

## The influence of the organizational culture on the enterprise performance indicators of its production activity

Natalia Victorovna Kuznetsova

Department of World Economy, School of Economics and Management Far Eastern Federal University, Building 22 (G), 10, v. Ayaks, 690950, Russkii Island, Primorskii Region, Russia

**Abstract.** The paper suggests a method for the quantitative measurement of organizational culture and its impact on the efficiency of production. The article intends to prove that there is a strong positive correlation between organizational culture and company performance indicators of its production activities. Therefore the higher the level of the organizational culture of the company, the higher performance indicators of its production activities. Taking into account all the studied concepts and approaches, we offer our own quantitative technique for the measurement of the impact of organizational culture on the production efficiency.

[Kuznetsova N.V. **The influence of the organizational culture on the enterprise performance indicators of its production activity.** *Life Sci J* 2014;11(8s):398-403] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 88

**Keywords:** organizational culture, efficiency, core values, value system, independent features

### Introduction

Taking into account all the studied concepts and approaches, we offer our own quantitative measure technique for the measurement of the organizational culture impact on the production efficiency.

One of the aspects of controversy results from the different approaches to the understanding of the essence of the enterprise organizational culture. For example, in many formulations of organizational culture researchers suggest that the main aspects of culture are common to all of its bearers and that they dominate in the frameworks of the enterprise. In other words, the culture might be attributed to only that company which is almost equally recognized by all the members of the organization and which is accepted and undisputed. However, there is another opinion. Joan Martin in his book "Organizational Culture" says that only a certain part of the organizational culture consists of the ideas that are common and obvious to all the employees. The second component of culture is characterized by the intergroup conflicts, discrepancy of actions and proclaimed values, goals vagueness, paradoxes, and contradictions [1, p.9]. Thus, those definitions of the enterprise organizational culture, which exclude this component, do not cover the full area of the organizational culture influence and simplify the reality.

When studying the culture, it is necessary to aim at a more accurate interpretation of the situation which is to be free of the subjective opinion and at the same time subtly taking into account the features and essence of the studied medium [2, p. 164; 3].

The next moot point is so - is it possible to draw general conclusions on the basis of a study of the enterprise organizational culture or is it so unique in

each company that it is almost impossible to generalize and make predictions.

The next problem deals with the question such as a depth and width of the research. Joan Martin notes that studying the culture, the researchers may learn on practice all the variety of its variations [1, p.44]. Some researchers focus their attention on one or more aspects of the culture assuming that this is enough to understand its nature and type. For example, O'Reilly, Chatman, and Caldwell asked the participants of survey to choose from a set of signs the cards with adjectives that would characterize the culture of the enterprise the best [4, p.158]. Such pretty narrow approach affects the depth and completeness of the analysis. However, this approach allows the researchers to cover a larger amount of information and to analyze not one company but a greater number of them.

On the contrary, others studies and researches tend to a deep and thorough analysis of a particular culture. Such analysis is usually quantitative but rather qualitative, and it focuses on the deeper layers of the organizational culture [5, p.246; 6; 7]. E. Shane, for example, believes that for a thorough understanding of the enterprise organizational culture it is better to study its hidden and invisible component, as well as to discuss with the bearers of culture their deep assumptions and beliefs [8, p.46]. Undoubtedly, such depth of study gives a more accurate picture; however, it causes the researchers to confine to less number of companies for the analysis. Less number of the companies, in turn, means less possibility of finding common patterns (or natural laws). Thus, the width of the scope versus the depth of analysis is another decision that needs to be taken.

## Methodology

The method of assessment of the enterprise organizational culture, proposed by us, is a quantitative approach to the study of the organizational culture. Assessment tool in our case has a form of a questionnaire. We recognize that our method is not able to overcome all the limitations and it is not able get rid of the measurement errors. Nevertheless, we believe that it goes the best for the assessment of the relationship between the results of the company performance and its organizational culture.

For the quantitative measurement of organizational culture of the company there was developed a questionnaire the final version of which included 111 statements each of which assessed (or measured) the state of one of the 18 elements of the enterprise organizational culture.

