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ORIGINAL PAPER

MODELS OF COMMERCIALIZATION OF INNOVATIONS IN AN OPEN INNOVATION PROCESS

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A b s t r a c t

At present, innovations constitute a key determinant of a competitive position among market entities. Recent years have seen a change in the approach towards innovations and a gradual shift from a closed to an open model of innovation. The changing paradigm of innovation is accompanied by the question how to commercialize about outcomes of open innovation processes. The aim of the present article is to review models of the commercialization of innovations which are applied in innovation processes based on principles typical of the open innovation model.

MODELE KOMERCJALIZACJI INNOWACJI W OTWARTYM PROCESIE INNOWACYJNYM

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Abstrakt

Innowacje stanowią obecnie najważniejszy czynnik determinujący pozycję konkurencyjną podmiotów rynkowych. W ostatnich latach jest dostrzegalna zmiana filozofii postrzegania innowacji i stopniowe przejście od zamkniętego do otwartego modelu innowacji. Zmieniającemu się paradygmatowi innowacji towarzyszy także pytanie o to, w jaki sposób komercjalizować wyniki otwartych procesów innowacyjnych. Celem artykułu jest przegląd modeli komercjalizacji innowacji, które mają zastosowanie w procesach innowacyjnych prowadzonych na podstawie zasad typowych dla otwartego modelu innowacji.

Introduction

Dynamically changing conditions force businesses to seek new ways of gaining an actual competitive edge. One such pathway is to implement innovations. However, developing and launching novel or significantly improved solutions alone may not suffice.

There has been a change in the approach to understanding innovation in recent years, namely a gradual move from a closed to an open innovation model, in which enterprises employ both external and internal ideas in innovation processes they are conducting. The shifting paradigm of innovation is accompanied by the question of how to commercialize the outcomes of open innovation processes. The relevant literature describes many models of commercialization, but their scopes differ to a large extent. The present article aims to review and categorize models of commercialization of innovations.

Open Innovations and Innovation Process

Innovations are now a key factor which determines a competitive position of market entities. Dynamically changing conditions of operating business force the entities engaged in this process to re-orient their innovation policies. Such changes are especially evident in developed economies, where economy of a novel type emerges and morphs into the network economy or knowledge-based economy. It can be characterized by three basic properties: a high share of the service sector in employment and generation of the GDP, a significant share of knowledge and innovation in the growth stimulation, and an increase in the role of formal and informal relations between economic entities (Limański, 2011, p. 136).

The emergence of this new type of economy is accompanied by modifications in the innovation activities. We witness a move away from the traditional (closed) models to open models of innovation, which follows from the increasing role of the body of knowledge (Oberg & Alexander, 2018, p. 1). The open model of innovation describes how entities creating innovations use internal and external sources

of market information to share the knowledge. This process often takes the form of a network of relations and systems of relations and interactions (Ollila & Elmquist, 2011, p. 276).

Within this space in the subject literature, a new paradigm of innovation processes has been formed. It assumes rejecting the previous philosophy and placing more emphasis on the fact that innovations should result from numerous interactions and relations between businesses and surrounding entities. This approach has led to a new model, an alternative to the traditional (closed) model of innovation, laying the foundation for a more contemporary approach to managing innovations, such as the open innovation paradigm (Rojek, 2014, p. 210).

The open innovation model reevaluates the guidance set by traditional models, for instance it abolishes the assumption that any entity is in full control of all elements of an innovation process. The new model adopts valuable ideas generated not only in laboratories or R&D departments, but also in the environment of the entity engaged in innovation activities. Thus, market success of an enterprise does not depend solely on the resources of the company; it requires seeking ideas and modern technologies outside the boundaries of the company (Chesbrough, Vanhaverbeke & West, 2008, p. 3). This assumption also involves forms of market access, seeking innovation as well as the commercialization and sale of a developed solution (Pohulak-Żołędowska & Żabiński, 2016, p. 490, 491).

