

Current Trends in Knowledge Management: Problems and Challenges

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Abstract

Knowledge plays a key role in the development of the enterprise, providing with competitive advantages the business entity on the market of goods and services. Rational and effective knowledge management allows companies to generate intellectual capital, which is mainly represented by intangible assets (databases and software, patents and licenses, trademarks, etc.). In this article, the authors explore current trends in knowledge management in Ukraine. An assessment of investments in intangible assets of economic entities, an analysis of the amount of funding for research at enterprises, a study of the cost of innovation by economic entities. With the help of correlation-regression analysis, the dependence of costs on the rights to commercial designations, software costs and databases from the amount of investment in intangible assets was developed. Prospects for the development of knowledge management in enterprises in the future are outlined.

Keywords¹

knowledge management, intellectual capital, intangible assets, databases, software, capital investments, innovation, correlation and regression analysis

1. Introduction

In today's market economy, the presence of a strong resource base of the enterprise does not provide an adequate level of competitiveness on the market, if the available resource potential is not rationally organized and used. Globalization and global market challenges motivate businesses to constantly create new products and services, improve service, maintain existing market positions, open new market segments and ultimately make a profit. All this requires modern enterprises to move to new methods of business management, based on knowledge. For the rational and effective application of knowledge at all stages of design, production and sale of goods and services, enterprises need to develop tools and methods of knowledge management. Knowledge management in modern business conditions is the key to building the managerial potential of business entities. Knowledge management must integrate and balance the human and technological components of knowledge. The knowledge management paradigm is not new to business, it only rethinks known management technologies according to the current conditions of the market economy of economic entities.

The effective knowledge management should be one of the priorities of enterprise development, as EU integration intensifies competition and requires the search for better methods of knowledge management. The experience of the world's leading countries shows that foreign businesses pay considerable attention to the processes of knowledge generation, updating and rational management of knowledge in the process of production and commercial activities. In Ukraine, similar processes are proceeding too slow: oftentimes domestic enterprises will not be able to compete with foreign

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competitors due to outdated knowledge, which is reflected in uncompetitive goods and services in the market.

Knowledge for the enterprise is the force that supports the efficiency of the business entity and is manifested in the most rational use of production factors: land, labor, capital and information. Knowledge management is a component of the intellectual capital of the enterprise and is reflected in intangible assets (databases and software, patents, licenses, copyrights), business reputation and brand, know-how, methods and techniques of production and more. In modern business conditions, the success is achieved by those businesses that pay significant attention to education and science, innovation, fundamental and applied research.

The aim of the article is to study current trends in knowledge management of business entities in Ukraine: features of development, problems and challenges.

2. Related Works

Knowledge for the company is a combination of experience, values of the organization, contextual information, assessments, which form a common framework to adapt new experiences and information. That is, knowledge acts as a product of the enterprise, as subject of final consumption as a productive resource, as a means of transactions and profit hoarding. Necessity knowledge management arose in enterprises as available the need to transform knowledge into an asset that can enhance the level of competitive advantage of any organization.

The huge potential of human capital and intellectual assets in shaping and maintaining the long-term success of any enterprise has formed a fairly new direction of research in economics and management, which attracts the attention of many scientists around the world. The problem of knowledge generation and management has been studied by both foreign and domestic scientists.

Knowledge management in the context of decision making and organizational performance is considered Abubakar A. M., Elrehail H., Alatailat M.A., Elci, A. [1]. Researchers [Ode E., Ayavoo R.] explore the mediating role of knowledge application in the relationship between knowledge management practices and firm innovation [2]. Supply chain issues in knowledge management are being investigated Schniederjans D.G., Curado C., Khalajhedayati, M. [3].

Ukrainian scientists are studying the problem of knowledge management at enterprises. Researchers Smolinska N.V. and Hrybyk I.I. consider knowledge management as one of the tools to ensure the innovative development of the enterprise. The authors consider the problems facing knowledge managers in organizations [4]. Rudenko M. and Kryvoruchko V. considers knowledge management as a competitive advantage of the enterprise. The authors believe that the operation of enterprises in the face of intensified competition in domestic and foreign markets is accompanied by the need for continuous knowledge management, which will enhance competitive advantage and transform the enterprise into a self-organized system [5].

