

A NEW MEASURE OF EMPLOYEE SATISFACTION

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ABSTRACT

Employee satisfaction involves not only efficient usage of human resources, but also preservation and securing vital company information. Satisfaction lowers fluctuation of employees, positively influences productivity indicators, and thus overall company output. Therefore it supports long-term stability and competitiveness. The problem with evaluating and interpreting gathered knowledge is that it can be greatly influenced by subjective evaluator criteria. In this article a methodology for evaluating employee satisfaction is developed. The goal is to quantify employee satisfaction by means of a factor that indicates employee satisfaction. The indicator was empirically tested in a selected company in 2003 and 2009. Results indicate that the employee satisfaction indicator developed here has predicative ability. However, it is necessary to update partial indicators and their weights over time to reflect the current economic situation.

JEL: J53, M12, O15

KEYWORDS: employee satisfaction valuation survey, employee satisfaction indicator, company information securing

INTRODUCTION

Human resources are strategically the most important company resource, even though it cannot be expressed in numbers from a financial point of view. The task is the motivation of employees to produce high-quality output. Motivation is closely linked to employee satisfaction (Kaplan, Norton, 1996), which is one of the main motive forces of future company output. Moreover, a content employee has no reason to change his/her occupation reducing workforce fluctuation. Consequently, the costs for training new employees are reduced and revenues are maximized by using trained employees (Belcourt, Wright, 1998).

The influence of satisfied employees manifests outside the company, in customer and supplier relations (Styblo, 2001). Another reason to ensure employee satisfaction is the safety of company information. We cannot delimitate the information only as strategic, because such information is probably not available to common workers, but in small businesses it could be information about suppliers, customers structure, and work processes etc. With narrowly specialized workers there is a danger, that they can be hired by a competitor.

All the findings stated imply that it would be appropriate to engage employee satisfaction issue in more detail and to find ways and methods of measuring it a methodology of satisfaction evaluation.

Usage of causal analysis can help us to delimitate more causal relationships. The following are considered important: a) in terms of work output: Insufficient work output → unwillingness of employees to maximize their work output (in quality and quantity areas) → insufficient motivation → no motivating influence is clarified → employees are not satisfied. b) in terms of internal information safety: Company information leakage → bad company climate → unsatisfied workers. Application of deductive causal analysis can identify insufficient work output and information leakage – employee dissatisfaction (Myskova, 2003).

The article is divided into several parts. First the existing literature related to employee satisfaction is examined. These results indicate that the problem is important for further company development. In next

part the design of methodology for evaluation of employee satisfaction is presented including goal setting, problem identification, and a new method of satisfaction measurement. This new indicator was tested empirically in a selected company in years 2003 and 2009. The results of these researches and discussion on gathered knowledge are stated in last part of the article. The paper closes with some concluding comments.

LITERATURE REVIEW

Employee satisfaction is connected to usage of human resources and influences the quality and amount of work done (Kaplan and Norton, 2001; Copeland, Koller and Murrin, 1991, Lamming and Bessant, 1995, Belcourt and Wright, 1998). Styblo (2001) describes the impact of employee satisfaction on customer satisfaction. Donnelly, Gibson and Ivancevich (1997) examine a similar problem. The importance of employee satisfaction can be supported by a statement of a Nobel price winner – G. S. Becker (1997) – about the rational behavior of individuals, which states: “Individuals maximize utility in a consistent way and in decision-making process they consider impact of their own activities on utility – current and future.”

Drucker (2000) recommend using comparative analyses for better usage of human resources and improvement of interpersonal relations. Delaney and Huselid (1997) surveyed more than 1400 American organizations. Their research indicated that employee satisfaction, motivation and keeping high output have certain significance in the evaluation of company performance. The relations between employee satisfaction and company performance are monitored within BSC methodology by Kaplan and Norton (2008), Harris and Moran (2000), Keaveny (2001) and others. Connection between satisfaction and employee motivation has been noted for many years (Bernard, 1948; Porter, 1993; Becker, 1997; and Vebr, 2009). Nenadál (2001), Rosa (2000) and others emphasize the importance of employee satisfaction and warn that measurement of employee satisfaction is not easy.

