CONSIDERATIONS REGARDING THE IMPROVEMENT OF COST CALCULATION IN THE BAKERY INDUSTRY USING UVA METHOD

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Abstract:
The traditional methods used for the calculation of full costs no longer provide managers with the information they need in order to make the best decisions. The use of equivalent units of production in the cost calculation represents an alternative to the methods used so far. In the last years, the UVA method has been the object of many debates. The paper tries to present some considerations regarding the possibilities of implementing UVA method in cost calculation in the bakery industry and the advantages obtained by its application.

Key words: *UVA, GP, equivalents of production*

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1. Foreword

The accounting information system must provide an accurate image of the company, otherwise, it loses its role of tool available to managers in adopting and implementing decisions. Businesses need ways to track consumption of resources and to provide the information necessary in order to work towards reducing them.

Traditional costing methods have limitations. In recent decades we have witnessed a steady increase in the share of indirect costs of the enterprise. In traditional methods, overhead costs are assigned arbitrarily, based on less relevant keys. The cost allocation bases are most often than not dependent on volume (man-hours, machine-hours), and it is considered that there is a relationship between overhead costs and volume sizes. Frequently, there are difficulties in reconciling the management accounting result with the financial accounting result. In addition to the product cost, the company has considerable costs with services requested by clients. Such costs, although they have a significant level, are often ignored. The prices below which an order should be declined because its fulfilment would lead to losses for the company instead of profit are not known;

The delivery of a product to different customers brings different results to the company. Under traditional management accounting methods this aspect is ignored.

The main problem with traditional systems is that the level of the calculated costs is far from the actual level, the information concerning the costs are no longer a real support for managers. The solution is to adopt a new calculation method, which due to its specificity, eliminates the shortcomings of the traditional methods.

The milling and bakery industry is one of the first industries in history. Its evolution is closely related to the evolution of the human society and that of the technological process.

Bakery products, by their nutrient content, takes an important place in human nutrition. In Romania, the consumption of bread and bakery products is traditionally high, so the market allows for the trade of large quantities of products.

2. Rationale for the adoption of new calculation methods in the bakery industry

The organization of the management accounting and of the cost calculation is mainly influenced by the following factors: the size of the company, the organizational structure of the company, the type of production and its manner of organization, production technology, management methods and techniques, the main object of activity, level of integration, level of concentration, profiling and specialty of the company.

Before 1990, the bakery industry was characterized by the existence of large companies situated in urban centres. After 1990, the bakery industry underwent a transformation process that followed three main directions:

- the privatisation of the existing companies;
- re-technologization, in order to cope with the new competitive conditions;
- the establishment of small private companies having as a core activity making bread

As for the cost calculation methods used, the company can choose one of the following options:

- improving the cost calculation method it already uses;
- adopting a new cost calculation method more suitable for the managers' need for information.

The first option is apparently the most convenient for the company, due to the low costs. In most cases, the attempts to eliminate the shortcomings of a method by improving it bring favourable results in the short term, but fail to solve its fundamental limitations, arising from its conception.

In my opinion, the option of adopting a new cost calculation method brings benefits in the long term, despite the implementation costs that can sometimes be quite high.

The question arises: "what makes a company adopt a new cost calculation method?". In addition to the shortcomings of the traditional cost calculation methods, which have already be highlighted, there are other factors, such as:

- the emergence of losses. Losses can result in decisions made without accurately knowing the costs, and the cost calculation method is the main cause in this respect.
- the deterioration of profitability. Obtaining negative financial results or obtaining positive, but increasingly poorer positive results should be a warning urging managers to look for solutions, including in the cost calculation area.
- The strategic option to expand the business. Expanding the company can make the current cost calculation method inappropriate to the needs for information.

Companies in the bakery industry are characterised by:

- diversified production. In the bakery industry, even very small companies with less than 10 employees make at least 5-6 product ranges. Big companies can make as much as a few hundred product ranges.
- except for the basic product, i.e. bread, the other products have an increasingly shorter life cycle. The increased competition in this area causes companies to launch new products.
- taking into account the cost structure, the problem is to set prices that can cover costs and obtain a favourable result from the sale of the product in question. However, a competitive economy, the price is set by the market. The calculation method must should allow for making forecasting that should be the basis of well grounded decisions on launching the manufacturing of a product.

3. The UVA method – an alternative to traditional methods

The methods based on equivalent units of production (constant ratios) were created by engineers in the first part of the 20th century. They sought to express costs based on a physical measurement standard rather than directly in a monetary form. The reliability of the methods based on equivalence ratios is dependent on the cost ratios remaining constant among products on a longer term.

