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**ACCOUNTING AND ANALYTICAL PROVISION OF MANAGEMENT IN THE TIMES OF INFORMATION THINKING**

**Abstract.** The article is devoted to solving topical issues concerning modern trends of development of new type of thinking as an ideology of continuous changes due to technological reorientation of society, economy and accounting. The substantive content of the essence of informational thinking has been worked out, which made it possible to substantiate its features, which caused by the generation and dissemination of technological and intellectual innovations in the processes of processing, transmission and storage of information. The key parameters and limitations of the development of informational thinking were characterized, which allowed to structure the factors of modification of information processes. The modification of the principles are made, which should promote the innovative direction of the transformation of thinking as a new ideology of information processing without the use of templates and the rejection of traditional statements. The communication component of the project of change is substantiated as a priority parameter for the formation of a plan for further actions that defining a new logic of changes and transformations for business. The conceptual model of the development of project of changes are formed, in which takes into account the parameters of innovation in the formation of knowledge and the expansion of professional competencies, which in the integrated set give a universal formula for business development.

**Keywords:** informational thinking, economy, accounting, development, model, managerial decisions

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**JEL Classification:** D80, D81, D83, D84, F20

**Introduction.** Development is always accompanied by changes and the need to reorientate to new conditions, rules, principles, methods and procedures. The new order requires readiness for change and acceptance them as logical and objective element of improvement that involves the transformation of the ideology of the development of society and economy. Modernity is represented by social and economic changes that based on a redefinition of general postulates and the adoption of new laws as the basis of sustainable development. Transformation processes are caused by a new developmental ideology that characterized by the parameters of the syn-

ergetic approach as a consequence of postmodern in the formation of a new type of thinking, distinguishing features of which are: developmental alternatives; hypotheses of options; initiating changes; personalization of information processes; the irreversibility of transformation processes; integrity of transformations. Postmodern ideology of development defines a new stage in entering the information age, the priority value of transformations in worldview and socio-economic relations. The trend of information activity has allowed to identify a new development factors - information, technology and knowledge, the production and implementation of which is a priority for the modern economy.

Science moves forward, generally, proportionally to the mass of knowledge that received earlier. However, today's rapid transfer of information and the replacement of some data by others sometimes leads to the opposite effect, when the amount of knowledge does not contribute to the growth of science, and prevents to it. So, today the totality of information that received by a person per day, can be compared with an array of Big Data, to which data are available from everywhere, structured and unstructured, needed, secondary and frankly unnecessary knowledge. To focus on the relevant or unambiguously and objectively to classify the information, when the sources of its receipt for so many, and the speed of its update is so great, is very difficult and requires extraordinary efforts from any person, and from the person who accepts the decision - the more.

**Literature review and the problem statement.** The concept of information development is the basis of methodological transformations in economic processes, the modernization of which is due to the influence of theories of information, global communication and the symbol. Thus, according to separate forecasts at 2020, personal computers will reach the computing power of the human brain; at 2022 will begin to adopt laws that govern the relations of people and robots; at 2026 per unit time it will be possible to extend human life to more time than it has been; at 2040 search engines will work not only on the basis of requests from the voice of a person, but also from opinions; at 2043 the human body will be able to take any form due to nanorobots and cybernetic devices that will be substitutes for human organs at a much higher quality; at 2045 technological singularity will begin - the transformation of the planet into a complete computer, when technical progress will be beyond the limits of its understanding [The future of the world: a forecast up to the year 2099].

The establishment of information thinking as a specific category of modern worldview is the result of the conceptual development of economy and society with a change of the status of knowledge and information. The phenomenon of information thinking is to reorient knowledge and skills of the individual to solve tasks of any complexity with the formation of the most acceptable result. The phenomena of informational thinking combines the parameters of modern society, for which the characteristics of postmodernism are inherent - the priority of information technologies in economic processes and the competencies of «information human». Thus, the coordination of new values with general rules without asymmetry is carried out in the transition to an innovative type of thinking, in which the ideals of technologically minded society are laid. It is important to determine the proportions between the destructive and constructive content of information thinking as the prospect of actualization of economic processes with a positive result of changing of established worldview.

