innovative or creative attitudes expected among the crew by the management.

Results of several years of research were presented in the habilitation monograph 'Identification of employee's attitudes in various cultures on the basis of mining enterprise' (2012).

The scope of my habilitation monograph includes identification of the selected employees' attitudes and behaviours in the Polish hard coal mines as well as comparative analysis of enterprises of a different technical culture (eg. of full automatics types of production – automotive). The objective of my studies was in particular an employee attitude of 'Z' type (Enslaved) in the Polish hard coal mining enterprises. In my publications I suggested a proper name of a 'passively active' employee (*Identification of employees' attitudes, 2011*) and next publication - *The Passively Active Worker—A Diagnosis and Comparison of the Phenomenon in a Mining Company and a Corporation*” (2017, *Impact Factor 0,140*).

Simplifying, such an employee can be characterized largely by an 'externally-controlled' attitude, as well as strongly selfish and claiming behaviour towards the management and colleagues.

In the habilitation monograph I formulated the following research objectives:

The main objective of the thesis was analysing the connections between the technical culture of an coal mine and automotive company and the employee of 'z' type.

The Application Objective of the thesis was presentation of the employee type 'Z' attitude test method for motivational and recruitment in mining enterprises.

The results of such studies allowed to determine the percentage of the type 'Z' employees in the Polish hard coal mining enterprises (without the Lublin coal basin) and answer the question if they should be particularly motivated to achieve desired attitudes in teamwork. Studies conducted on such a type of an employee are of innovative character and, in my opinion, meet the needs signalled by the management personnel of the Polish mining enterprises. So far, the theorists and practitioners in their research focus particularly on creative and resourceful attitudes among employees on various organisational levels. I decided to focus on the employee who is 'other-directed', enslaved but punitive. Analogically, such an employee exemplifies undesirable features from teamwork point of view – martyrdom and egotism. With regard to the needs of mining enterprises to manage employees I conducted my studies not only to identify such attitudes in mining but also in order to compare them to other technical cultures as

well as determine instruments of their effective management in the Polish hard coal mining enterprises. The method applied is an authorial instrument to measure the increase of features of the type 'Z' employee. ('Z' for Enslave, in publications in the English language I use the term Enslave). I adapted the research survey to the requirements and working conditions of miners.

To meet my objectives I scheduled the following research task:

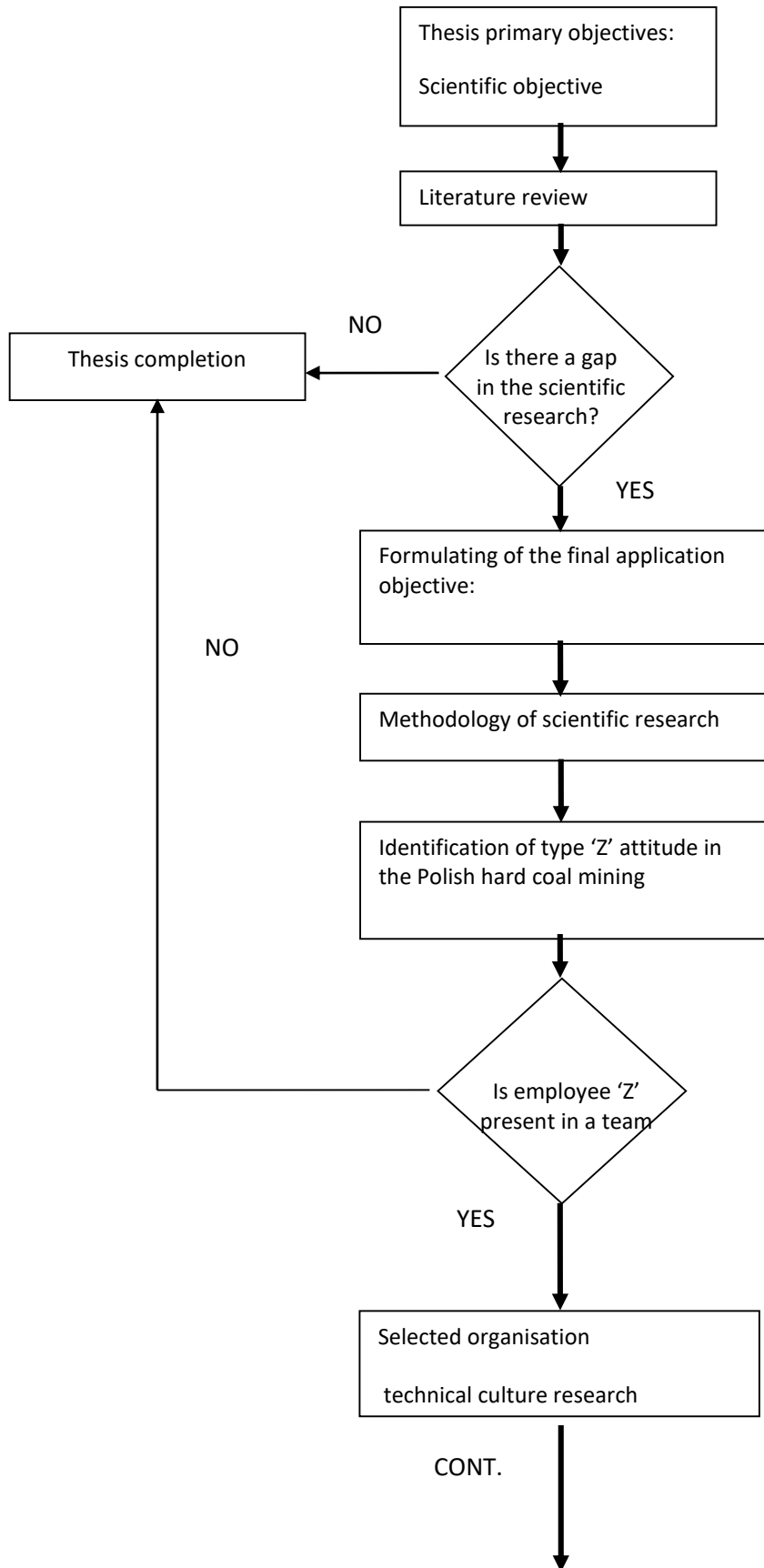
- Analysing technical culture indicators of selected researched organisations and determining differences (organisation is meaning entity), where the basic organisations were – selected Zakład Mechanicznej Przeróbki Węgla Kopalni „X” i Company „X”,
- Analysis of the survey results regarding the employee type 'Z' in various technical cultures, with emphasis on the mining enterprise.
- Research results analysis of various employee attitudes in teamwork with particular emphasis on type 'Z' employee.
- Developing of motivation system for type 'Z' employee in a mining enterprise.