EMPLOYEE SATISFACTION VALUATION– METHODOLOGY AND DATA

The aim of this methodology is to describe and delimitate possibilities of employee satisfaction evaluation according to the needs and requirements of the company. A second goal is construction of an employee satisfaction indicator and its application in reality of individual companies, with consideration of their specific conditions.

The aim was to create a methodology to measure employee’s satisfaction. The reason why we want to determine satisfaction level within a company is the casual relation expressed in method BSC and also in systems of quality management. Respectively: employee satisfaction leads to productivity increase and thus increase in efficiency of the company as a whole. Even though factors which influence employee satisfaction have qualitative character, it is necessary to determine and measure them.

In the process of resolving this problem we have to ask a number of questions. First, what is the content? – Determination of employee satisfaction influencing factors. Who is the subject? – Company employees. Where is the problem resolved? – Best within company as a whole with workers classification according to their position. How often is the problem solved? – Employee satisfaction needs to be observed not only once, but in regular periods. In this way we can search for ways to increase it and consequently use the gathered data as a feedback for evaluation of already realized changes within company (related to employee satisfaction). Why is the problem solved? – Employee satisfaction is determinant of future output rate and increases human potential. Dissatisfaction of employees result in lower working effort and thus lower utilization of human resources.

What kind of values should we look for and how many factors should we delimitate? – The answer to this question depends on specific conditions of the company. (I recommend delimitating 15 factors.).The applied process of measuring satisfaction includes: 1. Analysis and formulation of the problem, 2. Determination and analysis of all parameters (factors) which characterize the problem and determination of possible values (level, implementation) of individual parameters, 3. Systematic delimitation of the problem solution alternatives through combinations of individual parameter values and 4. Choice and realization of selected alternative.

Ad 1. Analysis and formulation of the problem is already described in the text above.

Ad 2. In course of factors delimitation, we created questionnaires. Question comprehensibility should be examined with certain workers. Accuracy and integrity of element delimitation is further verified by means of questionnaires within company where workers themselves delimitate factors influencing their satisfaction and also significance of these factors for an individual. I recommend utilization of scales for numeric and metric data necessary to determination of satisfaction indicator. Also we can apply a semantic differential, scalable by a method that uses points for evaluation.

Ad 3. Quality of analysis of all the elements depends on delimitation and data collection. Statistical analysis can be complete or incomplete. If all observations are available (parent population is described by parameters; that mean unique constants), data are complete. If a population is incomplete, constricted, does not contain all statistic units (sample population), data are incomplete. We deduce characteristics of the whole from characteristics of a part; therefore, we have to consider the probability theory and selection of descriptive characteristics which have characteristics of random quantity.

For calculation, whether sample population fits into required accuracy and approximation reliability, delimitation is defined as follows: approximation accuracy 5 % or 10 %, approximation reliability 80 – 95 %, variation coefficient 0.3 – 1. Delimitation of number of factors which influence employee satisfaction level is required according to needs and opportunities of the company.

Selection of method for data analysis depends on decision; whether questionnaires would serve for the sole purpose of delimitation of the most important factors which influence employee satisfaction with aim to quickly remove acute deficiencies within this area in company or whether a synthetic indicator of employee satisfaction which covers all influencing factors is desired.

Ad 4. Point 4 is represented by own evaluation of filled-in questionnaires.

DETERMINING THE FACTOR WITH GREATEST INFLUENCE ON EMPLOYEE SATISFACTION

In order to evaluate the data, aggregate statistic characteristics are used to determine location, dispersion, inclusion of special characteristics and dispersion characteristics need for evaluation of sample population characteristics. Location (level) describes data on the number axis according to their order. Dispersion (variability) describes the level of representation of parent population and collective dispersion around mean value.

The following location characteristics are used arithmetic mean, modus, median and fractile. For correct interpretation of statistic data it is vital to present characteristics according to points a) to c). For purpose of practice it is possible to determine the most significant factor of employee satisfaction with the median. Another possibility is to evaluate the factor with greatest influence on employee satisfaction, by means of maximum relative frequency, where relative frequencies can be calculated according to following formula:

$$p_i = \text{number of evaluations of } i\text{-th factor by maximum number of points} / \text{total number of workers} \quad (1)$$

We can assume that even in parent populations there will be the same relative frequency of this factor. An advantage of this approach is the possibility to simplify empirical research by identifying only factors that influence satisfaction level and not to differentiate their significance. Then the most significant factor would correspond to the highest relative frequency of answers.