Special attention should be paid to the artificial intelligence (AI), the development of which today does not cause anxiety, but the pace of its improvement leads to reflection and taking into account trends for the development of all branches of science.

Questions on the use of artificial intelligence in everyday life of every person, as well as enterprises and states are given today attention at different levels [Karbownik, Dźwigoł, Wodarski 2012; Dźwigoł 2013; Dźwigoł 2015b; Dźwigoł 2016b; Marszałek-Kawa, Chudziński, Miśkiewicz 2018; Miskiewicz 2012; Miskiewicz 2016].

The analytical paper prepared by the House of Lords of Great Britain addresses the positive opportunities that artificial intelligence can provide to the British economy through optimization, in particular, business processes and related risks [AI in the UK: ready, willing and able?]. The authors of the report provide the use of AI and propose to inform the public when used by AI for making important or sensitive decisions. The introduction of such rule would be, perhaps, the first regulatory measure for the regulation of human relations and artificial intelligence since 1955, when it was first spoken about in the world.

However, researchers note [AI in the UK: ready, willing and able?], constant attention should be paid to raising public awareness of the digital environment, information technology and, in fact, artificial intelligence. Development and positive trends in the implementation of AI will be based on this. However, it is right to note that, for example, in school programs, it is not appropriate to increase the focus on informatics through the arts or humanities that form creative, contextual and analytical skills [Dźwigoł 2014; Dźwigoł 2015a; Dźwigoł 2015c; Dźwigoł 2016a; Dźwigoł 2018; Dzwigoł, Dźwigoł-Barosz 2018; Miskiewicz 2017a; Miskiewicz 2017b; Miskiewicz 2018].

In fantastic films, you can often find like-minded atnoglobolists people with the slogan «Robots will take our jobs», which in the development of our topic and questions about the future of AI is not without meaning. Questions about the impact of AI on employers and staff were rated by PricewaterhouseCoopers specialists [2018 AI Predictions 8 insights to shape business strategy]. Quite rightly, they note that changes in employment will relate to retraining staff more quickly: indeed, some professions will disappear, but new and, most likely, more highly skilled will replace them. And such changes are actually a constant satellite of technical evolutions and at each stage of society development we see such changes. In addition, as before, they will be faster evolutionary rather than one-stage. Thus, the profession of Chimney Sweep before the invention of steam heating (and especially on the basis of natural gas) was also popular and disappeared, too, not immediately, because only gradually steam heating came to most homes. And today, workers who servicing gas boilers are popular and clearly more qualified than chimney sweeps.

Today, perhaps the most successful and illustrative example of the use of artificial intelligence is targeted sales and advertising. This question is devoted to the analytical paper of Deloitte specialists [Artificial Intelligence Innovation Report 2018]. Processing a large array of data and the decision concerning the offer of a particular product to a certain buyer at the right time – with this task today able to handle the AI system. Researchers note the interesting solution used by RapidMathematix company in the pricing system: prices in the online store are updated in fact every second depending on the time of day, market conditions, shelf life of the product, season, customers sentiment, etc. Indeed, the value of goods for each of us depends on many factors and can change at any time, then why not change its value for buyers to maximize turnover and profits.

Insurance companies that count on their risks based on global and individual conditions around the world should always be aware of recent events. Thus, one of the world's largest insurance companies Allianz points out the seventh place in the rating of major business risks impact of artificial intelligence and other forms of advanced technologies. This type of risk, according to the insurance company's experts, is more significant than, for example, political risk and the risk of climate change [The rise of artificial intelligence: future outlook and emerging risks. Allianz global corporate & specialty 2018]. In particular, it is about boosting thanks to the AI of traffic safety. And

by 90%, the number of road accidents will decrease. Indeed, with the introduction of the 5G data technology, the integration of car systems with traffic control systems is possible, and the AI will help to calculate the probability of an accident, depending on the speed and trajectory of each car's traffic in the flow, for example, to offer the driver to change the parameters of the movement to avoid the accident.

