FACTOR ANALYSIS OF NON-FINANCIAL MOTIVATORS FOR SUCCESSFUL MANAGEMENT AND PROMOTION OF THE COMPANY

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ABSTRACT

Factor analysis of non-financial motivators will be presented through a statistical model whose goal is to group factors. Composing a statistical model implies grouping the factors that determine the contributions of qualitative preference to business efficiency of the whole company. Empirical material is obtained by surveying the target group, and the response pattern to clarify the management problem is factor analysis. The purpose of factor analysis is to rationalize the number of dependent variables of business efficiency in relation to qualitative and quantitative requirements within the surveyed target group. Considering the modern lifestyle, it is reasonable to assume that general dissatisfaction level is increasing every day. This includes professional orientation, working conditions, leisure time management and all levels of interpersonal relationships such as collegial, friendly, partner and family relationships. It is reasonable to assume that within business systems there is a space for recognizing this dimension and its careful analysis that respects the non-economic dimension of employees' (dis) satisfaction and manages business efficiency in terms of non-economic factors. This paper aims to present thorough analysis of grouped factors that are basically non-financial; they represent a group of spiritual factors that contribute to a better internal climate of the company. All this leads to a prosperous company management that can represent and promote the company in public well.

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1. INTRODUCTION

The company is an open system formed of tangible, monetary and intangible components. Companies adapt their business concept to specific goals, but the basic idea is to achieve the maximum possible difference between output and input values.

The business result is measured and expressed through monetary, exact and explicit values, but it is formed by various components, among which it is justified to single out work efficiency, which is not only the result of objective factors but is largely the result of subjective and non-economic factors.

It is justified to examine the impact of such factors and perform their model classification, for which statistical models such as factor analysis are used successfully and efficiently. In order to achieve the maximum possible contribution to business efficiency factor analysis results allow managerial efforts to be targeted.

The task of factor analysis is to group and classify, more concisely than in the total amount, the contributions of individual variables by observed factors, in order to facilitate monitoring and control of their impact in reality.

It is important to emphasize that the research and analysis is related to the territorial unit and that it can manifest itself in different forms in different environments or time periods, therefore, in order to be relevant, the obtained results should be refreshed by repeated research.

2. PREVIOUS STUDIES

Factor analysis is a methodological framework of numerous professional and scientific papers in the field of social sciences, and combines a large number of procedures which, by expert approach, extract reduced dimensional data based on interaction within a set of variables. It allows a large number of variables, used to describe aspects of certain phenomenon, to be presented by using a smaller number of variables which are based on interconnectedness of a larger number of factors as sources of covariance. Factor analysis has the task (Zahirović, 2005) to:

- determine the factors of the interconnected manifest variables, or to reduce the dimensionality of the original space, by some factorization procedure;
- determine the connection of individual manifest variables with these factors, or to achieve more interpretable solutions by rotating the factors.

There are numerous examples of factor analysis application, and, by using factors, it most often determines a group of variables and their impact on attitudes, perceptions or observations about the phenomenon as a subject of the research. The results of several studies that serve as a basis for the systematization of theoretical concepts and results of previous studies have also served, in the paper, as a basis for defining the research problem. Since its inception, more than a hundred years ago, this type of analysis has become one of the most widely used multivariate statistical procedures in applied research across a variety of fields. (Brown, 2006)

In her work, which referred to the determination of the product basic characteristics by applying factor analysis, (Kurnoga Živadinović, 2004) the author researched the respondents' attitudes in relation to a specific product, and it was about "coffee". The researcher's aspiration was related to the empirical analysis of "coffee" product characteristics, where she tried to reduce a great number of manifest variables among which there was covariance to a small number of latent variables, or factors that would explain covariance between manifest variables.

Specific empirical research indicated the fact that the initial matrix of factor structure did not meet the criterion of simple structure and was not interpretable. The analysis continued in the direction of orthogonal varimax rotation of factors, the result of which was the simplification of factors. Factor analysis of the "coffee" product characteristics based on fifteen manifest variables allowed the extraction of four factors, which were expressed as:

- relaxation,
- addiction,
- concentration and
- the fourth factor called "taste-smell".

