

## **VIEWS ON THE APPLICATION OF COST CALCULATION METHODS BASED ON THE CONSTANT RATIO PRINCIPLE IN THE BAKERY INDUSTRY**

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**Abstract:** In the conditions of the current economy companies around the world are characterised by diversity, complexity, and heterogeneity, which is why the information underlying the decision-making in the company is increasingly important. In this context, companies need methods allowing them to monitor the consumption of resources and to provide the information required to take steps for the reduction of the consumption of resources. With traditional methods, indirect costs are allocated arbitrarily, based on variable and irrelevant allocation keys, most of the times depending on the volume of the activity performed (work hours, machine hours between which there is a causal relationship). Specialists' concerns for the promotion of new cost calculation concepts have led to the creation of new models, such as UVA method. Naturally, the question is which calculation method would be the most appropriate for bakery companies in order to meet the performance-cost-value triptych? In order to be able to provide an answer to the question above, we aim at reviewing hereunder several cost calculation methods based on the constant ratio principle, that could be adapted to the bakery industry.

**JEL classification: M40, M41**

**Key words: cost; calculation; method; bakery industry**

### **1. INTRODUCTION**

The quality of the decisions adopted by a manager has a critical influence on the fate of the whole company. In the conditions of the current economy companies around the world are characterised by diversity, complexity, and heterogeneity, which is why the information underlying the decision-making in the company is increasingly important. In this context, companies need methods allowing them to monitor the consumption of resources and to provide the information required to take steps for the reduction of costs.

In the latest decades, we have seen a constant increase of the share of indirect costs of the company. With traditional methods, indirect costs are allocated arbitrarily, based on variable and irrelevant allocation keys, most of the times depending on the volume of the activity performed.

Complete traditional costs have the disadvantage that are oriented towards the past and are assessed by an inaccurate calculation. The decisions made based on the costs assessed by such methods may be erroneous.

In order to improve the methods of the management accounting and the cost calculation in the bakery industry, systems, methods, and techniques must be adopted for

budgeting, collecting and distributing production costs and for the cost calculation, that should allow for simplicity, efficiency, economical efficiency and forecasts, the objective being to increase the quality of the results obtained.

Naturally, the question is which calculation method would be the most appropriate for bakery companies in order to meet the performance-cost-value triptych?

In order to be able to provide an answer to the question above, we aim to review hereunder several cost calculation methods based on the constant ratio principle and choose the option we consider optimum, with the highest information valences. The category of methods based on the principle of constant ratios includes: the method of the coefficients of equivalence, the weighted coefficients methods, the Georges Perrin method, the UVA method.

In fact, are we talking about the cost calculation or about the cost computation? At first glance, it seems we are talking about the same thing, but by comparing the two notions, in our opinion, the “calculation” is based on a set of calculations made in order to determine the production cost, while the “computation” is the action of calculating and is, therefore, just part of the calculation.

## **2. GENERAL ASPECTS CONCERNING THE COMPANIES IN THE BAKERY INDUSTRY**

The bakery industry is one of the first industries in history. Its evolution is closely related to the evolution of human society and of the technological progress. Bakery products, due to their nutritional content, have an important place in human nutrition. In Romania, the consumption of bread and bakery products is traditionally high. The consumption of bread of the population in our country is relatively constant, and thus the bakery product market has a static trend.

The businesses in the bakery industry are characterised by a diversified production. Even very small businesses, 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.

Businesses in this industry have their own chain stores that ensure the selling of a significant percentage of the total production.

In recent years, competition related to bakery products has increased, partially due to the emergence of a new category of production units: i.e. the micro-production units within large stores built in the last decade in all the big cities. Due to their sales volume, these units are a significant competitor in the market.

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. In a competitive economy, the price is set by the market. The calculation method should allow for making forecasting that should be the basis of well grounded decisions on launching the manufacturing of a product.

## **3. THE METHOD OF THE COEFFICIENTS OF EQUIVALENCE**

In the literature, in most papers, the problem of the coefficients of equivalence is treated as a version of the procedure of the figures of equivalence. But, as we have mentioned hereinabove, the cost problem cannot be reduced to mere mathematical computation. Consequently, we support the opinion of the authors who bring up the concept of method rather than that of procedure when they refer to coefficients of equivalence.

