

## THE FACTORS OF SELF-ASSESSMENT IN A QUALITY MANAGEMENT SYSTEM-WITHIN A CLIENT ORIENTATION CRITERION

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### SUMMARY

*The paper presented below concentrates on the self-assessment of organizational maturity level. There are the results of author's own research of sub-criteria significance (in criterion customer orientation) carried out using factor analysis. The analysis consists of the criterion of customer orientation. In this criterion, using factor analysis there were three hidden factors identified.*

**Keywords:** ISO 9001, ISO 10014, client orientation, factor analysis, quality management

### 1. INTRODUCTION

The self-assessment in a quality management system is a tool, which is used for a complex study and an analysis of this system in an organization. It can be defined as [13]: a complex, systematic and regular review of organization's taken actions according to an accepted model.

It is a very useful technique for each and every organization which wants to develop, control and improve a quality management system. As a tool, it is not deprived of flaws though, it is more and more often used as it is marked with a high usefulness and it is relatively easy to utilize.

This publication presents the results of factor analysis which concerns the significance of sub-criterion of self-assessment within the scope of one of the principles of quality management – a client orientation.

### 2. THE PRINCIPLE OF CLIENT ORIENTATION

Currently, the ISO standards 9000 are significantly client-oriented and focus on his satisfaction. This fact is proved by a number of bequests of PN-EN 9001:2009 [7] which refer to a client, as such. Among many points of these standards, there is one (5.2) which is called 'a client orientation'. According to it, the top management should ensure that all client's requirements will be defined and fulfilled in order to improve his satisfaction. The notion of a client was defined in the standard PN-ISO 9000:2000 where in the point 4.4.5, where he is defined as an organization or a person who gets a choice. While the point 4.1.4 defines a client's satisfaction as a client's perception of an extent to which his expectations have been met (where a requirement is defined as a need or expectation which was defined, accepted commonly or compulsory).

The client orientation and meeting his expectations is a trend which has been in management for a while. The role of client's satisfaction is underlined in ISO 9000 and as well as in other models of improvement, such as: EFQM, Polish Quality Award, TQM, Six Sigmas etc. According to requirements concerning the improvement described in PN-EN ISO 9004:2001, an organization should implement a system of measuring and monitoring a client's satisfaction. It is recommended to the management to use different sources of information and it is also suggested to define effective and efficient processes of data gathering, analyzing and utilizing. Also, it is underlined that measuring a client's satisfaction should be a basic tool which is to be used by the management. The following information concerning a client, which should be gathered, is:

Client's and user's questionnaire,

- Feedback concerning different aspects of choice,
- Client's requirements and information being a consequence of a contract,
- Market needs
- Data concerning providing service,
- Information about competitors.

### **3. THE CHARACTERISTICS OF CONDUCTED RESEARCH**

The following research is a part of a complex study concerning the importance of different aspects of self-assessment of the maturity of quality management system (The studies have been done as a part of analysis concerning Ministry of Science and Higher Education grant 2754/B/H03/2009/36). For each studied area- the principles of quality management, using the expert-like method and already existing models of self-assessment: PN EN ISO 9004:2009 EFQM and PN-ISO 10014 [2, 6, 8, 9, 10], a set of sub -criteria was created within each criterion. In case of a client orientation, twelve sub-criteria have been selected:

- The identification of key group of clients so as to gain benefits,
- Understanding clients' needs and expectations,
- Establishing efficiently aims connected with clients,
- Assigning aims to proper employees,
- Communicating clients' satisfaction inside organization,
- Using a balance attitude to all groups of clients,
- Using measures of degree of client's satisfaction,
- Using measures concerning complaints,
- Considering a client's application and complaints fast
- Considering a client's application and complaints justly,
- Ensuring sufficient resources so as to meet a client's needs,
- Regular monitoring the changes of market conditions with respect to competitors.

Next, in 2010, the questionnaire was conducted among companies which have a certified quality management system being in accordance with requirement of PN-EN ISO 9001. The questionnaire was sent to 3000 randomly chosen companies. 753 correctly filled up questionnaires were received.

