УДК 332.13: 005: 165 JEL Classification Code: L26, M13, M150

S. M. Porev

KNOWLEDGE MANAGEMENT FOR ENTREPRENEURIAL ECOSYSTEMS AND THE COGNITIVE GAPS PROBLEM

The article is devoted to the problem of knowledge management in entrepreneurial ecosystems with the participation of universities, where knowledge exchanges should be intensive. It is important for our study to define, whether the notion of a commodity could be used to knowledge. It is shown that the use of tacit and explicit knowledge as objects of management conceals the cognitive gaps between subjects' consciousness and texts or other material presentations of information. The author has proposed to supplement the subjective component of knowledge management with the notion of operative knowledge, which corresponds to the concept of knowledge as justified true belief. Operative knowledge may be defined as all of the words and phrases in consciousness, which appear when author seeks an optimal version to transmit mental knowledge into explicit material form. By using the concept of operative knowledge, the author defines the cognitive gap of actualization between tacit and operational knowledge, and also the cognitive gap of externalization between operational knowledge and the material form of information. It should be noted, that the concepts of operative knowledge and cognitive gaps give the reason to believe, that information management concepts have a more substantiated cognitive basis than the knowledge management ones.

Keywords: *knowledge management, entrepreneurial ecosystem, commodity, university, operational knowledge, cognitive gap, information, belief.*

Introduction. Today, the agenda for the development of socioeconomic systems is the formation of entrepreneurial ecosystems as environments that provide the growth of small firms [1–4]. Often such ecosystems are formed with the participation of universities and scientific institutions, serving them as a source of trained specialists, scientific developments and technologies. Naturally, the creation and use of knowledge that is traditionally the basis for the formation of new technologies and the production of competitive goods and services in the concepts of clusters and innovation systems is an important subject of cooperation between small businesses and universities. According to researchers [5, 6], for clusters and innovative systems, the dissemination of scientific and technical knowledge is necessary, while knowledge of entrepreneurship is critical to business ecosystems as well.

Entrepreneurial ecosystems are characterized as «information rich ones» and «have typically emerged in places that already have an established and highly regarded knowledge base which employs significant numbers of scientists and engineers» [3]. It is believed that the success of entrepreneurial ecosystems determines the presence and interaction between entrepreneur networks, leadership, finance, talent, knowledge and support services [4], and defines knowledge management as a critical issue [7, 8]. These studies indicate that there are communication problems in entrepreneurial ecosystems that can hinder the successful development of firms in the aspects of creating, transforming and using knowledge, and these issues need to be studied and understood. Publications raise the question of how knowledge in entrepreneurial ecosystems is created and what steps are needed to promote knowledge creation [7].

There are many definitions of knowledge management concept that define any knowledge operations [9] and one of the generalizations is that knowledge management is the process of creating, sharing, using and managing the knowledge and information of an organization [10]. Naturally, the notion of knowledge is one of the key concepts in management. As a rule, knowledge management concepts are based on the definition of knowledge not as «justified true belief», which is considered by classical epistemology, but the dichotomy of «tacit» and «explicit» knowledge [8, 11, 12]. Despite the widespread use of knowledge management concepts in the last two decades, the specified dichotomy of «tacit» and «explicit» and the very concept of knowledge management in a number of publications are criticized. Often, the object of criticism consists in that the basic ideas about knowledge define it as strictly personal, which is in the mind of a person, and knowledge management is nonsense [13]. There is reasoning that explicit knowledge has much in common with information. It is sometimes argued that the concept of knowledge management has no proper theoretical basis [14].

In our view, the use of the concept of knowledge management in the formation of entrepreneurial ecosystems with the participation of universities requires careful consideration. We need to investigate how to use well the concept of knowledge as one of the most important subjects of cooperation in such ecosystems. It needs to be clarified whether certain limitations can lead from the fact that knowledge has an individual character, and how does it relate to the notion that, according to the social epistemology [15], knowledge is a commodity or a common good?

