

THE WORKERS OPINION ANALYSIS IN THE CONTEXT OF VALUE ENGINEERING

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Abstract

The information in the form of the workers and management staff opinion constitutes one of the most important elements of the organization improvement process by using of value engineering. In the article there research findings in the area of workers and management staff opinion were presented in the context of its applying in order to the enterprise effectiveness increase achieved by unnecessary costs reduction and fulfilling of functional and quality requirements. Traditional quality management tools, the FEMA method and the BOST method, were used in the examinations.

A reliable method of work candidates assessment should include a detailed application forms for admission to work, tests (which will be aimed at selecting the best people from all candidates), and interviews carried out by appropriately trained for this person. Evaluation of results is important for identifying training needs, decisions on salary increases, promotions possible to employees and ensuring adequate feedback information. Managers should always remember about the problem of information from these evaluations, because it is difficult to accurately assess the various aspects of employee skills and competencies for a given position.

Key words: workers opinion, value engineering, analysis, management, BOST.

Classification JEL: M12 – Personnel Management

1. Introduction

Important source of the information about the work, methods and work conditions, as well as determinants of the human work effectiveness, there is not only technological processes analysis, processes of the work, but ahead of it examination of the workers opinion.

The information obtained is used mostly in developing HR strategy, which aims to support the process of solving problems and improving business efficiency. The extent of information, on which decisions are made, include information regarding, inter alia, working conditions, labor relations, production problems, conflict resolution, stress related to the implementation of tasks and their control, managers assess the attitude and the possibility of modifying technology or tasks. While research is the staff opinion can assess, inter alia: the efficiency of organizational processes, communications (information flow), technology, quality issues, the effectiveness of organizational units cooperation, as well as assessment procedures and personnel policy. Processing and data verification from such studies support processes: product and technology development, modification of organizational structures, management of employee teams. This in turn leads to increased efficiency throughout the organization (Potkány, Gejdoš, Šatanová, 2003).

The purpose of the employee survey is to learn their views and assessment of broad issues related primarily to their needs, job, work environment and business. These tests are most often used to assess the level of job satisfaction, the analysis of organizational climate or organizational commitment. The information thus obtained allow to assess the actual state of the analyzed factors, and then allow the formulation of proposals in relation to impact the level of job satisfaction on the effectiveness of employees, teams and entire organizations.

A frequent subject of employee opinion surveys is the organizational climate, namely: communication and information flow, encouraging innovation, professional development, the atmosphere – the openness, conflict, work and involvement, perception of the company by employees. The level of employee engagement is a very important factor that influences

the level of work efficiency of both the individual teams and the entire organization. Employee involvement is multifaceted and is given by: the degree of employees' identification with their employing organization, involvement into the organization and use their knowledge, skills, and competencies to achieve the objectives of the organization. Willingness to participate in employee opinion surveys is also considered as a manifestation of the employees' involvement due to the specific type will express their views on the activities of the organization (Czaja, Rosak-Szyrocka, Rutkowski, 2009). Knowing the level of workers involvement allows establish relevant programs that shape an appropriate level of organizational commitment, and thus – to increase work efficiency and contributing to the creation of value not only for the workers themselves, but for business processes.

Analysis of employee attitudes and behavior identified through employee surveys is an element of value engineering; the idea is to search for new technologies and practices that lead to the reduction of unnecessary costs in complying with the desired functional requirements and quality. Polish businesses before becoming a necessity to meet the requirements of the European market will be forced into buying west patterns of the business activity. In these conditions, insignificantly gain the ability to use such tools, such as value engineering.

Value engineering is an organized effort directed at making the analysis of system functions, equipment, facilities, connections and resources for the purpose of gaining the necessary functions at the lowest life cycle, in accordance with the requirements set, reliably, while maintaining the quality and safety. These organized efforts can be made both by individuals plant inside staff and by management personnel (Mandelbaum, Reed, 2006).

The analysis carried out in the value engineering applies to all areas of business, because the multifaceted analysis of the information coming from employees at all management levels, all departments, allows to obtain a true picture of the organization, which, in turn, through appropriate verification of information obtained allows the action to confront the organization with the opinions and customers requirements and the market (Figure 1). Information obtained in this way presents a particular value for both the recipient (organization), as well as for customers and the market (social value), (Miles, 1972).

