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## THE PROCESS OF INTELLECTUALIZATION OF STRATEGIC FINANCIAL ACCOUNTING ON THE BASIS OF ACCOUNTING ENGINEERING

### Abstract

**Introduction.** One of the possible ways of effective system development of strategic financial accounting at the enterprise is using of accounting engineering, which is considered to be one the ways of intellectualization of accounting as a science.

**Methods.** The dialectical method of cognition and system approach to determination of conceptual basis and opportunities of accounting engineering were used in the paper; the monographic method for monitoring scientists' points of view to accounting engineering as a method of strategically oriented accounting system, abstract and logic method for theoretical generalization and summarizing were applied in the study.

**Results.** The analysis of historical development of accounting engineering was made in the article. The contest of accounting engineering as the concept of development and introduction of accounting informative systems on the basis of using specialized engineering instruments is identified. The perspectives of using accounting engineering as a method of construction of strategically oriented accounting system.

**Discussion.** The usage of certain instruments of accounting engineering such as development of structural account plan, vector determination of correcting notes, the formation of sets of strategic and engineering accounting notes, the development of strategic derivative accounting report, the methodology formation of interpretation of strategic accounting indices were highlighted.

**Keywords:** accounting engineering, the strategic financial accounting, strategic management, intellectualization of accounting

**Introduction.** The issue of implementation of strategic financial accounting in practical activities of Ukrainian enterprises generates the conditions for accounting engineering realization as a key category of intellectualization of accounting. The fact that using of engineering methodology, that allows to change the ways of giving information, when methods that exist don't response the needs of modern enterprises makes this issue an up-to-date one. [2, p.28]. That is why accounting engineering as a mixture scientifically proved methods that identify the accounting objects and development of adequate accounting methods, that guarantee the processing and presentation of information about the following objects, response to existing needs of strategically oriented system of financial accounting.

Stipulation of conceptual parameters of strategically oriented accounting system development is emphasized in studies of I. Bohata, V. Hovindaradzhan, S. Holova, V. Zalevskiy, V. Kerimova, I. Kryshtop, H. Kroklicheva, A. Pylypenko, M. Pushkar, B. Raian, S. Suvorova, K. Uord, I. Khakhonova, A. Shaikan, Dzh. Shank. The issue of engineering instrument implementation of accounting is analyzed by I. Bohata, N. Breslavtseva, T. Hrafova, V. Zhuk, L. Zimakova, O. Yevstafieva, H. Kroklicheva, D. Kursiev, O. Kuznetsova, V. Lesniak, V. Tkach, I. Tkach, M. Shumeiko. Thus, the majority of works are devoted to separate aspects of accounting engineering as a method of development of strategically oriented system of accounting that requires to be emphasized and identified.

**Purpose.** The aim of the study is monitoring of historical aspects of appearing and identifying the basis of accounting engineering, the opportunities of its application as a method of strategically oriented system development of accounting are considered.

**Methodology research.** The dialectal method of cognition and system approach to identifying the theoretical and conceptual parameters and potential opportunities of accounting engineering were used in the study. The monographic method for monitoring researchers' points of view on the accounting engineering as a method of development of strategically oriented accounting system, abstract and logical approach for theoretical generalization and concluding.

**Results.** The performed experiments allowed us to conclude that the main aim of accounting engineering is development of new or modernization of existed accounting and informative technology which must provide the quality generation of accounting information of strategic character and raise the effectiveness of accounting system operation, to strengthen its adequacy due to increasing needs of users.

The main reason of using of engineering in the system of accounting is the ability to be formed on the basis of effective system of accounting and analytical assuring of strategic management, able to increase the effectiveness of operation and business process management, identify threats of inner and outer environment, which is an up-to-date issue in terms of world economic crisis. I. Tkach notes that in the period of economic crisis only those institutional items, which can realize the main managing strategies of changes one of which is engineering instruments will survive and further development [8, p.104].

The accounting engineering is considered to be one of the main type of financial engineering, which is identified as projecting, development and realization of innovative instruments and process, creative search of new approaches in the sphere of finance [6, p.33]. Marshall and V. Bansal [6, p.95] emphasize the necessity of invasion corporative accountants and tax inspectors into working financial and engineering groups. But, due to the fact that such items are commercial secret of majority of enterprises, the papers on this issue are not published. Accounting engineering offers the invasion of creative and innovative approaches to improving of financial accounting as the informative technology, that provides the information for management decisions. In the result of the development of accounting engineering a new technology of processing data about activities of enterprises and their outer environment generates.

