Digital Design Management: Technologies, Mechanisms, and Platform Solutions

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ABSTRACT

The article discusses digital management systems, platforms, patterns, technologies and mechanisms used in the management of economic processes, situations, human capital, enterprises and organizations based on design methods and solutions.

Keywords: *digital management, digital platforms, digital technologies, digital mechanisms, pattern, project management, platform solutions*

Digital management radically changes the essence of management, relations between contractors, organizational and system processes, attracting platform solutions in real time.

The essence of digital management is determined by the implementation of the main focus on the result of a behavioral economy: optimization, equilibrium (competition), synergy.

The basis of the digitalization of economics and management is a platform organization that replaces the assembly line, the use of a distributed register, a permanent record of computer technology and platform solutions. The backbone factor is time, synergies and platform solutions: the backup system, risks, solvency, etc. The systems of organization of accounting, planning, management, control and management are radically changing.

Financial accounting is replaced by mega-accounting, which, on the basis of computer programs, reflects any behavioral processes: social, economic, behaviorist; the backbone of management is the system of predetermining decisions.

Permanent recording changes the control system at all levels, as it allows the control authorities (tax inspectorates, regional administrations, ministries and departments) to store the correctness of the data obtained at any time and for any period in real time when storing information in the clouds: taxes, financial results budget financing.

As a result of the digitalization of the behavioral economy, corruption will disappear due to fear that the facts will be discovered necessarily and there is no chance to avoid punishment.

The basis of management digitalization is artificial intelligence, distributed registers, new computing technologies, platform solutions and focus on results.

Theoretical problems of the digital economy and management, the integration of engineering and economic knowledge, the essence of the digital approach in economics, the constructive beginnings of engineering tools in management, the functioning of engineering in the field of accounting and management were investigated by: I.M. Ageev, E.A. Aksenova, M.Yu. Anikeev, A. Apchern, E.L. Arkhipov, A.I. Belousov, E.S. Boyko, S.V. Countless, I.N. Rich, V.V. Bocharov, N.A. Breslavtseva, J. Brigham, A.A. Vorobyova, T.O. Grafova, R. Gliss, C. Drury, V.B. Zang, L.A. Zimakova, S.V. Ivanov, P. Domingos, V.Yu. Katisonov, J. Kleinberg, Br. King, L. Lightman, J. Kleinberg, E. Tardos, E. McAfee, Er. Brignolphson, Yu.A. Ilshtein, E.A. Karyavkina, D. Campbell, M. Warner, O.I. Kolvah, G.E. Krokhicheva, E.V. Kuznetsova, D.V. Kurseev, V.V. Lesnyak, A.N. Maksimenko, D. Marshall, F. Makhlup, E.Yu. Moskvitin, E.I. Murugov, M.R. Matthews, M.H.B. Perera, F. Oberbrinkmann, I.A. Pavlenko, V.A. Proskurina, S.V. Romanova, N.P. Rudenko, E.Yu. Rusina, T.G. Savchenko, T.V. Sidorina, M.Ya. Simonovich, T.A. Stolbunova, I.V. Sugaipova, I.V. Sysoeva, V.I. Weaver, I.M. Weaver, V.S. Weaver, O.B. Chervan, M.V. Shumeyko, P.E. Shumilin, A.N. Schemelev, J. Parker, S. Reese, M. Swan, N. Taleb, R. Thaler, B. Franks, J. Pauks, J. Macaulay, E. Noronha, M. Wale, K. Schwab, E.V. Yurova, Y. Yakutin.

Digital management systems are built on the following principles, focused on the use of algorithms:

− design of a digital platform and the functioning of digital technologies equipped with a complex of digital mechanisms in the form of a megabalance system;

− designing engineering tools that provide financial, intellectual, structural, behavioral, educational and consumer capital management;

− management of economic situations and aggregated flows of resources (digital platforms);

− formation of an engineering chart of accounts, in which the economic aggregates are mega-accounts, permanent record and distributed register;

− use of aggregated iterations focused on property indicators, that is, on financial, intellectual capital and organization brand formation;

− management of the reserve system with the definition of security margins and areas of financial risk (active, neutral, passive);

– focus on determining the results of activities of the university, faculties, departments, laboratories with a financial and intellectual capital management system, management of an effective contract;

– general indicator of the organization's activity, the resulting synergy or anergism, focused on the use of financial and intellectual capital and a management roadmap.

Digital management is based on the quantification of economic processes related to the formation of financial, structural, behavioral, educational and consumer capital, which allows us to fully measure on the basis of intellectual capital indicators such as performance, reserve system, risks, etc.

