

DOI: [10.55643/fcaptop.3.50.2023.4061](https://doi.org/10.55643/fcaptop.3.50.2023.4061)

Maxym Polyakov

D.Sc. in Economics, Associate
Professor, Managing Partner,
Noosphere Ventures, Mountain View,
United States of America;
ORCID: [0000-0001-7896-2486](https://orcid.org/0000-0001-7896-2486)

Igor Khanin

D.Sc. in Economics, Professor of the
Department of Enterprise Economics
and International Business,
National University of Water and
Environmental Engineering, Rivne,
Ukraine;
ORCID: [0000-0002-4221-2314](https://orcid.org/0000-0002-4221-2314)

Gennadii Shevchenko

Candidate of Technical Sciences,
Associate Professor, Head of Scientific
Center, Association Noosphere, Dnipro,
Ukraine;
ORCID: [0000-0003-3984-9266](https://orcid.org/0000-0003-3984-9266)

Volodymyr Bilozubenko

D.Sc. in Economics, Professor, Head of
the Department of International
Economic Relations and Regional
Studies, University of Customs and
Finance, Dnipro, Ukraine;
e-mail: bvs910@gmail.com
ORCID: [0000-0003-1269-7207](https://orcid.org/0000-0003-1269-7207)
(Corresponding author)

Received: 09/04/2023

Accepted: 26/05/2023

Published: 30/06/2023

© Copyright
2023 by the author(s)



This is an Open Access article
distributed under the terms of the
[Creative Commons CC-BY 4.0](https://creativecommons.org/licenses/by/4.0/)

KNOWLEDGE MANAGEMENT IN INTERNATIONAL COMPANIES: SPECIFIC FEATURES AND INFORMATION TOOLS

ABSTRACT

The increasing importance of innovation as a factor in the effectiveness and competitiveness of companies makes them pay special attention to the processes of obtaining and using knowledge that require special management. International companies, being innovatively active for expansion, are a special subject of knowledge management (KM). In such companies, KM has significant specific features related to their structure, which includes foreign subsidiaries, and the nature of their activities, covering different national markets. Due to the specifics of such companies, they widely use information technology in management and, in particular, use special information tools for KM.

The research is aimed to characterize the specific features of KM in international companies and to provide the rationale behind using new information tools for KM, which can be used to improve the effectiveness of innovation.

The main focus of the paper is on the specific features of KM in international companies, taking into account their structure and nature of activities, namely: 1) specific features related to the content of the KM, taking into account the number of subsidiaries, the scale of activities, the complexity of tasks, etc.; comparison of the models of internalization and externalization in obtaining new knowledge by companies; 2) specific features related to the internal environment (involvement of all levels of management, multicultural environment, creation of communities of intensive knowledge); 3) specific features related to the external environment, covering interaction with consumers, partners and authorities of different countries; 4) specific features related to the innovative activity (distribution of powers between the parent company and subsidiaries, coordination of research and development (R&D), organization of innovation processes). The global approach of international companies to the development of innovations is substantiated, which determines the content of KM, as well as the need to create a KM system, part of which is information tools. Their improvement allows for enhancing the quality of KM and the effectiveness of innovation. In terms of KM in an international company, the purpose of such information tools as an R&D management information system, a single innovation management platform, a tool for formalizing knowledge, and a corporate knowledge base, is determined. In the future, it is expected to study the effects of the proposed tools, highlight the problems of their introduction and operation, as well as a set of measures to overcome these problems.

Keywords: knowledge management, international company, internal environment, external environment, innovative activity, information tools, knowledge base

JEL Classification: D29, L86, M11, M21

INTRODUCTION

In today's economy, innovation is the preferred factor in economic growth and development, and at the company level - the basis for effectiveness and competitiveness. The need for innovation has made them an integral part of the business strategy, and innovative activity has become a routine, which requires appropriate organization and management. As science and technology have progressed, the importance of knowledge as a primary component in products, services and technologies has increased, making it the basis for creating a new value. The development of innovations,

in turn, has become more complex, requiring significant intellectual resources and extensive purposeful activities. In this regard, companies began to consider the processes of knowledge obtaining and use, which covered the analysis of needs, markets, design of innovation, research and development (R&D), the introduction of technology, production development and marketing of new products. This has turned knowledge into a new factor in production and productivity, increasing the importance of intellectual capital. The growing importance, scale and cost of the processes of obtaining and using knowledge created a demand for knowledge management (KM) and required the development of its theoretical foundations and practical approaches. Modern information technologies (IT), which generate significant benefits for management within companies and their activities in general, are also widely used for KM.

The globalization of markets is accompanied by the rapid spread of innovation, the expansion of international business, especially related to high technology, the internationalization of R&D and the transfer of technologies. This brings innovative competition to a new level and creates a special environment for competition and technological progress, which encourages companies to be more active in innovation and, accordingly, effective in KM. First of all, this applies to international companies that seek to expand and maintain leadership, which requires intensive innovation. At the same time, such companies are very specific in conducting R&D and organizing innovative processes, which gives rise to specific features in KM and the need to use special information tools.

