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RISK-BASED MANAGEMENT OF INTELLECTUAL CAPITAL AS A STRATEGIC RESOURCE OF AN IT COMPANY

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With the rapid growth of the digital world, IT companies that develop, implement, and improve information technology are growing in importance at an exponential rate. However, as studied by O. Starkova and O. Andreichikov (2024a), IT companies are largely dependent on their intellectual capital (IC), the core of which is human capital, thus qualifying IT services as intellectual, as most of their added value is generated by labor, particularly highly skilled labor. Clearly, the development of software, as the major activity of IT companies, is actually carried out by employees that have specific technical skills and knowledge; therefore, IT companies cannot innovate or compete effectively without highly qualified specialists. This, in turn, requires IT companies to develop appropriate systems for the development and management of intellectual capital as a strategic asset that drives innovation, growth, long-term success, and competitive advantages of IT companies.

However, although intellectual capital is of strategic importance, the issue of its effective management is still understudied in scientific and applied aspects. Hence, the primary aim of this paper is to analyze the management of intellectual capital as a strategic asset for IT companies with due regard to the main risks.

Among a small number of research studies dealing with the issues of IC management in IT companies it is worth mentioning works by researchers such as V. Lapotkov (2024), L. Pater (2024) and Y. Serpeninova *et al.* (2022).

The first thing to note is that intellectual capital management involves a transition from traditional asset- and function-based thinking to a knowledge-based paradigm, where the main asset is seen as neither equipment nor financial capital but as employees' expertise, intellectual property, and the IT company's ability to generate knowledge and innovation, as studied by O. Starkova and O. Andreichikov (2024b) on the example of Apple and the 100 largest companies in Ukraine.

According to L. Pater (2024), intellectual capital management is one of the priority functions of strategic management. Therefore, the design of the intellectual capital management system should consider potential risks, which is a critical task for the strategic management team of IT companies, as this minimizes threats to organizational resilience, increases adaptability to market changes and ensures sustainable competitiveness in the long term in a dynamic market environment. Hence, intellectual capital management in this context goes beyond a purely formal function and becomes more risk-based, which involves identifying and minimizing the impact of factors that may limit the effective use of intangible assets of IT companies, such as knowledge, staff's skills, intellectual property, internal corporate culture and so on. Given that human capital is a key source of value for IT companies, these risks should be given special attention.

The main groups of IC management risks can be classified as follows:

1. Risks related to human capital.

1.1. The risk of losing key employees because of the high mobility of today's skilled specialists, especially in the context of extensive remote work opportunities, which can lead to brain drain or loss of critical knowledge and reduce the innovation potential of IT companies.

1.2. The risk of inefficient knowledge sharing between business units and employees because of the lack of internal communication and mechanisms for knowledge documentation, which may complicate the adaptation of new employees and reduce productivity among specialists in general.

1.3. The risk of losing the relevance of employees' knowledge and skills because of the rapid development of IT technology, which leads to a mismatch between human capital and the current requirements of the IT industry.

2. Risks related to structural capital.

2.1. The risk of functional inconsistency resulting from an inadequately efficient internal structure, inefficient IT solutions, or lack of clearly identified knowledge management mechanisms, which may adversely affect and limit the fulfillment of intellectual capital potential.

2.2. The risk of technical obsolescence of the infrastructure or the use of outdated and low-efficient information systems complicates knowledge management and innovation processes, which can slow down the company's adaptation to technological changes.

2.3. The risk of losing intellectual property, e.g. inadequate legal protection of patents, copyrights or code fragments, can lead to loss from theft or unauthorized use of innovations.

3. System and external risks.

3.1. The risk of regulatory changes in intellectual property or labor law may significantly affect intellectual capital management policies.

3.2. The risks of cyber threats, data loss, hacking and unauthorized access to internal knowledge bases and code repositories pose a threat to the security of intellectual assets.

3.3. The risk of exposure to global competition because of the increasing number of competitors in the IT market affects the processes of staff migration, which adds to pressure on the main component of IC, the human capital of IT companies.

3.4. The risk of technological shifts and the emergence of disruptive technologies, such as artificial intelligence, which may lead to the displacement of some employees, thus entailing major changes in the IC management system.

In view of the above, it is obvious that a risk-based approach to intellectual capital management in IT companies is a prerequisite for the formation of strategic flexibility and innovation capacity of IT companies. Identifying, assessing and monitoring risks related to the key elements of IC allows not only minimizing potential losses but also adapting management practices to a dynamic environment in a timely manner.

To create an effective risk-based intellectual capital management system for IT companies, it is reasonable to implement comprehensive risk assessment methodologies, in particular, using quantitative and qualitative approaches (SWOT analysis, PEST analysis, risk matrix, scenario modeling, etc.). It is also important to integrate risk management into the overall strategy of knowledge and human resource management in IT companies.

To summarize the main findings of the study, it should be noted that intellectual capital is not only an asset, but also a fundamental strategic resource that determines the competitiveness, innovation and sustainable growth of IT companies. Managing intellectual capital efficiently is critical to success in information technology and knowledge-based innovation.

Further research and development of effective systems for managing the intellectual capital of IT companies should be aimed at examining its components, exploring their strategic importance, reviewing management models and methods, assessing challenges and opportunities, evaluating their impact on performance, analyzing successful examples and forecasting future trends with due regard to technological changes, risks and the specific impact of different components of intellectual capital on different types of IT companies.

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ДОСЛІДЖЕННЯ МЕТОДІВ SINGLE SIMPLE PATCH (SSP) ТА ENHANCED SINGLE SIMPLE PATCH (ESSP) ДЛЯ ВИЯВЛЕННЯ ЗОБРАЖЕНЬ, ЗГЕНЕРОВАНИХ ШТУЧНИМ ІНТЕЛЕКТОМ

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Стрімкий розвиток генеративного штучного інтелекту (ШІ), зокрема Generative Adversarial Networks (GAN) і дифузійних моделей, дозволив створювати фотореалістичні зображення, які складно відрізнити від справжніх [1, 2]. Це породило загрози дезінформації, маніпуляцій та підриву довіри до медіа [3, 4].

Сучасні методи виявлення ШІ-згенерованих зображень включають Convolutional Neural Networks (CNN), локальні метричні підходи (multiLID) та мультимодальні архітектури [1-4, 7]. Проблема таких методів полягає в тому, що їх ефективність знижується на зображеннях із невідомих генераторів або при спотвореннях, таких як розмиття чи стиснення [3, 4, 9].

Для вирішення цих проблем було запропоновано метод Single Simple Patch (SSP), що аналізує локальні шумові області зображень, та його покращену версію Enhanced Single Simple Patch (ESSP), яка включає модулі сприйняття та покращення якості [5, 6]. Також ефективними є моделі на базі Contrastive Language-Image Pre-Training (CLIP) для виявлення згенерованих зображень від різних генераторів [8].

Метод SSP є сучасним підходом до виявлення зображень, згенерованих штучним інтелектом, який аналізує лише одну невелику ділянку зображення з низькою текстурною складністю [5]. Ключова ідея полягає у використанні "простих" (однорідних) фрагментів, оскільки саме у таких областях найкраще проявляються відмінності між шумом камери у справжніх зображеннях і артефактами, притаманними згенерованим зображенням [5, 10]. Алгоритм SSP включає: