Innovative Capital as Difficult-to-Identify Factor of Production

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Introduction

Under research there are the concept of 'innovative capital' of a company as a new factor of production, the rationale for the structure of innovative capital, the study of the possibility to identify, account for and analyze the size and dynamics of innovative capital.

The tasks set to achieve the goal of the study were to analyze the definitions of the concept of 'innovative capital' of a company and determine its structure, to look into innovative capital as a factor of production, to identify problems of accounting, evaluation and management of the innovative capital of a company.

The author employs various economic entities as an object of this research. Among them there are enterprises, corporations, small and medium-sized businesses that carry out innovative activities, generate and use innovative capital.

The subject of this study covers the processes of determining and clarifying the structure of innovative capital, evaluation, accounting for and management of it.

The implementation of production processes has now drastically changed. We have seen new, radically new processes, new, radically new products (goods), new tools and mechanisms appear; new business models are being formed and implemented. The industry is evolving from entire automation, computerization to digital transformation of processes, mechanisms and tools. Cutting-edge production is an active, forced and preferable use of Internet technologies, the Internet of things, cloud technologies, and artificial intelligence. The so-called 'smart (intellectual) production', more flexible and more efficient, is being created based on the active and rapid use of all types of innovations (manufacturing, technological, managerial,

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A. Rumyantseva et al. (eds.), *Challenges and Solutions in the Digital Economy and Finance*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-031-14410-3_8

marketing, financial, and others). There is intellectualization of manufacturing processes under way and, accordingly, known production assets are being transformed into new intellectual objects possessing new characteristics and requiring new methods of accounting, analysis and management.

One would think traditional factors of production (from Latin, *factor* means 'making', 'producing'), such as Land, Labor, Capital, and, added later, Entrepreneurship and Information, will remain active 'doers' of manufactures forever. The traditional factors of production have not gone but have merely become secondary, and such new factors of production as intellectual, innovative, human, digital capital, are coming to the fore. The time has come to interpret theoretically those new factors of production and their role in the process of production.

Industry, a priori, requires innovations. Without innovation, there is no talk about the effectiveness of activities or achieving and maintaining competitiveness. That is why it is essential to measure and analyze the innovation activity of companies. However, currently statistical methods of observation only imply some indicators that characterize either the costs of innovation or the results of innovation activity, and they are completely different in time (Federal State Statistics Service, 2022; Gokhberg et al., 2021; Isaksen & Trippl, 2017; Andrew et al., 2009). The subject of scientific research is *innovative development*, *innovative activity*, *innovative viability* and other nouns following the adjective *innovative* (Zemtsov et al., 2016; Machikita & Ueki, 2015; Rullani et al., 2016; Akhtyamov et al., 2016; Levchenko & Karpenko, 2020; McDowell et al., 2018). In most cases, all the above-mentioned innovation achievements are evaluated using known indicators of innovation activity monitored statistically. However, those concepts do differ in terms of goals, tools, mechanisms, and finally, management methods and, thus, assessment indicators.

Given the necessity to form a company's (region's, country's) innovativeness, one can assume the emergence of a new concept of *innovative capital* and consider it as a new factor of production. The concept of *innovation capital* was first discussed in the research works of L.A Joia (2000) and M. E. Van Buren (1999), later M. Khalique et al.'s (2011) and Gomezelj Omerzel's & Smolčić Jurdana's (2016), Russian scientists also look into the problems of innovative capital (Akhtyamov et al., 2016; Levchenko & Karpenko, 2020; Arenkov & Yaburova, 2018; Ustinova & Alekseyeva, 2020). But, the analysis of the scientific literature on this and related topics showed that it focuses more on the so-called 'intellectual capital' comprising of human, client and structural capitals, social, technological, and spiritual (M. Khalique et al., 2011; Gomezelj Omerzel & Smolčić Jurdana 2016) capitals. *Innovative capital* is more often considered as one of the elements of the intellectual capital structure, which is not clarified; scientific papers cover various points of view. And certainly, innovative capital has not been considered as a factor of production.

The study of the innovative capital of a company, clarifying the essence of this concept, determining its structure, analyzing the possibility of innovative capital to be measured and evaluated will make it possible to arrange innovation activities more reasonably, assess the results achieved and manage the process of innovation activity.

Materials and Methods

This study is based on the main provisions of the theory of economy and company management, the theory of innovation-driven economy, balanced development, the scientific foundations of strategic management, the theory of evaluation and management of business value, methods of statistical observation, analysis and measurement, the principles of company capital formation, presented in scientific publications of foreign and Russian scientists. The potential of using this new concept of *innovative capital* of a company is substantiated herein as the value advanced in certain innovation-oriented resources contributing to successful implementation of innovation activities; its structure is clarified (human, intellectual, patent, digital capital). This paper reveals that the existing methods of accounting and analysis of innovation activities do not make it possible to assess either the value of innovative capital or its transformation, particularly in terms of its constituent elements, which makes it difficult to develop and rationalize innovation activities, does not allow qualifying innovative capital as a new factor of production.