The author of the paper "Application of factor analysis in researching the usage of information and communication technologies: the case of European countries" (Zoraja, 2014), starting from 17 variables, extracted three factors, related to:

- The first factor called "Internet use by individuals" included eight variables,
- The second factor "high technology transfer" included six variables and
- The third factor "electronic business of companies" included only three variables.

A group of authors (Delić, 2013), in their research related to the identification of influencing factors of student satisfaction with the quality of teaching in

high school, pointed out that satisfaction with the quality of teaching could be expressed with four factors:

- ambience,
- quality of the teaching process,
- discrimination and
- student.

The formulated model indicated the need to formalize the described approach as an extension of the model by using variables that would allow continuous monitoring of their covariance.

Assessing the quality of higher education institutions on the example of the Faculty of Economics, University of Tuzla, the authors identified five key factors that determine the quality of a particular higher education institution, which relate to (Fazlić & Đonlagić, 2016):

- teaching staff expertise and positioning of faculties in the area;
- consistent application and transparency of study programs and syllabus;
- solving student requests, problems and remarks by administrative and teaching staff and
- infrastructure and IT support.

Empirical data analysis generated five factors that profile the consumer: (Landika, Aleksić-Anđelić & Barjaktarević, 2021):

- Factor I, which included: the amount of monthly income, type of housing (-), travel frequency, place of residence (-) and knowledge of foreign languages;
- Factor II, which included: marital status, number of children, respondents' age, children's age (-), property ownership(-) and employment status;
- Factor III, which included: attachment to the "house" outside working hours, choice of travelling companion (-) and pursuing hobbies (-);
- Factor IV, which included: tendency to cook, the way the time is spent with friends (-) and dietary habits (-)
- Factor V, which included: shopping experience and the way the household chores are done.

Based on the above, we can conclude that factor analysis is a powerful analytical tool, it is widely used in researches, and thus can be called a useful technique of multivariate analysis that allows summarization of information about a particular product, process and/or service into a number of factors that replace the subjective approach with their interpretation.

Factor analysis enables the interpretation of complex processes and phenomena to be systematically simplified, empirically proven, and adapted to a specific research problem; it also enables the arbitrariness in the processes and phenomena interpretation to be translated into interpretations based on relevantly modeled information.

3. MATERIALS AND METHODS

3.1. Sample size and type for the analysis and testing

Estimation of the total population in the territory covered by the survey was 3,290,791 for 2020 (Wikipedia, 2021). The number of employees in the territory of Bosnia and Herzegovina was 832,200 and the employment rate was 25.29%. In the same period the unemployment rate was 12.11%. (ARZ, 2020) (Labor and Employment Agency of Bosnia and Herzegovina). The number of pensioners was 416,672 or 12.66% (PIO/MIO, 2020) (Pension and Disability Insurance Fund).

The target population within the population of the territorial unit, which the research project related to, included the categories of unemployed, employed and retired population, whose estimated disposition in the population (basic set) was 50% employed, 25% unemployed and 25% retired population.

3.2. Data collection - Sources and technologies

Data collection was based on a random sample, stratified on the basis of population categorization into groups according to working capacity, taking into account only the working population and the population with work experience, or the category of employed or unemployed in terms of job seekers and pensioners. The survey was conducted electronically, through Google Forms. The content of the questionnaire is visible at the link:

https://docs.google.com/forms/d/e/1FAIpQLSfdyVRBHLwRVbWIz-NBFpMMVsEQk0QCxuA7qVAzVJrZx5Tciw/viewform?vc=0&c=0&w=1&flr=0.

The planned rate sample was at least 600 respondents, 300 employed, 150 unemployed and 150 retired.