Open innovations represent a holistic concept of the sustainable use of both internal and external information for the sake of potential innovations. This approach involves seeking, testing and exploiting various sources of information simultaneously in order to identify innovations which show commercial potential (Inauen & Schenker-Wicki, 2011, p. 496-520). As pointed out by Spoińska (2013, p. 288), the use of external participants in innovation processes has a positive effect on the reduction of cost and risk of the research activities, and leads to effects of scale in production. It is also significant that the potential of technological convergence and synergy of resources is noticed in this process. Bearing the above in mind, suppliers, clients, competitors, research institutes and higher schools become natural partners in the open innovation model (Buganza & Verganti, 2009, p. 309).

The opening of an innovation process concerns all of its phases. Both in the internal stage and the development of an innovation and then during the marketing stage, external resources are engaged in order to elaborate an innovative solution. In the research phase, it is possible to transfer the activity outside the company and its R&D department to specialized research units; in the implementation phase, the company may attempt to acquire licenses and other technological solutions from external entities which exercise intellectual property rights. Sometimes this process runs in reverse and takes a form of sale of own patents, rights and technologies to other companies (Pohulak-Żołędowska & Żabiński, 2016, p. 492).

Defining the categories of an innovation process in the context of the open innovation paradigm is extremely difficult, as its course depends to a large extent on specific characteristic of an entity which engages in it. The extent of the complexity of an innovation process depends on the assumed objectives and results, understood as effects of the innovation process. Practically every innovation process is characterized by occurring in a stepwise, cyclic and simplified manner. It usually involves seven stages (Baruk, 2010, p. 4):

– seeking and collecting ideas;
– selection of the ideas for viability, profitability and potential demand;
– elaborating and testing the concept of a new product among potential buyers;
– economical and financial analysis including the forecast of sales, cost, and profit;
– converting the concept of a new product into a technical design and prototypes;
– marketing test;
– commercialization of the product.

An innovation process, regardless of the character of an innovation, is realized in a specific, often different organizational context, which to a large extent determines its course. Proper management of an innovation process leads to the transition of an organization previously understood as a traditional into an innovative one, by means of a model of steering the innovation process.

The model of steering the innovation process may take a form defined in the relevant literature as traditional or modern. The former one treats innovation as an element of a separate whole, which in some way closes the innovation cycle. Innovation perceived in this way influences the corporate management, which – using a wide array of negotiation instruments or direct pressure (possibly evoking resistance and rejection) – influences the behavior of the internal clients of the process taking place in the culture specific to that organization. On principle, this culture is part of the status quo and does not change easily, which means that the innovation formed this way seems excessive, as it only determines the existing factual state. A significant problem observed on the grounds of the traditional model is the barrier of routine perception, arising from the long-term participation in the organization's life and the following routine, which endows the traditional model with a static character and stands in contradiction to the dynamics of change (Francik & Kosała, 2011, p. 16, 17).

Unlike in the traditional model, the modern model of managing the innovation process places less emphasis on the result (effect). More attention is paid to the relations created inside the organization, which take the form of a change in the culture, a new shape of the organization, in which knowledge, tradition, intuition and experience become an entire range of benefits. Knowledge is a starting point in shaping the ideas and harmonious realization of internal and external innovations. In the modern model,

innovation becomes an opportunity for an organization, a way to strengthen its level of creativity. Changes involving the search for the most effective and best evaluated reinforcements turn the clients of internal innovation into approving employees, who sometimes initiate changes, which means that the effect of innovation does not close the stream of creativity, but begins another innovation process (Francik & Kosała, 2011, p. 16, 17).

The context described above builds a clear image of the phased character of innovation activities. It is then warranted to ask the question what the mentioned change is and should be. Is every change an innovation? Should a designed and implemented change satisfy specific criteria? What should it result in? What should it involve? (Baruk, 2009, p. 13). The answers to these questions should be found in conceptual models of the commercialization of an innovation process.

