

## Quality estimation of sale process with usage of quality methods in chosen company

**M. Dudek-Burlikowska\* , D. Szewieczek**

Division of Materials Processing Technology, Management and Computer Techniques in Materials Science, Institute of Engineering Materials and Biomaterials, Silesian University of Technology, ul. Konarskiego 18a, 44-100 Gliwice, Poland

\* Corresponding author: E-mail address: marta.dudek-burlikowska@polsl.pl

Received 27.10.2006; accepted in revised form 15.11.2006

### Industrial management and organisation

#### ABSTRACT

**Purpose:** A new approach for estimation of sale process in production company with usage of quality research methods has been presented.

**Design/methodology/approach:** The possibility of usage of quality research methods are connected with monitoring and improvement of all processes in organization. Interdependence of the quality control and quality research methods in management processes has been taken into account.

**Findings:** At the present time the enterprises should integrate management processes and their continuous improvement with quality management, knowledge management and intellectual capital. Such kind of strategy will enable to achieve success for these companies.

**Research limitations/implications:** Described management processes, quality methods and quality analysis of product modernity can be employed in companies, in which quality control has been implemented.

**Practical implications:** Pareto Analysis, Ishikawa Diagram, Internal Audit, Analytical Model of Process Correctness can be used in companies for estimation of quality sale process modernity. Usage of these methods can improve functionality of chosen process.

**Originality/value:** Describing and comparing possibilities of different estimations of sale process inside company with usage of Pareto Analysis, Ishikawa Diagram, Internal Audit, Analytical Model of Process Correctness has been presented. This method of estimation is a propose of new strategy for increase of effectivities and efficiencies activities of sale process.

**Keywords:** Quality management; Quality research methods; Internal audit

### 1. Introduction

Majority of Polish organizations, in conditions of market transformation and intensifying competition, has been subject to many changes. This transformation has caused continual readjusting of firms to existing and changing conditions of surroundings by organization's pursuit for wide understood success.

This success based on delivery of high quality products and services about and continual fulfilling of customers' growing requirements [1].

To extremely important problems, which gather increasing attention belongs the necessity for transfer from management functions to management process. At the same time the companies realized the importance of implementing, functioning and improvement of Quality Management System according to PN-EN ISO 9001:2001[2].

The management processes, their estimation, monitoring and continual improvement is often supported by eight basic principles and quality methods, tools and techniques of quality.

Such form of adopted strategy of management in modern company shows the way to growth of efficiency of firm and consolidation of its position on market.

The thinking in a company and its operation should be process oriented. This process meaning had to include in Quality Management System [3].

In this paper selected problems, connected with management process, processing approach, estimation of sale process have been presented. Suitable examples of sale process estimation in Polish companies have been given.

## 2. Processing approach and management process

According to standard ISO 9000:2000 process has been defined as set of interrelated or interacting activities which transforms inputs into outputs [4-5].

For every products or service there should always exist the customer, and the result of the process should so useful need. [5] When we define process we should describe [5-7]:

- Beginning and end of process.
- Input and output of process.
- Supplier and customer of process.
- Owner of process.

Processes in companies exist always but in many cases organizations not always focus on them, therefore these companies in reference to every process should also [5-10]:

- Establish every process in influences on ability to fulfillment of requirements of relating products or services.
- Set up methods suitable for activities connected with process.
- Establish the criterions and method of steering process.
- Establish a way of process monitoring.
- Assure suitable documents of process and records his relating.
- Assure indispensable supplies to effective process functioning

In present times "process approach" is a bases for creation of Quality Management System according to standard PN-EN ISO 9001:2001. It is also the bases for complex quality management conforming with principles Total Quality Management (TQM) [6].

Management process is implemented both on strategic and operating level in general tendency the Total Quality Management, what creates a new, global orientation of organization management [9].

This orientation contains elements the following: the philosophy, strategy and correcting tools as well as the techniques for value creation [6]. To achieve superior values well defined strategies are indispensable: evolutionary improvement (Kaizen) and revolutionary improvement (reengineering) [6]. The suitable quality methods, tools and techniques, quality metrology should be use in this strategy [10].

