

Scientific review

UDC: 657.3

*Paper received: 11/04/2016*

*Paper accepted: 30/04/2016*

## **INFLUENCE OF OPERATING CONDITIONS TO THE METHOD OF CALCULATING COST PRICES**

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### **ABSTRACT**

That the company knew what the price of production some product or service, it is necessary to apply adequate method of calculating the cost price. Accordingly, the method of calculating the cost price, and it covers the cost, will affect the accuracy of the information provided and therefore the decisions that are made based on it. This paper assumes that the method of calculating the cost price incurred and develop under the influence of current business conditions. This will show when incurred the first method of calculating cost price and what are the business conditions imposed by the need of a given calculation, and to have developed. Why are they under certain business conditions apply just these methods? How did that affect cost price? How is the cost price calculated in present conditions? What trends are expected in the future? This paper will try to answer these and similar questions.

**Keywords:** *cost price; calculation; costs; business conditions*

### **1. EMERGENCE OF CALCULATION OF A COST PRICE**

Although the importance of cost price may be linked to the occurrence of the man's need to create, the importance of calculating the cost price arises only by the emergence of the industrial revolution which caused radical changes as regards conditions of business performance of that period. Given changes required adapting to new conditions in order to meet a new goal

related to production of goods and services. In other words, the then manufacturers adapted their production to meet the market's needs, therefore the information about how much does a product or service cost was of importance for making business decisions and win the market. The emergence of business conditions dictated by the Industrial Revolution caused changes in the accounting system, as well as techniques for the calculation of cost price.

Until the emergence of the Industrial Revolution, the production occurred in primitive households and everything which was produced was designed for the needs of the producers themselves and their families, as well as the needs of the slaveholders or feudalists. Therefore, production and consumption came down to the household and the purpose of the production itself was the usage. Trade existed, but it was insignificant compared with the production which was taking place for personal use of farmers. During the above agricultural production period, which took place within households and exclusively for the purposes of the producers themselves, the slave holders or feudalists, there was no need for accounting records, except for the above given calculation. The transition from simple accounting records to the double entry accounting system may be noted in the 14<sup>th</sup> century when trade flourished by the development of Italian cities. Given accounting system occurred as a result of credit sale of products and services on which represented the grounds of debtor-creditor relations then created. The double entry accounting system meant that each transaction was recorded in two accounts and it was radically different from the previously used accounting records. Therefore, the accounting before the Industrial Revolution mainly came down to external relations records, i.e. transactions which were determined by the market.

The Industrial Revolution led to relocation of manufacturing, which until then took place in households, to factories and facilities. In other word, it has led to industrial production. Everything produced in single households has been produced in factories since the Industrial Revolution. In this case, the production is not carried out for the needs of the producer itself, but most of the manufactured products and services is intended for sale, i.e. exchange. Relocation of production to factories resulted in separation of production from consumption and in greater exchange in relation to one that existed before the Industrial Revolution. This means that consumers and manufacturers are separated, since the manufacturer no longer produces for its own needs, but for the needs of the market. On the other hand, the manufacturer buys products and services produced by others for his own needs. Thus, the industrial revolution the first time led to a situation in which "everyone became almost

totally dependent upon food, goods, or services produced by someone else"<sup>1</sup>. In the new conditions, the purpose of production was no longer the use, but the exchange, which means that the goal was to sell manufactured products and services. In addition to the fact that the only important thing for manufacturers was to produce more goods and services, the conditions created by the Industrial Revolution also imposed the importance of calculating the cost price, i.e. calculating each product and service costs for a manufacturer. This meant that it was necessary to monitor through the accounting the costs incurred in the process of creating goods.

