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Management of Intellectual Capital Development on the Basis of Conflict Settlement System

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Abstract: In the study, researchers approach to design high-quality model of intellectual capital using categorical system methodology is offered. The intellectual capital is presented as a system object and formed as three categories, each of which corresponds to a certain system level. In turn, the content of each level causes a specific objective and intellectual capital development is carried out as a result of the aggregated objectives. A conflict between the objectives of the levels as well as between carriers of quality categories is substantiated. The contradictions are typed and described, the possible development trajectories of intellectual capital as a result of the various options to resolve them are identified. Managerial impact on these contradictions for the purpose of their productive resolution will support growth in organizational and system complexity of an object, enhancement of the consolidation mechanism for parts in whole and transition of the object to a more complex environment. The results obtained give a chance to develop a management system to form and develop the intellectual capital and in the long term to create conditions for transformation of the socio-economic system of the country towards creation of an economy based on knowledge.

Key words: Category, purpose, cognitive activity, economy based on knowledge, system object, sub-purpose, progress intellectual capital, the external environment

INTRODUCTION

Forming and development of intellectual capital is one of the key factors to establish knowledge-based economy. At present the primary challenge of russian economy is its focus on the export. As a crucial requirement for it to transit to innovative path it is necessary to develop intellectual capital of the organizations. At the same time, there is no comprehensive theory for intellectual capital of an organization now a days. As a result, the problem of formation for effective management system to control form and develop this phenomenon emerges.

Papers of modern authors consider various aspects of intellectual capital phenomena. Significant amount of papers discuss category "intellectual capital" contents and composition of its elements (Vaganian, 2007; Ermolenko and Popova, 2012; Isaenko, 2009; Kochetkova, 2012; Leontiev, 2002; Milner, 2003; Permyakova, 2007; Sergeev, 2005; Roos *et al*., 2010; Chernoles, 2008; Ashton, 2005; Brooking, 1996; Klein and Prusak, 1996; Sofian *et al*., 2008). Several works are devoted to conceptual basics of the intellectual capital theory (Kendrick, 1976; Saint-Onge, 1996; Edvinsson and Sullivan, 1996; Albert and Bradley, 1996; Efremov, 1999; Inozemtsev and Formatsii, 1995). An important task is to analyze potential of using intellectual capital as a backbone of knowledge economy development (Vaganyan, 2007; Kleiner, 2005; Makarov, 2003; Chencova, 2008; Drucker, 1993; Kogut and Zander, 1992; Stiglitz, 1999; Taylor, 2001).

MATERIALS AND METHODS

We try to investigate the essence of the intellectual capital, its qualitative characteristics, composition, structure and other aspects (Nedoluzhko, 2015, 2016). The results obtained enable to build management concept of forming and development for this object of research. In the present study the task at hand is solved using methods of categorical system methodology, particularly with Ranking Purposes Method (RPM) which proved its effectiveness to solve this class of tasks (Boush, 2010, 2011). The method examines the object studied from the perspective of system approach while its development is considered as achievement of purposes corresponding

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various system levels of the object. Thus, revealing purposes of the object and its composition elements as well as their interconnections research appear to be an important scientific problem. Solving the problem will enable to manage development for intellectual capital of organizations on scientific basis, make it more effective, thus, provide the conditions to transform socio-economic system of the country towards knowledge-based economy.

The key concept of the RPM is qualitative definiteness (quality of the object). It is a hierarchy of qualitative categories ordered a certain way along with a hierarchy of the object purposes. Utilizing the method involves viewing any complex object through a prism of interaction between processes that are aimed to achieve purposes of various level, leading to change of the object qualities.

The method framework presumes the following qualitative categories within a system object:

- Object-Quality (OQ)
- Sub-Quality (SQ)
- Integrative Quality (IQ)

OQ constrains the object as a whole and makes it stand out from a number of similar but not identical objects due to its special features. OQ corresponds to the object within its boundaries. SQ indicates OQ included in the component parts. IQ shows principles or mechanisms for integration SQ into OQ forms the idea of some emergent properties that are the result of combining SQ into OQ.