The main fears associated with the implementation of AI, usually lie in ethical aspects. In the UNESCO publication deals with three categories of such risks [Ganaschia 2018]:

- deficiency of labor – machines, but not people can do the work;
- consequences for the autonomy of the individual: regarding freedom and security of the person;
- the advance in the development of mankind with more «intelligent» machines, which are able to process much larger amounts of information faster, make decisions, have access simultaneously to a large number of sources of information.

The question of the development of the information system of modern society and economy becomes more relevant and is considered in the papers of various scientists, who have their own position regarding the methods, principles and procedures for the formation of the information environment of the economy. In particular, leading scholars of our time [Kiernan 1997; O'Connor 1997; Appelo 2011; Johnson 2014; Bolman 2003; Hofkrichner 2011; Kahneman 2013; Curzon 2017; Berger 2016; Dyer, Gregersen, Christensen 2011] identified a new stage in business development based on technology and reorientation in the perception of information, justifying the priority of an irrational approach to decision-making. However, less attention is paid to the formation of a new type of thinking. This issue is less studied by scientists and is considered primarily from the standpoint of working out a different type of worldview that is more characteristic of philosophical sciences. This leads to the intensification of research of a new nature to determine not only the essence of information thinking, but also an understanding of the basis of its formation and implementation in the processes of sustainable economic development.

The research goal is to reveal the essence of information thinking with a characterization of its priority role in economic processes and the formation of accounting and analytical provision of management as a parameter of change and promoting the inevitability of information innovations.

The totality of general scientific methods of knowledge processes and phenomena that take place in the modern economy under the influence of technological transformation has become theoretical and methodological basis of scientific research. At scientific research used: gnoseological method for concretization of conceptual-categorical apparatus that characterizes information thinking; system-structural method for specifying the principles of forming a new type of thinking; method of analogy for forming conceptual development models of project changes and construction information thinking model; theoretical generalization and comparison methods for determining the prospects and directions of transformation of changes management projects on the basis of a new approach to the interpretation of events and phenomena.

**Research results.** «Grow or die» is the business slogan of the 21st Century [Kiernan 1997], that determines the possibilities for strategic differentiation. The ideology of the modernity is the formation of a new reality based on technology that has changed the understanding of the essence of knowledge, information and thinking.

Changes are a prerequisite for development, but the question remains «why change?». The answer is simple – the business has long ceased to be predictable. Managing a business involves the constant search for new methods and principles that take into account different situations of

uncertainty and are able to form hypotheses for reaction models and alternatives to development. Managing modern business is in the area of continuous updating of knowledge and expansion of professional competences that involves targeting a new type of thinking, which is characterized by adoption of changes. A distinctive difference in the organization of modern business is system thinking that aimed at identifying the connection between different phenomena and processes, ensuring the possibility of predicting the reaction of the system to changes in the external environment, with the orientation of the management team to the application of innovative methods, principles and procedures [O'Connor 1997]. The importance of system thinking is explained by the need to understand the essence of the relationships and phenomena inherent in the economic systems that form the basis of business.

The development of technologies has allowed to bring to the new level the study of complex systems that contributed to the study of the components of the system in different areas of their characteristics and parameterization of their qualities to predict the results of development. The technological culture is a subsystem of a general economic culture for business and is also associated with political, legal and moral culture.