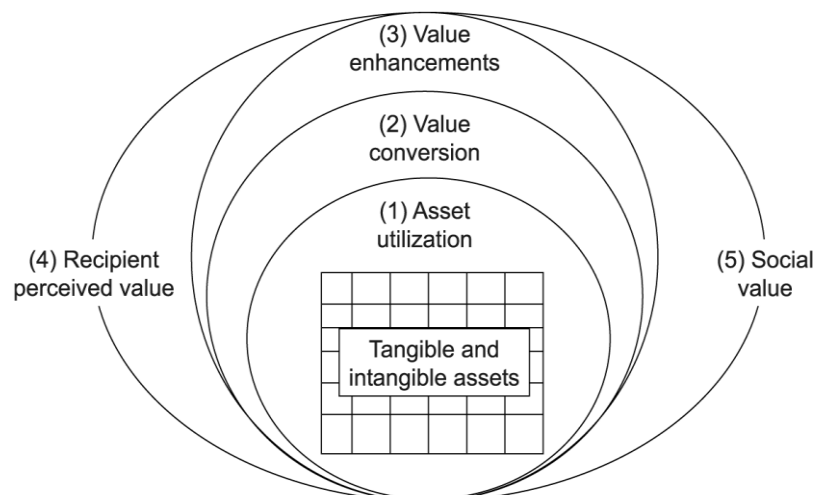


Figure 1: Dimensions of value creation considering core tangible and intangible assets and how well they are utilized in value conversion

Source: Miles, 1972

Examinations of workers opinion, realized mostly in the form of various types of interviews and surveys, allow employees to obtain different levels of workers expression in the organization. In this study, the results presented below, the BOST method and technique of group interview (realized at the meeting, where brainstorming was used for problem analysis, which was human resources management) were applied (Borkowski, Blašková, Hitka, 2009).

2. Characteristics of analyzed company

Company X is an independent production and service unit coming into existence owing to the incorporation of companies, reflecting the organizational structure Arcelor Mittal Steel Poland S.A.

Top of the firm dates back to 1975, when it was founded under the name Main Bulider Service Station, in order to protect the current technical documentation of the replacement of machinery and equipment imports, and prints for photocopying and operation of the Huta Katowice steelworks. In 1999 the company changed its name to Department of Design and Engineering Sp. Ltd., which is based on the basis of functioning at that time in the organizational structures of the Construction Design Office. The new organization took over the entire output, together with highly qualified crew with extensive experience and long tradition. In 2005, analyzed Construction Design Office combined with the company production and service group X, which consists of two large production and service units creating a service engineering plant.

Analyzed company X (Group Service of Department of Mechanical Engineering) has full technical equipment for the implementation of a wide range of turning and machining: Claw, CNC lathes, milling, drilling, drilling – milling machines, machining center, CNC grinding machines, milling machines for machining gears envelope, shaping, and grinder. Analyzed enterprise X is a manufacturing company specialized in the area:

- production and regeneration of spare parts and steel,
- main roads maintenance and repair of specialized technology,
- trade in steel products,
- design and implementation of investment.

The company has modern technical equipment, a broad technological capabilities, efficient management system and experience that enable organizations of all procurement projects for the production, service and repairs. The basic profile of the company X is activity of Department of Mechanical Engineering such as:

- full range of machining, including CNC machine tools,
- cutting, bending, shaping and welding related to the fabrication of steel structures,
- heat and thermo - chemical,
- repair workshop,
- processing rolls,
- additional services such as: receiving research, sharpening of cutting tools and the training of welders.

The company offers, among other things: high quality technical documentation prepared by a design and copy center, supervisions, short lead times, efficient design solutions, providing technical advice.

Different managerial units are active in an examined enterprise. Each section has a manager or head of department, from department budgeting and economic analysis, office organization and quality systems, logistics through an office, office technology, plant design, engineering plant and office renovations to prepare.

3. Human resources characteristics

The characteristics of the analyzed object include such features, as: the gender, the education, the age, the work experience, professional mobility and forms of employing it. Respondents' characteristic of analyzed enterprise was shown below in the form of figures and tables.

