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Multiple Correspondence Analysis in the Study of Remuneration Fairness: Conclusions for Energy Companies—Case Study of Poland

Agnieszka Barczak [1,*], Natalia Marska-Dzioba [2], Tomasz Rostkowski [3] and Dorota Rozmus [4]

[1] Department of System Analysis and Marketing, Faculty of Economics, West Pomeranian University of Technology in Szczecin, ul. Janickiego 31, 71-270 Szczecin, Poland
[2] Institute of Economics and Finance, University of Szczecin, ul. A. Mickiewicza 64, 71-101 Szczecin, Poland; natalia.marska-dzioba@usz.edu.pl
[3] Warsaw School of Economics, Collegium of Business Administration, Human Capital Institute, al. Niepodległości 162, 02-554 Warszawa, Poland; tomasz.rostkowski@sgh.waw.pl
[4] Department of Economic and Financial Analysis, Faculty of Finances, University of Economics in Katowice, ul. Bogucicka 3a, 40-287 Katowice, Poland; dorota.rozmus@ue.katowice.pl
* Correspondence: agnieszka-barczak@zut.edu.pl

Abstract: Finding a fair system of rewarding employees in energy companies and its influence on their motivation to perform their duties is a problem faced by many economic entities. Therefore, the aim of the article is to initially direct further research, taking into account the basic characteristics of employees such as age, gender and level of education, in order to verify whether and to what extent it is necessary to dedicate the communication of the remuneration system to the needs of selected groups. Multiple correspondence analysis was used to analyse the data obtained from the questionnaires, examining the subjective evaluation of professional remuneration with regard to age, gender and level of education of the respondents in energy companies. The results obtained indicate that all enumerated features have an impact on the perception of work remuneration systems. It is also possible to adjust the applied remuneration solutions and the methods and content of messages to particular groups of employees of energy companies.

Keywords: employees in energy companies; multiple correspondence analysis; labour economics; issues of labour market in energy companies

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1. Introduction

The energy sector in Poland is an important element of the economy, employing over 100,000 people. Due to the specificity of the sector, men with technical education, both higher and secondary, and with relatively long work experience, dominate in key positions. The sector is currently undergoing dynamic development and new challenges, e.g., related to the need to implement solutions compliant with the guidelines of sustainable development of the economy, which will certainly influence the creation of new, important and ambitious challenges. Employees of the sector will have to face these challenges in the near future (more on employment in the energy sector in Poland [1–4]).

Differences in the perception of fairness between people with a different education, gender and age fully justify the use of different communication aimed at these groups in many cases. The use of differential remuneration systems is not only incompatible with the law in many countries but also ineffective, as indicated among others by Adams' theory of justice. However, this does not exclude a different way of explaining the adopted solutions to employees. Therefore, the aim of the authors was to work out guidelines that would make it easier for employees in various groups to recognise existing remuneration systems as fair, by means of correct communication referring to the specific needs of these groups of employees.

The J.S. Adams' fairness theory is one of the classic concepts explaining the basic conditions that must be met to be able to motivate employees [5]. Adams' achievement complements significantly the theories based on needs e.g., A. Maslow [6], expectations e.g., V. Vroom [7], the division between hygiene factors and motivational factors [8], and different motivation strategies (X and Y) [9]. These classic theories form the current framework for thinking about motivation, including employee compensation.

In their search for fairness, employees make comparisons of their efforts and outcomes. They also compare the input and results achieved by others. The key to understanding fairness is not only the performed mechanisms but also the way they work and how they are subjectively perceived by individuals. In other words, there is a need not only to provide employees with objective conditions so that existing arrangements in organisations can be considered fair but also to provide employees with a "sense of fairness". Renumeration fairness is a question about ideals and values [10] but also about tools and the way they are used.

The problem of remuneration fairness is, therefore, dealt with by philosophers, psychologists, sociologists, lawyers, economists, and on the ground closest to the practice of organization, management specialists [11] who strive to develop a coherent model based on the achievements of various sciences, which could be used in practice.

The research is also joined by specialists, who look for at least a partial explanation of negative socio-economic phenomena in remuneration issues and analyse possible regulations preventing such problems [12].

