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MANAGEMENT OF INNOVATION COMMERCIALIZATION PROCESSES: EXPERIENCE OF SWEDEN UNIVERSITIES AND POSSIBLE WAYS OF ITS USE IN UKRAINE



A Swedish model of innovation commercialization for higher educational establishments is considered. A model for commercialization of research results by Ukraine HEE has been developed. It implies the stepwise incorporation of formal features of innovative company, by the analogy with knowledge mining concept.

Key words: commercialization of innovations, knowledge mining, and business activity.

In the global information society the world and, particularly, the Ukrainian universities have to ensure the implementation of innovative intellectual model for the development of national economy in order to raise its competitiveness, insofar as the evolution of post-industrial society is impossible without innovative resources. Higher education must meet the imperatives and produce knowledge required for research and innovation activities in the priority areas of scientific development. In this context, it is necessary to improve the mechanisms for the creation of innovations, the commercialization of scientific and technological research, and for the support of business, which is essential for the innovative development of higher educational establishments in Ukraine.

Problems related to innovation commercialization have been studied and discussed in numerous Ukrainian and international publications: research commercialization models were considered by V. Antonets et al. [1]; the global experience in research and technological commercialization was reviewed by J. Gans [2], A. Petrunenko-

va and M. Vonstein [3], and by D. R. Kingham and P. Bakey [4]; the innovation commercialization strategy was in focus of S. Brazinskas research [5].

Russian researcher I. Salimianova [6] believed that the present-day universities had to generate knowledge and to effectively transfer them to the economy through creating an integrated research and academic framework for knowledge development. The role of universities and research institutes in the innovation process was considered by S. Kasper [7], K. Venberg [8], V. Titov [9], N. Fedorov [10], G. Andreev [11], A. Andronov and A. Cherep [12], M. Didivskyi [13], etc. However, some practical aspects of involving higher education institutions in the innovation commercialization have to be further studied.

This paper deals with the analysis of Swedish experience in the field of innovations and the development of model for innovation commercialization by incorporating spinoffs in the context of higher educational institutions of Ukraine.

Ideas and innovations are the main framework for developing the innovative economy. The generation of innovations, the industrial application of research results, and the development of cutting-edge technologies have a significant va-

lue-added potential and ensure product competitiveness.

In 2000–2012, the industrial application of innovations in Ukraine showed the favorable dynamics (Fig. 1), but in 2012, the share of innovation-oriented industrial enterprises amounted to 17.4% of the total number of industrial enterprises [14] (according to the State Statistics Service of Ukraine), which was significantly less than in the advanced European countries. For example, in Sweden, the share of innovative enterprises accounts for 54% [15].

For the formation of knowledge-based economy the relevance of addressing the issues related to research and innovation commercialization is determined by the lack of a universal model which, being different from the classical approaches and methods, would ensure the effective implementation of innovation policy by higher educational institutions. Such a model is of paramount importance for the formation of new market economy.

The research and technological activities can be commercialized in the following ways [16, 17]:

- 1) Sharing of innovation;
- 2) Transfer of innovation;
- 3) Implementation of innovation using its own resources.

For sharing the innovations a joint venture or a venture fund is incorporated. The main advantage of this method for implementing innovations is scalability of production, combined financial resources and efforts, and access to partner innovations [18]. Venture business is characterized by personal interest of employees in the successful commercialization of ideas and technologies [19].

Transfer of innovations implies their practical application that can be done in two ways:

- 1) Transfer of rights to the use of technology (licensing, engineering, franchising, leasing);
- 2) Sale of patent (full transfer of rights to use the innovation).

The developer can utilize innovative product in its own production or business activities, etc. [20].

A Swedish model of Lund University Innovation System (LUIIS) is an example of successful approach to the innovation commercialization by

spinning off¹. Thus, the process of innovation commercialization [21] can be presented in the manner given in Fig. 2.

The process of creating an innovative company at the University of Lund was based on the NABC model proposed by *C. Carlson* and *W. Wilmot* in 2006 [22]. The model name is derived from the initial letters of the four words, namely: **N**eed (What does the client need?); **A**pproach (Does the proposed approach meet this need?); **B**enefits (costs and benefits of chosen solution); and **C**ompetition (Which benefits do the competitors allow for when making decisions?). The model is aimed at creating new consumer products that would satisfy the market needs.

