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INNOVATIVE DETERMINANTS OF SUSTAINABLE ENTREPRENEURSHIP DEVELOPMENT AFTER CRISIS TRANSFORMATIONS

ІННОВАЦІЙНІ ДЕТЕРМІНАНТИ СТАЛОГО РОЗВИТКУ ПІДПРИЄМНИЦТВА ПІСЛЯ КРИЗОВИХ ТРАНСФОРМАЦІЙ

The article investigates the innovative determinants of sustainable entrepreneurial development in the post-crisis transformation context, focusing on the mechanisms of innovation diffusion and commercialization within higher education institutions (HEIs). It substantiates that the efficiency of Ukrainian entrepreneurship largely depends on the integration of academic innovations into small and medium-sized business (SME) activities. Given the limited financial and organizational resources of SMEs, cooperation with technological innovation centers is identified as a key driver of innovation diffusion and commercialization. These centers perform not only commercial but also socio-economic functions, fostering human capital, enhancing regional clusters, and strengthening science–business–government collaboration. The study highlights three major patterns in the evolution of technological innovation centers: a gradual transition from state funding to self-financing through partnerships with private business; expansion from local to international cooperation; and the development of innovative clusters that intensify the flow of ideas, knowledge, and investment capital. A comparative analysis of two principal legal mechanisms for intellectual property commercialization – full transfer of rights and licensing – is provided. The paper identifies their respective advantages and disadvantages for innovation creators (HEIs) and entrepreneurial structures, emphasizing the role of long-term strategic partnerships and contractual relations as instruments for effective technology transfer. Based on theoretical generalization and practical evidence, the article proposes a comprehensive concept of state governance of innovation commercialization processes in HEIs. The concept defines management subjects, objects, and levels -micro, meso, and macro – within the national innovation system. Its main objective is to improve the effectiveness of innovation commercialization by enhancing institutional frameworks, public management mechanisms, and regulatory support for innovation infrastructure. Implementation of this approach is expected to foster integration and mediation forms of cooperation between HEIs and business, encourage academic entrepreneurship, increase access of SMEs to innovative products, and strengthen financial autonomy of universities.

Keywords: sustainable entrepreneurship development, innovation, commercialization, technological innovation centers, licensing, innovation diffusion, public governance, university–business partnerships, innovation ecosystem

У статті досліджено інноваційні чинники підвищення ефективності комерціалізації інновацій у закладах вищої освіти (ЗВО) як основу сталого розвитку підприємництва в умовах посткризових трансформацій. Обґрунтовано, що одним із ключових механізмів формування інноваційного підприємницького середовища є дифузія інновацій та їх інтеграція у господарську діяльність малого й середнього бізнесу. Виокремлено специфіку процесів створення та поширення інновацій у вітчизняних умовах, де обмежені фінансові ресурси та організаційні можливості МСП стримують розвиток власних R&D підрозділів і посилюють роль партнерства із технологічними інноваційними центрами. З'ясовано, що такі центри виконують не лише комерційну, а й соціально-економічну функцію, формуючи людський капітал, розвиваючи локальні інноваційні кластери та забезпечуючи взаємодію науки, бізнесу і влади. У роботі виокремлено три закономірності розвитку

технологічних інноваційних центрів: поступове самофінансування за рахунок комерційних відносин з бізнесом; розширення від локальних до міжнародних партнерств; зміцнення інноваційних кластерів, що забезпечують потік ідей, капіталу та технологій. Проведено порівняльний аналіз механізмів комерціалізації інтелектуальної власності – продажу прав і ліцензування. Визначено переваги та недоліки кожного підходу для творців інновацій (ЗВО) і підприємницьких структур, акцентовано на ролі стратегічних партнерств та формуванні довгострокових контрактів у процесі передачі технологій. На основі узагальнення теоретичних положень і практики запропоновано концепцію державного управління процесами комерціалізації інновацій у ЗВО. У ній визначено суб'єктів, об'єкти та рівні управління – мікро- мезо- та макрорівень. Головною метою концепції є підвищення ефективності комерціалізації інновацій через удосконалення державного регулювання та інституціональне забезпечення інноваційної інфраструктури. Зазначено, що впровадження запропонованої концепції сприятиме розвитку кластерних і партнерських форм взаємодії ЗВО з бізнесом, активізації науково-дослідної діяльності, розширенню доступу підприємницьких структур до інновацій та формуванню сталих джерел фінансування інноваційної діяльності.