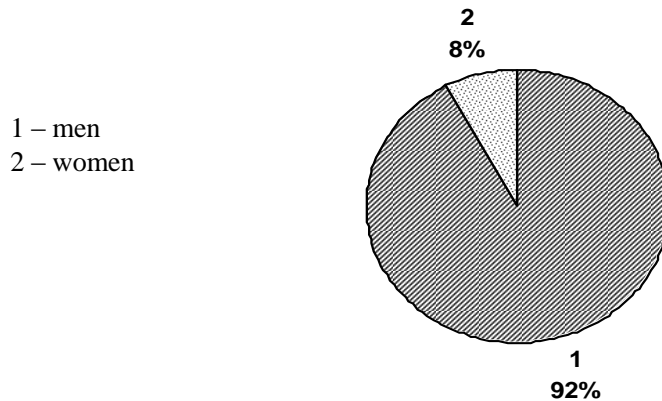


Figure 2: Characteristics of workers' gender in analyzed company (%)

Source: own study

From above data (Figure 2) it results, that 92% respondents are men, however women constitute the 8% of remaining respondents. In Table 1 characteristics of the educating level of workers in the analyzed enterprise was presented.

Table 1: The educating level of workers in the analyzed enterprises

Workers' education	Basic	Vocational	Secondary	Higher
Percentage of workers	0	3.84	57.70	38.46

Source: own study

From analysis of above data it results, that about the 58% of workers have a secondary education, the 38% - have university education, and scarcely the 4% of respondents have the vocational education. Table 2 concerns the age of respondents.

Table 2: The age of workers in analyzed enterprises

Workers' age	till 30 years	31 – 40 years	41 – 45 years	51 – 55 years	56 – 60 years	61 – 65 years	above 65 years
Percentage of workers	4.85	13.39	30.77	15.39	27.00	8.60	0

Source: own study

It results from analysis of presented data (Table 2) that about the 31% of respondents are in age 41 – 45, however the 27% of respondents is between 56 and 60 year of the life. Persons, who didn't finish 30 year of the life, constitute above 9% of all respondents. It is possible to suppose, concluding on the basis of above data, that the considerable part of the crew is in an age bracket

above 40 (above the 80% of the crew). The next characterization of the crew concerns the work experience (Table 3).

Table 3: The work experience of workers in the analyzed enterprises

Work experience	till 5 years	5 – 10	11 – 15	16 – 20	21 – 25	26 – 30	31 – 35	36 – 40	above 40 years
Percentage of workers	0	7.70	11.53	23.07	3.83	11.53	19.23	7.70	15.39

Source: own study

Almost half the crew of the enterprise has the work experience above 15 years of the work. One should emphasize, that the 20% of the crew works already over 30 years, what results from the fact of employing them by the unit, in frames which was organized this enterprise. These data, like data on the job frequency characteristics, confirms that nearly 40% of the crew is workers, who come from an origin company, which was basis of this enterprise appearing. Table 4 shows professional mobility of examined workers.

Table 4: Professional mobility of examined workers

Current employment	First	Second	Third	Fourth	Fifth	Sixth
Percentage of workers	10.50	27.0	34.61	15.39	7.70	4.80

Source: own study

It results from get replies, that the largest per cent of respondents (34%) constitute persons, whose present employment is third. However, not quite a 5% of respondents replied, that present employment is sixth. Information concerning employment forms was shown in the Table 5.

Table 5: Forms of employment in analyzed enterprises

Mode of employment	Normal mode	On the basis of the transfer	Because of better financial conditions
Percentage of workers	73.07	11.54	15.39

Source: own study

The obtained data show, that about 74% of the respondents, who participated BOST study, were employed in normal mode, 15% of respondents were admitted due to better financial conditions, while 11% were employed by way of transfer.

4. Analysis of problems causes in human resource management in the analyzed object

The Ishikawa diagram is a graphical presentation of the interrelation analysis of the reasons that cause a specific problem. This knowledge is necessary to eliminate or reduce the scale of the problem (Borkowski, 2004).

Based on information gathered from the production company X, the main problem is the human resources management – specifying degree of influence different factors groups on appearing of analyzed problem. Factors identified in the following research groups: management, workers, work organization, information managers. The period of research covers the first half of 2008 (January – July). Analysis of these factors was shown in the Figure 3.

During the Ishikawa diagram assessment (Figure 3), it can be observed that the greatest impact on the analyzed problem plays: **management** (30%) and **work organization** (25%). Inadequate cooperation between departments, which is the result of nonconformities, causes conflicts which are occasioned by the new problems, and thus the wrong decisions are taken.