CONSTRUCTION OF SYNTHETIC EMPLOYEE SATISFACTION INDICATOR

Construction of this indicator is executed by following process. 1) Classification of filled-in questionnaires to groups according to characteristic marks, 2) Evaluation of the scale by arithmetic mean, modus, median, standard deviation and variation coefficient for each of surveyed factors influencing employee satisfaction, 3) Selection of characteristics which optimally describes the sample for further calculation, 4) Application of the Saaty method or method of paired comparison with determination of weights of individual criteria (influencing factors). When applying more methods, weight determination is done by arithmetic mean of values obtained from individual methods.

1. I suggest employee satisfaction indicators as synthetic resulting from following relation

$$I_{sp} \approx \sum w_i \cdot I_{si}, \quad (2)$$

Where w_i = weights of individual (partial) factor (mark) of satisfaction,
 I_{si} = i-th partial satisfaction factor,
 $i \in \langle 1, 2, \dots, k \rangle$ for k = number of satisfaction factors.

2. Substitution of recognized weights (w_i) and partial indicators (I_{si}) to synthetic employee satisfaction indicator equation ($I_{sp \ xx}$). I formulate employee satisfaction indicator within designed methodology like this:

$$I_{sp \ xx} = \sum (w_i * Fs_i) / 10, \quad (3)$$

where $I_{sp \ xx}$ = employee satisfaction indicator within group xx,
 xx = delimitates group according to a characteristic symbol,
 Fs_i = fulfillment of partial (i-th) factor of employee satisfaction in particular company conditions (expresses in %),
 w_i = weights of partial satisfaction factor,
 $i \in \langle 1, 2, \dots, n \rangle$, where n = number of factors, which influence employees satisfaction,
 $I_{sp \ xx} \in \langle 0, 10 \rangle$.

The employee satisfaction indicator can take the value from interval $\langle 0 - 10 \rangle$, where 0 represents complete dissatisfaction, 10 means complete contentment. Choice of this interval ensued from need to ensure comparability with range of scales used in data collection. Calculation of employees satisfaction is done by substituting assigned percent points Fs_i to individual factors according to their occurrence and fulfillment in the company. Verification of employees satisfaction is done by subsequent comparison of resulting indicator values with subjectively stated values of satisfaction in a selected sample of employees. When there is greater variance between calculated and subjective values we adjust the factor weights.

CONSTRUCTION AND VERIFICATION OF EMPLOYEE SATISFACTION INDICATOR ACCORDING TO DESIGNED METHODOLOGY – EMPIRICAL RESULTS

Employee satisfaction indicators can be constructed for selected satisfaction factors and delimited work groups according to various perspectives resulting from different needs of the examiner. Satisfaction indicators of certain work groups can be obtained by substituting calculated weights w_i to equation (3). Calculation of satisfaction is, as mentioned above, realized by substituting F_{s_i} . This formula was used within an empirical survey for a specific company. The design indicator was verified by a sample of common workers selected as a random sample without repeating data filled in to questionnaires. Each worker valued (in %) fulfillment of partial criteria within the company and then expressed his/her satisfaction on an interval from 1 to 10. Calculated indicator Common worker’s satisfaction $I_{sp\ cw}$ was compared to subjectively stated satisfaction of employees in their current occupation. Weights of satisfaction indicators related to individual methods for groups of common workers are stated in Table 1.