"Process approach" to management of organization is a field developing dynamically. This concept is very universal, it works well both in small and larger firms, because it integrates in transparent way all key mechanisms which result from requirements for quality management system [4,5,11].

In context a new edition of standards ISO series 9000:2000 is based on of the process approach during preparation

implementation and improvement of effectiveness of quality system management aiming of increase of the customer's satisfaction by fulfillment of requirements [4,5,8]. Process approach and management process requires first of all understanding what process is, what processes exist at organization; that is suitable both for their identification and also their definition [12].

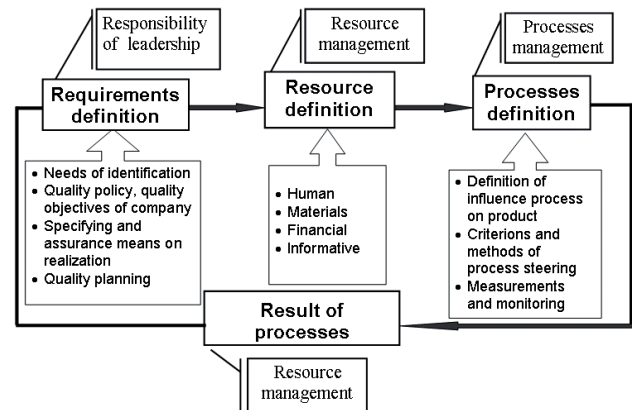


Figure 1. Management processes chain [6]

This activities are connected with qualification of interconnection among different processes. At the same time we should establish owner of the given process, elaborate suitable documentation, define the ways and frequency of measurement of so called coefficients of process and also define methods of continuous improvement [7,8,12]. Management process according to PN-EN ISO 9001:2001 can be defined therefore as closed chain in aim of qualification of requirements, supplies and processes (Fig. 1) [6].

## 3. Estimation of functioning sale process in chosen company

A need for estimation of functioning of sale process taking into account estimation of customers' satisfaction has been found in one of the polish metallurgic organization. Analysis of sale process has been implemented with usage of a chosen quality methods and tools, and in this :

- Pareto-Lorentz Diagram.
- Ishikawa Diagram.
- Internal audit.
- Analytical Model of Process Correctness.

Estimation of sale process functioning concerned four chosen metallurgic products (the names of product: product X, product Y, product Z, product W). In the first step of estimation of sale process questionnaire of customer's satisfaction has been prepared. Two areas of criterions have been defined. The first area concerned fulfillment of customers' requirements and was defined as follows:

The criterion number 1. Wide assortment of products.

The criterion number 2. Consistence with settled requirements.

The criterion number 3. Punctual realization.  
 The criterion number 4. Procedure of packing and delivery.  
 The criterion number 5. Ease of business.  
 The second area of criteria concerned forms of payment and price:  
 The criterion number 6. Kind of payment.  
 The criterion number 7. Price.

With the help of the above mentioned criterions and obtained data what causes influence individual causes fall of sale for individual products. The Pareto-Lorentz Diagram has been prepared for particular products and also Ishikawa Diagram has been developed.

The Pareto-Lorentz Analysis shows, that the largest and the most frequent problems occurring in studied organization are caused by high price of offered products as well as difficult conditions of payment. Where A,B,C on diagram are names of risk areas: A- 70%; B- 20%; C- 10%. Too high price of manufactured products concerns all the analysed products. Ishikawa diagram has been used for this problem (fig. 2).