Literature review. According to C. Mason and R. Brown [3], in entrepreneurial ecosystems individuals can access information and knowledge on new buyer needs and evolving technologies. As noted, organized and accidental meetings are the main channels by which such information is shared, but entrepreneurial ecosystems will also have «bridging assets», individuals whose mission is to connect. According to Mason and Brown notions [3], «Universities also play an important role in entrepreneurial ecosystems, but not the re-eminent role that is often attributed to them. First, leading research-based universities are not found in every ecosystem. … Second, numbers of university spin-out companies are typically small and high growth spin-outs are rare».

As E. Stam and B. Spigel have noted [5], «the role of knowledge differs between ecosystems and allied concepts like clusters and innovation systems. Within traditional models knowledge refers to the technical know-how necessary to develop new products and technologies and the market knowledge necessary to know which new products will succeed in the marketplace … This knowledge is key in ecosystems, but ecosystems approaches also highlight a new type of knowledge: knowledge about the entrepreneurship process itself. This includes knowledge about the challenges facing entrepreneurs as they scale, how to design business plans and pitch ideas to angel investors and venture capitalists, and how to overcome the liability of newness when working with potential clients and suppliers».

According to E. Annanperä et al [7], «By adapting the knowledge management viewpoint to the analysis of knowledge creation and conversion in emerging business ecosystems, we can add to the understanding of how these business ecosystems are formed».

B. Clarysse et al have noted [16], that they «observe three factors in which knowledge and business ecosystems differ. First, the primary activity in knowledge ecosystems is the generation of new knowledge whereas the focus in business ecosystems is on value for customers. Second, players in a knowledge ecosystem are typically connected in a dense, geographically clustered network while business ecosystems are represented by value networks which can be globally dispersed. Third, knowledge ecosystems are centered around a university or public research organizations whereas large companies are the leaders of business ecosystems», … «knowledge ecosystems are based on value chains where value creation flows from upstream to downstream players. Business ecosystems, on the other hand, are characterized by a non-linear value creation process as groups of firms deliver integrated solutions to end users» and «we show that there seems to be a disconnection between the development of knowledge and business ecosystems».

K. Valkokari [17] also summarizes the differences between three ecosystem types: «Business ecosystems focus on present customer value creation, and the large companies are typical key players within them. Knowledge ecosystems focus on the generation of new knowledge, and in this way research institutes and innovators, such as technology entrepreneurs, play a central role in these ecosystems. Innovation ecosystems occur as an integrating mechanism between the exploration of new knowledge and its exploitation for value co-creation in business ecosystems. Thus, innovation policymakers, local intermediators, innovation brokers, and funding organizations (such as venture capitalists or public funding agencies) are salient actors in innovation ecosystems».

According to I. Nonaka, R. Toyama and T. Hirata [12]: «In fact, knowledge is different in nature from information or physical resources, and unless we understand the essential nature of knowledge, we cannot share it or use it, and, more importantly, create it effectively …Since knowledge is created by human beings, we cannot theorize knowledge creation apart from human subjectivities, such as individual thoughts and feelings, ideas, hunches, and dreams. And we cannot understand how firms create knowledge that is unique to them unless we understand the role and function of human subjectivity in that process. … Knowledge cannot exist without human subjectivities and the contexts that surround human beings because "truth" differs according to who we are and from where we view it. Knowledge is information that is meaningful … Rather, we should focus on "belief" as the starting point to an understanding of knowledge, because it is belief that is the source of all knowledge, and it is human beings who hold and justify such belief».

Nonaka et al have also proposed an approach to «a management theory that tackles head-on the issue of differences in individual subjectivity». They have used M. Polanyi's dichotomy of subjective «tacit» and objective «explicit» knowledge, and they understand knowledge primarily as a process, but they «do not deny the merits of comprehending knowledge as a substance». Nonaka et al have considered the SECI process, which consists of socialization, externalization, combination, and internalization as modes of knowledge conversion. In socialization stage, «individual tacit knowledge is shared through shared experiences in day-to-day social interaction to create new tacit knowledge». In externalization, «tacit knowledge of individuals is made explicit through language, images, models, and other modes of expression, and then shared with the group».

