

Accountancy as the Organization's Multidimensional Database

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Abstract

During the last decennia we have witnessed a spectacular development of the technologies in the domain of communications, electronics and informatics, and one of the main features of the contemporary society is its transformation into an informational society. Accountancy has not been an exception from these transformations, being the beneficiary of the advantages provided by the use of the calculation technique in the processing of the economic database. As these domains come to a full development, we are witnessing an increasing integration of the management informatics (datawarehouses, OLAP) with the accounting operations, which gives new meanings and storing-and-use opportunities as regards the data afferent to the needs of different users.

Keywords: *multiple-entry bookkeeping, matrix bookkeeping, multidimensional databases, OLAP, hypercubes*

JEL Classification: M15, M41

Introduction

Accountancy, as it can be seen today, is the result of a long historical process, the evolution of accountancy being connected to the society's economic, social and cultural evolution. In the organization of an accounting informational system, there are two approaches (Ionascu, 1997): the monoist or the single circuit bookkeeping, in which the management accounting is fully integrated in the accounting system and the dualist system, also adopted by Romania, whose feature is the separation of the two major and distinct informational circuits into:

- **financial accounting**, rigorous, compulsory and uniquely regulated by the organs with normative attributions, providing information to the external environment
- **management accounting** adapted to the specifics and to the needs of the economic entities, providing an information flow to the decisional factors inside an economic entity.

In practice, there is also an integrated conception, supposing the concentration of all the works in a single compartment, subordinated to the manager, generically called "prices, costs, economic analyses".

Taking into account the different informational needs that accountancy has to meet, we consider that at present the choice of the dualist accounting system corresponds to a larger extent to the state's informational needs, opening in this way the road of accounting (on an informational level) towards different users. At the same time, the double entry appears more and more not just like a founding principle of the accounting

model, but also as a constraint connected to a certain stage of the technological development, which has to be associated to the control needs of the manual accounting organization system (Popescu, 2009).

Following the progresses realized during the last period in the domain of informatics, the two traditional methods of organization of the accounting informational system seem to be declining. The multidimensional accounting is the new vision opening unexpected horizons to the organization and to the distribution of the accounting information.

Research methodology

In order to present an overall view on the topic *multidimensional databases used in accountancy*, in our work we have taken into account the economic literature on this subject and, at the same time, we have relied on our practical experience gathered while creating applications. In this sense, we have developed a conceptual model for the accountancy of a trading organization. The development-related process has pursued only the creation of a model bringing to light the defining elements of the topic under analysis: the fact table gathering the quantified information, the dimension tables storing the context based on which the analysis is made, without going further into the details related to the programming area, which supposes the use of a specific product (ex. Microsoft SQL Server) in order to transpose the software model.

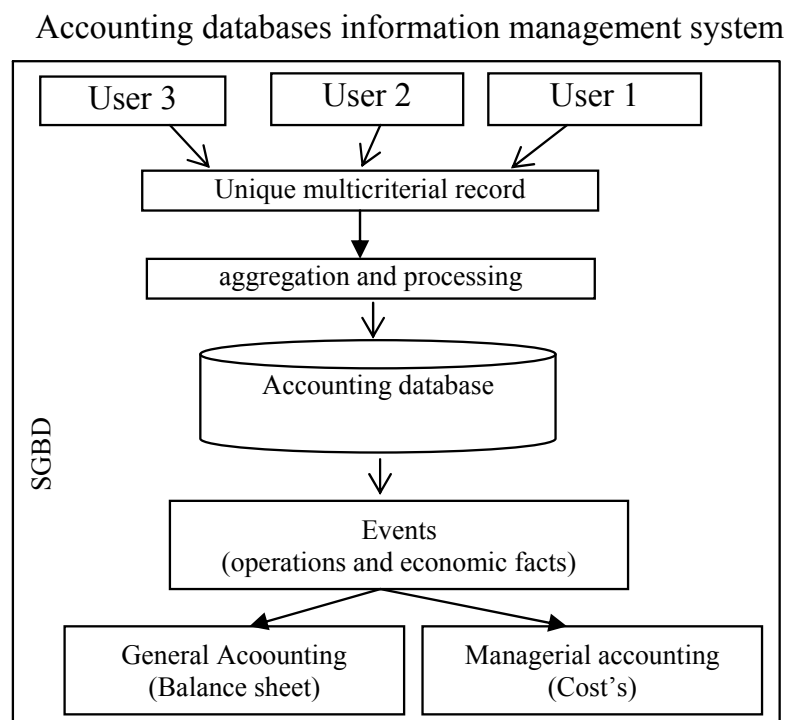
Application software for multidimensional accounting

During the last decennia, the preoccupation for the formulation of an accounting organization model able to better answer the users' information needs has grown. The truth known for a long while, yet denied, that the consumers' needs can be known in advance, has found its answer in the accounting theory (event approach) that treats as its main concern the theoretical preoccupations related to the information systems and the efficiency of the decision. In this type of accounting, raw data concerning different events are recorded, which are neither grouped, nor processed, the selection and processing being left to the users' decision, according to their needs (Albescu & Bojan, 2004).