Thesis assumed in the habilitaton was:

These are motivational instruments, thanks to which, the type 'Z' employee is a useful employee in the mining enterprises.

Studies were conducted in several phases. Figure 2 shows the thesis' assumptions and objectives.

For studies of the employee 'Z' identification the author developed a survey no 1 consisting of 17 questions characterising various features of this attitude. Questions were formulated by the author on the basis of literature review performed by the author. (182 number of references).



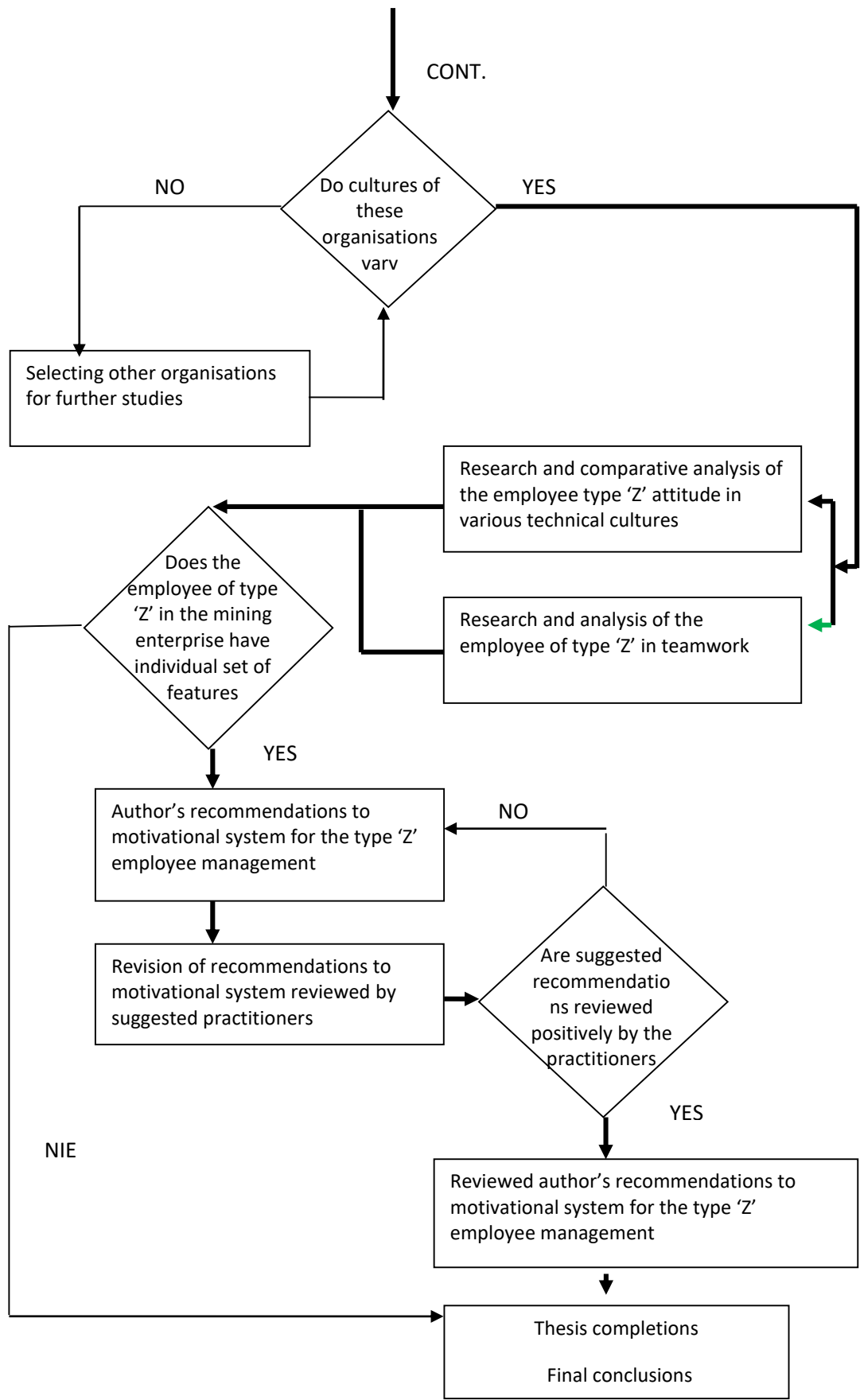


Fig. 2. Organisation chart of thesis' assumptions and objectives (own work)

Questions regarded all features describing factors ‘N’ ‘C’ and ‘E’ which determine the type ‘Z’ employee:

- factor ‘N’ – slavery. Determines dependency upon the system displayed by the individual.
- factor ‘C’ – Martyrdom. Is a measure of everyday feeling of imposed sense of justice and oppression.
- factor ‘E’ – egotism. Mirrors the ‘egotistic nature’ of an employee with an organisation.

Questions in the authorial survey were randomly placed to avoid suggested answer. Simultaneously, the number of questions allowed for detailed identification of presence or absence of ‘passively worker’.

In my thesis I used the method of indicating matrices distance of each of the answers from coal mines or company ‘X’ and the ideal answer matrix.

The ideal answer was the set of features describing the type ‘Z’ employee. The distance measures I treated as a number determining average deviation of a given answer by the survey respondent in relation to the assumed ideal. Thus, I treated that number as unbiased estimator of deviation and indicated according to a pattern I developed. As a result of my studies I determined that the employee with type ‘Z’ features:

- expects creativity from both workplace and an employer,
- in a problem situation seeks support from co-workers and supervisors,
- is unsatisfied from workplace conditions and thinks any change in work does not depend on him/her,
- thinks promotion and work upgrade can be achieved only through connections and good luck,
- thinks he/she can use company’s goods for his/her own benefit.

The number of such employees is higher in technical cultures of high-automatics type 30% in comparison to the compared company ‘X’, 14% in a researched mining

enterprise 'X'. For determining such cultures I used my own model developed on the basis of E. Schein model and my own bibliografhy studies. It may be due to a large volume of procedures in the high-tech organisations and limitation of the level of employees' decisions making in the enterprises using fully-automated production systems. Such attitudes are present in the researched Company 'X', though, new communicative methods, complex employee training and motivation systems have been introduced. That is why using other methods of employee management in the mining enterprise allowing for the employee self-identification in a workplace reduces the percentage of type 'Z' employees and increases flexibility as well as creativity at work.