Results and Discussion

The scientific novelty of the study consists in the development of theoretical provisions and recommendations on the possible ways to assess the innovative capital of a company. This paper clarifies the content of innovative capital (human, intellectual, patent and digital capital) and presents a comparative analysis of methods for assessing the effectiveness of innovation activity. The author has revealed major challenges of identifying innovative capital and its subsequent assessment, particularly in terms of unidentifiable intangible assets such as professional knowledge of employees, their creative and digital capabilities required to be assessed using an interdisciplinary approach.

Innovation Activity of a Production Company: Meaning

Innovations have always been essential for industrial manufactures, but in the present context they mostly determine success and development. Researchers point out the critical change that has taken place in the study of corporate production strategies: it was erroneously assumed that the development of digital technologies is exponential. One should agree with (Mainzer, 2020) that scientific and technological progress on the current stage has changed the role of innovations making them develop under to the laws of biological evolution and play a new role of ‘mutations’, and only after that the market can select products (goods). It is the evidence of the new importance of innovation in modern economic development.

The problems of today's industry (Industry 4.0) are clearly defined as the importance and need for a significant increase in costs to accelerate and localize production processes in order to improve product quality (the modern principle of competitiveness) (Götz & Yankovska, 2020). One of the sources of superiority from the resource-based viewpoint (RBV) should be a unique set of resources (VIRO: valuable, inimitable, rare and organized), which should also include innovative capital. High significance is attached to knowledge, competences that are "'embedded' in an organization and are not easy to transfer" and can hardly be measured and evaluated.

Exploring the Fourth Industrial Revolution, there are also 'dark corners' (unforeseen consequences) observed that require improved management in a digital economy in favor of structural changes, including the capital structure of a company. It has been revealed that new information technologies are revolutionizing products and new 'smart, connectable products', in their turn, launch a new era of competition eager for quick innovations and restrained 'long-running' innovations (Porter & Heppelmann, 2015).

At present, the success of any company is ensured primarily by intangible assets, new technologies, licenses, and innovative capabilities.

Innovative Capital: Concept

The concept of 'capital' has organically entered the modern economic vocabulary. The present-day science is involved in an active study of the issues of (any) capital formation and management, assessment of the value of a business (own capital of an enterprise), capitalization measurement. The cost of capital (business) has become one of the main performance indicators of production activities as well. However, if fixed and floating capitals, human capital (labor resources), then entrepreneurship and information are officially recognized as factors of production (relying on such attributes as terminological clarity and universal recognition, accounting, evaluation and measurement system), new types of capital, including innovative (intellectual) capital, are so far under discussion with their contents, structure, indicators of measurement and evaluation under scientific search and clarification.

The concept of *innovative capital* appears for the first time in the works of Joia L.A. (2000) and Van Buren M. E. (1999), but only as part of intellectual capital. Intellectual capital is discussed in numerous scientific papers (for instance, Tripathy et al., 2015; Jordão & Novas, 2017; Hussinki et al., 2017; Ndou et al., 2018). Innovative capital is considered from the standpoint of strategic management as a strategic innovative capital (Kovacs, 2018). Some research works qualify innovative capital as aggregate costs for innovative projects (Tripathy et al., 2015), or as expenses on innovative resources (Jordão & Novas, 2017). Often innovative capital is viewed as an element of intellectual capital (Hussinki et al., 2017; Ndou et al., 2018).

The author suggested her own definition of the innovative capital of a company as the value advanced in certain innovation-oriented resources contributing to successful implementation of innovations (Babkin & Merzlikina, 2021). It is essential to clarify that the above definition implies an assessment of innovation-oriented resources which makes it possible to attract all available resources for innovation (for instance, equipment, production sites, various types of raw and consumable materials, relevant technological projects and solutions, patterns, employee skills).

Innovative Capital: Structure

The content of the *innovative capital* concept is mostly determined by its structure. However, in the same way that there are multiple points of view on the content of this concept, the structure of innovative capital is also viewed in many different ways. Let us try to consider the evolution of the innovative capital structure based on the well-known and better studied concept of 'intellectual capital'. The concept of 'intellectual capital' was first proposed by Stewart (1997). Now intellectual capital is understood as a set of knowledge and skills of the staff (McDowell et al., 2018; Gomezelj Omerzel & Smolčić Jurdana, 2016), as a factor in the company value increment and a significant resource of the company (Edvinsson & Malone, 1997). The intellectual capital includes human, client, social, technological, spiritual capital (McDowell et al., 2018; Khalique et al., 2011; Gomezelj Omerzel & Smolčić Jurdana, 2016), structural and relational types of capital (Jordão & Novas, 2017). The listed types of intellectual capital are certainly important and necessary for innovation activity as well, but they cannot determine the structure of innovative capital.