By relocating production to factories, its purpose becomes satisfying market needs. Therefore, individual production which took place in individual households, became a part of the production process managed by a factory owner. Entrepreneurs who became factory owners during that period "linked processes in the new single-activity organizations because they believed that greater value could be achieved by managing the processes in a centrally controlled organization than by exchanging outputs from the processes in the market"<sup>2</sup> In this way manufacturing plants developed in factories through which raw materials turned into finished outputs, products or services. In that case, the output of one plant was the input for the other manufacturing plant while getting the final outputs. Therefore, the exchange between manufacturing plants occurred and within one single factory. With the occurrence of the internal exchange between plants, accounting not only records external transactions, but also those ones taking place in the factory.

It could be said that all this resulted in the emergence of management accounting<sup>3</sup> whose characteristic is that it is taking place within companies for internal purposes of controlling operations and making business decisions. Thomas Johnson and Robert Kaplan in their book *Relevance Lost: The Rise and Fall of Management Accounting* (1987) consider that management accounting first appeared in the US in the 19<sup>th</sup> century in single activity businesses such as textile making, iron and

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<sup>1</sup> Id. - p. 58

<sup>2</sup> Johnson, H. Thomas; Kaplan, S. Robert (1987) *Relevance Lost: The Rise and Fall of Management Accounting*, Harvard Business School Press - p. 19

<sup>3</sup> Management accounting is also known as internal accounting or cost accounting. It follows operating costs incurred in the process of creation of products and services and connects them to final outputs, while enabling determining of the cost price of each product and service.

steel manufacturing, railroading and in retail companies. Hence, in the early 19<sup>th</sup> century the owners of the then companies demonstrated the need to control performance of single manufacturing processes.

In this period, all external exchanges with suppliers and consumers were monitored through more developed accounting methods, while internal exchange within the companies themselves were monitored through a newly developed method of management accounting.

## **2. CHARACTERISTICS OF THE METHODOLOGY OF CALCULATION OF A COST PRICE IN 19<sup>TH</sup> CENTURY**

New accounting techniques which enabled determination of the cost price of products and services were tailored to companies' needs. For companies' owners it was important to determine the cost price in order to be able to control the conversion of raw materials into finished products and services, thus reaching the goal to produce more with lower manufacturing costs. Bearing this in mind, the former accounting system was adapted to a given goal. This system was used to determine the direct labor costs and general, i.e. overhead costs, in order to determine the price at which semi-products pass from one manufacturing process to another.

Johnson and Kaplan's research showed that, among the earliest records of controlling costs and determining the cost price were the records of textile factories which integrated more manufacturing processes and which were established in New England in the early 19<sup>th</sup> century.<sup>4</sup> Factories' accounting system of that period was kept on two levels. One level represented general books of original entries and books of secondary entries kept in the home office, while the second level included factory books of original entries and books of secondary entries kept in manufacturing plants.

Factory journals kept records of current assets, current liabilities, as well as of all operating costs. These journals also included two accounts which were called cost accounts.<sup>5</sup> Those cost accounts included all direct and indirect production costs incurred in the production areas within the factory. These cost accounts follow production costs of final two-level effects. Thus, one cost account is debited for production costs incurred in connection with production

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<sup>4</sup> According to Johnson and Kaplan, the first records come from Boston Manufacturing Company in Waltham. It was the first mechanized textiles company which connected all manufacturing processes until creating final product. Accounting records of this company from 1815 show that a very precise system of management accounting was used at the time. The given accounting methods were adopted and used by other textile factories which were founded in New England in 19th century.

<sup>5</sup> Are these accounts precursor of operational accounting which was used to a large extension in giant companies which operated during 20th century?

of unfinished goods, while the other is debited for the costs incurred in the production of final goods. Both cost accounts provided information about overall production costs, being debited by an appropriate share of raw materials, factory labor and factory overhead costs. Therefore, the production costs consisted of costs of raw materials, cost of factory workers salaries and general factory costs.

Regarding the general books kept in the home office, they include all the accounts kept in factory books and records related to plants and equipment (long-term assets), capital inventories, long-term liabilities, profit and loss. Amounts on operating accounts, kept in records of general books at the company's level, are identical to amounts on the same operating accounts kept in factory books. Also, these books include costs which are not included in operating factory books, and which relate to sales costs and non-production cost. This means that the given costs were not included in the cost price of final result, but were considered period costs and for their amount the final result of operating of entire company was reduced for a certain accounting period. Also, depreciation cost is recorded only through general books kept in the home office and does not affect the amount of production cost recorded in the factory books but it affects the overall result in the books kept at the level of entire company.