After World War II several methods occurred the purpose of which was to calculate costs au based on the cost of a reference product. Georges Perrin's reference work was published in 1963: *Prix de revient et contrôle de gestion par la méthode GP* (Cost and Management Control by the GP Method). The G.P. method is well represented in the literature, but its implementation did not bring major success.

Georges Perrin faced an environment that was not the most favourable for spreading his method. The GP method faced fierce competition from other methods such as the homogenous section method (*sections homogènes* method), the standard cost method, or the direct costing method. After Georges Perrin's death, his method was developed and improved by Jean Fievez and the firm LIA (*Fr. Les Ingenieurs Associes*). For a while, the method was not very widely spread. In 1995 it was re-launched as UVA – Unité de Valeur Ajoutée (Value added Unit).

The UVA method has its origin in the G.P. method by the use of a common production equivalence unit and in the ABC method by dividing processes on activities.

For the cost calculation, the simplest case is that of a company that makes a simple product which is sold to a single customer. The possibility that such company exist is very low. Businesses are complex and their complexity is judged by several criteria. In order to bring a complex company in the situation of a company with a single product/single customer, the UVA method resorts to the creation of a value added unit (UVA) by means of which it will measure the entire production of the company. The production means not only the result of the manufacturing process of a company, but also the result of its din administrative of commercial activities.

In the case of the UVA method, the term "value added" is not the same as that used in general accounting. In the view of the creators of the method, the value added of a product corresponds to all the resources consumed plus the raw material costs incurred to obtain the finished product in the shop. The value added includes the design, manufacturing, storage efforts and other efforts.

The main features of UVA method can be summarized as follows.

The UVA method is based on the analysis of the transactions of the company with its customers and on a few simple rules[1]:

- each transaction is a turnover;
- the sum of the turnovers of all the transactions is the turnover of the company;
- each transaction generates a result: profit or loss;
- the sum of the results generated by all the transactions of the company is its operating result.

The UVA method allows for a detailed analysis of the company, which analysis allows, right from the construction stage, for the discovery of opportunities of improving the activity. Thus operations that can be eliminated, new organization methods, etc. can be discovered.

The description of all the company processes and the relevance of their place in the value chain enables all business leaders to understand their role in the achievement of the performance targets of their company. This opens the way towards mobilizing the whole company to reach the fundamental objective: obtaining profitable sales.

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[1] Fievez Jean -*Présentation de la méthode UVA, (Presentation of the UVA Method)*, Journée Pédagogique "L'actualité comptable en débat", 2003, p. 22

By applying this method, the cost of the products is known with greater precision, and there are two arguments in this respect:

- the fine outlining of the company achieved by this method avoids using average values which hide a significant real dispersion;
- the complete analysis of a process by the integration of the operations generating overhead costs avoids the use of arbitrary allocation keys.

It should be noted that in addition to the significant contributions to the product cost calculation, the UVA method also calculates general administration costs.

A more accurate determination of the costs allows for comparing products and processes. Following such comparisons, proposals can be made for potential improvements.

Jean Fievez proposes[2] two phases of the process of adopting the UVA method: the construction phase of the method and the phase of its operation. The cost of a product is the sum of all the costs of the incorporable acquisitions (raw materials and other incorporable costs) and the cost of the value added by the company.

The customer cost is generated by what the company had to do from the reception of the order and until the cash-in of the invoice issued to the customer. The customer cost is made of customer-specific costs (transport, packaging not-included in the cost of incorporable materials) and the cost of the value added by the company to the client.

The cost of the value added by the company to the client is made of:

- the commercial cost (market exploration, documentation, taking part into fairs and exhibitions and others) ;
- administrative cost registering the order, invoicing);
- logistics cost (handling, storage, transport).

Noting that $A_{UVA}=\Sigma\ a_{UVA}$ and $B_{UVA}=\Sigma\ b_{UVA}$ we obtain the number of units UVA made by the relation:

UVA made = $A_{UVA} + B_{UVA} = P$

The calculation of a UVA (m.u./UVA) for a given period is made using the formula:

$$\text{The cost of one UVA} = \frac{\textit{Costs retained for the calculation of the UVA (m.u.)}}{\textit{Total UVA production (UVA)}}$$

The relation above can also be written in the following form:

$$\text{The cost of one UVA} = \frac{C-(A+D)}{Q_{UVA}}$$

w:

C= The sum of the expenses in the financial accounting

A= the value of the goods incorporated in the products;

D= the costs specific to the relation with the clients

In order to evaluate the cost of the value added that was incorporated, the UVA method calculates the consumption of resources of each workstation in usual operating conditions. From this point of view there is a view similar to the standard cost calculation method. A normal workload is defined for each workstation, expressed in standard units of work. Each workstation is allocated operating expenses per unit of work. The most frequently used unit of work is the hour.