The author comes forward with the following structure of a company's innovative capital: human, intellectual, patent and digital capital (Merzlikina, 2020). Perhaps, further development of the innovative capital measuring and evaluating methods will give rise to new components, but so far, the structure is proposed as such. The specified types of capital as components of innovative capital constitute the innovative essence of the total capital.

The human capital of a company has been sufficiently studied (starting from the works of Schultz, 1971) and consists in personal professional knowledge, skills and competences of the employees of a company forming the total human capital (Khalique et al., 2011).

A great number of research papers mentioned above are devoted to intellectual capital, but all of them regard intellectual capital essentially as a modern concept of human capital (higher requirements to employees), without assuming special qualities of employees for innovative activities. However, it should be pointed out that even professional knowledge and skills do not imply special innovative, creative capabilities, that is why the author differentiates human capital and intellectual capital (part of human capital) with the latter distinguished by a set of creative abilities, sometimes referred to as the 'innovation gene', of certain employees of a

company who are able to identify novelty, new methods, techniques, processes ('novelty seeking'). Thus, intellectual capital (innovative employees) in essence becomes a catalyst for new ideas, innovations.

Patent capital consists in clearly identifiable intangible assets 'secured' by intellectual property title documents that allow generation of income through using a patent, either from the sale of a license or from the sale of a patent. The author has found no scientific research on patent capital yet. With all the clarity of the content of this concept (capital, everything that generates income, if it can be defined), there is a problem of forming patent capital as such. In order to become the owner of a patent (the owner of patent capital), one requires either significant financial resources, or a strong research base at the enterprise, which is hardly available for everyone.

The most sophisticated and currently demanded component of innovative capital is digital capital, which is generally understood as some digital resources for the digital economy (which seems to be quite a vague notion). Digital capital also includes digital technologies, the process of collecting and processing data, and analytical Big Data management (Krutikov & Gerayeva, 2018; Bughin & Manyika, 2013; Park, 2017; Ragnedda et al., 2020). One particular problem is not so much the proclamation of the necessity and importance of digital capital, but the ability to measure and evaluate it in order to manage it. When evaluating digital capital, it is essential to single out digital capital as access to digital technologies (software, communication facilities, data collection and processing, and digital competences of personnel), without which digital capital will not 'work'. Digital capital is considered (Park, 2017) as a set of conditions that predetermine accessibility and usability of digital services for people. Digital capital is thought to be an accumulation of digital competences and digital technologies that can be isolated, singled out as an independent aspect and measured. Summarizing the above, we would refer to digital capital as a set of tangible and intangible assets allowing the use of digital technologies (Ragnedda et al., 2020).

Innovative Capital as Difficult-to-Identify Factor of Production

There is a problem of accounting for capital in integrated financial reporting (Malinovskaya, 2018). At present, there are six categories of capital suggested (financial, industrial, intellectual, human, social, connected, natural capital), and intellectual capital is considered as a combination of intellectual property and organizational capital. However, the forms of capital types in integrated reporting can be expanded so far as all the six capitals listed above are specified 'for reference'.

Let us try to define innovative capital as a factor of production based on innovation activity indicators. In Russia, they are recorded in *Innovation Activity of Organization* statistical data form No 4 (Federal State Statistics Service, 2022). Based on the analysis of data provided by companies in terms of their innovation activities it has been found that the aspects accounted for include types of innovations (technological, marketing, organizational, environmental) and the total volume

of innovative products. Besides, small enterprises engaged in innovation activities are singled out. Thus, it may be concluded based on official information that innovation capital cannot be measured, and therefore it is impossible to conduct a comparative analysis (for enterprises, regions). Due to the lack of accounting for the innovation performance (obtaining additional revenue (its allocation, accounting, tracking) it is impossible to assess the cost of innovative capital. It will only be possible to consider control of the innovative capital cost and balanced management of innovative capital when the operational ('field') data of a particular company/enterprise are used, when personalized accounting of current and capital costs is carried out and effectiveness of innovative capital and its constituent parts are analyzed. Focus is placed on the indicators of innovation activity and innovative development of a company and a region (Gokhberg et al., 2021). Among them there are indicators characterizing the conditions of innovation activity and innovation potential. But it should be noted that all the indicators under review overlap to a certain extent (indicators of innovative development of a company and a region). And the so-called *process approach* prevails here fixing the implementation of a process (basically, 'today's' costs) and the result of the process implementation of (release of innovative products, advanced technologies used, today's results).