Selection was done by filling the planned quotas of respondents in the total number of collected and validly completed questionnaires, so that the formed stratum corresponds to the assumed form of distribution in the basic set (population). The survey questionnaire was formulated so that it consisted of three parts:

- General data on respondents, which included: age, employment status, place of residence, marital status, education.
- Data on the type of work related to the occupation and employment of the respondents, which included: work sector/type of employment, work experience, job conditions and requirements.
- Data on non-economic factors as an integral part of the business environment, which included: working conditions, care for employees expressed through health insurance, healthy meals, conflict management, correction and management of interpersonal relationships at all levels, psychological support and recreational activities that contribute to physical health.

In the first and second part of the survey the answers were offered in accordance with the questions, and in the third part the questions were formulated in the way "would it affect you if it was possible", and the answers were offered in the form of 3 point Likert scale (1 - fully, 2 - partially, 3 - not at all).

4. RESULTS: MEASURING AND EXPRESSING FACTORS THAT AFFECT THE METRICS OF NON-ECONOMIC CONTRIBUTION TO WORK EFFICIENCY

The purpose of factor analysis is to reduce the number of variables in the model in order to make it easier to describe the phenomenon, but with minimal loss of information contained in the original values. (Hair et al., 2010)

The dimensions of the non-economic factors which impact business efficiency, measured by using a scale of expectations, were treated by factor analysis in order to determine a reduced number of dimensions for their expression.

Description		Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.825
	Approx. Chi-Square	6881.908
Bartlett's Test of Sphericity	Df	105
	Sig.	.000

Table 1: KMO and Bartlett's Test

Source: Authors' calculation

75 - 88

checked with KMO (The Kaiser-Meyer-Olkin) and Bartlett's test.¹ The obtained value of the KMO test in this case was 0.825, which made the sample suitable for factor analysis. Acceptable empirical values of the KMO test were considered to be between 0.6 and 1. (Tabachnic & Fidell, 2007). Bartlett's test was used to check the existence of a correlation within the empirical values of the variables. The empirical value of this test was 6881,908. On the other hand the acceptance region of the null hypothesis at 0.005 level of significance for the degrees of freedom 100 was 140.17. The value obtained indicated the fact that there was no correlation of variables within the sample.

After the factor analysis, expectations scale table was obtained, which can be illustrated in the following presentation.

 Table 2: Unrotated factor analysis table Extraction Method: Principal Component
 Analysis

Question – variable	Extraction
Would it affect you if it was possible to work shorter for the same salary (W1)	.858
Would it affect you if it was possible to have additional benefits for working conditions (W2)	.843
Would it affect you if it was possible to have quality healthcare (W3)	.703
Would it affect you if it was possible to have trainings that make your job easier (W4)	.642
Would it affect you if it was possible to have management support (supervisors) (W5)	.816
Would it affect you if it was possible to have understanding and support of colleagues (W6)	.778
Would it affect you if it was possible to have healthy meal at work within no additional expenses (W7)	.768
Would it affect you if it was possible to have a pleasant environment (W8)	.689
Would it affect you if it was possible not to be exposed to noise during work (W9)	.745
Would it affect you if it was possible to have recreational activities (W10)	.755
Would it affect you if it was possible to have team building to be organized in order to connect with colleagues (W11)	.776
Would it affect you if it was possible to have the support of a psychologist (W12)	.767
Would it affect you if it was possible to have someone to take care of the atmosphere at work (W13)	.832
Would it affect you if it was possible to have someone to take care of communication among employees (W14)	.796
Would it affect you if it was possible to have someone to prevent and manage conflicts (W15)	.807

Source: Authors' calculation

1 Kaiser – Meyer – Olkin Measure of Samplyng Adequacy

Extracted factors indicated high values of factor weights, all factors have a factor size above 0.5. The extraction of a certain variable showed the explanation degree by the common factor and its value ranged from 0.642 to 0.858. If the value was less than 0.5 it would mean that the variable could be omitted from the analysis.

The following table shows the eigenvalues of the extracted factors, as well as the value of the total variance, which in this case is 6,447 for the first, 2,626 for the second, 1,499 for the third and 1,003 for the fourth factor and their critical values are greater than 1 and 77.162% of the variability is explained by them (in social research it is necessary to be higher than 60%).