LITERATURE REVIEW

In recent years, there has been a steadily increasing focus on understanding knowledge as an economic factor, and on KM issues in companies. Structural changes in the economy in the second half of the XX century, the transition to an innovative type of production and the «knowledge economy» have created new benchmarks for the formation of strategies and structures of the company, understanding their nature and changes in activities [1]. Companies began to be considered knowledge creators [2]. There is a new vision of companies as knowledge-based [3]. Faced with competition in the field of innovation, companies are forced to focus on obtaining new knowledge, mastering and transforming it into innovation to create competitive advantages. [4]. It required an appropriate organization to generate knowledge [5], a special communication system [6] and made management necessary to transform knowledge into innovation [7-9]. Practice proves that the high quality of KM can significantly increase the company's innovative performance [10]. Therefore, KM has become an integral part of project implementation, helping to optimize the use of resources and set priorities. [11]. In the context of innovation, KM covers all the new objectives, functions and directions, including those related to risk minimization [12] and quality management [13]. Therefore, KM has become the basis for the integrated organization and improvement of all business processes of the company [14]. The importance of KM is increasing in the context of modern technological trends, especially the Fourth Industrial Revolution, changes in supply chains [15] and the introduction of environmental innovations [16].

As the field of management activities, KM is rapidly evolving; new approaches are emerging [17]; special attention is paid to practical tools [18], systematic approach, including the individual level of work of employees and their communication. [19]. Therefore, building KM systems in companies is inconceivable without IT [20], defining new methodologies and practices. In addition to corporate networks and websites, special programs for data mining, knowledge maps, and knowledge bases for developing innovations have emerged [21], that is, special tools that have become the object and part of KM. The globalization of the world economy has led to the development of international companies in all sectors of the economy. In terms of developing and promoting innovations, KM issues in such companies have become increasingly important. [22-25]. However, despite the increased attention to KM, the specific features of such management in international companies have been studied fragmentarily, both theoretical and practical aspects. It should be noted that the issues of creating and using the tools for KM in international companies are not sufficiently clarified, although this is of great practical importance.

AIMS AND OBJECTIVES

This research is aimed to characterize the specific features of KM in international companies and substantiate the information tools for KM that can be used to improve the effectiveness of the innovative activity.

METHODS

The theoretical basis of the research is the fundamental provisions of microeconomics, the theory of the firm and innovative enterprise, and the foundations of innovative management. The following concepts played a great role in the theoretical basis of the paper: knowledge economy (knowledge-based economy), knowledge-creating, learning and knowledge-based company. Theoretical developments in KM, revealing its goals, objectives, methods, were used. Researches on the use of IT and individual tools in KM were taken into account. The research methodology includes general scientific methods of cognition (generalization, abstraction, induction, deduction, and analogy) and special methods of analysis (structural, functional, comparative, and systemic).

RESULTS

Brief clarifications are needed to provide insight into the paper. Knowledge is understood not as a concomitant, but as an immanent element of the company's economic activity, which determines competencies, value creation (of products and services), technological superiority, productivity, competitive advantages, and performance. Therefore, for companies, knowledge is a strategic resource, and the development of its stock and effective use are decisive for achieving sustainability. At the company level, it is expected to focus on the following processes: 1) obtaining knowledge through self-generation or commercial acquisition, as well as natural absorption; 2) the use of knowledge, which includes the development of the product, technological, organizational, marketing innovations, and adoption of managerial decisions (the sale of knowledge as a commodity may also take place). Companies need not only scientific knowledge, which is a result of R&D, but also, for example, knowledge about the market, consumers, partners, and the environment of the company itself. From the company's perspective, knowledge can be considered as a resource (production factor), capital, specific asset, result of activity, commodity. Assessment and monitoring of knowledge, as well as the issues of knowledge transfer, are significant in this context.

The consideration of KM as a separate area is based on realizing the critical importance of knowledge for the company's activities. There are some differences in the understanding of KM in different sectors [26]. However, in general, KM at the company level can be defined as a set of measures and activities in the field of obtaining and using knowledge, aimed at achieving the goals of the company, increasing its efficiency and creating competitive advantages. KM is today supported by IT, but it cannot be reduced to information management in business processes (providing employees or customers with relevant, timely and accurate information), information resources and systems, which in turn is also needed as one of the focuses. In modern conditions, KM covers R&D management; development, introduction and promotion of innovations; training (development) of personnel, as well as making strategic decisions. KM is also understood as a complex, systematic and purposeful activity: 1) which is based on appropriate resources, processes, methods, and tools; 2) covers the internal and external environment of the company; 3) includes all management functions and can influence the organization and strategy of the company as a whole; 4) provides the processes for obtaining and using knowledge, including special activities for identification, search for the necessary knowledge, accumulation, transfer, etc. At the same time, KM also covers a variety of experiences, know-how, practices, and certain tacit knowledge. In terms of the company's activities, KM can be of various types depending on the strategy, in order to meet the market conditions and ensure a timely response to technological changes in the industry.