Table 1: Weights of Partial Criteria for Group Common Workers – Calculation According to the 2003 Survey

Criterion	Common Employees		
	Method 1	Method 2	Weights-average
Type of work	0,0998	0,0976	0.0987
Wage	0,0998	0,0976	0.0987
Working hours	0,0608	0,0609	0.0609
Organization of work	0,0608	0,0609	0.0609
Team	0,0608	0,0609	0.0609
Environment	0,0608	0,0609	0.0609
Qualification	0,0608	0,0609	0.0609
Educational possibilities	0,0608	0,0609	0.0609
Superiors	0,0608	0,0609	0.0608
Independence	0,0608	0,0609	0.0608
Traffic	0,0397	0,0401	0.0399
Vacation	0,0397	0,0401	0.0399
Vacation term	0,0397	0,0401	0.0399
Working process	0,0397	0,0401	0.0399
Work safety	0,0397	0,0401	0.0399
Necessity of education	0,0231	0,0234	0.0233
Re-qualification	0,0231	0,0234	0.0233
Team leading	0,0231	0,0234	0.0233
Benefits	0,0231	0,0234	0.0233
Employment contract restrictions	0,0231	0,0234	0.0233
Sum of weights	1	1	1

Source: author. Table 1 shows weights of partial criteria for group Common workers. Method 1 corresponds to the Saaty method with utilization of columnar standardized matrix for weights calculation; method 2 applies geometric average values for weights determination. Weights-average represents weights determined by arithmetic average values from used applications. I assume that for practical usage it would be sufficient to round weights of individual criteria (factors, which influence employee satisfaction) to 3 decimal places. Pair comparison is not used, because in my opinion the result would be burdened by method error.

VERIFICATION OF SATISFACTION INDICATORS IN PRACTICE IN 2003

The designed indicator was further verified in the chosen company. The subject had 21 employees, 4 of which constituted Company management. The verification does not distinguish by gender. The calculated satisfaction indicator of common employees $I_{sp\ cw}$ is then compared to subjectively stated employee satisfaction in current occupation. Results of this verification are stated in Table 2.

The predicative ability of satisfaction indicator can be thought of as sufficient (max. deviation of subjectively stated satisfaction is 0.785), even though we cannot separate the error rate caused by subjective evaluation of employees from company specifics. The satisfaction indicator can express

satisfaction of individuals from delimited groups (as shown in Table 2), but can also cover satisfaction of a group or all employees. In this case there are two ways of calculating the result:

Table 2: Satisfaction of Common Employees According to Subjective Evaluation and Satisfaction Indicator (One Company, Data from 2003)

Employee	Subjective Satisfaction (2003)	Satisfaction Indicator (2003)
1	7	7.21052
2	6	5.5756
3	8	7.5253
4	7	6.74535
5	8	8.59351
6	6	6.78221
7	6	6.13689
8	6	6.75268
9	8	7.56912
10	7	6.59874
11	7	7.02158
12	8	7.27155
13	6	6.503
14	5	4.21552
15	6	6.2893
16	7	7.69842
17	9	8.57413

Source: author. Table 2 sums up results of empirical research in the selected company in 2003. Employee satisfaction is determined by each and every employee subjectively and also by calculation of means of designed employee satisfaction indicators. Value 1 (from interval from 1 to 10) corresponds to total dissatisfaction whereas value 10 indicates total satisfaction. Variance of subjective satisfaction and satisfaction indicator is small

1. We will determine satisfaction of all individuals within group (company) and satisfaction of whole group (all company employees) based on the arithmetic mean of these values, 2. Determine fulfillment level of each (i-th) factor of employee satisfaction F_{si} within the team (company) as an arithmetic mean of values stated by individuals; finally we include the computed value into the satisfaction indicator formula.

VERIFICATION OF SATISFACTION INDICATOR IN 2009

Considering economic changes and on-going crisis we presume that employee satisfaction will be influenced by individual factors with a different rate. For this reason we conducted the survey in the same company as in 2003 with the aim of recognizing changes and determining factors of satisfaction and their weights in current conditions. Table 3 contains results of satisfaction surveys from 14 employees. Answers were obtained from filled-in questionnaires created for research in 2003, so the weights of individual criteria correspond to the weights in Table 1.

The results show that satisfaction indicator has lower predicative ability than in 2003 (max deviation 1,951), which is caused by changes of individual satisfaction factors. Based on current evaluation of these criteria significance (from an empirical survey from 2009) I determined new satisfaction indicators weights for common employees in surveyed company.

Table 4 states the values and consequently indicates by + and – symbols changes in preferences compared to 2003. New employees indicated the most important factor was certainty of work combined to stability of their company.

