

Common to all commercial enterprises is the problem of violating the basics of the formation of intellectual activity. The same problem of enterprises' intellectual activities is quite relevant from a practical point of view. One of the useful tools, the use of which makes it possible to translate the issues of intellectual activities, is the formation of a business model. In the process of the study reported here, a meaningful part of the intellectual business model of an enterprise was proposed and the corresponding concept was introduced. The main groups of indicators for assessing the level of intellectual activities of the business model of an enterprise were combined into the following clusters: qualifications (Q), skills (S), possibilities (V). The level of an enterprise's intellectual activities was assessed using an empirical and graphical method since the selected assessment indicators in their content can only accept point scores. The proposed methodology for forming a radar system to determine the format of business models for intellectual activity of trading enterprises is based on the definition of clusters of indicators to assess the level of an enterprise's intellectual activities using an integral indicator. According to the radar system, the formats of enterprises' intellectual activities have been determined: innovative, integrated, rational, content-oriented, conducting. It was investigated that the potential for increasing the level of intellectual activity of the integrated format of the business model of an enterprise is about 14 %. The conclusion about the level of the enterprise's intellectual activities is made on the basis of determining the scale of values of expert assessments. Validation of the assessment of the level of intellectual activity of an enterprise was carried out separately for each format for all proposed clusters of assessment indicators. Based on the results of testing, recommendations have been compiled for choosing the format of a business model for the studied enterprises

Keywords: *employee self-development, intelligent products, radar system, performance evaluation, intelligent capital, business model, cluster*

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DEVELOPMENT OF FORMATS FOR THE IMPLEMENTATION OF THE INTELLIGENT BUSINESS MODEL OF TRADE ENTERPRISES

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1. Introduction

Insufficient innovative development and unformed innovative potential at commercial enterprises and, accordingly, in the field of trade, indicate a slowdown in their development. Common to all trading enterprises is the problem of violation of the basics of the formation of intellectual activities [1]. To obtain the desired result, the management of enterprises should motivate personnel to form and realize the potential of the enterprise based on intellectual activities as the basis for enabling the continuous development of the enterprise [2].

The problems of enterprises' intellectual activity attract the attention of many economists, which for modern enter-

prises is a rather relevant practical task and is confirmed not only by theory but also by the reality of today [3]. One of the useful tools, the use of which makes it possible to translate the problems of intellectual activities from the theoretical area to the field of practical application for the purpose of increasing competitiveness and development of commercial enterprises, is the formation of a business model. The business model describes the processes of exchanging value, value between different participants in the business process. In general, the business model turns innovation into economic value for the consumer and the enterprise, describing in detail the way of making money through a clear definition of the place of innovation in the value chain [4]. The most pop-

ular approaches to interpretations of the concept of “business model” are [5]:

- value approach: the proposals of enterprises to offer products, services, or technologies are based on the business model of the enterprise;
- combined approach: a business model is a way that allows enterprises to gain competitive advantages and achieve their goals;
- cost approach: a business model is a description of the elements by which an enterprise earns money by carrying out its business.

The complexity of the tasks of managing the intellectual activities at enterprises and improving the business model is determined by the difficulties of assessing the level of intelligent possibilities and potential, which is characterized by many quantitative and qualitative indicators [6]. Therefore, it is necessary to take into consideration the complex nature, variety of configurations, and format of the business model of the enterprise, financial and technical possibilities, as well as information support of business organization processes.

Therefore, research on the development of a radar system for determining the formats of the intellectual business model of commercial enterprises is relevant.

2. Literature review and problem statement

The concept of “business model” of an enterprise is one of the least unambiguous and structured terms in the modern scientific literature. In [7], it is noted that “a business model is an idea of how an organization makes (or intends to make) money. The business model describes the value that an organization offers to different clients, reflects the organization’s ability, the list of partners needed to create, promote, and deliver this value to customers, the capital relationships necessary to generate sustainable revenue streams.” However, the issue of attracting investment resources remained unexplored, which could ensure the expansion of the enterprise’s activities based on various types of innovations.

The business model presented in work [8] consists of a set of products, services, and flows of information, as well as a description of various participants in the business process, their role in the value chain, various benefits with decoding the sources of income. However, approaches to the formation of a methodological platform for managing the intellectual activity of enterprises have not been investigated. According to work [9], to understand the business mission of a company, a marketing model is added that combines business models and marketing strategies of the desired business representative. Nevertheless, the question of assessing the components of the intellectual activity of enterprises remains unresolved. The lack of investigation of the integral indicator of intellectual activity has hindered the solution to this problem.

