

MODELLING OF ENTERPRISE'S ACCOUNTING POLICY: THEORETICAL ASPECT

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Abstract. *The purpose* of this article is to study the possibility of modelling accounting policies and accounting processes. Since accounting processes don't have defined parameters, to study them we can model their functional features and forecast the behaviour of the object in question in various situations. It is achieved by means of developing certain sign patterns: charts, schemes, unified forms and rules for filling them out. Such modelling is called sign modelling. The most important type of sign modelling is logical-mathematic. In logical mathematic modelling, sign formations and their elements are considered in connection with certain transformations and operations with them. A logical mathematic model (LMM) is a basis (mathematic and linguistic provision) for creating algorithms for accounting processes and software development. Since the accounting objects are rather diversified, the principles of processing corresponding information can also differ. For instance, the most efficient accounting methods and approaches for large enterprises and turn out to be irrational for small enterprises and even result in additional losses and unnecessary increase in the amount of differently detailed information. *Methods of the research:* the statistical method of the questionnaire and generalization for studying the preconditions of accounting policy development at enterprises; the method of expert evaluation of strong and weak points of the analysed enterprises to define options and threats for their economic activity. *Practical results.* The content of the conceptual apparatus "accounting policies" is considered. The expediency of application of mathematical modelling information of accounting policy of the enterprise for the choice of effective methods of conducting financial accounting is substantiated. Elements of stages of the process of modelling accounting processes and accounting policy are studied and improved. When creating an accounting model, it is important to take into account which of the factors should be entered into the model. On the one hand, while using a model for forecasting, it is necessary to take into account as many factors as possible. On the other hand, gathering and processing large amounts of information are time-consuming, therefore, it is better to reduce the number of factors restricting by the most powerful ones. *Value/originality.* The choice of accounting policy should be based on modelling, the central link of which is a system of accounting and analytical support.

Key words: economic-mathematical modelling, logic-mathematical model, accounting processes, accounting policy, forecasting.

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1. Introduction

The current stage of Ukraine's economic development is characterized by a change and realignment of business processes corresponding to the rapid market transformations. From the position of market relations, the system of management at the enterprise sets new

requirements to accounting as an information basis for making decisions.

Modelling is a general scientific method of research, which plays an important role in the development of specific branches of scientific knowledge. Accounting, as a science and practice, doesn't stand aloof general

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development trends and actively uses the possibilities of the modelling method in shaping its theory and adapting it to changing conditions of accounting. Thus, the application of mathematical modelling methods in accounting, in market conditions, becomes a prerequisite for its development in scientific and practical dimensions.

Problems of simulation of accounting are considered in the works by E. K. Hilde, who developed the problem of modelling normative accounting in industrial enterprises. Ya. V. Sokolov researched both theoretical principles of modelling in accounting and problems of automation of the information environment using the model method. P. Arkov, A. S. Borodkin, L. A. Gorshkova, V. Ivashkevich, A. L. Luzin, I. S. Matskevichius, A. Narinsky, R. S. Rashitov, N. Ubliev, A. A. Shaposhnikov made an important contribution to the theory of accounting modelling.

2. Modelling as a method of scientific knowledge

The economic mathematic model is a description of an economic process or a phenomenon through mathematic expressions (equations, functions, inequalities, identities) that simulate the behaviour of a modelled object in given or possible conditions of its performance.

Any economic-mathematical model should be adequate to reality, reflect the essential aspects and connections of the object under study, have a simple form and structure. Modelling is the only systematized way of seeing the options for the future and determining the potential effects of alternative solutions that enable their relevant comparison. Yet, economic-mathematic modelling remains an auxiliary tool in the system of production and management. The results obtained with the help of models are mainly used as consulting means. It is the manager's function to make final decisions. This is because of the complexity and insufficient knowledge of the economy complex and the drawbacks of modelling, the most typical of which are:

- entering into the model indices and standards insufficient for problem-solving;
- withdrawal from the model relevant to the given object features and variables;
- inaccurate evaluation of the parameters of the modelled object;
- drawbacks in the model structure, i.e. incorrect or inaccurate definition of functional dependence of the accepted criteria on the managed and linked variables;
- excessive model simplicity that does not fully embrace the main parameters and variable objects in their dynamics;
- excessive model complexity that hinders or complicates the analysis of the variables and is mostly time- and resource-consuming.