Tokmakova I.V., Voytov I.M., Didenko Y.V. considers the stages of development of knowledge management technologies at the enterprise [6]. Illiashenko S.M., Shipulina Yu.S., Illiashenko N.S., Komarnicka G.A. considers knowledge management in the system of innovative development of the enterprise and investigates the management of the choice of promising areas of knowledge use in the organization [7,8].

Knowledge management is an important component of intellectual capital. The importance of the concept of intellectual capital in the age of knowledge becomes the new core of economic progress, since the influence of fixed assets and financial assets is reduced in comparison to the influence of intangible assets. An increasing number of specialists support the argument that intellectual capital is an essential element in achieving performance in an organization. Currently, a process to change the composition of capital is undergoing in order to develop a significant share of intangible assets that have priority. Therefore, these assets are intangible (the ability to use information, organizational culture) [9]. Knowledge management is used in the introduction of ergonomics in the activities of economic entities [10].

The process of knowledge management in companies requires a detailed analysis of many factors and the use of modeling methods. Studying knowledge tools study requires the definition of related

concepts such as data, information, knowledge, and knowledge management. Data is a set of signs and alphanumeric characters. Information results from applying an interpretation model to data. Therefore the same data may be associated with many kinds of information depending on the interpretation model used. Data may be considered as raw intangible material which convey little unless transformed into information. Information with context and experiences is called knowledge [11,12].

The knowledge management system plays an important role in service companies that provide services and perform work, form intangible assets of these companies to service companies [13, 14]. Knowledge management is one of the tools of the life cycle of new products and services [15]. Knowledge management is one of the factors shaping a company's value [16]. Knowledge management practices are also present in research universities Dei D. J., van der Walt, T. B. [17].

The organizational structure of the company, levels of management and communication between employees play an important role in the formation and accumulation of knowledge in the company [18]. A large number of factors influence the process of knowledge management, which requires their consideration when planning the activities of organizations [19, 21, 22]. When making management decisions, those companies are effective that use effective models of knowledge management [20].

The development of knowledge is closely linked to the higher education system, which allows to intensify entrepreneurial activity [23]. Knowledge management is closely linked to innovation and innovation activities studied by scientists Halkiv, L., Karyy, O., Kulyniak, I., Ohinok, S [24, 25].

Despite the multifaceted and multifaceted nature of knowledge management, the aim of the study is to study the current trend in the activities of Ukrainian businesses. This requires the identification of features and trends, problems and prospects for the development of knowledge management in enterprises.

3. Methods

The authors used a set of scientific methods, in particular: content analysis - to justify the feasibility of studying knowledge in the context of their management system; dynamics modeling - to build trends in the volume of publications arrays on the subject; comprehensive evaluation - to summarize the results of the analysis of the indicators system; correlation-regression analysis - to assess the dependence of some indicators from others that characterize the object of study; tabular and graphical methods - compact presentation and visualization of data. Knowledge management is closely linked to innovation and innovation activity.

4. Results and Discussion

Today, the focus on knowledge has become the highest priority in almost all areas of human activity, especially in today's business environment. This is due to the trend of advancing technological means in relation to their theoretical justification. This state is inherent in the field of intelligent systems, based on the paradigm of knowledge processing (expert systems, linguistic and cognitive processors of self-learning systems, etc.).

The knowledge system is determined by the attributes of knowledge, methods and relationships between knowledge. Elements of knowledge management: people (establishing contacts and interactions between people with knowledge); processes (knowledge sharing procedures, mechanisms for motivating and involving individuals in the exchange of knowledge); technologies (development of technological infrastructure for the preservation of experience and for communications) [9, 10].

Formed and active management system knowledge in enterprises and corporations is one of important tools in the fight against competitors. The highest benefits of knowledge management are achieved in the following areas: business planning, customer service, training and promotion staff qualifications, implementation cooperation enterprise projects, etc.