J. Lee [18] has studied knowledge sharing concepts as a main part of knowledge management. As noted, «knowledge sharing, which is the central activity of knowledge management, has multifaceted implications and potential benefits for organizations, and the effects of knowledge sharing have been investigated by many previous researchers in multifaceted dimensions». It is noted, that «the university should support formal and informal communities inside the university to let the students make more social interaction ties. The increase in social interaction ties would result in the knowledge 'gateway' of individuals, to make knowledge sharing smoother and increase the chance to find qualified knowledge» [18]. In our opinion, informal communities outside the university should play essential role for entrepreneurial ecosystems. It is important to note, that individual creativity of university staff and entrepreneurs and ability of the last to accept knowledge of university researchers is one of the central for bridging the gap between them.

The study of knowledge management process, provided by R. V. D. Gonsales and M. F. Martins [19], has shown, that «the definition and classification of knowledge are extremely important. Knowledge should not be mistaken with information or data. In fact, knowledge is the final result of an evolutionary cycle, which requires observation, evaluation, reflection, and experience, i.e. knowledge, unlike data and information, only materializes with human activities». For the phase of acquisition, authors have identified four themes: organizational learning, absorbing knowledge, creative process, and transformation of knowledge».

According to T. D. Wilson [13], «the 'knowledge management' idea is that it is, in large part, a management fad, promulgated mainly by certain consultancy companies, and the probability is that it will fade away like previous fads. It rests on two foundations: the management of information – where a large part of the fad exists (and where the 'search and replace marketing' phenomenon is found), and the effective management of work practices. However, these latter practices are predicated upon a Utopian idea of organizational culture in which the benefits of information exchange are shared by all, where individuals are given autonomy in the development of their expertise, and where 'communities' within the organization can determine how that expertise will be used». … «So, now, every aspect of organization and management theory has to have a 'knowledge' dimension, otherwise you aren't in the game. In the literature, of course, this amounts to the token use of the term 'knowledge management' and the use of 'knowledge' as a synonym for 'information'». … «according to the rhetoric of 'knowledge management', 'mind' becomes 'manageable', the content of mind can be captured or down-loaded and the accountant's dream of people-free production, distribution and sales is realized – 'knowledge' is now in the database, recoverable at any time. … Fortunately, like most Utopias, it cannot be realized».

One of the views of relations between knowledge and information is that proposed by F. Dretske. According to him [20, p. 33]: «Information, as commonly understood, as the layperson understands it, is an epistemologically important commodity. It is important because it is necessary for knowledge». As noted by K. Devlin and D. Rosenberg [20, p. 697]: «Today, most of us think of information as a commodity that is largely independent of how it is embodied».

Also, if we think the knowledge to have an explicit form, it is possible to use a notion that knowledge is a commodity. For example, I. Kaupinnen has written: «if we accept that commodity form is a crucial aspect of capitalistic market economies, then the demonstration that knowledge can be, and is, treated as commodity within the field of higher education gives us reason to suppose that 'academic capitalism' is not merely a metaphor».

According to W. D. Holford [21], tacit knowledge is incommensurable to explicit knowledge, and tacit knowledge cannot be fully expressed as language or code. He proposed «the post-humanist approach of human-machine interactions allowing for technologies … to free up humans to concentrate on creative work».

As well known, the traditional approach [22] put the view of knowledge as justified true belief (JTB). But H. Radder [15] has proposed to distinguish three types of knowledge: «The first type is based on the weak notion of justification. This type of knowledge is very close to what we usually call (correct) information; hence the 'i' of *informational* knowledge. … In contrast, the second type of knowledge is based on a stronger form of justification: it requires the skills to perform the procedures that support the claim (which, of course, presupposes a thorough understanding of its meaning); hence the 's' of *skilled* knowledge». Radder argues that «we need the differentiation between three types of knowledge when dealing with the issue of scientific knowledge as a common good». According to him, «stating that a particular item of scientific knowledge is a common good is a normative claim. This is an important further respect in which this view differs from the economists' theory of a public good».

Also, H. Radder has noted [15], that «Related to its individualism is the JTB assumption that knowledge is a (specific kind of) belief, that is, a psychological attitude toward a proposition held by a specific individual. … However, if other people matter epistemically, for example if reliable justification depends on the knowledge of other people, the idea of knowledge as *primarily* a belief becomes questionable».

Among the unresolved issues of knowledge management (in spite of externalization stage, proposed by Nonaka et al) remains the way in which the transition from strictly individual forms of knowing as tacit and JTB to explicit knowledge or information is provided and how effectively knowledge as justified belief could become a commodity or common good.