Decision-making employing economic mathematic models is based on the methods of simulation modelling, linear programming, probability modelling, operation study etc.

The number of definite models is almost equal to the number of problems for which solving they were developed. Let us consider the most common of them.

The model of stock management is used to determine the time for allocating orders for the resources and their number, as well as the mass of ready-made products in warehouses. Any enterprise should keep some goods or materials in stock to avoid production and sales delays.

The goal of this model is to minimize the negative impact of stock accumulation expressed in certain losses. These losses come of three types: for orders allocation, storage or losses connected with a shortage of stock/purveyance. In this case, it is impossible to sell ready-made products or deliver services. The standstill of the production lines also causes losses linked with the labour payment, despite the fact that the workers are not working at this time.

The maintenance of a high level of stock prevents the losses caused by their shortage. Purveyance of materials in larger quantities necessary to accumulate stocks in many cases minimizes losses for orders allocation since the enterprise can get corresponding discounts and reduce the amount of "paperwork." However, additional expenditures for storage, reloading, interest payment, insurance, goods decay, theft exceed these potential revenues.

Models of stock management are applied to define an optimal way of scarce resources allocation at available competitive needs. Linear programming is normally used to solve production problems.

Typical applications of linear programming in production management are:

- major production planning (compiling production charts minimizing general costs taking into account the costs related to change in the interest rate, given restrictions on labour resources and the stock levels);
- ware assortment planning (defining an optimal products assortment, in which each its type is characterized by its costs and resource requirements);
- item production routing (defining an optimal technological production route to pass through several processing centres, each of them having its peculiar costs and productivity);
- managing the technological process (minimizing steel filings, leather or fabric scraps per roll or cloth);
- stock management (defining an optimal correlation of the items in the warehouse);
- calendar planning of production (calendar planning to minimize the expenditures for storing stock, overtime payment and odd orders);
- planning products allocation (scheduling optimal uploading schedule taking into account goods distribution among the production enterprises and warehouses, as well as retail stores);

- determining the optimal location of the new plant (defining the best location by estimating transport costs between the alternative locations of a new plant and the raw ware supplies and sale points of ready products);
- calendar transport planning (minimizing the costs of truck supply during loading and cargo vessels to the piers);
- labour force distribution (minimizing costs for distributing workers for lathes and working places);
- shipping materials (minimizing expenditures for shipping raw ware, for instance, fork-lift trucks, trucks from the warehouse to the production departments).

3. Stages of mathematical modelling in economics

The modelling process involves three structural elements:

- an object of the research;
- a subject (researcher);
- a model that mediates the relations between the subject and object.

The modelling process can be presented in 6 stages (Figure 1).

1. The analysis of theoretical regularities typical of the phenomenon or process in the study, and empirical data on its structure and features. Such analysis serves for building models.

2. Defining the methods to solve the tasks.

3. Analysing obtained results and refinement (if necessary) of the form and structure of the model; returning to the first stage.

The most important point of the first stage of the modelling is the clear definition of the ultimate goal of model designing, as well as the definition of a criterion to compare different solution options.

Not every economic problem requires an original model. Some processes from the mathematical point of view are homogeneous and can be described by similar models. For instance, in linear programming, the theory of public service and others there are typical models to apply for solving a number of problems.

The second stage in the modelling economic processes is the choice of the most rational mathematical method for solving problems. For example, for solving linear programming problems, many methods are applied: simplex method, the method of potentials and others. The best model is not the most complicated one and most similar to the real phenomenon but the one that enables to find a rational solution and obtain the most accurate economic evaluations. Excessive details complicate model building and its extension results in losing important economic information and inadequate reflection of the real state of things.

The third stage of modelling is a comprehensive analysis of the results obtained in the study of an economic phenomenon. The final criterion of the probability and the quality of the model is practice, the conformity of the obtained results and conclusions to the real conditions, as well as the economic significance of the obtained evaluations. If the results do not conform to the real conditions, it is necessary to analyse the causes of this discrepancy such as unreliable information, the model's inconformity to the economic conditions etc. On the basis of this analysis, the economic mathematic model is corrected and the task is solved anew.