Therefore, the accounting system used in companies during the 19th century provided for information regarding the cost price of produced goods and services, employee productivity and enabled control of the receipt and use of raw materials.

### **3. CHANGES INCURRED UNDER THE INFLUENCE OF MASS PRODUCTION**

Further economic development meant that small factory plants were replaced by big industries resulting in mass production. These industries developed the most after the second half of the 19<sup>th</sup> century, when the oil and its derivatives started their use. Economic development and changes in business also meant changes in the accounting systems, and therefore in the calculation of cost price.

End of the 19<sup>th</sup> and early 20<sup>th</sup> century was marked by the development of mass production, as a result of possibilities for mass exchange (distribution). "Separation of production from consumption caused forced "macrofibia" in all industrial societies"<sup>6</sup>, explained by Tofler as "in-

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<sup>6</sup> Tofler, Alvin (1983) *Treći talas (I)*, Jugoslavija i Prosveta, Beograd - p. 75

fatuation with bigness and growth”<sup>7</sup> The emphasis was on maximization, which meant the establishment of giant companies, large factories with multiple production processes and multiple product lines. This also meant the mass employment of workers who were needed in the production process. It was thought that this was the only way to achieve the profit maximization. So it was deemed that, if the large production series in manufacturing plants might affect the reduction in cost price of products, increasing the volume of production would lead to significant savings, and thus to higher profits.

Therefore it was the period in which it was believed that the efficiency may only be achieved by mass production. Robert Kaplan in his paper *The Evolution of Management Accounting* (1984) points out that mass production enterprises formed in the 1880s for the manufacture of tobacco products, matches, detergents, photographic film, and flour. Most important was the emergence of the metal-making and fabricating industry. Many authors link the need for calculating the cost price with this period which was characterized by the emergence of large-scale industry and mass production. However, as already shown in this paper, the roots of calculating the cost price incurred a century earlier.

The accounting system, which was founded in the early 20<sup>th</sup> century, carried out the calculation of the cost price by distributing costs on cost centers, and after that on the final effects, products or services. Namely, it is necessary to determine the cost centers which caused certain costs and allocate adequate amounts of these costs to given centres. Thereafter, the allocation was made to relevant products or services, allocating costs related to cost centers to final effects due to which they incurred, thus determining the cost price of each product or service.

When determining the cost price, i.e. cost allocation to final effects, it is of a great importance to determine which costs and in which amount are allocated to final effects. In this case, the cost of materials (raw materials) and direct costs of salaries a lot easier linked to final effects than is the case with indirect costs. This is because when delivering raw materials from the warehouse into production it may be determined how much of the raw material is issued for a specific product. Also, in a similar manner, it can be determined how much work the worker spent on the creation of a certain product.

Differing from direct costs, the problem occurs when allocating indirect (general) production costs. The problem of these costs is that with them it is impossible to recognize what amount of incurred costs relates to production of a certain result. It is necessary to find a manner in which general productions

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<sup>7</sup> Id.

costs, allocated to cost places, will be allocated to final results due to which they were incurred. Concerned manners are recognized as keys to allocation of general production costs to final results, which may be: number of production units, number of hours of machine running and number of working hours of employees. Also, direct material costs and direct operational costs may be used as keys of allocation. Based on the given keys the rates of allocation of general costs are determined, as a percent based on which general costs are attached to final product or service.

Theory and practice show that, in this period, the cost price of goods and services accounted for the costs related only to production. Other operating expenses were considered costs of the period and did not burden the final effects, but total company revenues were reduced for their amount thus affecting the profit for the given period. The methodology of calculation which emerged in small plants in the early 19th century, when the calculation only included costs of plants, while administrative expenses (home office) were neglected by calculation concerned.

