

## TOTAL QUALITY MANAGEMENT AND ACTIVITY-BASED COSTING

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**Abstract.** *Global competition challenge and rapidly changing technologies endanger classic instruments of managing enterprise and they need understanding and application of new management philosophies. In order to compete successfully in new conditions enterprises put customers' satisfaction at first place. It is by realizing and improving the quality of their products and services that enterprises ensure competitive advantage during the length of time.*

*In addition, the paper is to deal with quality, being the key success factor and competition paradigm, evolution in quality management, and the emphasis given to total quality management. Special attention is to be paid to activity-based costing, being compatible with total quality management.*

### 1. INTRODUCTION

For contemporary enterprises faced with changeable, ever-increasing customers' demands, quality becomes a paradigm of competition. Both product and service quality and operational process quality must be taken into account, as well. Traditional cost accounting systems are directed to product, not to process, and they are not compatible with management philosophy of the total quality. That points out the need for finding a new concept of cost accounting, the one that suits contemporary conditions of business operation.

### 2. QUALITY AS KEY SUCCESS FACTOR IN CONTEMPORARY CONDITIONS OF OPERATIONS

Until 70s enterprises in West countries carried out their business in protected competitive conditions. Barriers concerning communication, geographic distance, protected markets etc. lessened foreign enterprises possibilities to compete successfully at domestic markets. In such conditions enterprises had no motives to operate more efficiently and cut down their expenses, for it was usually possible cost increase to be switched to customers.

During '70s, however, enterprises faced strong competition that offered high quality products at low price. Markets suddenly became global ones. Traditional classification into local, regional and national markets becomes less relevant when the whole world is a big, global market. Global enterprises look upon the whole world as being their market, and it is not important where is the enterprise located, and where is the enterprise top management from. Global orientation asks for radical reorientation of business functions and business policy.

Intensive global competition, technological innovations, sophisticated and changeable customers' requirements for products and services with lower costs, appropriate quality, high reliability, wide possibility of choice, resulted in drastic fall of product life cycles and that increased the risk of manufacturing. Condition of survival at the market means increase of dynamics of new products introduction and securing information at the product designing stage, for it is just in that stage that a lot of costs are committed.

In order to compete successfully on the high competitive global market, enterprises must take care of customer satisfaction as a top priority in business operations. To achieve it, they must concentrate on key success factors – costs efficiency, quality, time and innovations (1,p.23).

When all the other products characteristics are equal, customers will buy the product with the lowest price. By keeping costs low enterprise provides strong competitive advantage. For that purpose enterprises use target cost, which is a strategic concept of cost management directed to cost decrease over the entire product life cycle. In addition, it is necessary to possess precise information on costs. Incorrect cost information lead to frequent and expensive mistakes in making decisions. The advantage is on the side of those enterprises that use cost accounting systems, which give precise information on costs.

One of the key success factors is time. Meeting consumers' needs may be increased by providing speedier response to their requests, ensuring 100% on-time delivery, reducing the time taken to develop and bring new products to market. For these reasons attention is to be paid to time based measures.

Enterprise success depends on capability to research and develop new products and services and adopt them to changeable consumers' requests. Management accounting includes effect measures that are focused on flexibility and innovations. Flexibility relates to the responsiveness in meeting customer requirements. Flexibility measures include the total launch time for new products, the length of development cycles and the ability to change the production mix quickly. Innovation measures include an assessment of the characteristics of new products, number of new products launched and their launch time.

Quality is a very important success factor. Besides low costs, consumers require high quality product. Until the end of '80s most enterprises considered quality improvement to result in cost increase and profitability decline. That counts for those conditions where quality system was dealt with over inspection and rework of already finished products. That time philosophy reflected in increase of production volume on account of quality, and the result was keeping high levels of stocks at each production stage in order to protect against shortages caused by inferior quality in the course of previous stages. The outcome of that was increase of costs linked with inspection, rework, scrap and warranty repairs.

Contemporary approach to quality management means not only quality improvement, but cost reduction, as well. It is cheaper to produce the items correctly the first time, rather than to waste resources producing substandard items, the ones that have to be

detected, reworked or returned by customers. The emphasis of total quality management is to "design and build quality in, rather than trying to inspect and repair it".

