Key Performance Indicators in the Process of Performance Evaluation Selected Approaches

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Abstract— **Performance management at individual level requires a systematic approach for evaluating the work and expectations, supporting such efforts of employees by providing evaluation and feedback in the form of the subsequent implementation of the appropriate corrections, while rewarding. One of the strategic assessment tools of performance management in organizations are key performance indicators (KPI) and the underlying assumption that the selected indicators can be measured or quantified. However, the fundamental problem of any performance measurement system is it´s correct assessment. Based on this interpretation, the aim of the article is to analyze the statistically significant association between the application of performance evaluation methods in terms of the degree of KPIs implementation in organizations. For the purposes of assessing the afore mentioned relationship we have specified a set of fourteen most used evaluation methods which were then subjected to testing by Chi-square test of independence, which has been applied. To simplify and reduce the original amount of data, while maintaining a substantial part of the information, the analysis applied the multivariate statistical method of factor analysis. The research sample consists of small, medium and large organizations operating at the local, but also multinational level. The examined relationship was verified. Based on this, it can be stated that we need KPIs to make a complex picture of what organizations really need and how to achieve the set objectives.**

Index Terms— **Performance, key performance indicators, business entities.**

I. INTRODUCTION

Key performance indicators (KPI) can be described as indicators that help organizations achieve their objectives by defining and measuring the course of their implementation. Simply put, when we look at KPIs, they tell us whether we are reaching our objective or not. At the same time, KPIs show us what accomplishments we have already achieved and what partial objectives lie ahead of us. There are quite a lot of areas that use KPIs every day, like websites traffic tracking, HR management or facility management. KPIs must make sense, so it is necessary to determine why exactly we need to follow and measure the given complexity and keep in mind reasons why it is significant. The user must clearly know what is his objective and what is the objective of the monitored process. It should be noted that the values of variables can change over time, for example energy consumption values vary depending on a season (limits are not static either). Our solutions provide the means that support the creation of various forms of measurements, their monitoring/ tracking and presentation.

There is a whole range of different chart types, setting limits and actions to be taken in the event objectives are achieved. The graphic presentation should feature bar charts (which appropriately represent the development of an indicator) or figures showing upper and lower limits. After using the above approach, it is then easy to determine whether everything is as it should be. It is just a matter of course that indicators are continuously re-evaluated and re-calculated. The results are then archived for future evaluations. It is also possible to show and compare several indicators at once. KPIs are undoubtedly very important and they are also becoming very popular. It should be kept in mind that KPIs are not enough to manage a company. The successful company management requires intelligent manufacturing solutions using KPIs and which also inform us whether the parameters are all right or not.

II. CURRENT STATE OF KNOWLEDGE OF THE ANALYSED ISSUE

Parmenter [1] states that the fundamental problem of any performance measurement system is the correct assessment of key performance indicators. Key performance indicators include results and outcomes that are key to achieving high performance and provide the basis for setting targets and performance measurement [2]. Key performance indicators can therefore be defined as indicators that help the organization achieve its objectives by defining and measuring the course of their implementation. Key performance indicators (KPIs) help the company in defining and quantifying the progress towards the objectives that were outlined in the corporate strategy. KPI implementation gives top managers an opportunity to see the real picture of what is going on in the company and assess the correctness of their decisions. [3]

Parmenter [1] defines three types of performance measures:

- Key Result Indicators (KRI);
- Performance Indicators/Results Indicators (PI/RI);
- Key Performance Indicators (KPI).

KPIs can directly work with KRIs (Key Risk Indicators) to provide managers with two different sides of the same coin. KPIs and KRIs serve as an early warning signal outlining serious risks associated with a activity. The parameters that are vital to the success of the company are called Critical Success Factors (CSF). In the past, it was believed that the success of the company was mainly determined by the marketing mix: 4P – Product, Price, Promotion, Place.

Nowadays it is not enough to rely only on these factors alone, they are now minimum requirements. To succeed companies should identify also other important CSF and measure their performance through KPI. Ranking CSFs per their priority, measuring results and rewarding the best performance help companies to succeed in the long term. [1]

KPIs by Kerzner [4] are sometimes categorized as follows:

- Quantitative KPI: expressed as a numerical value,
- Practical KPI: relating to business processes,
- Directional KPI: whether there is an improvement or a deterioration in the business processes,
- Actionable KPI: bring about changes,
- Financial KPI: indicators of financial effectiveness and efficiency.

Typical features of key performance indicators by Parmenter [1] are as follows:

- Represent non-financial/fiscal measurement instruments;
- Are regularly evaluated;
- All employees understand them and know what corrective actions should be taken;
- The responsibility for key performance indicators can be assigned to teams and individuals as well;
- Have a significant impact on the organization, influence the critical success factors;
- The results of key performance indicators positively affect other measures as well.