Component -	Initial Eigenvalues			Extract	Extraction Sums of Squared Loadings			
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %		
1	6.447	42.979	42.979	6.447	42.979	42.979		
2	2.626	17.505	60.485	2.626	17.505	60.485		
3	1.499	9.992	70.476	1.499	9.992	70.476		
4	1.003	6.686	77.162	1.003	6.686	77.162		
5	.632	4.216	81.378					
6	.492	3.282	84.660					
7	.424	2.828	87.488					
8	.382	2.543	90.031					
9	.335	2.233	92.264					
10	.301	2.004	94.268					
11	.262	1.744	96.012					
12	.197	1.313	97.325					
13	.160	1.067	98.392					
14	.149	.993	99.385					
15	.092	.615	100.000					

Table 3: Total Variance Explained. Extraction Method: Principal Component Analysis.

Source: Authors' calculation

The Cattell diagram allows visual identification of the number of factors that explain the analyzed phenomenon and the occurrence of fracture in the diagram shows the degree of explained variability using a certain number of factors.



Figure 1: The Cattell's Scree Plot dijagram Source: Authors' calculation

Considering that the initial matrix didn't have the characteristics of a simple structure, factor rotation was performed, which changed the relationship between variables and factors and a simple factor structure was obtained, which distributed factor loads to all four factors, which was not the case with unrotated matrix.

Table 4: Extraction Method: Principal Component Analysis.	Rotation Method:	Varimax
with Kaiser Normalization		

Potated Component Matrix ^a	Component matrix			
Rotated Component Matrix-		2	3	4
Would it affect you if it was possible not to be exposed to noise during work (W9)	0.804			
Would it affect you if it was possible to have the support of a psychologist (W12)	0.763			
Would it affect you if it was possible to have someone to take care of the atmosphere at work (W13)	0.749			
Would it affect you if it was possible to have someone to prevent and manage conflicts (W15)	0.731			
Would it affect you if it was possible to have management support (supervisors) (W5)	0.653			
Would it affect you if it was possible to have the quality healthcare (W3)	0.545			
Would it affect you if it was possible to have understanding and support of colleagues (W6)		0.796		

Poteted Component Matrix ^a	Component matrix			
		2	3	4
Would it affect you if it was possible to have a pleasant environment (W8)		0.789		
Would it affect you if it was possible to have trainings that make your job easier (W4)		0.755		
Would it affect you if it was possible to have healthy meal at work within no additional expenses (W7)		0.750		
Would it affect you if it was possible to have team building to be organized in order to connect with colleagues (W11)			0.828	
Would it affect you if it was possible to have recreational activities (W10)			0.805	
Would it affect you if it was possible to have someone to take care of communication among employees (W14)			0.744	
Would it affect you if it was possible to work shorter for same salary (W1)				0.906
Would it affect you if it was possible to have additional benefits for working conditions (W2)				0.903

a. Rotation converged in 17 iterations.

Source: Authors' calculation

The results of the factor analysis indicate the following:

- the first factor explains 42.979% of the variance and consists of six variables,
- the second factor explains 17.505% of the variance and consists of four variables,
- the third factor explains 9.992% of the variance and consists of three variables and
- the fourth factor explains 6.866% of the variance and consists of two variables.

5. DISCUSSIONS

The research showed that there were 4 groups of factors that showed the perception of users about non-economic factors, whose structure can be illustrated by the scheme using the diagram in the Figure 2.

All four groups of factors show over 77% of the value, or we can say that almost 80% of the factors that show the non-economic impact on workers can actually be changed.





Source: Authors' calculation

In order to influence the large percentage of changes in beliefs of employees in the company, within the management, it is necessary to include staff training. Staff training would be related to the work of ESTH managers. Based on this, guidelines can be given for staff training which will help deal with the issues of ESTH managers (Aleksić, 2020.).

When it comes to non-economic factors, or factors that would have a motivating role in management among employees, it is desirable to work on the knowledge and perception of employees.