International business refers to the companies that carry out operations related to the production, movement, promotion and sale of goods, the provision of various services, the provision of capital, and the transfer of technologies that are international in nature. It should be borne in mind that international operations are often carried out by national companies. Therefore, let us focus on the companies that locate production facilities, perform R&D and sales operations abroad. This may have different options for capital structure (transnational, multinational, international or stateless company/enterprise). Given the multiplicity of interpretations, the paper uses the definition of "international company", meaning: the formation of a quite large structure, the pooling of resources and the presence of a network of subsidiaries in different countries (the number of which may be quite large); the expansion into various national markets; ensuring international value chains. The most interesting are the international companies that initiate, develop and promote innovations in the market regardless of their industrial sector. The specific features of KM in international companies are considered as specific distinctions from such management carried out in national companies, primarily related to the nature of the structure and activities associated with the content of KM in an international company; the internal and external environment of such a company, as well as the specifics of activities for the development and introduction of innovations.

Information tools in the field of KM can be represented by quite different systems designed for human resource management, employee training, information management, communication, organizing and ensuring the work of employees and

teams, creating virtual environments for working with data, and much more. This involves, for example, specialized web portals for KM, software-based solutions for data analysis, applications to share scientific and technical information. The use of such tools is based on certain rules and is provided organizationally, which is also related to KM.

At the turn of the XX-XXI centuries, international companies have become one of the leading participants in the world economy, their influence is steadily increasing. In addition to great potential, the wide expansion and diversification of international companies have become possible thanks to proactivity and focus on innovation, which allows for achieving great advantages in technology and marketing. This required progressiveness in the field of knowledge, which turned into a leadership imperative. For tech companies (Table 1), innovative activity has become routine, characterized by an increase in R&D costs and patent activity. The scale of activities to obtain knowledge and develop innovation is illustrated, for example, by the amount of R&D US costs (2021, billion US dollars): Alphabet – 22.47, Huawei Investment & Holding – 17.46, Microsoft – 16.88, Samsung Electronics – 15.89, Apple – 15.28, Volkswagen – 13.89, Roche – 11.25, Intel – 11.05, Johnson & Johnson – 9.91 [27].

Table 1. Top 10 innovative companies according to BCG and Clarivate, 2021. (Sources: [28, 29])

Position	According to BCG		According to Clarivate	
	Company	Country	Company	Country
1	Apple	USA	3M	USA
2	Alphabet	USA	ABB	Switzerland
3	Amazon	USA	Abbott	USA
4	Microsoft	USA	Advanced Micro Devices	USA
5	Tesla	USA	AGC	Japan
6	Samsung	South Korea	Air Products & Chemicals	USA
7	IBM	USA	Airbus	France
8	Huawei	China	Aisin	Japan
9	Sony	Japan	Alcatel-Lucent	France
10	Pfizer	USA	Alcon, Inc	USA

Specific features of KM related to its content. As compared to national enterprises, the need for KM is more acute for international companies due to tougher and more diverse competition, even greater uncertainty and volatility of national markets, often large investments in R&D, especially when it comes to large innovations or large portfolio projects dispersed among subsidiaries in different countries. Activities in different markets and competitive interactions form a wide range of issues that need to be addressed as well as benchmarks for change in terms of generating advantages. This requires the company to be more focused, rapidly responsive, resilient, and flexible in order to achieve global and local leadership. As a result, the overall goals of KM in an international company (for example, generating innovations, achieving and sustaining advantages, increasing productivity) acquire a new quality associated with the space of action in different national markets and, possibly, in several industrial sectors, and the objectives (for example, increasing the efficiency of business processes, ensuring the effectiveness of R&D, developing innovative potential, etc.) are extended to a larger number of innovative projects. This adds more complexity for KM in an international company, which also applies to its elements, such as plans and information systems. The complication of KM creates a demand for the quality of these elements and the building of a whole system of business processes that correspond to the challenges facing the company. Apart from a wider range of market problems, the complexity of KM practice in an international company is associated with the number of subsidiaries and innovative projects and involves planning, monitoring, control, organization of processes, etc., which requires appropriate management mechanisms. At the level of subsidiaries (and even individual projects), different KM methodologies and approaches can be applied, for example, built on rigid vertical or horizontal relationships. This, as well as, for example, activities in different sectors of the economy, require significantly different technological competencies, which implies decentralization of KM. This does not exclude strict administrative procedures, if necessary, but horizontal relationships based on the principles of co-creation are preferable.

The content of KM is determined by the nature of the company's development strategy, and the style of such management may have significant distinctions associated with the general tradition of management, the internal climate and the so-called "DNA" of the company. The strategy of an international company, especially a diversified one, includes many lines of action in industrial sectors, products, local markets, and technologies. Therefore, a more diverse "bank" of knowledge is being operated, which, apart from well-structured and formatted knowledge, also includes extensive production and

marketing experience, various know-how, etc. There is also a "pool" of tacit knowledge, backed up by the company's in-house intellectual traditions and corporate culture. Along with ample opportunities for experimentation and market expertise, all this makes each international company a special "machine" for the production of knowledge. The implementation of this role requires a special strategy and the development of own methodologies for working with knowledge, as well as special competencies of KM. Only in this case, the whole complex of material conditions and intellectual resources that are accumulated for the obtaining and use of knowledge will be effectively used.

Speaking about the content of KM in an international company, one cannot but focus on the appropriate understanding and evaluation of its effectiveness, which involves determining the level of results: in national markets, sectoral areas of activity, innovative projects, gaining competitive advantages on global markets, as well as scientific and technological achievements in the fields of knowledge. Companies can obtain knowledge in different ways: on the basis of in-house generation or from external sources (in practice, these options are combined). Therefore, it is necessary to consider two opposite models - internalization and externalization, which have their own specifics in an international company and give rise to the specific features of KM (Table 2).