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In my thesis I introduced the results of the studies on cultural transformations in the organisational culture in the Polish mining enterprises in the years 1986-2011. I demonstrated that despite the strong organisational transformations in the Polish hard coal mining in the nineties of the previous century, the culture of power and red tape is still predominant. Although the beginning of the economic transformations in Poland of the nineties of the XX century brought the increase of the organisational culture focused on an employee, the following years indicated that the traditional culture based on supervising power authority and formal organisational activities was strongly rooted in the mining tradition.

As a result of the comparative studies conducted introduced in my thesis, the qualities that miners in the years 1980-2011 believed in have not significantly changed. The highest priorities are: health and safety at work, remuneration proportionate to the amount of work performed and relation among co-workers. Thus, basing on these results and the qualities miners believe in a motivational system using material and nonmaterial values can be created. For that, based on the results of research organisations culture and miners` moral value it is possible to prepare the motivation system (with materials and non-materials tools) for mining companies.

Based on my own studies I initially formulated a set of nonmaterial motivational instruments which can be implemented for complete, more effective and efficient use of 'Z' type employee/s potential. Further, the effectiveness of these instruments I verified with the use of 'studies of experts' opinion' method among members of the middle and higher management in the mining enterprises. Due to the fact, that in the survey I applied the Likert scale, the studies of experts opinions' compatibility with the small attempt up to 30 opinions were difficult. However I applied the numerical scale and following the literature assumed that intervals between the opinions were equal, so that scale served as the scale of intervals. I used then for the consensus measure both the results arithmetic average as well as the number of the results evaluation median eliminating untypical answers. At the same time I indicated in my thesis that as a measure of consensus we can assume standard deviation or variation coefficient or kurtosis value. In order to fully indicate the number of experts' compatibility I indicated the probability of expected answers occurrence. The highest scoring that is also the most efficient instruments listed by the examined experts were the following recommendations:

- Motivational system should be based on clear rules of reward and punishment including all relevant fields of activity. It should also be clear and comprehensible for all employees regardless of their education and position;
- The scope of an employee duties should be precisely defined and consequently supervised;
- It should always be employee's performance to be precisely evaluated not his/her behaviours or manners as a human being, with the evaluation criteria clearly and objectively set out to eliminate the feeling of injustice among employees and prevent the 'other-directed' attitudes;
- It is a vital issue to realise that the type 'Z' employee needs a strong and respected leader – supervisor, even with a heavy-handed style of management.

