

## Chapter 2

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### VALUE MANAGEMENT IN THE INDUSTRY CERTIFICATION WITH REFERENCE TO TOYOTARITY CONCEPT

**Abstract:** Today market conditions and clients requirements turn enterprises' attention to implementing concepts of business which underline the workers opinions importance. Workers play the role of internal clients who have the direct contact with production process and the knowledge about processes. Evaluation of the production process and its results in the certification process can help with identifying value sources both in the process and the product. Workers opinion about factors that create the future value for the companies was identified and interpreted in the chapter with BOST method applying. Chapter includes description of the strategy elements of woodworking and construction companies what is analyzed with using the Value Engineering theory.

**Key words:** woodworking industry, certification, Value Engineering, Toyotarity.

#### 2.1. Introduction

Certification is a voluntary mechanism which involves assessing either woodworking and construction companies management or chain-of-custody

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tracking through supply chains against set of standards. Certification is becoming an important market requirement particularly in value-added wood and construction product sectors such as millwork, wooden joinery, wooden houses (VLOSKY R., GAZO R., CASSES D., PERERA P. 2009).

Certified product provides evidence to customers that the product is originated from an environmentally friendly sources and was prepared in accordance to institutions standards that support the product safety using. Certificates in construction documents are evidence of the release data of construction products and general use in construction.

Prior to certification elaboration, the discussion about the difference between quality management systems, certification of its implementation and certification of the product quality should be taken. Certification attests to the fact that the company operates in accordance with the procedures (GREGER K., SEGOTIC K., GRADINOVIC T., BICANIC K., PERIC I. 2013). An example is the procedure of the raw material delivery, procedure of the customer service and documentation of the incoming and outgoing mail. The existence of such procedures in the company guarantees the buyer a competent and kind response to his questions and uncertainties. However, the quality management system does not impose a deadline to respond to such a question. This is the company's own decision regarding the specific service standards. In accordance to ISO 9001: 2008 standards the company is required the products and service continuous improvement, but it do not specify the product and service parameters. It is indicated from the experience that, despite certification of the quality management system, the production company sold a low quality product with a distinctive and noticeable disadvantage. For this reason, although the certification is general, there is also product quality certification (GEJDOS P. 2008).

As the need for a product certification is usually governed by the law regulations, that it is or is not required to hold a certificate, the examined company has not been forced to make decisions about whether or not to obtain the relevant certificate. It is otherwise about a quality management

system, where not all cases are required to hold a certificate, although this requirement is regularly extended.

Certificate of quality management system through the quality issue is referred to the whole system of the examined company, not just a single product. Properly designed and established quality management system guarantees the product manufacturing with high quality parameters, therefore, relate to the cause and not just the final result, which is checked only at the product certification stage. Functioning and an effective system has a big impact on the continuous improvement of quality manufactured product, so it is a way of continual development and not just for a single certification that the product meets current quality requirements (GEJDOS P. 2008, HITKA M., POTKANY M., SIROTIAKOVA M. 2009).

## **2.2. The certification reasons in the chosen company**

The examined woodworking companies attend to implement ISO system for different reasons. There are some factors that led the managers to pay the relatively high costs of implementation and certification and revising the system because of changing standards and the company development strategy. The arguments for the certification's benefits are following:

- *Improving the company status.* Quality management has become a standard recently. Success of Toyota and other companies were associated with Total Quality Management – the continuous improvement of the management process (the method developed in Japan). On European continent there are companies that operate without the appropriate certificate, although it is true that some of the company's success stems from laws that force you to have certain certificates.
- *Marketing benefits.* The main reason for applying for a certification of the quality management system is the company's willingness of its use in marketing. Organizations that can boast of such a document, they

are seen by the customer as reliable and trustworthy. The examined woodworking companies that have nearly seventy years market tradition are aware of the fact that the principle of action is still not gaining new customers, but keeping the current ones and focused the creative company's potential on the customers. Such activities are cheaper than constantly exploring of new markets. Satisfied customers stimulate others through word of mouth to use the company services. This system is the cheapest and most effective advertising. Operating the continuous improvement quality system as well as the high quality of manufactured products and provided services is contained in ISO 9001 standards and related systems (OBLAK L., JELACIC D., MOTIK D., GRADINOVIC T. 2008).