### 3. QUALITY AS A PARADIGM OF COMPETITION

For contemporary enterprises faced with changeable, increasingly more sophisticated customer's requests and strong competition of global market, quality becomes paradigm of competition. One must have in mind not only quality of product and services, but quality of all business processes, as well. It means "quality system as a set of management activities by which organizational efficiency is made better, productivity increased, costs reduced and competitive position on the market improved". (2, p.202)

There is no method for quality creation "over night". It is necessary to analyze and pay attention to quality problem in the length of time, and that was unfamiliar to most enterprises. Experiences of, at first Japanese and then American and European companies show that quality is realized by quality system as a constant management activity. High quality means increase of product reliability and its performances up to the level of excellence. Former approach to quality meant product quality inspection after the end of manufacturing process, in contrast to contemporary approach which means building quality in before beginning the manufacturing process, during the stage of designing and making the prototypes. Such an approach asks for coordination of all the employees – from direct producers to top management.

New approach means quality improvement in all stages of manufacturing, and at the same time results in shortening time needed for product manufacturing, more efficacious use of production factors, and reducing waste. They all result in cost reduction. The objective is to produce correct products at the first stage, and that is how costs concerning inspection, rework, scrap and warranty repairs are eliminated, that is costs originated due to inadequate quality inspection. The emphasis is on the preventive "keeping up and carrying out the work well at the first stage". It starts from the assumption that quality reduces costs. Incorrect items stop manufacturing process, require additional cost of manufacturing and result in delay in delivery terms. Accepting the programs, which raise the awareness on quality, many enterprises reduce defect rate, reduce stocks, improve quality and at the same time reduce costs.

Quality as a strategy for the competitive position improvement is embodied in Japanese enterprises. Japanese manufacturers, before the others, applied new production philosophies and management technique, such as business system "Just-in-Time", target cost, etc., and that enabled them to introduce new products faster, taking care of consumers' requirements, with shorter period of product manufacturing and with lower costs. Shorter production cycles, low stocks, "cell" production, synchronized production, waste reduction, are just a part of what west manufacturers could learn from Japanese manufacturers, that is, what leads to high quality.

Wish and interest of Japanese nation to compensate scarce natural resources by know-how, have resulted in development of business operation system where the idea on productivity and quality penetrates every part of an enterprise and occupies every employee – from top management to production worker. By means of new organization culture, the basis of which are "learning, innovations and team-work", the principle "zero

defect" and "quality cycles" technique, Japanese enterprises managers have found in quality "strategic possibility for entering and affirmation on the world market". (2, p.203)

#### 4. EVALUATION OF QUALITY MANAGEMENT

Quality management evaluation may be analyzed through the following four stages (3, p.492):

- Inspection
- Quality Control
- Quality Assurance and
- Total Quality Management

*Inspection* is the simplest way for quality assurance. In contrast to handicraft in small series, mass production and need for ensuring possibility of parts change required formal inspection. It was done through comparison and inspection of product characteristics with set requirements, and was applied for materials, component parts, in the scope of certain stages during manufacturing, and for finished products, as well. Inspection activities were given to employees. The system was "internally oriented and was not directed to prevention" (4, p.31). Such quality control did not satisfy, for it was based on finished product inspection. In addition, products of appropriate quality were accepted, while the other products were abandoned, and if possible reworked or used for the other purposes. Thus, there had not been any possibility of taking corrective measures before deviations were noticed.

*Quality control* involves "various activities and methods that are used with the goal of achieving and keeping up quality of the product, process and service" (4. p.31). It is to start from the fact that product defects may appear in the course of various stages in the process of production, so that it is necessary quality management to be oriented towards detecting and eliminating causes of defects, not the control of already finished products, in order to detect irregularities and to try to eliminate non-coordination in relation to defined requirements.

*Quality assurance* means that quality control is carried out systematically, that is through planned and systematic activities. Thus, quality control is not focused only to production stage, but it is planned quality management to be done in the course of projecting and development of the product, building it in and service. Experience of numerous and various approaches of the world companies in the field is rationalized and given in the series of ISO 9000 standards.

Starting from 1980s, by applying the principle of quality management on all the aspects of business operations, the concept Total Quality Management (TQM) is achieved. Total quality management objective is to meet consumers' requirements and is based on the principle of continuous improvements with participation of all the employees. The word *total* denotes the idea that all the employees, over every function and level in organization, strive to quality; word *quality* suggests excellence of every aspect of an organization; word *management* shows that quality is to be looked for as the effect of quality management process (3, p.493).