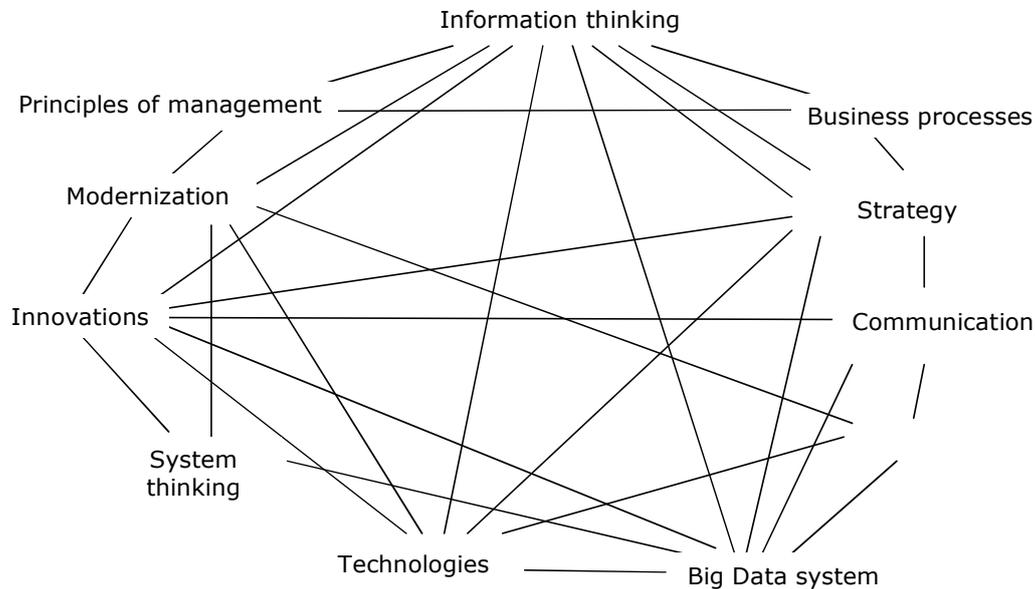
Technological culture is the result of the development of society's experience in the processing, transmission and storage of information with the acquisition of new knowledge and skills that formed to technological competencies. The development of technological culture contributed to the change of economic values and norms, information traditions and concepts that changed the basic provisions of the development and interaction of economic institutions. Accordingly, transformational processes that initiated in social and economic processes, cause technological innovations demanded at all levels of business management. Technological initiatives become effective provided that the idea of innovation changes as a conscious choice through the change of thinking and acquiring new skills, the use of which allows you to obtain strategic advantages through the «benefits of the pioneers». Technological consciousness means the perception of traditional phenomena and processes in accordance with the ideology of a multimedia society, which rejects established rules with the advantage of perceiving information processes as natural, covering all systems and interconnections. Transformation in traditional thinking should be characterized by a strategic focus, without fragmentary realization, and therefore, it is necessary to allocate the basic tasks of changes in accordance with the level of influence on the activity of economic systems (Table 1).

**Table 1** – Categories of problems of information thinking

| General problems                                   | Personified micro problems  | Personified macro problems                              |
|--|---|---|
| The universe of principles, methods and procedures | Asymmetry in the formation of information provision of management | Untimely of technological response                      |
| Principal hierarchy                                | The inconsistency of information behavior                         | Complexity of interaction with the external environment |
| Denial of options and alternatives                 | Untimely monitoring of opportunities and threats                  | The priority of capital with material essence           |

**Source:** developed by authors

The overcoming of these problems (Table 1) involves the rejection of rationalism in the perception of phenomena and the generation of knowledge. The new type of thinking is appropriate to compare with the «web» (Figure 1), to define it as a structured «the labyrinth», therefore, the formation of knowledge takes place at a new level of assimilation of information with the priority of empirical knowledge as more effective for solving tasks.