Ключові слова: сталий розвиток підприємництва, інновації, комерціалізація, технологічні інноваційні центри, ліцензування, дифузія інновацій, державне управління, університетсько-бізнесові партнерства, інноваційна екосистема.

Formulation of the problem. One of the main mechanisms for increasing the level of innovation in Ukrainian entrepreneurship is the process of diffusion of innovations in the entrepreneurial environment. It should be noted that the process of formation and diffusion of innovations has industry-specific characteristics. Given the limited capabilities of small and medium-sized businesses, it is difficult to generate sufficient income to cover the costs of maintaining special departments engaged in the commercialisation of innovations. An effective means is the joint ownership of intellectual property rights by organisations that create innovations and entrepreneurial structures that acquire innovations for further commercialisation.

Although the processes of creating innovations in scientific organisations and their commercialisation by business structures are interrelated, it is necessary to distinguish between them, since the use of know-how to develop a new product is a process of creating innovation, while commercialisation is related to how a finished innovation goes from a research lab to being used in industrial settings.

Analysis of recent achievements and publications. Recent publications on entrepreneurship after crisis transformations converge around five vectors [1-14]: (1) resilience and anti-fragility of business models through the development of dynamic capabilities, organisational ambidexterity and adaptive supply chains; (2) «green» modernisation – integration of ESG/SDGs principles, decarbonisation, circular and regenerative value creation models supported by climate finance and impact measurement; (3) digital transformation with a focus on data-centric processes, AI tools, platform ecosystems, fintech and smart contracts as catalysts for inclusive growth; (4) social innovation and impact entrepreneurship, including cooperative and crowdfunding mechanisms that strengthen local resilience; (5) Policy and ecosystems – the role of universities, clusters, technology parks, and government incentives in accelerating the scaling of innovation and increasing the productivity of SMEs. Despite the consensus on the benefits of digitalisation and greening for long-term sustainability, questions remain about impact metrics, transition costs, and the transfer of best practices between regions and sectors.

The purpose of this article is to conceptualise the innovative determinants of sustainable entrepreneurship in the post-crisis period, integrating the findings of contemporary literature into a framework model that combines dynamic organisational capabilities, digital and green technologies, social capital, and policy and ecosystem instruments, as well as to propose operationalised indicators for assessing the progress of enterprises in different sectors.

Presentation of the main material. The initial successes of cooperation between small and medium-sized enterprises and technological innovation centres determine their positive reputation in the market and business loyalty to them. Having felt the benefits, small and medium-sized enterprises are increasingly turning to these centres themselves. Pursuing the commercialisation of HEI innovations as their main goal, they fulfil an important socio-economic mission, which includes the following [6]:

– bridging the gap between the research community (HEIs) and business by acting as intermediaries;

– building and developing human capital in target geographical areas by developing talent concentration and building innovation capacity;

– training scientists and employees of local small and medium-sized enterprises in the basics

of successful commercialisation of innovations in order to increase their internal innovation capacity;

– promoting the competitiveness, productivity and well-being of the target geographical area, etc.

The second pattern is a gradual transition from state funding of technology innovation centres to self-financing based on establishing commercial relationships with private businesses. Initially, in order to gain a foothold in the market, a technology innovation centre receives financial support from national and local authorities. Having gained the support of market agents, it increasingly receives income from cooperation with businesses, other research institutes and private investors [3]. At the same time, long-term state funding, which is maintained throughout the entire period of the technology innovation centre's existence, is intended for long-term investments necessary to build national innovation capacity.

