UDC 65.01

Iryna M. Kadykova[1], Candidate of Economic Science, Associate Professor of Project Management in Urban Economy and Construction Department,
E-mail: irina.kadykova@gmail.com, ORCID: 0000-0002-3189-7231
Viktor V. Khvostichenko[1], PhD Student of Project Management in Urban Economy and Construction Department, E-mail: viktor.khvostichenko@kname.edu.ua,
ORCID: 0000-0001-7356-0971
Illia O. Khudiakov[1], PhD Student of Project Management in Urban Economy and Construction Department, E-mail: Illya.Hudyakov@kname.edu.ua,
ORCID: 0000-0002-0049-2979
[1]National University of Urban Economy O.M. Beketov, st. Marshal Bazhanov, 17, Kharkiv, Ukraine, 61002

APPLICATION OF CONVERGENT APPROACH IN STRATEGIC PROJECT MANAGEMENT

Abstract. *The article is dedicated to the problem of integration of project, strategic and cognitive management in the system of interactions of the management subject and the heterotropic environment. The place of convergence in strategic development projects management is considered through the prism of cognitive approach. Main multidisciplinary approaches are defined in the field of open nonlinear systems of "subject-environment" interactions management. Issues of the place of intentions, goal setting and their interconnections were considered in the context of the project approach. Relevance of convergency of strategic, cognitive and project approach from the perspective of strategic projects management was justified. Connections of cognitive knowledge obtaining processes and project integration management during the realization of the lifecycle were identified. Relevant approaches to convergency issues were analyzed and theoretical justifications of influence of correspondence of competencies of the project team on the system's strategic development was developed. Key elements of the system of interactions of the management subject from the position of cognitive, strategic and project management were described. Base interconnections of modern epistemological directions of the modern management field were formalized. Multidisciplinary connections were considered that highlight the change of paradigm of complex nonlinear systems management, its adaptation to the conditions of the sixth technological mode – NBIC-convergence. Issue of concept of system's strategic development as a complex of formalization processes and realization of management approaches for successful realization of projects was considered. A particular attention the authors pay to research of knowledge management in the integrated system of project team management. A concept of development of intellectual capital through the system of experience accumulation new ideas, initiative, innovations generation of intentions, goal setting and result during acquiring new valuables by the subject of project management.*

Keywords: *convergency; project; goal; strategy; system; knowledge; integration; development; management*

Introduction. The modern information age is characterized by the dynamic development of global interconnections of subjects of society in circumstances of a high level of turbulence of heterotropic environment. To describe the systems with symptoms of self-organization, self-development and self-reproduction M. Foucault proposed the term "heterotropia". This terminology is polysynaptic and multidisciplinary and takes its start in sociology for research of processes of constellation of contingent intentions in heterotropic environment. Thus, for description of interaction subject-environment two aspects are identified [1]: external – observable and internal – unobservable. The external aspect includes directly the action (response of the subject to challenges of the environment) and the result of this action.

The internal aspect includes the intention (intention to act) and the goal (the object of this intention). Common are researches in defining the interconnections between the goals and the terminal result through the correlation of goal setting and the conducted action. Though, namely during the phases of intentions and processes of conduction of actions it is possible to define the reasons of appearing of constellations as the interconnections of different factors that in previous analysis have contingent (unexpected and random) character. According to the project management classics the closest to the concept of intention is the project's mission. In the context of formalization of "subject-environment" interaction system it is appropriate to consider intention as an idea, a conceived action plan that is characterized by an intentional (reflective and meaningful and not reflex) reaction of the subject to the irritants of the environment. Thus, further the term "intention" will be used in the context of convergency of project, strategic and cognitive

management. The environment is cognized by the subject through universal cognitions, based on which the subject sets goals and makes decisions about actions in the corresponding situation. The subject tries to avoid the cognitive resonance which can be characterized by an inconsistency of intentions about certain objects and phenomena. This can have as a positive, as a negative influence on the further realization of actions considering achievement of the wanted result. Based on this, influence on avoidance of doubts and misunderstandings in the system of interrelations of the subject of management with the environment is important. Thus, ways of achieving the wanted condition of the system will be considered in the research.

Object of the research is use of convergency in strategic development projects management through the prism of cognitive approach.

Subject of the research are the processes of integration of management of knowledge of the subject who makes strategic project decisions. In the context of management cognition (from lat. cognition – awareness, study) is an ability of subjects of management to reflectively perceive and process input information from the environment and to adapt it to the conditions of heterotropic environment afterwards.

Purpose of the research is to uncover the modern trends of use of convergent approach in strategic project management.

Objectives of the research are: identification of place and role of cognitive goal setting processes by the project management subject; rationale of convergence of strategic, cognitive and project management in complex nonlinear systems; identification of connection of cognitive processes of acquiring knowledge and project integration management during realization of the lifecycle; to characterize the influence of correspondence of competencies on the strategic development of the "subject-environment" interaction system.

Related works. Modern approach to making management decisions is based on that it is a focused reflective activity with acquiring a positive synergetic effect as a result of interaction with the heterotropic environment. The focus of making management decisions can be characterized as an intentional action to achieve a certain goal. The term "intention" is met in philosophy, sociology and psychology. From the point of view of linguistics, the concept of internationalism is characterized by fostering choosing strategies and tactics of behavior of the subject of communication to satisfy its own interests through analysis of social behavior of surrounding people. As René Descartes said, "Correctly define words and you will free the world from a half of misunderstandings". The communication process "fastens" the dynamic disequilibrium" of such an open nonlinear system as the society. Thus, from the point of view of making management decisions strategies must be viewed as trajectories of activity of the subject in the heterotropic environment that are caused by achieving priority goals in the future. In the process of goal setting the subject of management, including the criteria of specificity, measurability, achievability, relevance and time-boundless can increase the probability of achieving the general goal and success on intermediate stages of activity. These criteria act as components of a mnemonic abbreviation – SMART, first proposed by George Doran [2] as a management goals and objectives formalization method. Herewith, for the formalization of gradual activity of the subject in the heterotropic environment, i.e. its realization of the way from the intention to the goal, to achievement of an original terminal result it is appropriate to use the term project (from project – thrown forward). As it is known, project is a time-bound action that is aimed at achievement of unique goals considering creation of new valuables (product, service) in conditions of limited resources and taken risks. Interconnection of the management subject and the heterotropic environment with indication of internal and external elements and the project as a formalized action aimed at achievement of new valuables can be presented as a compiled Venn diagram (Fig. 1)