Modern business conditions of domestic enterprises are characterized by a number of problems and obstacles that do not allow enterprises to effectively manage their knowledge. Such barriers include: lack of experience in innovation by business entities, lack of funds for research, imperfect

legislation and accounting standards. There is no legal term "intellectual capital" in Ukrainian law, which makes it difficult for managers and analysts to measure the value of knowledge, the value of intellectual capital. Part of the knowledge of business entities is represented by intangible assets.

To study the trend of knowledge management in Ukraine, we use the data of the State Statistics Committee, which gives a partial picture of this situation. An important place in the development of knowledge management is the investment of funds in the development of enterprises, which is carried out in both tangible and intangible assets. The volume of capital investments in the activities of Ukrainian enterprises for the period 2015-2020 is studied, which is shown below in Table 1.

Table 1
Capital investments in intangible assets, 2015-2020

Indicators	Value, years					
	2015	2016	2017	2018	2019	2020
Total capital investments, UAH, million	273116,4	359216,1	448461,5	578726,4	623978,9	508217,0
Investments in intangible assets, UAH, million	18385,5	11825,6	16422,0	36391,3	23410,8	24893,0
The commercial designations rights, objects of industrial property, copyrights and relate drights, patents, licenses, concessionsetc, UAH, million	12653,9	4435,8	6228,1	24381,6	8389,5	8389,1
Software and data bases, UAH, million	4908,4	6315,5	8196,4	9476,4	10215,3	12411,1

Source: data of the State Statistics Service of Ukraine [26]

As can be seen from Table 1, the total capital investment (acquisition or production by own use for own use of tangible and intangible assets) increased significantly during the analyzed period. There is a dynamics of growth of total capital investments from 2015 to 2019, while in 2020 they decreased. Capital investments in 2015 amounted to UAH 273116.4 million, in 2016 they increased to UAH 359216.1 million. The volume of capital investments in 2017 amounted to UAH 448416.5 million, in 2018 - UAH 578726.4 million, in 2019 - 623978.9 million. In 2020, the total volume of capital investments was less than in the previous year -UAH 508217.0 million.

The capital investments in intangible assets is primary interest of our study, which partially reflect the investment of funds in intellectual capital and knowledge of the enterprise. It can be seen that the amount of investment in intangible assets of economic entities in different years was different. The capital investments in intangible assets of enterprises by years were as follows: in 2015 - UAH 18385.5 million, in 2016 - UAH 11825.6 million, in 2017 - UAH 16422.0 million, in 2018- UAH 36391.3 million, in 2019 - UAH 23410.8 million, in 2020 - UAH 24893.0 million.

The investments in intangible assets made by enterprises were divided into two large groups: 1) rights to commercial designation, industrial property and related rights, patents, licenses, concessions, etc.; 2) software and databases. Regarding the first group of investments in intangible assets, the volumes of investments by economic entities were different during different periods. In 2015, investments in intellectual property rights and objects amounted to UAH 12653.9 million, in 2016 these investments decreased to UAH 4435.8 million. In 2017, the investments in intellectual property rights and objects increased to UAH 6228.1 million, in 2018 the volume of investments increased sharply to UAH 24381.6 million. During 2019-2020, the volume of investments decreased and was at the same level: UAH 8389.5 million, respectively. and UAH 8389.1 million.

Regarding the second group of investments in intangible assets (software and databases), there is a trend of annual growth, which may indicate the interest of businesses in investing in this type of intellectual capital in order to accumulate and develop knowledge of enterprises. In 2015, the volume

of investments amounted to UAH 4908.4 million, in 2016 - UAH 6315.5 million, in 2017 - UAH 8196.4 million, in 2018 - UAH 9476.4 million. in 2020 UAH 12411.1 million.

The dependence of costs on rights to commercial designations, industrial property, copyright and related rights, patents, licenses, concessions, etc. and software and database costs from the amount of investment in intangible assets is modelled as a polynomial on the independent variable degree 2 in the first case (Fig. 1) and degree 4 in the second case (Fig. 2), respectively, in the presence of a strong ($R^2 = 0.8415$) and very strong ($R^2 = 0.9263$) relationship.