Table 2. Comparison of internalization and externalization models in obtaining new knowledge by international companies.

Feature	Internalization	Externalization
Essence of model	predominance of self-generated knowledge	Predominance of external borrowing and obtaining knowledge
Prerequisites	availability of resources, structures, abilities	narrow specialization strategy, linkages needed for outsourcing
Advantages	leadership in innovation	reduction in time and cost
Disadvantages	complexity, uncertainty, long duration, increase in costs	dependence on external sources, lack of leadership
Specifics of the international company	internal generation of knowledge, development of one's own potential, the predominance of internal flows of knowledge within the international structure	a broad search for knowledge in the external environment, its assessment and obtaining; an active external partnership in different countries; diversified external knowledge flows
	own development and international marketing of innovation	
Focus of KM	routine activities to gain knowledge are supported	emphasis on seeking external sources, assessing and combining knowledge

Specific features of KM related to the internal environment. Given the fact that an international company combines enterprises and units located in different countries, it is proposed to highlight several features of KM related to its internal environment. Firstly, KM, as a purposeful activity operating with strategic resources, should involve all levels of management, as well as the level of operational activity. Multi-level KM is implemented regardless of the options of the organizational structure, distribution of powers between the parent company and subsidiaries. The acceleration of market changes and innovation dynamism is pushing most international companies to increase the level of autonomy of foreign subsidiaries in addressing both tactical and strategic issues.

Secondly, the features of KM are associated with a more complex multicultural (multinational) social environment of an international company, while preserving the specifics of world views, mentalities, values, and beliefs of employees from different countries. Therefore, in order to organize joint intellectual and creative activities of personnel and managerial interactions within the framework of a single course, an appropriate corporate culture and information space are required. Such a space is formed, first of all, by the mechanisms of communication, both deterministic and free, unplanned, informal. It is only in the case of appropriate common corporate culture and well-developed communication that KM can be conducted effectively, the tradition of collaboration has been created, a favourable climate has been ensured, the free circulation of knowledge within the company has been ensured, and joint obtaining, accumulation and utilization of knowledge have been organized. The social environment is crucial for enhancing the cognitive closeness of employees, the transfer of experience between generations of employees, subsidiaries, teams, especially tacit knowledge for disseminating best practices. There are a lot of social issues (motivation, self-organization, initiative, leadership, discipline, etc.) that depend on the quality of the internal environment, which are not directly related to this paper, but, in an international company, they are more important in terms of KM, in particular when building international teams.

Thirdly, in order to accelerate and improve the performance of obtaining and using knowledge, it is rational to create intercorporate communities of intensive knowledge. Such communities can be considered, for example, as networks of

competencies that bring together specialists with complementary or common professional interests. In international companies, these communities are quite extensive and include professionals from different countries. In the communities, special «technologies» of communication and work with knowledge, which are necessary for highly skilled specialists to accelerate the sharing and processing of knowledge, can emerge or be imported from outside. Given the specifics of international companies, the use of IT is more urgent for them.

Specific features of KM related to the external environment. International companies have a specific external environment, involving interaction with consumers, partners and authorities from different countries. This enables monitoring market signals and requests, building the necessary system of business relations, adapt to various regulatory requirements. The market environment differs from country to country, which makes it possible to obtain a variety of social and marketing knowledge to promote innovation. Moreover, within the strategic lines of action, an international company can communicate and develop partnerships, related to the obtaining and use of new knowledge, in different countries. These can be universities, research and technical institutes, medium and small innovative firms, startups, teams, and professional communities. International companies have the opportunity to continuously monitor the emergence of knowledge and developments in the global space, build networks for R&D and innovation development, and bring together specialists from different countries. All this has great advantages, especially in terms of accelerating innovation processes and reducing costs.

The international absorption of knowledge becomes a part of the KM of international companies, which makes it possible to combine knowledge, resources and developments from different countries in time and space, using various forms of cooperation. With the availability of appropriate communication mechanisms, international companies can build complex «spirals» of knowledge obtaining in the areas that bring together different participants from both the internal environment and in cooperation with third-party partners. Specialized web platforms and services can also be used for this purpose.

Specific features of KM related to activities for the development and implementation of innovations. In most sectors of the economy, an active innovation strategy is becoming necessary, especially for international companies seeking to create global dynamic competitive advantages. The routinization of innovative activity requires continuous work with different knowledge as a resource. Therefore, any innovative company creates KM mechanisms that correspond to the nature of innovative processes and ensure interaction between the parent company and subsidiaries. The development and introduction of innovations are carried out within an international company, which determines the influence of the internal environment. A key feature of KM is the division of functions between parent and subsidiary companies. Depending on the strategy and conditions, the most typical options are: 1) the parent company performs centralized KM, and innovation processes take place at the level of subsidiaries; 2) KM functions are distributed between the parent company and subsidiaries, and the innovation processes are at the level of the latter; 3) KM is carried out at the level of subsidiaries, where innovation processes take place, and the parent company focuses on strategic issues. Under certain conditions, the development of innovations can be carried out not in isolation at subsidiaries, but be built on the basis of network interactions between them, respectively, the parent company should carry out special coordination actions in KM. Decentralization and network models are preferable for adapting to changes, for promoting innovations in different countries, when operational monitoring and interaction with consumers are needed. The greater autonomy of subsidiaries makes cooperation with local universities and businesses easier. Through the decentralized development of the innovation potential of subsidiaries, an international company is able to create intra-corporate innovation networks and, if necessary, it is easier to create such networks in the external environment.