Total quality management is based on the following principles:

- Concentration towards meeting various and ever-increasing more sophisticated customers' requirements
- Concentration on processes and their continuous improvement
- The correct way for achieving quality is total activities management in value-chain
- The emphasis is on prevention, not on inspection at the end of the product manufacturing process
- Every employee is to be engaged in quality improvement and responsible for his work quality
- It is only by team-work that processes can be improved and high quality achieved
- Decision making is to be based on accurate and relevant information
- Enterprise is to cooperate with those suppliers who are able to ascertain qualitative inputs
- Concentration does not reduce costs
- Quality assurance is a continuous process
- It is the customer who defines quality, not the manufacturer.

Elements of total quality management include (5. p.16)

- Eliminating or reducing non-value-adding activities (such as setting up machines and ordering materials)
- Reducing inventories, lead-times, and defects
- Streamlining production flow
- Cooperating with suppliers
- Increasing the flexibility of the workforce
- Encouraging operators to maintain their own equipment, and detect, record, and solve their own problems.

##### 5. ACTIVITY-BASED COSTING IN THE FUNCTION OF TOTAL QUALITY MANAGEMENT

By realizing and improving the quality of products and services enterprises ascertain competitive advantage in the length of time. In order to realize it, it is necessary to manage activities and processes in the right way, so that it is made possible the product to get desired characteristics. Quality is not to be singled out of the product, but it must be involved in all activities of the enterprise. In that sense, enterprise is viewed as a system of business processes through which resources are transformed into products intended for market. Business process is a series of activities arranged according to certain order in time and space, which asks for certain inputs, add value and produce output for internal and external users.

It is by performing business processes that value is created both for the owners and the customers. The source of enterprise competitive advantage stems from its capability, by performing business processes, to create value for its customers, the one that overpasses the costs of creating. Special importance is given to creating superior value for customers, that the other competitors on the market are not capable of creating or imitating.

In that sense, Michael Porter (6, p.37) views every enterprise as a special value-chain. Through value-chain enterprise performance is divided into a number of joined,

strategically relevant activities, in order to find out possibilities for competitive advantage realization much easier. That is a joined group of activities that add value over the entire process, from the stocks of basic raw-materials and materials, to the final product for customer. "Value" in value-chain is what customers are willing to pay for product or service. Each activity in value-chain is included in total quality management. It is by coordination and concentration of certain parts in value-chain to teamwork, that are realized conditions for more efficacious cost management, formulation and carrying out quality management successful strategy.

Total quality management means excellent quality of products and services and its goal is to carry out the things well at the first time, and to work on continuous improvement. It emphasizes the need for production functions in the enterprise to be continually improved. Traditional cost accounting systems are directed to the product, not to the process, and thus they are not compatible with the philosophy of total quality management. Enterprises can, in order to increase operation efficiency and realize higher quality, use the business system "Just-in-Time" and total quality management, but use of traditional systems of cost accounting creates problems, specially when overall costing is concerned. Traditional cost accounting systems application, which in overall costs allocation use driver costs connected with production volume, leads to the fact that more overall costs are imputed to products manufactured in large volume, and less to products manufactured in small volume, without taking into account those products needs for supporting activities.

Traditional cost accounting methods were created in conditions when enterprises manufactured products with a little variety, with a predominant proportion of direct work costs in price costs and with similar requirements for supporting activities. On the other side, contemporary manufacturing is characterized by complexity and variety, wide range of products, growing number of operations in the process, complex product design, etc. These factors, combined with increased application of automatization, resulted in increased portion of overall costs in total costs, and thus in problems concerning their allocation, if as a bases are used measures connected with volume (direct work-hours, machine-hours, etc.). Many costs are created due to activities that are not connected with physical volume. Those are activities concerning material handling, material supply, preparing manufacturing operations, quality control, and the like.

Researches have shown that a great number of enterprises use as a basis for making decisions information on costs that are not reliable enough. Managers are often in need for information they require for efficient management and in getting the answer concerning two very important questions- what are the profitability sources and where are the best chances for improving performances. Activity-based costing is an attempt to deal with the problem. Activity-based costing is viewed as Porter's value-chain division, which is bases for analyzing enterprise competitive advantage, and it refers to those activities which are in the function of meeting consumers' needs and wishes. Activity-based costing is a source of missing information on performances. It provides information on costs and information on processes. It is based on an assumption that activities are cause of costs, while products create need for the activities. Costs are "traced" from resources to activities and from activities to products or customers.