For these purposes, Russia has developed and patented a system of digital mechanisms that operate online in the form of megabalances: educational, behavioristic, hedged, monitoring, etc. [19,27,28,32]

All currently used digital systems and management subsystems are classified into three groups:

I. Digital systems of accounting, control, analysis and management;

II. Digital mechanisms integrated into financial, tax, managerial and strategic accounting;

III. Systems of control digital mechanisms (zero micro, mega, meta, meso and macro balances).

Digital management systems are classified into two groups:

A. Behavioral or behavioral systems, which include subsystems: structural, behavioral, educational, consumer; accounting, control, analysis and management of financial and intellectual capital;

B. Digital transaction systems include the following transactions:

– strategic;

– reserve system, which includes 14–20 units of a warranty nature;

– risks, the accounting of which is ensured by the application of the megabalance of integrated risk for the purpose of managing risky assets and comparing them with hedged and protected assets;

– actuarial system used to predict the value of the organization in collateral and market valuations;

– semantic, used to manage economic situations;

– innovative;

– subsidiary;

– synergetic – used to determine synergies or anergism in reorganization processes and the use of innovative capital;

– gradual – provides management with a wide variety of changes with the definition of relevant results. [1, 3, 5, 7, 9, 11, 15, 18, 19, 27, 28, 32]

Digital management is based on design methods based on patterning, i.e. design patterns.

The pattern is an algorithm synthesizing new knowledge in the form of a three-step procedure:

1. Presentation – a comprehensive review of the problem being studied (big data analysis, logic, neural networks and other methods).

2. Evaluation – the function of assigning qualitative indicators to the model (error square, fitness level, posterior security, clearance, security margin, financial risk zone, etc.).

3. Optimization – obtaining the research result with the best estimate (synergy in money terms, the result of reverse deduction, gradient descent, genetic search, probabilistic inference , optimization with restrictions).

There is a scientific school management of the process of obtaining new knowledge in the educational process or by machine method in the form of a system of self-learning algorithms:

1. Symbolists (logic , accuracy, reverse deduction).

2. Connectionists (neural networks, squared errors, gradient descent).

3. Evolutionists (genetic programs, adaptability , genetic search).

4. Bayesians (graphic models, posterior probabilities, probabilistic inference).

5. Analogizers (support vector method, gap, optimization with constraints) [10].

6. Knowledge engineering (aggregated models, safety margin , synergy) [19, 32].

The digital system of regeneration and knowledge is presented in Fig. 1 .

The digital system of knowledge regeneration functions in the form of a pattern that includes three stages.

The first is the presentation and analysis of big data based on relevant analytical procedures: logical, statistical, network, genetic, graphic, vector, analytical, support vectors, etc.

Representation is a formal language in which machine learning algorithms express their models. The formal language of symbolists is logic, particular cases of which are rules and decision trees. For connectionists, these are neural networks; evolutionists – genetic programs, including classification systems; Bayesians – graphic models, a general term for Bayesian and Markov networks; analogues – special cases, possibly with weights, as in the support vector method.

For specialists in the engineering school of knowledge, analysis is based on aggregates and aggregated processes in the form of an engineering information base and systems of honey, macro, meta, meso and macro iterations of an aggregated type.

The second step is to evaluate the options for the problem.