- *The costs reduction of the inadequate product quality.* The traditional approach of expenditures connected with the quality improvement and system implementation have increased the unit cost of the product and service. Companies had to make a choice between two conflicting variants: one assumed the production of cheap products with the lower quality level, while the other assumed - which is in line with the existing policy of the company - to increase product quality level, but it was to be expected with an increase in the cost of product manufacturing. Experience shows nevertheless that skillfully implemented quality management system positively affects the product quality that have a smaller number of nonconformities what is related to lower costs associated with customers' complaints.

It should be noted, that expenditures for the quality improvement should be balanced to avoid the unlimited quality costs increase. The added value of improving the quality management system of the unit must exceed the expenditures which should be returned to the added value of the gain. Initial actions will result in improving the quality of significant benefits but it will have another trend (BORKOWSKI S., STASIAK-BETLEJEWSKA R., NÁPRSTKOVÁ N. 2011, STASIAK-BETLEJEWSKA R. 2012).

- *The external factors.* Those factors are related with the company

limited impact of its market situation. An example is, of course, law regulations such as the need for "CE" marking valid in the European Union. The success of the quality system in accordance with ISO 9001 meant that in a number of EU Directives they were entered as the main instrument to achieve compliance with safety product requirements. In addition to external factors, customers who are forcing suppliers to have appropriate certificates should be included (great company provides its own quality management system to ensure that co-operation with the supplier also requests the implementation of such a system).

The organization's development also means the company care of the environment. Constant searching for a favorable environment for less aggressive new products and packaging innovation results. In addition, in the examined companies, except of the own combustion of waste (biomass) to obtain process heat, the use of activated carbon filters during coating operations, there are used varnishes based on waterborne acrylic dispersions which are friendly for the environment.

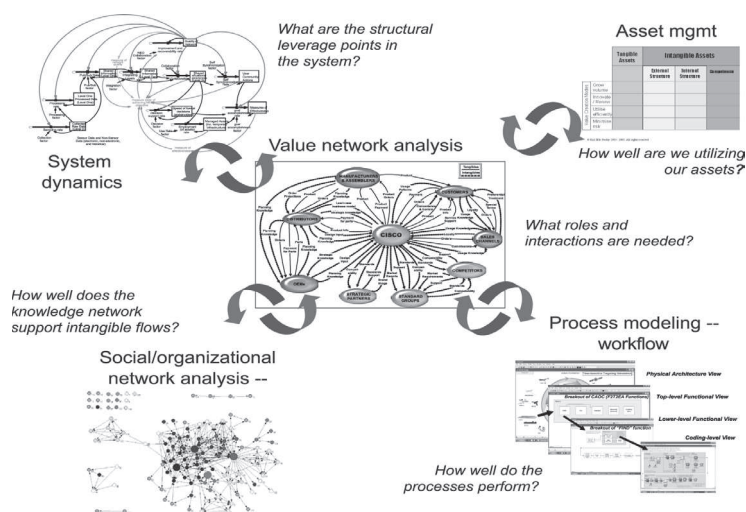
Introduction of the quality management certification in the surveyed companies were related to the changes such as transition resulting in the production employee's reduction and the opposition from those employed in relation to the implementation process of the excess policies, procedures, forms and controls. These measures have put suspicion among employees, which decreased morale and confidence in the management.

### **2.3. General concept of Value Engineering analysis in the context of Toyota's methodological approach**

The managers in the examined woodworking companies constantly working on improvement and modernization of the products quality. These activities have a positive impact on the company's development and it recognize the validity of the total quality management. However, the knowledge of the opinions of employees about the changes, as well as of the realized company's strategy, constitute a valuable element in shaping the future of examined companies.

Taking into consideration Toyota principles model, which is recognized as a executive model of the analyzed companies, it was decided to determine the most valuable for staff elements for the development strategy of the company. The staff are here referred to as both internal clients (in internal processes) as well as potential outside customers for the analyzed companies (BORKOWSKI S. 2012).