The third pattern is the expansion of the activities of technology innovation centres, which initially focus on local enterprises and gradually develop international ties to achieve a global scale. Each of the technology innovation centres we have examined initially achieved great success in establishing partnerships with local economic actors, including members of the research community (HEIs), enterprises in various industries, investors, economic development departments and local government agencies [8].

This has contributed to the creation of innovation clusters, increased the flow of ideas and capital exchange, which, in turn, has ensured the development of innovative products, processes and practices. Having established themselves in local markets, technological innovation centres entered the global arena, establishing cooperation with foreign centres and ensuring the global commercialisation of innovations from local HEIs.

Below, we analyse a situation in which domestic HEIs have no other option for commercialising their innovations than to cooperate with domestic businesses due to regulatory restrictions on the export of many innovations, as well as the greater complexity of this compared to sales within their own country. It is noted that quite often, only the HEIs themselves, and not businesses, are interested in commercialising innovations created in HEIs [3].

In international business practice, there are two main legal mechanisms by which modern organisations can commercialise their intellectual property (apart from internal exploitation): sale (or transfer of rights) and licensing of rights to innovative products.

When selling rights to products (intellectual property) of innovative activity, the organisation that created the innovation transfers all rights to them to the buyer. The agreement on the sale of rights to the products of the organisation's innovative activity is documented in writing (in the form of a contract or deed). This ensures the legitimacy of the agreement and allows the parties to specify the conditions for the transfer of rights to the products of innovative activity, such as guarantees, trade restrictions, etc.

We believe that the advantages of selling rights to an organisation's innovative products are as follows [11]:

– if the sale of ownership rights involves a one-off payment of the full contractual price, the investment in the innovative project pays off immediately for the organisation that created the innovation, without the need to wait several years for gradual profits and bear the risk of the innovation not being in demand on the market, which may result in the investment never paying off;

– the sale avoids the risk that the intellectual property may be invalidated or replaced by another technology;

– there is no need to control the operation of the innovation;

– it is possible to agree on a larger advance payment from the organisation that created the innovation compared to the initial licence fee.

The following disadvantages of selling or completely transferring the rights to the products of an organisation's innovative activity can also be identified [2]:

it is difficult to agree on the price of the transferred intellectual product due to the lack of a generally accepted methodology for assessing the value of intellectual property;

when transferring intellectual property rights, the transferring organisation will not be able to claim profits from its future use by the receiving party, i.e. the business entity; therefore, it must be prepared to accept the fact that the buyer may significantly increase its income when selling the results of using the intellectual product.

At the same time, creators of intellectual property at the initial stage who possess the necessary knowledge and skills are unlikely to be able to participate in the process of its use. Therefore, if the organisation that created the innovation is interested in the further use of the products of its innovative activity, the solution may be as follows:

– to license the relevant rights to the successor;

– if the transfer of rights to intellectual property is related to the sale of a business, such

transactions may be subject to regulation through government duties and regulations.

Licensing allows the organisation that created the innovation to retain ownership rights to the products of its intellectual activity.

Let us consider the potential advantages of licensing. From the point of view of the licensee-business structure, licensing allows the following goals to be achieved:

– it provides savings in financial resources that would otherwise be spent on research and development, and eliminates the risk of inefficient use of resources in the event of unsuccessful research and development;

– provides an opportunity to ensure that the product is in demand on the market, which is especially important in conditions where the product life cycle is short and there is a risk of reduced competitiveness;

– helps the business entity to develop without the effort of R&D and inevitable temporary delays (provided that scientific research and development is carried out individually);

– an effective licensing agreement can also serve as a catalyst for the formation of a long-term strategic partnership between the licensor-innovator and the licensee-business entity that acquires the innovation for further commercialisation.

Table 1 lists the most important advantages of licensing for both parties to the agreement.

