Development of Digital (Engineering) Entity's Capital Management Frameworks

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Abstract:

The paper presents digital (engineering) management frameworks in two lines: capital accounting and management; zero engineering balance.

A set of qualimetric features of digital systems like technological, economic, managerial are considered in the research. Authors presented the accounting and control tools as well as engineering-type accounting and analytical framework was developed.

Keywords: *Digital economy, engineering accounting and control, capital, balance system, engineering tools, financial risk zone*

JEL Classification Codes*: M41, M42.*

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1. **Introduction**

Introducing the digital technologies into capital accounting, control, and management could be defined by the following:

- shifting to the management accounting from the standpoint of accounting and analytical support of economic procedures;
- capability and suitability of managing the entity's reserve system;
- managing risk-related cases involving forecast balance;
- development of digital accounting, control, audit, and economic phenomena management framework via block-chain technology;
- online economic procedures management

2. Theoretical, Informational and Empirical, and Methodological Grounds of the Research

The paper reveals studies in digital technologies of accounting and audit of major shifts in production management (Tkach and Shumeyko, 2013; Franks, 2016; Vovchenko *et al.,* 2016; 2017). Groundbreaking changes in economy caused by digital technology evolution (Schwab, 2016; Pociovalisteanu and Thalassinos, 2008) covers the whole management framework with modern statistical highlights of process flows taken into account (Swan, 2017; Hapsoro and Suryanto, 2017; Averina *et al.,* 2016). Ryza S., Laserson S., Owen S., Wills J. ground the digital based tools for complex phenomena management. (Ryza *et al.,* 2017). Forecast balance is considered to be applied for managing funds and economic efficiency evaluation (Tkach, 2010; Glavina, 2015). Applying the forecast balance framework allows evaluating and considering strategic factors like external effect, multivariance in evaluation of the innovations' and investments' efficiency. (Shchemelev S., 2001)

3. Results

According to the issues noted above we developed a "Digital capital accounting and management framework" model focused on analysis of frameworks that are formed in two lines: capital accounting and management; zero engineering balance.

Table 1. *Digital capital accounting and management framework model*

Frameworks / Qualimetry	Quantitative	Systemic			Math			Technological		
		Goals	Objects	Estimates	Graphs	Matrices	Algorithms	Initial operator	Iterations/ aggregated transactions	End operator
1	2	3	4	5	6	7	8	9	10	11
I. Capital accounting and management framework: - property; - reserve system; - securitization; - risk-related situations; - financial status; - solvency; - survival proceedings - assurance and collateral; - tax considerations; - control and audit procedures; - quality and performance; - liquidation; - strategy. II. Zero balance system utilized in business activity evaluation process according to Russian and international standards	12-20 100-120 software apps 5	Straightforward goals, proxy goals	Defined by problems solving and connected with financial risk zones and safety margin	Approx. 50 rates and values are used, paired with accounting engineering tools	Directed graphs	Adjacency matrices, working matrices of various dimensions and forms	System of algorithms defining end operators: net assets, net liabilities etc.	Basic accounting equation, balance sheet and accounts chart's sections etc.	Iterations are based on economic aggregates from 4 to 50 in existing software	Market value of assets and equitable value of liabilities

Qualimetry	Economic		Result	Control	Management
Frameworks	Financial risk zones	Security margin			
1	12	13	14	15	16
I. Capital accounting and management framework: - property; - reserve system; - securitization; - risk-related situations; - financial status; - solvency; - survival proceedings - assurance and collateral; - tax considerations; - control and audit procedures; - quality and performance; - liquidation; - strategy. II. Zero balance system utilized in business activity evaluation process according to Russian and international standards	Financial risk zones: active, neutral, passive	Defined only in active zone of risk	Change in entity's value, state and type of zone and security margin of business activity	Management and technology of production control based on zero and special balance framework	Management of the institutional unit is performed in online mode, basing on specific software and utilizing zone and margin adjustment

Source: *developed by authors*

Capital accounting and management framework includes a set of sub-frameworks providing engineering accounting and business indicators and procedures management as follows: property, reserve system, survival proceedings, assurance and collateral, tax considerations, development strategies, liquidation procedures, quality procedures, strategic accounting, entity development scenarios, risk-related situations, innovations etc.