Each category corresponds to a specific set of quality objectives which interact each other and affect the object and its evolution.

RESULTS AND DISCUSSION

Usage of RPM to the intellectual capital as an study object allows to identify the following qualitative categories:

Object-quality is the intellectual capital itself, distinguished from a number of similar but not identical objects (industrial capital, monetary capital, financial capital, etc).

Sub-qualities are the composing parts of the intellectual capital. On the previous stages of the research we have identified its following components: “Education”, “Engagement”, “Industrial rationalization”, “Self-improvement”, “Customer-oriented rationalization”, “Innovative activities”. Is possible to consider cognitive activity of employees as a fundamental characteristic of the intellectual capital. Such activity is represented as multiple ways to perceive and work on the information which are revealed through a complex of mental processes (perception, attention, memory, thinking, imagination, speech, emotions) and mental states (beliefs, desires intentions) of employees (Korotaeva and Nefedova, 2012). The components indicated before represents various types of cognitive activity implemented with use of various types of resource (intellect). They lead to creation of various types of intellectual capital (human capital, organizational capital, consumer capital) (Nedoluzhko, 2015, 2016).

Integrative quality is a principle of combining the parts into the whole along with its emergent properties. In this case this is a principle of uniting various types of cognitive activity into the intellectual capital of an organization, along with acquisition of certain emergent properties, i.e., qualities missed by some types of cognitive activity before their combining.

According to RPM, each qualitative category is represented by a complex of purposes. They form the following hierarchical structure in complex.

Intellectual capital as a object-quality possesses the purpose which is the most effective usage of the intellectual capital at each stage of its development. It is performed as a result of implementing a complex of cognitive activity types available in the organization at certain development level.

Composing parts of the intellectual capital as sub-qualities (types of the organization cognitive activities) possess sub-purposes. Among them are to be distinguished: usage of existing qualitative features of cognitive activity, increase of performance and effectiveness in using certain type of intellect as a resource base for corresponding type of cognitive activity, increase of effectiveness in perception and work on external information.

Finally, the principle of combining the parts of intellectual capital into a whole as integrative quality has super-purpose. The latter is to improve the principle of combining the types of cognitive activity which are available at certain development level of the intellectual capital of the organization and provide its transition to a qualitatively new level.

The system of intellectual capital purposes of an organization, related to qualitative categories of RPM is provided in Table 1.

The existence of various hierarchy levels in intellectual capital qualitative categories determines origin of contradictions between their purposes, thus between qualitative categories bearers themselves. Typing and description of the contradictions in accordance with RPM

Table 1: The system of intellectual capital purposes of an organization

Qualitative categories of intellectual capital and corresponding categories of purposes	The content of the purposes
Object-quality, purpose	Development of qualitative characteristics possessed by intellectual capital
	Development of new cognitive activity types
	Improvement in design of intellectual capital as a system object
	Domestic resource base development for intellectual capital which represents the totality of the available types of intelligence
	Increase adaptive capacity of intellectual capital to the impacts of the current external environment of the organization
	Accumulation of potential for new emergent properties appearance by intellectual capital
	Preparing the transition of intellectual capital to a higher level of system and organizational complexity
Sub-quality, sub-purpose	Usage of available qualitative characteristics of cognitive activity
	Improvement of productivity and efficiency in usage of a certain kind of intelligence as a resource base of the corresponding type of cognitive activity
	Efficiency improvement in perceiving and processing external information
Integrative quality, super-purpose	Improvement of cognitive activity types combination principle into intellectual capital
	Forming of new qualitative characteristics (emergent properties) of intellectual capital
	Preparing the relocation of intellectual capital into a new, more complex environment

provides the understanding of the intellectual capital essence as well as identifying possible ways of its development due to various options to resolve them. Let us consider this contradictions using an example of high school institution.