One of the method effective for searching the most valuable elements both in the products and services is Value Engineering, also known as Value Analysis, Value Methodology or Value Management, that is a systematic and function – based approach to improving the value of the products, projects and processes (STASIAK-BETLEJEWSKA R. 2012). The basis of the searching of the creative solutions here is analysis of the personnel opinions in comparison with the customers’ requirements. Figure 2.1 presents a model of the value network analysis including analysis of approaches related to Value Analysis conducted in the aim of searching the most effective solutions for the company’s future.



**Fig. 2.1. Value network analysis and other business analysis approaches.**  
 Source: illustration co-developed with Bob Wiebe of The Boeing Company.

Model of the Value network analysis (Fig. 2.1) includes all approaches involved in the process of certification that concerns the entire organization. There are mentioned issues related to the following problems on: social and organizational network, system dynamics, assessment management, process modeling – workflow. Social aspect of the presented model was elaborated in the form of developed research methodology that includes, in accordance to Total Quality Management concept, the workers opinion as the creative element for the entire organization improvement.

Toyota principles model that was elaborated in the form of Toyotarity research methodology was named BOST (what origins from the method founder's surname and name professor of technical and economical sciences Stanisław Borkowski). The author used Toyota principles as the basis for the questionnaire aimed both to workers and managers, where they express their opinions on the production processes elements, the strategy elements, the importance of the standardization and control issues, work conditions and relations in the company that are satisfying for their work results.

## **2.4. Research findings and discussion**

One of the element of the research questionnaire BOST is analysis of the fourth Toyota principle presented in the form of the question (E2 area) on the organization development concept (BORKOWSKI, S. 2012).

The survey has highlighted four factors, which workers of the examined companies attributed the validity with applying of the scale: 1÷7 (where 7 is the most important element). These factors are: the customer's welfare (DK), the product's innovativeness (IP), cooperation with cooperators (WK), trustiness in relationships with employees (ZP), self-reliance and responsibility of employees (SP), the technology development (RT), the company's care on the culture (PR).

Table 2.1 presents research findings on the workers opinion that concern the company development strategy.

*Table 2.1. Workers' opinion on the company development strategy (percentage share)*

| The assessment | Factors' denotation |      |      |      |      |      |      |
|----------------|---------------------|------|------|------|------|------|------|
|                | DK                  | IP   | WK   | ZP   | SP   | RT   | PR   |
| 1              | 0,0                 | 0,0  | 6,7  | 20,0 | 6,7  | 26,7 | 40,0 |
| 2              | 0,0                 | 0,0  | 0,0  | 13,3 | 40,0 | 13,3 | 33,3 |
| 3              | 6,7                 | 0,0  | 20,0 | 33,3 | 13,3 | 6,7  | 20,0 |
| 4              | 6,7                 | 0,0  | 13,3 | 20,0 | 33,3 | 20,0 | 6,7  |
| 5              | 26,7                | 26,7 | 26,7 | 6,7  | 6,7  | 6,7  | 0,0  |
| 6              | 33,3                | 33,3 | 13,3 | 6,7  | 0,0  | 13,3 | 0,0  |
| 7              | 26,7                | 40,0 | 20,0 | 0,0  | 0,0  | 13,3 | 0,0  |

*Source: own study*

The analysis of data contained in the Table 2.1 shown the most important factors in the development strategy of the company for the examined workers and it shown also a significant impact on the concept of organization development in accordance to workers point of view as the internal customers.

According to the responses, a product's innovativeness (IP), which received the highest number of assessment 7. The assessment 6 shows that respondents most often chose equally the customer's welfare (DK) and the product's innovativeness (IP). Both of these elements have been selected five times by the all examined respondents. Based on the collected workers opinions, it can therefore be argued that these factors (analyzed development strategy features) are considered as the moderate importance to the examined group of the woodworking companies. A less



important factor in the concept of companies development was noted in the case of the company's care on the culture (PR). The other factors were positioned more or less evenly on each of the evaluation and therefore it is more difficult to analyze them in an unambiguous manner.