Table 1

Brief description of the mutual benefits of licensing for both parties to the agreement [compiled by the author]

Benefits for the licensor	Benefits for licensees
Savings on investment in research and development	Creation of new revenue streams by realising the full potential of the technology
Elimination of risks associated with conducting scientific research and development	Expansion of customer awareness
Reduced time to market for innovations	Assistance in overcoming barriers to entry into foreign markets and reducing costs and risks
Ensuring high competitiveness of innovative products	Savings on distribution and marketing costs
Addition of new product lines to the portfolio	Можливість уникнення судових розглядів
A strategic partnership can be formed on the basis of the licensing process	

During licensing negotiations, the main focus is on financial compensation for the issuance of a licence. Such compensation may include the following:

– licence initiation fees or advance payments;

– royalties based on the gross income received by the licensee from the use of the innovation;

– minimum royalties paid regardless of the licensee's income.

The specific amounts of payments and royalty rates are determined by factors such as the nature of the innovation, its cost, the degree of protection, market factors, and the cost of use. However, as a rule, a low selling price and high sales volume of innovative products imply a lower royalty rate, while a high selling price and low sales volume imply a higher royalty rate.

Some of these factors include whether the licensor is simply a user of the patent and prototype or whether they also contribute some important know-how or other technical information, as well as the mark-up typical for this type of product. Royalty rates, like the terms of a licence agreement, are subject to negotiation. Given the number of potential pitfalls, it is advisable to seek expert advice when drafting and negotiating licence agreements.

As a result, we can identify additional disadvantages of licensing, in our opinion:

if an exclusive licence is involved in the contractual process, the patent owner cannot grant licences to other parties and cannot even use the invention himself (unless the patent owner obtains a licence from the exclusive licensee): the negative factor in such a situation is that if the selected licensee does not promote or sell the innovation effectively, no one else can do so. Therefore, when discussing an exclusive licence, it is very important to ensure that the licence agreement clearly specifies the efforts to be made by the licensee to effectively commercialise the intellectual property, as well as the minimum acceptable levels of sales and/or royalty payments to the patent owner;

when drafting a licence agreement, it is necessary to take into account a multitude of conditions and factors that may affect the subject matter of the licence in order to minimise future problems, costs and litigation. In other words, when drafting a licence agreement, it is important to clearly define all possible changes (including both positive and negative) during the term of the agreement. For example, if sales turn out to be either higher or lower than expected, the response of the licensee and licensor to this circumstance must be clearly spelled out. If the licensee

becomes insolvent, the licence may automatically terminate;

– the licensee's performance (both for exclusive and non-exclusive licences) can be difficult to control, meaning that the process of implementing licence rights requires constant attention. The licensee's performance can be difficult to describe or monitor, but methods and algorithms for controlling the process by the licensor must be developed;

ultimately, the patent owner may be forced to negotiate with several parties, which requires additional effort and time. The upfront payment and royalty rate for a non-exclusive licence are usually lower than for an exclusive licence, as other business entities may also have the right to use the same patented innovation.

The study, using the example of the service sector, presents proposals for improving the efficiency of the commercialisation of innovations created in domestic higher education institutions and their implementation in the financial and economic activities of business structures. The tool for achieving this goal is the improvement of state management of this process. Below is a concept of state management of the commercialisation of innovations in higher education institutions in order to increase their efficiency. It shows that the predicted benefits for business structures will be an increase in the availability of innovations based on cooperation with higher education institutions.

The approximate volume of HEI innovations that will be commercialised is 40-60% of the total number of innovations created by HEIs. State and private enterprises engaged in a particular field participate in the process of commercialising innovations in HEIs. That is, the role of HEIs and enterprises engaged in a particular field is secondary in the process of improving the effectiveness of forms and methods of commercialising innovations in HEIs, while the role of the state is primary. Therefore, in order to promote the implementation (increase the probability) of a balanced scenario, we have developed a concept of state management of the processes of commercialisation of innovations in HEIs in order to increase their effectiveness.