The European Social Charter (ESC) adopted by the Council of Europe, indicates that wages should be decent and that work should be paid equally if it is work of equal value [13]. Internal regulations of individual countries use the assumptions adopted in the ESC to regulate the problem of fair treatment of employees in the field of remuneration (for example, in Poland [14]). The document indicates the external and intra-organizational determinants of wage fairness. The first of these relates to the cost of living and, in simple terms, to ensuring that the working person is able to support him or herself. The second takes into account the sense of intra-organizational justice. Many people assume that the sense of justice is determined by the amount of remuneration, but conducted research shows that the amount of earnings is poorly related to employees' attitudes [15]. Currently, one of the popular research topics is the problem of the gender pay gap. The problem of the "wage gap" [16] is examined in relation to top positions [17], race [18], or other issues important to a particular labour market. The literature offers a number of explanations for this phenomenon, such as education, work experience [19], individual preferences and attitudes [20], as well as decisions about having children [21] and whether they have undertaken negotiation [22]. Studies conducted in Poland allow us to believe that remuneration principles in organizations are coherent and consistent, and differences in earned wages, apart from objective factors, may only result from the application of these principles in practice [23]. Apart from the "wage gap", the literature on the subject has also noted a significant problem of gender differentiation in unemployment rates, i.e., income opportunities. Poland, along with Malta and Cyprus, is one of the countries where this problem occurs to a very small extent. However, in Europe, this problem concerns some countries to a significant degree (e.g., Greece, Spain) and, as a result, it can be considered a significant issue at the level of the European Union [24].

The sense of fairness of remuneration is shaped by a variety of factors resulting from elements that create the value of work and are taken into account in the methodology of valuing jobs [25–27]. These factors include, inter alia: education and skills necessary to perform a specific job, time required to perform the job, effort required to perform the task (physical, mental), working conditions (e.g., harmful (noise, dust, etc.)) or burdensome methods of performing tasks (e.g., monotony, monotyping), exposure to legal risk (e.g., corruption proposals), achieved results, responsibility (for the results, entrusted resources, etc.) and the way it is enforced (e.g., risk of losing the job).

Although the applied tools of analysing the value of work in organisations concern determining the relative value of particular positions, roles, tasks and/or competences necessary for their realisation, the comparison with the external environment, including both regional, branch [27] or sector [28] diversity, and the place of particular positions in the organisation's hierarchy [29], is also significant. It concerns both renumeration fairness and competitiveness in the labour market. Some researchers see a relationship between the level of motivation of employees, their performance and income, but this relationship is explained not so much by the fact that available rewards affect the level of motivation but as the result of the pre-existence of commitment (for example, see [30]). Such a view on the problem emphasizes the importance of fairness of remuneration both internally, where the lack of adequate rewards may result in reduced effectiveness and motivation, but also externally, where inadequate remuneration of an employee may result in a change of job. For this reason, the following should also be taken into account: wages in other organisations, including in particular organisations operating in the same labour market (regional and sectoral), a minimum wage, the legal definition of fair renumeration used in a given country, which may be different from "minimum or above minimum", wage disparities and the dynamics of price changes (inflation, deflation), etc. [31].

The selection of appropriate criteria and their relationship to the environment are the first steps in achieving fairness. In the next steps, one should take care of the reliable and consistent application of these criteria, as well as their transparency. Following M. Juchnowicz, it may be said that the essence of fair remuneration should be considered from the perspective of system effectiveness, but also by:

1. Understanding the method of salary determining,
2. Knowing how to increase salary,
3. Performance-payment related mechanisms [11].

At this point it is worth emphasizing that the effectiveness of the remuneration system refers to the goals of the organization, and an effective system is one that causes the goals of the organization to be achieved by combining the interests of employees with the interests of the organization. However, this indicates the need to take into account not only the interests of the organization and the strategy pursued by it but also the interests and opinions of the employees of the organization.

A remuneration system is a very complex set of elements [32]. It includes both non-financial elements (e.g., praise) and financial elements (e.g., basic salaries, bonuses, awards, non-wage benefits), as well as mechanisms of changes made within the whole system and decisions made with regard to particular employees (e.g., increase in basic salaries, granting additional non-wage benefits). The remuneration system is also directly or indirectly related to the whole system of human capital management in the organization (including: recruitment and selection, competence development, promotion, etc.). This multiplicity of elements of the remuneration system creates serious communication problems and makes it even more difficult to obtain an impression of the fairness of both the whole system and its individual elements.

In summary, it can be said that obtaining a sense of justice is contingent upon the fulfilment of basic principles including:

1. Distributive justice—includes criteria that give a sense of receiving a fair outcome,
2. Procedural justice—includes fair treatment during the decision-making process and implementation of decisions,
3. Restorative justice—includes ways to deal with situations where established rules have been violated,
4. Scope of justice—includes principles of opportunities within an organization.