Excessive obligations of workers and supervisors as well as haste makes the working atmosphere is tense, which increases the number of errors, irrelevant decisions.

Owing to incorrectly carried out recruitment and selection of candidates under-qualified staff, without appropriate job experience are hired. The reason is a shortage of qualified personnel properly conducted staff planning system. Therefore, personnel problems, which should be immediately eliminated, arise. So it should be introduced preventive measures, because any oversight and lack of appropriate responses entail additional costs. Lack of adequate incentive system makes workers approach to its tasks with indifference, what decreases as a result a quality of company activity and quality of products and services.

The most important problem, which should be addressed by senior management, is not adequate staff selection and the level of qualification, as well as specific responsibilities. An employee, who clearly will be presented to the division of responsibilities, which will have a clearly defined career path and an adequate incentive system, will be pleased with their work and thus will raise the quality of the company.

In order to improve the method of proper planning staff, their qualifications, as well as how to *motivate employees*, managers should conduct more frequent inspections and constant improvement of skills and qualifications of persons, who are responsible for these processes in the enterprise. Staff qualifications and human resources management improvement will help to improve productivity, creativity, which ultimately will lead to proper work organization and an exemplary management process.

The Pareto-Lorenz diagram is a tool that allows you to detect and identify adverse events with the highest frequency of occurrence or giving the highest costs in the enterprise. Determination of the main reasons of problems appearing will allow in the future taking precautionary steps, which will reduce problems number (Borkowski, 2004). Furthermore, this analysis is applicable in engineering quality, in fact serves to identify the factors, which contribute to eliminate the focus on the business, that creates value in terms of customer requirements or to clean production processes and services (Bytheway, 2007).

Data from the period of the first half of 2008 (January – February) were used for making analysis. During the analyzed period, six different problems' reasons occurred at different intervals, which influenced analyzed problem appearing. Table 6 presents data concerning the main causes of the problem.