Models of Commercialization of Innovation Process

The essence of a properly implemented innovation process is not only the elaboration of a novel or greatly improved (modified) product, but also, and more importantly, its successful commercialization. This phase usually begins at the preliminary stage of designing a new solution, by defining the functional properties of the product or technology being developed. This activity is therefore a starting point for the determination of the market potential of a given innovative product or service. This process entails numerous, interconnected variables, which often makes it assume a complex form, which necessitates the participation of specialized stakeholders in the commercialization process. They assume the role of the so-called brokers of technology, who are intermediaries between the research sector and economic practice, engaging in a range of operations, including (Kalinowski, 2010, p. 11): presentation of new, innovative ideas, products or processes; conducting developmental activities and identifying potential applications of the innovation; generating prototypes of innovative products, seeking market applications of technologies and conducting technological audits; analyzing markets, designing and launching marketing strategies, as well as launching the product on the market and its sale.

In the traditional understanding, the transfer of technology is defined as a network of relations and dependencies between the world of science, research and development, and economic enterprises. It occurs both inside market entities and at the point of contact between individual inventors and entrepreneurs. Technology transfers include two elements: transmission and absorption. The former involves the acquisition of knowledge and technology and passing them on to a potential recipient, while the latter is the acquisition of knowledge and technology and their acceptance (Wiatrak, 2018, p. 247). Moreover, it should be noted that the transmission and absorption of knowledge may occur in two dimensions: horizontal and vertical. The horizontal transfer takes place between

economic entities engaged in similar business, while the vertical transfer refers to the cooperation between universities and research institutes and enterprises, public and social organizations in order to sell licenses or realize the projects (Klimczuk, 2010, p. 151). The horizontal transfer entails precise determination of priorities in the cooperation and their connection to the objectives inside both the research entity and the economic enterprise. It makes it possible to expand the educational offer by programs preparing for the practical application of knowledge and technology; to develop the directions of research which are commissioned by economic, public and social organizations; to consult on preparation and implementation of local strategies for particular areas (on macro-, mid-, and micro-levels); to set up clusters, especially those based on knowledge, which rely on the access to research results (Wiatrak, 2015, p. 82).

The subject literature identifies several models of the commercialization of innovation. One of the most characteristic is the so-called Jolly model, which was developed on the basis of an analysis of technological cycles proposed by Schumpeter, Wright and Cooper. V.J. Jolly proposed the so-called segmentation understanding of the commercialization process, involving the setting of phases of development as well as the stages referring to the readiness of a market launch in order to develop and maintain the innovation on the market. The Jolly model consists of five subsequent stages and four intermediary elements, which mark the so-called reinforcement, a specific bridge in the process of the commercialization of innovation (Kaczmarska, Bochnia & Gierulski, 2015, p. 106):

– awareness – an idea and vision of a product, determination of technical parameters and viability;

– reinforcement – interest and acceptance;

– incubation – determination of commercial potential, preparation of a business plan, securing the funding, selection of the production location;

– reinforcement – collection of resources;

– introduction – design of the final version of the product to be launched on the market, organization of the production process;

– reinforcement – shaping of the market;

– promotion – presentation of the product to potential buyers, collection of consumer surveys, organization of the distribution network;

– reinforcement – seeking of complementary resources;

– maintenance – expansion and development of the product securing a stable market position.