At the first stage, it is necessary to formulate the nature of the problem, to define the preconditions and state the assumptions. It is necessary to distinguish the most important features of the object of modelling, study its structure and the links between its elements, pre-formulate hypotheses that explain the object's

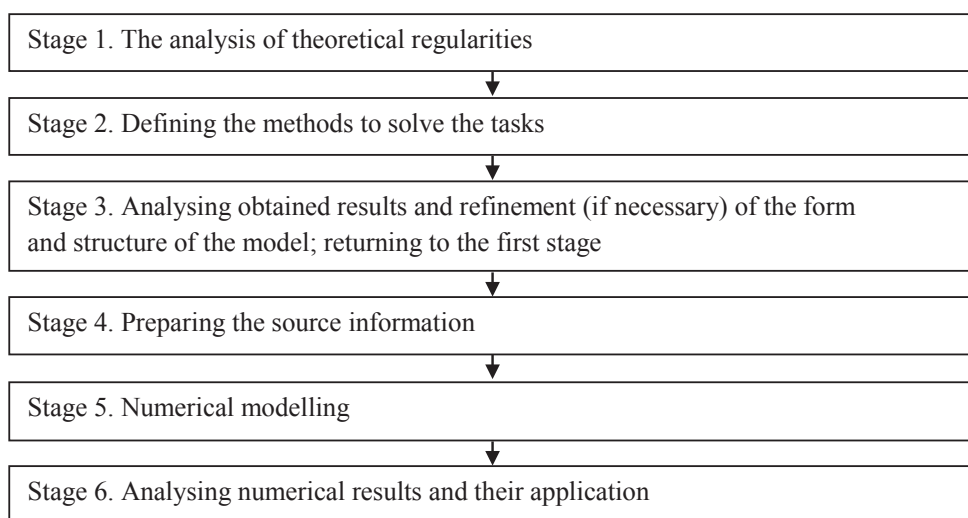


Figure 1. Stages of mathematical modelling in economics

Source: own research

behaviour and development (in the dynamics), clarify its connections with the environment etc.

During this process, complex objects are divided into parts of separate study: to study the links and their logical correlations, their qualitative and quantitative features. All these actions refer to the stage of the system analysis of the problem to consider the object as a whole system.

At the second stage, the economic model is formalized, i.e. expressed in clear mathematical correlations (functions, equations, inequalities, etc.). The process of model constructing has several stages. First, the type of economic-mathematical model is determined, the possibilities of its application in the particular case are studied, the list of variables and parameters is specified, as well as their correlation. Complex models may require several multi-dimensional models.

At the third stage, purely mathematical methods help investigate the general properties of models and solutions. However, previously conducted system analysis may have led to such a set of elements, properties, and correlations that are not solvable by the existing methods. In this case, we should return to the stage of system analysis. The next stage is to substantiate the solutions to the formulated problem. In the process of the analytic analysis, we define the number of solutions (singular or multiple), define the variable parameters that can relate to the solution, as well as the tendencies and limits of their variations.

However, the models of complex economic objects are hardly ever possible to study analytically. In this case, it is better to refer to quantitative methods. As a rule, the problems occurring in the economic practice are fitted to the common models with developed methods and algorithms of solving.

4. Preparing the source information. In economic problems, it is the most labour-consuming process of modelling since passive data accumulation is not enough. The quality of information plays a more important role in mathematical modelling. In the process of preparing information, methods of the theory of probability, mathematical statistics, as well as economic statistics are used for aggregation, data grouping, estimating the data reliability, etc.

In the process of system economic-mathematical modelling, the results of the functioning of some models serve as the source information for others.

5. Numerical modelling. This stage incorporates the development of algorithms of numerical problem solution, preparation of software and calculations. Besides, the large size of economic problems brings about some difficulties in their solution. For large complex objects suffice it to make up a database and find the means to deal with it, as well as methods of data aggregation necessary for calculations. In the case with standard problems, suffice it to choose a suitable program package and database management

system (DBMS). Numerical modelling substantially contributes to the results of analytical research.

6. Analysing numerical results and their application. At this stage, above all is the correctness and completeness of the modelling results and the possibilities of their practical use, as well as possible ways of its further improvement.

Therefore, primarily, it is necessary to check the model correctness according to the most relevant features chosen. So, the model should be verified and validated since the modelling refers to solving practical problems (analysing economic objects, economic forecasting, making managerial decisions) (Shyghun, 2010).

4. Peculiarities of modelling accounting objects

Accounting processes having no physical parameters, their study can restrict to modelling functional characteristics, and also predicting the behaviour of the studied object in different settings. It is achieved by developing sign formations of a certain type: charts, schemes, unified forms and rules to fill them out. Such modelling is called sign modelling (Laux, Stocken, 2018).