In [10], one can note several important additions to the definition of the term “business model”:

- the term “business model” is often misunderstood and mixed with the term “business process model”;
- they try to describe the business model using modeling languages: UML (Unified Modeling Language), EPC (Event-Driven Process Chain), Petri nets.

According to work [11], the business model is a conceptual description that explains the principles of an enterprise. According to study [12], the business model explains how business links are combined with each other and integrated

into a single structure. However, due to the unformed model of the mechanism for integrating the components of enterprise management systems, the author failed to form a mechanism for the development of intellectual activity as an objective function of enterprise personnel management. In [13], researchers argue that any business model should answer three key questions:

- how the company creates value for external customers;
- how the company plans to make a profit;
- how the company provides strategic control over value chains.

However, due to the lack of a unified methodology for the formation of components of intellectual activity within a business model of an enterprise, there is a low return on significant costs invested in the development and accumulation of intelligent capital. Based on this, the problem of determining the formats of the intellectual business model of enterprises remains unresolved. That is why there is a need to develop a scientifically based approach to increasing the level of intellectual activity of the business models used.

3. The aim and objectives of the study

The aim of this work is to develop formats for the intellectual business model of enterprises. This will make it possible to propose a methodology for forming a radar system to determine the formats of the intellectual business model of commercial enterprises.

To accomplish the aim, the following tasks have been set:

- to construct formulas for calculating the level of intellectual activity of the business model of an enterprise;
- to develop a graphical method for representing the results of assessing the level of intellectual activity of an enterprise.

4. The study materials and methods

The object of this study is the process of intellectual activity of the business model of commercial enterprises under the conditions of development of an intelligently knowledgeable economy.

Research hypothesis assumes that the primary source of development of trading enterprises are intelligent resources that are concentrated in clusters of qualifications, skills, possibilities, while the development of the process of intellectual activities of trading enterprises depends on the participation of personnel.

The study used methods of structural and logical analysis, statistical, empirical, graphic, and systemic.

The essence of the concept of “business model” of an enterprise is revealed through structural and logical analysis. Using the methods of mathematical statistics, the formats of business models of enterprises were investigated in accordance with the levels of intellectual activity of their operations. The statistical method determined an acceptable level of intellectual activity at the expense of all groups of clusters. The system method was used to calculate the radar areas of the intellectual level and integral intellectual indicators for each format of the enterprise business model. We determined the level of an enterprise’s intellectual activities using the empirical method since the selected assessment indicators in their content can only accept point scores. To present the results of assessing the level of intellectual activity of an enter-

prise, a graphical method of constructing the so-called “radar” was used. The basis of this graphical method is the calculation of the relative area of the polygon located inside the estimated circle, according to the integral indicator.

5. Results of studying the implementation of the intelligent business model of an enterprise

5.1. Features of calculating the level of intellectual activity of the business model of an enterprise

The main groups of indicators for assessing the level of intellectual activity of the business model of an enterprise were combined into the following clusters: qualifications (Q), skills (S), possibilities (V). This is due to the fact that the basis for the effective use of this set of elements of intellectual activity is the understanding and participation of personnel in the formation of the process of intellectual activities that characterize the position of an enterprise in the market and its relations with customers (Fig. 1). The level of intelligent business model of an enterprise for each cluster of assessment indicators is proposed to be calculated using the formula:

$$RI_{K,Z,S,V,RA,IA} = \sum_{i=1}^n \varphi_i \times \frac{\partial_i}{\sum_{i=1}^n \partial_i}, \tag{1}$$

where RI is the level of intellectual activity of an enterprise; K, Z, S, V, RA, IA – indices corresponding to clusters of qualifications, skills, and possibilities for forming a business model; φ_i is the expert assessment of the i -th indicator of assessing the level of intellectual activity of the enterprise’s operations for each cluster, in points (from 0.1–10); ∂_i is the importance of the i -th indicator of assessing the level of intellectual activity of the enterprise’s activities by clusters, in points (from 0.1–10); n is the number of indicators for assessing the level of intellectual activity of the enterprise’s operations for each cluster.