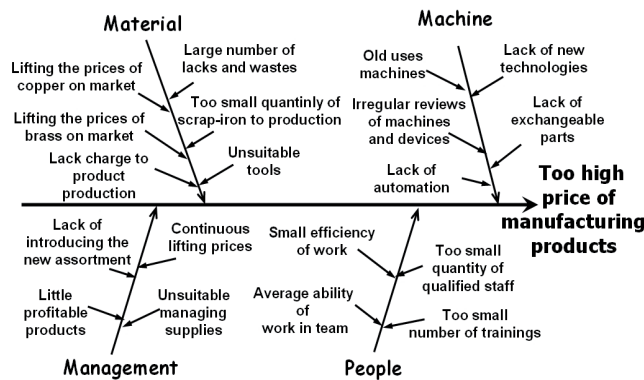


Figure. 2. Ishikawa Diagram for researched problem

The difficult conditions of payment concerned three products. Qualification of aspect of occurrence of this cause is difficult, because studied organization realizes only one form of payment. It means that customer can take ordered product if payment is obtained (for reliable customers a short prolongation of payment accepted). In comparison with year 2004 estimation of customers' satisfaction related to this criterion slightly increased.

Internal audit of process is the next step of estimation of sale process. The report from internal audit shows, that the sale process and activities connected with customers' satisfaction and customers' service are conducted properly, according to requirements.

The section responsible sale for sale in the analysed company studies the satisfaction of customers using questionnaire method.

The inquiry results show, that organization has to implement many improvements to meet customers' requirements, e.g.: the prices of product, way the packing and delivery of products, the improvement of information transfer between the customers-and the company.

To meet qualitative aims in sale process the investigation of realization of sold products twice a year. In year 2005 the index has been published in reports but without any exact description.

As the result of internal audit it was estimated that sale process had been realized correctly. The conducted internal audit of sale process did not show any nonconformity.

The last stage of estimation of functioning of sale process is usage of "Analytical Model of Process Correctness" [7, 17, 20]. For every definite criterion subordinated the suitable number of points.

Subordinating the points to suitable quality factors has been got total sum was obtained 176. Index of Sale Process Correctness achieved 75,2% (tabl.1; tabl.2; tab.3).

Table 1. Sum of individual groups of criterions for sale process

Received the criterion	Sum of points of individual criterion
A Preparing of production	28
B Production process	40
C Supervising	24
D Staff	28
E Customer orientation	35
F Safety of work	21
The sum of got points $S = \Sigma(A_i \dots F_i)$	176

Table 2. Percentage share of individual groups of criterions for sale process

Received the criterion	Percentage share of individual groups of criterion $Up = (\Sigma A_i / S) * 100 \%$
A Preparing of production	77,8%
B Production process	74,1%
C Supervising	66,7%
D Staff	77,8%
E Customer orientation	77,8%
F Safety of work	77,8%

Table 3. The quality index of analysed sale process  $J_{pt}$

The quality index of analysed sale process	$J_{pt} = 75,2 \%$
$J_{pt} = (S / 234) * 100 \%$	

Making the analysis of proportional influence of individual criterions, defined in analytical model of process correctness, it was found that the smallest share possesses the criterion C - supervising.

This caused by the fact, that it in the studied company there is no practice in using quality tools (chart X-R) .

## 4. Summary

Development, new technologies, customers' requirement and competition on market exert pressure on company to begin the search too active solving problems solutions as well as new possibilities of processes estimation, their monitoring and improvement.

The concept of process approach to management is therefore universal. This concept implements well in small and large companies, both production and service. The well defined processes of the given company describe strategy of management, ordering products, purchase of materials, whole production cycle until after the sale of product.

Such strategy of permits to estimate quality of process functioning with methods, tools and techniques of quality management.

Application of quality methods in companies creates varies possibilities of correcting the existing qualitative problems, which is directly connected with improvement of products and increase customers' satisfaction.

The confirmation of such functioning of organization processes is standard ISO 9001:2000. According with "Organization shall improve all process to demonstrate conformity of product, to ensure conformity of the quality management system, to continually improve, to effectiveness of the quality management system, to monitor information relating to customer perception, to conduct internal audit (...)"[5].