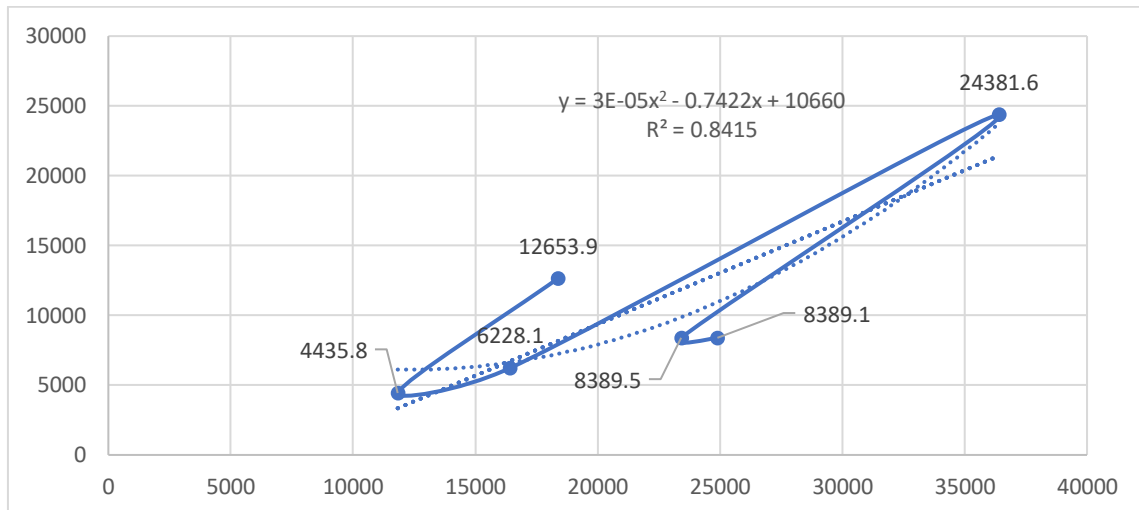


Figure 1: The model of the dependence of costs on the rights to commercial designations, etc. and the amount of investment in intangible assets