Contradiction "SQ-SQ": Existence of the contradiction is caused by competition between various types of cognitive activity for usage of the resource (intellect). For example contradiction between production rationalization and self-improvement arises from the fact that in the first case left-hemispheric type of thinking is performed while in the second one right-hemispheric type of thinking, related to intuition and creative task solution. Productive resolution for the contradiction is to give priority to a thinking type (and cognitive activity, respectively) that better fits the requirements of environment. Unproductive resolution of the contradiction is when leadership of the organization keeps the possibility of spontaneous resolution or the situation which results in a simpler form of cognitive activity and a regression of the intellectual capital.

Contradiction "SQ-IQ": The contradiction is caused by a conflict between super-purpose SQ and sub-purpose IQ. Achieving the super-purpose is possible in the only case when focus shifts from the previous types of cognitive activity to new ones while transiting to new types of intellectual capital, located on higher levels of its creation chain. Achievement of a sub-purpose of a SQ involves development of a single cognitive development type. Ex, a new high school employees tend to use newer student learning technologies (the use of e-learning environment, "inverted-class" model) while their union into the organization is still based mainly on learning beginners with traditional work methods. It is possible the reverse situation when new high school employees set reproducing of traditional ways to work as their primary goal when the leadership aims to achieve their union on more progressive basis. Productive resolution for the contradiction is possible by making sub-purposes of cognitive activity types to conform the principle of their combination. Otherwise, "Backward" SQs slow down development of IQs and vise versa.

Contradiction "IQ-environment": Certain development level of Intellectual capital of an organization assumes usage of specific balance between various types of cognitive activity. In varying conditions of the external environment its super-purpose could stop meeting the organizational environment. For example, the purpose of industrial rationalization is improvement of industrial processes organization based on the use of thought intellect, thereby creating organizational capital. The purpose of the changes is focused beyond an individual employee. The later brings the newly created knowledge of more effective industrial processes into the organization. When self-improvement is implemented, the purpose of the changes is targeted inwards. Such purpose is personal growth by choosing more effective strategy for acting and forming qualitatively new tasks. This case results in creation of human capital. Quite often the first variant is more preferred for an organization, since, self-improvement of individual employee facilitate industrial processes rationalization unobvious way. Since that the leadership is more probable to encourage an employee to use intellect towards production rationalization, rather than self-improvement.

Solution for the problem is influenced by the way balance in the use of various intellect types and implementation of various cognitive activity types is correlated to conditions of the external environment. If in an organization environment an intellectual capital evolves at the expense of particular employees

self-improvement and the leadership in the long run accepts its necessity, it is possible to consider the contradiction to be solved productively. For example, taking into the a account requirements of the Ministry of Education and Science of the Russian Federation, high school functioning accent is shifted from more effective usage of the classroom fund towards increase of employees' publication activity. If the high school leadership insists on more effective usage of the classroom fund, the high school eventually fails to meet the requirements for one of the most significant indexes and does not get a competitive advantage compared to other high schools of the same category. In this case, its activity is not effective and resolution for the contradiction is not productive.

Contradiction "SQ-environment": Cognitive activity types implemented separately could also do not meet development level of the environment. Ex, the Ministry of Education and Science of the Russian Federation lowers the number of free education positions per high school. This leads to decrease of competitive advantage for one, thus negatively affecting the salary. In this situation, creation of human capital as a result of education and self-improvement could make more demanded employee to leave for a high school that has competitive advantage and able to pay higher wage. Eventually, this jeopardize the effective interaction with the clients. Productive resolution for the conflict is seen in bringing sub-purposes of cognitive activity in compliance with requirements of the environment and in developing ones that facilitate forming for currently most demanded types of intellectual capital.

Contradiction "SQ-OQ": Sub-purposes of various cognitive activity types are not always in conformance with the purpose of its most effective usage at the current moment. Ex, not every kind of routine procedures are to be adopted from experienced employees by a new one, taking into account the industrial rationalization. Productive resolution for the contradiction is implemented in case when sub-purposes of cognitive activity are formed taking into account development level of intellectual capital achieved in an organization. Otherwise, implementing uneffective types of cognitive activity prevents more effective usage of OQ, thus, preventing grows of capacity for progressive transition (jump).