[2] Fievez, Jean -*Présentation de la méthode UVA*, Journée Pédagogique "L'actualité comptable en débat", 2003

The main objective of the UVA method is to measure the result per each invoice. According to this method, the cost of an invoice is the sum of two costs that are distinct and independent from one another:

- one cost in relation to the product sold;
- one cost in relation to the client to which the product was supplied.

The profitability curves can be drawn based on several criteria, as follows: the curve of the profitability of all sales, the curve of the profitability for one product, for one customer, for one market, for one geographical region, etc.

In relation to the profitability analysis, the method provides decision-makers in the company with a new vision concerning what is profitable and what is not profitable in the company. They can act in two different directions:

- to reduce losses from poor sales;
- increasing the turnover by increasing the quality of the services provided if possible and decreasing the prices in order to win new market segments.

4. Possible errors in the cost calculation by the UVA method

The accuracy of the cost analysis is related to the number of the workstations or the activities. Starting from the principle of stability of the cost structure, the UVA method only needs a single distribution.

Datar and Gupta, in a survey published in 1994 identifies three types of errors that can occur in a cost calculation system: measurement errors, specification errors, aggregation errors.

The measurement errors result from the difficulty to identify the costs of an activity or to measure the resources consumed per cost item. Such errors correspond either to a wrong entry in the accounts, or to an error estimated at the inductor level (an employee estimates that he spends 20% of his time for an operation, when in fact he spends 35%).

In the case of the application of the UVA methods the measurement errors are limited. Michel Gervais (2006) believs that the errors made in the accounts have no significance, as it is an engineering approach which takes into account what resources a certain workstation spends under normal conditions. On the other hand, errors can occur concerning the resource consumption. An error may occur concerning the number of consumed resources, especially in relation to the time spent for trading and administrative activities and the occurrence of errors concerning the number of UVA made (Gervais, 2006).

Specification errors come from the omission of an inductor, from using the wrong inductor or from creating a wrong relation between the inductor and the cost of an activity. In the case of the application of the UVA method, in order to avoid specification errors it is necessary to perform a thorough analysis in such a way as not to omit any workstation. Moreover, it is necessary to associate an adequate working unit to each workstation.

Aggregation errors occur when the cost is obtained by adding the cost of the resources spent on cost items in various proportions. Michel Gervais (2006) believes that aggregation errors are an essential problem in the UVA approach. This method is based on the assumption that the relations among the costs of the various workstations remain constant. In fact, costs can change for various reasons, some having nothing to do with the company. If there are major evolutions, the workstation indices must be updated. The problem arises to determine the circumstances under which such updates must be made.

Kaplan and Anderson (2004) identify a fourth type of error that can occur: errors coming from underutilizing the production capacity. By applying the ABC method, part of the expenses is broken down on activities according to the time employees report they spend for each of them. By reporting these times, employees cover up the potential

inactivity, therefore the sum of the reported times is 100%. The above-mentioned authors propose the use of the Time Driven ABC solution.

The errors caused by the use of the production capacity do not occur on the workstation indices and on the UVA equivalences.

Georges Perrin notes that the unit prices of the period t_1 developed all in the same proportion as compared to the period t_0, the proportions among operations remaining the same. Georges Perrin supported the need to review the hidden constants on a regular basis, and Fievez proposes a review of the UVA indices every 5-6 years. The users of this methods may view aspect as the advisors' intention to sell an additional mission.

In 2002 Dimitar Staykov makes a number of tests concerning the stability of the indices. Michel Gervais (2006) makes an analysis of the reliability of the costs calculated by the UVA method. Both authors offer conclusions in favour of the UVA method.

The hidden constant principle or the hypothesis of the UVA indices stability over time is the basis of the method. It is also its main weakness, an aspect highlighted by Mevellec (2002) and Meyssonnier (2003). Meyssonier also mentions the absence of a normalization concerning the choice of the base item.

In the implementation of the method, there are a few critical phases that may raise problems, such as the cascade distribution of overhead costs, the evolutions of the cost of various resources spent (which can be divergent) or the questionable choice of the reference product.

An appropriate software is essential for the success of the method. Michel Gervais (2006) believs that the success of UVA method application "depends on the ability to couple the accounting software with the software for production management and human resources management as well as updating information in these two last software".

