

Open Innovation Concept Based on Ecosystem Approach

Subjects: Economics

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One of the major factors of developing economics in the modern world is promoting innovation activities, which frequently ensures a competitive position of a state in the global market. Thus far, the introduction of innovative high-performance technologies founded on scientific research has been considered to be a driver of economic growth that results in enhancing the welfare of a population. Therefore, many states look for measures to support innovations.

Keywords: innovation activity ; open innovation ; ecosystem ; cluster

1. Introduction

The corresponding activities in regions play a significant role in the development and implementation of innovative ideas. This is especially true for the case of Russia, where the socio-economic development of individual subjects varies largely due to geographic and population differences ^[1]. Therefore, in order to ensure the innovative development of the state as a whole, it is necessary to focus primarily on the issues capable of intensifying activities in particular regions.

Currently, the innovative activity in Russian regions is clearly highlighted by a significant superiority of only the central regions, which serve as “points of growth” that are often supported at the federal level. However, as these points are rare ones, they cannot significantly manage the innovative growth of the entire state, accounting for its scale and territorial extent. Thus, there is a clear need to organize a regional’s interaction, which could provide not only “free” innovation traffic but also appropriate support for the practical implementation of new ideas and their diffusion.

2. Implementing the Open Innovation Concept in Brazil, India and Canada for Comparison with Russia

To compare the Russian experience with some international ones, Researchers could consider such countries as Brazil, India and Canada, which are closest with regard to territory. Additionally, Brazil, India and Russia have similar values in GDP (India took third place, Russia sixth and Brazil eighth in 2020) and in the innovation index (Russia was 45th, India was 46th, and Brazil was 57th in 2021). Furthermore, researchers agree with some authors ^{[2][3]} that the emerging economies of Russia, Brazil and India, have in common dominant public funding. Canada is quite interesting to consider, too, because it has, similar to Russia, (i) a clear distinction of two kinds of territory: one with developed infrastructure and a periphery one, (ii) the same focus of development for the sectors of agriculture, forestry, mining and oil mining and (iii) natural and climatic conditions.

2.1. Case of Brazil

According to Ref. ^[4], the state policy in the field of innovative development of Brazil’s economy aims at achieving the synergy of all the actors in order to enhance the innovative potential of the market by combining small innovative enterprises with large ones, as well as stimulating the appearance of innovative enterprises through several indirect supports via, for instance, tax incentives. The literature shows ^[5] that start-ups are the major mechanism involved in introducing open innovation in Brazil. In this country, there are a large number of agencies, including non-profit ones, with the aim of accelerating implementing and applying innovations with clearly defined functions. A wide variety of programs stimulate the innovative development of enterprises in contrast to Russia, where the number of programs to support interaction of various actors via open innovation is quite limited and includes the Innovation Promotion Fund (1994), yielding eight programs, the National Technology Initiative (2016) and the Agency for Strategic Initiatives (2011). Still, the latter organization could not fulfill the government’s directive to advance Russia from the 120th place to the 20th place in the international Doing Business rating of the World Bank by 2018. In Brazil, more attention is paid to the activities of innovative enterprises, both from the state and other sources of investment. In contrast to Russian practice, the investor’s

“assistance” consists not only in financing but also in providing the marketing services, patent services and interaction of actors in the innovation activities. Still, however, both Brazil and Russia have to improve the patent system. In Brazil, for instance, the registration of a patent takes up to 10 years, which obviously leads to a spillover of open innovations in the ecosystem, because the invention might lose its relevance over such a long period of time and bring no or a less-than-expected income. Still, the Russian patent agency takes a shorter time for such a registration, from 1 to 1.5 years, which might be considered to be a positive factor. Another acute problem in Brazil hindering fast development of the innovative enterprises is the lack of highly qualified personnel in IT technologies. This is completely different in Russia, which even serves as a donor of IT specialists at the global level.