On this basis the sense of justice can be built, i.e., the feeling of obtaining fair results by individuals thanks to establishing fair rules, obeying them, correcting mistakes with regard to a specific pool of benefits and belonging to reliably defined groups of people.

As stated, efficiency means making the reward system subordinate to the goals of the organization, but also to provide a sense of fairness to employees. Both the organisation's goals and the employees' opinions change. In part, the organisation can influence this, but it also has to reckon with external factors such as changes in the labour market or goods and services market, or changes in legislation. In this case, the organisation must adapt to the changes by modifying its remuneration system. On the other hand, employees' opinions also change. They are influenced by personal experiences (both positive and negative), as well as heard stories (not necessarily true) and possessed knowledge (not necessarily consistent with the current state of art). The organisation has an influence on shaping the views of its employees, or at least it can make efforts to explain to employees the reasons for a particular arrangement [33] and why such an arrangement can and should be considered fair. This is because renumeration fairness is not a single state, but rather a combination of many criteria and the need to take into account objective external conditions, subjective opinions and also the shaping of employees' knowledge [34]. In order to determine the various narratives that are helpful in presenting the principles of justice professed by the organization and to examine the opinions of individuals, standard models were developed. They reflect the most common models of perceived justice by employees. They were also given names referring to the names of the Greek gods possessing the qualities of each type of justice (Table 1) [35].

Table 1. Models of perceived justice by employees.

Dominant Criteria of Fairness	Model Name
Final result	Ares
Efficiency and commitment	Apollo
Contribution to results and accountability	Zeus
Amount of work	Hephaestus
Working time	Chronos
Objective needs, e.g., family situation	Demeter
Seniority and position	Hera
Employee evaluation by the organization	Aphrodite
Risk taken and sacrifice made	Prometheus
Balanced impact of all these criteria	Athena

These models are used to develop the specific guidance needed to construct messages that are relevant to individual companies. However, this article is designed to provide an initial orientation for further research. It takes into account the basic characteristics of employees such as age, gender and level of education in order to verify whether and to what extent it is necessary to dedicate the communication of the remuneration system to the needs of individual groups of recipients.

As a result of the analysis of existing theories in the field of employee motivation and their need for equity in their working lives, an eclectic approach was developed to explore and apply the findings in practice. Therefore, the aim of the article is to initially direct further research, taking into account the basic characteristics of employees such as age, gender and level of education in order to verify whether and to what extent it is necessary to dedicate the communication of the remuneration system to the needs of selected groups.

The benefits of increasing pay transparency are proven [36–45]. However, we might also find arguments against increased pay transparency including concerns about employee privacy, exposure of pay-structure inequity and shortcomings [42,45–49] or a risk of companies being charged with pay discrimination [50]. As suggested in some recommendations [51,52], studies of pay communications and pay transparency need to be updated because, since previous large-sample studies, the workforce has become more diverse in terms of gender, education, race, age, religious affiliation and so forth. It is expected that these factors may also influence how employees perceive pay transparency as well as the efforts companies make to communicate pay information. The presented study is one of the first attempts to fill the gap in reference to the impact of gender, age and education.

The nature of the study made it possible to focus on easily-observable criteria, and conclusions were drawn on this basis. In the case of solving individual problems of remuneration systems in companies in the energy sector, it seems necessary to include more detailed research taking into account the opinions of employees differing in terms of less obvious criteria such as type of education, seniority in a particular organisation or even subjective opinions and views [53].

2. Methods

For the preparation of this article, the long-term research output of the team of authors was used (more in [54]), but it was re-examined from the perspective of the newly stated theses. The research was conducted in 2016–2019 and included, among others, qualitative research in the form of individual in-depth interviews (IDIs) and group interviews (FGIs), narrative analyses of the daily press, CATI (Computer Assisted Telephone Interviewing) research (a method for collecting information in quantitative market and public opinion research) on a sample of 1007 people in 2017, panel research, experiments and CAWI research conducted in 2019 on a nationwide representative research panel accredited by the PKJPA (Programme for the Protection of the Quality of Interviewers' Work) and ESOMAR (European Society for Opinion and Marketing Research). The study was conducted on a sample of 1007 respondents using the CATI technique, and it is a representative sample. The questionnaire survey was undertaken on a representative group of employees of companies in the energy sector. The representative group was selected at the 0.95 significance level from approximately 109,000 people (employment data for the energy sector according to Polish public statistics). The representative sample consisted of 383 persons, but as more results were obtained, all correctly filled sheets were used for the analysis.

The study used qualitative variables describing the analysed phenomena. Correspondence analysis uses qualitative data and is used to examine the structure of relationships between categories of variables. Multiple correspondence analysis has been extensively described in the literature [55–61], the methodology has already been presented in the paper [62,63]).