Table 3: Subjective Satisfaction of Common Employees and Satisfaction Indicator Value - Year 2009

Employee	Subjective Satisfaction (2009)	Satisfaction Indicator (According to 2003)
1	6	7.569
2	8	9.1254
3	7	8.021
4	5	4.568
5	9	9.544
6	5	3.965
7	6	7.658
8	6	7.951
9	7	7.689
10	4	4.213
11	5	4.368
12	8	8.924
13	7	7.988
14	6	7.052

Table 2 summarizes results of empirical research in the selected company in 2009. Employee satisfaction is determined by each and every employee subjectively and also by calculation by means of designed employee satisfaction indicator designed in 2003. Value 1 (from interval from 1 to 10) corresponds to total dissatisfaction whereas value 10 indicates total satisfaction. Variance of subjective satisfaction and satisfaction indicator indicates that it is necessary to re-evaluate factors which influence employee satisfaction and to reset their weights.

Table 4: Weights of Individual Criteria for Group of Common Employees – Calculation Based on Survey From 2009

Criteria	Weights (Saatys Method, Usage of Columnar Standard Matrix)	Change from 2003	Weights 2003
Wage	0,1083	+	0.0987
Type of work	0,0824	-	0.0987
Organization of work	0,0678	+	0.0609
Qualification	0,0678	+	0.0609
Independence	0,0678	+	0.0608
Work safety	0,0678	+	0.0399
Traffic	0,0523	+	0.0399
Superiors	0,0523	-	0.0608
Certainty of work	0,0523	New factor, +	
Working hours	0,0421	-	0.0609
Vacation	0,0421	+	0.0399
Team	0,0421	-	0.0609
Environment	0,0421	-	0.0609
Educational possibilities	0,0421	-	0.0609
Necessity of education	0,0296	+	0.0233
Vacation term	0,025	-	0.0399
Re-qualification	0,025	+	0.0233
Working process	0,025	-	0.0399
Benefits	0,025		0.0233
Employment contract restrictions	0,025		0.0233
Team leading	0,0161	-	0.0233
Sum of weights	1		

Table 4 shows criteria that influence employee satisfaction within company surveyed in 2009. Weights of individual factors are recalculated (2nd column) and for comparison there are weights of satisfaction indicator stated in 4th column. Changes in factors and weights, compared to 2003 (column 3) are expressed by + (criterion weight increased; criterion for employee satisfaction is more important than it was in 2003), - (criterion is less important for an employee than it was in).

The indicator calculated with newly calculated weights of individual satisfaction factors was again verified by subjectively expressed satisfaction of individual employees. Results are stated in Table 5.

Table 5: Subjective satisfaction of common workers within surveyed company and satisfaction indicator value – calculation based on survey from 2009

Employee	Subjective Satisfaction (2009)	Satisfaction Indicator (according to 2009)
1	6	6.451
2	8	8.336
3	7	7.522
4	5	4.753
5	9	8.792
6	5	4.787
7	6	6.564
8	6	6.254
9	7	7.310
10	4	4.532
11	5	5.215
12	8	8.321
13	7	6.756
14	6	6.162

Table 5 summarizes results of empirical research in a selected company in 2009. Employee satisfaction is determined by each employee subjectively and also by calculation by means of designed employee satisfaction indicator designed in 2009. Value 1 (from interval from 1 to 10) corresponds to total dissatisfaction whereas value 10 indicates total satisfaction. Variance of subjective satisfaction and satisfaction indicator are not too big.

CONCLUSION

The goal of this article was to create a methodology suitable for evaluating employee satisfaction and to design an employee satisfaction indicator that could be applied in individual companies with consideration of their specific conditions. The methodic approach includes four phases – analysis and formulation of the problem, determination and analysis of all factors which characterize the problem, delimitation of a set of possible values for each parameter, delimitation of possible solutions and selection and implementation of the selected alternative. It is convenient to express employee satisfaction mathematically to quantify levels. For that purpose an employee satisfaction indicator was developed. In the process of construction, factors influencing employee satisfaction were determined, and then weights were assigned to them. Necessary data were gathered within empirical research performed in 2003 and 2009. The designed indicator was tested in a selected company. The results can be summed as follows: Indicator I_{sp} created according to this methodology for one company quite precisely expresses satisfaction rate of the subject employees.