We sort out 18 elements in the structure of the organizational culture: 1. Clarity of the objectives and focus on their achievement. 2. Focus on the production activity of the enterprise. 3. Management style. 4. The level of formality. 5. Ability to resolve the conflicts. 6. Catering for the staff. 7. Internal integration. 8. Employees' participation in the decision-making process. 9. Devotion to the shared values. 10. Delegation of authority. 11. The system of compensation and rewards of employees. 12. Values system management. 13. Customer orientation. 14. Orientation to the changes. 15. Orientation to the training and qualification of the employees. 16. Working conditions, labor protection, and labor discipline. 17. Organization of the production. 18. Technical level of production.

Answering each question, the employee was offered to indicate the degree of agreement with each statement on a seven-point scale (the scale of response options may vary from 3 to 7), that was proposed for use by Likert and named questionnaire survey of Likert-type [9, p.42]. In our case, the scale had the following gradation: strongly disagree (1 point), mostly disagree (2), partially disagree (3), can't decide (4), partially agree (5), mostly agree (6), strongly agree (7). According to the experts, the reliability of questionnaire increases along with the greater number of options; however, the reliability decreases when the number of response options reaches 7 [10, p.595]. Thus, the seven-point scale gives the possibility to increase the reliability of research, but it does not create any difficulties for the respondents when choosing the right option. For the research, we have chosen thirteen food industry enterprises of Primorskiy region.

A number of workers, who filled out the questionnaires varied from twenty to one hundred at each enterprise. As an average number of workers in

the studied objects varied from fifty to five hundred, the sample size, which varied from twenty to fifty persons, allowed us to give quite an objective evaluation of the enterprises organizational culture. Moreover, the questionnaires were distributed among workers belonging to different hierarchy.

We counted voices for each question the following way. For positively-formulated answers number of points matched respondents' answers. For negatively-formulated questions number of points was counted according to the following formula.

$$(x+1)-y, \quad (1),$$

where  $x$  is a number of possible answers (seven in the given research),  $y$  is a number of points relevant to the respondents' answers. Therefore, the formula is

$$(7+1)-y, \quad (2)$$

The next step was to count the number of points for each of the eighteen elements of organizational structure for each enterprise. Notice: the maximum value of organizational culture in our research equals to 777 (111x7 points), meaning that the most powerful organizational structure weights 777 points. The higher an enterprise organizational structure point is, the higher and stronger its culture is.

An average meaning of organizational culture can be counted according to the following formula:

$$\bar{C} = \frac{E_1 + E_2 + \dots + E_{18}}{n}, \quad (3)$$

where,  $E_1, E_2, E_{18}$  are element of organizational structure of an enterprise, and  $n$  is a number of respondents.

This allowed us to compare levels of organizational cultures of different enterprises and to make a statistical analysis regardless the amount of respondents at each enterprise.

## The major part

The organizational culture of the studied objects lies between 422.25 and 553.40 points. An average meaning of organizational culture among all the studied enterprises is 485.62 with a standard deviation equal to 37.79. In the organizational culture homogeneity research a coefficient of variation

$$V = \frac{\sigma}{\bar{C}} \cdot 100\% \text{ was counted. It equaled to } 7.78$$

percent. This means that, in terms of the organizational culture, the enterprises are homogeneous.

The given in Table 1 data shows a low level of organizational culture at the enterprises from the sample. Also, having counted average meanings of the eighteen elements with a standard deviation, the interval limits, and coefficients of variation for each element, we came to a conclusion that the enterprises,

where the meanings of the organizational culture are above the average of 485.62, are more homogeneous for the eighteen elements of organizational structure. This means that the workers (the entire labor) of the enterprises evaluate the level of organization of the structure elements and the culture itself rather homogeneously – the degree of variation of the eighteen elements perception of their enterprises organizational culture is the least in comparison with that one of the enterprises the meaning of the organizational culture of which is under the average. This means that the working collectives of the examined enterprises are more stable than those of the enterprises where the points scatter for each of the eighteen elements is higher. In addition, indicators of effectiveness of those enterprises are higher than those of the enterprises, where the meanings of the organizational culture are under the average.