Multidimensional accounting (event approach) is the classification and the recording of the organization's operations and transactions according to a multitude of criteria, each criterion corresponding either to a certain evaluation of the respective operation or transaction, or to a certain possible user. For instance, an acquisition of raw matter will be entered with its different aspects regarding: date, type of payment, nature of the raw matter, destination, physical quantity supplied, price, supplier's name. Favored by the informatics-related progress, such a structure aims to answer different predefined or predetermined information demands.

What multidimensional accounting and information technology have in common is the concept of database (the physical structure in which the accounting data are stored) by which one understands a set of structured data, which, after having been recorded just one time, are accessible to different users. A suggestive representation of this concept is realized following scheme (figure no. 1) (Niculescu & Alain, 2002).

Figure 1.



The use of databases is related to the use of informatics in accountancy and to the impact that the information technology has on the evolution of accountancy.

If, during a first stage, the use of informatics supposed just an automation of the manual procedures, this fact has allowed a faster recording of a larger quantity of information. In this case, the informatics applications had a particular, individual character and their progress and impact on accountancy were limited. For example, we can list a series of operations that correspond to information management applications:

- Elaboration of primary or other documents with entry data;
- Automatic notation of accounting formulas on the documents with entry data during processing;
- Electronic document management;
- Data storage in files or databases;
- Automatic processing of the data and information according to different criteria and automatic supply of the reports with results printed by a printer, such as: accounting notes, diary-register, sales/acquisitions diary, synthetic/analytical checkup sheets, fiscal VAT/tax declarations, balance sheets and annexes to these balance sheets.

According to what has been presented above, the relation between accountancy and informatics was one of influence in just one sense: informatics adapted itself to accountancy. The development of the accounting informatics systems was limited to the informatization of the accounting procedures, without intervening on them with any modification.

During a second stage, informatics moved on and separated the data from the applications. The data are recorded just one time, and then they become available for several different applications. In accountancy, this informatics solution (ERP) led to the recording of the data and to the classification of the information not according to the usual

accounting criteria, but according to the specific criteria of the files from the databases. The very information classification criterion makes the difference between different varieties of databases. (Roman, Roman, & Sendroiu, 2006)

Accountancy can exploit this variety, diversifying its offer, abandoning the principle of balance sheet uniqueness. The use of a database allows accountancy to answer different users' specific demands, taking into account very different evaluation and classification criteria.

Not only can each user draw the information he needs from the database, but the integrated conception on the system allows each file to be shared among the different services in the enterprise (supply, personnel, production, distribution).

We are witnessing a change in the vision of representation of the enterprise, from the double-entry to the multiple-entry bookkeeping. Accountancy is obliged to change its vision concerning the way of reflecting the events and transactions from the enterprise.

The passage from the double-entry bookkeeping to the multiple-entry bookkeeping supposes the replacement of the double-entry principle by the multiple-entry principle and its effect is the change of the way of representation from the plane dual image to the multiple "n image" of the enterprise.

Multiple bookkeeping supposes the recording of each event just one time, from different viewpoints that we consider necessary for its complete description. In this way, it is inserted just one time in just as many different classifications and accounts or, in other words, an "n" space" is created. The number of accounts simultaneously used can be even or odd. In this way, a vast number of multiple entries are created, through the number of accounts used simultaneously and through the rules determining their functioning (Minu, 2009).

The features of the multiple-entry bookkeeping: It records a phenomenon just one time in several accounts with different analytical development levels. For example, clients: internal or external clients; merchandise or service clients; tax: VAT; deductible VAT; It records a phenomenon taking into account different classification criteria. An expense will be recorded just one time, both according to its nature and according to its destination, and revenue will be recorded both according to its nature and according to its origin.

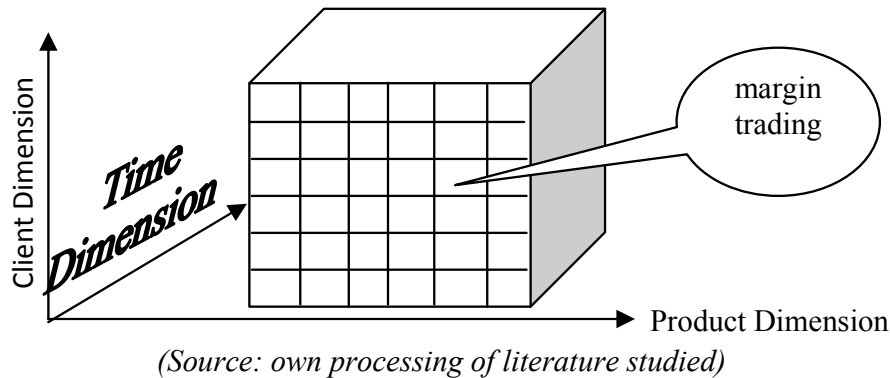
Although the economic phenomenon or transaction is recorded just one time following the complete exploitation of the information managed by multidimensional databases, in accountancy one finally gets to an integrated system able to provide information both for management accounting and for financial accounting. The multiple accounting will build different and complementary images concerning the enterprise by means of informatics.