Most of the frameworks are patented and appropriate certificates were issued by FIPA (Federal Intellectual Property Agency). Engineering software is able to modify the type of data in financial accounting framework. Thus, the financial accounting could provide only indexes system with a time step of 1-3 months. The results could be presented only in relative terms. Engineering accounting frameworks appositively are presented with capital pattern, customers (marketing) capital, goodwill, innovations and its effect on assets, venture capital and the result of its utilization.

According to FIPA, nearly 100-120 engineering software apps are now in use in Russia. They are integrated into financial accounting framework basing on structured engineering chart of accounts (Kuznetsova, 2010).

Today western enterprises offer Russian customers mix of management systems like ERP, AMS operating side-by-side to financial accounting.
Value indicators of the systems noted above are:
1. Introduction costs – nearly 15 million USD;
2. Support and maintenance costs – 2-3% yearly sales;
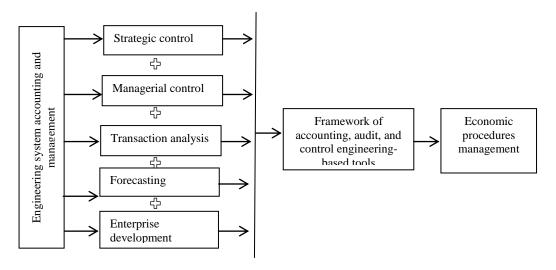3. Space cost – 50 thousand USD.

Unlike to AMS and ERP, the value of digital software app hovers around 200-500 USD; capital demand is 0,01-0,02%; space cost is 500 USD. Accounting and management entities are defined by issues solving in relation to financial risks and security margin. Engineering accounting tools are aimed at solving the following issues:
*   Digital data processing software development;
*   Multivariate accounting and analysis options' implementation;
*   Utilizing of 4 evaluation dimensions: time, assessment, activity type, horizon period;
*   Engineering accounts' chart – based activity;
*   Utilizing of math technique;
*   Online mode-based activity.

Engineering tools are diverse and provide not only obtaining the data in online mode but also a transfer from accounting and analytical support to the stage of accounting business management considering external factors (Shchemelev, 2001). The concept of zero and special balance framework could be specified by the following: estimating enterprise value both as at the beginning and the end of certain period and

defining factors affected the ratio between them (in market and balance values) when making a decision; comparing net balance assets with net zero balance liabilities when estimating the synergy effect.

Figure 1. *Accounting and analytical engineering-based framework*

Balance sections: K = A1 + A2 - O4 – O5, whereas:

A1 is to fixed assets (capital assets);

A2 is to current assets;

O4 is to long-term liabilities;

O5 is to short-term liabilities;

K is to capital within the accounting and management evaluation system.

Iterations are based on economic aggregates ranging from 4 to 50 in developed apps. Engineering technique is cross-situational and could be grouped into following: (Shchemelev, 2003).

1) Capital accounting and management framework (100-120 apps are used to manage reserve capital, financial condition, securitization, risk-related cases, financial solvency, survival procedures, assurance and collaterals, tax considerations, control and audit procedures etc.;

2) Engineering techniques applied for developing zero balances to evaluate the business activity according to Russian and international standards in the capital management and accounting framework.

Engineering data is used for decision making in:

1) Modifying the accounting and control framework;

2) Improving the liabilities' accounting and control framework;

3) Strategic and prompt decision making based on engineering accounting and management tools' utilization.

The model provides the usability for proper and effective finance, reserve system, securitization, risks, and solvency frameworks with a focus on financial risk zones (active, neutral, passive) and security margin.

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