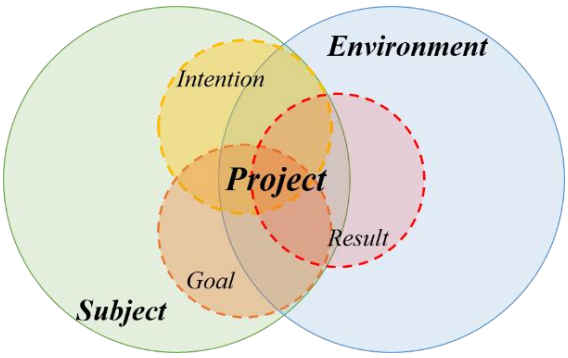

Fig. 1. Diagram of interconnections of the "subject-environment" system elements

The given diagram (Fig. 1) illustrates the interconnection of the subject-environment system, where on their intersection are internal and external elements: intention, goal and result correspondingly. The first two are subject to the subject, and the external element – the result, is subject to the environment in which it will be achieved. The

ISSN 2663-0176 (Print)
ISSN 2663-7731 (Online)

intersection of abovementioned elements is characterized by the project activity in the subject-environment system and is marked on the diagram as a project. In project management sector project management is identified, the goal of which is provision of successful achievement of the project goals and objectives through the prism of its restrictions. In its turn the general evolution (from lat. evolutio – deployment, development) of management of interconnections of "subject-environment" systems can be described with the concepts of strategic management as a complex of processes of formalization and realization of decisions connected with an optimal condition.

The aspects of cognitive, strategic and project management are actively researched in the modern scientific environment. Herewith, exactly the harmonization of management approaches in the processes of development of complex nonlinear systems acts as a key problem of modern management. The established integration processes management defines its self-organization and self-development. Thus, the illustration (Fig. 2) of components of project management of strategic development of the complex non-linear system "subject-environment" highlights the basic interconnections of the modern epistemological directions of the modern management sector.

The main institutional components (Fig. 2) of system development are sub-systems of strategic, project and cognitive management. The consequence of the established integration of the components of management (in Fig. 2 marked as the central intersection) is achievement of sustainable development of the "subject-environment" system. Sustainability of the system development is characterized by the orderliness of information, i.e. minimization of the entropy level in the consequence of interaction of the management subject with the environment. Models, methods and instruments of achievement of negentropy (movement towards regulation, organization of the system) are on the intersection of the components of the management system. Thus, on the intersection of strategic and project management foresight is displayed. It includes: Delphi method, scenario approach, SWOT-analysis, BSC balanced scorecard method, SMART goal setting method and others.

The intersection of project and cognitive approach highlights methods and instruments of project team management, stakeholder management, competence approach, artificial neuron network modelling method etc. On the intersection of cognitive and strategic management – knowledge management, behavioral strategies, reflective management, trendspotting method, Ishikawa causal relationship diagram etc.

Such a wide specter of instruments that is used in management sector is caused by the adaptation of the society to the modern technological structure through the implementation of innovations. The content of the technological structure as a component of the scientific and technical progress is researched by many domestic scientists [3-6], foreign scientists [7-8].

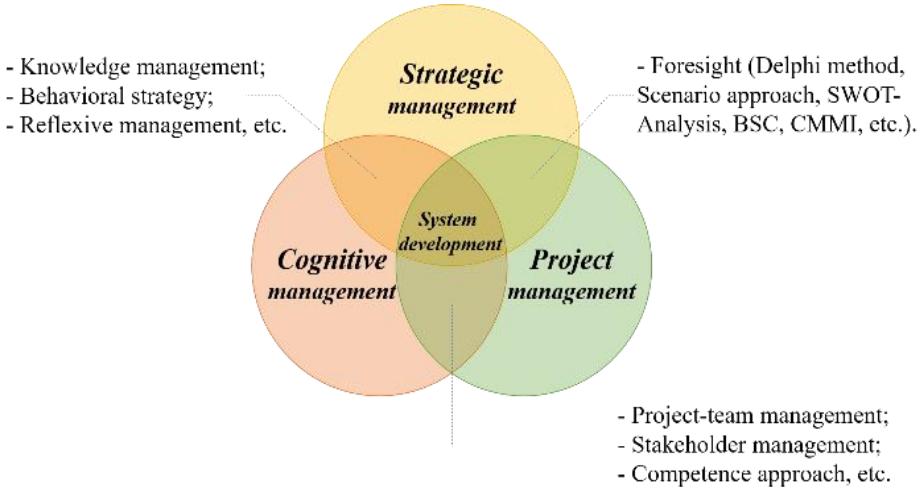

Fig. 2. Interaction of the components of strategic development of the system of interactions of the management subject with the heterotropic environment

The evolution of technological innovation [3] is a result of scientific works of the scientists: M. Tuhan-Baranovskyi (cyclic economic development theory, late XIX century), M. Kondratiev (long innovation waves theory, 1920s), J. Schumpeter (innovation development theory, 1940s), S. Kuznets