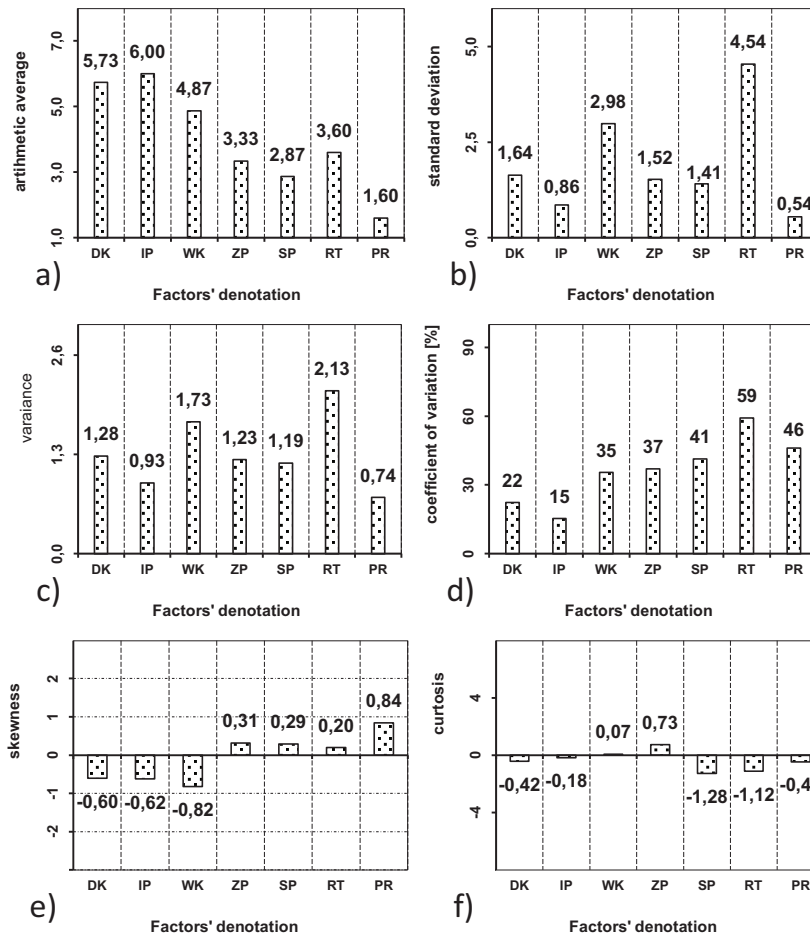
Based on the information provided above diagrams concerning workers opinions analysis of E2 area were elaborated (Fig. 2.2). This diagram shows the assessments structure for E2 area factors: customer's welfare (DK), the product's innovativeness (IP), cooperation with cooperators (WK), trustiness in relationships with employees (ZP), self-reliance and responsibility of employees (SP), technology development (RT), the company's care on the culture (PR).

The statistical analysis of the obtained research results used terms such as: the arithmetic average, the standard deviation, the variation, the coefficient of variation, the skewness, the kurtosis.

The figure presents six graphs for statistical elaboration. The first of these, Fig. 2.2a is the average of the comparison. There is easy to note, that the highest value (6.00) resulting from estimation of the element IP the product's innovativeness. The lowest and the value was obtained by the factor PR the company's care on the culture.

Figure 2.2b shows a comparison of the variance. An element which has the highest value (4.54) was noted in the case of factor "the technology development" and the element PR "the company's care on the culture" has the lowest value (0.54). The figure 2.2c presents a comparison of the standard deviation and there the highest value was obtained by the factor "the technology development" (RT) and the smallest is characterized by factor PR – the company's care on the culture.

The coefficient of variation (Fig. 2.2d) is a confirmation that the most important element for the respondents that was the technology development (RT). Analyzing skewness (Fig. 2.2e) confirms, that the trustiness in relationships with employees (ZP), self-reliance and responsibility of employees (SP), technology development (TD) and the company's care on the culture (PR) have right-sided positive skewness.