The European Innovation Scoreboard (Isaksen & Trippl, 2017) uses human resource involvement indices and some company performance indicators (investment, performance, efficiency). In the United States human capital ratings are used along with general indicators of economic dynamics and labor productivity, innovation costs and the set of the indicators constitute 'innovative behavior' (a kind of statement of 'input' and 'output') (Andrew et al., 2009).

All the reviewed indicators for evaluating innovation activity do not allow an objective assessment of its effectiveness as long as the indicators compared differ in time (costs incurred today are juxtaposed with the results of already implemented innovations at yesterday's costs). Besides, all the methods offer a certain generalizing index (as an integral indicator) without justifying the weight of either individual indicators or their groups, which distorts the result. So, it is hardly possible to determine the value and dynamics of innovative capital using these indicators. Research work (Merzlikina, 2020) overviews the results of a study of various methods for assessing the level and indicators of innovative development, mainly territories/regions, as information on individual enterprises is not always provided in statistical surveys.

The author of this publication makes an attempt to identify innovative capital. The review of scientific literature and the results of statistical observations showed that there is no generally accepted understanding of this concept, its content, and structural components. Every scholar offers his own interpretation of the concept. This echoes the ancient Indian parable on the elephant and the blind sages. That is, we see a problem of assessing innovative capital arise: how can we evaluate something that everyone defines in their own way? Therefore, before offering methods for assessing innovative capital, it has to be defined. The identification procedure (from Latin, *identifico* means 'to identify') implies that an object is established on the basis of attributes with the most important attribute being its

structure, as an inherent feature of the whole. The author proposes the structure of innovative capital to include human, intellectual, patent, and digital capital. Other structural components of innovative capital may be considered just as well, perhaps, but we will focus on the proposed ones.

Difficulties in identifying innovative capital are explained by the complicated determination of its structure and innovative features of seemingly known structural components, the complexity of the subsequent assessment. Currently we suggest the identification of innovative capital as a whole and that of its structural components.

Further research involves identifying approaches to assessing innovative capital. At that, the author, as a professional appraiser, does not see problems in the evaluation of identifiable intangible assets of patent and digital capital (in terms of tangible assets). For this purpose, there are excellent, eternal and universally recognized methods for estimating the value of a business (or rather, estimating intellectual property). One can use all the approaches: cost, comparative, income based. Two methods of the income-based approach are more commonly used, namely, direct capitalization and cash flow discounting. The problems here may only be in a correct and reasonable formation of cash flows and the determination of the discount rate or capitalization ratio.

However, the assessment of unidentifiable intangible assets will require at least an interdisciplinary approach. How to assess professional knowledge (human capital)? How to assess intellectual capital as part of innovation ('novelty seeking' mentioned earlier)? How to assess the creative abilities and digital competencies of employees? One can assume that most likely these will be expert assessments, but who is going to specify the assessment model and a list of characteristic features?

Thus, the author has come forward with her version of the identification of innovative capital (clarifying its structural components) as a factor of production and indicated significant current difficulties in identifying innovative capital such as the fuzziness of the structure and the lack of special methods for assessing unidentifiable intangible components of innovative capital.

Conclusion

Based on the research conducted the author draws the following conclusions.

1. Innovation development is, a priori, inherent in cutting-edge industrial production. The study of production processes changes the approach to assessing the factors of production; they transform both quantitatively and qualitatively.
2. The content of the *innovative capital* concept has been clarified to denote the value advanced in certain innovation-oriented resources that contribute to the successful implementation of innovative activities.
3. The structure of innovative capital is proposed to include human, intellectual (special creative competences of personnel), patent, digital (both tangible and intangible assets) capital.

4. It is concluded that innovative capital is difficult to be identified as long as information (statistically observed) is usually different in time. Integrated reporting can only take into account identifiable tangible and intangible assets. A considerable part of the unidentifiable intangible assets that are part of the innovative capital 'drops off the radar.
5. Challenging issues of identifying innovative capital are determined as the complexity of its structure and subsequent evaluation. It has been found that known methods for assessing intellectual property can be used to assess the identified intangible components of innovative capital, and the assessment of unidentifiable intangible components of innovative capital (professional and creative abilities and digital competences of personnel) requires an interdisciplinary approach and more complex further research.

This study may be continued to design a methodology for assessing innovative capital, to determine indicators for assessing innovative capital, to look into management of the innovative capital cost.

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