During the study, the respondents were asked to assess in the process of self-assessment, the significance of separate sub-criteria which combine a criterion of client's satisfaction. The use of factor analysis allowed selecting hidden factors within 12 sub-criteria.

#### 4. FACTOR ANALYSIS OF CLIENT ORIENTATION CRITERION

The factor analysis is one of the most often used techniques of so-called "correlation analysis" [5]. Its aim is to connect important information from a set of observed variables in new, a bit smaller set of factors which define these what initial variables have in common.

In case of factor analysis, it is assumed that data should fulfil three following assumptions:

- A number of analysed cases should be at least ten times bigger than a number of analysed variables,
- The markers of covariance matrix should fulfil the Bartlett's spherical test, which checks the null hypothesis which states that a matrix of variables correlation is a unit matrix that means that there are 1s diagonally while there are nulls in the rest of the places. It would be tantamount to the lack of correlation between criteria [15].
- The criterion of Kaiser-Maiera-Olkina [3]. This coefficient takes values from a range  $<0,1>$ . The bigger the value of coefficient is, the stronger there are basis for the application of factor analysis in the assessment of relations between studies variables. The higher values are taken by KMO statistics, the stronger there are basis for conducting factor analysis [11]. The following interpretations of coefficient of Kaiser-Mayer-Olkina are then into account [12, 14]:
  - $KMO > 0,9$  – very high ,
  - $KMO > 0,8$  – high,
  - $KMO > 0,7$  – medium,
  - $KMO > 0,6$  - moderate,
  - $KMO < 0,6$  – very low.

It is claimed that the value of this coefficient should go beyond 0,5. Some researchers state that until after it goes beyond 0,7, the factor analysis can be conducted [14]. According to the first assumption, the number of cases for a client oriented criterion should not be smaller than 120. Since in this study, it stands for 753 , this assumption can be claimed to be fulfilled. For the next assumption- Bartlett's spherical test- in the described criterion of the U statistical test is 3994 and it is bigger in comparison with a critical value which in the analysed case for the statistical significance level  $\alpha=0,05$  and 66 degree of freedom is 85.9. Therefore, the null hypothesis, where all coefficients of correlation, is equal 0.

In the next stage, the analysis of assessment of adequacy of correlation matrix was conducted by means of using Kaiser-Mayer-Olkina criteria. The adequacy degree of correlation matrix according to KMO for client orientation is 0,92, which is a very high value and gives the basis for conducting the factor analysis. The Kaiser's criterion, which is used to define the number of coefficients [4], recommends to leave in the analysis these factors whose their own values/eigenvalues are higher than 1 [1]. Within the scope of client orientation, this criterion recommends to leave three factors which are marked with their own values higher than 1.

This criterion is worth to be supplemented with other one, which is very often used in the analysis of factors- which also allows to choose a number of factors- that is the criterion of Cattell's scree. This criterion is based on so called the graph of Cattell's scree. It is a simple line graph which shows next own values/eigenvalues. Cattell proposes finding the place from which there is a slight drop of eigenvalues . On the right side of this point, there is presumably only 'a factor talus '. It is a place where a growth of information drops sharply. Thus, more factors should not be chosen [14].

The use of criterion of Cattell's scree suggests leaving three, four factors maximally. They explain together 64% of variability. Table No.1 presents the matrix of factor loadings. These factor loadings which have been allocated to a given factor were bolded.

The obtained factors are usually difficult to be interpreted. That's why, in order to obtain these factors which are easier to be interpreted, the initial factors are subjected to the rotation. Such a rotation causes that the obtained, new factors with more differential loadings and are easier to be interpreted. The normalized Varimax rotation was used to gain a simple structure of factors. In the Varimax method, the aim of rotation is to maximize raw loadings of factor variables for each factor (so –called factor clearing). It is equivalent to the magnification of variations in matrix columns of raw factor loadings. If the Varimax rotation is conducted on the normalized factor loadings, this method is called the normalized Varimax method.