The rating element is a scoring function that shows how good the model is. Symbolists use accuracy and informational gain. Connectionists are a continuous measurement of error, for example, the squared error, which is the sum of the squared differences between the predicted and the true values. Bayesians use a posteriori probability, analogs (at least specialists using the support vector method) use a gap. In addition to evaluating how well the model fits the data, all "tribes" take into account other desirable properties, such as the simplicity of the model [10].
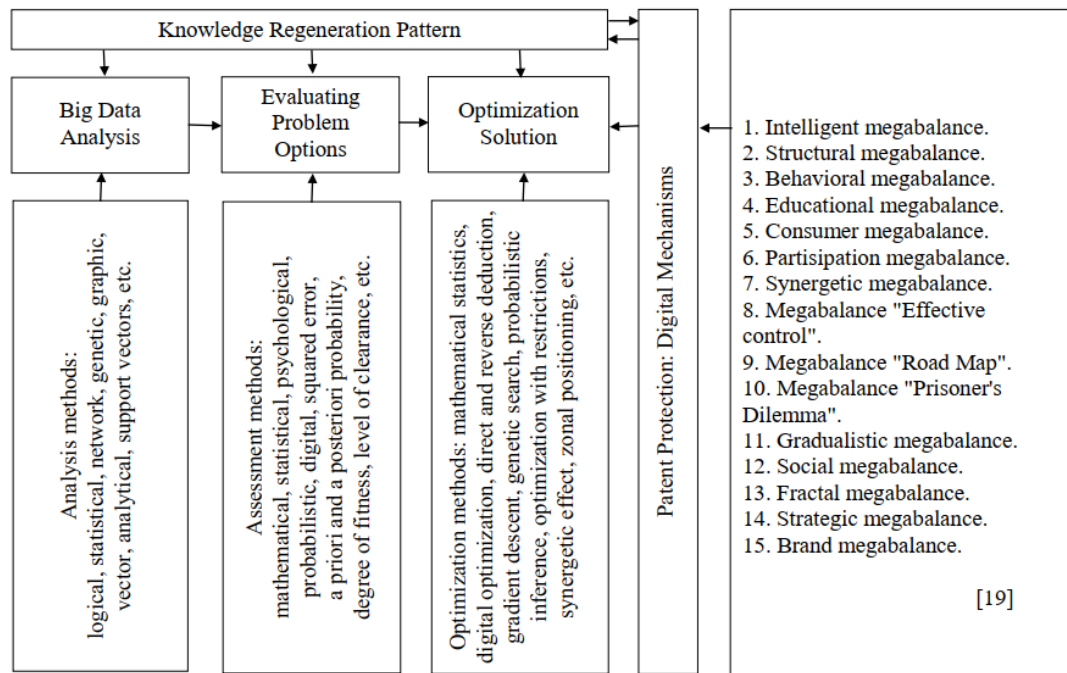
Figure 1 Digital system of knowledge regeneration "Pattern of knowledge regeneration" [32]

In an engineering system, an assessment is made on the basis of the use of several hundred of their computer programs ensuring the determination of the zone of financial, economic, and intellectual risk and margin without danger.

The third stage is an optimization solution to the problem.

Optimization is an algorithm that searches for and issues the model with the highest rating. The typical search engine of the symbolists is reverse deduction; connectionists - gradient descent; evolutionists - genetic searches, including crossing over and mutations; Bayesians are unusual in this respect: they not only look for the best model, but also average over all models, weighing their probability. For effective weighing, they use probabilistic inference algorithms, for example, MSMS. Analogizers (or, more precisely, adherents of the support vector method) use conditional optimization to find the best model [32].

The optimal solution in the engineering system is focused on the determination of synergism or anergism in any of hundreds of economic situations and problems and problems to be solved.

Digital project management operates on the basis of a digital platform.

For over 40 years, a whole gamut of digital management platforms has been created and is functioning : investment, innovative , payment, behavioral, social, instrumental, biometric, industry, transactional, integration, immunization, monitoring, fractal, etc.

Innovative platforms allow leaders to attract a very large number of external innovators and serve as the technological basis on which other companies develop complementary products and services. Examples of such platforms are iOS Inc. iOS. and Google's Android, which created very large innovative ecosystems of application developers for their mobile devices.

Management platforms at the micro, mega, meta, meso, and macro levels provide solvency management for individuals, enterprises, and other ecosystem participants (China, Kenya).

Transactional management platforms provide for the commercial interaction of ecosystem participants and the functioning of transactions (Amazon, Uber).

Integration management platforms offer a wide range of interactions, both transactional and innovative (Apple, Google).

Investment management platforms are holding companies that manage a portfolio of platform companies. For example, Priceline Group is focused on online travel and related services, including Priceline, Kayak and Open Table.

In the field of management , multilevel digital platforms are developed and operate:

− behavior of individuals and individuals of ideal entrepreneurs (micro level);

− behavior of commercial enterprises (mega-level);

− functioning of budget structures (meta-level);

− industry fluctuations (mesoscale).

The study of digital platforms, their development and design is expedient to be carried out on the basis of the use of the "Platform organization of the digital economy" pattern (Table 1).

The pattern classifies hundreds of the most diverse platform forms on four main types:

1) instrumental;

2) infrastructure;

3) behavioral;
4) applied.

The typification of digital platforms is based on the classification of the sub- mission on the digital economy, added by the gamut of digital platforms and behavioral economics.

According to the Russia e-State Expert Center D Russia.ru, approaches to the definition and typing of digital platforms were approved on April 25 at a meeting of the subcommittee on digital economy of the government commission on the use of information technologies to improve the quality of life and the conditions for doing business.