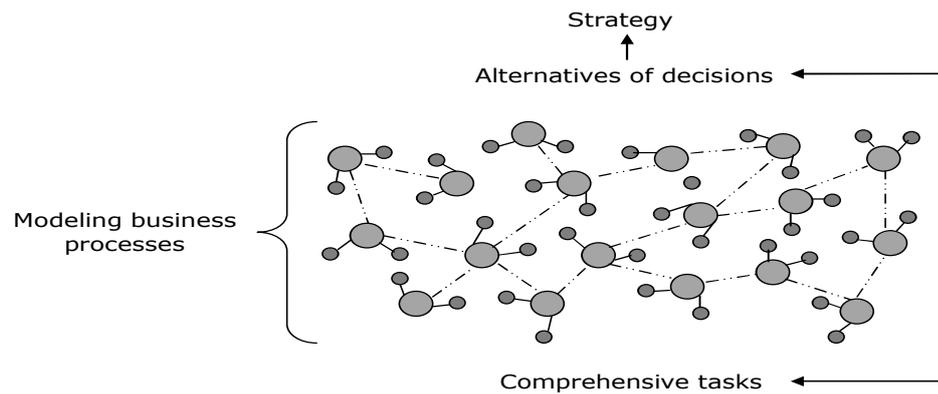


**Figure 1** – Parameters of informational thinking

**Source:** developed by authors

Information thinking can be defined as an advantage in the interpretation of information for the formation of knowledge that, by qualitative parameters, significantly differs from ordinary a priori and empirical knowledge. A distinctive feature of informational thinking is the ability not only to generate ideas, but also to implement them, thus ensuring the practical value of knowledge and skills. The key point of information thinking is the complexity that allows us to formulate solutions to complex problems (Figure 2). Information thinking in the modern world has become a symbol of the complexity of the rejection of predictability in favor of a new style of decision-making [Appelo 2011]. Complexity is a factor that can be managed if you have the relevant competencies that are formed on the basis of changing thinking and orientation towards innovative development with the formation of new case decisions [Johnson 2014]. According to business process modeling, the range of knowledge and skills necessary to solve the task varies based on several alternatives, each of which provides a certain direction of strategy development with a set of methods, principles and procedures. This means personalizing each decision with a prediction of the end result and forming an appropriate model for responding to risks and possible threats. In this case, the informational thinking focuses on the expansion of information management to maximize the amount of data processing without informational asymmetry and the use of significant amounts of time and money, which greatly facilitates the decision-making process.

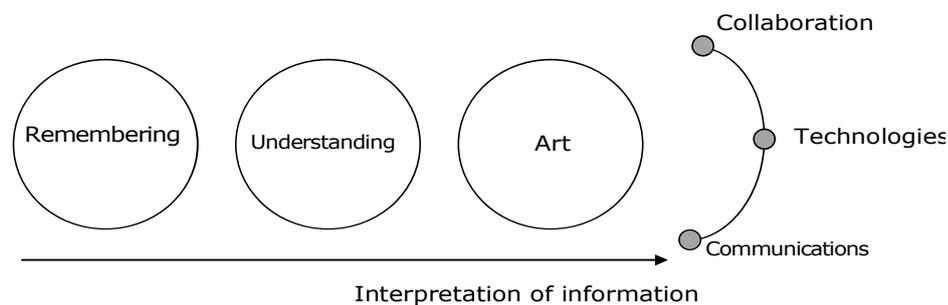
Information thinking is the result of rethinking facts without manipulating templates to protect beliefs that slow down the development process. New information maps characterize the objective interpretation of phenomena and events that lies in the logic of information thinking [Bolman, Deal 2003].



**Figure 2** – Conceptual model of informational thinking

**Source:** developed by authors

The model of information thinking is the result of an evolutionary process of processing of information with the use of developed professional competencies (Figure 3). This is a change in the style of perception and interpretation of data with access to the process of creative application of knowledge and the generation of information for management at different levels of economic systems. Influence of technologies on bias, intuitive and conscious thinking, emotions in judgments allowed us to move to a new level of interpretation of information with the formation of unconventional conclusions that meet the requirements of time [Kahneman 2013]. Information type of thinking is not limited to traditional images, principles and factors. This is a new format of development of social and economic relations with the transition to a new level of reality [Curzon 2017].