The issues are also important when it comes to hiring psychologists, but many are not ready for these changes in the company's climate. If the ESTH managers, who deal with education, spiritual techniques and health in the company, further educated employees, it would be possible to influence the acceptance of changes that bring success to the company.

On the other hand, in order to make people in the company open for changes, a solution could be offered through new psychological methods that can be applied to employees. ESTH Manager (Education, Spiritual Technique and Health manager) is an abbreviation for manager for education, spiritual techniques and health. The role of the ESTH manager is precisely to work with employees at the group and individual level through the aforementioned spiritual techniques related to theta healing, eff tapping and healing timelines. Cooperation within the company leads to satisfaction, and this influences employees to good cooperate well with external clients, and all this together contributes to the prosperity of the company and the achievement of its goals, mission and vision.

ESTH managers can influence the positive energy in the company by working hard with people on their emotions and beliefs. When it comes to doing business and working in companies, it would be good to expand our minds to a wider picture. Also, critical thinking questions, which have a scientific basis and improve employee performance, are:

- reduce working hours in the company to effective 5 to 6 hours;
- make more time for the family;
- for all company activities concerning non-working hours, include the family of employees;
- enable activities of relaxation and recreation, babysitting, taking care of helath of employees;
- through engaging ESTH managers, enable the individual and company development and growth.

6. CONCLUSIONS

The research showed that almost 80% of the variability in the expectations of employees related to the impact of non-economic factors on business efficiency can be explained by four factors that show non-economic impact on employees, which is actually possible and economically justified to change.

In order to influence a large percentage of changes in the beliefs of employees and the success of a company, within the management, it is necessary to include staff training. Staff training would be related to the work of ESTH managers. ESTH managers can be a great support to market research, internal and external factors analysis of a company, as well as the main support to PR experts and managers who deal with human resources as the greatest resource of a company. It is the cooperation between HR managers and ESTH managers that can bring big changes for the better.

Together, they make changes in the company and encourage employee motivation. All groups of factors (care, support, relationships and added value) that were included in the analysis can be raised to a higher level which would show the obvious employees' openness and inclination to change and the acceptance of these changes in the company and a complete change of climate will result in greater satisfaction, motivation and ultimately the success of the company in the market.

Conflict of interests

The authors declare there is no conflict of interest.

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ФАКТОРСКА АНАЛИЗА НЕФИНАНСИЈСКИХ МОТИВАТОРА ЗА УСПЈЕШНО УПРАВЉАЊЕ И ПРОМОЦИЈУ ПРЕДУЗЕЋА

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САЖЕТАК

Факторска анализа нефинансијских мотиватора је приказана кроз статистички модел чији је циљ груписање фактора. Формирање статистичког модела подразумијева груписање фактора који одређују доприносе квалитативне преференције пословној ефикасности цијелог предузећа. Емпиријски материјал је добијен анкетирањем циљне групе, а образац одговора за разјашњавање проблема управљања је факторска анализа. Сврха факторске анализе је да се рационализује број зависних варијабли пословне ефикасности у односу на квалитативне и квантитативне захтјеве у оквиру испитиване циљне групе. С обзиром на савремени начин живота, разумно је претпоставити да је опште незадовољство сваким даном све веће. То укључује професионалну оријентацију, услове рада, управљање слободним временом и све нивое међуљудских односа као што су колегијални, пријатељски, партнерски и породични односи. Разумно је претпоставити да у оквиру пословних система постоји простор за препознавање ове димензије и њену пажљиву анализу која уважава неекономску димензију (не)задовољства запослених и управља пословном ефикасношћу с обзиром на неекономске факторе. Овај рад има за циљ да представи детаљну анализу груписаних фактора који су у основи нефинансијски; они представљају групу духовних фактора који доприносе бољој унутрашњој клими предузећа. Све ово води ка просперитетном менаџменту компаније који може добро да представља и промовише компанију у јавности.

Кључне ријечи: факторска анализа, статистички модел, успјешно управљање, оглашавање, менаџмент, мотивациони фактори.