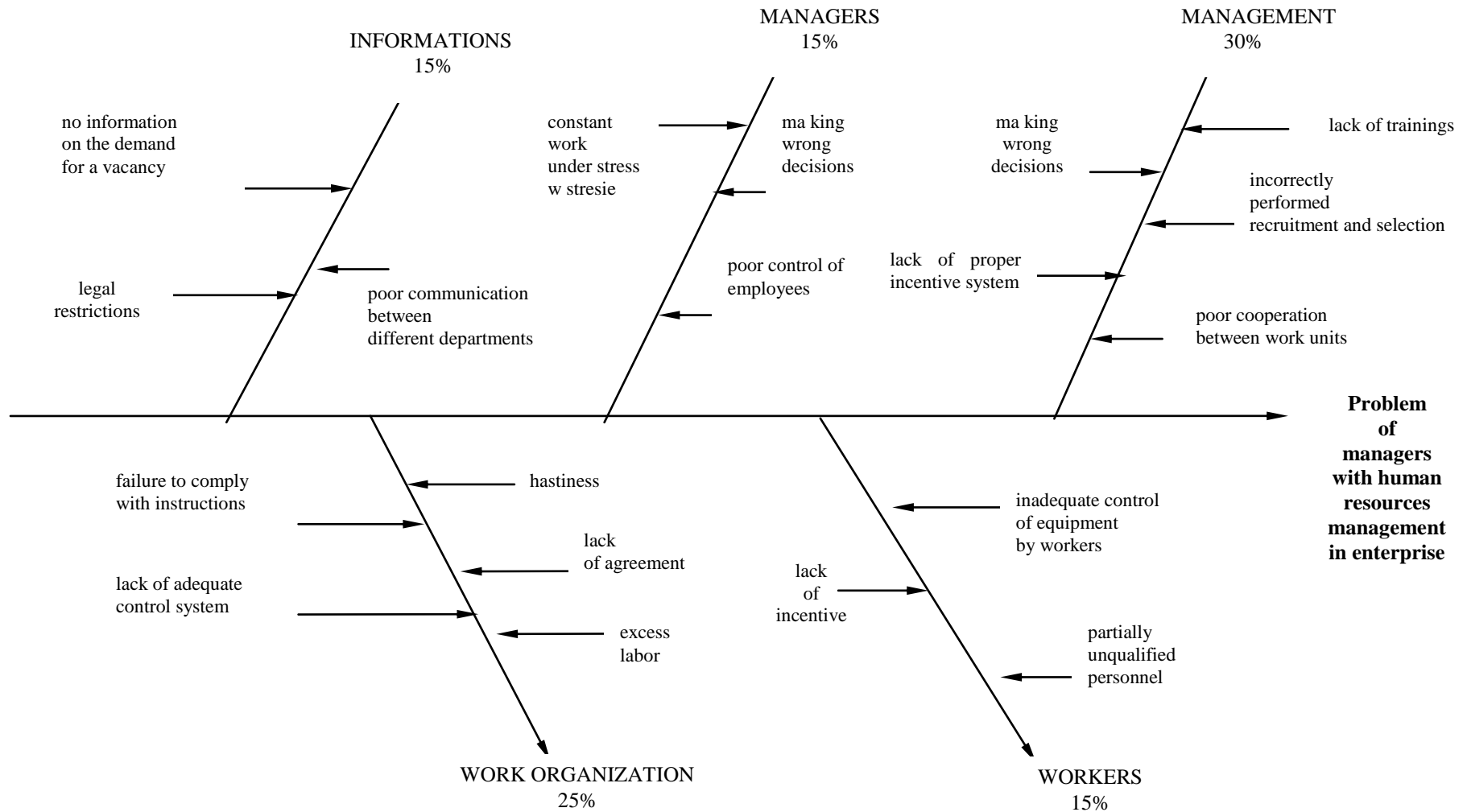


Figure 3: The Ishikawa diagram for problem of human resources management in analyzed enterprise

Source: own study

The division is assigned by qualification after finding the causes and their frequency at the same time, by making the code of nonconformity (reason causing analyzed problem appearing) and assigns them a numbered sequentially (Table 6). Nonconformities were ranked in order of their frequency in the research period in order of problem causes analyzing. Percentage and cumulative percentage of nonconformities were presented in the following table.

Table 6: Analysis of causes structure for management problems in enterprises

Symbol of nonconformity	Name of problem cause	The frequency of appearing	The percentage (%)	The cumulative percentage (%)
N 1	Incentive system	180	29.75	29.75
N 5	Poorly carried out recruitment and selection	130	21.48	51.23
N 3	Poorly carried out recruitment and selection	110	18.19	69.42
N 4	Working under stress	80	13.22	82.64
N 6	Unqualified personnel	65	10.75	93.39
N 2	Lack of adequate control system	40	6.61	100.00

Source: own study

The Pareto-Lorenz diagram was made (Figure 4) on the base of data collected in Table 6.

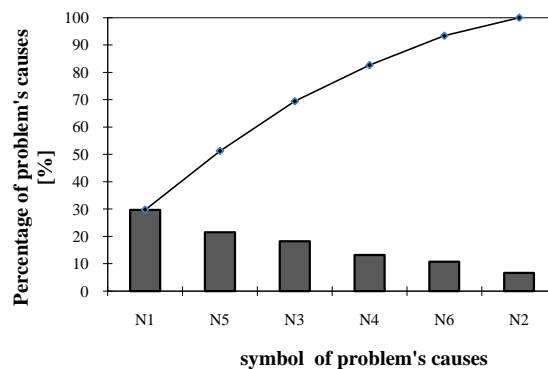


Figure 4: The Pareto – Lorenz diagram for analysis of problems' causes in human resources management in 2008

Source: own study

In examined period, main causes, which are responsible for appearing of problems concerning human resources management, were:

- inappropriate incentive system for workers,
- improperly carried out recruitment and selection of staff,
- inadequately planning staff.

The analysis Pareto-Lorenz found, that the 29.75% of causes is responsible for appearing of the 70.25% factors causing the existence of problems in the area of human resource management in the analyzed company. The main factors responsible for the existence of problems in the area of the analyzed factors include the groups: „management” (30% of replies

in the Ishikawa diagram) and „work organization” (25% of replies in the Ishikawa diagram). However, the most important cause of the problem (coming from a factors’ group called „management”) is the lack of appropriate incentive system (N1 29.75%).

The reasons that cause analyzed problem appearing mainly refer to management forms used by managers. Through adequate planning qualifications of staffing needs, without tying attention to the form and manner of recruitment and employee’s selection, as well as lack of appropriate incentive system, that would increase worker productivity and encouraged potential candidates to apply for a free vacancy, problem appears that contributes to enterprise reputation reduction and quality of the whole production company.