Source: calculated by the authors

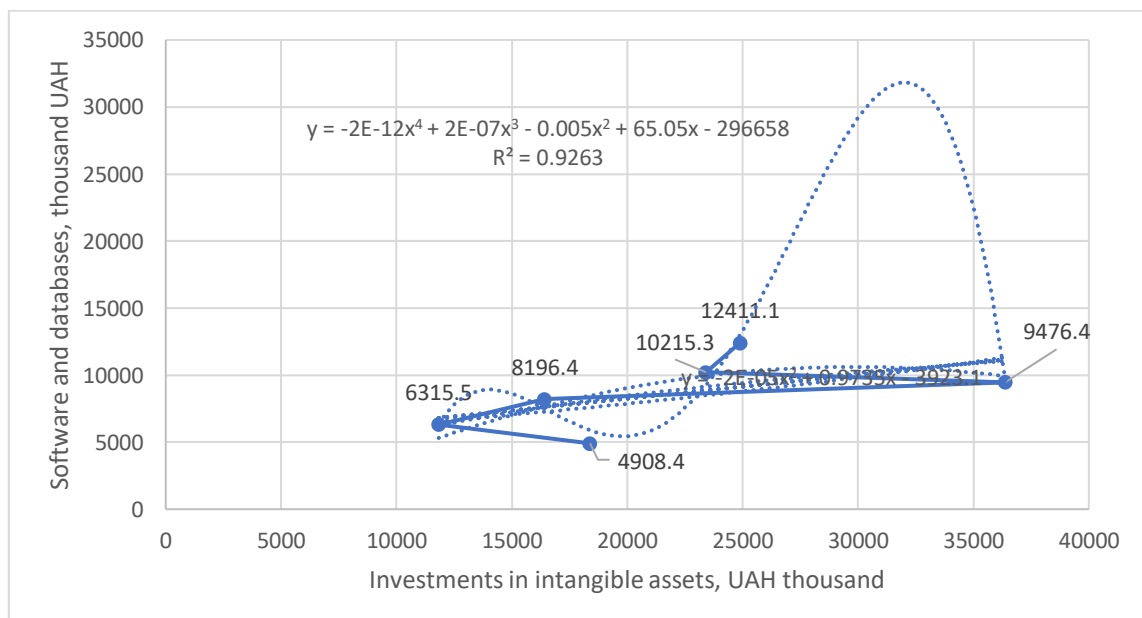


Figure 2: Polynomial regression model

Source: calculated by the authors

Let's examine the costs of research and development by type of work for 2015-2020, as shown in Table 2. The intensity of research and development for businesses is evidence of development and

accumulation of knowledge, generating new ideas, creating new products, increasing market value of companies, development of intellectual capital of enterprises.

Table 2

Expenditures for research and development by type of work for 2015-2020

Indicators	Value, years					
	2015	2016	2017	2018	2019	2020
Expenditures for research and development - total, UAH million, incl.	11003,6	11530,7	13379,3	16773,7	17254,6	17022,4
- fundamental research, UAH million	2460,2	2225,7	2924,5	3756,5	3740,4	4259,0
- applied research, UAH, million	1960,6	2561,2	3163,2	3568,3	3635,7	3971,4

Source: data of the State Statistics Service of Ukraine [26]

As can be seen from Table 2, the total cost of research and development carried out by Ukrainian businesses increased annually during the period 2015-2020. In 2015, enterprises spent UAH 11003.6 million, in 2016 - UAH 11530.7 million, in 2017 the expenses amounted to UAH 13379 million. Expenditures on research and development in 2018 increased to UAH 16773.7 million, in 2019 increased to UAH 17254.6 million, and in 2020 amounted to UAH 17022.4 million. Regarding basic research, during the study period the costs of their implementation increased: in 2015 - 2460.2 million UAH, in 2016 - 2225.7 million UAH, in 2017 - 2924.5 million UAH. , in 2018 - UAH 3756.5 million, in 2019 - UAH 3740.4 million in 2020 - UAH 4259.0 million.

Regarding applied research, during the study period the costs of their implementation increased: in 2015 - 1960.6 million UAH, in 2016 - 2561.2 million UAH, in 2017 - 3163.2 million UAH., in 2018 - UAH 3568.3 million, in 2019 - UAH 3635.7 million in 2020 - UAH 3971.4 million. The dependence of the costs of fundamental research from the cost of research and development is correlated with a linear relationship in the presence of very strong correlation ($R^2 = 0.9227$), (Fig. 3).