("revolution innovations" concept, 1960-1970s), T. Hagerstrand (innovations diffusion model, 1970s), F. Hayek (intellectual technology theory, 1980s) and P. Drucker (new innovation economy concept, 1990s-2000s) that researched the problematic of sustainability of social-economic development of society. Chronology of research indicates the process of adaptation of scientific concepts and approaches to conditions of the environment. Alsoб it is important to note that clear is the transformation of meaning of the "subject-environment" interaction system from the initial maximization of accumulation of material resources to creation of new valuables in the heterotropic environment. The global GDP indicators testify to this that are produced by intellectual innovations that in economically developed countries makes from 75 % to 100 % of growth [4]. Innovations are used in different spheres, for example, according to the statistical data in 2017 about 40 % of organizations implemented innovations during the realization of energy saving programs [5]. In the project management sphere during while forming innovative methods and models it is appropriate to use the convergent approach. Thus, in the research [6] the authors propose convergent levels of forming a new project management methodology with the help of analogy method. The authors provide an example of movement of an organization in the space of strategic goals which is determined by the processes of transformation of the system's elements. In modern field physics the change of condition is interpreted as a mathematical function given in time and space that determines the force of action on the elements of a dynamic system.

Intellect and intellect carriers, innovators who have an intention to act, initiative, readiness to risk, according to the idea of J. Schumpeter acts as a driving force of innovation. In its turn, in neo-schumpeter directions of research innovations take a special place in development of the "subject-environment" system, including their special interconnections, dynamism and cluster nature [7] that is characterized by the concentration of economic competitiveness as a warrant of sustainable economic development globally [9].

As already mentioned, in 1990s the beginning of transformation of spheres of social activity and transition to information networks development took place. Today neuro-network transformation of global and national economy is in process that provides the breakthrough for realization of hypercompetitive advantages of the leading countries in medium term [8]. Artificial neuro networks as an innovative instrument of cognitive management are used in development of artificial intelligence and virtual reality systems that are characteristic of the sixth technological mode in which cognitive sciences and characteristic convergencies take a special place in development of modern and future society. Although the research in the sphere of cognitive management in comparison to other sectors of management are in the initial stages (a little amount of publications in scientific literature testifies this [10-12]). Cognitive management is a system of knowledge and habits that is directed by the subject to achieving a positive synergetic effect as a result of the convergent interaction with the environment. Cognitive management relies on multidisciplinary basis that studies how a person perceives itself and the environment [11-12], namely neurosciences, synergy theory, computer sciences and information technology and imitational modeling. A rapid development of bio- and nanotechnology at the end of XX century fostered NBIC-convergence (N – nano, B – bio, I – info, C – cogno). The term was proposed by Michael Roko and William Bainbridge at the World Technology Evaluation Center in 2002 [10]. It was noted how NBIC-convergency will influence the general development of the civilization and evolution. Thus, according to the data of "Digital 2019: Global internet use accelerates" [11] obtained by "We Are Social" and "Hootsuite's" the general worldwide amount of Internet users is 4,388 billion people (57 % of Earth's population), 3,256 billion people are the users of social networks on smartphones (42 % of Earth's population) that testifies the globalization of informational connections and the actual transition of humankind to the sixth technological mode.

Knowledge as an integral component of the cognitive development and innovations implementation system was researched by I. Nonaka and H. Takeuchi [14]. They identified that appearance of a new knowledge in an organization is connected with the cyclic (spiral) transformation of explicit (that can be formalized) and implicit (personified, contextually specific) knowledges in the process of their interaction. As Socrates said: "I know that I know nothing", Thus, according to the knowledge spiral concept individual knowledges are cyclically identified, accumulated, distributed and used in the process of interaction with the working team subjects or the environment. The goal of the knowledge creation processes is the development of intellectual capital through the replenishment of knowledges, generation of new ideas, initiatives, innovations and reflection of the cognitive system subject.

ISSN 2663-0176 (Print)
ISSN 2663-7731 (Online)

In its turn, the current issues of development of convergent connections of strategic, project and cognitive approaches by the subjects of the systems are the ideas of knowledge management:
– of knowledges in the project environment distribution;
– transfer of experience by subjects of knowledge management'
– transformation of knowledges as co-evolution of the system.

Based on the literature analysis, it is necessary to note that integration of strategic, project and cognitive management requires a more detailed consideration, considering the modern globalization of the convergent approach towards "subject-environment" systems management.

Results of the research

Conceptual basis of the ideas of distribution and transfer of knowledges in the social space as clear is formalized in the processes of the modern knowledge areas. For example, in project management: communications management and stakeholder management. The process, during which accumulated knowledge are distributed and transferred from one management subject and/or environment to another is called the diffusion of knowledge. Term "diffusion" (from lat. diffusion - distribution) was initially used to describe processes that happen during mixing of substances (usually liquids) with different attributes (density, temperature, solubility etc.) that results in the change of attributes of the substance (color, temperature etc.) and appearance of new substances (unlike convection). In the context of management diffusion of knowledges is characterized by synergy, i.e. addition of new valuables to the existing experience in process of knowledge exchange. Comprehension of new knowledges and valuables creates ideas of implicit knowledge (knowledges that are difficult to transfer with words and symbols are usually transferred via practical experience) that are highlighted in: reflective management [15], issues of personal experience of the management subject [16] and competency approach [17].

Knowledge structure in the "subject-environment" system is similar to an iceberg where explicit knowledges are on the surface. Implicit knowledges are under the surface (i.e. hidden and unformalized) and have a key role in the process of creation of new knowledges. Due to the complexity implicit knowledges stay unused in most organizations and are lost, if no effective cognitive management system is implemented in the organization. Thus, cognitive management systems are focused on transformation of implicit knowledges to explicit ones, then methods of their implementations in different structural subdivisions of the organization are identified.