Important features of KM in an international company are related to the planning and organization of international R&D at the level of subsidiaries or the whole company. The specifics manifest themselves in different categories of R&D: focused, national, regional (at the level of regions of the world), global, «selective» (for a separate enterprise) and others. Each category implies its appropriate KM and distribution of functions between the parent company and subsidiaries.

The content of KM differs depending on the nature of the innovations being developed, such as incremental (step-by-step), improving (the subject of KM is to a great deal knowledge about changes in preferences and analogues) or major innovations (the subject of KM is to a great deal scientific and technological knowledge). The development of incremental innovations for local markets can be at the level of subsidiaries, which determines the focus and KM. With regard to major innovations, the international company creates all stages of the innovation process, concentrates resources, so KM becomes more centralized at the level of the whole company. At the same time, both intra-corporate and external innovation networks are possible to accumulate a large interdisciplinary amount of knowledge and attract the best professionals from around the world. Within such networks, KM is involved as part of cooperative processes.

KM is closely related to the technological (innovation) policy of the company, relating to 1) setting priorities for technological development and increasing investment; 2) targeting R&D and coordinating the efforts of subsidiaries; 3) technology

assessment and acquisition; 4) effective transfer and rapid introduction of technologies at subsidiaries, possibly along the chain in different countries of presence; 5) maximizing profits from the diffusion of innovations (technologies) in the global space. In international companies, KM is concerned with supporting technology transfer between subsidiaries or external ones, which includes the transfer of know-how and training of personnel. Given the challenges of large international companies, and the huge volume of resources involved, KM can stand out as an autonomous unit of the corporate innovation system, which is aimed to provide for the increasingly complex processes of obtaining and using new knowledge.

Modern high technologies are of interest all over the world; therefore, a global approach can be applied to their development, the main characteristics of which are presented in Figure 1.



Figure 1. Characteristics of the global approach of international companies to the development of innovations that determine the content of KM.

The application of this approach highlights the emergence of a new generation of innovative companies that are less tied to a particular country. Given the structure and nature of the activities of an international company, a spatial aspect of KM arises, which takes into account the global landscape of innovation, the geography of scientific and technological development, the distribution of intellectual resources and specialization in the field of knowledge, national features of development and innovation systems, which enables to determine the ways to achieve the company's success in every location. The spatial aspect is associated with a wide range of strategic, organizational, investment, temporal and other issues. KM also significantly influences the decision to concentrate innovative activity depending on local conditions (resources, public policy, culture, etc.).

The foregoing gives grounds to speak of the possibility of considering a corporate KM system. At the level of an international company, such a system is designed to integrate subsidiaries, harmoniously combine their resources, create favourable conditions for communication, cooperation and, in general, work in the field of knowledge, and promote the necessary external interactions. The KM system is a response to the spatial remoteness of subsidiaries and makes it possible to focus on the global markets. Taking into account the covered resources of subsidiaries, their different competencies and objectives, the KM system of an international company require a specific organization. As compared to a national company, its management subsystem will be more complex, particularly in terms of planning and monitoring, resource accumulation and redistribution, not to mention ensuring the full range of conditions for knowledge obtaining and use.

In view of the above, information tools have become an important part of the processes of obtaining and using knowledge and a factor in enhancing the effectiveness of KM. Taking into account the specific structure and activity, international companies naturally take advantage of IT, providing a lot of work with information, namely: communication, decision-making, automation of procedures, organization of individual and collective work of personnel, sales of goods and services, interaction with consumers and partners, etc. Examples include the following: corporate portals and intranets; collaboration tools; project management solutions, content and document management systems; infrastructures for working with data

(repositories, cloud services) and Big Data Solutions; applications for the organization of e-learning; electronic directories, repositories, libraries, catalogues; internal knowledge base. And also, well-known comprehensive tools, such as Knowledge-Management Platforms and Knowledge Management Systems. As you can see, there are quite a variety of information tools that solve different practical problems, mainly related to facilitating and ensuring the work with the knowledge to develop innovations or ongoing activities. In terms of KM, the most interesting are the tools for data mining; working with scientific and technical information; building cooperation schemes in the field of knowledge; creating intellectual environments for collaborative researches. The tools perform a wide range of functions and, despite their fragmentary nature, enable to achieve qualitative changes in the company's business processes. In general, IT has acquired systemic importance: it affects the work of employees, the structure and environment of international companies and their performance.

Improving the information tools of KM can enhance its quality for the increase of the effectiveness of innovation and, accordingly, the economic performance of the company. Given the problems and needs in the field of KM, the improvement of its information tools should be aimed at 1) empowering employees, facilitating routine and technical operations to concentrate on intellectual work; 2) enhancing the quality of planning, improving the coordination and harmonization of the work of the units related to R&D and innovative projects; 3) supporting the activities of networks of competences, communities of intensive knowledge; 4) facilitating the circulation of knowledge, supporting the cooperation and specialization within the company; 5) facilitating the integration of intellectual resources of subsidiaries, focusing common efforts on the main areas. The characteristics of the proposed KM information tools that can be created at the level of an international company are presented in Table 3.