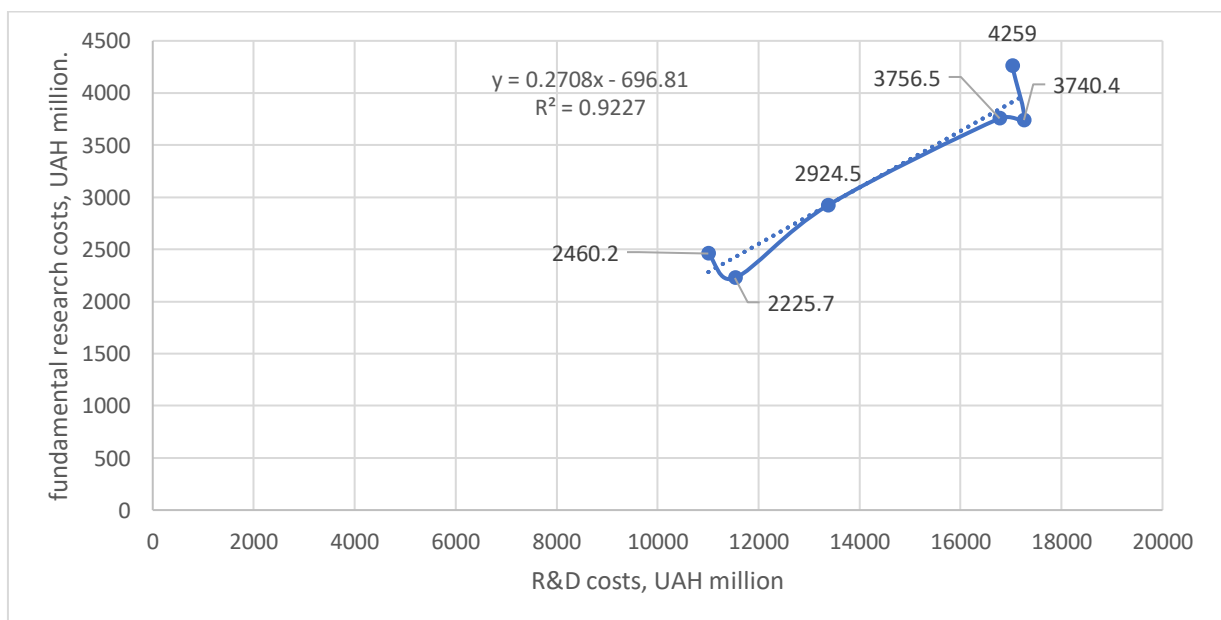


Figure 3: Correlation of costs for fundamental research and costs for research and development

Source: calculated by the authors

The relationship between the cost of applied research and the cost of research and development is also linear in the presence of strong correlation ($R^2 = 0.8915$) (Fig. 4).

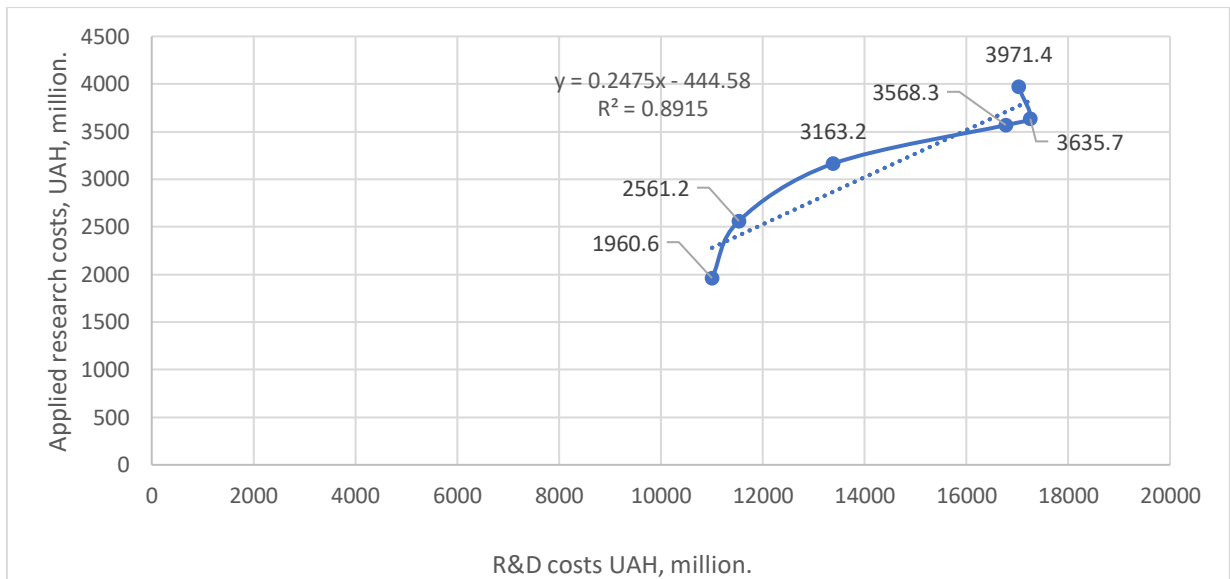


Figure 4: Correlation of costs for applied research and costs for research and development
Source: calculated by the authors

Let's examine the costs of innovation for period 2015-2020, as shown in Table 3. The intensity of research and development for businesses is evidence of development and accumulation of knowledge, generating new ideas, creating new products, increasing market value of companies, intellectual capital development.