The purpose of the article is to determine how we should understand the transition from individual knowledge as justified true belief into explicit form, which may become the commodity or the common good, how essential is a gap between the individual consciousness and the economically useful forms of information and is this gap a problem for knowledge management.

Basic material. In order to be a commodity and a subject of management, a cognitive product must be accessible to consumers and separated from the mind of the person who creates it. As known [12, p. 42], «Much of a firm's economic value is measured in explicit knowledge assets, such as know-how, patents, copyrights, and brand image, because they are easier to measure», but «The more valuable asset is the underlying tacit knowledge that was needed to create them because that knowledge and its methodology are the source of knowledge-creation capability at the firm and therefore the gauge of future value».

According to Nonaka et al, Polanyi asserted that all knowledge is either tacit or rooted in tacit knowledge, and that no knowledge is completely explicit, however, he did not theorize the process of knowledge creation. For them [12, p. 54], «Tacit knowledge is not transformed directly into explicit knowledge but is converted in the context of the value judgments of the knower». In the SECI model [12, p. 19], tacit knowledge should be «transformed into explicit knowledge so it can be shared with others and enriched by their individual viewpoints to become new knowledge». In externalization, tacit knowledge of individuals is made explicit through language, images, models, and other modes of expression. They think [12, p. 24]: «Reading books, for example, can put us in contact with a vast array of explicit knowledge». It is essential to note, that according to Nonaka et al [12, p. 26] «There is always a gap or contradiction because it is impossible to convert all tacit knowledge into explicit knowledge, and it is equally impossible to convert all explicit knowledge into practice».

How is tacit knowledge to explicit transformation in the process of preparing scientific articles, monographs, as well as documentation on the implementation of research results that are consistent with the ideas of externalization?

When presenting his thoughts on paper and computer, the scientist writes the text with the provisions, «pulling» them out of the hidden layers of their consciousness into more operational. As a rule, the transfer of thoughts to material carriers in itself takes place in such a way that the person updates several variants of the phrases, choosing among them those that it considers relevant, are optimal for a particular document. In operative thinking, there is much more phrasal language than it is then transferred to the material carrier. However, far from all «called» from memory promptly: something needs additional reflections, somewhat remains irrelevant. Thus we can say that tacit knowledge in the process of writing a text is partially converted into thinking on a form that I propose to call operative knowledge, containing everything that is transferred to operational consciousness. Note that tacit knowledge along with operative knowledge is equivalent to knowledge as justified true belief.

In order to transfer the selected version of this operational knowledge to the text on the external material carrier, its author deliberately chooses what he considers to be optimal. Text on a material carrier can be considered, so to speak, an objective explicit knowledge or information.

It should be noted that creation of operative knowledge has formed a gap between it and tacit knowledge of the corresponding person. A cognitive gap is created as characterizing the separation of the entire mental tacit content from the knowledge that is «extracted» from the consciousness hidden layers to more operational ones at the present moment in the existing external and internal context and other factors that determine the human condition. Obviously, it is this operative knowledge that closely corresponds to what is considered as justified true belief: operative knowledge should be a justified belief for the author to consider it to be his own knowledge.

A cognitive gap of a somewhat different type arises in the process of transforming by the author the operative knowledge into a cognitive entity, which is transferred to a material medium in a certain language or with the use of several languages. This cognitive transition is fully understood by the author of the text, because it is (s)he who forms phrases based on the operative knowledge, but it is a gap for the text or expression, which loses unverbalized beliefs of the author, and in the final moment – for those who perceive them. For those who perceive, it remains unknown not only tacit content of the author's consciousness, but also his situationally formed operative knowledge.

In my opinion, the gap between tacit and operational knowledge can be qualified as the cognitive gap of actualization, and the gap between operational knowledge and its presentation on a material carrier – as the cognitive gap of externalization.

It must be confirmed that tacit and operative knowledge or justified true belief are not subjects of commodity, but the objective explicit knowledge is. With regard to information, there are different approaches [23] to defining its concepts that information is an objective or a purely subjective phenomenon. The notions of information are not discussed in our study, but we think that being objective or subjective is more inherent to information and data than to knowledge.