Table 3. The purpose of the proposed KM information tools at the level of an international company.

Tool	Characteristics
R&D management information system	It functions as an intranet, covering all R&D units (centres), operating in the parent company and its subsidiaries. The system is designed to support the chain of knowledge generation, R&D management, given the scientific specialization of the units, stages of development, types of technologies and products. This includes such functions of the system as organization, planning, control, assessment of the effectiveness of R&D projects, coordination between subsidiaries (by objectives and results), integration of their resources, research infrastructure management. Special modules are created to implement each function. Within the framework of the system, a digital infrastructure can be created for storing and exchanging data, operational communication, etc., as well as the networks of competencies that unite specialists. A map of knowledge flows in the company can be a standalone supplement.
Single innovation management platform	It functions as an intranet, covering all innovative projects (ventures) at the level of the company's subsidiaries. The platform is designed to sustain innovation processes, ensuring the work of units and teams. The platform is assumed to have such functions as organization, planning, monitoring, coordination between projects, to this end, the appropriate modules and communication mechanisms are being developed. The platform is supplemented by: tools for organizing the work of projects, teams; data mining tools; knowledge bases and maps; means of monitoring; science and technology library, KM mechanisms. Competency networks, discussion forums, cooperative schemes between subsidiaries can be maintained separately.
Tool for the formalization of knowledge	It is a special program (templated editor) that provides forms for describing knowledge of various types, which should facilitate the fixing and, accordingly, the transfer and use of knowledge by giving it a formalized form and presenting content (logical chains, structural logic diagrams, logical operators, systems thesauri, etc.), assessment of the level of novelty and use cases. The tool can be used to formalize representations of the object, set objectives and systematize results of R&D, for patent analysis, processing sources of other scientific and technical information, its generalization and structuring, preparation of technical tasks, brainstorming, categorization of knowledge, formalization of experience, practices, heuristics. The editor can be supplemented with auxiliary directories, tools for text analysis, visualization, knowledge maps, explanatory materials, methods for assessing the quality of knowledge and the novelty of developments, explanatory materials, methods for assessing the quality of knowledge and novelty of developments.
Corporate knowledge base (for employees)	It is a special information system that enables to accumulate and structure the knowledge in various forms (scientific and technical information, data on innovations, data collections and results of their analysis, solutions bank, etc.) and which reflects the focus areas of the company's innovative activity. Knowledge base enables to ensure the processes of obtaining, integration, distribution and storage of the company's knowledge. The system is designed to systematize and organize fragmented knowledge and additional intellectual resources, organize access, facilitate synthesis, support individual and collective work with knowledge, including in terms of scientific communication. The accumulation of knowledge helps create «mixes» of knowledge necessary for solving specific problems. The knowledge base can also be focused on: the development of certain competencies, support of technology transfer, R&D projects, cases of cooperation, in-house training and consulting, to facilitate the organization and coordination of collective intellectual activities, create a collective memory for competency networks and expert communities.

DISCUSSION

The introduction of the presented tools requires organizational conditions, changes in corporate culture, appropriate training, which requires additional research. Each tool can be a significant part of the KM system and should therefore be considered as a process optimization factor, including through economies of scale and network effects. The use of such tools should be monitored and reviewed for effectiveness.

A separate problem is the assessment of each tool as an intangible asset of the company and the value of the knowledge (intellectual resources) accumulated through these tools. Moreover, the tools presented are primarily related to the internal environment, but external aspects can also be considered, such as the use of these tools to support external (for the whole company) technology transfer or knowledge import.

CONCLUSIONS

Thus, KM is an important component of the activities of modern companies, especially those focused on innovation, which requires effective processes for obtaining and using knowledge. In international companies, KM has significant specific features, primarily related to the content of KM itself, the complexity of the objectives and the scope of activities; the internal and external environment of the company; the specifics of the development and introduction of innovations. In this regard, the paper describes the global approach of international companies to the development of innovations that determine the content of KM and notes the need for a holistic system of KM. The paper provides the rationale behind using a number of new tools to enhance the effectiveness of the processes for knowledge generation and use, and directly KM (information system of R&D management; a single platform for managing the company's innovation activity; a tool for the formalization of knowledge; corporate knowledge base). In future papers, it is expected to study the economic effects of the proposed tools, highlight the problems of their introduction and operation, propose a set of measures to overcome these problems.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