**Figure 3** – Evolutionary changes in traditional thinking

**Source:** developed by authors

The basis of information thinking is the integration of various skills concerning task solving that is not limited only to logical and algorithmic thinking, but also includes the ability to understand and predict the actions of participants of economic relations with the proposal of various ways of solving tasks. The uniqueness of information thinking lies in the multivariate nature of the development of knowledge and skills for the formation of complex information constructions with appropriate parameters regarding the activity of entrepreneurial structure. Information thinking differs by changing the ideology of understanding information with the formation of new skills that based on new principles of information management:

1. Rejection of the principle of the hierarchy in information - all information is important without the allocation of secondary data. The possibility of taking into account various data without the need for their sorting to relevant and irrelevant became available though the development of information technology. More important is the allocation of types of information by the criterion of novelty - new information and known information. New information characterizes a more qualitative level of

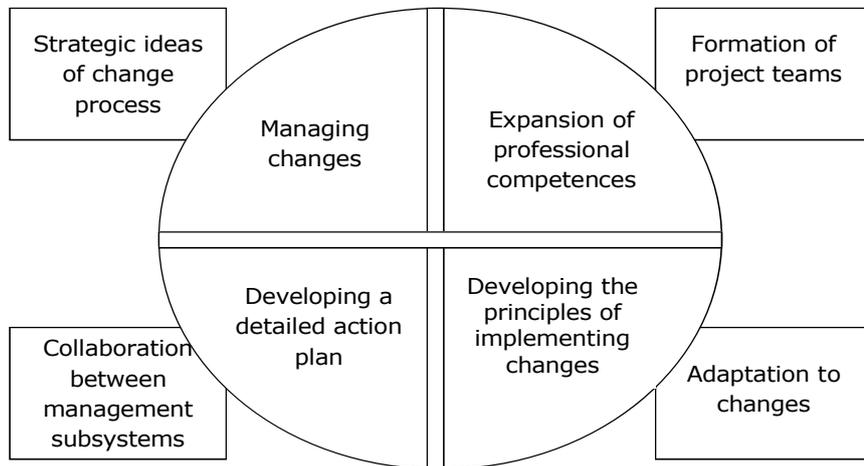
rational cognition, allows to form new knowledge as key elements of managing an enterprise. The new information (for which a message is created) is information that, in the opinion of its author, is capable of making changes to the structure of social and individual thesauruses (amounts of knowledge).

2. The rejection of binary logic – priority of large databases for the formation of universal knowledge. Modern features of information processing allowed to operate with Big Data and apply analytical appendices in the processing of information that greatly improved the quality parameters of the decisions taken. The use of Big Data promotes the increase of analytical information through its segmentation that stimulates the development of various variants of scenarios of managerial decisions and increases the opportunity to consider and evaluate alternatives to the development of enterprise activity. Multivariate and flexibility of business process scenarios contribute to the quality of performance, and hence, the increased efficiency of managerial decisions and development projects.

3. Rejection of unambiguous information conclusions – any information can be transformed and modified to create different hypotheses and alternatives. The formation of information constructions in accordance with the task and parameters of the business structure has become accessible, which made it possible to personalize each decision with a timely assessment of threats and prospects. The rationality of information provision in the generation of new knowledge should include a full range of relevant data necessary for the development of professional judgments, on the basis of which decisions are made. For further complete development of knowledge, information is required concerning professional judgment of the individual, but not narrowly focused, and such information that covers the whole field of knowledge. A significant proportion of information that interests the expert is professional information: the information needed to complete the task and information for professional development. For the complex extension of knowledge the specialist needs information that allows to identify factors of influence and predict the dynamics of enterprise development, justifying managerial decisions in accordance with the realities of the enterprise's activity in the market environment, which changes under the influence of the formation of the information economy. On the basis of informational thinking there is a rethinking of the ideology of development with readiness for fundamental changes, up to a complete transformation. Information thinking cannot exist only at the highest level of management – it should be characteristic of all members of the team, thus contributing to the formation of a unified logic of action and to encourage change as an appropriate measure for the development of not only business, but also for professional competences. In such a change project, the communication component becomes a priority for the formation of a plan for further action that defines a new logic for change and transformation for business (Figure 4). Communication impact are a hidden powerful factor for business modernization, because are the basis for the formation of a unique development project [Berger 2016]. At planning and implementing changes the communications is the basis for the formation of the appropriate information provision that should cover all management subsystems without informational asymmetry.