Being the universal approach to transformation of accounting technology and development of effective organization system of accounting service at the enterprise the accounting engineering was formed at the beginning of XXI century. We suppose that by the moment of appearing of folded sheet form of accounting, realized in computer environment, the process of development new and improving existing at that time forms of accounting can be compared with the lasting process of accounting engineering. But, the first features and examples of its incipience in the form that exists today (spectrum of engineering instruments (accounting aggregates; structural plan of accounting; correcting, engineering, strategic and hypothetic accounting notes, derivative accounting reports)), appeared in the middle of the XX century, which was connected with the appearing and using the methodology of making derivative accounting reports. The economic reason for spreading engineering in accounting is the reduction of prices of computerization of accounting procedures, appearing personal computers and database, the security of computer techniques, specializes accounting software. Without branched computing of accounting process, the development of system of engineering accounting was too laborious and expensive project, which could be realized only by big corporations and its effect was not significant because of limited

informative flows and low speed of presentation and generalization of accounting information. Only dynamic development of informative and computer technology in the sphere of accounting, starting from 60-70 of the XX century allowed to pay attention not only to aromatization of standard accounting procedures, but the development of alternative accounting systems in different software on the basis of using the accounting engineering.

The "father" of using in resource management and testing control of system of derivative accounting reports, notes O. Aksonova, is considered to be T. Limperh, who created the cost concept, that could be used in terms of business as the alternative of ruling concepts of subjective cost, based on individual advantages and usefulness. He based his cost concept on the definition of hypothetical leaving: the cost of assets can be identified with the help of summarizing the enterprise losses, it gets lost of these assets [1, p.107]. The main contribution of T. Limperh to development of accounting science is connected with broadening the accounting horizon in terms of methodology, which is used for costs estimate and valuation of asserts. The author conception of replacement value determined the development of alternative accounting system on the basis of which the derivative balance should be generated. It will enable the users to get information for flexible reaction at changeable events, that take place both at the enterprise and its outer environment. T. Limperh proposed to identify not realized potential of the enterprise as the "available possibilities loss" and compare it with real data about using of available possibilities. The researchers will be able to get separate balance, that reflected the unused forces, on the basis of which the ways of overcoming disadvantages can be formed. To realize these propositions special accounts and financial reports which can be considered as ways of using instruments of financial engineering.

V. Zhuk thinks that accounting engineering started its way in 1970 and atomized zero balances were used. More than 100 types of accounting engineering instruments are identified today, which are characterizes by using mathematical apparatus, specific software, structural plans of accounting, different types of balances, 5-leveled system instead of 2 [4, p.52]. So, in the middle of the XX century the basic changes of enterprise functioning, which faced accounting with new tasks. To provide the correspondence to new demands and adaptation to needs of accounting information users. The system of financial accounting had to be transformed in a new quality strategically oriented informative technology, this caused the necessity of using accounting engineering as a universal way of projecting of strategically oriented system of accounting.

In modern realities the usage of accounting engineering has acquired the widespread when the strategically oriented management accounting systems are built. The scientists' increased attention is paid to the study of theoretical and methodological foundations of its usage in accounting practice and analysis of development of accounting engineering instruments which are used in financial, administrative and strategic account.

The principal feature of the accounting engineering instruments is the preparation of financial transactions for consolidated units which can act chapters of the structured chart of accounts, balance sheet, other types of balances (distribution, liquidation, forecast and others), mega-accounts and others for the purpose of focusing on the aggregated and disaggregated rate of cost of equity that give the possibility to reduce the number of accounts significantly (from 15000 to 8-14) and to develop computerized versions of derivative balances for online character in selected areas of accounting (the resource potential objects, the external management objects, etc.) [5, p. 218].