To overcome the resistance of the type 'Z' employee towards the new motivational methods I formed several own recommendations based on the previous research on organisational change management (the results were published in the book of 2011

entitled: ‘Change and conflict management in the mining enterprise’). Effectiveness of these recommendations I verified using experts’ opinion survey among the middle and higher staff in the mining enterprise. The highest scores include:

- Provide the employees with the effective internal communication;
- Team workers should first of all be informed of common norms and values using the attributes of a given organisation (strong, autocratic manager, formalised rules of organization’s activities and procedures);
- Rules can become rituals allowing an employee to feel safer (it is particularly advised with ‘other-directed’ employees).

Summing up the features of the ‘Z’ type employee, they do not significantly differ in various technical cultures, though, the biggest threat to task performing failure is their passive attitude and spreading of martyr and egotistic on other employees, essentially the attitude of such an employee towards teamwork. That is why managers’ attitude and choosing right motivational instruments are so important to identify an employee would be effective and efficient for the organisation.

Thus, my habilitation thesis was an outcome of many years of studies in which I focused on the organisational attitudes in the mining enterprises and presented a new authorial method (so far had never been used) of identification and intensity of the features typical for the type ‘Z’ employee in the enterprises. This allowed me to perform the infeasible so far – studies on workers regarding their attitudes in teamwork. Innovative aspect of such insight was confirmed by the latter publications, including these from JCR list.

As I wrote before, the internal factors related to miners' behaviour include work safety. Incorrect behaviour of the employees is the main cause of accidents at work in the Polish hard coal mines (Table 1). Table 1 presents data from 2011-2015, but this percentage structure was also valid in previous years (Main Statistical Office).

Table 1. Percentage share of the prevailing causes of accidents at work in hard coal mines in 2011-2015

Group of causes	2011	2012	2013	2014	2015
incorrect behaviour of an employee	55.66%	53.56%	50.32%	52.48%	52.42%
incorrect arbitrary behaviour of the employee	8.93%	10.08%	11.18%	11.51%	10.69%
incorrect general organization of work	6.61%	7.66%	8.88%	8.43%	7.63%
lack or incorrect use of a material resources	7.68%	6.84%	7.61%	8.64%	7.97%
inadequate condition of material resources	7.49%	7.90%	7.61%	7.76%	7.94%
incorrect general organization of a workplace	7.05%	7.61%	8.11%	7.89%	6.72%

Source: Data of GUS

Therefore, in the years 2009-2013 I conducted research on the multi-faceted perception of security in Polish hard coal mines. These included primarily the identification of such behaviour of miners that had a bearing on the state of safety in the mines. The research was conducted among underground workers in hard coal mines in the Silesia province. 315 questionnaires were collected. The results of these studies have been presented in publications dated 2009, 2010 and 2013: Corporate identity and safety as a multi-aspect value (2009), Security as a value in the organizational identity of a company (2010), Security in organizational identity of enterprises as part of the value system (2013).

It should be noted that research into work safety in hard coal mines was also prompted by previous research conducted with engineer Małgorzata Wyganowska, PhD, where we defined a set of the most desirable behaviours among miners from hard coal mines in Poland (Figure 3).