*Table 1. The identification of hidden factor loadings for client orientation criterion*

<b>Variables /sub-criteria</b>	<b>factor 1</b>	<b>factor 2</b>	<b>factor 3</b>
The identification of key clients so as to gain financial and economic benefits	0,06	0,07	<b>0,85</b>
Understanding clients' needs and expectations	<b>0,80</b>	-0,18	-0,06
Efficiently setting aims referring to clients	<b>0,71</b>	0,24	0,15
Allocating aims to appropriate employees	<b>0,74</b>	-0,34	-0,13
Communicating clients' satisfaction inside the company	-0,29	-0,26	<b>0,71</b>
Using a balanced attitude to all groups of clients	<b>0,59</b>	-0,07	0,04
Using indicators of clients' satisfaction level	<b>0,82</b>	0,25	-0,09
Using indicators concerning complaints	<b>0,78</b>	0,18	-0,09
Quick response to client's complaints and applications	<b>0,79</b>	-0,03	-0,17
Fair considering clients' applications and complains	<b>0,74</b>	-0,07	0,02
Ensuring necessary recourses so as to fulfil a client's requirements	0,02	<b>0,92</b>	-0,05
Regular monitoring the changes of market conditions concerning competitors	<b>0,71</b>	0,37	0,01
<b>Explained value</b>	<b>5,07</b>	<b>1,37</b>	<b>1,32</b>

*Source: Author's own study based on the results of the research.*

The first identified factor explains 42% of variability and is comprised of eight variables which are connected with it. These variables concern the issues of the identification of client's needs and expectations including the use of measures of degree of fulfilling these requirements, the issues connected with client's complaints and their considering. This factor also includes the sub-criterion connected with monitoring market conditions concerning the competition within the aspect of competitors influencing the needs of organization's client's needs, expectations and satisfaction. Also, the eighth variable can be included here which is marked with a lower level of correlation and refers to the use of a balanced attitude to all groups of clients. Taking into account the sub-criteria comprising this factor, it was called "the identification of needs and measurement client's satisfaction".

The second of factors explains 11% of variability. It is composed of one variable- ensuring the necessary resources so as to fulfil client's requirements. It was called 'necessary resources for fulfilling customer's needs'. The third factor includes two variables. The first one refers to issues connected with the identification of key clients and defining which clients are the most important for our organization and their division into groups in terms of their profitability to a company. The second variable comprises of factors which are connected

with communicating issues concerning clients especially the degree of his satisfaction inside the company . The identified factor was called “identification of customers and communicating customer’s needs inside an organization”. The studied factor explained 11 % of variability. Figure 1 illustrates three identified factors within a scope of client orientation category (the order of factors is connected with a value which a given factor explains).

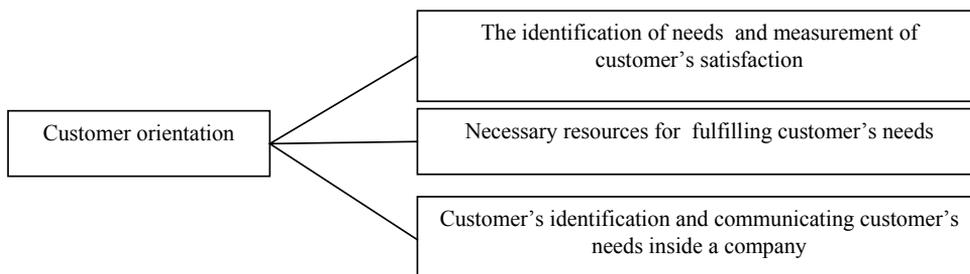


Figure 1. Factors of self-assessment of client orientation criterion  
 Source: Author's own study based on the results of the research.

## 5. SUMMARY

12 variables –sub criteria of self- assessment within a client orientation have been defined within the expert analysis. The use of factor analysis allowed to reduce a number of sub-criteria to three factors:

- The identification of needs and measurement of clients’ satisfaction,
- Necessary resources for fulfilling client’s needs,
- Client’s identification and communicating client’s needs inside the company.

The company, which wants to conduct a precise self assessment of its own level of maturity with reference to a client, should analyse the realization of three above mentioned factors.

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