It is worth noting that Brazil has an interesting solution to the problem of intellectual property rights, which a priori belong to public sector institutions. In Russia, the industries are not ready to employ intellectual properties, which do not belong to the enterprises. This greatly hinders the development of spin-offs. In contrast, Brazil fixed the practice of managing the transfer of the results of intellectual activities of the public sector to autonomous organizations at the legislative level in 2018. A quite remarkable example comes from Brazil's automotive industry ^[6], where a preference is given primarily to closed innovations via their own managing departments. As researchers note, the reason seems to be a misunderstanding of the open innovation approach by top industry managers. This is quite similar to Russia, as well. As a solution, it is necessary to develop a corporate culture and to advance the use of novel intellectual properties. Furthermore, some authors emphasize ^[7] that universities should be an innovative core of ecosystems. However, neither country has sufficient development in this direction. The same feature relates to growing spin-offs, which occupy a certain niche in the development of ecosystems to transfer technologies.

In summary, researchers may conclude that one of the key factors in advancing an ecosystem in both countries is developing the region of interest; the proximity to the regions leading in innovative development is a positive factor, too. The periphery's economics is always characterized by a “catching up” nature and is thus unlikely to reach the leaders' status without proper support. The innovative resources are concentrated in a low number of central regions. Still, these two economies grow in different directions: the focus in Brazil has shifted to the export of engineering products, while Russia is a pronounced exporter of raw materials. Furthermore, a distinctive feature of Brazil's policy is attracting foreign companies. Researchers believe Russia could adopt the Brazilian experience (i) to develop corporate multinational enterprises attracting venture capital to the regions of interest from external sources and (ii) to promote start-ups in accordance with current market needs via adopting artificial intelligence.

2.2. Case of India

The economies of India and Russia have a common feature insubstituting the import to a higher degree. To reach this target, the governments apply similar regulations, which makes it interesting to compare innovation policies.

Some authors note ^[8] that India has to intensify the interaction between entrepreneurial universities, industry and the state as a major factor for the country's development. Indeed, it occupies a leading position in financing research and development activities ^[9]. Somehow, implementing the concept of open innovations could be considered via creating a database to connect specialists in the field of innovation and young professionals to promote the exchange of ideas. This is practiced in Russia, too. Another similarity comes from a similar patent system in both countries; however, India now pays special attention to adapting the domestic patent regime to the international one in order to simplify employing results of intellectual activities. India mostly has state support for innovations, like Russia, which is quite vertical, provided by the state to research institutes, universities, incubators and other structures united in a single block.

Despite the priority participation of the state in the country's innovative development, India now actively attracts international venture investments through the formation of the Indian Association. Particular attention is paid to the development of technology parks and incubators, which are provided under tax incentives and other support measures ^[10] ^[11]. Some authors find ^[12]^[13] India and Brazil to be quite close in their innovative development as they involve foreign capital and are highly different from Russia; the most remarkable example is Bangalore, Mumbai ^[14]. Furthermore, the attention in India focuses on advancing entrepreneurial ecosystems where business incubators and technology start-ups are in a central place ^[15]^[16]. In these systems, one of the major actors is foreign companies ^[17] such as Xerox Corp or Microsoft, which interact with other actors, such as domestic and foreign companies, universities, etc. It is worth noting that such a collaboration mostly takes place over the country's periphery, though the interaction between companies and universities is still low.

In conclusion, the ecosystems in India are focused on (i) an intensive development of the regions, in the central part of the country and beyond and (ii) active involvement of foreign partners for innovative activities. These practices could be helpful to Russia, especially regarding intensifying remote regions' activities via state support under conditions of limited

involvement of foreign capital. Moreover, the involved actors should not compete for markets and resources but interact with mutual benefits.

2.3. Case of Canada

Primarily, researchers should note that in contrast to the previous two countries, Canada's economy is already developed [18][19]. However, despite this fact, the state actively participates in funding innovation activities. Still, the public funds are spent on such targets as (i) improving the skills of employees because a low professional level is considered to be a weakness, (ii) developing superclusters and (iii) focusing on extending clean technologies by encouraging international alliances. A particular feature of the Canadian ecosystem is the employment of the concept of a "strategic bridge" as a mechanism for implementing open innovations. The government there pays special attention to strengthening the patent system; for example, it provides special care to protect results of intellectual activities from various imitations of the original.