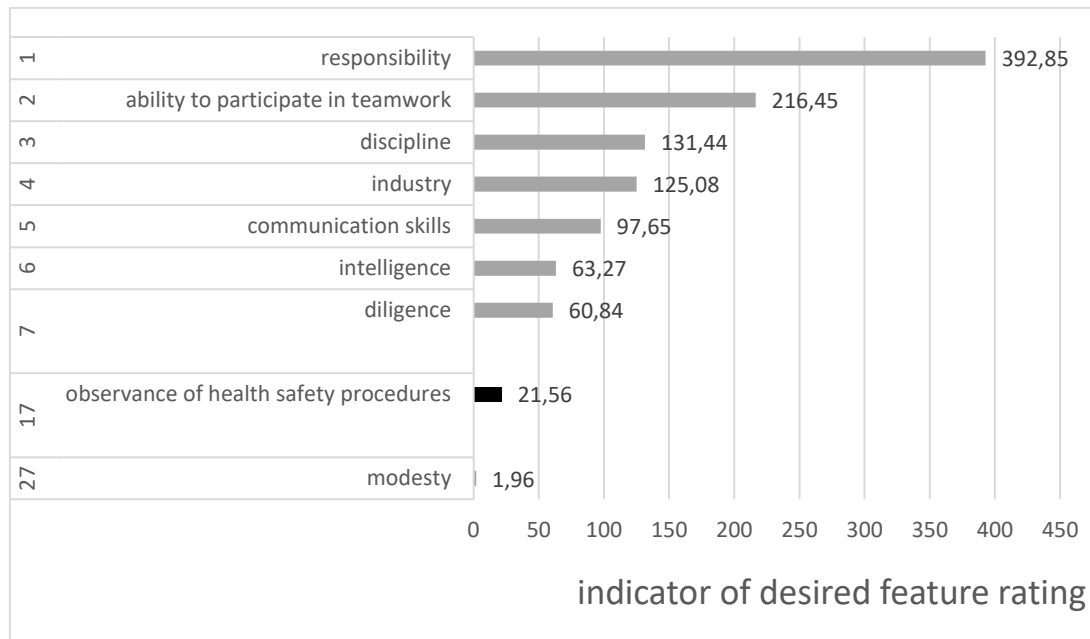


Fig. 3. Observance of health and safety regulations in the hierarchy of desirable behaviours among miners from hard coal mines in Poland (own research)

The research involved representatives of the middle mining staff. The features assessed in the survey were first distinguished on the basis of preliminary surveys (expert opinion surveys). Then, the research survey included desirable features that the first group of respondents considered the most important. Each of the respondents had to choose 8 most important features according to them, while grading them from 8 to 1. 100 questionnaires were collected with 27 features proposed in the survey. The rating indicator contained both the average rating and the frequency of the selected feature. Observance of health and safety regulations was ranked 17th with only 21.56 points, when the highest index reached 392.85. The result is worrying all the more because the respondents were representatives of the middle mining staff, which is the main source of information and behaviour patterns for miners.

A significant rate of incorrect behaviour among miners as the cause of accidents in the mines (Table 1) prompted me to answer the question: Does the identified ‘Z’ type employee show other behaviour than other miners in relation to compliance with health and safety regulations? In a publication called ‘*Employee attitudes to work safety in Poland's coal mining companies*’ (2017, IF 0.300), I presented the results of these analyzes, which were only part of a larger study conducted with engineers Anna

Manowska, PhD and Małgorzata Wyganowska, PhD. In that publication, I presented a different way of calculating the distance of responses from the model answer (no 'Z' employee characteristics). The new mathematical tool allowed to evaluate and rank, from none to the strongest feature, any answer in the research questionnaire (e.g. in question no. 17, values from 0 to 6 were assigned). Such correctness of the response increased the accuracy of identification of that group of employees, which is the biggest threat to health and safety in hard coal mines. Using the Mahalanobis distance, I confirmed the results contained in the habilitation monograph (with another research group of 213 questionnaires, a similar percentage of miners with 'Z' features was obtained). I also showed that such workers demonstrate a different attitude than others in compliance with the health and safety regulations or in dangerous situations. Therefore, according to the research, the identification of such employees is necessary not only to determine and choose tools for motivation or communication, but also, and perhaps above all, to build a desirable security culture in Polish hard coal mines.

The results of these studies have contributed to the search for effective tools to improve the safety management in miners. That resulted, among others, in scientific publications: *'Construction of a behavioural health and safety audit card for selected positions in a mining company'* (2016), *'Behavioural audit as an element of positive motivation in managing occupational health and safety'* (2016). In those publications, I presented the possibility of applying the behavioural audit method to specific working conditions in a hard coal mine with an example a haulage conveyor belt station operator.

The next internal factor I paid attention to in my research was the organizational aspect of teamwork. This was partly due to the results of the research on desirable characteristics of an employee in a hard coal mine presented in Fig. 3. They indicate that teamwork is the second most important competence. This is confirmed by the results of literature research on values professed among Polish miners, presented in my habilitation monograph.

At present, basic foreman brigades are distinguished in the organizational structure of the mines. Their task is to carry out mining in a wall or in a corridor. The brigade consists of a front miner, harvester operator and a builder. The front miner is the head of a brigade, who acts as a direct superior and is responsible for the team. Transport and

storage brigades are units that cooperate with the front brigade (sometimes known as the wall brigade). The task of the storage brigade is to provide efficient hauling off the output from the excavation site. The transport brigade is responsible for the maintenance of machinery and transport equipment, as well as for all logistics tasks related to transportation of materials, output and people to and from the excavation site. A front miner is the head of a transport brigade, just like in a front brigade. On the other hand, the storage brigade is lead by a shift steiger, who is also superior to the other brigades. He is responsible for the execution of production tasks and the safety of people and machines in the work area.

In Polish mining, it is also possible to distinguish types of work teams according to their position and assigned tasks (*'Identification of employee attitudes...'*, 2012):

- multi-specialized work brigades,
- multi-specialized position brigades.

The first type includes a team of employees who are accounted for by the superior from the implementation of tasks and designated goals. The manager's tasks include organizing works in time and space and providing all means to carry out tasks.