3. Empirical Results

For the purpose of this study, 25 variables characterizing energy company employees' perceptions of renumeration at their current workplace were considered. The variables were analysed in relation to age and education level of the respondents. Before proceeding to the correspondence analysis, it was examined whether the variables were dependent. Since the responses obtained are measured on a nominal scale, the χ^2 Pearson's independence test was used to assess the dependence of the variables. All the variables presented met the required conditions of dependence and were used for further analysis.

Table 2 presents codes for the variables used in the survey.

Table 2. Response codes.

Variable		Response Codes
SEX	Gender of the respondent	1: male 2: female
AGE	Respondent age	1: 8–24 years 2: 25–34 years 3: 35–44 years 4: 45–59 years 5: over 60 years
EDUC	Respondent education	1: basic education 2: vocational education 3: secondary education 4: higher education

Table 2. *Cont.*

	Variable	Response Codes
P1_01	I know the rules of establishing remuneration in my company	1: I strongly disagree 2: I rather disagree 3: I neither agree nor disagree 4: I rather agree 5: I definitely agree
P1_02	My remuneration is adequate to the job I do	
P1_03	My direct supervisor ensures appropriate remuneration for his/her employees	
P1_04	The rules of remuneration in my company are transparent	
P1_05	My current remuneration is fair	
P1_06	I am proud of my work	
P1_07	My job gives me satisfaction	
P1_08	I am willing to undertake additional tasks, apart from the mandatory ones	
P1_09	I find my remuneration satisfactory	
P1_10	I am willing to share my knowledge and experience at work	
P1_11	I feel used at work	
P1_12	Employees who do similar jobs to mine receive similar remuneration to mine	
P1_13	The company I work for cares about its image as an employer also by setting remuneration	
P2	How would you rate your current remuneration?	1: He cannot afford to meet his basic needs, he has to use the help of others 2: Afford the basic needs (i.e., fees, bills, food) 3: Stand for the satisfaction of needs and pleasures 4: To be able to meet the needs and additionally save
P5_1	How important is salary?	1: Definitely irrelevant 2: Rather irrelevant 3: Neither significant or negligible 4: Rather significant 5: Definitely significant
P5_2	How important is job security?	
P5_3	How important is development and promotion opportunities?	
P5_4	How important is independence and doing what you like at work?	
P5_5	How important is atmosphere and contact with people?	
P6_1	What should influence the fact that people in the same position should earn more than others?	1: I strongly disagree 2: I rather disagree 3: I neither agree nor disagree 4: I rather agree 5: I definitely agree
P6_2	What should influence the fact that people in the same position should earn more than others?—they work after hours (stay longer at work)	
P6_3	What should influence the fact that people in the same position should earn more than others?—have more responsibilities than others	
P6_4	What should influence the fact that people in the same position should earn more than others?—they perform more difficult, more important tasks for the company	
P6_5	What should influence the fact that people in the same position should earn more than others?—are more often praised by superiors	
P6_6	What should influence the fact that people in the same position should earn more than others?—they have more experience; they have more seniority	

The conducted independence χ^2 test indicates that the correlations between the studied variables are statistically significant ($p < 0.0001$).

Since we are interested in the relationships between categories of variables, the correspondence analysis was performed using Burt's matrices. The dimensions of these matrices were as follows: 38 × 38 for gender, 42 × 42 for age ranges and 25 × 25 for education level. It should be noted that only those variables that show correlations with the categories of the gender (SEX), age (AGE) and education (EDUC) were presented graphically. The results obtained are presented in two-dimensional graphs (Figures 1–3). The large number of variables made the originally obtained perceptions maps unreadable. In the article, it was decided to present only the part of the chart that showed the relationships of the EDUC categories (AGE, SEX) in relation to the other variable categories. Based on this, the correlations between the categories of variables were characterized.

Dimension 1, which explains 39% of inertia, polarizes mostly those who strongly agree with a given statement from those who answered "strongly disagree". Dimension 2, explaining 13% of inertia, is unfortunately no longer easily interpretable.

A closer look at the perceptions map shows that both women and men are dominated by attitudes willing to agree with the given statements.