To form directions for increasing the level of intellectual activity of the enterprise, it is advisable to determine the potential for increasing this level for each cluster of assessment indicators according to the following formula:

$$P_{QSV}^{RI} = \left(100 - \frac{RI_{QSV}}{RI_I}\right) \times 100\%, \tag{2}$$

where P is the potential to increase the level of intellectual activity of the enterprise; RI – an index that corresponds to the level of intellectual activity of the enterprise; QSV – an index corresponding to clusters of competencies, knowledge, skills, opportunities, market, and infrastructure assets; RI_j is the ideal level of intellectual activity of the enterprise, which is equal to 10 points.

The next stage in assessing the intellectual activity of the enterprise for the formation of a business model is to determine its general level according to the formula:

$$RI = \sum_{j=1}^m RI_j \times \frac{\partial_j^{RI}}{\sum_{j=1}^m \partial_j^{RI}}, \tag{3}$$

where RI is the general level of intellectual activity of the enterprise; RI_j is the expert assessment of the j -th level of intellectual activity of the enterprise’s operations by clusters, in points (from 0.1–10); ∂_j^{RI} – the importance of the j -th level of intellectual activity of the enterprise’s activities by clusters, in points (from 0.1–10); m – the number of clusters of indicators for assessing the level of intellectual activity of the enterprise.

The potential for increasing the general level of intellectual activity of the enterprise is calculated by the formula:

$$P^{RI} = \left(100 - \frac{RI}{RI_I}\right) \times 100\%, \tag{4}$$

where P^{RI} is the potential to increase the overall level of intellectual activity of the enterprise.

The conclusion about the level of intellectual activity of the enterprise can be drawn based on determining the scale of values of expert assessments, proposed based on a generalization of the practice of constructing such scales in the economic literature [4, 12]: $9.1 \leq RI \leq 10.0$ – high; $7.1 \leq RI \leq 9.0$ – acceptable; $5.1 \leq RI \leq 7.0$ – sufficient; $3.1 \leq RI \leq 5.0$ – low; $0.1 \leq RI \leq 3.0$ – critical.

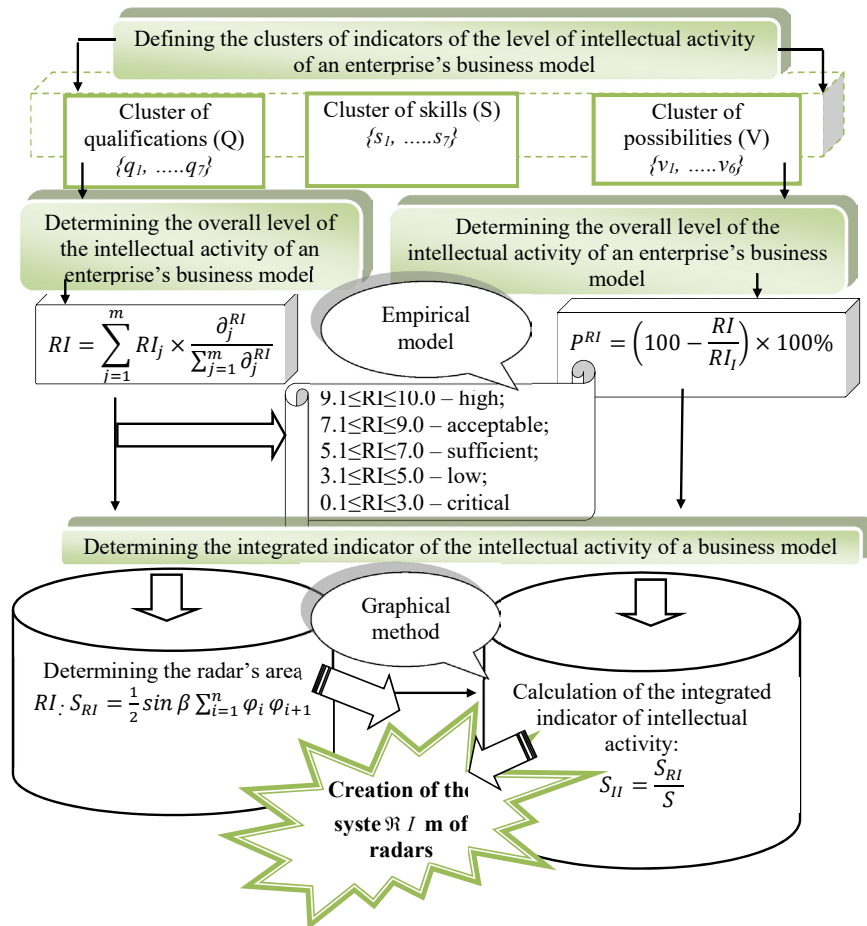


Fig. 1. The sequence of formation of a radar system for determining the formats of business models of intellectual activity of trading enterprises

5. 2. Assessment of the level of intellectual activity of an enterprise

The basis of the graphical method of constructing the “radar” is the calculation of the relative area of the polygon located inside the estimated circle, according to the integral indicator:

$$S_{II} = \frac{S_{RI}}{S}, \tag{5}$$

where S_{II} is an integral indicator of the intellectual activity of the enterprise; S_{RI} is the radar area of the general level of intellectual activity of the enterprise; S – the total area of the circle (polygon).