The second type are teams in which the employee is accounted for from the performance of assigned tasks at a given workplace and is accounted for individually according to the efficiency and effectiveness of work.

In hard coal mines, the creation of task teams based on project teams is also used. They can be divided into four groups (*'Identification of employee attitudes...'*, 2012):

- production teams - they conduct works that affect the production capacity, such as: level construction, field or wall activation, construction or modernization of the shaft, etc.,
- liquidation teams - perform activities related to the liquidation of a wall or exploitation field,
- infrastructure teams – introduce improvements in both technical and managerial aspects of the mine functionalities, e.g. modernization of the ICT network, introduction of the controlling system, modernization of the baths, etc.,

- special teams - perform activities related to the purchase or lease of production equipment - harvesters or housings.

Therefore teams, or just employee groups, are a common form of work organization in hard coal mines in Poland.

Therefore, the subject of my research was also to determine the behaviour of ‘Z’ type employees from mining enterprises in terms of teamwork. Individuals with the characteristics of a ‘Z’ type employee demonstrate a different attitude in that type of work than other miners. The performance of the teams in which they work and their achievements are less important than their individual work. Nevertheless, the whole team is responsible for failures at work rather than its members as individuals. That information is particularly important for the manager when entrusting individual tasks to members of the task force.

In my research, I also introduced my own method of selecting and assessing an employee for work in a given team. For this purpose I used a desirable competence profile of a mining survey team member developed by me on the basis of previous research conducted in one of the KW S.A. (currently PGG S.A.) mines, as well as designated competence profiles of the above mentioned employees. By measuring the distance vectors between the desired team competencies and the individual competences of an employee, I determined the degree of matching of an individual employee to the desirable characteristics of the team. The proposed method can be used to select miners for any task team, building general, professional and unique competence profiles. In publications, I presented calculations for 8 competences, but their number can be increased. With more features, the choice of an employee is not so obvious and properly carried out avoids the cost of lost opportunities in effective management of miners’ work. In conclusion, the method of measuring the distance between competences proposed by me can be used at various levels of recruitment and assessment of employees in hard coal mines. This is very important in project management, which is currently dynamically developing in mining enterprises.

I presented the results of research on the behaviour of miners in relation to teamwork in the following publications: *‘A competence profile of the X mine survey team in the*

light of the desirable characteristics of a member of a mining company team' (2013) and *'Selected employee attitude in the context of team behaviour based on an example of Polish hard coal mining enterprises'* (2016).

In the years 2015-2017, my research was focused not only on searching for characteristics or behaviour of miners, but also on identifying organizational internal factors affecting effectiveness of their work. The effects of that research were included, inter alia, in publications: *'Reasons for problems in the period 1988-2014'* (2016, Impact Factor 2.618), *'Selected sources of crisis and repair ideas for Polish coal mines'* (2016, monograph). These studies are a contribution to the ongoing discussion on the direction of the necessary restructuring of the hard coal mining industry in Poland. These publications present a critical analysis of the structural and organizational changes in the Polish hard coal mining in 1989-2015 and the restructuring processes carried out until 2016. They draw attention to the correlation between the miners' work performance, the use of available material resources (e.g. wall equipment), accessibility of the mining system or between the daily work time and the efficiency of coal mining. As part of the research into the organization of miners' work, while looking for sources of efficiency gains in this area, I conducted in-depth analyzes and surveys of miners' working time on a daily, monthly or annual basis (*'Selected sources of crisis ...'*, 2016). The daily working time in hard coal mines in Poland (at the employer's disposal) is 7.5 hours (with shortening of the working time to 6 hours in case of unfavourable working conditions), calculated from the underground descent to the surface ascent. Sometimes the time to reach a wall or excavation site reduces the effective working time to 4 hours and, in extreme cases, even to 2 hours. Due to the occurring threats (e.g. methane) in walls, breaks are applied as a prevention measure (mining shift - shift without extraction - mining shift). Such a solution, even though it helps to improve security, worsens the efficiency output of a site. It should be noted here that in the majority of Polish mines, the remuneration system means that labour costs are fixed costs. Thus, the working time of miners is an internal factor that can be a source of deterioration (resulting from poor management), as well as improvement of work organization efficiency in a mine. Miners' working time is just one of many organizational internal factors to be taken into

account in order to increase the efficiency of hard coal mines, especially in the process of their restructuring both in the macro and micro economic scale.

To sum up, the presented research on internal factors of miners' work shows that skilful management of miners, their attitudes, behaviour in task teams and effective use of working time gives an opportunity to improve efficiency in the organizational, economic and safety management in hard coal mines.