#### **4. IMPACT OF CONTEMPORARY CONDITIONS OF BUSINESS OPERATIONS TO THE METHOD OF CALCULATION OF A COST PRICE**

Calculation of a cost price used during the 20<sup>th</sup> century did not have any changes during the given period, and thus it could not respond to modern operating conditions. Considering the above, a critic of the given calculation of a cost price arises during the 80s of the 20<sup>th</sup> century. As many authors considered this accounting system of calculation of a price cost antiquated and less important in the modern economy, they called it traditional calculation system. This calculation system of a cost price was adjusted to production industries of large scope, which are becoming less important in modern operation conditions.

It is believed that the abandonment of the Industrial Revolution period and the emergence of contemporary business conditions may be linked to the last two decades of the 20<sup>th</sup> century<sup>8</sup>. This period was characterized by the emergence of computers and information technology development, i.e. emergence of information society which means a huge increase in the amount

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<sup>8</sup> Toffler, in his book *The Third Wave* (1983) considers that the decision which was made in 1960 by Monroe Rathbone, a chemical engineer, can be a symbol to the end of industrial era. Rathbone was a director a large corporation Exxon and at the time he decided to reduce levies this company paid to countries which manufactured oil. Later this decision was adopted by other leading oil companies, after which an urgent counciling took place in Baghdad (committee of governments of oil exporters was formed). Thirteen years later (1973) the October war between Egypt and Israel started and the worldwide oil supply stopped, which shook the entire economy of industrial society.

of mutually exchanged information. Thus, Toffler (1983) states that in this period the civilization was experiencing a third wave of changes which caused transition from the industrial age society to information age society. In this period means and opportunities for exchange of information emerged, which made that the mass information media (e.g., mail, fax or telegraph), dominating the industrial era, seemed rather primitive.

The rise of the information society and easier and faster access to large amounts of information have contributed to the fact that territorial distance between individuals, and therefore the companies, is insignificant. As it is impossible to limit the exchange of information, so the new information society contributes to disappearance of borders and business operations in global terms. Given the easy availability of the global market, companies are starting to operate in a highly competitive market. Bearing this in mind, companies are starting to fight for the market and to adapt to operations dictated by global conditions. "In countries where outside world influences strongly affect the domestic economy, old economic theories do not hold up."<sup>9</sup>

Since traditional calculation systems of a price cost could not respond completely to the new operating conditions, it was necessary to find alternative systems. This is due to traditional systems corresponding to stable and peaceful operating conditions, the reason they were mostly internally directed. Considering the mentioned disadvantages of traditional systems, great efforts were put to create a calculation system which will provide "more organic" allocation of costs to final products and services or which will more precisely determine their price cost. One of the most widespread alternatives to traditional calculation system was the calculation system based on activities (Activity Based Costing).

ABC Based Costing starts from the assumption that costs incurred in production of products and services are caused by various activities which are performed in the given company. Basically, ABC system is based on traditional calculation system of a price cost. Namely, in this system the incurred costs are allocated to objects, and then final products or services. Difference is that with ABC system cost objects are basis of activity. This modern calculation system enables more precise and adequate allocation of costs to cost objects in two stages. In the first stage of allocation, resource costs are allocated to activities, according to application of principle of resource cost driver. In the second allocation stage, activity costs are allocated to final products and services, according to principle of activity cost driver. So, in the first stage the question is:

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<sup>9</sup> Ohmae, Kenichi (2007) *Nova globalna pozornica, izazovi i prilike u svijetu bez granica*, MATE, Zagreb - p. xxi



which activity caused resource cost, while in the second allocation stage the question is: which products and services caused the incurred activity cost.

For this calculation system of a price cost it is characteristic to, as opposed to traditional system, take into account costs incurred in all stages of life of products and services and not only in the production stage. The given system starts from assumption that all activities of one company exist to enable production and sale of products and services for which the company operates.<sup>10</sup> Also, this system is characterized by the principle that it is necessary to attach the general operating costs to cost objects as precise as possible, in this case base activities.