Main attributes of the knowledge management system are:
– knowledge detection;
– new knowledge generation;
– transformation of new knowledge into material form;
– knowledge exchange;
– implementation of new knowledges into everyday processes of management;
– fostering knowledge acceptance and growth in the "subject-environment" system by creation the learning culture and motivational measures as schemes of "award-recognition";
– measurement of advantages of knowledge from the perspective of their weight and increase of their importance [18].

For the successful functioning of the management system the team has one of the key roles in the knowledge and information exchange processes while creating innovations in all stages of "subject-environment" system operation. Formation of a new team requires provision of comfortable conditions from the manager for self-reflection and knowledge transformation. Group reflection – a cumulative ability of group members to analyze the efficiency of their activity and interaction (subject's behavior), identify the reasons of appearance of mistakes and successes in relationships (global behavior), change of team activity strategy (subject's adaptation), analysis of own place, role, values in organizational changes (subject's comprehension). This way in the group reflection field are included not only an isolated analysis of activity strategy and "subject-environment" interactions, but also their place in the contextual, discourse system of the team's vital activity, and also analysis of subject activity and abilities of each in the productive changes of these discourses and contexts [19].

An urgent task of modern scientists is an assumption that in the "half-subject environment" paradigm subject in the "subject-system" interaction context can act as separate people, groups of people (teams), organizations that are integrated via communicative-information connections [20], i.e. a project team must be considered as a subject that is able to provide reflective reactions to the changes of condition of the interconnection with the heterotropic environment system. Reflection (from lat. reflexio – return back) is a try to comprehend of "subject-environment" interactions, i.e. iterative analysis aimed to prevent deviations of activity and results from intentions and goals. Reflection is

aimed at comprehension of causal relationships that are formed in process of interaction of subjects, as with one another, as with the environment. It foresees how making management decisions can influence the future condition of the project.

In cognitive meaning subject's environment can be considered (Fig. 3) as a "subject-intentions-goals" system, i.e. the condition of the internal environment is characterized by harmonization of management subjects with identification of general intentions during the goal setting process.

In the scheme (Fig. 3) elements are marked (1-6) that emerge in the process of interaction and development of the "subject-environment" system. In process of reflection the management subject must identify the intentions (development direction, in figure 3 marked as "1") that will encourage it to setting general goals (marked "2"). The scheme is rationale be The scheme is justified by I. Nonaka and H. Takeuchi's theory considering transformation of cognitive knowledges [14] in the "subject-environment" interconnections system. Thus, subject, intentions and goals have reverse interconnections along which knowledges about the future condition of the project are generated, processed and used. Sustainable development of knowledges is provided by the processes of their transformation from implicit to explicit via the communication management system. Thus, creation of subject's environment system creation is determined where the core of the system is the subject and the trajectory of the system's goals borders the project environment. The project environment in the context of the "subject-environment" system is a space where the management subject performs its activity in achievement of the wanted goals. Thus, project environment acts as a platform for identification, processing and exchange of information in the processes of "subject-environment" interconnections for the further use in project activity. The goals are "closely" connected by communicational connections with actions, i.e. project environment (marked "3"), in its turn, projects with the result (marked "4"). These connections are characterized by the knowledge areas of communications management and stakeholder management. Explicit knowledges of project management knowledge areas are used for clear formalization of management processes. And implicit ones are formed in interaction of the subject and the project environment, adapt the formalized processes to the specifics of the project. The result of the project must correspond to the wanted future condition (marked "5") of the subject. Due to the "close" connections and analysis of the obtained information at each iteration during the project implementation it is possible to achieve the maximum correspondence of the result to the general goals via reflective management. The connection "2-5" is characterized by the transfer of the general goals to the future condition of the subject.

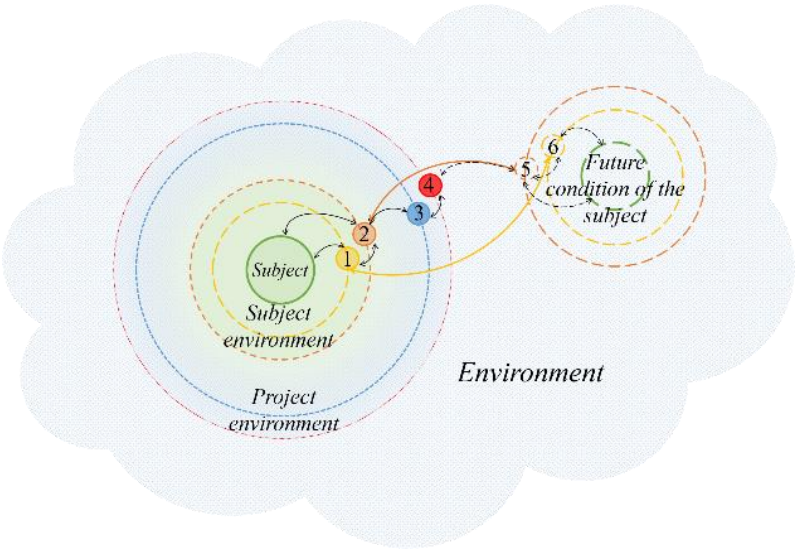

Fig. 3. Reflection system of interconnections of elements of the "subject-environment" system

But the future goals can be adapted due to the connection "4-5", as a result of which the management subject uses up-to-date information, knowledges and certain experience. A similar modification of the future intentions (in Fig. 3 marked "6") in the context of system development is explained by reverse connection "5-6", adapting the connection "1-6" via reflective processes of the management subject.