5. Discussion of the remaining research and scientific achievements

a) Remaining research and scientific activities

Management and development of non-productive assets in restructured hard coal mines, particularly in post-mining facilities

Following the dissertation thesis, my interests concerned also the issues of mining organisation and economics within the area of management and revitalisation of unproductive estate of the restructured hard coal mines, in particular, mining objects. Several state and foreign works (in the English language) scientific publications (including among others: *‘Development of post-mining assets – possibilities and obstacles’*, *‘Working class housing estate and their cultural and touristic Potential in the Upper-Silesia region.’*, *‘Recycling’ of the post-mining wastes - the element to improve the quality of management – case studies (conference of WoS, 2017)* included in the index attachment no 3. Those publications described the use of post-mining objects to run effective and efficient business activity, for example geo-touristic.

Change management in emergency situations in a mining company

In 2010 I was an author and editor of several chapters of post-conference monograph entitled: *‘Resourceful attitudes in crisis situations’* The monograph concerned issues from the field of mining and geology as well as mining enterprise management.

While in 2011, in the book published together with dr inż. Jacek Korski and dr inż. Małgorzata Wyganowska (*Management of changes and conflicts in mining enterprises*), I focused on the issues concerning change management in the organisational culture in respect of the crisis situation in the mining enterprise. In this publication we draw attention to the importance of human factor in the effective management of the mining enterprise. As it is well-known from the national and international research, the imperfect staff management system has a negative impact on

the employees' motivation decreasing their loyalty, morals which results in stress and fear increase. Such attitudes contribute to the occurrence of problematic issues and further conflicts. The uncertainty of the future, turbulent environment as well as mistakes in the process of implementing changes result in the employees feeling constant instability and lack of further perspective.

In the publication we stress the importance of creating a desired organisational culture (that part of the publication is my own contribution) in the Polish hard coal mines, because the employees expect the sense of identification belonging to the organisation. Lack of commitment to the organisation results in underperformance at work on so called 'internal notice'. It was the publication I was granted in 2012 the Chancellor's Reward of the Silesian University of Technology for academic achievement. In 2017, the research in the field of crisis management resulted in two international projects ('*Crisis management in border areas*', '*Crisis management in urban areas*').

Economic and organizational aspects of human resources management in restructured hard coal mines in Poland

In the years 2010-2012 I conducted studies on employee's attitudes in mining in the aspects of the sense of identity with the strategic mission of the enterprises they work for. I studied if they are well-informed about the mission and if there is a place in these missions for miners' security. As a result of those I concluded the following:

- For the employees of KHW SA (Katowicki Holding Węglowy SA, currently joined with PGG SA) work security and the increasing value of their company on the market were the most important factors.
- For the employees of KW SA (Kompania Węglowa SA, currently PGG SA) the most important direction were their company stability and development, product quality and relations with clients, next security and modern company management.

- For respondents from JSW SA (Jastrzębska Spółka Węglowa SA) the most important part of the strategic mission was ‘providing Clients with the highest quality products’ and also considering their stakeholders expectations.

In my research I identified gaps in the companies’ missions that would bring employees together and constitute their common goal. Most of the researched employee, regardless of the company, answered that it would be a descent remuneration for work. They appreciated development, use of competence but claimed that it is one-sided perception of an employee from the employer’s point of view. They also stressed the importance of motivational instruments. As a consequence of my research I published the following work: ‘*Company’s mission – a guideline to organisational identity management*’ (2011).

My research of the years 2015-2017, conducted together with dr inż. Jacek Korski dr inż. Anna Manowska, dr inż. Małgorzata Wyganowska focused on the organisational and economical aspects of human resource management in the restructured Polish mining enterprises. The results of these studies I presented among others in the following publications: ‘Departures of employees from hard coal mines in 1993-2012’ (2014) *Assessment of competitive ability of the Polish hard coal mining in the light of historical data* (2016), *Economic and social aspects of restructuring Polish coal mining: Focusing on Poland and the EU* (2017, Impact Factor 2,618).

The result of many years of own research on organizational behaviour in Polish hard coal mines was published in an independent academic textbook (as a monograph) used to enrich the didactic classes at the Faculty of Mining and Geology of the Silesian University of Technology: ‘*Selected issues of organizational behaviour. Workbook*’ (2016).

b) Organisational and scientific output

Since 2009 I have been cooperating with the Institute of Mining Engineering and Security at the Technical University, Faculty of Mining and Geology in Ostrava. Our cooperation resulted in my lectures (29 hours of lecture) in the English language during four stays of ERASMUS program (in 2010, 2012, 2013 and 2014). The lectures discussed organisational identity issues and employee attitudes creation with respect to work safety in the Polish hard coal enterprises.

The consequence of further studies in these fields was my cooperation with the Department of Security Engineering VSB-TU, as a task coordinator on behalf of The Silesian University of Technology, team „Safety” as part of international consortium Progres 3. The result of this active cooperation is my participation the Project EUROP II: participation in 4 international workshops, 3 meetings of the International research and didactic team in higher schools from Cz, Sk, Pl and 6 applications for international project funding where I was appointed a project leader (2 recent projects in the progress of evaluation). Within my cooperation with Progres 3 I gave 5 lectures in 2015.