Conceptualization: Maxim Polyakov, Volodimir Bilozubenko

Methodology: Maxim Polyakov, Gennadii Shevchenko, Volodimir Bilozubenko

Resources: Gennadii Shevchenko, Volodimir Bilozubenko

Supervision: Igor Khanin

Validation: Maxim Polyakov, Gennadii Shevchenko

Investigation: Gennadii Shevchenko, Volodimir Bilozubenko

Project administration: Maxim Polyakov

Writing – original draft: Gennadii Shevchenko, Volodimir Bilozubenko

REFERENCES

1. Grant, M.G. (1996). Towards a knowledge-based theory of the firm. *Strategic Management Journal*, 17, 109-122. <https://doi.org/10.1002/smj.4250171110>
2. Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford University Press, New York.
3. Amini, E., Baniasadi, M., Vahidi, H., Nematollahi, H., Khatami, M., Amandadi, M., Malekyan, L., & Safarpour, H. (2020). Affecting Factors of Knowledge-Based Companies Using Fuzzy AHP Model, Case Study Tehran University Enterprise Park. *Journal of Knowledge Economy*, 11, 574–592. <https://doi.org/10.1007/s13132-018-0554-9>
4. Rahimli, A. (2012). Knowledge Management and Competitive Advantage. *Journal of Information & Knowledge Management*, 2(7), 37-43. <https://www.iiste.org/Journals/index.php/IKM/article/view/3255/3302>
5. Grigoriou, K., & Rothaermel, F. T. (2017). Organizing for Knowledge Generation: Internal Knowledge Networks and the Contingent Effect of External Knowledge Sourcing. *Strategic Management Journal*, 38, 395-414. <https://doi.org/10.1002/smj.2489>
6. Liyanage, C., Elhag, T., Ballal, T., & Li, Q. (2009). Knowledge Communication and Translation – a Knowledge Transfer Model. *Journal of Knowledge Management*, 13(3), 118-131. <https://doi.org/10.1108/13673270910962914>
7. Jang, S., Hong, K., Woo Bock, G., & Kim, I. (2002). Knowledge management and process innovation: the knowledge transformation path in Samsung SDI. *Journal of Knowledge Management*, 6(5), 479-485. <https://doi.org/10.1108/13673270210450582>

8. Akram, K., Siddiqui, S., Nawaz, M. A., & Ghauri, T. (2011). Role of Knowledge Management to Bring Innovation: An Integrated Approach. *International Bulletin of Business Administration*, 11, 121-134. <https://www.econ-jobs.com/research/9515-Role-of-Knowledge-Management-to-Bring-Innovation-An-Integrated-Approach.pdf>
9. Ode, E., & Ayavoo, R. (2020). The mediating role of knowledge application in the relationship between knowledge management practices and firm innovation. *Journal of Innovation & Knowledge*, 5(3), 210-218. <https://doi.org/10.1016/j.jik.2019.08.002>
10. Mardani, A., Nikoosokhan, S., Moradi, M., & Doustar, M. (2018). The Relationship Between Knowledge Management and Innovation Performance. *The Journal of High Technology Management Research*, 29(1), 12-26. <https://doi.org/10.1016/j.hitech.2018.04.002>
11. Polyaniinova, T. (2011). Knowledge Management in a Project Environment: Organisational CT and Project Influences. *VINE*, 41(3), 34-48. <https://doi.org/10.21427/D7NK7M>
12. Hock-Doepgen, M., Clauss, T., Kraus, S., & Cheng, C.-F. (2021). Knowledge management capabilities and organizational risk-taking for business model innovation in SMEs. *Journal of Business Research*, 130, 683-697. <https://doi.org/10.1016/j.jbusres.2019.12.001>
13. Abbas, J. (2020). Impact of total quality management on corporate sustainability through the mediating effect of knowledge management. *Journal of Cleaner Production*, 244, Article 118806. <https://doi.org/10.1016/j.jclepro.2019.118806>
14. Paschek, D., Ivascu, L., & Draghici, A. (2018). Knowledge Management – The Foundation for a Successful Business Process Management. *Procedia - Social and Behavioral Sciences*, 238, 182-191. <https://doi.org/10.1016/j.sbspro.2018.03.022>
15. Schniederjans, D.G., Curado, C., & Khalajhedayati, M. (2020). Supply chain digitisation trends: An integration of knowledge management. *International Journal of Production Economics*, 220, Article 107439. <https://doi.org/10.1016/j.ijpe.2019.07.012>
16. Abbas, J., & Sağsan, M. (2019). Impact of knowledge management practices on green innovation and corporate sustainable development: A structural analysis. *Journal of Cleaner Production*, 229, 611-620. <https://doi.org/10.1016/j.jclepro.2019.05.024>
17. Bootz, J.-Ph., Durance, Ph., & Monti, R. (2019). Foresight and knowledge management. New developments in theory and practice. *Technological Forecasting and Social Change*, 140, 80-83. <https://doi.org/10.1016/j.techfore.2018.12.017>
18. Anjaria, K. (2020). Negation and entropy: Effectual knowledge management equipment for learning organizations. *Expert Systems with Applications*, 157, Article 113497. <https://doi.org/10.1016/j.eswa.2020.113497>
19. Kuznetsova, A. Y., Lyzun, M. V., Savelyev, Y. V., Kuryliak, V. Y., & Lishchynskyy, I. O. (2019). Gravitaty potential for currency alliances' intrarigional trade. *Financial and Credit Activity Problems of Theory and Practice*, 3(30), 236-247. <https://doi.org/10.18371/fcaptop.v3i30.179550>
20. Tseng, Sh.-M. (2008). The effects of information technology on knowledge management systems. *Expert Systems with Applications*, 35(1-2), 150-160. <https://doi.org/10.1016/j.eswa.2007.06.011>
21. Hassink, R., & Plum, O. (2014). Knowledge bases, innovativeness and competitiveness in creative industries: the case of Hamburg's video game developers. *Regional Studies, Regional Science*, 1(1), 248-268. <https://doi.org/10.1080/21681376.2014.967803>
22. Vorbeck, J., Heisig, P., Martin, A., & Schütt, P. (2001). Knowledge Management in a Global Company – IBM Global Services. In K. Mertins, P. Heisig, J. Vorbeck (Eds.), *Knowledge Management*, 174-185. Springer. https://doi.org/10.1007/978-3-662-04466-7_12
23. Hasan, M., & Zhou, S. N. (2015). Knowledge Management in Global Organisations. *International Business Research*, 8(6), 165-173. <http://dx.doi.org/10.5539/ibr.v8n6p165>
24. Atalay, M., & Sarvan, F. (2014). Knowledge Management Processes in International Joint Ventures: A Case of an Airport Operator Firm. *Procedia. Social and Behavioral Sciences*, 150, 658-667. <https://doi.org/10.1016/j.sbspro.2014.09.085>
25. Ringel-Bickelmaier, C., & Ringel, M. (2010). Knowledge management in international organisations. *Journal of Knowledge Management*, 14(4), 524-539. <https://doi.org/10.1108/13673271011059509>
26. Girard, J., & Girard, J. (2015). Defining knowledge management: Toward an applied compendium. *Online Journal of Applied Knowledge Management*, 3(1), 1-20. http://www.iiakm.org/ojakm/articles/2015/volume3_1/OJAKM_Volume3_1pp1-20.pdf