The most significant lack of implementation of this system of calculation are high costs of its implementation. This is because the system consists of a large number of activities that need to be done in order to collect and process a huge amount of information. Also, the resistance of employees against its implementation may be emphasized as a lack of an activity based costing (ABC) system. Namely, the application of this system for employees might mean greater control of certain activities, but also change in company's priorities, which causes fear of layoffs.

Regardless of advantages and disadvantages of this system of calculation, it is evident that the relevant system has led to significant changes in the method of calculating the cost price which existed for almost the entire two centuries, as well as to adjustment of the calculation concerned to contemporary conditions.

## **CONCLUSION**

The paper shows that the methods of calculating the cost price emerge and develop under the influence of the current business condition. That is, methodology has been changing with the change of manner of business organization in companies and adjusted to given changes. The very change of the manner of calculation of a price cost affected its amount. That is, different methodologies of calculation during their development provided different information on how much some product or service costs the manufacturer.

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<sup>10</sup> However, there are authors who consider that with the ABC system it is necessary to differentiate between activities which create added value and those which do not. In that case, when calculating a price cost, resource costs are attached only to activities which create value, so only at the end costs of such activities are included in a price cost of final products and services. It could be said that this problem is similar to the problem which existed in traditional calculation systems with authors who considered that only production costs are included in the price cost. Most probably, the problem is in the approach to accounting systems, if they are "organic" or not, that is if they implement activities from the life of companies in a logical manner.

This paper demonstrates modern operating conditions and how in such conditions a price cost is calculated. However, there is a dilemma on what we should expect in the future. What will be the further development of methodology of calculation of a price cost? Existing trends of global changes affect the changes in the manner of production of products and services. These changes have as a result direct inclusion of buyers in the production process for the first time. They demand products and services according to their needs i.e. place their orders. Does this mean that mass production will be replaced by custom made production? Will traditional system of mass production be completely gone? In which direction methodology of calculation of a price cost will go? Will the calculation system of a price cost JIT (Just In Time) be more often used with change in the manner of production of products and services?<sup>11</sup>

Does this mean that in the future there will be more radical changes in accounting calculation systems of a price cost? Will there be a new revolution in accounting and will freeing of imposed frameworks and rules occur? Will accounting be “more organic” in the future?

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<sup>11</sup> This manner of calculation especially measures costs of a number of individual processes carried out during each activity and, also, it is established on measurement of time which is needed for each process. Given calculation system of a price cost can be changed in production which should respond to individual orders of buyers. In this production supply of exact quantity of raw materials required for production of the quantity of products and services required by buyers is carried out.

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## UTICAJ USLOVA POSLOVANJA NA NAČIN OBRAČUNA CIJENE KOŠTANJA

### SAŽETAK RADA:

Da bi kompanija znala koliko je košta stvaranje nekog proizvoda ili usluge, neophodno je da primjeni adekvatan metod obračuna cijene koštanja. Shodno tome, način obračuna cijene koštanja, odnosno njime obuhvaćeni troškovi, će uticati na preciznost date informacije, a samim tim i na odluke koje se donose na osnovu nje. U ovom radu se polazi od pretpostavke da metodi obračuna cijene koštanja nastaju i razvijaju se pod uticajem aktuelnih uslova poslovanja. Tako će se radom pokazati kada su nastali prvi metodi obračuna cijene koštanja i koji su to uslovi poslovanja nametnuli potrebu datog obračuna, te kako su se dalje razvijali. Zašto su se u određenim uslovima poslovanja primjenjivali baš ti metodi? Kako je to uticalo na cijenu koštanja? Na koji način se cijena koštanja obračunava u savremenim uslovima? Kakvi trendovi se očekuju u budućnosti? Radom će se pokušati dati odgovor na ova i slična pitanja.

*Ključne riječi: cijena koštanja; obračun; troškovi; uslovi poslovanja.*