

Mechanisms to manage intellectual property in collaborative innovation projects¹

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Abstract: This paper presents some mechanisms for managing Intellectual Property (IP) in collaborative innovation projects, especially those using co-creation techniques. The mechanisms selection was made from a documentary review that allowed to identify the essential elements that could be condensed into a cycle including phases, such as negotiation, protection, assessment, commercialization, among others. According to the literature, these mechanisms must be supported in an institutional policy that guides strategies and organizational processes, mostly those focusing on the product development from the co-creation techniques. The mechanisms presented were formed considering the innovation process used in the ARTICA² alliance and those

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² ARTICA is a center of excellence located in the city of Medellín, Colombia, and it is composed of the University of Antioquia, the National University, The EAFIT University, the Pontifical Bolivarian University, the IPS Universitaria and UNE EPM Telecomunicaciones.

that have been worked in the literature. Also, they were submitted to experts who work with intellectual property in innovation processes for their validation.

Keywords: *intellectual property, intellectual property management, intellectual property management model, co-creation, collaborative innovation.*

Introduction

This work is the result of a project in which an Intellectual Property Management model (IPM) was constructed in order to be used in collaborative development processes, especially those using innovation techniques based on co-creation. For the development of the model, four main sources were used: the review of the literature regarding IPM, mechanisms and instruments of protection in innovation processes; the observation and analysis of methodological processes used in the identification of new products with co-creation techniques; the innovation model of Alianza Regional en TIC Aplicadas³ (ARTICA), based on the interactive model from Kline and Rosenberg; and, finally, the opinion of experts in IP who work in the protection and commercialization of the developed products. This paper develops one of the components of the IPM model, referring to the instruments and tools that allow systematizing the management process. The fundamental contribution consists of the integrated and systemic presentation of these mechanisms that were scattered in the literature or that have been used empirically in different processes, not necessarily collaborative innovation; however, in the analysis, it was found that their application is relevant in the co-creation techniques.

The co-creation techniques within the concept of open innovation

Since Henry Chesbrough (2003) coined the term *open innovation*, a wave of literature about the concept and the way of making open innovation emerged, giving rise to a broad discussion in this regard. However, Chesbrough (2015) has explained that the conceptual interpretation of open innovation has been distorted, and in many cases it has been reduced to the supply chain taking part in the innovation process. Innovation focuses on external processes, and the importance of *Inside Out* has been ignored. Open innovation goes far beyond this narrow concept. New products and services are created by a wide range of agents, such as universities, public and private research organizations, venture

³ A center of excellence in Colombia

capital, competitors and customers or users of the services, among others. The purpose is to incorporate that external knowledge into internal knowledge that the organization has gained during the innovation process.

...we define open innovation as a distributed innovation process based on purposely managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model. These flows of knowledge may involve knowledge inflows to the focal organization (leveraging external knowledge sources through internal processes), knowledge outflows from a focal organization (leveraging internal knowledge through external commercialization processes) or both (coupling external knowledge sources and commercialization activities)... (Chesbrough and Bogers, 2014, p 17).

Therefore, it must be understood that if the innovation concept is very complex, the open innovation concept will involve a higher complexity both to address it and to manage it, and to obtain valuable results of its process.

It is here, in this concept of open innovation, that the co-creation techniques take their meaning. For example, Piller (2010) states that the co-creation term was introduced to define strategies of open innovation that actively involve the participation of customers in the design and construction of goods and services, in which ideas are produced, valued by organizations and the customers themselves. In this sense, for Vargo and Lusch (2008 a and b), the co-creation is the participation with customers in order to get value.

The co-creation process can be initiated with the group of possible ideas, clusters, to continue with the structuring by making them more robust, which permits the design of services or prototypes. And finally, it finishes with the development and market test (Ribes and Peralt, 2014).