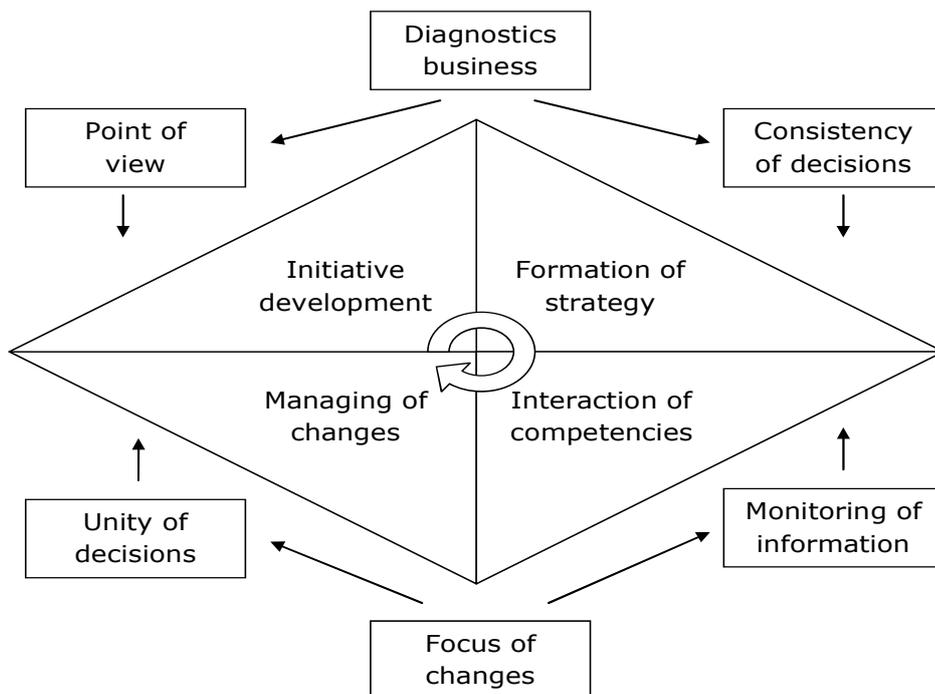
Through informational thinking, unity is achieved in involving the subjects of management in real action that is expressed in the integration of knowledge and professional competences with a productive exchange of skills, that is, the implementation of a practical approach to changes. The process of renewal begins with the change in traditional thinking that is the consequence of understanding the futility of established rules, principles and procedures. This is an objective assessment of the business with the definition of the place of the entrepreneurial structure on the map of the external economic environment. Information thinking inherit the characteristic features of the com-

pany's activities that involves identifying unique links in the structure of the principles of organization of activities, in the policy of making managerial decisions, stimulating motivation in regulating professional knowledge and competences, communication policy in the circulation of knowledge. Information thinking is more inherent to innovators, who are able to recognize a problem that is invisible to others and to offer solutions that go well beyond the usual approaches, that is, they are able to think alternatively without patterns [Dyer, Gregersen, Christensen 2011].



**Figure 4** – Information and communication environment of implementation of changes  
**Source:** developed by authors

The development of a project of changes should begin from transformation of the thinking style, and, therefore, meet the conditions of the present and take into account the professional competencies of the project team, which co-determine the new direction of business development. Structuring of the project of changes is carried out on the basis of innovation in the formation of knowledge and the expansion of professional competencies, which in the integrated set give a universal formula for business development (Figure 5).