The method of the coefficients of equivalence is based on the principles of the classical cost calculation methods, but is different in the stage of the calculation of the cost per unit and is applied only when, in the production process, as is the case with bakery businesses, most products or at least two of them are deemed main products. The application of this method should observe the following restriction: from the same consumption of materials and the same consumption of labour force, different products, differentiated by one or several common characteristic parameters, should be obtained.

These features are based on the homogenisation of the production in order to differentiate costs and are also a common point for the procedure of the numbers of equivalence, which is why the method has several methods, the most complete and the most realistic being the version of the aggregate coefficients.

The version of the aggregate coefficients has the advantage that it provides a more accurate calculation, because the coefficients of equivalence determined by this method can be used for a longer period of time, if there is a stability of the structure of the production ranges and of the manufacturing technology.

In the bakery companies, the application of the method of coefficients of equivalence, the aggregate coefficient version, should not be difficult given that this method was widely applied in this industry before 1990.

However, we express our reservations concerning the implementation of such calculation because, though it supplies a number of relevant elements for the company management, the market requirements lead to a rapid change of the production range and consequently, the aggregate coefficients cannot be maintained for a steady period of time.

#### 4. THE GP METHOD

The G.P. method emerged as a reaction to the shortcomings of the method of the coefficients of equivalence. The name of the method corresponds to its author's initials, namely the French engineer Georges Perrin who developed it.

Perrin noticed that, in the practical activity, the cost of the manufactured production cannot be accurately assessed, due to manufacturing costs that must be distributed on a large number of products. Given that the company aims at increasing its profits, assessing costs as accurately as possible becomes a major problem.

All the other calculation methods use various conventional criteria for the allocation of indirect expenses and fail to accurately allocate these expenses in the cost of each product, because they cannot establish a precise causal relation between the manufactured products and each item of the expenses to be allocated.<sup>1</sup>

The previously known calculation methods had a number of shortcomings related to: the inaccuracy of the set cost, the high workload required for the allocation of indirect expenses and others.

Following studies of more than 25 years and following 10 years of experimentation in the practice of the companies, Georges Perrin was able to find a single unit for the commensuration of the production, which he named G.P. , after his initials.

This unit has the advantage that it allows for the homogenization of the resulted production regardless of its form of presentation.

The G.P. is an equivalence index expressing the production costs required to manufacture one unit of the standard product and that can be calculated in advance. This

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<sup>1</sup> Oprea, C., Man, M., Nedelcu, M.V. – *Contabilitate managerială (Managerial Accounting)*, EDP, Bucharest, 2008, p. 238;

index was obtained starting from the observation that the production of a company in a certain period consists of the total goods manufactured during this period: finished products, semifinished products, work in progress, etc. For the calculation of the G.P. mathematical methods to bring the whole production at the same denominator, regardless of how heterogeneous such production is.

Essentially, the G.P. expresses a general production measurement unit, namely the production effort. The production effort can be measured only with the help of costs. In order to calculate G.P. mathematical measures are used to bring the whole production at the same denominator, regardless of how heterogeneous such production is.

The G.P. implies the calculation of equivalence indices corresponding to each finished product obtained, called G.P., with the help of which the whole production obtained, regardless of its form of presentation, is converted in conventional homogenous units.

Therefore, G.P. is an equivalence index that expresses the costs required for manufacturing one unit of the most representative product of the company. This product is viewed as a basic product, and the equivalence indices of the other products express the ratios between the production costs required to manufacture one of such products and the total manufacturing cost of the basic product.

## 5. EVOLUTIONS OF THE GP METHOD: UP, UEP, UVA

After Georges Perrin's death, his method was developed and improved by Jean Fievez and the firm LIA (Les Ingenieurs Associes) under the name of UP. 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).

Developments of the GP method were implemented not only in France, but also in Brazil (one version is known as UEP – Unidade de Esforço de Produção)<sup>2</sup>. One of Perrin's disciples, the Italian engineer Franz Allora, changed the GP method, creating what he called the UP method, and came to Brazil at the beginning of the 1960s. There was virtually no request for this method until 1978, when he created a consulting company whose activity was based on its implementation. The method was imported from Brazil in the UK<sup>3</sup>.