M. Shumejko in 2012 proposed the concept of "engineering architecture" which includes accounting system engineering instruments: balance sheet derivatives and other computer programs (substantial, hedging, integrated risk, monitoring, social, synergistic, reorganization, networking, situational, actuarial, subsidiary, investment, fractal, situational, strategic, semantic, venture capital, innovation, etc.) [9, p. 74]. As a result of the process of systematization and summarizing of developments in the sphere of the accounting engineering V. Tkach and M. Shumejko developed the engineering theory of accounting with its own subject (property, cost elements, sources and article calculation) and items (net assets and net liabilities) engineering method of accounting. According to the authors [7, p. 83] formation

of engineering theory meets the needs of the singular management the occurrence of which is associated with the emergence of the global financial crisis at the beginning of the XXI century.

Today, researchers proposed such embodiments engineering records:

- transformation of accounting entries (E. Bogataya);
- fractal accounting records (L. Lilyeyeva);
- substantial entries (Yu. Il'shtejn);
- recordings economic situation (O. Rusy'na);
- strategic balance conducts (O. Shhemelyev);
- immunization accounting entries (O. Shhemelyev);
- immunization balance conducts (L. Kuzneczova, Yu. Deny'`sevy`ch);
- conducts with display of risky assets (E. Arxipov);
- hedged records (E. Arxipov);
- display the facts of economic life taking into account the influence of factors of macro and micro surroundings (Ye. Yevstaf'yeva);
- conducting strategic aggregated by fractals (T. Grafova).

Each of the presented variants can be used for obtaining the account information of strategic nature as the appropriate original balance report. For example, for making a choice among the existing strategic alternatives it is necessary to compare in context of possibilities for strategic risks and in this case it is advisable to use the immunization and hedged transactions and posting which display the risky assets. Such actions permit to shape three different types of balance report derivatives for each of strategic alternatives and to take as a result the strategic decision which is based on the analysis of the performance from each report (for example, hedged net (clean, pure) assets, immunized net assets, net risk assets and etc.).

As a result of relevant scientific works monitoring two main approaches to understanding the essence of engineering accounting can be identified:

1. In the narrow sense engineering accounting is considered by the separate authors (for example O. Aksonova [1, p. 108-109]) as the derivative balanced report system which are used for management software of paying capacity, property, reserved system, risks. Derivatives balance sheets can be used as a primary source of information for strategic economic management and enterprise resource potential. But such narrowed understanding of accounting engineering leaves aside the order content of such reports, description and justification of methods and techniques, which are used to fill indices balance sheet indicators derivatives by the accounting information of strategic nature.

2. In a broad sense the accounting engineering is the concept of development and implementation of accounting information systems which is based on the usage of a structured chart of accounts, new types of accounting architecture (basic, correcting, derivative, strategic and hypothetical components), aggregated and disaggregated objects to provide accounting support economic management and determining the performance of the company or its business units. In our opinion, this approach is the most appropriate for building strategically oriented accounting system because it enables to ensure the identification and evaluation of objects internal and external environment of the company and to provide a comprehensive process of operation, formulation, implementation and monitoring of business strategy.

For results of the research we offer formulate strategic method of accounting in the context of the following steps:

- 1) constructing accounting units;
- 2) structured chart of accounts as an element of strategic financial accounting;
- 3) realization correcting records and compiling adjusted balance;
- 4) realization engineering accounts following the aggregated and analytical positions (analytical accounts and subaccounts) depending on the initial operator;
- 5) realization strategic accounts following the aggregated and analytical positions (analytical accounts and subaccounts) depending on the initial operator;

6) implementation of the hypothetical transactions with realization of assets and repayment obligations and realization of the hypothetical derivative strategic balance report.

The detailed characteristics for these stages of forming techniques strategic financial accounting are presented in the monograph. "Accounting and Analysis in the strategic management of the agricultural business" [3].

**Conclusions and prospects.** Implementation of accounting engineering as a separate area of Accountants which is associated with the modernization of accounting systems took place because "the narrow place" appeared in the traditional accounting methodology. The emergence of a large number of new targets in the work of internal and external account information users, which are the end-product customers of the accounting systems in the form of financial statements, stimulated the development of specialized instruments which allowed to modernize the accounting system in the direction of approximation to their needs. The economic prerequisite for the widespread use of engineering procedures became the development of ICT in accounting ranging from 60-70 years XX century. And this development allowed to reduce significantly the cost of a procedural process and create the opportunities for its basic operational implementation in accounting information system.