The results and functioning mode of the digital form management board allow solving the following digital economic problems:

1. Risk-based enterprise reserve management.
2. Safety regulatory band management.
3. Assessment of decisions.
4. Using an automatic decision support system.
5. Synergistic effect management.
6. The use of new forms of financing based on the functioning of the crowdfunding platform.
7. The emergence of the category of smart contracts and the new profession "lawyer-programmer". [more than 100]
8. Widespread use of electronic wallets in the settlement system.

9. A fundamental change in the nature of accounting and its transformation into the first area of management.
10. The predetermining nature of analytics and the formation of the specialty of a programmer-analyst.
11. Value creation in multichannel trading.
12. Construction of control based on a hash function, the use of digital megabalans.
13. Change in the social function of control.
14. Creation of new generations of applications.
15. The emergence and use of new theories of digitalization.
16. Formation of new industries and fields of activity.

The risk-based enterprise backup system is managed in a digital management environment based on:

1. The concept of accounting and analytical support for the backup system.
2. The control standard of the backup system of the enterprise.
3. The system of restrictions and the backup system in the accounting and analytical support for property management.

The concept of accounting and analytical support for the management of the reserve system operates on the basis of a complex of aggregated aggregates and digital reflection of the reserve system and risks with the management of the financial risk zone (active, passive, neutral).

The concept of accounting and analytical support for the management of the reserve system of the enterprise is presented in table 2 .

Table 1 Pattern "Platform Management Organization"

Platform Qualimetry / Types platform of decisions	Backbone indicator	Organization	Qualimetric platform criteria	Digital paradigm			Results and platform solutions				Digital the contro
				optimum	equilibrium	synergism	transactional costs	the risks	margin safety	synergism/ anergism	
1. Instrumental 2. Infrastructure 3. Behavioral: micro-, mega-, meta-, meso-, macrolevel 4. Applied	Real time	Platform instead of conveyor	Algorithmization, a single information environment, scalability, multi-level, multifunctionality	A set of optimization megabalances: micro-, mega-, meta-, meso- and macro-level	Digital instrument system	Synergetic Balance System: micro-, mega-, meta-, meso- and macro-level	Transactional Megabalance System	Hedged and Integrated System megabalance risks	Active, passive management and neutral safety margin	Management system synergism / anergism in a level context	System of zero mechanisms: micro-, mega-, meta-, meso- and macro-level zero derivatives of balance sheets

Table 2 Pattern "Digital technologies and their use in management"

Qualimetry digital economics / Scalability	Digital objects management: people / business / things	Digital platforms	Algorithmization	Functioning mode	Cloudy infrastructure	Competition management	Functioning paradigm
1	2	3	4	5	6	7	8
I. Global economy	Cryptocurrency, Internet of things, crowdfunding, digital exchanges of currencies	Blockchain 1.0 Operational Programs Basic Decentralized Log	Supreme Algorithm	Online: always, everywhere, everyone	Cloud infrastructure is an equipment system under the protection of browsers, is divided into public (rental) and private	Stakeholder, competitive megabalance	Accelerated Economic Development
II. Macroeconomics	Digital government Labor resources Goods, services Capital	Blockchain 2.0, 3.0 Digital platforms, programs					
III. Mesoeconomics	Energy, transport, municipal services, medicine, education, electronic banking, insurance	Digital platforms, programs					
IV. Microeconomics	E-Commerce, Decentralized financing, advertising, consulting, backup system, risks, roadmap, effective the contract	Digital Platforms Engineering Chart of Accounts The system of new business models					

The end of the table. 2

Results			Socio-Ethical Aspects of the Digital Economy						
financial and intellectual capital	risk zone management and security margin	synergy management	human potential and robotics	education	labor market	food and water	changing of the climate	new materials	synthetic biology
9	10	11	12	13	14	15	16	17	18
Megabalance system: monitoring, structural, behavioristic, consumer, educational	Financial Risk Zones and Security Margin based on digital mechanisms: hedged and integrated risk megabalances	Synergetic megabalance	Behavioral megabalance	Educational megabalance	Workforce Megabalance	Megabalance of food stocks	Digital gears will be created. climate control	Digital controls will be created materials	Digital controls will be created bioresources

Sections of the concept pattern:

I. Functioning conditions: principles, foundation of the backup system.

II. Accounting management mechanism of the backup system of the enterprise:
 - initial operator: megacount $A_1 + A_2 = K + O_4 + O_5$;
 - hedged aggregated iterations (8 positions);
 - hedged megabalance.

III. Accounting mechanism for reflection of risks:
 - hedged megabalance;
 - aggregated integrated risk postings;
 - integrated risk balance sheet;
 - megabalanse integrated risk.