Altogether, the innovation policy in Canada widely implements the concept of open innovation with a focus on the ecology issues and advancing innovative competencies. At this point, Russia still adapts Canadian practices to implement the open innovation model involving green technologies into a resource-based economy.

3. A Conceptual Model of Open Innovation in Regions Based on the Ecosystem Approach

Currently, many researchers often appeal to the ecosystem model as a foundation to effectively develop regions able to produce open innovations [20]. This model is associated primarily with Tensley, Moore and Rothschild as the founders of the ecosystem theory in business and innovation aspects, and they are noted today even more often than Porter, Kondratiev and Schumpeter. Due to the great amount of research literature in this area, researchers will obviously not dwell on a deep historical analysis of the origin of the term "ecosystem". For the target of the present contribution, researchers would only note the important provision, inherent in ecosystems, according to which all its actors interact on the basis, by analogy, with a biological system, on the principles of self-organization and mutually beneficial distribution of resources. The innovation ecosystems are frequently defined as "a set of actors and connections between them for the mutual exchange of ideas and knowledge" [21], "an emerging environment and conditions favorable for the development of technological entrepreneurship at all stages of the innovation process" [22], "a dynamic set of organizations and institutions and their multidimensional internal relations" [23] and "a new organizational integrity and a way of producing innovation" [24]. As stated, "the ecosystem approach considers innovation systems at all levels (national, regional, cluster, etc.) as living social organisms, subject to continuous variability, under the influence of new motivations of participants and new circumstances" [25].

At the same time, the researchers, as a rule, have an interest in finding how the actors interact in the creation and commercialization of innovation [26][27]. Here, issues related to the technology of interaction between actors are emphasized to ensure their mutual interest and the unhindered movement of all the flows accompanying the stages of innovative processes. At the regional level, the concept of an "ecosystem" is maintained to represent "a favorable environment for the commercialization of innovation and the intensification of innovative processes, based on the principles of self-organization and self-development" [28] while organizing mutually beneficial cooperation of all the actors is still within the scope.

As mentioned above, the "bottleneck" in the cluster model is often the "rigidity" and hierarchical management, which is implemented mostly by the state, which focuses on its own interests, thereby "suppressing" the certain interests of other actors. The ecosystem approach eliminates this drawback by providing the participants with the opportunity to "self-organize" and to "self-develop", which makes the structure more flexible and adaptive, while implementing principles for mutually beneficial distribution of resources acts as a motivator, too. Still, though, there are some disadvantages, which should be accounted for. For instance, it is indicated that the formation of the innovative ecosystem in regions cannot progress quickly since "the ecosystem is a constantly developing organism" [29]. In this regard, it becomes difficult to ensure an accelerated development. Secondly, "an ecosystem, unlike a classical company, is based on modularity, and not on hierarchical management, while there is a need for coordination and sharing of complementary resources and competencies" [30]. Therefore, as indicated, it is impossible to ensure the development of an innovation ecosystem without a special regulatory environment despite its key characteristics of self-organization, self-development and adaptability [31].

Therefore, researchers consider here a synergetic combination of the two models based on the benefits of cluster and ecosystem approaches. **Figure 1** presents such a model for implementing the concept of open innovation. Herein, the

actors [32] perform the transfer of innovations to the managing organization, which processes the obtained RIAs and then moves these results to the open innovation bank to ensure free access. Accordingly, the greater impetus is given through the management company to disseminate open innovation. Thus, the ecosystem approach, which initially drew attention due to differing from the cluster, network or “technopark” models in its self-organization and ability for self-development and adaptability, now obtains a control link in the system.