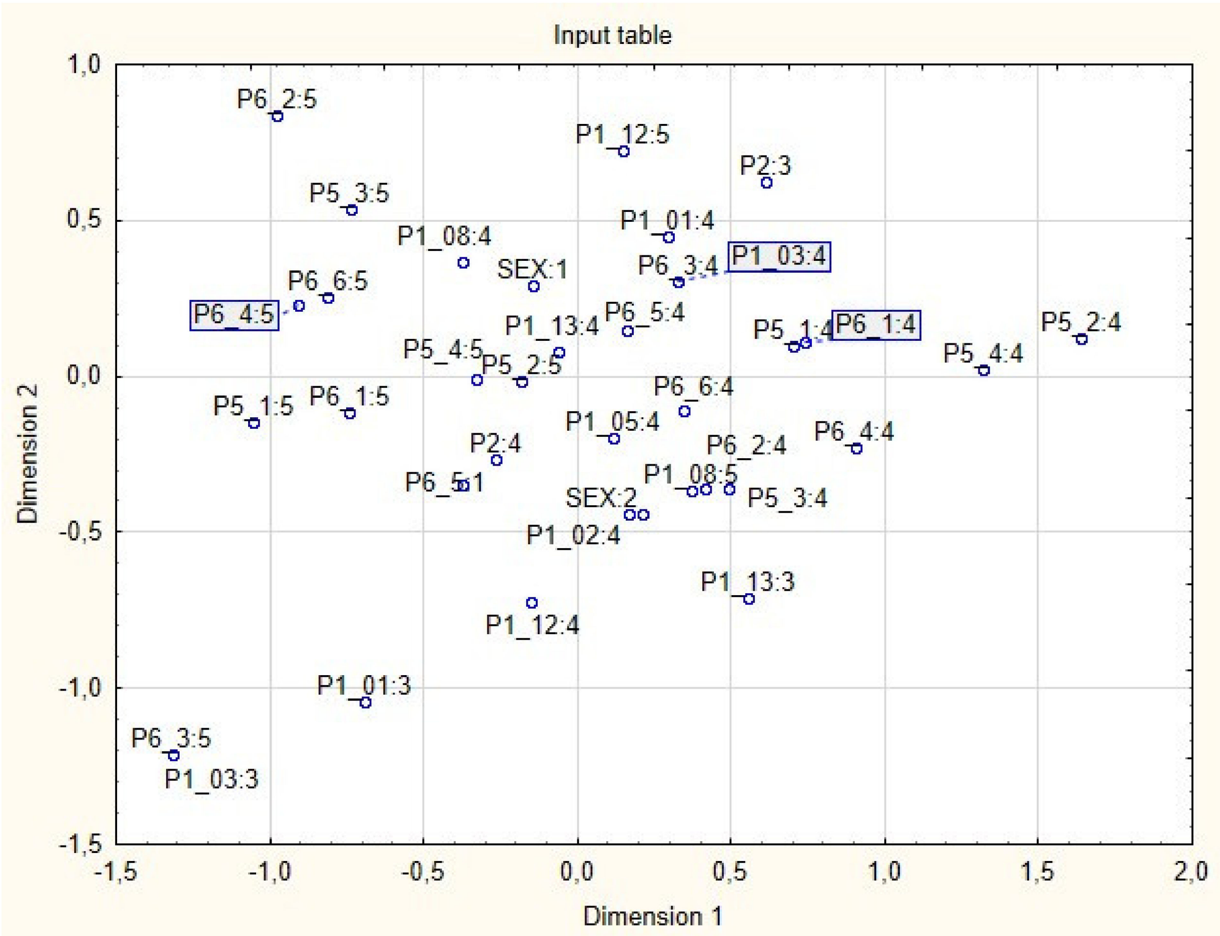

Figure 1. Two-dimensional perception map for the variables gender and subjective evaluation of salary in energy companies.

Men (SEX 1) participating in the survey tend to agree with undertaking additional tasks at work beyond the mandatory ones (P1_08:4). They are also of the opinion that the company they work for tends to take care of its image as an employer by setting salaries (P1_13:4). For men, job security (P5_2:5) and independence and doing what one likes (P5_4:5) are definitely important in the workplace. This group of respondents tends to agree that people in the same job position should earn more than others due to the fact that they are more often praised by their superiors (P6_5:4) (Figure 1).

Respondent women (SEX 2) tend to agree that their remuneration is appropriate for the work they do (P1_02:4), and they agree with undertaking additional tasks at work beyond the mandatory ones (P1_08:5). Female respondents believe that their current salary is fair (P1_05:4). According to women, opportunities for development and promotion are rather important at work (P5_3:4). They tend to agree that people working at the same position should earn more than others if they work after hours (stay longer at work) (P6_2:4) (Figure 1).