**Fig. 2.2. The research findings comparison of E2 factors:**  
**a) the average, b) the standard deviation, c) the variance, d) the coefficient of variation, e) skewness, f) kurtosis of factors E2 area. Concerns by the enterprise.**

Source: own study

## 2.5. Summary

The analysis of correlation graphs was carried out in two phases. Initially, the attention was turned to the value of the correlation coefficient. There were three degrees of freedom adopted:  $\alpha = 0.2$ ,  $\alpha = 0.1$ ,  $\alpha = 0.05$ . In the figure, the degrees of freedom were represented by vertical dashed lines. Considering the research results in this regard to the question E2, it was concluded that:

- workers' gender has an impact on product innovation (IP) at a significance level  $\alpha = 0.1$  and it is a positive correlation;
- workers' education has an impact on the independence and responsibility of employees (SP) at the significance level  $\alpha = 0.2$  and it is a negative correlation;
- workers' age and work experience have an impact on trust in relationships with employees (ZP) at the significance level  $\alpha = 0.1$  and the correlations are positive.

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## Bibliography

1. BORKOWSKI, S. 2012. *Toyotarity. BOST Method as the Instrument of Assessment Process Functioning according to Toyota Principles*. Faculty of Logistics. University of Maribor. Maribor. 2012. ISBN: 978-961-6562-56-0.
2. BORKOWSKI, S. 2012. *Zasady zarządzania TOYOTY w pytaniach. Wyniki badań BOST*. Wyd. PTM. Warszawa. 2012. ISBN 978-83-61949-48-0.

3. BORKOWSKI, S. 2012. *Toyotaryzm. Wyniki badań BOST*. Wyd. PTM. Warszawa. 2012. pp. 22. ISBN 978-83-61949-44-2.
4. BORKOWSKI S., STASIAK-BETLEJEWSKA R., NÁPRSTKOVÁ N. 2011. The Kaizen philosophy in the aluminium products improvement. *Manufacturing Technology* Vol. 11, December 2011, Pages 2-5 pp. 2-5
5. BICANIĆ K., GREGER K., GRLADINOVIĆ, PERIĆ I., COSIC V. 2012. *Certification documentation for responsible forest management in practice* [in:] WOOD AND FURNITURE INDUSTRY IN TIMES OF CHANGE - NEW TRENDS AND CHALLENGES editors: Rybansky R., Novakova R. UNIV SS CYRIL & METHODIUS TRNAVA-UCM TRNAVA, FAC MASS MEDIA COMMUNICATION, NAM J HERDU 2 917 01, TRNAVA, SLOVAK REPUBLIC 2012. Pages: 8-14
6. GREGER K., SEGOTIC K., GRLADINOVIC T., BICANIĆ K., PERIĆ I., 2013. *Criteria ranking in assessing technological process capability in furniture manufacturing*. SUMARSKI LIST Volume: 137 Issue: 5-6 Pages: 279-285
7. HITKA M., POTKANY M., SIROTIAKOVA M., 2009. *Proposal of assessment of wood processing company employees*. DREWNO-WOOD Volume: 52 Issue: 182 Pages: 91-102
8. GEJDOS P. 2008. *Process oriented quality management - Effective tool of companies' management*. [in:] WOOD PROCESSING AND FURNITURE PRODUCTION IN SOUTH EAST AND CENTRAL EUROPE: INNOVATION AND COMPETITIVENESS. International Conference on Wood Processing and Furniture Production in South East and Central Europe - Innovation and Competitiveness Location: Belgrade, SERBIA JUN 25-27, 2008. Pages: 80-84
9. OBLAK L., JELACIC D., MOTIK D., GRLADINOVIC T. 2008. *A model for stock management in a wood-industry company*. WOOD RESEARCH Volume: 53 Issue: 1 Pages: 105-117.
10. STASIAK-BETLEJEWSKA R. 2012. *Value engineering as the way of quality problems solving in the steel construction management*. *Manufacturing Technology*. Vol. 12. Issue 13, 2012.