In the GP-UVA approach the UVA workstation are viewed as entities resulted from an operational analysis of the manufacturing process in which overhead costs are allotted. If the implementation of the method is detailed, we must take into account that besides the costs allocated without any problems (staff cost, equipment depreciation, etc.), there are other expenses that must be regrouped and distributed on UVA workstations using allocation keys such as the surface occupied by the UVA workstation. In this respect, there are similarities with the allocation of the overhead costs used with classical full cost calculation methods.

5. Conclusions

Currently, traditional methods used for the calculation of full costs no longer provide managers with the information they need to control economic efficiency and to make decisions related to the allocation of resources. Traditional full costs have the disadvantage that they are oriented towards the past and are obtained by an inaccurate calculation. The decisions made based on the costs calculated by these methods can be erroneous.

Each calculation method has and disadvantages. The methods created in the attempt to eliminate the shortcomings of other methods fail to take into account other aspects that later become their disadvantages.

In my opinion, the UVA method is not only interesting from the theoretical point of view, but it is also practical due to the multiple advantages they provide. The main problem of the UVA method is the stability of the indices over time. This problem can be solved by the appropriate maintenance of the method and by simulations.

The application of the UVA method simplifies the evaluation and analysis of the costs of the company for an cost acceptable by any type of company. The UVA method is a cost calculation method preferred especially by small businesses, but it may also be

applied by big organizations. The method eliminates the concept of product margin, replacing it with the concept of sale result (benefit or loss). It does not need a complex and expensive information system, and therefore it contributes to the decrease in the general costs of the company.

The UVA method provides a series of undisputable advantages to the company, if it is correctly applied. By the UVA method, managers obtain information that enables them to make decisions related to: the reorganization of the product range and the development of a well defined policy concerning small orders.

Managers have a special role in the implementation of the method. Taking into account the extent of the resources used for the implementation of the method, a potential failure is unconceivable to them. The profitability curves that can be drawn have special interest for managers. The accountants in the company can perform, when they can master the method, detailed analyses of the costs of the company in a short time.

By creating a UVA method, the value added by all the functions of the company can be measured. The method is characterised by precision and reliability and by the fact that products and customers are accurately known. With the exception of depreciation costs that are dependent on the choice of the depreciation method, the method does not operate with amounts chosen arbitrarily, but with approximations. Another major advantage of the implementation of this method is the fact that it allows for turning the management of a complex company (several products and several clients) into a management of a simple company (one product and a single customer).

REFERENCES

1. Datar S., Gupta M., *Aggregation, Specification and Measurement Errors in Product Costing*, *The Accounting Review*, vol. 69, no. 4, October, p. 567-591, 1994;
2. Fiévez J., Kieffer J.-P., Zaya R., *La méthode UVA : du contrôle de gestion à la maîtrise du profit: une approche nouvelle en gestion*, Dunod, Paris, 1999;
3. Fievez Jean, *Présentation de la méthode UVA*, Journée Pédagogique "L'actualité comptable en débat », 2003;
4. Gervais Michel., *Les conditions de la fiabilité des coûts dans la méthode UVA (méthode des unités de valeur ajoutée)*, Finance Contrôle Stratégie, vol. 9, nr 2, 2006, p.225-258;
5. Iacob C., Ionescu I. Goagără D. - *Contabilitate de gestiune conformă cu practica internaţională*, Universitaria Publishing House, Craiova, 2007;
6. Kaplan R., Anderson S., *Time-Driven Activity-Based Costing*, Harvard Business Review, vol. 82, no.11, November, 2004;
7. Levant Y., de La Villarmois O., *Georges Perrin et la méthode GP : l'émergence et la diffusion d'une méthode française de calcul des coûts*, 8èmes Journées d'Histoire de la Comptabilité et du Management, Poitiers, 2004
8. Levant Y., de La Villarmois O., *Origine et développement d'une méthode de calcul des coûts : la méthode des unités de valeur ajoutée (UVA)*, Comptabilité, Contrôle, Audit, Tome 7, Vol. 2, communication at Journées d'Histoire de la Comptabilité et du Management , Sceaux, 2000;
9. Levant Y., de La Villarmois O., *The Implementation of a Cost Analysis Method: Case Study of the UVA Method*, European Accounting Association Congress, Prague, 2004;
10. Meyssonnier F., *L'approche des couts complets par les equivalents de production, voie d'avenir ou impasse ? (Une analyse de la methode GP-UVA)* Comptabilité, Contrôle, Audit, 2003;
11. *** http://www.association-uva.org/ .