At the early stages of development, the University gives the spinoff a support through a scientific park and a business incubator by providing advice on intellectual property, legal and accounting services, by leasing out office and industrial premises, or by assisting in licensing, etc. In so doing, LUIS creates favorable conditions for the incorporation and development of innovative companies.

At the stage of registration of scientific idea, the LUIS experts together with researchers estimate the potential of idea commercialization [23] by checking the existing patents and seeking novelty. At this stage, they decide on financial aid in funding the upfront costs.

The next step is the project evaluation: scientific and commercial research in order to ensure that the project can be successful in the real market. The evaluation may include the following procedures: comprehensive market analysis, R&D operations, applied research, technical audit of concept and application for patent, etc. The LUIS role is discussed with the inventor: it may range from the provision of coaching services to the active engagement in establishing a future company through investing.

¹ The Swedish experience was studied within the framework of a joint European project of TEMPUS program «Support of Innovations by Improving the Regulatory and Legislative Framework for Higher Education in Ukraine» (<http://spinoff-ua.eu/>).

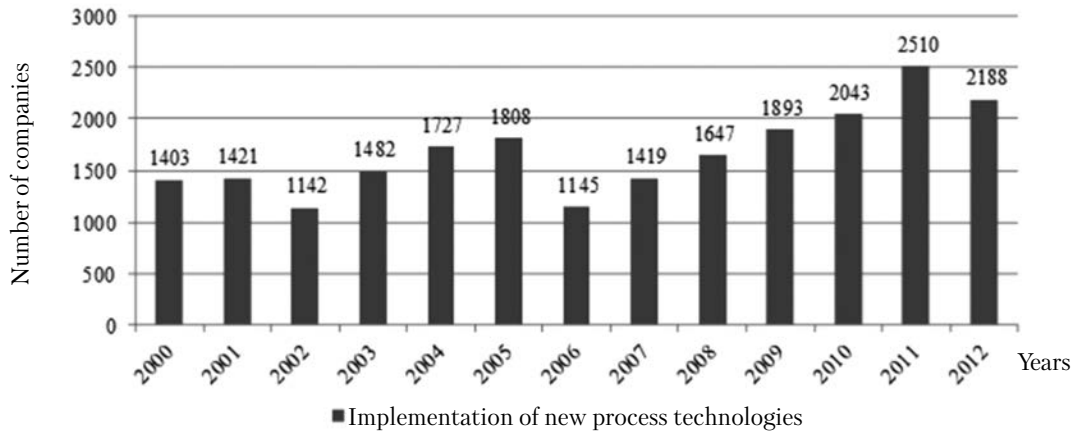


Fig. 1. Dynamics of Industrial Application of Innovations in Ukraine, in 2000–2012