The numerator and denominator of the integral indicator of intellectual activity of the enterprise is determined as follows:

$$S_{RI} = \frac{1}{2} \sin \beta \sum_{i=1}^n \varphi_i \varphi_{i+1}, \tag{6}$$

where φ_i, φ_{i+1} is the length of two adjacent assessment lines (the value of expert assessments $i - x$ indicators for assessing the level of intellectual activity of the enterprise’s operations by clusters); β – the angle between two adjacent estimated lines; n – the number of indicators for assessing the level of intellectual activity of the enterprise’s operations for all clusters.

$$S = \pi R^2, \tag{7}$$

where R is the radius of the estimated circle (polygon).

Table 1 demonstrates that the integrated format of the business model of the enterprise is characterized by an acceptable level of intellectual activity at the expense of all groups of clusters. The greatest positive impact on the formation of an acceptable level of intellectual activity of the business model of these formats is exerted by such clusters of assessment indicators as clusters of qualifications and opportunities. The potential to increase the level of intellectual activity of the integrated format of the business model of an enterprise is about 14 %, which should be aimed at the development of other clusters of assessment indicators.

The results of calculating the radar areas of the intellectual level and integral intelligent indicators for each format of the enterprise’s business model are given in Table 2.

The construction of radars of the levels of intellectual activity of the enterprise’s operations by format is shown in Fig. 2.

Thus, the defined indicators of intellectual activity of business models of an enterprise according to different formats indicate that the larger the radar area, the closer the integral indicator of intellectual activity to unity, and the higher its level.

Table 1

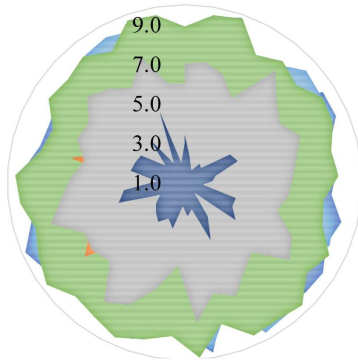
Formats of business models of enterprises in accordance with the levels of intellectual activity of their operations

The format of the enterprise’s business model	Cluster of qualifications (Q)		Cluster of skills (S)		Cluster of possibilities (V)		Integral level of intellectualization of the business model		Conclusion on the integral level of intellectualization of activity	Enterprise
	RI_K , point	P_K^{RI} , %	RI_S , point	P_S^{RI} , %	RI_V , point	P_V^{RI} , %	RI , point	P^{RI} , %		
Integrated	8.46	15.43	8.87	11.29	8.29	17.09	8.54	14.59	acceptable	Enterprises LLC “Dzerkalny”
Content-oriented	4.55	54.53	4.23	57.70	5.88	41.18	5.03	49.69	low	“Epicenter K” hypermarkets
Rational	7.08	29.24	6.96	30.38	7.03	29.66	6.95	30.52	sufficient	“Schyriy Kum” LLC supermarkets; “Silpo”
Conducting	2.52	74.79	3.03	69.67	2.99	70.05	3.04	69.64	critical	Enterprises LLC “Wine of the World”; Polymax Donbas LLC; TM “Etalon-Family”
Innovative	9.07	9.28	9.24	7.57	9.33	6.73	9.07	9.26	high	“ATB-market” LLC supermarkets

Table 2

Integral indicators of intellectual activity of an enterprise in various formats

Indicators	Conditional designation	Business model formats of the enterprise				
		Integrated (F^{Iten})	Content-oriented (F^{Co})	Rational (F^R)	Conducting (F^D)	Innovative (F^{Im})
The integral level of the intellectualization business model	RI	8.54	5.03	6.95	3.04	9.07
		acceptable	low	sufficient	critical	high
Radar area of the intellectualization business model level	S_{RI}	248.9	81.1	154.8	27.3	286.2
Total area of the circle	S	314	314	314	314	314
An integral indicator of the intellectualization business model	S_{II}	0.793	0.258	0.493	0.087	0.912