Table 3
Expenditure on innovation of industrial enterprises for 2015-2020

Indicators	Value, years					
	2015	2016	2017	2018	2019	2020
Expenditures on innovations, UAH million, incl.	131813,7	23229,5	9117,5	12180,1	14220,9	144069
- R&D, UAH million	2039,5	2457,8	2169,8	3208,8	2918,9	3486,3
- other expenditures on innovations, UAH million	11774,2	20771,7	6947,7	8971,3	11302,0	10920,6

Source: data of the State Statistics Committee of Ukraine [26]

As can be seen from Table 3, the costs of innovation of economic entities in Ukraine for the period 2015-2020 were different. In 2015, enterprises spent UAH 131813.7 million on innovations, in 2016 expenditures rose sharply to UAH 23229.5 million, in 2017 they fell sharply to UAH 9117.5 thousand. During 2018-2020, the costs of innovations implemented by business entities increased: UAH 12180.1 million. in 2018, UAH 14220.9 million. in 2019 and UAH 144069 million. in 2020. As for the costs of innovation, these funds were mainly spent on research and development and other types of costs.

As for research and development expenditures, they increased during the analyzed period, which indicates the interest of business entities in conducting research, implementing knowledge in the design and development of new products and services, technologies and equipment, etc. In 2015, the company spent UAH 2039.5 million on research and development, in 2016 - UAH 2457.8 million, in 2017 - UAH 2169.8 million. Significant increase in expenditures on research and development took place in 2018 - UAH 3208.8 million, in 2019 UAH 2918.9 million was spent, in 2020 - UAH 3486.3 million.

A significant share of the cost on innovation were other costs, which indicates that businesses focus on the purchase of ready-made innovative solutions - machinery and technology, new methods of production and economic activities, and so on. The volume of other expenditures on innovation in 2015 amounted to UAH 11771.2 million, in 2016 the volume of other expenditures on innovation

increased to UAH 20771.7 million, in 2017 the volume of other expenditures decreased to UAH 6947.7 million. In 2018, other expenditures on innovations amounted to UAH 8971.3 million, in 2019 other expenditures on innovations increased to UAH 11302.0 million, and in 2020 other expenditures on innovations decreased to UAH 10920.6 million.

In terms of indicators and costs on innovation, it can be concluded that Ukrainian enterprises and economic entities focus on other costs of innovation than on research and development. This can be justified by the fact that Ukrainian businesses are actively incurring costs for innovation, which includes all the actual costs in cash associated with the implementation of various types of innovation activities. Other costs of innovation are costs directly related to the implementation of the innovation project, which includes all material costs, costs of wages and accruals, depreciation and other costs. In terms of research and development costs, businesses spend significantly less money, which may indicate the impossibility of conducting research.

The dependence of research and development costs and innovation costs is modelled as a polynomial on the independent variable of degree 4 (Fig. 5) in the presence of very strong relationship ($R^2 = 0.9999$).

Thus, it can be concluded that Ukrainian business entities are actively investing in intangible assets, in turn developing and accumulating knowledge of the enterprise. During 2015-2020, the companies actively invested in software and database development, as well as in the rights to commercial designations, industrial property. Regarding the costs of research and development, companies have increased funding for fundamental and applied research in recent years. Ukrainian business entities have also increased spending on innovation, which can be the evidence of a high interest in the development and accumulation of knowledge, a desire to translate existing knowledge into goods and services. In the future, Ukrainian enterprises will increase investment in the development of new knowledge and their management, the creation of innovative goods and services. This requires state support for the development of knowledge management of business entities through changes in domestic legislation and accounting.