A similar situation as in the case of the study of the relationship between SEX and other variables is for the AGE variable. Only dimension 1 is interpretable, it explains 42% of the inertia, and again separates those who completely agree with a given statement from those who absolutely disagree. Dimension 2, explaining 14% of inertia, has no interpretation.

A closer look at the relationships between the categories of variables shows that the respondents from the categories AGE 2, AGE 3, AGE 4 and AGE 5 are unlikely to express the opinion "strongly disagree".

Analysis of the graph in Figure 2 shows that respondents in the age category 24–34 (AGE 2) are unlikely to show close relationships with any of the renumeration grade categories.

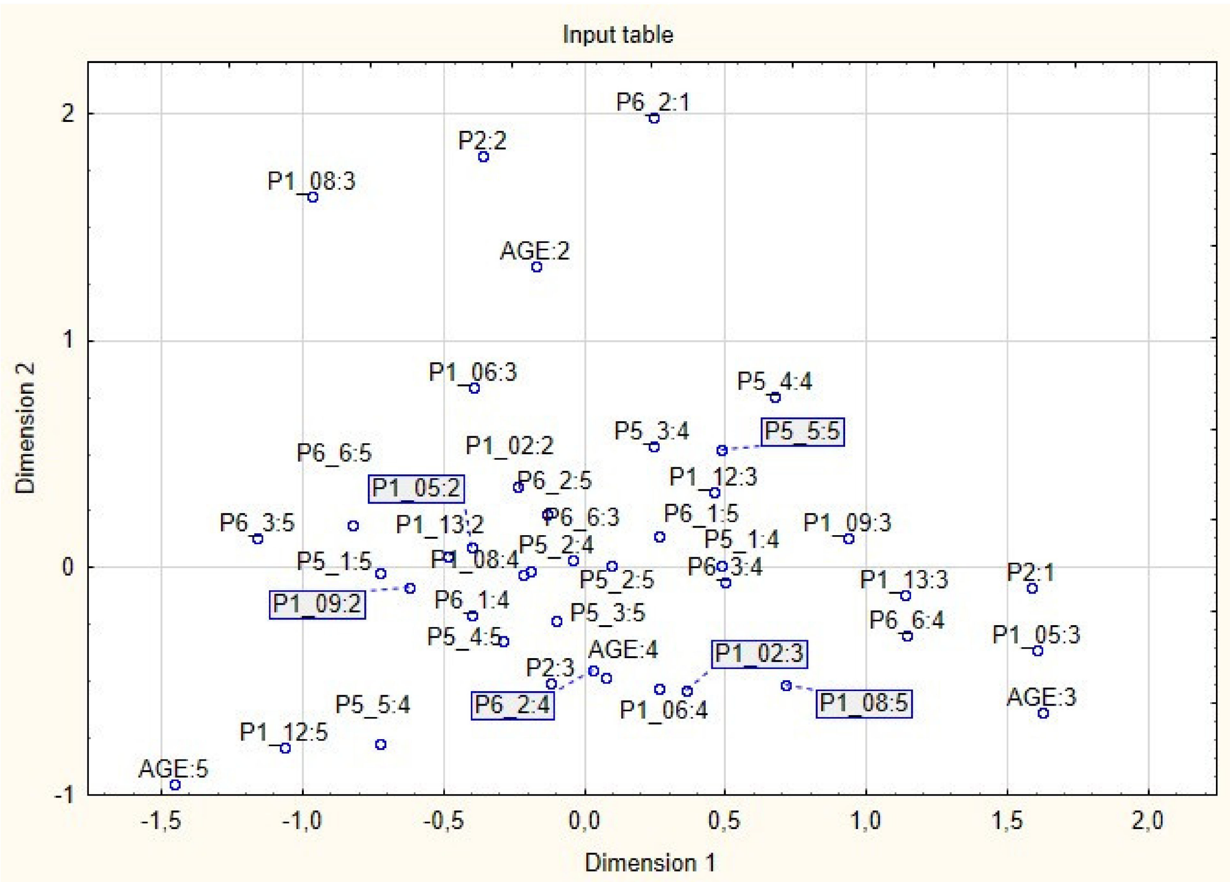

Figure 2. Two-dimensional perception map for the variables age and subjective salary evaluation in energy companies.

People aged 35–44 (AGE 3) do not have an opinion on whether the payment they currently receive is fair (P1_05:3). Respondents in this age group are most likely to agree with the statement that people in the same job position should earn more than others, due to the fact that they have more experience or more seniority (P6_6:4) (Figure 2).