In 2016 I attended 5 day training at the University of Mining and Geology 'St. Ivan Rilski', Sofia, Bulgaria, where I presented my research results.

As part of the industrial cooperation I was a leader of 2 projects NB and co-author in the following 4 and 1 service related research. They resulted in 2 construction implementations and 2 application of practical product use. Besides this, I led two statutory research, in 5 of them I was the leader of the research objective and a co-author in 15.

In the period of 1998 to 2015 I was a member of the Organisational Committee (since 2009 Head of that Committee) periodical scientific conference taking place at the Faculty of Mining and Geology at my parental Department. There have always been national publications as an outcome of such conferences (monographs and articles reviewed in magazines).

Since 2011 I have been cooperating with *Przegląd Górniczy*, since 2016 with *Wiadomości Górnicze*, since with Polish political science yearbook where I have been a reviewer of more than 40 scientific articles. These journals have been indexing in JCR. In the years 2015-2017 I was a reviewer of 6 articles from Web of Science list: *Journal Human Resource Management*, *Sustainable Cities and Society*, *Resources Policy*.

For my scientific achievements, I was granted twice Chancellor of the Silesian University Reward.

Concurrently, throughout the entire period of my didactic work I have been a highly evaluated academic teacher both by the students (one of the highest notes in academic end of term evaluation) as well as my co-workers. I developed, started and was the leader of the 2 post-graduate studies editions in the field of human resource for engineers. In 2017 I was invited as a lecturer to the Summer School of Safety Culture at the Faculty of Safety Engineering in Ostrava (10.07.-14.07.2017). In September 2017 I conducted the Summer School of Faculty of Mining and Geology Silesian University of Technology as part of a project with funds CEEPUS.

6. Summary

To sum up, my research and scientific output consists of 91 publications, (27 independent), including 4 publications from ISI Master Journal (total Impact Factor 5,676). Among my publications there are 6 monographs, 1 of them under my scientific edition, 1 independent and 1 independent monography based textbook. At the same time I published 24 monograph chapters, 16 of them independent. I have 4 publications in the reviewed materials of from the international conferences included at Web of Science (table 2).

The results of my studies were presented during 15 international conferences , including 4 independent and 29 national out of which 11 independent (table 3).

Table 2. Summary list of scientific publications

Item	Before obtaining a PhD degree	After obtaining a PhD degree	Total
Scientific publications in journals included in the Journal Citation Reports database (including IF WoS)	0	31 (4)	31 (4 individual)
Scientific publications in international and domestic magazines other than those in the JCR database (including English)	5	21 (7)	26 (5 individual)
Monographs	1	5	6 (2 individual)
Chapters in monographs	5	19	24 (16 individual)
List of publications in peer-reviewed materials from international conferences, included in the Web of Science	0	4 ¹	4
Points according to Ministry of Science and Higher Education	45	588	633
Total (number of publications)	11	80	91 (27 individual)

¹ 3 from 2017 still in evaluation

Table 3. A summary list of papers at domestic and international conferences

Item	Before obtaining a PhD degree	After obtaining a PhD degree	Total
Papers at domestic conferences	11	18	29 (11 individual)
Papers at international conferences	0	15	15 (4 individual)
Total	11	33	44 (15 individual)

Table 4. A summary list of participation in projects and scientific works

Item	Before obtaining a PhD degree	After obtaining a PhD degree	Total
Management of domestic and international projects and participation in such projects	1 (1 ²)	5 (3 ³)	6
NB works commissioned by industry (including management)	0	6 (2)	6
Statutory and own BK/BW work (including management)	4 (3 ⁴)	19 (5 ⁵)	23
Finished original designs, constructional and technological achievements	0	4 ⁶	4

Management of international and national research projects as well as participating in such projects - **35**. Overall as a leader, co-author and co-researcher I participated in: **1** structural project Operative Program Intelligent Development NCBiR (leader of the research objective), **4** international projects (in 2 of them task coordinator), **1** national research project (leader of the research objective), **6** scientific and research works with co-operation with industry (in 2 of them research head) as well as **23** statutory research BK/BW (in 2 of them project management, in 6 management of research objective). As a result of research with industrial cooperation I am a co-

² management of a research task

³ including 1 case of management of a research task

⁴ including 2 cases of management of a research task

⁵ including 4 cases of management of a research task

⁶ including 2 implementations and 2 product applications

author of 4 executed original project achievements, constructional and technological (table 4).

There are Indicators of scientific achievements in the table 5.

Table 5. Indicators of scientific achievements

Item	Before obtaining a PhD degree	After obtaining a PhD degree	Total
Impact Factor	0	5,676	5,676
Number of citations according to WoS database	0	3	3
Hirsch index according to WoS database	0	1	1
Number of citations according to JCR database	0	16	16
Hirsch index according to JCR database	0	2	2
Number of citations according to Publish and Perish database	0	65	65
Hirsch index according to Publish and Perish database	0	5	5

Definitely, most of my scientific output originated after having been granted a scientific degree of doctor.

Kateryna Tobin-Foolenik