The concept of the UEP method is based on the equivalence of the whole production of a company by means of a non-monetary unit: the unit of effort of production. In Brazil, the method was implemented by more than one hundred companies<sup>4</sup> especially in the southern part of the country and in São Paulo. In this country there is also a consultancy firm that owns the copyright on this method and promotes it: Tecnosul Consulting. This method is also taught in the Brazilian universities.

<sup>2</sup> Cambuzzi, Daiane, Balen, Fábio Viane, Morozini, João Francisco - *Unidade de Esforço de Produção (UEP) como Método de Custeio: Implantação de Modelo em uma Indústria de Laticínios*, ABCustos Associação Brasileira de Custos - Vol. 4 n° 1, 84-103 – jan/abr 2009, available at <http://www.unisinos.br/abcustos/pdf/149.pdf>, accessed in August 2011;

<sup>3</sup> Taghezout, Noria, Zarate, Pascale - *An agent-based simulation approach in an IDSS for evaluating performance in flow-shop manufacturing system*, Intelligent Decision Technologies 5, 2011, pp. 273–293, available at <http://iospress.metapress.com/index/Y067250KG3K42015.pdf>, accessed in August, 2011;

<sup>4</sup> Fraga, M. S. et all - *Unidade De Esforço De Produção E Utilização Do Planosequência*, available at <http://www.congressosp.fipecafi.org/artigos62006/175.pdf>, accessed in August 2011;

## 6. THE UVA METHOD

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. It is not necessary to prove that the UVA method has its origin in the G.P. method. It is sufficient to read the relevant papers at the same time<sup>5</sup> for each of the two methods. The basic concept of each of the two methods is based on the development of a representative unit of measurement for the company's production.

Although the two methods are essentially similar, their objectives are different: the GP method aims at analysing the profitability of the products starting from the cost and the profitability per GP, while the main objective of the UVA method is to analyse the sales earnings. From this point of view, the UVA method proposes a radical change compared to the traditional methods. Any company exists to perform sales transactions, thus ensuring its future existence in the market. We are presenting in Table no. 1 a brief comparison between the GP method and the UVA method.

**Table no. 1. Comparison between the GP method and the UVA method**

Comparison criteria	The GP method	The UVA method
Orientation	It is oriented towards the fine analysis of the manufacturing activity of the company.	It is based on the analysis of all the value creation processes: namely both the product manufacturing processes and the customer-related processes
Distinction between action and means	There is confusion between the action and the means used to perform the action	A very clear distinction is made between the means (represented by the UVA items and the use of such means represented by operations and operating ranges)
Assessing the cost and analysis of the result	Assesses the costs of the products starting from the cost of one GP. Only the products are analysed, while the costs that are not related to the products are arbitrarily allocated	The sales result is analysed and the cost calculation takes into account all the processes that have contributed to the sale. The only costs that are arbitrarily allocated are those related to the company management.

The UVA method aims at determining whether the sale of a product X to a customer Y, for a price of Z monetary units, brings profit or loss to the company and which is the value of the profit/loss.

Fievez proposes the following model<sup>6</sup>:

*The result of a sale = the collected amount - the sale cost*

*The sale cost = cost of products + cost of services to the customer*

*The product cost = purchases + added value*

The cost of the products consists of the costs of: research and development, raw materials, supply, storage, quality control, other costs for the products. The cost of the

<sup>5</sup> Perrin, Georges - *Prix de revient et controle de gestion par la methode GP*, Ed. Dunod, Paris, 1963 and 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 ;

<sup>6</sup> Fievez, Jean – *Présentation de la méthode UVA*, Journée Pédagogique "L'actualité comptable en débat", 2003 ;

services provided to the customer consists of the costs for: market research, other commercial activities, delivery, invoicing.

The UVA method allows for drawing yield curves. The yield curve is the graphical representation of the earnings of all the sales of an accounting period. Yield curves can be drawn based on several criteria, as follows: the yield curve of all sales, the yield curve for one product, for one customer, for one market, for one geographical region, etc.

For the cost calculation the simplest case is that of a company that manufactures only one product that it sells to only one customer. The probability that such company exist is very low or “0”. Companies are complex and their complexity is assessed based on several criteria.