A particular approach to commercializing innovation is found in what is referred to as the R. Cooper model. It introduces the stages of control and evaluation of the commercialization potential into the process, which enable its ongoing verification against the previously assumed plan. The Cooper model defines the set of operations and activities which are to be realized in particular stages. They correspond with the particular stages of the enterprise development and condition a possible move from one stage to another. Hence, the point

of making a decision becomes the moment when the whole process is subject to control and evaluation; this is when the decision to continue or abandon the work is made. This system aims at minimizing the risk and raising the effectiveness of the conducted work over the commercialization of the innovation (Bolek & Bolek, 2014, p. 48)

Another approach to the process of commercialization is an objective-based model, which includes five phases (Kaczmarska, Bochnia & Gierulski, 2015, p. 107):

– finding out what to produce. This stage requires particular commitment and creativity;

– defining the technical practicality of manufacturing the product with a simultaneous review of the expectations, needs and desires of potential customers. This phase requires the engagement of designers, constructors, and technologists. It is also recommended that these experts closely cooperate with specialists in marketing and promotion;

– seeking the sources of business success and making decisions as to the further direction of the project (continuation or abandonment);

– answering the question how to manufacture the product requires a combination of engineering expertise and business activities;

– engaging into marketing and promotional activities, pointing the potential markets for the new product and its distribution channels.

The subject literature describes other models of commercialization of innovation that give special priority to the protection of intellectual property. An example of such an approach is the model of commercialization generated in 2008, called SEKT (Network of Effective Commercialization of Technologies). The aim of the model is to generate knowledge with the largest possible added value, through the wide engagement of companies at the stage of identifying the priority research areas. The SEKT model foresees support for those scientists who stand out with excellent body of research and a high number of implementations in economic practice. An important component of the presented model of commercialization of innovation consists of attempts to protect intellectual property internationally. Such activities are realized through the cooperation with scientists who will participate in the future revenue from the commercialization of technologies and innovation, creating a possibility of participation (e.g. for a definite period) of the R&D staff in private companies, elaboration of new forms of financing research (patent fund, incubation fund), and attempts to integrate research teams in the network of cooperation with private companies (Kalinowski, 2010, p. 18).

Models of commercialization of innovation which allow for the process of intellectual property management show the innovation process from the perspective of two important elements: the unit of research and development and the intermediary institution in the transfer of technology and innovation. The transfer of knowledge, technology and innovation in these models is determined by the phases of commercialization. It may occur at each step

of this process or span a few phases at the same time. This is characteristic for the process of knowledge transfer from a research institute to economic practice, as during such a transfer of technology between the academia and business several assignments are realized, such as: basic research (acquiring new knowledge which is not expected to be applied in practice), applied research (new knowledge to be applied in practice), industrial research (acquiring knowledge in order to modify or optimize the existing products, processes, or services), pre-competition research (transformation of industrial research results into projects of new products, processes, or services), prototype building, and implementation activities (introduction of the new solution to industrial practice) (Kalinowski, 2010, p. 22, 23).

The process of generating innovation in the institute-business model is based on the constant monitoring of implementation effects in order to minimize the risk of failure of the process of generating and commercializing the innovation. This evaluation usually assumes the form of the TRL (Technology Readiness Levels) model and takes into account, among others, the state of development of a new product or technology, prospects for future elaboration, the amount of investment necessary to implement the elaborated solution, and the risk of the innovation. The methodology within the TRL model does not translate into the process of commercialization as such; hence, it does not answer the question whether there is demand for the evaluated product or technology. It constitutes the background for the other models of commercialization described above (Kaczmarska, Bochnia & Gierulski, 2015, p. 108).

Conclusions

The process of commercialization should yield economic, technological, social and environmental benefits to every participant. A properly managed process of the commercialization of innovation enables reinforcement of the potential of both the entity conducting the innovative activity and the ones at the receiving end of the innovation, which leads to an effective conversion of research results into a real product or service. This is particularly evident when the knowledge acquired in the process of innovation is personalized and adapted to the ability of the recipient (Wiatrak, 2018, p. 248). The effectiveness of the commercialization of innovation in this approach is determined by a few factors. The entity which offers knowledge or technology should engage in constant efforts towards the effective adaptation of the offered product to the market expectations and needs expressed by the final customers. Moreover, the entity which purchases the product should possess an adequate level of technological absorption, which conditions the scope and manner of adoption of the specialized solutions.

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