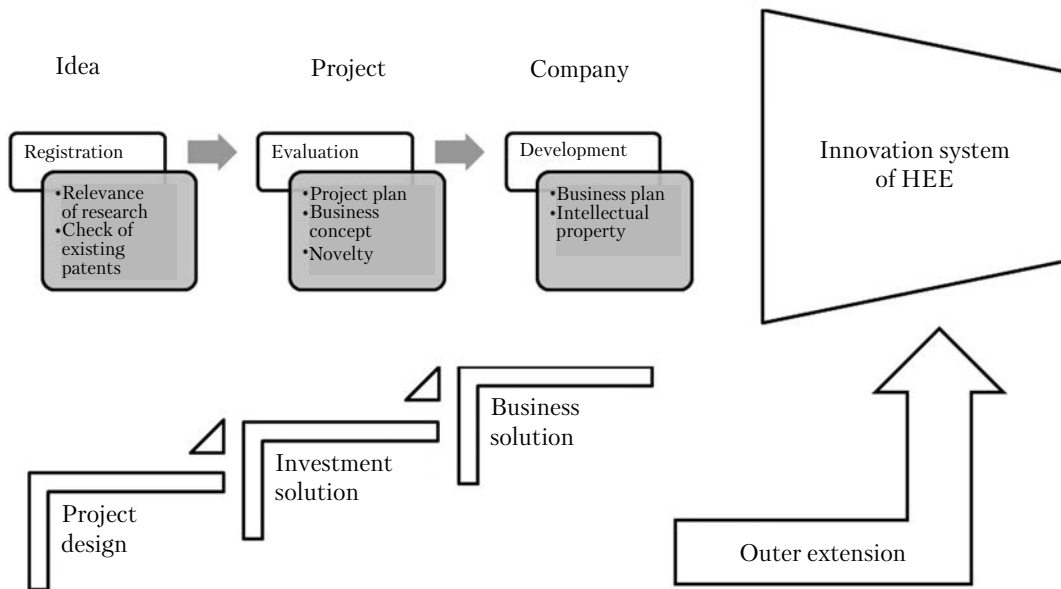


Fig. 2. Swedish Model of Innovation Commercialization

The stage of development is characterized by checking the business viability. Attention is paid to the company’s structure, its business lines and legal aspects of relations with the first client. In the University structure, there is *LUIS AB* Holding responsible for the technology transfer and business activities of the University, i.e. for the establishment of so-called spinoff companies [25].

New companies owned by the University are eligible for the assistance from the Board of Directors until they reach financial stability. The spinoff is incorporated at the expense of public funds, business angels, and investors.

The innovative company is, above all, the implementation of new or improved idea that has been commercialized and successfully introduced to the market.

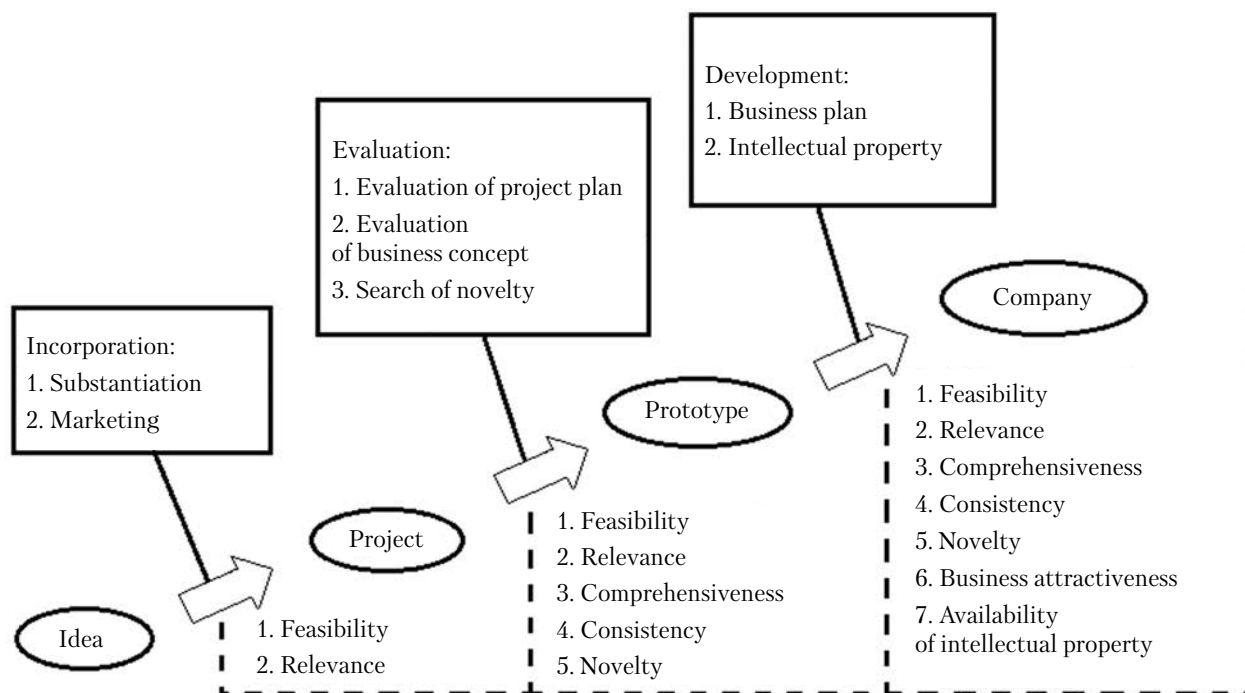


Fig. 3. Proposed Model for Commercialization of Innovations of HEE of Ukraine

In [25], the innovation process is characterized as transformation of idea into commercial benefits or competitive product. The business process of innovative idea development includes the following features of innovative company:

- ✦ *Feasibility*: formalization of author’s proposal on the development of innovative idea;
- ✦ *Relevance*: search, collection, and pre-analytical processing of information that is significant for the market success of the project;
- ✦ *Comprehensiveness*: direction of innovation development, various aspects of production and mechanism for industrial application of innovation, expected results;
- ✦ *Consistency*: a study of innovative capacity in the context of management and operation of company’s interconnected elements;
- ✦ *Novelty*: difference of the product (or service) from the traditional methods and analogues;
- ✦ *Business attractiveness*: determination of company’s ranking in the market;
- ✦ *Availability of intellectual property*: protection of innovation in the external environment.