## References

- [1] S. Tkaczyk, M. Dudek, Methodology research of quality in industry, Proc. of 7<sup>th</sup> International Conf. Committee of Material Science" PAN, Gliwice – Zakopane 1998, 513. (in Polish).
- [2] M. Dudek, Quality methods as a factor of functionality and improvement preproduction of organization sphere" Nationwide Science Conf.: „Management of organization of project oriented" UMCS, Lublin 14.05.2004, 89-93. (in polish).
- [3] E.W. Deming, Quality, Productivity and Competitive Position, University of Cambridge, 1982.
- [4] Standard ISO 9000:2000: Quality Management Systems – Fundamentals and vocabulary.
- [5] Standard ISO 9001:2000: Quality Management Systems – Requirements.
- [6] A.Hernas, A.Gajda: Quality management systems, Publ. Silesian University of Technology, Gliwice 2005 (in polish).
- [7] S. Tkaczyk, M. Dudek, Quality continuous improvement of production process in aspect of usage quality researches and estimation methods, Proc. of Conf.: 11<sup>th</sup> International Scientific Conference: Achievements in Mechanical and Materials Engineering, Gliwice-Zakopane 2002, Publ. Pol. Śl, s. 567-570.
- [8] A. Tabor, A. Zając, M. Rączka: Quality Management. Quality in manufacturing process, Publ. Cracow University of Technology, Cracow, 2000.
- [9] A. V. Feigenbaum, Total Quality Control: Engineering and Management, 3rd ed. New York: McGraw Hill, 1983.
- [10] M. Dudek, D. Szewieczek, Usage of quality methods: Failure Mode and Effect Analysis (FMEA) and Statistical Process Control (SPC) as a element of continuous improvement of production process Nationwide Science Conf.: 12<sup>th</sup> International Scientific Conference: Achievements in Mechanical and Materials Engineering, Gliwice-Zakopane 2003, Publ. Silesian University of Technology, 317-321.
- [11] E. Skrzypek: Quality and efficiency, UMCS, Lublin 2000. (in Polish)
- [12] A. Hamrol, „Quality management. Science and practice", PWN, Warszawa –Poznań, 1998 (in polish).
- [13] K. Ishikawa, Guide to Quality Control. White Plains, NY: Quality Resources, 1982.
- [14] D.E. Hardt, Modeling and Control of Manufacturing Processes: Getting More Involved, ASME J. of Dynamic Systems Measurement and Control, 115, June. 1993, pp 291-300.
- [15] M. Dudek-Burlikowska, Quality research methods as a factor of improvement of preproduction sphere, Journal of Achievements in Materials and Manufacturing Engineering, Vol 18, Special Issue AMME'2006, Issue 1-2, September-October 2006, 435-438.
- [16] M. Dudek-Burlikowska, Analytical model of technological process correctness as a new conception of usage in company, Nationwide Science Conf MIT-2005, Chłapowo, Journal of Materials and Technologies, PTM 2005(3), str.33-38 (in Polish).
- [17] M. Dudek-Burlikowska, Analytical model of technological process correctness and its usage in industrial company, The 11<sup>th</sup> International Scientific Conference on the Contemporary Achievements in Mechanics, Manufacturing and Materials Science CAM<sup>3</sup>S'2005 (former Countrywide Conference on Contemporary Achievements in Materials Science CAMS), 6<sup>th</sup>-9<sup>th</sup> December 2005 Gliwice-Zakopane, 308-315.
- [18] M. Dudek-Burlikowska, Quality estimation of process with usage control charts type X-R and quality capability of process Cp, Cpk, Journal of Materials Processing Technology 162-163 (2005) (Elsevier) 736-743.
- [19] J. Paquin, J. Couillard, D. J. Ferrand; Assessing and Controlling the Quality of a Project end Product: The Earned Quality Method, IEEE Transactions on engineering management, vol. 47, no. 1, February 2000.
- [20] M. Dudek-Burlikowska, Analytical model of technological process correctness and its usage in industrial company, Journal of Achievements in Materials and Manufacturing Engineering, Vol 15, Issue 1-2, March- April 2006.