Our research confirms the argument that the personal knowing in the form of tacit knowledge, justified true belief and operational knowledge in our understanding belong to the category of knowledge that is subjective and is in the consciousness of the person, although they are of a social nature by origin. From these positions, the management of this knowledge is a certain metaphor or simplification of the cognitive processes vision. The presence of the cognitive gaps, defined in our study, confirms the issue, that the notion of knowledge management in traditionally used forms is less correct than the information management concepts.

The role of the cognitive gaps should be taken into account in the processes of the formation and operation of entrepreneurial ecosystems around universities. In fact, there is the well-known concept of H. Etzkovitz [24] that continued in our research [2], which concerns the creation of small innovative firms based on research groups of universities. An essential aspect of bridging the cognitive gaps between research results and their using is the close participation of researchers in entrepreneurial activity of firms. It can be said that these concepts do not include awareness of cognitive gaps between researchers and entrepreneurs, but in fact minimize their impact on the knowledge transfer through direct participation of researchers in entrepreneurship.

Conclusion. Our study shows that issues of knowledge management are important for the formation and functioning of entrepreneurial ecosystems, in particular, when they actively use the collaboration between research groups of universities and small innovative firms. It is noted that the dichotomy «tacit-explicit knowledge», used in the concepts of knowledge management, conceals the cognitive gap between the subjects' consciousness and the product presented on the material carriers of information.

It is proposed to supplement the subjective component of knowledge management with the notion of operative knowledge, which corresponds to the concept of knowledge as justified true belief. Unlike tacit knowledge, operative knowledge is an actualized component of the mental content of consciousness that arises in the process of developing the author's thoughts for further transfer to material media. However, operative knowledge is more than what becomes a text of articles and books or speeches, since it contains all the possible options that is the justified belief, and not just the option that the author chooses to be presented.

It is shown that in the triad «tacit knowledge – operative knowledge – information (or explicit knowledge)» the cognitive gap appears as two components:

- between tacit and operational knowledge – the cognitive gap of actualization;
- between operational knowledge and information – the cognitive gap of externalization.

The author believes that the use of the operative knowledge concept, as well as the cognitive gaps of actualization and externalization, helps to clarify the provisions of the knowledge and information management concepts. At the same time, there are reasons to believe that the concepts of information management have a more substantiated cognitive basis than the knowledge management concepts, since they are more in line with the development of both classical and social epistemology.

Further research should put on the agenda the refinement of the concepts of knowledge, information and appropriate forms of management.