Activity-based traceability of costs means: identifying the concept and types of activities, identifying driver costs for certain activities, putting those activities together into

centers for analyzing according to activities and fixing cost price of the component parts and final product (7, p.9). Classifications of activities that are to be reported depends on enterprise organizational structure, size, type of activities that the enterprise performs, etc.

Berliner and Brimson define model of cost accounting generic activities in the scope of the following enterprise fifteen functions: strategic planning; basic research and development; marketing; product/process development and maintenance; tooling and production programming; production management; in-process material movement; production operations; incoming material control; outgoing material control; production quality control; human resources; information systems; facilities management product services (8, p.54-62).

Hornnngren, Foster and Datar divide enterprise in six groups, which are enterprise basic functions: research and development, product designing, manufacturing, marketing, distribution and services. Function are given to departments (e.g. manufacturing is divided into: manual production, machine production and installation), while departments are divided according to activities (e.g. activities in installation department would be the following ones: preparation of material, manual building in, machine building in, testing and packaging (9, p.166).

In enterprises with intensive technologies the following activities can be identified, as well: orders activities, receipt activities, activities connected with suppliers, orders planning, dealing with the processes, accounting department activities, tracing, reporting activities, activities concerning product delivery, propaganda, debts records, maintenance, and production (7, p.9).

Activities are further classified into four broad categories, and that gives possibility for setting more levels for driver costs, and those are: activities on the level of unit, activities on the level of series, product maintenance activities, and activities concerning resources keeping up.

Activities with the same driver costs should be aggregated into same centers, which are basis for cost calculation. Costs are first accumulated for each activity separately. Then the product is burdened with appropriate costs, in proportion with product requirements for the activities.

Activity-based costing information helps managers in realization of cost reduction programme. Traditional systems pointed out the possibility of reducing costs by providing material at lower prices, and thus making direct work more efficacious, and by speeding up machine operations. Contemporary approaches to the problem show that enterprise manages successfully the activities in order to reduce costs and increase quality. Costs can be reduced, and quality increased by more efficacious performance of planning products activities, material-handling activities, and by reducing number of parts that final product is made of, and taking care customers satisfaction not to be made less.

The starting point is that certain costs can be eliminated, and that it does not make product quality an inferior one. This approach is essential for application of continuo improvement culture. Activity analysis is done with the objective to eliminate those activities that do not add value to the product and, in addition, costs caused by those activities. As the quality emphasis is moved from quality control to quality building-in, so is costs emphasis moved from cost control to cost reduction. If processes and activities are analyzed and thus eliminate activities that do not add value for customers, costs are to be reduced automatically.

Activity-based costing measures activity performances, determines output costs of

business processes and identifies possibilities for making the process more efficient and effective. Activity-based costing is in accordance with total quality management methodology and product defining as a set of processes. In addition to calculating product costs, it is focused to activities, that is processes, control. Activities are compatible with total quality management.

## 6. CONCLUSION

In order to improve products quality, an enterprise is to manage properly the activities and processes which enable the product to possess desired characteristics. Quality cannot be singled out from the product, but it must be included in all enterprise activities.

Total quality management emphasis is on designing and building-in quality, not on control after manufacturing and rework. Traditional cost accounting systems are concentrated on the product, not on the process. New cost accounting concept, known as activity-based costing, gives information on costs and processes and is compatible with total quality management.

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## UPRAVLJANJE TOTALNIM KVALITETOM I OBRAČUN TROŠKOVA ZASNOVAN NA AKTIVNOSTIMA

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*Izazovi globalne konkurencije i brze tehnološke promene ugrožavaju klasične instrumente upravljanja preduzeća i zahtevaju razumevanje i primenu nove filozofije menadžmenta. Uspesno konkurisanje u novim uslovima stavlja satisfakciju potrošača na prvo mesto. To zahteva realizovanje i unapredjenje kvaliteta proizvoda i usluga, što osigurava konkurentsku prednost preduzeća.*

*U radu se razmatra kvalitet kao ključni faktor konkurentске prednosti, evolucija upravljanja kvalitetom. Posebna pažnja poklanja se upravljanju troškovima zasnovanim na aktivnostima i kompatibilnosti sa TQM.*