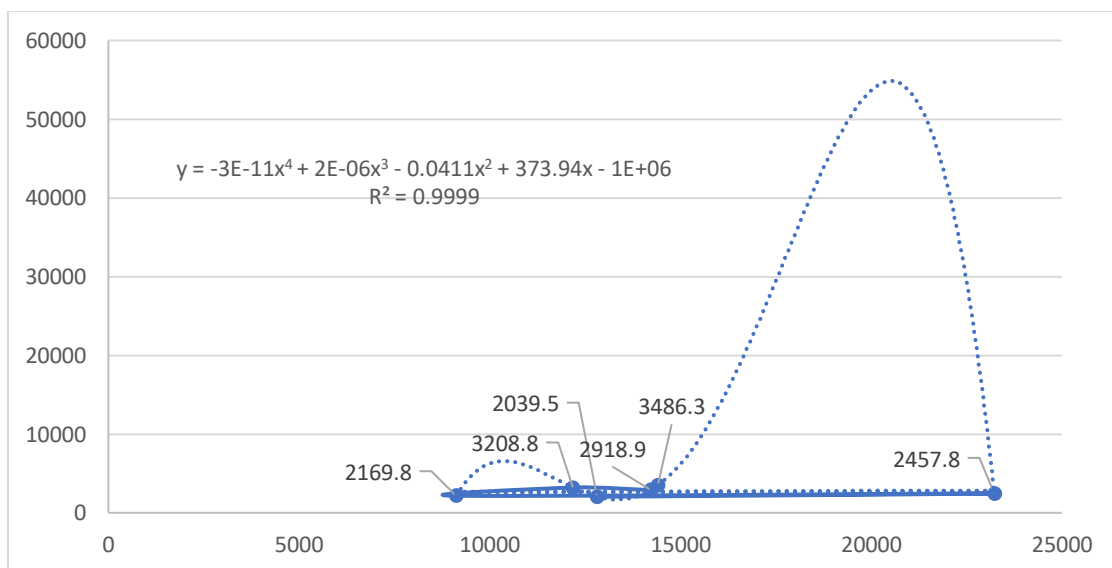


Figure 5: The polynomial regression model of the dependence of research and development costs and innovation costs

Source: calculated by the authors

The results of the study show that Ukrainian companies are interested in the process of knowledge management in the organization. To do this, companies invest in databases and knowledge, software, intangible assets and more. Business entities in Ukraine are actively engaged in innovation activities and innovate in production processes, conduct basic and applied research. During the period 2015-2020, Ukrainian businesses actively invested in intangible assets (mainly software and databases), financed innovation activities in enterprises. Annually, the amount of funding for the creation of new

knowledge in Ukraine has been growing. The problem remains in the accounting of the state of calculation of the components of intellectual capital, which does not allow to more effectively investigate the effectiveness of knowledge management in enterprises.

Effective functioning of enterprises in the conditions of intensification of competition in the domestic and foreign markets are accompanied by necessity continuous knowledge management, which will allow provide a competitive advantage and transform the company into a self-organizing system. Knowledge management the company acts as a kind of regulator, which helps both the employee and the organization as a whole fight for new experiences, get rich intellectually and interact effectively.

5. Conclusions

The effective functioning of enterprises in the conditions of competition on domestic and foreign markets is accompanied by the need for continuous knowledge management, permanent investment in intangible assets, fundamental and applied research. Difficulties in knowledge management for domestic businesses are lack of experience in this area, lack of qualified managers, insufficient funding for innovation processes. Domestic legislation and accounting standards do not provide a clear definition of the components of intellectual capital, such as knowledge, brand, reputation. This leads to the fact that it is impossible for the company to determine the value of knowledge on intellectual capital.

For domestic enterprises it is necessary to develop methods and processes of knowledge management, to adopt the experience and methods of knowledge management of American and European companies. Of great importance is the training of managers and professionals who generate and create new knowledge. The state needs to expand accounting standards to take into account the market value of knowledge and other components of intellectual capital, and not be limited to intangible assets such as knowledge bases, software. This will help domestic enterprises to be more active in investing in knowledge development, creating new products and services, products, opening new market niches.

This will allow domestic companies to expand their competitive advantages and increase their intellectual capital. Enterprise knowledge management will allow employees and the organization as a whole to learn new experiences, acquire new skills and abilities, intellectually enrich and interact effectively. Further research will focus on developing recommendations and tools for more effective knowledge management in enterprises, using foreign experience in the practice of domestic businesses, adapting the knowledge management system to specific conditions of the enterprise, development of intangible assets (databases and software, patents and licenses, copyrights, etc.).

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