

Quality management as a tool forming foundry competitive capacity in the process of market globalisation

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Received 28.04.2010; accepted in revised form 10.05.2010

Abstract

This paper presents the analysis and identification of the key factors influencing the competitiveness of the foundry in the process of market globalisation. The main attention is paid to the quality management as an important tool used for the formation of the foundry's competitive capacity.

Keywords: Foundry, Competitiveness, Quality Management, Process Management, Markets Globalisation

1. Introduction

Modern economy makes foundries to present their activities abroad in order to ensure that they work efficiently in the conditions of progressive processes of globalisation and regionalisation. The conditions of the foundry functioning under the UE structures and the progressive globalisation of the markets cause the increase of interest of the methods which eliminate the sources of waste, improvement of the technological processes or looking for the possibilities of being more competitive in the market. The conditions which are decisive while the foundry competitiveness consists of the abilities of maintaining in the market but also the adaptability to the unstable conditions and law regulations. The conditions mentioned above influence the prediction of the technologies allowing the competitive advantage over the producers with cheap labour force. It is also necessary to take under consideration the factors of situation and economic trends, economy development, the trends of development of the main

sectors of the casting recipients, the trends of the casting development in the industrially developed countries in relation to developing countries, the formation of basic prices and other materials, energy and restrictions resulting of the environment protection, formal and legal terms etc. The analysis of parameters and indicators characterizing the production of casting presents a large competitiveness in the costs of castings production in such countries as Brasil, Russia, India and China. The detailed analysis are conducted in order to make appropriate decisions. It is also possible to notice the regional transport of the casting production to Asian countries, Central European, North American and final user of casting, but also foundries and foundry equipment manufacturers. The foundries situated in the developing countries, foundry equipment manufacturers, suppliers start cooperating with the enterprises from industrialized countries. The purpose consists of gaining easier access to the information and knowledge, reduction of the costs of production and to facilitate the rapid achievement of international quality standards. While creating the competitive advantage of the foundry it becomes more and more important

to have the management systems implemented, including the quality management systems. The efficient system of management of the modern foundry is to ensure the technical – organizational conditions in order to meet the competitive requirements of the free-market economy by describing a strategy that involves continuous improvement of the methods and management techniques.

2. Tools foundries to compete in foreign markets

Expression of competitiveness of the foundry is to achieve sustained ability to produce the products corresponding with demand and the ability to dispose of them at a price covering the costs of providing the profit that allows for dividends by the owner and the financing of the development needs of the foundry. Competitiveness in foreign markets is also a subject conducted by the state economic policy. Foundries that want to survive in the market must have a good knowledge of the competition, their own production costs, invest in modern technologies, know and understand customers' needs. Market-based instruments of the value creation which are called the instruments of competition are essential to the achievement of certain market shares and financial situation according to the competition. Foundries using certain strategies of the competition create a configuration of tools to compete, under which they prefer each tool at different degree. For example, product quality, brand, company reputation, price, product availability and wide range of products. The simultaneous focus on all of the competition instruments is not possible. One of the tools of competitiveness in difficult markets is the application of the strategy for competing quality basing on the fact that a foundry offers the products with advantages of high utility. Their advantages should be higher than those offered by competition at the prices not higher than those offered by the others. From a global perspective, casting all over the world meets the side effects of the recession, although it has a special meaning for the modern industry. Therefore the management of the foundries and the branches which represent Polish casting ought to take effective measures to ensure its competitiveness in world markets, particularly paying attention to the high quality of the casting. To achieve success in the market, foundries need to react quickly to the new requirements of customers and market. Each foundry should describe the position in the area of new innovations and costs. Additionally, they need to obtain orders for specialised products. Most of the costs for casting production depend on the process efficiency and reduction of the deficiency level.

3. The complexity of the processes in the foundry

Foundries have their own unique chains of processes that create value for the customer and determine the value for the