The most important type of sign modelling is logical-mathematical. Sign formations and their elements in logical-mathematic modelling are considered in relation to certain transformations and operations with them. An ideal logical-mathematical model is a basis (mathematical and linguistic support) for creating algorithms of accounting processes and developing software.

Hence, modelling in accounting is symbolic, logical, and mathematical and aims at creating schemes for processing, generalization, and grouping of accounting information. All mentioned above enables to state that the model for current accounting of economic processes should at least comprise the relevant elements:

- unified forms of generalization and reporting accounting information;
- unified methods of data grouping, their details, distribution for calculation and evaluation, and also the subsequent grouping according to other features to make up financial statements for submission to users;
- rational methods and sequence of processing of accounting documentation.

Since the objects of accounting are quite diverse, the principles of related information processing can vary significantly. For example, the most effective accounting methods and techniques for large organizations may appear to be inefficient for small enterprises and lead to additional expenditures and unnecessary increase in volumes of detailed accounting information (Ivakhnenkov, 2011).

Therefore, several equal in rights models of the current accounting of economic processes can operate simultaneously, and the economic agents must be able

Table 1

The analysis of the use of various mathematic models in developing the enterprise's accounting policy

Model types	Authors	Goal	Use in developing accounting policy
Lineal programming	Evdokimov V. V., Lagovska O. A., Samigulin A. A., Yakubenko G. A.	Forming optimal production programs	Possible at the statement for calculating the prime cost of products
Stock management models	Selivanova Y. V., Sidyuk O. V., Sukov G. S., Ivakhnenkov S. V., Maliuga N. M.	Costs optimization for purveyance, consumption, and keeping stock	Possible at defining the reserves to provide the subsequent expenditures and payments
The model of optimal service	Money S. M., Filonenko N. O., Gerasimenko T. O.	Determining the optimal quantity of service channels	Possible at developing accounting apparatus
Correlation-regression models	Rashitov R. S., Vaschenko L. O., Luzin A. L., Smachilo T. V.	Distinguishing between the production factors	Possible at defining the elements of accounting policy
Operational calendar planning models	Boyko S. V., Bardul O. M., Popova N. I., Chizh V. I.	Making up optimal plans for performing and completing work	Possible at developing documents circulation
Game theory	Proskura K. P.	The choice of an optimal strategy	Possible at the choice of accounting method

Source: own research

to choose among them according to the specifics of the production, volumes of the processed information and engaged users.

The effectiveness of the organization's accounting services, as well as the completeness and timeliness of providing the necessary information to all interested users, depends on how well the accounting model is chosen. The results of the analysis into the use of various mathematic models while developing accounting policies for the enterprise are shown in Table 1.

The abovementioned elements of the models for accounting processes in theory and practice of accounting are realized in the form of:

- accounting rolls – special accounting forms to enter and group accounting data on the available inventory and its state, as well as operations with it; accounting rolls can be unified (obligatory within the state, branch or production type) or be developed within the enterprise that keeps accounts;
- accounting forms (forms of calculations), that is, a combination of accounting rolls and ways of keeping records of economic operations;
- accounting procedures – the order and sequence of actions while filling up certain accounting rolls.

5. Conclusions

As a conclusion, it should be noted that accounting information systems are critical to the production

of quality accounting information on a timely basis and the communication of that information to the decision-makers. Existing literature offers evidence of the relationship between these accounting information systems and organizational effectiveness; though it is important to highlight that an in-depth study is required to examine other factors that may influence this relationship. The information value generated by accounting information systems to shareholders and stakeholders in making investment decisions is invaluable. Financial managers need the financial and accounting data provided by accounting information systems to evaluate the firm's past performance and to map future plans.

Secondly, to choose the accounting policies of an enterprise, it is advisable to model future performance outcomes proceeding from past events and allowed alternative accounting methods. The choice of accounting policy should be based on modelling with the system of accounting and analytical support in the centre.

Finally, modelling the process of choosing an accounting policy incorporates accounting data, statistical data, and marketing information. This proves the indissoluble connection between accounting and managerial decision-making. Hereby, the studied information is the subject of transformation through its analytical processing. Modelling the choice of accounting policy implies the resources and methods of their use.

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