The situation within the examined company is good in light of achieved outputs and long-term company stability. Most employees, save administrative, are rewarded based on output related to commissions. That is why the possibility of adjusting work and working hours is so important. Management provides their employees with various benefits: company car even for private use and for transportation to work, company cell phones, and high meal allowances. Company management is aware that loss of such narrowly specialized workers represents not only increase of costs caused by training of new employee. Loss of employees to competition constitutes the greatest risk in the form of transfer of confidential information and know-how. Employee satisfaction is therefore very important aspect of safeguarding confidential information.

Over time satisfaction of employees changes. Aggravated situation of 2009 as a result of financial crisis reflected in weights of individual satisfaction factors, priorities of employees have been changed. Predicative ability of the newly designed employee satisfaction indicator depends on factors selected as significant for the respective workgroup, on significance of these factors, which is expressed by their weights. The indicator describes the satisfaction rate only when the designed methodology is implemented to the situation within certain company. It is important to recognize changes, which are

implemented within or outside the company and in case of significant changes it is necessary to update the indicator. In further research variations on the technique developed here might be examined. These include observation of causal relations among employee satisfaction values and output of their work activities.

REFERENCES

Barnard, Ch. I. (1948), *Organization and Management: Selected Papers*, Cambridge, MA: Harvard University Press.

Becker, B., Huselid, M., Pickus, P. & Spratt, M. (1997). HR as a source of shareholder values: Research and recommendation. *Human Resource management*, 2, 39 - 47

Becker, G. S. (1997) *Teorie preferencí*. 1st ed. Czech Republic, Praha: Grada Publishing, 352 pgs.

Belcourt, M. & Wright, P. C. (1998) *Vzdělávání pracovníků a řízení pracovního výkonu* 1st ed. Czech Republic, Praha: Grada, 248 pgs.

Copeland, T., Koller, T., Murrin, J. (2000) *Valuation. Measuring and Managing the Value of Companies*. 3rd edition. The United States of America, New York: John Wiley & Sons, Inc.

Drucker, P. F. (1999) *Management Challenges for the 21st Century*. Oxford: Butterworth-Heinemann.
Gibson, J. L., Ivancevich, J. M. & Donnelly, J. H. (2000). *Organizations: Behavior, structure, processes*. New York: McGraw-Hill.

Harris, P. R., Moran, R. T. (2000), *Managing Cultural Differences: Leadership Strategies for a New World of Business*, 5th ed., Butterworth-Heinemann, Woburn, MA.

Kaplan, S. R. & Norton, D. P. (1996) *Balanced Scorecards: Translating Strategy Into Action*. The United States of America, Boston: Harvard Business School Press, 316 pgs.

Kaplan, S. R. & Norton, D. P. (2008) *Strategický systém měření výkonnosti podniku* 5th edition. Czech Republic, Praha: Management Press, 2008. 268 pgs.

Keaveny, T. M. (2001) Human Resource Practices and Organization Performance *Ekonomie a management, IV.* (3), 21-24.

Lamming, R. & Bessant, J. (1995) *Macmillanův slovník podnikání a managementu*. Czech Republic, Praha: Management Press. 294 pgs.

Myskova, R. (2003) *Vliv pracovní výkonnosti na efektivnost podniku*. Czech Republic, Brno: VUT, PhD Thesis, 30 pgs.

Nenadál, J. & comp. (2001) *Moderní systémy řízení jakosti Quality Management*. 1st ed. Czech Republic, Praha: Management Press. 283 pgs.

Porter, M. E. (1993) *Konkurenční výhoda - Jak vytvořit a udržet si nadprůměrný výkon*. Czech Republic, Praha: Victoria Publishing. 626 pgs.

Rosa, Z. & comp. (2000) *Komentované vydání návrhů norem ISO/DIS 9000/2000, ISO/DIS 9001/2000 a ISO/DIS 9004/2000* Czech Republic, Praha: Český normalizační institut.

Styblo, J. (2001) *Lidský kapitál v nové ekonomice*. Czech Republic, Praha: Professional Publishing, 104 pgs.

Veber, J. & comp. (2009) *Management*. 2. vyd. Czech Republic, Praha: Management Press. 734 pgs.

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