shareholders. The value is created by the producer, i.e. foundry, defined and estimated by a final user. Value chain, which is based on the recognition process, presents the process as a source of added value. Value – chain of values produce activities necessary for the designing, production preparation, production, launching into market, distribution and service. Processes shape the quality of the casting providing valuable information, allow to distinct their effectiveness, efficiency and flexibility. The quality of casting is only one of the results of quality processes. A measure of the casting quality of is the efficiency for its features and characteristics of the target. The result of quality processes, in addition to efficiency, can be effectiveness measured with the use of productivity, including efficiency and increased flexibility, which increases the capacity for rapid change. The basis for efficient management is the process approach. The processes must be precisely defined, analysed, linked in a single unit, measured in order to be properly managed, corrected, improved or eliminated when it is necessary. Complex production processes in foundries must be improved through consistent and systematic pro-quality actions, which require the highest standards of reliability and stability, and excellent knowledge of the processes [1]. The casting process consists of a various number of sub processes creating the process chain. There are many individual relationships between process parameters and variables, and numerous elements of uncertainty, which affect the stability of the sub-processes, and consequently the casting quality. It is important to have the knowledge and ability to control the causes, factors and their interactions. The manufacture of cast components requires a thorough knowledge of processes and sub-processes technologies, i.e. the composition of alloys, the size of the series, the type of project, the geometry of the cast. Sub-processes have specific input variables and output parameters, which are attributes of the quality of the final product, which may be a melt, form or core [2, 3]. Individual processes are measured and their effectiveness is determined. The measure of effectiveness of the design process requires a mapping process [2]. Map of process is a tool for process improvement, identifying the key links of the process, determine the time necessary to perform each of the operations. Figure 1 presents a simplified factor analysis of the process in foundry. Table 1 shows the example of map of process in respect of the technical preparation of the production process in foundry. They show the course and interaction of the processes, therefore the foundry employees may verify what is the degree of their actions influencing internal or external customer, and how the surplus value is created by them. In most cases, the process described above consists of a determined sequence of activities. The process description should consist of functions achieved successively, responsibility for the achievement of separate functions, input and output documents. The diagrams of processes are the basis of the function implemented by employees at separate levels of company organization. The processes presented on the map need to be developed in the form of procedures [1, 2].

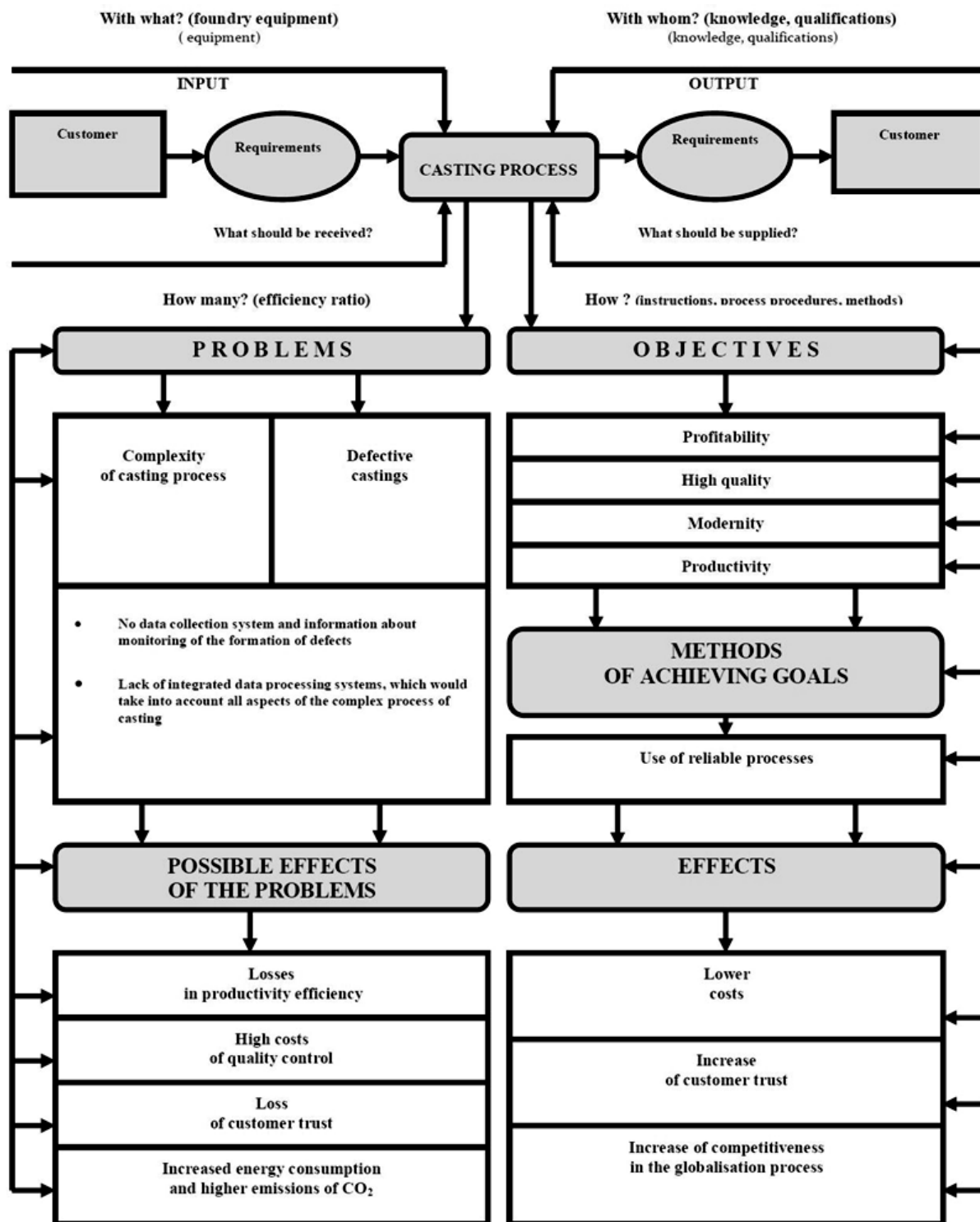


Fig. 1. Simplified factor analysis in the foundry process

Table 1.