Contradiction "OQ-IQ": The contradiction could be caused by inconsistency between current combination of cognitive activity types and principle of the organization improvement with the purpose of transition towards qualitatively new level. As an example, if leadership of an organization actively stimulate the search for more effective ways to interact with education service consumers, making cognitive activity in the process of consumer-oriented rationalisation available to the staff. The employees in their turn, prefer to utilize the standard combination of learning, engagement and in certain cases, self-improvement. Productive resolution for the contradiction is achievable through search by leadership for additional ways to stimulate employees towards activation of consumer-oriented rationalisation. Including addition types of cognitive activity into the combination allows to bring it into consistence with the principle of its self-improvement. Otherwise, if high school employees use new ways to interact with the educational services consumers, the department initiative is likely not to be supported by the rectorate. Example is when one of the departments engage students to perform contractual works while this mechanism does not get used in the university scale. In this case, development of intellectual capital by adding consumer-oriented rationalization into the combination of cognitive activity types is not realized.

Contradiction "OQ-environment": Intellectual capital competes with other types of capital for ability to be used to increase value of the company. Productive resolution for the conflict is implemented when the most effective usage of available cognitive activity types combination conforms requirements of the environment. On the earlier development stages of the world economy system (for example, during the second industrial revolution) an ordinary employee was not required to do any action but to inherit basic action sequence from mentors (education) and possibly, to share the organization interests (engagement). The highest type of the cognitive activity was an industrial rationalization, more likely intrinsic to the leadership. During the epoch of the sixth techno-economic paradigm an organization becomes competitive if its employees utilize more advanced cognitive activity types in accordance with external environment complication. It is already not enough to simply reproduce the typical procedures. It is required, at least, to build up a complex of necessary knowledge, skills and expertise (self-improvement) as well as to actively work with the clients (consumer-oriented rationalization). Intellectual capital of organization that ignore trends of the external environment, eventually will not match its requirements. In this case, development of intellectual capital slows down which could cause transition to a regressive development branch.

Thus, management in forming and development of intellectual capital of an organization can be performed by

resolution of contradictions within system of an object purposes and their bearers. Affecting the contradiction towards their productive resolution facilitates growth of design and system complexity of an object, improvement of mechanism that integrates the parts into whole, transition of an object into more complex environment.

CONCLUSION

The use of categorial method "Ranking purposes" enabled to achieve the following results: The object of study is represented within three categories, reflecting its qualitative definiteness (object-quality, sub-quality integrative quality) as well as their respective categories of purposes (purpose, sub-purpose, super-purpose). This allows to construct a quality model of the object with its components distinguishing. Purposes of the object studied and its subsystems are defined as a system. Possible variants of emerging contradictions between them are typologized. Possible resolution for the contradictions and their possible outcome for development of intellectual capital of an organization are predicted. Practical meaning for the results obtained is that they enable to proceed to the development of evolution model for the object studied intellectual capital and in the long run to develop a management system for its forming and development.

REFERENCES

Albert, S. and K. Bradley, 1996. Intellectual capital as the foundation for new conditions relating to organizations and management practices. Master Thesis, Open University Business School, Milton Keynes, England, UK.

Ashton, R.H., 2005. Intellectual capital and value creation: A review. J. Accounting Lit., 24: 53-134.

Boush, G.D., 2010. Cluster development through conflicting purposes: Herald of Omsk University. Ser. Econ., 3: 5-12.

Boush, G.D., 2011. Business Clusters Categorial and System Representation: Monograph. Omsk State University, Omsk, Russia,.

Brooking, A., 1996. Intellectual Capital: Core Asset for the Third Millennium Enterprise. International Thomson Business Press, New York, USA., ISBN-13: 978-1861524089, Pages: 224.

Chencova, M.V., 2008. [Concept of knowledge economy as new direction of formation of a modern economic paradigm (In Russian)]. Bull. Financial Univ., 2: 118-125.

Chernoles, G.V., 2008. [Intellectual capital in structure of assets of the science-driven enterprise based on new knowledge: Essence, content and functional roles of its components (In Russian)]. Innovations, 9: 106-111.

Drucker, P.F., 1993. Post-Capitalist Society. Harper Business, New York.