**Figure 5** – Conceptual model of development project of changes  
**Source:** developed by authors

Changes are initiated by human and ensured by the introduction of new technologies, the development and dissemination of intelligent decisions that, in turn, increases the role of innovations in the development of socio-economic relations associated with the synergetic approach to the management of economic systems. Technological-evolutionary dynamics involves the transformation of the idea of growth with identifying the priority of a new form of sustainable development – the level of information culture. This indicator goes beyond the economic dimension of business competitiveness and determines its ability to self-development, that is, to enhance the potential of professional competencies, which contributes to the formation of a new platform for reproduction of the potential of the economy in the implementation of technological projects and intellectual decisions. It is a definition of a new category of basic values of the transformation of economic systems that contributes to their transition to a qualitatively new state with the formation of the ability to adapt operatively to changes.

**Conclusions.** Modernization of society and economy in the context of digital transformation, factors and conditions of business development in modern times, expansion of the concepts of information management – all this adapts the subjects of management to the conditions, factors and requirements of the present with a change in the perception of events and phenomena that affects the interpretation of data and forms a new type of thinking. Changes should begin with the adaptation of the management subsystems to the processes of technological transformation and knowledge transfer in favor of new methods, principles and procedures of decision-making. Important scientific and practical task to identify trends in the development of a new type of thinking, the development and presentation of the latest concept of the formation of the project of changes is solved in the article that defines the development of the fundamental provisions of the management process based on the introduction of technological and intellectual innovations in the processes of processing, transmission and storage of information. The main conclusions and the results obtained in the scientific research are as follows:

1. The essence of informational thinking as a complex system, elements of which interact in accordance with the style of management and factors of innovation development are substantiated. Unconventionality of information thinking is manifested in the formation of reaction-simulations on events and phenomena, which allows solving problems of varying complexity with the transition to a new organizational and methodological level of information processing, and therefore, management.

2. A model of informational thinking is formed, on the basis of which reformatted the process of strategy development with the allocation of multivariate development alternatives with provision of hypotheses about the response to the risks inherent in the design of business processes taking into account the individual nature of the organizational structure of the management system. This is a decomposition of the factors of influence with the development of the necessary measures to eliminate the disintegration of information processing processes, controlling the reserve for the mobilization of knowledge and competencies, thereby increasing the effectiveness of information in the formation and implementation of management influence.

3. The conditions, factors and basic provisions of the development of informational thinking with the definition of key principles describing its distinctive features in accordance with the conditions and factors of the information society and economy as a continuous process of interaction of management subsystems, the effectiveness of which is determined by the level of implementation of new technologies and intellectual decisions in the management process the formation of multifaceted information, which is a parameter of sustainable business development.

4. It is substantiated that for the effective implementation of the project the changes it is necessary to be guided by the transformation of thinking with the definition of the priority of communication as an effective means of integration of knowledge and competences, resulting in a new factor in the development of professional judgment. The communication reality of modern business is manifested in the formation of a new system of information culture, the adoption of which adapts to the transition to new rules with an understanding of risks, advantages, threats and opportunities.

5. The conceptual model of development project of changes is proposed as a project for modernization of the organizational structure of the company and transition to a new methodological level of management. This model incorporates a scenario approach using a combined approach to information generation based on the compilation of transformation variants with alternatives to quantitative and qualitative change parameters. It enables multivariate development of scenarios with the possibility of its implementation with a variety of risks and opportunities, which makes the plastic process of change minimizing their probable negative consequences.

Proposals and recommendations, set forth in the scientific article, are formed for the development of modern business and are aimed at spreading innovations with the transition to a fundamentally new stage in the evolution of economic systems, the informational character of which characterizes another type of thinking. In the future it is planned to develop the research results for the formation of innovative models of information provision of management based on the expansion of professional competencies of management subjects.

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