References

1. Fedulova, L. (2016) Innovatsiyna ekosystema universytetu [University innovation ecosystem]. *Visnyk KNTEU*, No. 4, pp. 162–177.
2. Porev, S. M. & Sandyga, I. V. (2016) Shliakh nauky universytetu [The way of university science]. Kyiv: Khimdzhest.
3. Mason, C. & Brown, R. (2014) Entrepreneurial ecosystems and growth oriented entrepreneurship (Final report to OECD). Paris: OECD.
4. Stam, E. (2015) Entrepreneurial ecosystems and regional policy: a sympathetic critique. *European Planning Studies*, No. 23 (9), pp. 1759–1769.
5. Stam, E. & Spigel, B. (2016) Entrepreneurial ecosystems. USE Discussion paper series nr: 16-13. UU USE Tjalling C. Koopmans Research Institute.
6. Guerrero, M., Urbano, D., Fayolle, A., Klofsten, M. & Mian, S. (2016) Entrepreneurial universities: emerging models in the new social and economic landscape. *Small Business Econ*., No. 47 (3), pp. 551–563.
7. Annanperä, E., Liukkunen, K. & Markkula, J. (2016) Managing emerging business ecosystems – a knowledge management viewpoint. *Proceedings of AMCIS*, San Diego.
8. Bandera, C., Keshtkar, F., Bartolacci, M., Neerudu, S. & Passerini, K. (2017) Knowledge management and the entrepreneur: insights from Ikujiro Nonaka's dynamic knowledge creation model (SECI). *International Journal of Innovation Studies*, No. 1, pp. 163–174.
9. Dalkir, K. (2011) Knowledge management in theory and practice (seconded.). Cambridge MA: MIT Press.
10. Girard, J & Girard, J. (2015) Defining knowledge management: toward an applied compendium. *Online Journal of Applied Knowledge Management*, No. 3 (1).
11. Polanyi, M. (1958) Personal knowledge. Towards a post-critical philosophy. London: Routledge.
12. Nonaka, I., Toyama, R. & Hirata, T. (2008) Managing flow. A process theory of the knowledge-based firm. Basingstoke: Palgrave Macmillan.
13. Wilson, T. D. (2002) The nonsense of 'knowledge management'. *Information Research*, No. 8 (1).
14. Lambe, P. (2011) The unacknowledged parentage of knowledge management. *Journal of knowledge management*, No. 15 (2), pp. 175–197.
15. Radder, H. (2017) Which scientific knowledge is a common good? *Social epistemology*, No. 31 (5), pp. 431–450.
16. Clarysse, B., Wright, M. & Bruneel, J. (2014) Creating value in ecosystems: crossing the chasm between knowledge and business ecosystems. *Research Policy*, No. 43 (7), pp. 1164–1176.
17. Valkokari, K. (2015) Business, innovation, and knowledge ecosystems: how they differ and how to survive and thrive within them. *Technology Innovation Management Review*, No. 5 (8), pp. 17–24.
18. Lee, J. (2018) The effects of knowledge sharing on individual creativity in higher education institutions: socio-technical view. *Administrative Sciences*, 8 (21); doi: 10.3390/admsci8020021.
19. Gonsales R. V. D. & Martins, M. F. (2017) Knowledge management process: a theoretical-conceptual research. *Gest. Prod.*, São Carlos, No. 24 (2), pp. 248–265.
20. Adriaans, P. & van Benthem, J. (Eds) (2008) Philosophy of information. Amsterdam: Elsevier.
21. Holford, W. D. (2018) Knowledge flows in the form of entanglement and ‘cuts’: an agential realist perspective on knowledge construction phenomena within an aircraft manufacturing workplace. *Proc. of 51st HICSS*, Hawaii, pp. 4233–4242.
22. Steup, M. (2018) Epistemology. *The Stanford Encyclopedia of Philosophy* (Summer edition), Edward N. Zalta (ed.). Available at: https://plato.stanford.edu/archives/sum2018/entries/epistemology/
23. Mingers, J. & Standing, C. (2014) What is information such that there can be information systems? *Working paper series*, № 302, Kent: Kent Business School.
24. Etzkowitz, H. (2003) Research groups as‘ quasi-firms’: the invention of the entrepreneurial university. *Research policy*. No. 32, pp. 109–121.

С. М. Порев

МЕНЕДЖМЕНТ ЗНАНЬ ДЛЯ ПІДПРИЄМНИЦЬКИХ ЕКОСИСТЕМ І ПРОБЛЕМА КОГНІТИВНИХ РОЗРИВІВ

Статтю присвячено проблемі менеджменту знань у підприємницьких екосистемах за участю університетів, де обмін знаннями має бути інтенсивним. Для нашого дослідження було важливо визначити, чи поняття товару може бути використане для знання. Показано, що використання прихованих і явних знань як об'єктів менеджменту приховує когнітивні розриви між свідомістю суб'єктів та текстами або іншими матеріальними презентаціями інформації. Автор запропонував доповнити суб'єктивну складову менеджменту знань поняттям оперативного знання, що відповідає поняттю знання як виправданого істинного переконання. Оперативні знання можуть бути визначені як всі слова та фрази в свідомості, які з'являються, коли автор шукає оптимальну версію для передачі ментального знання в явну матеріальну форму. Використовуючи поняття оперативного знання, автор визначає когнітивний розрив актуалізації між прихованими і оперативними знаннями, а також когнітивний розрив екстерналізації між оперативними знаннями та матеріальною формою інформації. Слід зазначити, що поняття оперативного знання та когнітивних розривів дають підстави вважати, що концепції менеджменту інформації мають більш обґрунтовану когнітивну основу, ніж менеджменту знань.

***Ключові слова**: менеджмент знань, підприємницька екосистема, товар, університет, оперативне знання, когнітивний розрив, інформація, переконання.*