Edvinsson, L. and P. Sullivan, 1996. Developing a model for managing intellectual capital. Eur. Manage. J., 14: 356-364.

Efremov, V.S., 1999. [Business systems of post-industrial society (In Russian)]. Manage. Russ. Abroad, 5: 3-24.

Ermolenko, V.V. and E.D. Popova, 2012. [Intellectual capital of the corporation: Essence, structure, development strategies and management model (In Russian)]. Chelovek Soobshchestvo Upravlenie, 2: 110-122.

Inozemtsev, V.L. and K.T.P.O. Formatsii, 1995. To the Theory of a Post Economic Social Formation. Academia, Moscow, Russia, Pages: 330.

Isaenko, Y.S., 2009. [Estimation of intellectual capital of the company and its components by using method of hierarchies analysis (In Russian)]. Univ. Ser. Econ. Ecol., 1: 87-91.

Kendrick, J.W., 1976. The Formation and Stocks of Total Capital. 1st Edn., National Bureau of Economic Research, United States, ISBN-10: 0870142712, pp: 256.

Klein, D.A. and L. Prusak, 1996. Characterizing intellectual capital: Multiclient program working paper. Master Thesis, Ernst & Young Center for Business Innovation, Boston, Massachusetts, USA.

Kleiner, G.B., 2005. [The formation of the knowledge society in Russia: socio-economic aspects (In Russian)]. Soc. Sci. Modernity, 3: 56-69.

Kochetkova, N.V., 2012. [Transactional costs of intellectual capital of non-state universities (In Russian)]. Actual Prob. Econ. Law, 1: 135-139.

Kogut, B. and U. Zander, 1992. Knowledge of the firm, combinative capabilities and the replication of technology. Organiz. Sci., 3: 383-397.

Korotaeva, E.V. and A.N. Nefedova, 2012. The development of cognitive activity of the older preschoolers. Pedagogical Educ. Russ., 3: 176-180.

Leontiev, B.B., 2002. Intellect Price: Intellectual Capital in the Russian Business. Aktsioner Publisher, Moscow, Russia,.

Makarov, V.L., 2003. [Knowledge economy: Lessons for Russia (In Russian)]. Bull. Russ. Acad. Sci., 73: 450-456.

Milner, B.Z., 2003. Knowledge Management. INFRA-M Publisher, Moscow, Russia,.

Nedoluzhko, O.V., 2015. Construction of the definition of category of intellectual capital. J. Econ. Theory, 2: 29-36.

Nedoluzhko, O.V., 2016. [A new approach to the formation of a conceptual space of the phenomenon of the intellectual capital of an organization (In Russian)]. Bull. Udmurt Univ. Ser. Econ. Law, 2: 42-49.

Permyakova, A.M., 2007. Model of the formation of innovative intellectual capital firm. Mag. Econ. Theory, 4: 177-180.

Roos, J., S. Pike and L. Fernstrem, 2010. Intellectual Capital: Practice of Management. 2nd Edn., Saint Petersburg State University Graduate School of Management, Saint Petersburg, Russia,.

Saint-Onge, H., 1996. Tacit knowledge the key to the strategic alignment of intellectual capital. Plann. Rev., 24: 10-16.

Sergeev, A.L., 2005. Intellectual capital of cognitive micro economy: Thesaurus and structure. Econ. Anal. Theor. Pract., 11: 50-55.

Sofian, S., M.E. Tayles and R.H. Pike, 2008. Intellectual capital: An evolutionary change in management accounting practices. Master Thesis, Bradford University School of Management, Bradford, England, UK.

Stiglitz, J.E., 1999. Knowledge as a Global Public Good. In: Global Public Goods: International Cooperation in the 21st Century, Kaul, I., I. Grunberg and M.A. Stern (Eds.). Oxford University Press, Oxford, England, UK., pp: 308-325.

Taylor, F.W., 2001. Principles of Scientific Management. Harper & Row, New York, USA.,.

Vaganian, O.G., 2007. [Management of intellectual capital is an effective instrument of strategic management in Russia in the conditions of the knowledge economy (In Russian)]. Creative Econ., 7: 42-47.