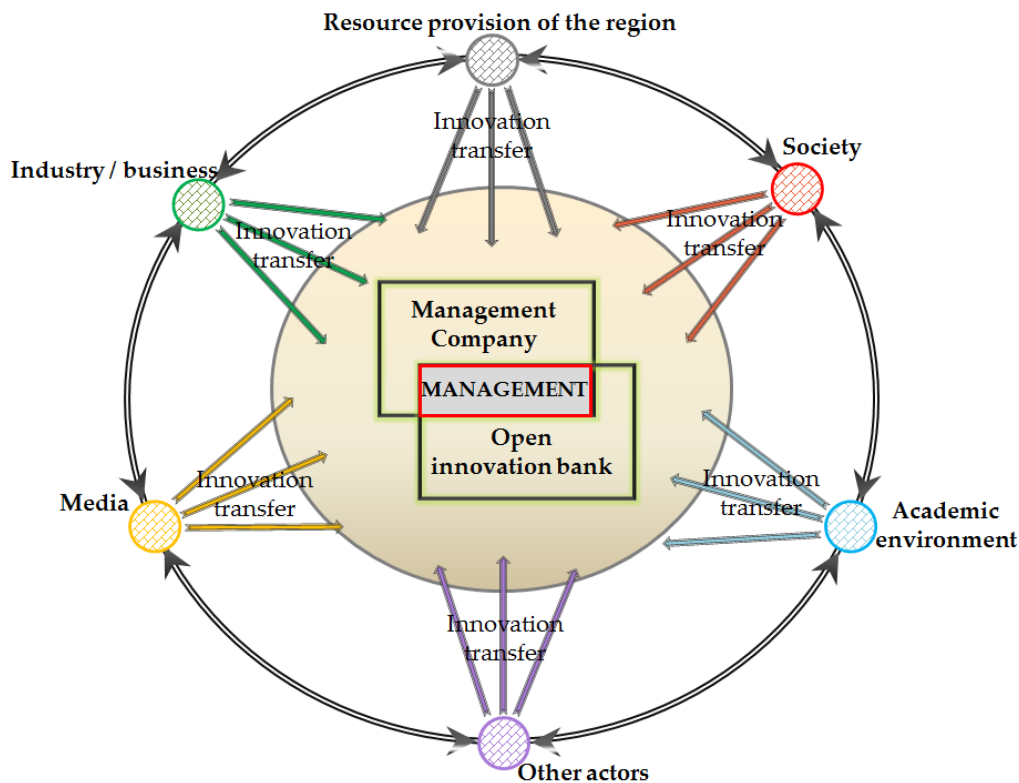


Figure 1. The schematic view for a model implementing the concept of open innovation based on the cluster and ecosystem approaches.

To properly organize such a control link, there are various options, including the state, a digital platform or a company [33] [34], which constitute a “central entity around which the innovation ecosystem is built” [35]. In this context, researchers should employ the term “orchestrator” to denote the central subject of the ecosystem [36]. In addition, it is proposed to consider a “pacemaker” as a “center of intellectual attraction of actors”, which ensures a consistency of the interaction of all the actors, (a separate actor, technology, project or platform, with each other [37]. Furthermore, Ramenskaya introduced the concept of an “ecosystem leader” which “sets the architecture and basic parameters—general rules and methods of interaction, standards, interfaces” [29].

Here, researchers should note that many research works consider a digital platform to serve as the link, which manages the interaction of the ecosystem’s participants. However, such a link is justified in Russian science and practice by a real need for a control element which can combine into a single system and organize the interaction of its actors, as well as provide the necessary support for their initiatives, aiming to create and implement innovations. Therefore, researchers suggest a model of the innovation ecosystem in a region, which accounts for elements of the cluster and ecosystem models in order to implement the concept of open innovation. With mutually beneficial and self-organizing interaction of the actors, the core element here is a management company implementing functions of managing and regulating the interaction of actors, as well as providing, if necessary, a methodology support in the application of technologies, methods and tools for the development and implementation of innovative ideas. In other words, the model combining education, business and state actors is complemented by a management one. At the same time, the management company must be also motivated, unlike the cluster model, to achieve the final result, which must be approved by a corresponding agreement among the actors. Given the existing trends, this model can be implemented in the digital platform, which does not change its concept and focuses on enhancing innovation in a region.

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