5. Risk analysis of analyzed problem appearing in the area of human resources management

In order to identify potential factors causing analyzed problem in the area of human resources management the FMEA method was used. FMEA is used to identify potential defects and causing them causes, which contribute to the formation of a given problem in the highest degree. All detailed information concerning the analyzed problem, are helpful to determine the possible types of defaults. The causes and consequences are determined for each type of problem/nonconformity. The results of this analysis are stored in the appropriate worksheet.

FMEA is conducted in accordance with the knowledge and experience of team members based on the database. The initial phase includes:

- establishing the limits of the problem, which include an FMEA analysis,
- establishing work schedules, which must include an assessment of current status, determine corrective actions/preventive measures and verify results.

The causes and consequences of each issue are set out on a scale of 1 – 10:

- a) **LPW** – probability of problem appearing (1 – little chance of problem appearing, 10 – big chance of problem appearing),
- b) **LPZ** – the meaning if the problem for management staff (1 – without the meaning, 10 – important meaning),
- c) **LPO** – probability of problem detecting (1 – detectable, 10 – not detected).

Product of the LPW, LPZ, and LPO is a risk priority number of LPR considered as the validity of individual errors and provides the basis of their hierarchy.

$$LPR = LPZ \cdot LPW \cdot LPO$$

FMEA analysis was made in the aim of estimating the risk of specific causes which affect the formation of management staff’ problem in the area of human resource management within the analyzed company.

Table 7 included a FMEA analysis, whose task was to identify nonconformities causing problem appearing in the scope of human resources management. FMEA shown in subsequent nonconformities also shows the potential causes and effects.

Estimated by the FMEA method, the indicators allow for corrective and preventive actions adapt analyzed factors to the planning of the human resources management in organization. The indicators calculated in the FMEA method gave a base to draw the graph (Figure 5), comparing the level of the individual critical areas and isolate those areas, whose risk is greatest, in accordance with the FMEA methodology, for which the $LPR \geq 120^{\text{th}}$.

Diagnosis of risk in relation to the factors influencing the process of human resource management in production-service company X Group Service, which decisively influenced the inappropriate management system, has enabled the organization to identify:

- improperly conducted an incentive system in a production-service company, which entails dissatisfaction with work and lack of desire for further development and upgrading of skills by workers, the risk priority number was (LPR = 150),
- performed recruiting and selecting employees in an inappropriate way, that people with little experience and lack of appropriate competencies are employed (LPR = 140).

Table 7: The FMEA analysis of human resources management process in analyzed enterprise

LP.	NONCONFORMITIES	EFFECTS	CAUSES	LPZ	LPW	LPO	LPR	PREVENTIVE ACTION
N1	Incentive system	Lack of staff willingness to further develop	Inadequate human resource management system	10	5	3	150	Adequate training in raising the motivation of employees
N2	Lack of adequate control system	Vulnerabilities, mistakes, not due to binding of the work performed	Detachment because managers and failure to comply with inspection standards	8	2	2	32	Introduction of a systematic inspection process
N3	Inadequate planning jobs	Too high staff turnover	Lack of adequate information on human resources requirements	8	4	3	96	Improvement of procedures for planning the employment
N4	Working under stress	Fatigue, poorly performed work	Time pressure of work	7	5	2	70	Ensuring a better work system, flexible working hours
N5	Improperly conducted recruitment and selection	Too little experience or lack of qualifications	Improperly prepared team provided for the recruitment and selection	7	5	4	140	Adequate training of persons carrying out the process of recruitment and selection
N6	Improperly qualified personnel	Work performed incorrectly, the wrong attitude to their work	Inadequate preparation workers for the occupation	5	4	3	60	Verification of skills and qualifications of staff in the initial recruitment and selection

Source: own study

Employment planning system, which priority number achieved 96 (but it does not fit within the limit established in the FMEA which is $LPR \geq 120$), was equally important factor.

The study shows that, inadequate planning system of employment, contributes to the large and frequent rotation of workers, through lack of information from the outside with a need for a free vacancy (LPR = 96).

The use of preventive action contained in Table 8, should help to improve the overall efficiency of human resource management in the surveyed production-service companies.