27. European Commission (2023). Data: EU Industrial R&D Investment Scoreboard (World 2500). An official website of the European Union. <https://iri.jrc.ec.europa.eu/data>
28. Manly, J., Apostolatos, K., Baeza, R., Krühler, M., Panandiker, R., Ringel, M., & Harnoss, J. D. (2021). Overcoming the Innovation Readiness Gap. Most Innovative Companies 2021. Boston Consulting Group. <https://www.bcg.com/publications/2021/most-innovative-companies-overview>
29. Clarivate (2022). Top 100 Global Innovators 2022. Clarivate. <https://clarivate.com/top-100-innovators/the-top-100>

Поляков М., Ханін І., Шевченко Г., Білозубенко В.

УПРАВЛІННЯ ЗНАННЯМИ В МІЖНАРОДНИХ КОМПАНІЯХ: ОСОБЛИВОСТІ ТА ІНФОРМАЦІЙНІ ІНСТРУМЕНТИ

Підвищення важливості інновацій як фактора ефективності та конкурентоспроможності компаній змушує їх звертати особливу увагу на процеси здобуття та використання знань, які потребують спеціального управління. Особливим суб'єктом управління знаннями (УЗ) є міжнародні компанії, які для експансії є інноваційно активними. У таких компаніях УЗ має суттєві особливості, пов'язані з їхньою структурою, яка об'єднує зарубіжні дочірні підприємства, і характером діяльності, яка охоплює різні національні ринки. Зважаючи на специфіку таких компаній, вони широко застосовують інформаційні технології в управлінні і зокрема використовують спеціальні інформаційні інструменти для УЗ.

Метою дослідження є характеристика особливостей УЗ в міжнародних компаніях та обґрунтування нових інформаційних інструментів для УЗ, які можна використовувати для підвищення ефективності інноваційної діяльності.

Основний акцент у роботі зроблено на особливостях УЗ в міжнародних компаніях з огляду на їхню структуру та характер діяльності, а саме: 1) особливостях, пов'язаних зі змістом УЗ з огляду на кількість дочірніх підприємств, масштаби діяльності, складність завдань тощо; виконано порівняння моделей інтерналізації та екстерналізації в отриманні компаніями нових знань; 2) особливостях, пов'язаних із внутрішнім середовищем (залученням усіх рівнів управління, багатокультурним середовищем, створенням спільнот інтенсивних знань); 3) особливостях, пов'язаних із зовнішнім середовищем, з охопленням взаємодії зі споживачами, партнерами та органами влади різних країн; 4) особливостях, пов'язаних із інноваційною діяльністю (розподілом повноважень між головною компанією та дочірніми підприємствами, координацією досліджень і розробок (ДіР), організацією інноваційних процесів). Обґрунтовано глобальний підхід міжнародних компаній до розроблення інновацій, що визначає зміст УЗ, а також необхідність створення системи УЗ, частиною якої є інформаційні інструменти. Їх удосконалення дає змогу підвищити якість УЗ та ефективність інноваційної діяльності. Із погляду УЗ в міжнародній компанії визначено призначення таких інформаційних інструментів, як: інформаційна система управління ДіР, єдина платформа управління інноваційною діяльністю, інструмент для формалізації знань, корпоративна база знань. У перспективі передбачається дослідити ефекти запропонованих інструментів, виокремити проблеми їх упровадження та експлуатації, а також комплекс заходів для подолання цих проблем.

Ключові слова: управління знаннями, міжнародна компанія, внутрішнє середовище, зовнішнє середовище, інноваційна діяльність, інформаційні інструменти, база знань

JEL Класифікація: D29, L86, M11, M21