Considering the management subject as, for example, the project team, it is necessary to note that in such system interpersonal reflection can take

ISSN 2663-0176 (Print)
ISSN 2663-7731 (Online)

place. It is directed at self-organization through comprehension of personality and activity of the partner of the common management activity in the processes of communication and knowledge exchange. Interpersonal reflection acts as a character of effective functioning of any common activity, like a precondition of forming adequate forecasts and hopes [21] in the "subordinate-superior" system via "subject-subject" relationships. In the case of transformation of relationships in the project office to "subject-object" where the team member is considered as a working resource in the project calendar plan a risk of its alienation emerges. Alienation negatively influences the resistance of the management system to the influence of the environment [22]. Thus, a need emerges in creation of "subject-subject" relationships through the prism of the competency approach. In the context of management, the subject's competency is an ability to integrate and us knowledges, skills and cognitive experience in the processes of interaction with the environment. The main groups of competencies of the management subject are: motivational-volitional, functional, communicative and reflective [17]. In turn, the management subjects' competency criteria can change according to the project specifics.

For example, in professor S. D. Bushuev's research [23] for breakthrough innovative projects management a pattern of competencies of a successful manager is proposed, such as:

– holistic thinking (identification ability);
– strategic thinking (strategic perception);
– planning ability (task structuring);
– project realization ability (actions systematization);
– coordination ability (actions optimization);
– interpersonal skills (interpersonal reflection ability);
– aim at results achievement (initiative ability);
– leadership (focus on goals);
– integral thinking (adaptation ability);
– self-realization (cognitive development).

Cognitive competence perspective can be generalized in interpretation that identifies the competency of the project team as combination of all "assets" and "processes" of knowledges that allow the organization to perform its activity [26-27]. Chains of knowledges that are formed in the internal and external environment of the management system have transformation of implicit knowledges into explicit ones in all stages of the lifecycle as a goal. As a result, the amount of formalized knowledges increases and their efficiency is based on the correspondence of competencies to context knowledges of the management subject in the strategic development system. Thus, in the context of a separate project the way of obtaining future knowledges by the management subject is shown (Fig. 4).

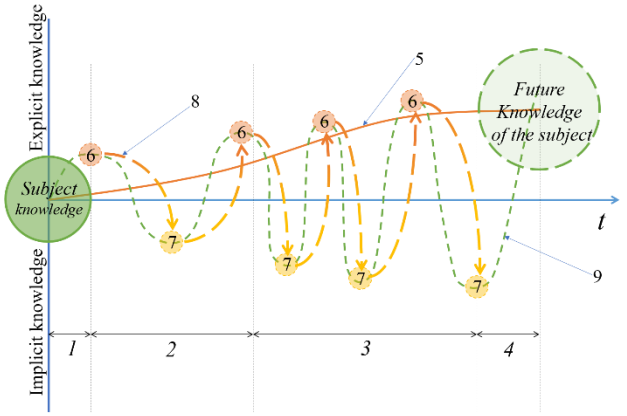

Fig. 4. Scheme of obtaining knowledges by the management subject during the project realization

The project lifecycle reflects the development of the project from an idea to obtaining a new valuable and is characterized by four main phases: concept (in Fig. 4 marked "1"), development (marked "2"), realization (marked "3"), finalization (marked "5"). The amount of formalized knowledges in the process of realization of lifecycle phases increases [25] which are indicated by the curved line of formalized knowledges (marked "5"). Formalized knowledges (marked "6") transform (marked "8") into implicit ones (marked "7") via processes that are described in the spiral of knowledge method [14]. Herewith, the frequency of cycles of knowledge transformation (marked "9") depends on the processes of "subject-environment" system interconnections management. Thus, during the realization of the project's lifecycle in the concept phase increase of formalized knowledges is illustrated via analysis of the environment to define the problems that intentionally influence the project initiation. Then, during the transfer to the development phase ("1-2") the management subject via implicit learning obtains implicit knowledges due to the interconnection with the environment (planning content, schedule, cost, quality, resources, communications, risks etc. management). Transfer to the realization phase ("2-3") is characterized by the processes of transformation of implicit knowledges into explicit ones and constant monitoring of control of correspondence of actual realization to planned and adaptation to changes that is characterized by a certain frequency of transformation of implicit-explicit knowledges during realization. As a result of practical use of knowledges, the subject obtains experience.

Experience is a practical component of a competence that is a valuable for an individual and defines its further motivation considering enrichment of experience in certain activity or spontaneous activity or obtaining unique experience [26]. Obtaining a new valuable is characterized by the transfer to the finalization phase ("3-4"). Knowledges transform from implicit into explicit ones via conduction of project realization analysis, record keeping, problems and success analysis, correspondence of the achieved result to the strategic goals of the system. Herewith, in case of the project's success the competency of the management subject, i.e. cognitive and intentional (motivational target) experience can answer the requirements of the future projects that positively influence the general development of not only the subject, but also the system in general. Development as a way of result achievement is identified by the cognitive style of the subject. This is the way of cognition, i.e. this is the system of means and individual methods for organization of own cognitive activity [16].

Conclusion. As a result of the conducted research of modern tendencies of making management decisions in system's strategic development projects the place of cognitive goal setting processes by the management subject in the project approach context. Thus, convergency of strategic, cognitive and project management in complex nonlinear systems was justified via analysis of multidisciplinary connections that highlight the change of paradigm of complex nonlinear systems management, its adaptation to the conditions of the sixth technological mode – NBIC-convergence. Schematic connections of knowledge transformation were created that highlight the processes during interactions of the project team and the heterotropic environment.

Synthesis of approaches on the intersection of project, strategic and cognitive management, as a result of the research, justifies the use of convergent approach in strategic project management. The achieved results of the research underline the necessity of implementation of integrated control in the project team's knowledge transformation system via the "subject-environment" interaction processes. Formalization of such processes, their metrics and modelling of influence of achievement of the wanted condition of the management subject [27] via the implementation of integrated control requires the synthesis of modern methods and instruments of strategies, project and cognitive management. Achievement of positive synergetic effect from realization of project activity considering creation of a new valuable in circumstances of a turbulent environment poses challenges to the authors solving which requires further research in the field of management of processes of strategic development of heterotropic systems.