Accounting engineering must be interpreted as the concept of development and implementation of accounting and information systems which are built on the basis of engineering architecture as the set of engineering instruments which apply to all stages of the process and include an accounting aggregates, structured plan accounts, corrective, engineering, strategic and hypothetical accounting records, derivatives balance reports etc. The accounting engineering is one of the methods that can be used to build a strategically oriented financial accounting system because it allows you to develop new information technology for the formation of accounting information which will ensure the formation, development, implementation and monitoring of enterprise strategy.

The system of the accounting engineering is a superset of accounting system. Unlike the last one which involves drawing up standardized financial reporting forms, the accounting engineering provides the making of engineering and derivatives reporting forms depending on the embodiment of engineering operations according to the needs of user's interests in the accounting information. The main characteristic features of engineering accounting are:

- 1) inability of operation without initial operator (balance sheet);
- 2) the usage of new sections for classification grouping the facts of economic life through the use of structured charts of accounts;
- 3) the usage of initial and final accounting units (net assets and net liabilities) and aggregated business transactions for reducing the complexity of accounting procedures engineering;
- 4) mandatory use of ICT as the organizational and technological framework for implementing accounting engineering in practice;
- 5) the usage of different types of assessments depending on user's requirements engineering reports;
- 6) the usage of engineering and hypothetical economic transactions which would expand the subject of accounting in space (environment) and in time (future);
- 7) forming derivatives balance sheets of various kinds;
- 8) the focusing on the needs of strategic management and for specific purposes and inquire from management.

The presented technique of strategic accounting has the result - the construction of a hypothetical derivative strategic balance sheet as the basic accounting and information sources for strategic management decisions consists of the following stages: construction accounting units (aggregation sites account); development of a structured chart of accounts; implementation of corrective records and preparation of adjusted balance; implementation of engineering accounts; implementation of strategic accounts; hypothetical exercise records and preparation of hypothetical derivative strategic balance sheet.

The prospect of further research is the rationale for the use of specific instruments accounting engineering the development of strategically oriented financial accounting system and its adaptation to the

needs of strategic management. In particular, there is necessary to develop a structured strategic plan of accounts, study areas of corrective items, forming a set of strategic engineering and accounting records, development of strategic balance sheet derivative, forming methods of analysis and interpretation obtained strategic account performance.

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## ІНТЕЛЕКТУАЛІЗАЦІЯ СТРАТЕГІЧНОГО ФІНАНСОВОГО ОБЛІКУ НА ОСНОВІ БУХГАЛТЕРСЬКОГО ІНЖИНІРИНГУ

#### Анотація

**Вступ.** Одним із можливих варіантів побудови ефективної системи стратегічного фінансового обліку на підприємстві є застосування бухгалтерського інжинірингу, який на сьогодні вважається одним із напрямів інтелектуалізації бухгалтерського обліку як науки.

**Методи.** Відповідно поставленій меті застосовано діалектичний метод пізнання та системний підхід до трактування концептуальних основ і можливостей бухгалтерського інжинірингу; монографічний метод для моніторингу позицій вчених щодо бухгалтерського інжинірингу як методу побудови стратегічно орієнтованої системи обліку; абстрактно-логічний метод для теоретичних узагальнень і формулювання висновків.

**Результати.** Проведено аналіз історичного розвитку бухгалтерського інжинірингу. Обґрунтовано сутність бухгалтерського інжинірингу як концепції розробки і впровадження облікових інформаційних систем на основі використання спеціалізованих інжинірингових інструментів. Окреслено перспективи застосування бухгалтерського інжинірингу в якості методу побудови стратегічно орієнтованої системи обліку.

**Перспективи.** Обґрунтування доцільності використання конкретних інструментів бухгалтерського інжинірингу, зокрема розробки стратегічного структурованого плану рахунків, визначення векторів коригуючих записів, формування набору стратегічних та інжинірингових бухгалтерських записів, розробки стратегічного похідного балансового звіту, формування методики інтерпретації одержаних стратегічних облікових показників.

**Ключові слова:** бухгалтерський інжиніринг, стратегічний фінансовий облік, стратегічний менеджмент, інтелектуалізація обліку.