Within the framework of the proposed concept, the goal is to improve the effectiveness of innovation commercialisation processes in HEIs. The tool for achieving this goal is the improvement of state management of this process.

The subjects of management are state authorities in modern Ukraine. The objects of management are regional state authorities and multifunctional centres throughout the country.

The concept is implemented simultaneously at all levels of the economic system. At the micro level, favourable conditions are created for the development of cooperation between higher education institutions and enterprises engaged in a particular field. To this end, it is recommended to promote such cooperation by explaining its necessity and advantages at various levels of government.

At the meso level, it is necessary to strengthen the requirements for regional government bodies to promote the commercialisation of innovations in technical higher education institutions. At the macro level, it is advisable to enshrine the proposed recommendations for improving the forms and methods of commercialising innovations in technical higher education institutions in Ukraine's national innovation development strategy. At the same time, general institutional measures are being implemented: the formation of a regulatory and legal framework for the activities of the technological innovation centre and the assignment of powers and responsibilities to multifunctional centres for the provision of public services and the signing of contracts for the supply of innovations.

The implementation of this concept results in the activation of a balanced scenario, within which the effectiveness of all identified promising forms and methods of commercialising technical innovations of higher education institutions in modern Ukraine is increased: the method of clustering within the framework of integration, the method of a technological innovation centre within the framework of mediation, and the method of a contract within the framework of direct interaction. As a result, innovations in the field are implemented evenly at all levels of the economic system.

The developed concept of state management of innovation commercialisation processes has the following advantages.

First, it is designed specifically for technical higher education institutions in order to increase their efficiency. Such a clear focus ensures that this concept is ready for practical implementation, while other concepts for promoting the commercialisation of HEI innovations are generalised and not linked to specific categories of HEIs, which does not allow them to be fully developed in detail.

Secondly, the proposed concept is fundamentally new for modern Ukraine, where innovation management is carried out without reference to HEIs. This concept defines the central place of HEIs (as sources of innovation) in the national innovation system and aims not simply to promote the growth of innovative activity in the technical sphere, but to link it to the commercialisation of innovations by technical HEIs.

Thirdly, the concept allows technical universities to regain their rightful place in the innovation process and establish self-sufficiency in innovations in a particular field, bring the scientific research conducted by technical HEIs and the innovations they create closer to the needs of domestic enterprises operating in a particular field, and provide incentives and opportunities for these enterprises to demonstrate high innovation activity.

Conclusions. The results of the study showed that the forms and methods of commercialisation of innovations in higher education institutions in modern Ukraine, which boil down to intermediation, pursue the commercial interests of the Chamber of Commerce and Industry, are characterised by low efficiency and do not fully meet the current needs of the domestic innovation economy. It is necessary to develop a recommendation base for the development of new forms and methods of commercialisation of innovations in higher education institutions – forms of integration using the clustering method, forms of intermediation by a technological innovation centre, as well as forms of independent direct interaction using the contract method – to increase the efficiency of this process.

The concept of state management of innovation commercialisation processes in modern HEIs proposed in this study, aimed at increasing their efficiency, is designed to ensure the accelerated institutionalisation of the proposed new forms and methods of innovation commercialisation in HEIs of a modern country in cooperation with business structures and their successful practical application, which will contribute to the innovative development of the domestic socio-economic system. The planned positive results for HEIs will be associated with a reduction in the risk components of entrepreneurial innovation, an increase in commercial efficiency and a reduction in dependence on state funding, i.e. an increase in financial independence and, consequently, flexibility and adaptability to changing economic conditions.

The projected benefits for entrepreneurial structures will consist of increased access to innovation based on cooperation with HEIs. The expected positive social effect (externalities) will be represented by a reduction in state (public) expenditure on financing science and education and the accelerated development of an innovative entrepreneurial system characterised by increased sustainability and global competitiveness.

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