References

1. Ban'kovskaya, S. (2011). "Ponyatiye geterotopichnoy sredy i eksperimentirovaniye s ney kak s usloviyem ustoychivogo netselenapravlennogo deystviya" [The concept of a heterotopic environment and experimenting with it as a condition for a stable non-targeted action], *Sociological review*, 10(1-2), pp. 19-33 [Digital Resource]. – Available at: https://sociologica.hse.ru/2011-10-1,2.html. – Active link – 15.05.20 (in Russian).

2. Doran, G. T. (1981). "There'sa SMART way to write management's goals and objectives", *Management review*, 70(11), pp. 35-36.

3. Kolomiyets′, I. F. & Hoshovs′ka, H. V. (2014). "Evolyutsiya teoriy innovatsiyno-tekhnolohichnoho rozvytku v retrospektivniy otsintsi" [Evolution of theories of innovation and technological development in retrospective evaluation], *Regional Economy*, (2), pp. 178-186. [Digital Resource]. – Available at: http://ird.gov.ua/pe/re201402/re201402_178_KolomiyetsIF,HoshovskaHV.pdf. – Active link – 15.05.20 (in Ukrainian).

4. Oliynyk, V. Y. A., Buryak, A. V. & Dem″yanenko, I. V. (2016). "Innovatsiyno-tekhnolohichnyy prohres yak rushiynyy chynnyk tsyvilizatsiynoho postupu suspil′stva" [Innovation and technological process as a factor of civilized progress of humankind], Dnipropetrovsk State Financial Academy, Ukraine, (1), pp. 21-30 [Digital Resource]. – Available at: http://biblio.umsf.dp.ua/jspui/handle/123456789/1650. – Active link – 15.05.20 (in Ukrainian).

5. Achkasov, I. A. (2020) "Konverhentne zbalansovane upravlinnya portfelyamy proektiv znyzhennya tekhnolohichnykh vtrat v elektrychnykh merezhakh v umovakh turbulentnosti rynku" [Text]: author's abstract ... dr. Tehn. Sciences, special. 05.13.22 – project management and programs, Kyiv, Ukraine, Kyiv National University, University of Construction and Architecture, 40 p. [Digital Resource]. – Available at: http://lib.sumdu.edu.ua/library/DocDescription?doc_id=757239. – Active link – 15.05.20 (in Ukrainian).

6. Bushuyev, S. D. & Dorosh, M. S. (2015). "Formuvannya innovatsiynykh metodiv ta modeley upravlinnya proektamy na osnovi konverhentsiyi",

ISSN 2663-0176 (Print)
ISSN 2663-7731 (Online)

[Formation of innovative methods and models of project management based on convergence], *Management of complex systems development*, 23 (1), pp. 30-38 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/Urss_2015_23%281%29__6. – Active link – 15.05.20 (in Ukrainian).

7. Perez, C. (2010). "Technological revolutions and techno-economic paradigms", *Cambridge journal of economics*, 34(1), pp. 185-202 [Digital Resource]. – Available at: https://academic.oup.com/cje/article-abstract/34/1/185/1699623. – Active link – 15.05.20.

8. Carlsson, B., Jacobsson, S., Holmén, M. & Rickne, A. (2002). "Innovation systems: analytical and methodological issues", *Research policy*, 31(2), pp. 233-245 [Digital Resource]. – Available at: https://www.sciencedirect.com/science/article/pii/S0048733301001 38X. – Active link – 15.05.20.

9. Danilovich-Kropyvnytska, M. L. (2013). "Kontseptsiya intehrovanoho klasternoho menedzhmentu ta yiyi osnovni instrumenty" [The concept of integrated cluster management and its main tools], *Bulletin of the National University "Lviv Polytechnic", Management and entrepreneurship in Ukraine: stages of formation and problems of development*, (778), pp. 54-59 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/VNULPM_2013_778_10. – Active link – 15.05.20 (in Ukrainian).

10. Khrom'yak, Y. Y. A., Slyusarchuk, Y. U. M., Tsymbal, L. L. & Tsymbal, V. M. (2013). "Kohnityvni tekhnolohiyi ta yikh osoblyvosti u menedzhmenti y marketynhu" [Cognitive technologies and their features in management and marketing], *Bulletin of the National University of Lviv Polytechnic, Management and Entrepreneurship in Ukraine: Stages of Formation and Problems of Development*, (767), Lviv, Ukraine, pp. 75-82 [Digital Resource]. – Available at: http://ena.lp.edu.ua:8080/handle/ntb/22830. – Active link – 15.05.20 (in Ukrainian).

11. Kadykova, I. N. & Chumachenko, I. V. (2015). "Rol' instituta doveriya v upravlenii kommunikatsiyami sotsial'nykh proyektov" [The role of the institute of trust in the management of communications of social projects], *Bulletin of the National Technical University "KhPI", Series: Strategic management, portfolio management, programs and projects*, (2), pp. 51-56 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/vntux_ctr_2015_2_12. – Active link – 15.05.20 (in Russian).

12. Kadykova, I. N, Larina, S. A. & Chumachenko, I. V. (2017). "Ynformatsyonnaya tekhnolohyya stratehycheskoho upravlenyya proekt-no-oryentyrovannoy orhanyzatsyey" [Information technology of strategic management of a project-oriented organization], *Bulletin of the National Technical University "KhPI", Series: Strategic management, portfolio management, programs and projects.* (3), pp. 9-15, [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/vntux_ctr_2017_3_4. – Active link – 15.05.20 (in Ukrainian).

13. "Wearesocial.com" [Digital Resource]. – Available at: https://wearesocial.com/blog/2019/01/digital-2019-global-internet-use-accelerates. – Active link – 15.05.20.