- Radar of the integrated format of the business model of an enterprise
- Radar of the innovative format of the business model of an enterprise
- Radar of the content-oriented format of the business model of an enterprise
- Radar of the rational format of the business model of an enterprise
- Radar of the conducting format of the business model of an enterprise

Fig. 2. Radar for determining the formats of business models of intellectual activity of trading enterprises

6. Discussion of results of studying the implementation of the intelligent business model of an enterprise

The results of the literature review [13–18] show that the intellectual activities under modern business conditions determine the competitiveness of existing business models of enterprises and are a key resource for their development. Awareness of the level of intellectual activity of the enterprise is of great importance in the justification and implementation of strategic development directions [16, 19–22].

The specified indicators (Fig. 1) indicate that the higher the level of intellectual activity of the enterprise’s operations according to the formats of business models, the larger the area occupied by the radar of the intellectual level, and therefore the integral indicator of intellectual activity is closer to unity. The radar area of the ideal level of intellectual activity of the enterprise is approximately equal to the area of the circle. The general scheme for assessing the level of intellectual activity of the business model of an enterprise based on the considered clusters of indicators is shown in Fig. 2.

A high level of intellectual activity is inherent only in the innovative format of the business model due to the constant development of all indicators of business intellectual activities. The potential to increase the level of intellectual activity of this format of the business model is the smallest and can be used to maintain the existing basis of intellectual activity, as well as to introduce new directions for its improvement. The content-oriented format of the business model of the enterprise is characterized by a low level of intellectual activity, which is due in most cases to the insufficient development of competencies, skills, and infrastructure assets of the enterprise. Such a format of the business model of the enterprise as “conducting” has a critical level of intellectual activity, primarily due to the very specificity of the activities of these enterprises, in which almost all components of business intellectual activity practically do not develop. The rational format of the business model of the enterprise is characterized by a sufficient level of

intellectual activity for all clusters of assessment indicators. The potential for increasing the level of intellectual activity for these formats of the business model of the enterprise is the highest and ranges from 30 to 50 %, which indicates the need to introduce an appropriate program.

The advantages of this study in comparison with similar known ones are that a general scheme for assessing the level of intellectual activity of the business model of an enterprise based on the considered clusters of indicators was created. The development of our authentic approach to increasing the level of intellectual activity of the business models used closes the problem of determining the formats of the intelligent business model of enterprises.

The limitations of this study are that the role of digitalization in the process of intellectual activity of trading enterprises has not been determined. The introduction of digital technology into the practice of enterprises will allow them to minimize errors and determine ways to encourage staff to intelligent activity in order to ensure the development of commercial enterprises. That is why, in further theoretical studies, it is planned to fill this gap.

The disadvantages of the study are that for the formation of a business model, the general level of intellectual activity of the enterprise’s operations is determined. This technology can be developed in accordance with the tasks of multidisciplinary enterprises, the diversification of which makes it difficult to choose one business model for all areas of the company’s activities. The development of technology for choosing an enterprise business model under the conditions of dynamism and uncertainty of the market can be a potentially interesting object of further research.

7. Conclusions

1. Formulas for calculating the level of intellectual activity of the business model of an enterprise are presented. They describe the dependence of the level of intellectual activity of an enterprise on indices corresponding to clusters of qualifications, skills, and opportunities for forming a business model. The potential of increasing the level of intellectual activity of an enterprise’s operations for each cluster of assessment indicators, which consists in determining the formats of the intelligent business model of enterprises, has been investigated. It is proved that the potential for increasing the level of intellectual activity of the integrated format of the business model of an enterprise is about 14 % (acceptable), content-oriented – more than 49 % (low), rational – about 30 % (sufficient), conducting – more than 69 % (critical), innovative - more than 9 % (high).

2. A graphical method of building a “radar” has been developed to represent the results of assessing the level of intellectual activity of an enterprise. According to the radar system, formats for the intellectual activity of enterprises’ operations have been established: innovative, integrated, rational, content-oriented, conducting. In addition, it was determined that the integrated format of

the business model of an enterprise is characterized by an acceptable level of intellectual activity at the expense of all groups of clusters. It is also determined that clusters of qualifications and opportunities have the greatest positive impact on the formation of an acceptable level of intellectual activity of the business model of formats.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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