Example of process map: Technical preparation of the production process in the foundry

PROCESS MAP: TECHNICAL PREPARATION OF THE PRODUCTION PROCESS IN THE FOUNDRY			
PROCESS OBJECTIVE: TECHNICAL PREPARATION OF THE PRODUCTION PROCESS			
PROCESS RATIO: TECHNICAL CONFORMITY OF PRODUCTION TO CUSTOMER REQUIREMENTS TECHNICAL COMPATIBILITY			
PROCESS OWNER: ...			
SUPERVISION OF THE PROCESS: CHAIRMAN OF THE BOARD			
INPUT DATA – CUSTOMER/PROCESS - DOCUMENT			
1.design documentation ; 2. customer requirements – norms; 3. minutes of meetings; 4. review of the offer – orders; 5. card fault; 6. production order 7. delivery documents / certificates, quality certificate/; 8. sales plan; 9. technical-economical plan; 10. internal correspondence ; 11. review card complaints			
PROCESS IMPROVEMENT:	The scope of self-control and monitoring of risks Gap analysis: quality, timeliness, production repeatability Related procedures	I. Process planning	RELATED PROCEDURES AND INFORMATIVE SYSTEMS Norms, instructions, software, tooling catalogues, regulations
Performer: ...		Performer : 1. Production schedule 2. Notes from the production meetings 3. Meetings minutes 4. Minutes from the Committee on Quality	
EXERCISE OF CORRECTIVE AND PREVENTING ACTIONS		II. Process realisation	
EXERCISE OF THE SUPERIOR'S DECISIONS CONSIDERING THE PROCESS IMPROVEMENT		Performer : ... 5. Development of technological and combined documentation 6. Preparation of the demand for materials 7. Performance of the sample	
		III. Review and analysis of data process	
	Performer: 8. Analysis of gaps and inconsistencies 9. Corrective actions 10. Committees on Quality 11. Supervision of the production implementation		
OUTPUT DATA – DOCUMENT – CUSTOMER/PROCESS			
1. technological documentation / according to the instructions, 2. main card; 3. guidebook; 4. specific instructions; 5. charter change; 6. demand for casting materials; 7. card of approval process; 8. stocks of materials; 9. quality plan; 10. card technology			

4. Conclusion

The main challenges faced by Polish foundries are due to increased competitiveness, which is caused by globalization. The globalization has set Polish casting companies in a new situation. Competition from Asian countries offer cheaper products resulting from low labour costs. Western european foundries base their strategies on high quality of the products and technical advances. An essential element of these strategies is the high efficiency of products supply of sufficient quality, Just In Time, as a result of the optimization process. Due to the progressive process of globalization and regionalization and increase of the competitiveness of the countries with advanced technology and low costs of labour force, new foundry should be built or increase the efficiency of existing ones through the implementation of modern technologies ensuring high quality of the products and satisfaction of customers. In the world, bigger foundry buys smaller ones.

Also some foundries are transferred from well developed countries. A phenomenon increasingly common is the development of competitiveness through efficient customer service and the use of local production and outsourcing. Example is the first Finnish URV Foundry (Uudenkaupungin Rautavalimo Oy) which started their own casting production in cooperation with other companies, even very distant ones. The system cooperates with 10 chinese foundries and one estonian foundry in the system of 'outsourcing' [4].

Requirements for foundries change as time goes by. Their task is not only to provide castings of various alloys in their crude state, but also finally finished products, their delivery to the customer including the guarantee of high quality products, inter alia through the improvement of casting processes. In recent years some of the foundries have invested in new production lines and machining centers as customers increasingly demand the machining of castings which are components ready for assembly. It is more common to use the fully automated monitoring of the process.

Competition is further impeded by economic factors. It is important that foundries maintain low costs, high quality of products and rapid execution of customer contracts. These processes should be supported by the use of computer tools [5].

Optimization of casting processes can significantly reduce castings production costs. Technology optimization improving the manufacturability of produced castings and their structures can help reduce the demand for production basic materials and, what is the most important – lower costs resulting from poor

quality. Globalization has faced polish foundries and foundry companies with new challenges: quality, design and organizational ones. Reducing the number of process scraps, raising the quality of products, offering a modern and technologically advanced devices – all requires making investments in machinery parks. At the same time important activity is a systematic management of quality as a process.

That includes ongoing monitoring of the quality of raw materials, intermediates and finished products as well as qualification of suppliers. Elements that can be optimized are: production planning, foundry working capital and personnel costs as well as transportation.

Optimization of quality, improving the efficiency of the design and delivery of products requires reliable information delivered in proper time. A good solution for foundry is to implement the integrated IT systems which will cover all areas of foundry activities. A rather problematic task to achieve, ensuring the sustainability of competition, is to create the organizational and technical conditions necessary for obtaining high quality human resources especially high level of their knowledge, skills and communication and closer cooperation.

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