Kueng [5] further points out two scenarios for the implementation of key performance indicators in the organization:

- Adopting a common set of performance indicators with an emphasis on the most suitable type of indicators for the given area;
- Creating and implementing new performance indicators.

While the first option appears to be attractive because it makes no sense to reinvent something that has already been in use, the opposite is true since there is no universal set of performance indicators that could be implemented in all organizations.

The second option is about creating and implementing key performance indicators. This option seems to be useful, since it allows for precise definition of an indicator and its subsequent adapting to the conditions of the company. Links between indicators that follow the development of the reproductive process and facts taking place in the company serve as a basis for the pyramidal system of indicators. The pyramid system of indicators consists of one major indicator that is then broken down into its individual parts. These parts then serve as causative factors. This breakdown is carried out at multiple levels; therefore, it results in targeted hierarchical order of indicators.

The third option of expressing the performance at the organizational level is to express it through the perceived performance in comparison with the performance of similar companies operating in the sector. Under this approach the performance can then be described as lower than, much lower than, the same, as, higher than or much higher than. This method of performance measurement does not require specific data which in some cases might be confidential or misused.

As indicated above, the organizational performance is in addition to financial indicators evaluated using other non-financial indicators such as customer satisfaction, quality of output, the length of the innovation cycle, processing time and so on. Performance management implies clear individual and organizational objectives based on financial and other indicators. The strategy of increasing process efficiency in the company results in profit, increases competitiveness, means better position in the market and brings economic benefits. [6]; [7]

III. MATERIAL AND METHODS

In the search for a context or differences between tested performance appraisal methods of individual's performance with its characteristic constituents and the degree of KPIs implementation the statistical method Chi-square test of independence has been applied. Chi-square test testing the null hypothesis that expresses the independence of the variables. To simplify and reduce the original amount of data, while maintaining a substantial part of the information, the analysis applied the multivariate statistical method of factor analysis. The research sample consisted of 203 companies operating in Slovak republic.

IV. THE BASIC EVALUATION OF PRIMARY DATA

For the purposes of assessing the relationship between the methods and the degree of key performance indicators implementation and based on the analysis of theoretical assumptions we have specified a set of fourteen most used evaluation methods which were then subjected to testing. We formulated the following hypothesis:

H1: There is a statistically significant association between the application of performance evaluation methods in terms of the degree of KPIs implementation (breakdown of performance indicators) in companies.

To determine the relationship between the selected variables we used χ ^ 2 test the results of which are shown in the following table. We reject the null hypothesis on the independence of the monitored factors due to p values > 0.05 on the significance level α = 5%. Therefore, it makes sense to examine the internal structure of the pivot table.

Table I. The values of χ ^ 2 test

Variable (Performance evaluation method)	χ ^ 2 test
Management by Objective (MBO)	0,0230*
Rating Scales	0,0013*
Ranking	0,2029
Interview	0,1764
Checklist Method	0,0023*
Paired Comparison Method	0,5854
Critical Incidents Method	0,4273
Essay Method	0,0602
BARS	0,0119*
360-Degree Feedback	0,0792
Self-Appraisal	0,4533
Assessment Center	0,2993
Balanced Score Card	0,3934
Benchmarking	0,4773
Management by Objective (MBO)	0,0230*

The correspondence map reveals the following: the higher the degree of the evaluation scale implementation, the more detailed the breakdown of KIPs is.

Moreover, the study also paid attention to the relationship between the degree of KPIs breakdown and checklist method. Regarding to the breakdown of KPIs the map has a very similar distribution of responses to the previous two evaluation methods. Much like in the above cases also in the case of the checklist method it follows that the higher the degree of the evaluation scale implementation, the more detailed the breakdown of KIPs is.

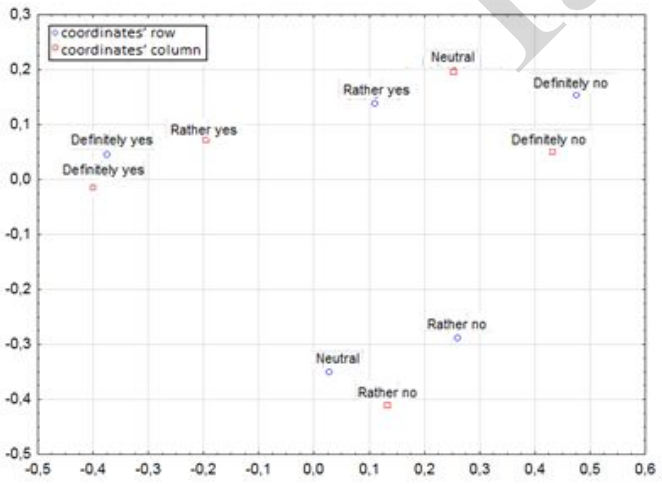

Fig. 1. Factors load – MBO method

The correspondence map shows that companies using the method of management and evaluation of objectives do work with KPIs and their individual parts. By contrast, companies that do not use KPIs did not pay attention to their individual parts, hence the answer not. The companies that do not use the method or have expressed a neutral position towards do not use KPIs breakdown or do not know much about the issue.