The informational coordinates presented above are attainable due to the new information storage technologies - the multidimensional databases and the OLAP technology (Coman, 2009).

The data structures specific for this technology called hypercubes are adequate for the depositing of the expenses and revenues identified on the level of a product sold to a certain client, during a certain period of time. All the possible values for these coordinates can be found on the sides of the cube (a multidimensional structure similar to the pivot tables). Sections of the cube can be built by selecting those coordinate values included in the group criterion (geographic area, client profile, product class etc.). These sections are organized as profitability segments (market segments, product lines, sales divisions etc.). The smallest profitability segment is the elementary cube: the product-client pair, to which one adds the time coordinate (the period) (figure no.2).

Figure 2.

Visualization of the accounting data in a multidimensional structure



In such a cube we can have the following elements:

1. Analysis coordinates (dimensions according to which the decisional factors can carry out analyses): *product code, client code, period of time.*

2. Value fields – the measures followed in the analysis process are the revenues and expenses detectable on the level of the product/client per month. These will be direct values or estimates on the level of the invoicing line, where the information is stored:

1. *Revenues:* Sales value, Rebates, Discounts;

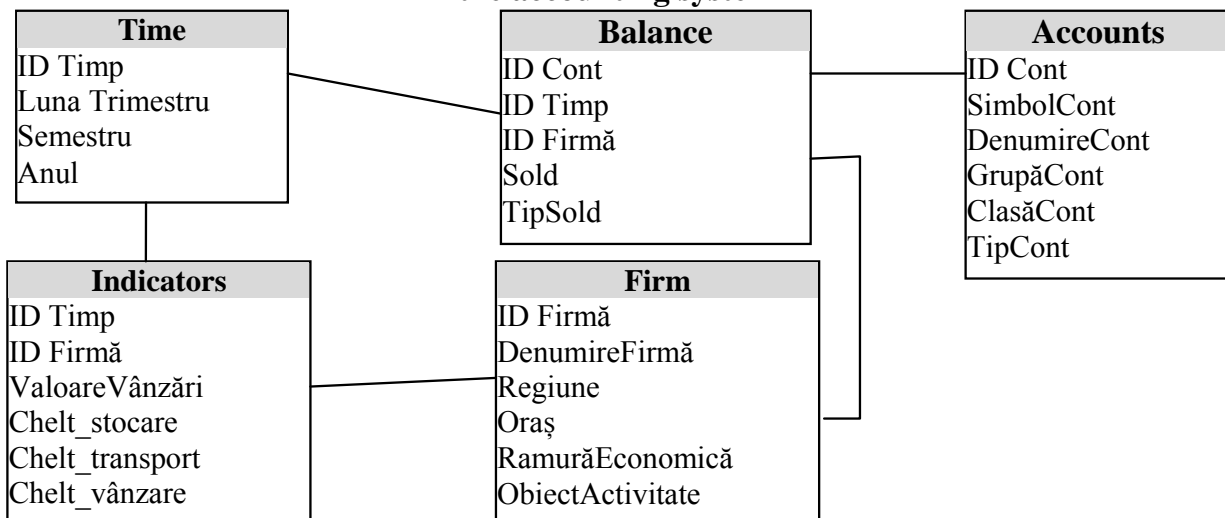
2. *Expenses:* Storage expenses, Manipulation expenses, Transport expenses, Supply expenses, Sale expenses, Provider-payment expenses, Customer-charge expenses.

On the basis of the model previously described, one can build a database serving as multidimensional base, in which the bookkeeping operations can be recorded. This construction can be implemented in any of the computer programs that include facilities for datawarehouse construction (ex. Microsoft SQL Server 2008, Oracle Database).

A possible multidimensional database concerning the financial accounting that will include the elements mentioned above is the one rendered in following scheme (figure no. 3) (Stanciu, 2006).

Figure 3

Constellation model of the multidimensional database concerning the accounting system



(Source: Adaptation from Stanciu, A., p. 167)

Conclusions

Along its evolution, accountancy has been marked, influenced by other domains or sciences such as: law, economy, finances, and taxation. During the era of informatics, it is about time for a renewal and a reconsideration of the pressures exerted by informatics. In this sense, the diversity of the accounting information users and their different and changing needs impose a recording and storage of the information by the accounting system in such a way as to make it possible for each user to find what he needs from his viewpoint.

Through the use of a multidimensional accountancy, one can imagine an integrated accountancy reuniting financial accounting and management accounting; commitment accounting and treasury accounting; different evaluation bases and multiple classification criteria for revenues, assets, debts and capitals, all of them available thanks to an integrated accounting informational system, able to answer all the users' demands.

The present article, based on a series of theoretical notions related to multidimensional accountancy, aims to create a model able to answer a various array of users. The model is not perfect, it can be adapted according to the identification of certain demands that we have not detected at the moment of its conception and could lay at the basis of a software application serving as a departure point in this domain. The applicability of this solution can be easily deduced as, in the present economic context, accountancy must serve the interests of a large category of users, each one with their own demands, which supposes the recording of an operation with a large amount of details and, then, its rendering in accordance to the informational needs of each user in turn.

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