14. Nonaka, I. & Takeuchi, K. H. (2003). "Kompaniya-sozdatel' znaniya. Zarozhdeniye i razvitiye innovatsiy v yaponskikh firmakh" [Knowledge creator. The origin and development of innovation in Japanese firms], Moscow, Russian Federation, *Publisher: Olimp-biznes*, 384 (in Russian).

15. Dymchenko, N. S. (2013). "Refleksyvne upravlinnya ta yoho rol′ v upravlins′kiy diyal′nosti" [Reflexive management and its role in management], *Economic sciences, Ser.: Economics and Management*, (10), pp. 55-66 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/ecnem_2013_10_9. – Active link – 15.05.20 (in Ukrainian).

16. Stovba, N. I. (2011). "Kohnityvnyy dosvid yak skladova profesiynoho dosvidu" [Cognitive experience as a component of professional experience], *Bulletin of Postgraduate Education* (4) pp. 250-256 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/Vpo_2011_4_35. – Active link – 15.05.20 (in Ukrainian).

17. Maslennikova, K. S. & Kolesnikova, K. V. (2013). "Skladnyky povedinkovoyi kompetentsiyi uchasnyka komandy proektu na zasadakh competentnisnoho pidkhodu" [Components of the behavioral competence of the project team member on the basis of the competence approach], *Management of complex systems development*, (14), pp. 48-51 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/Urss_2013_14_11. – Active link – 15.05.20 (in Ukrainian).

18. Mohapatra, S., Agrawal, A. & Satpathy, A. (2016). "Designing knowledge management strategy", *In Designing Knowledge Management-Enabled Business Strategies, Publ. Springer*, Cham, pp. 55-88 [Digital Resource]. – Available at: https://link.springer.com/chapter/10.1007/978-3-319-33894-1_5. – Active link – 15.05.20.

19. Gorbunova, V. V. (2015). "Indyvidual′na ta hrupova refleksiya tsinnisno-rol′ovoyi

vzayemodiyi u komandi" [Individual and group reflection of value-role interaction in the team], *Psychological sciences: problems and achievements*, (7), pp. 22-35 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/Pnpz_2015_7_4. – Active link – 15.05.20 (in Ukrainian).

20. Kalinescu, T. V. & Shvedchikov, O. A. (2013). "Zabezpechennya staloho rozvytku promyslovykh pidpryyemstv z vykorystannyam refleksyvnoho pidkhodu" [Ensuring sustainable development of industrial enterprises using a reflective approach], *Innovative Economics*, (1), pp. 73-77 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/inek_2013_1_20. – Active link – 15.05.20 (in Ukrainian).

21. Panov, M. S. (2012). "Znachennya refleksiyi v upravlinni osvitn′oyu orhanizatsiyeyu" [The importance of reflection in the management of an educational organization], *Theory and Practice of Modern Psychology*, (5), pp. 36-41 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/tpcp_2012_5_8. – Active link – 15.05.20 (in Ukrainian).

22. Ivanova, L. S. (2013). "Filosofs′ko-psykholohichnyy aspekt fenomenu vidchuzhennya lyudyny v sotsial′no-ekonomichnykh strukturakh" [Philosophical and psychological aspect of the phenomenon of human alienation in socio-economic structures], *Problems of modern psychology*, (2), 65 p. [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/pspz_2013_2_14. – Active link. – 15.05.20 (in Ukrainian).

23. Bushuyev, S. D., Bushuyev, D. A. & Yaroshenko, R. F. (2018). "Proryvni kompetentsiyi v upravlinni innovatsiynymy proektamy ta prohramamy" [Breakthrough competencies in the management of innovative projects and programs], *Bulletin of the National Technical University "KhPI", Series: Strategic management, portfolio management, programs and projects*. (1), pp. 3-9 [Digital Resource] – Available at: http://nbuv.gov.ua/UJRN/vntux_ctr_2018_1_3. – Active link – 15.05.20 (in Ukrainian).

24. Babaiev, V. M., Kadykova, I. M., Husieva, Y. & Chumachenko, I. V. (2017). "The method of adaptation of a project-oriented organization's strategy to exogenous changes", *Scientific Bulletin of the National Mining University*, (2), pp. 134-140. [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/Nvngu_2017_2_22. – Active link – 15.05.20.

25. Snyder, C. S. (2014). A Guide to the Project Management Body of Knowledge: PMBOK (®) Guide. Project Management Institute.

26. Kotikova, O. M. (2012). "Dosvid u strukturi kompetentnosti" [Experience in the structure of competence], *Scientific journal of NPU named after MP Drahomanov*, Series 16: Creative personality of the teacher: problems of theory and practice, (18), pp. 11-15 (in Ukrainian).

27. Guseva, Yu. Yu., Martynenko, O. S., Kadykova, I. M. & Chumachenko, I. V. (2017). "Metryky protsesiv upravlinnya ta kontrolyu vymoh u proektakh" [Metrics of process management and control processes in projects], *Radio electronics, computer science, management*, 4(43) pp.179-186 [Digital Resource]. – Available at: http://nbuv.gov.ua/UJRN/riu_2017_4_22. – Active link – 15.05.20 (in Ukrainian).