Employees aged 45–59 (AGE 4) tend to agree that people in the same position should earn more than others if they work after hours (stay longer at work) (P6_2:4). This group includes people who believe that the salary they receive allows them to satisfy their needs and pleasures (P2:3). Respondents in this age group are in favour of the view that opportunities for development and promotion are definitely important at work (P5_3:5) as well as independence and doing what one likes (P5_4:5). They do not have an opinion on whether their salary is adequate for the work they do (P1_02:3). They tend to agree with the statement that they are proud of the work they do (P1_06:4) (Figure 2).

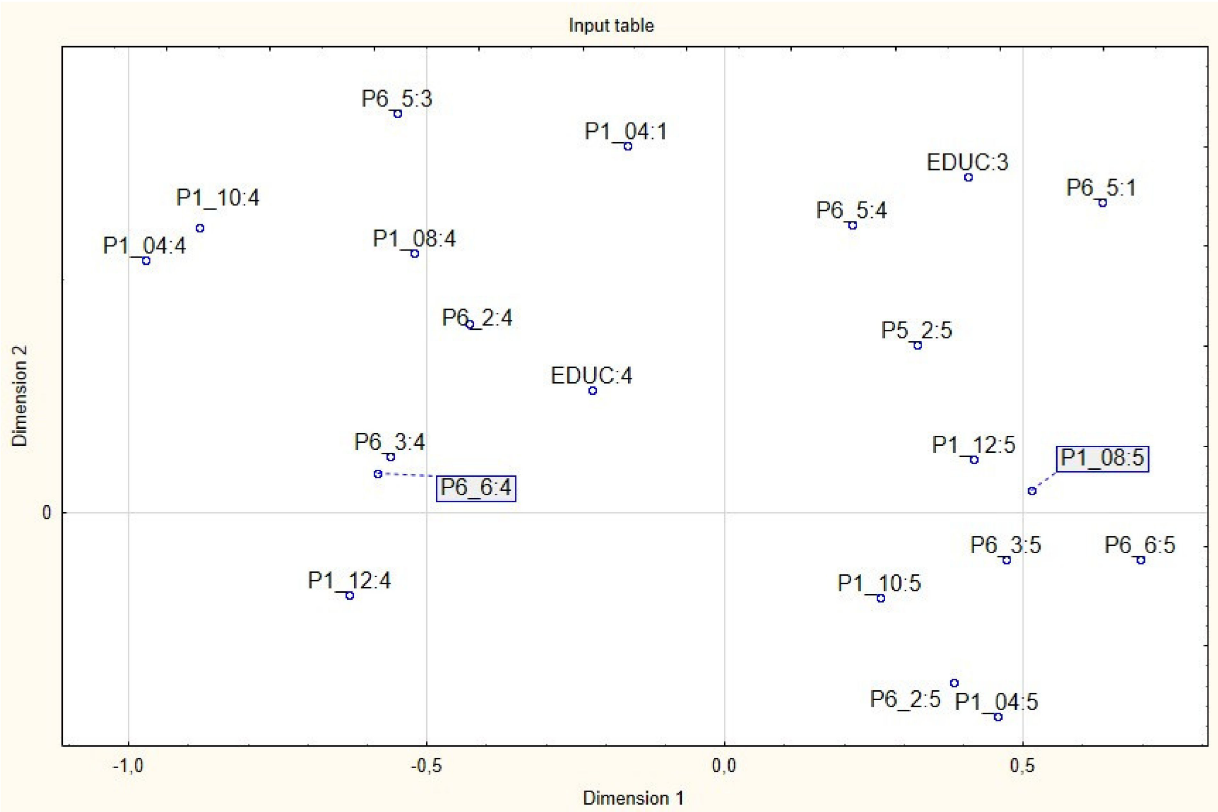

Figure 3. Two-dimensional perception map for the variables education and subjective evaluation of salary in energy companies.

Respondents over the age of 60 (AGE 5) who are economically active are the most likely to strongly agree that workers doing similar work as them are paid similarly (P1_12:5) (Figure 2).

The study of the relationship between EDUC and other variables allowed for the interpretation of both dimensions. Dimension 1, explaining 38% of inertia, as in the case of the relations discussed above, separates the respondents who answered "definitely agree" from those who answered "strongly disagree". Dimension 2, explaining 19% of inertia, is the dimension that differentiates the respondents according to the level of education (from the lowest to the highest).

Relationships between the categories of the EDUC variable and the other variables can only be observed for the categories EDUC 3 and EDUC 4, which tend to express opinions such as "rather agree" or "definitely agree".

Respondents with a vocational education (EDUC 2) tend to disagree with the statement that people in the same position should earn more than others because they are praised more often by their superiors (P6_5:2) (Figure 3).