Furthermore, a statistically significant correlation was observed between the breakdown of key performance indicators and a rating scales. The results were processed graphically. Lines represent the use of a rating scales and columns the breakdown of KPIs.

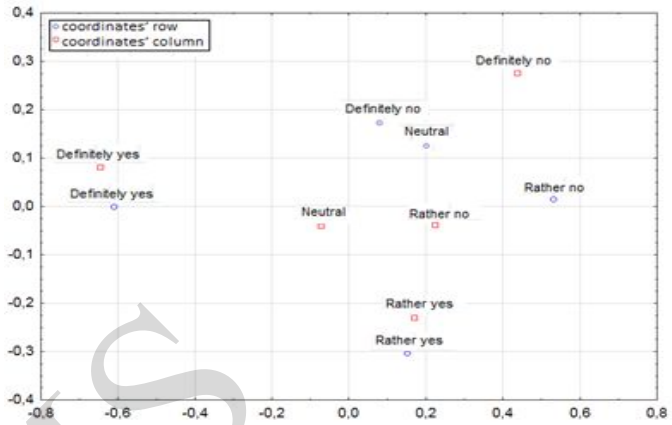

Fig. 2. Factors load – Rating scales

The correspondence map reveals the following: the higher the degree of the evaluation scale implementation, the more detailed the breakdown of KIPs is.

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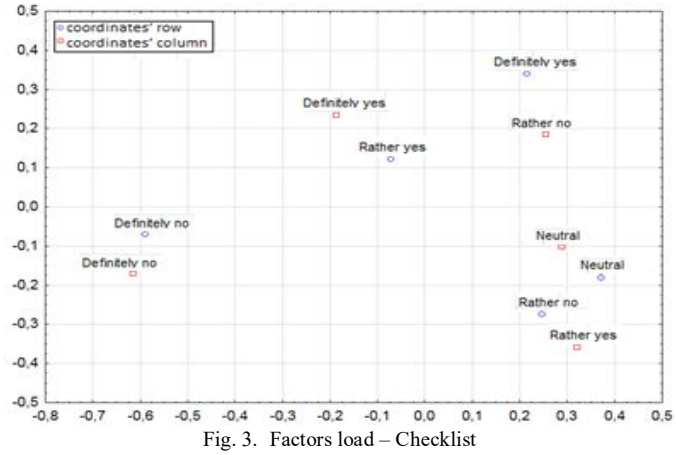

Fig. 3. Factors load – Checklist

The last correlating relationship between the KPIs breakdown degree and performance evaluation methods is to be observed using BARS method (Behaviorally Anchored Rating Scale).

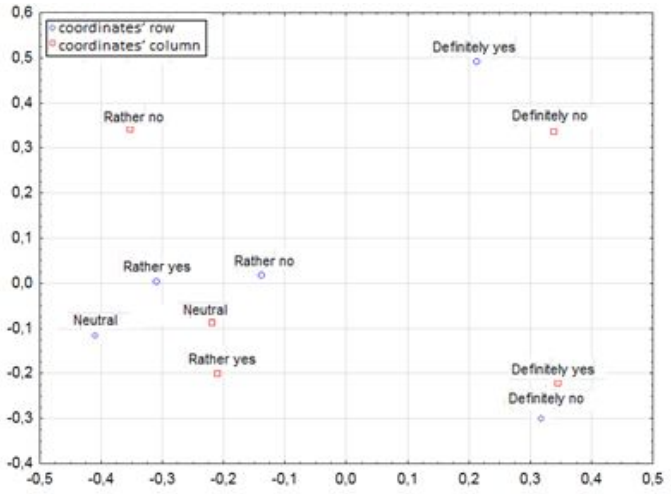

Fig. 4. Factors load – BARS

In the correspondence map, can be seen that KPIs breakdown degree is in this case not important at all. The higher the KPIs breakdown degree the less BARS are used and vice versa.

Based on the results of χ ^ 2 test we can accept the alternative hypothesis H1. This means that there is a statistically significant relationship between the evaluation methods and KPIs breakdown degree. Thus, H1 hypothesis can be verified.

V. DISCUSSION

In order to very statistically significant relationships from the point of view of KPIs breakdown, we have used individual performance evaluation methods to test the aforementioned.

The statistically significant relationships were confirmed in the case of MBO method (0.0230), rating scale method (0.0013), the evaluation questionnaire (0.0023) and BARS method (0.0119). The hypothesis was verified. In conclusion, it can be stated that we need KPIs to make a complex picture of what the company needs and how to achieve the set objectives. KPIs, however, have to be quantifiable and be easy to interpret. If not, a company will not be able to determine whether the objectives were or were not achieved. KPIs are thus helpful in measuring company's progress or meeting the set objectives to increase its efficiency.

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