IV. The state of the backup system (active, passive, neutral).

The computer program system "Management of economic processes and results" provides online business management with the main financial indicators (32) :
 - solvency;
 - cash flows;
 - economic situations;
 - financial condition;
 - property;
 - of her financial risk.

Digital management provides management of economic situations (restructuring and transforming property, using venture and crowdfunding financing, introducing innovations, determining the synergetic effect, risk situations and solving operational, tactical and strategic tasks), characterized by an assessment system and digital

tools engineering, relevant algorithms, results and the multivariate nature of the decisions made.

Digital control of the effectiveness of the use of payment resources of an enterprise includes a system of adjustments based on the use of semantic methods of cash flow control , hypothetical sale of assets and satisfaction of obligations in order to determine the authorized and unauthorized movement of cash resources and price changes for the controlled period and their impact on the property of the enterprise based on the use of indicators of net assets and net liabilities.

The digital performance monitoring provides verification of how legally and efficiently the company's money is used in network settlements and payments, and is aimed at making informed administrative decisions on punishment of non-residents and management decisions on regulation of payment resources, strengthening cash flow management and payment status of the network enterprise. [32]

The developed and tested model of behavioral management of human capital is based on the use of two systems of behavioral accounting and a complex of subsystems:

1. Behavioral digital accounting of intellectual capital:

a) digital accounting of human capital and its management: behavioristic; structural; consumer; educational; knowledge and other megabalances;

b) oriented towards accounting for behavior affecting human capital: Pareto/Harvard optimum; prisoner's dilemma.

2. Behavioral regulation of the impact on the human capital: search; semantic; environmental; ethical; creditworthiness; biological.

The effective functioning of behavioral systems of accounting and management is based on the use of a complex of qualimetric characteristics: quantitative; sphere systemic; methodological; technological; economic; synergistic; resultant; control; managerial.

The behavioral accounting model is oriented towards increasing the efficiency of functioning of human capital with a focus on indicators that increase the value of the enterprise as a property complex:

– net intellectual assets at market value;

– pure intellectual liabilities in a fair assessment;

– synergistic effect of changes in the efficiency of use of human resources.

The compilation of digital megabalans of direct and regulatory impact goes through a number of stages:

1. Focusing on the principles that are used to address:

– capacity building;

– increase in value;

– use of reserve capital;

– use of risk capital, etc.

2. The main idea being implemented (increasing the capital of the company):

– financial;

– behavioristic;

– structural;

– consumer;

– accumulated knowledge;

– behavioral according to the optimum of the Pareto / Harvard Business School;

– variant capital in accordance with the prisoner's dilemma;

– search;

– semantic;

– environmental;

– ethical;

– social;

– credit.

3. Rating.

4. Used behavioral management tools .

5. Behavioral Accounting Algorithm:

– initial operator (actual, forecast, planned and other megacounts);

– iteration:

a) adjustment and preparation of adjusted megabalance;

b) specific and compilation of specific megabalance: behavioristic; structural; consumer; accumulated knowledge; intellectual; Pareto or Harvard; a dilemma; semantic; environmental; ethical; social; credit.

6. The multivariance of the solution:

– aggressive strategy;

– conservative strategy;

– business minimization strategy.

7. Result: net intellectual assets and net liabilities in adequate estimates of the problems being solved.

The standard "Behavioral system of human capital management" provides the organization of accounting for human capital (behaviorist, structural, consumer, educational, accumulated knowledge) and the regulatory impact on human capital of search, semantic, environmental, ethical, etc.

The standard includes the following sections:

I. Types of accounting (behavioristic, strategic, multivariate);

II. Engineering structural chart of accounts (digital platform);

III. Organization and technology of accounting for human capital:

a) interface system:

– initial operator;

– aggregated behavioral postings;

– finite operator.

b) a system of behavioral mechanisms of direct impact on human capital:

– behavioristic;

– structural;

– consumer;

– accumulated knowledge;

– intellectual, etc.

c) a system of behavioral mechanisms that regulate the impact on human capital:

– search engines;

– semantic;

– environmental;

– ethical;

– social and others

The standard provides the organization of accounting for behavioral capital with a focus on determining the synergistic effect of its use and areas of financial risk (active, neutral, passive).

Developed at the scientific school of the honorary professor of DSTU Tkach V.I. digital platforms, technologies, tools, databases, patterns are decorated in Rospatent R.F. more than 300 patents and certificates are widely used in scientific research, the educational process and in practice.

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