In order to bring a complex company in the situation of a “one product/one customer” company, the UVA method resorts to the creation of a value added unit (UVA) by means of which the entire production of the company will be measured. The production includes not only the result of the manufacturing process of the company, but also the result of the administrative or commercial activities, and the value added includes the efforts of the design, manufacturing, storage, and others.

The UVA method provides several undisputable advantages to the company, if it is appropriately implemented. By creating a UVA, the added value created by all the functions of the company can be measured.

The UVA method is innovative not only when compared to other cost calculation methods, it is also revolutionary for the whole management accounting and cost calculation field. Unlike the traditional calculation, the UVA method takes into account most costs of the company as direct costs.

In the literature, studies were published about the implementation and practical use of the UVA method in companies. Ollivier de la Villarmois and Yves Levant published<sup>7</sup> an analysis concerning the implementation of the method by 24 companies, from which 13 implemented the method by 2001 and 11 between 2001 and 2009. According to the above-mentioned study, from the 24 companies, 12 have a number of employees exceeding 100, and 16 have an annual turnover of more than 10 million euros.

However, in our opinion, the UVA method is not used as widely as other calculation methods. The question is: why?

Each calculation method has advantages and disadvantages. The methods developed in the attempt to eliminate the shortcomings of other methods fail to take into account other aspects that later become their disadvantages. The hidden constant principle or the hypothesis of the UVA indices stability over time is the basis of the method, but also its main weakness systematically highlighted by its critics. In the business practice, costs can change for various reasons, some that do not depend on the company. If such developments are major, the indices of the items must be updated. Georges Perrin supported the need to revise the hidden constants on a regular basis, and Fievez proposed the revision of the UVA indices every 5-6 years. If a consultancy form is used for the implementation of this method, there will be additional costs for the beneficiary. In the implementation of this 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 or the questionable choice of the reference product.

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<sup>7</sup> de la Villarmois, O., Levant, Y. - *La mise en place et l'utilisation de la méthode UVA : une comparaison de deux enquêtes réalisées en 2001 et 2009*, available at <http://hal.archivesouvertes.fr/docs/00/47/69/84/PDF/p37.pdf>, accessed in July, 2011 .

Given the undisputable advantages provided by the UVA method, this method is, in our opinion, the most suitable method for bakery businesses. The UVA method is nowadays an alternative to the traditional cost calculation methods and to the ABC method.

## 7. CONCLUSIONS

The implementation of a widespread method cannot be reduced to mere mathematical computations. The calculation method must be an efficient means of operative control for all consumptions, determined by the product development and sale, a real management tool, aiming at creating an informational cost system, to provide effectiveness, simplicity and accuracy.

Management accounting has evolved in recent decades from a financial information supplier to a set of tools focused in strategy, exterior and future. Thus, the traditional view according to which managerial strategy and accounting are two different parts of the management process was refuted. The cost calculation oriented towards control and decision becomes one of the basic components of the management of an efficient company. As an informational tool, the cost calculation obtains and provides information on cost and performance, and as a management tool, it is a decision-making tool for the maximisation of profitability.

In relation to the profitability analysis, the UVA method provides decision-makers in the company with a new view related to what is profitable and what isn't. They can act in two different directions: (1) reducing losses from deficient sales, and (2) increasing turnover by increasing the quality of the services provided where possible and decreasing prices in order to obtain new market shares.

The UVA method is characterised by accuracy and reliability and allows for knowing the exact cost of products and the cost of the services provided to customers. 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, or with approximations. A 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).

In order to organise a managerial accounting able to meet the requirements of an efficient management, the company must implement the most adequate cost calculation method, in compliance with the peculiarities of the manufacturing technology and also with the requirements of an efficient method. In our opinion, the UVA method is the most adequate for the two requirements.

In the bakery industry, most companies make standardised products. The implementation of the UVA method will allow for the adoption of an adequate price policy. The price policy refers not only to the product prices, but also to the prices of the services associated to the products and provided to the customer such as: the reception of the order, the preparation of the delivery, the invoicing, etc.

In our opinion, the UVA method is not only interesting from the theoretical point of view, but it is also practical due to the multiple advantages it provides. The implementation of the UVA method simplifies the evaluation and analysis of the company costs with a cost acceptable by any type of company. The implementation costs of a calculation method are an essential criterion especially for small businesses that have limited financial resources.

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