**Table 1. Average meanings of organizational structure at the studied enterprises**

#	Average meanings of organizational structure (points)
1	456.95
2	479.18
3	494.27
4	479.66
5	508.51
6	553.40
7	540.20
8	481.97
9	422.25
10	545.79
11	445.40
12	522.12
13	474.04

To determine the degree of reliability of our questionnaire, therefore substantiating its relevance use in order to evaluate the organizational culture of the enterprises, (its quantitative measure) we counted the  $\alpha$  – coefficient, the Cronbach's Alpha. This coefficient is a statistical indicator, which measures a degree of homogeneity of a questionnaire, or an internal consistency of its questions [11, p. 58; 9, p.5]. This means that the reliability check of the eighteen elements evaluations with the help of the Cronbach's  $\alpha$  shows how the united in groups questions are reliable, internally homogeneous, and measure the same element (the truth mark). This step is very important. Missing the proper reliability check the entire work can be based on a wrong basis.

The Cronbach's  $\alpha$  was counted with a help of PPS MS Excel for each group of questions from the

questionnaire. Those groups evaluate elements of organizational structure considering the formula:

$$\alpha = \left( \frac{k}{k-1} \right) * \left( 1 - \frac{\sum \sigma_i^2}{\sigma_{\Sigma}^2} \right), \quad (4)$$

where,  $k$ —a number of questions in a group, which evaluates elements of organizational structure,  $\sigma_i^2$  – variance of single question of the group,  $\sigma_{\Sigma}^2$  – variance of sums of meanings of all questions of the group [6, p.5].

As all the Cronbach's  $\alpha$  are above 0.7, the reliability of the questionnaire we worked out is high, and every question evaluates an indicator it is supposed to evaluate.

Thus, basing on the computation made, we have statistically proved the reliability and possibility of our questionnaire for the further use in similar researches.

Then, after conducting correlation and regression analysis, we

- determined correlation among 18 structural elements of the organizational culture by calculation of the matrix of pair correlation coefficients and identifying the coefficient of determination ( $R^2$ );

- built pair linear regression equations, which allow to determine in what direction and how much the resulting element changes when a factor element changes by 1 point;

- chose elements, defining the organizational culture of an enterprise, statistically by exploring close correlation between the organizational culture and given elements; built multiple linear regression equation of dependence of the culture from chosen elements, defining it to a greater extent.

Given matrices confirmed that all the elements of the organizational culture of an enterprise are interrelated to a particular extent.

For evaluation of the absolute effect (in points) of one culture element on another, we estimated pair linear regressions. Mathematically, the task came to finding the analytical expression, which, in the best way, describes correlation between one element of the organizational culture and another, in the form of:

$$y = a + bx, \quad (5)$$

where  $y$  – resulting indicator,  $x$  – factor indicator. Coefficient  $b$  shows on how many points the resulting indicator changes when the factor indicator increases by one point.

Accordingly, we consider all the chosen 18 elements define the organizational culture and are its structural elements.

There are two independent characteristics in the basis of the growth of all elements: element #12 «customer orientation» and element #6 «staff orientation». It confirms the importance of the organizational culture elements when it is forming. The other independent element in this analysis is element #4 «formality level». However, we believe that formality level is determined by such elements as management style, customer orientation, and staff orientation; at the same time, this research did not discover a statistical relationship between items mentioned above.

Then, in order to solve a problem of the selection of factor characteristics and multicollinearity problem we have conducted the statistical analysis by stepwise regression method. The essence of this method is sequential factors inclusion to the regression equation and further testing the significance of them. This was resulted the next equation:

$$C = \alpha_0 + \alpha_1 E_1 + \alpha_{14} E_{14} + \alpha_{18} E_{18}, \quad (6)$$

where,  $C$  – company's organizational culture,  $\alpha_0$  – constant,  $\alpha_1, \alpha_{14}, \alpha_{18}$  – regression coefficients,  $E_1, E_{14}, E_{18}$  – elements that determine the organizational structure (factor characteristics).