Thus, the transformation of idea into business can be described with the help of the above characteristics.

To describe the innovation commercialization model by spinning off for Ukrainian HEE it is recommended to use the concept of inclusion of formal characteristics at different stages of the company incorporation, which is similar to the knowledge mining concept [26, 27]. The knowledge mining implies the transformation of data into knowledge by incorporating formal characteristics of knowledge. It can be presented as follows: $data + previous\ knowledge + target \rightarrow new\ knowledge$, where target is a transcript of user needs in knowledge; new knowledge is a knowledge fitting for the target. This knowledge can be formulated as a set of rules for decision-making, decision trees, equations, statistical patterns, visualization, etc. [28].

Hereafter, the model for innovation commercialization of HEE in Ukraine is given (Fig. 3). At the initial stage, the *Registration* (see Figure), the idea takes features of feasibility and relevance

through marketing (research of requirements and needs for the development of ideas in the real consumption sector) and engineering justification studies (materialization of existing theoretical knowledge and discoveries, relevance of selected idea aimed at the creation of new scientific knowledge and identification of the most significant regularities). At this stage, the idea takes features of project.

The *Evaluation* stage is characterized by the fact that the project gets signs of complexity, consistency, and novelty. The result of evaluation of project plan (complexity), business concept (consistency), and search for novelty (novelty) is the transition from the design to the prototype of the company. Therefore, at this stage, the company has its structure and responsibility is distributed among its departments. The successful operation of the prototype can be considered a guarantee of profit. With the help of prototype, researchers can work out in detail a concept of new product.

At the last stage (the *Development*), a business plan is elaborated and a type of intellectual property is chosen. The prototype takes features of business attractiveness and intellectual property. This stage is associated with diffusion of innovation idea, profit gained in the market, and its distribution. So, the innovative company has a complete set of formal characteristics as such.

The commercialization of innovations can be presented as implementation of innovative project «*from idea to company*» through the stepwise inclusion of formal features (characteristics) of the entity dealing with innovation activities.

The analysis of Swedish experience in innovation commercialization shows its effectiveness as a mechanism for the implementation of innovative ideas aimed at ensuring sustainable economic growth with higher education institutions involved. A model for commercialization of HEE research activities in Ukraine based on the knowledge mining concept has been proposed. This model implies the stepwise formalization of business entity as innovative company. It provides for identification of formal features of innovative compa-

nies on the path “from idea to company” through the stages of incorporation, evaluation, and development. Further studies have to be conducted for improving the innovation commercialization model. Using the knowledge of advanced European countries and adapting it for the national environment will allow Ukraine to build a powerful scientific and innovative potential of HEE in Ukraine.

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УПРАВЛЕНИЕ ПРОЦЕССАМИ
КОММЕРЦИАЛИЗАЦИИ ИННОВАЦИЙ:
ОПЫТ УНИВЕРСИТЕТОВ ШВЕЦИИ И
ВОЗМОЖНОСТИ ЕГО ПРИМЕНЕНИЯ
В УКРАИНЕ

Рассмотрена шведская модель коммерциализации инноваций университетом. Построена модель коммерциализации результатов научной деятельности ВУЗов Украины с помощью распределенного включения формальных признаков инновационного объекта по аналогии с концепцией KnowledgeMining.

Ключевые слова: коммерциализация инноваций, Knowledge Mining, предпринимательская деятельность.

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УПРАВЛІННЯ ПРОЦЕСАМИ
КОМЕРЦІАЛІЗАЦІЇ ІННОВАЦІЙ: ДОСВІД
УНІВЕРСИТЕТІВ ШВЕЦІЇ ТА МОЖЛИВОСТІ
ЙОГО ЗАСТОСУВАННЯ В УКРАЇНІ

Розглянуто шведську модель комерціалізації інновацій університетом. Побудована модель комерціалізації результатів наукової діяльності ВНЗ України за допомогою розподіленого включення формальних ознак інноваційного об'єкта за аналогією до концепції Knowledge Mining.

Ключові слова: комерціалізація інновацій, Knowledge Mining, підприємницька діяльність.

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