For those with secondary education (EDUC 3), job security is definitely important at work (P5_2:5). Respondents with a secondary education have a divided opinion on the impact that people in the same position should earn more than others because they are more often praised by their superiors (P6_5:1, P6_5:4). Out of 838 respondents with secondary education, 89 strongly disagree with this statement (Figure 3).

Employees with tertiary education (EDUC 4) are of the opinion that the remuneration policy at their place of employment is not public (P1_04:1). At the same time, they have some belief that people in the same job position should earn more than others if they work after hours (stay longer at work) (P6_2:4) (Figure 3).

4. Conclusions

The research carried out indicated elements that are important for particular groups of people employed in energy companies and that influence the perception of differences in salaries as fair. Men seem to be willing to accept that people highly evaluated by their superiors should earn more. Women are able to accept higher earnings over others if they devote more time to work. This observation seems more relevant in Poland, where the gender pay gap is one of the lowest in Europe. Therefore the explanation of possible differences in payment practices should be particularly clear and transparent for fear of discontent among employees accustomed to higher standards of gender equality than in other developed countries [64].

Middle-aged people, on the other hand, believe that the renumeration gap may be a result of experience and seniority. Slightly older people also agree that workers who work overtime deserve higher wages.

Respondents with relatively low education do not see any reason why people who are valued by their superiors should earn more, while people with higher education also believe that it is fair that time spent at work should influence the amount of remuneration received.

The above shows that it is possible to adjust the applied remuneration solutions and the methods and content of messages to particular groups of employees in energy companies (for more on the problem of remuneration, see inter alia: [65–67]). However, an indirect relation between the criteria of fairness indicated by the respondents and the achieved results is slightly worrying. This may indicate that educational activities aimed at raising awareness of the role of work results in shaping the possibilities of salary increase should be conducted at the national level. The high popularity of university studies, the scope of which is not related to the needs of the labour market in Poland, may also distort the relationship between qualifications and earning opportunities.

The conclusions cited above should be treated only as directional guidelines for practice and outlines for the education system of young people and university students who want to relate to the energy industry in the future. As indicated in the literature gathered for this article, the development of detailed guidelines would be possible after examining the opinions of employees of specific energy companies and applying them to the needs of the organisation, e.g., using the proposed "Olympic" model of narration. As stated above, there is a possibility to at least partially shape employee views on renumeration fairness. The literature points to the need to communicate to employees both the payment system itself and the reasons for particular decisions about it. Actions of this kind could, therefore, increase the effectiveness of remuneration expenditures, and taking into account employees' needs may be helpful in shaping a positive working atmosphere. Based on observations of practice, many problems that are important in other countries, e.g., discrimination due to gender, race or religion for objective reasons, in the case of Poland play a lesser role than in other countries. Therefore, the mutual adjustment of the needs of the organization and the employees seems to be an easier task. According to research conducted in other countries, the problem of inequality in wages between people of different genders or races is much greater. In these countries, the task of developing objective remuneration principles that can be considered fair, and their implementation in organisations, may be more difficult, but the benefits of their application also seem to be higher. Organisations that are able to put in place arrangements that provide employees with a sense of fairness in such a way that there is no question about whether non-substantive criteria such as gender or race are taken into account when setting salary will have a chance of gaining additional employee commitment.

Research shows that there can be significant differences in the perception of fairness of pay in the various employee groups. However, this is not a justification for introducing major changes to the legislation. On the contrary, the existence of laws guaranteeing equal pay without taking into account the gender or age of employees should be considered fully justified in the theory of management and employee remuneration. The conclusions of the research are, therefore, primarily addressed to the practice of applying the law and appropriate methods of communicating the remuneration system. Practitioners should pay more attention than before to the choice of arguments and personalise the information provided to a greater extent. Adapting communication to the needs of particular groups of recipients should result in a broader recognition of the proposed solutions as fair or at least dispel doubts about the possibility of applying unethical and illegal solutions. To sum up, it may be noted that the study was of a nationwide character and, thus, may serve as an introduction for further research. Potentially meaningful further research directions include:

- international comparative research in the area of salary management covering both employee opinions and applied systemic solutions in the area of financial and non-financial remuneration,
- interdisciplinary international research focused on such areas as, e.g., the impact of the applicable law on the development of remuneration systems and the impact of education systems on the remuneration expectations of employees in the sector,
- research for practical purposes—deepening the research taking into account the opinions of employees in sub-sectors, taking into account the views of employees depending on their positions, comparative research of remuneration solutions and methods of communicating remuneration in companies in the sector.

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