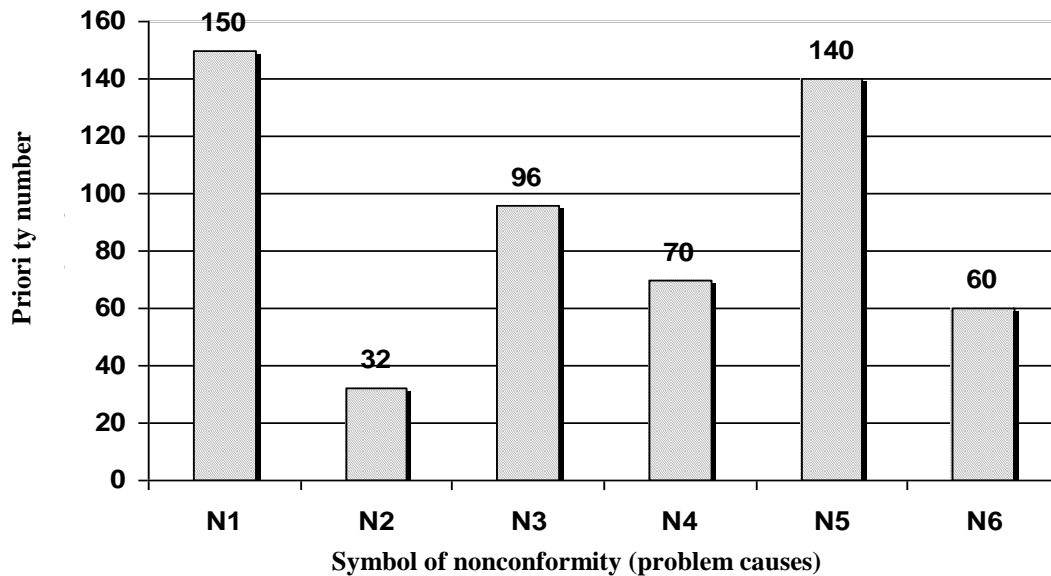


Figure 5: Risk priority number for critical areas influencing planning of human resources in enterprises

Source: own study

6. Summary

Human resources are crucial for the effective functioning of the entire organization. Effective human resource management has very big impact on the enterprise results, what should be in the manager's awareness. Inadequate planning their recruitment causing damming interlaced with periodic exemptions, which is very costly in terms of unemployment benefits payment, training expenditure.

Planning staff in the surveyed company X should primarily focus on such functions as:

- to prevent a situation, when the creation of staff shortage or staff excess, or optimization of incurred staff costs,
- optimal use of resources, knowledge, skills and competence of staff and selection of appropriate methods of development and improvement of staff,
- developing appropriate criteria for staff assessment to track the employee usefulness for the company and its development.

Planning can include all environmental trends or focus only on some of them, the most important for organization. Managers should primarily focus on the accessibility and updating information concerning current job vacancies in the company and the opportunity to gain job candidates.

The most important is detailed work analysis. This analysis should aim to define, what constitutes work in the open position. It is also important, also in the context of value engineering in the entire organization, is providing information that is useful during the various stages prior to recruitment. It should be made based on an interview with a person, who formerly occupied the post or its associates.

Collected information should concern the employee task scope, his business connections with persons occupying other positions, as well as the type of skills needed to perform specific tasks. The scope of the analysis should also include tools and machines, which are used by the employee. HR department can make the recruitment and pre-selecting candidates, but the final selection is one of the managers at the department in which the employee is to be employed.

HR department's attention should be paid to those elements of the existing educational and professional careers that are important from the perspective of positions, while analyzing the incoming employees' applications.

A reliable method of work candidates assessment should include a detailed application forms for admission to work, tests (which will be aimed at selecting the best people from all candidates), and interviews carried out by appropriately trained for this person.

Ill-considered systems of salaries don't allow for the attraction, the maintenance and motivating good worker, but obsolete practice of good human resources can expose the company to costly for her, and quite embarrassing court action for discrimination against an individual or a group. That is why the company director of human resources department should be, as it is in most organizations, Vice President, who reports directly to the Chief Executive, the company develops strategic plans for human resources and integrates them with other activities within the strategic planning. Adequate staff training and manager's improvement enable workers to the proper execution of work entrusted to them and to prepare for work on other jobs in the future.

Evaluation of results is important for identifying training needs, decisions on salary increases, promotions possible to employees and ensuring adequate feedback information. Managers should always remember about the problem of information from these evaluations, because it is difficult to accurately assess the various aspects of employee skills and competencies for a given position.

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