The provided equation which shows how factor characteristics influence the culture was become as follows:

$$C = -15,04 + 5,12E_1 + 4,56E_{14} + 5,93E_{18}. \quad (7)$$

Thus, the conducting of the correlation-regression analysis was resulted in availability of strong connection between selected factor characteristics and company's organizational structure, because multiple factor of the  $r$  correlation is equal 0.98. Although 96.5% change of company's organizational culture is determined by element #1 change «clearness of purpose and its achievement orientation», element #14 «the ability of the company to react change», and element #18 «manufacture technical level». In particular, regression coefficients show that with 1 point increase in element #1 «clearness of purpose and its achievement orientation» the company's organizational culture would increase by 5,12 points; with 1 point increase in element #14 «the ability of the company to react change» the company's organizational structure also would increase by 4,56 points and with 1 point increase in element #18 «manufacture technical level» the company's organizational structure would increase by 5,93 points.

When checking the significance of the equation based on Fisher's  $F$ -test, particularly when comparing the calculated indicator  $F_{calc} = 82.9$  and critical value  $F_{crit} = 3.86$  with significance level

equalled 0,05 we have discovered, that the equation is significant and the relation is set as essential one.

During the estimating of the regression coefficients significance on the basis of Student's  $t$ -test we have also come to an conclusion that all of them are significant at the 0.05 level, also it could be noted that all of them are significant even at the level of 0.02. Calculated values  $t_{calc}$ : for the coefficients are equalled 3.71; 4.98; 2.82, respectively, and they are larger than the critical value  $t_{crit} = 2.26$ .

Also we have statistically confirmed that the multiple regression equation we have got could be used for making forecasts in the future. We have compared the theoretical value (463.90 points) and the empirical value of the company's organizational culture (456.95 points) and have discovered them to be practically identical.

The theoretical value of the company's organizational structure was calculated by substitution of derived empirical average values of three elements («clearness of purpose and its achievement orientation», «the ability of the company to react change», and «manufacture technical level») to multiple regression equation.

In addition, within the context of the current analysis we have calculated confidence intervals for the company's organizational structure during the changing its factor characteristics by 1 point. As a result, during the 1 point change of the technical level value the organizational structure could increase by the value of the interval (3.24; 8.63) with the 0,95 probability, during the 1 point change of the company's ability to react changes it could take values from the interval (0.90; 8.22) with 0,95 probability, and during the 1 point change of the clearness of purpose and its achievement orientation value it could vary in the interval (2; 8.24) with 0.95 probability.

It should be noted that these three elements are effective characteristics for the last 15 elements of the organizational structure. For example, element #3 «management style», which is not included in the multiple regression equation to effective characteristic «the company's organizational structure» and which determines the company's organizational structure according to the pair correlation matrix, also determines element #14 «changes orientation». Specifically, it conditions 50% variation of the company's ability to react changes. As it follows, we believe that all the 18 elements underlined of the company's organizational structure are its structure parts besides of the fact that only three of them are used in multiple regression equation.

To estimate the statistical significance of the company's organizational structure influence on production activity performance indicators, we have also conducted the correlation-regression analysis.

The three performance indicators was taken as a basis: labor productivity, profit margin from core operations, and return on sales. We have limited ourselves only by these three indicators still we have got the data only for these values during the our field-work analysis process.

a) The correlation-regression analysis which allows to estimate the influence of the company's organizational structure on labor productivity.

As a result of the analysis conducted we have determined the availability quite close relation between the company's organizational structure and the labor productivity. The correlation coefficient equalled to  $r=0.67$  confirms that. At the same time, 45% change in labor productivity is caused by company's organizational structure change equalled to ( $R^2=0.45$ ).

With increasing of element #6 «staff orientation» by 1 point, for example, element #3 «management style» would increase by 0.54 points, that in turn would call the increasing of element #14 «changes orientation» by 0.37 points ( $0.54 \times 0.69$ ), by 4.35 points of company's organizational structure, and by 6.96 thousand rubles per capita of labor productivity.

b) The correlation-regression analysis which allows to estimate the influence of the company's organizational structure on profit margin from core operations.