Received 15.04.2020
Received after revision 20.05. 2020
Accepted 12.06.2020

ISSN 2663-0176 (Print)
ISSN 2663-7731 (Online)

УДК 65.01

[1]**Кадикова, Ірина Миколаївна** кандидат економічних наук, доцент, доцент кафедри управління проектами в міському господарстві і будівництві, E-mail: irina.kadykova@gmail.com,
ORCID: 0000-0002-3189-7231
[1]**Хвостіченко, Віктор Віталійович** аспірант кафедри управління проектами в міському господартсві і будівництві, E-mail: viktor.khvostichenko@kname.edu.ua,
ORCID: 0000-0001-7356-0971
[1]**Худяков, Ілля Олександрович** аспірант кафедри управління проектами в міському господартсві і будівництві, E-mail: illya.hudyakov@kname.edu.ua, ORCID: 0000-0002-0049-2979
[1]Харківський національний університет міського господарства імені О. М. Бекетова, Харків, вул. Маршала Бажанова, 17, 61002

ЗАСТОСУВАННЯ КОНВЕРГЕНТНОГО ПІДХОДУ У СТРАТЕГІЧНОМУ УПРАВЛІННІ ПРОЕКТАМИ

Анотація. *Стаття присвячена проблемі інтеграції проектного, стратегічного та когнітивного управління в системі взаємовідносин суб'єкту управління та гетеротопічного середовища. Розглянуто місце конвергенції в управлінні проектами стратегічного розвитку, через призму когнітивного підходу. Визначено основні мультидисциплінарні підходи в галузі управління відкритими нелінійними системами взаємозв'язків «суб'єкт-середовище». Розглянуті питання місця інтенцій, цілепокладання та їх взаємозв'язків в контексті проектного підходу. Обґрунтувано актуальність конвергенції стратегічного, когнітивного та проектного підходів з позиції стратегічного управління проектами. Виявлено зв'язки когнітивних процесів набуття знань та управління інтеграцією проекту в ході реалізації життєвого циклу. Проаналізовано актуальні підходи до питань конвергенції та розроблено теоретичні обґрунтування впливу відповідності компетенцій команди проекту на стратегічний розвиток системи. Описано ключові елементи системи взаємовідносин суб'єкту управління з середовищем з позиції когнітивного, стратегічного та проектного управління. Формалізовано базові взаємозв'язки сучасних епістемологічних напрямів галузі управління. Розглянуті мультидисциплінарні зв'язки, що висвітлюють зміну парадигми управління складними нелінійними системами, її адаптацію до умов шостого технологічного устрою – NBIC-конвергенції. Розглянуто концепцію стратегічного розвитку системи як комплексу процесів формалізації управлінських підходів для успішної реалізації проектів. Окрему увагу автори приділяють дослідженню управління знаннями в інтегрованій системі управління командою проекту. Розглянуто концепцію розвитку інтелектуального капіталу, через систему накопичення досвіду та генерації нових ідей, ініціатив, інновацій та рефлексії суб'єкту управління. Формалізовано когнітивні процеси, через схематичні зв'язки інтенції, цілепокладання та результату в ході набуття нових цінностей суб'єктом проектного управління.*

Ключові слова: *конвергенція; проект; ціль; стратегія; система; знання; інтеграція; розвиток; управління*

УДК 65.01

[1]**Кадыкова, Ирина Николаевна** кандидат экономических наук, доцент, доцент кафедры управления проектами в городском хозяйстве и строительстве E-mail: irina.kadykova@gmail.com,
ORCID: 0000-0002-3189-7231
[1]**Хвостиченко, Виктор Витальевич** аспирант кафедры управления проектами в городском хозяйстве и строительстве, E-mail: viktor.khvostichenko@kname.edu.ua,
ORCID: 0000-0001-7356-0971
[1]**Худяков, Илья Александрович** аспирант кафедры управления проектами в городском хозяйстве и строительстве, E-mail: illya.hudyakov@kname.edu.ua, ORCID: 0000-0002-0049-2979
[1]Харьковский национальный университет городского хозяйства имени А. Н. Бекетова, Харьков, ул. Маршала Бажанова, 17, 61002

ИСПОЛЬЗОВАНИЕ КОНВЕРГЕНТНОГО ПОДХОДА К СТРАТЕГИЧЕСКОМУ УПРАВЛЕНИЮ ПРОЕКТАМИ

Анотация. *Статья посвящена проблеме интеграции проектного, стратегического и когнитивного управления в системе взаимоотношений субъекта управления и гетеротропной среды. Рассмотрены место конвергенции в управлении проектами стратегического развития, через призму когнитивного подхода. Определены основные мультидисциплинарные подходы в области управления открытыми нелинейными системами взаимосвязей «субъект-среда». Рассмотрены вопросы места интенций, целеполагания и их взаимосвязей в контексте проектного подхода. Обоснована актуальность конвергенции стратегического, когнитивного и проектного подходов с позиции стратегического управления проектами. Выявлены связи когнитивных процессов приобретения знаний и управления интеграцией проекта в ходе реализации жизненного цикла. Проанализированы актуальные подходы к вопросам конвергенции и разработаны теоретические обоснования влияния соответствия компетенций команды проекта на стратегическое развитие системы. Описаны*

ключевые элементы системы взаимоотношений субъекта управления со средой с позиции когнитивного, стратегического и проектного управления. Формализованы базовые взаимосвязи современных эпистемологических направлений в сфере управления. Рассмотрены мультидисциплинарные связи, которые пришли на смену парадигмы управления сложных нелинейных систем, а также их адаптация к условиям шестого технологического уклада - NBIC-конвергенции. Рассмотрена концепция стратегического развития системы как комплекса процессов формализации управленческих подходов для успешной реализации проектов. Особое внимание авторы уделяют исследованию управления знаниями в интегрированной системе управления командой проекта. Рассмотрена концепция развития интеллектуального капитала через систему накопления опыта и генерации новых идей, инициатив, инноваций и рефлексии субъекта управления. Формализованы когнитивные процессы, через схематические связи интенции, целеполагания и результата в ходе приобретения новых ценностей субъектом проектного управления.

***Ключевые слова**: конвергенция; проект; цель; стратегия; система; знания; интеграция; развитие; управление*

Kadykova, Iryna Mykolayivna
Research field: program management, strategic management, project management, IT

Khvostichenko, Viktor Vitaliyovych
Research field: strategic development, project management, project team management, knowledge management

Khudiakov, Illia Oleksandrovych
Research field: Program management, strategic management, smart city, machine learning, energy efficiency

ISSN 2663-0176 (Print)
ISSN 2663-7731 (Online)