As a consequence of the analysis conducted we have determined the essence of close relation between company's organizational structure and profit margin from core operations. The correlation coefficient equalled to  $r = 0,70$  confirms that. At the same time, 50% change in profit margin is caused by company's organizational structure change equalled to ( $R^2=0.50$ ). For instance, if company's organizational structure would have 1 point change with 0,95 probability, profit margin could be changed by the interval value (0.03; 0.14).

c) The correlation-regression analysis which allows to estimate the influence of the company's organizational structure on return on sales.

As a consequence of the analysis conducted we have determined the essence of close relation between company's organizational structure and return on sales. The correlation coefficient equalled to  $r=0.70$  confirms that. At the same time, 49% change in return on sales is caused by company's organizational structure change equalled to ( $R^2=0.49$ ). Thus, if organization's culture changes by one point with the probability of 0.95, the profitability of sales may change according to the value from the interval (0.03; 0.13).

## Conclusion

In fact, the investigation shows that there is a significant positive correlation between the organization's culture and the efficiency of its productive activity. Therefore, the higher the level of organization's culture is, the higher the efficiency of its productive activity is.

We have proved the necessity of the evaluation of organizational culture. This analysis allows developing the program of its future activities that will allow establishing of the strong organizational culture which will set conditions for the stable work in the unstable environment.

As a result, the proposed method of diagnostics of the organizational culture, which allows setting its crucial values, is a useful tool for the effective management of organization's changes, which are made for the creation of a strong culture. Nevertheless, the diagnostics of the culture must be permanent; it will allow estimating not only the level of individual achievement of the goals, but also the level of institutionalization of a strong organizational culture.

We do not insist that our approach to the estimation of the organizational culture is the only right way of its diagnostics. Some authors offer other approaches to the estimation of the organizational culture. For example, today in scientific literature the usage of frame constructions prevails for the estimation of the organizational culture. But, managers, which are interested in diagnostics and variation of the level of the organizational culture, should use our approach, because it has some advantages: practical orientation; timeliness; the scope of involvement; qualitative and quantitative; accessibility for the management; validity.

## Corresponding Author:

Dr.Kuznetsova Natalia Victorovna  
Department of World Economy, School of Economics and Management Far Eastern Federal University  
Building 22 (G), 10, v. Ayaks, 690950, Russkii Island, Primorskii Region, Russia

## References

1. Martin, J., 2002. Organizational Culture: Mapping the Terrain. London: Sage Publications, pp: 596.
2. Rousseau, D., 1990. Assessing Organizational Culture: the Case for Multiple Methods . Frontiers of Industrial and Organizational Psychology. # 3: 153-192.
3. Denison, D. R., 1990. Corporate Culture and Organizational Effectiveness. New York: John Wiley, pp. 267.

4. O'Reilly, C. and J. Chatman, 1998. Culture as Social Control: Corporations, Cults, and Commitment. *Research in Organizational Behavior*, # 18: 157-200.
5. Rousseau, D. and R. Cooke, 1988. Behavioral Norms and Expectations: a Quantitative Approach to the Assessment of Organizational Culture. *Group and Organizational Studies*, #13: 245-273.
6. Sorensen, J., 2002. The Strength of Corporate Culture and the Reliability of Firm Performance. *Administrative Science Quarterly*, # 47 (1): 70-91.
7. Maister, D. H., 2011. *Practice What You Preach*. New York: A Division of Simon & Schuster, Inc. , pp: 260.
8. Shein E. *Organizational culture and leadership*. St. Peterburg: Piter, 2002. - pp.336
9. Reigle, R. F., 2001. Measuring Organic and Mechanistic cultures. *Engineering Management Journal*, # 13 (4): 38-45.
10. Nunnally, J.C., 1978. *Psychometric Theory*. New York: McGraw-Hill, pp: 701.
11. Post, W.Z. R. and T. J. Coning, 1997. An Instrument to Measure Organizational Culture . *South African Journal of Business Management*, #28(4): 54-106.

23/05/2014