Ruiz-Moreno *et alii* (2014) developed the co-creation concept from the theory of resources and abilities in which, one of the keys to create and keep the competitive advantage over competitors lies in getting resources and abilities that are unique, valuable, irreplaceable and difficult to imitate (Barney, 1991). According to these authors, it is not the possession and control of those resources that make an organization competitive, but rather its ability to articulate and transform them so that they can be perceived with a higher value by the customer. From here, it arises the current need to create innovations together with the customers and the proactivity of the organizations to generate changes from the opportunities found.

Co-creation is a useful methodology that can be used in the processes of ideation by refining ideas, or in the design and the final prototyping of the product

or service. If we take innovation models, we can use the methodology in the exploration, design and assessment phase. However, it is necessary that different kinds of people with a different experience level, in regards to a particular subject (knowing or being related to the problem), take part, as well as a group of experts who immediately guide, lead, characterize and analyze the obtained data.

The co-creation techniques seek collaborative development of new products, hand-in-hand with the end customer, accelerating the process of market introduction of new products or services, given that the end users involved in the process have validated key features of these innovations. Additionally, use value is added to the co-creative process, as it is produced according to needs identified by the customers themselves (Ramaswamy, 2009; Paasi *et alii*, 2010a; Rodríguez *et alii*, 2011; Ruiz-Moreno *et alii*, 2014; Xiaoyi and Chaoming, 2014). For its implementation, it is necessary that the participant agents share tacit knowledge relevant to the process, that they interact with it and have the ability of generate new knowledge (Leiponen, 2008; Paasi *et alii*, 2010b). Also it is required that the organization lead the methodological process of such implementation (Morales, 2014).

Intellectual Property (IP) and the importance in the valuation of innovation results

The economy based on knowledge is supported in the innovation processes. However, the innovation process ceased to be conceived as one of ingenuity of some privileged brains and companies with business acumen to become a transversal social process in all areas and economic sectors, mediated today, as all human activities, by the market. This social process is generated in the interaction of social agents that produce, use, and commercialize knowledge (López, 2008). This presents high complexity in the negotiation of the results of products derived from the creative processes involving the participation of multiple actors.

Many innovations fail because their contribution to intellectual capital is not established; if the innovation is protected or not by a copyright, a patent, trademark or any other intellectual property right (IPR), what value is it and what right is being transferred to the new creation? Vulnerability exists in the co-creation processes due to claims regarding violations of intellectual property, for instance, for using previous protected knowledge, which is not revealed or is ignored by the contributors. Likewise, in these processes, actors that took part in very early stages can claim property over results, but the transfer for the subsequent developments is not established. Additionally, in the development

process of the new product, it may happen that it is not defined clearly when, how, where and by means of what mechanisms the results of the creative process can and must be protected.

Moreover, in the vast majority of cases, the value conferred by a patent, a utility model, the registration of an industrial design, accompanied by brands, or even proper management of a business secret is much higher than the value of the product that has no protection and, in many cases, the unprotection can lead the open innovation project to failure. Therefore, proper management of IPR in any process of innovation is inherent to the process itself.

The IPM in collaborative innovation projects contributes to the consolidation of agreements of a different nature among participants to carry out joint innovation projects; it makes the protection and thus the commercialization of the obtained results easier (Al-Aali and Teece, 2013; Fisher III and Oberholzer-Gee, 2013).

Mechanisms of the IP management

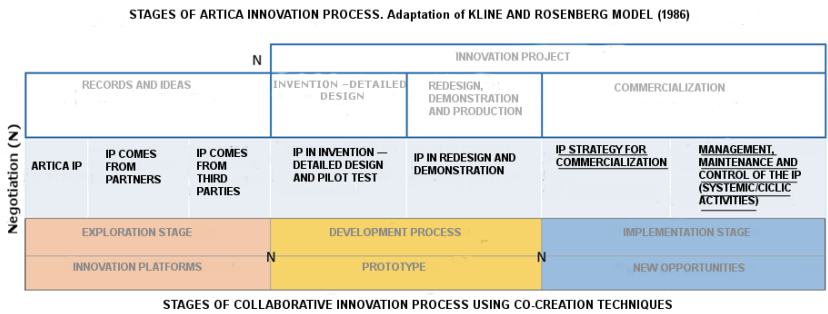
Any management process requires the design of policies to guide and define the limits and powers in the decision making that produce value. Therefore, under the model of innovation, designing IP policies creates the context for the definition and use of the mechanisms. According to Blomqvist *et alii* (2005); Kaiser (2010); Salazar and Silva (2010); Payumo *et alii* (2012); Allarakhia (2013); Londoño (2014); Mejia (2014); Xiaoyi and Chaoming (2014) and Bstieler *et alii* (2015), the policies should include both the organization's innovative model, and the resources and capabilities which it has, so that it allows management to, among other things:

- ✦ Facilitate the ownership management to establish relationship guidelines between organizations or others involved in an innovation project, whether or not possessing IPR.
- ✦ Facilitate the design of processes, tools and clauses to make it easier to use and protect information and strategic knowledge deemed to be confidential.
- ✦ Facilitate the design process that helps to determine if the result can be the object of legal protection, and the best strategy to carry it out.
- ✦ Propose methods of assessment and preparation of the results.
- ✦ Provide bases that serve as a starting point to negotiate the results (ownership, percentages of royalties, etc.).

- ✦ Establish the minimum requirements and conditions to do technology transfer processes and *knowhow*.
- ✦ Propose methods for the development of technology and management of knowhow.

These are some of the considerations that must be taken into account in the design of policies, which address how to lift and establish processes and tools to facilitate IP protection and, at the same time, support the construction of IPM models as an approximation to the realities faced by some organizations (Hertzfeld *et alii*, 2006; Lopez *et alii*, 2009; Orozco, 2010; Salazar and Silva, 2010; Cao and Zhao, 2011; Payumo *et alii*, 2012). Chart 1 proposes meeting points between the actions contained in the innovation model by the ARTICA alliance, the methodology phases of co-creation, and the IPM.

Chart 1. Relationship between the innovation model of the Arctica alliance, the co-creation and the susceptible stages to IPM.

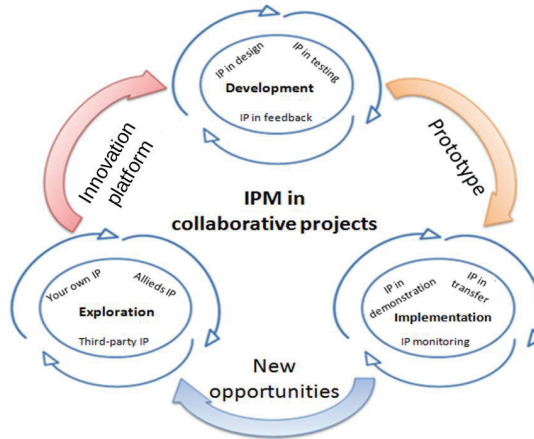


Source: Self made structure from David, M.L.; semi-structured interview⁴ with members of the ARTICA alliance (February 14, 2014; April 8, 2014; April 15, 2014; May 23, 2014).

According to the innovation model of the ARTICA alliance, which was built on Kline and Rosenberg’s innovation model, IPM mechanisms are presented for each of the stages that are involved: exploration, development and implementation stage. Chart 2 shows said model with the IP milestones to manage at each stage.

⁴ The semi-structured interview seeks to understand specific aspects of a particular topic through a formal conversation. In this type of interview, open questions are used so that people’s knowledge and experience showcase their perception of the object of study (Ardèvol *et alii*, 2003)

Chart 2. IPM proposed model for collaborative innovation projects using co-creation techniques.



Source: from Lopez (2008) and ARCTICA's IP Manual (internal document of the alliance).

Chart 1 shows that it is mandatory in the exploration stage to have policies and mechanisms to identify and manage your own IP. In the development stage, the IP arising is managed in the design, testing and feedback processes. Finally, in the implementation stage, the IP is considered in relation to the demonstration and the transfer; and the IP produced is tracked in the new product or service created. This makes it possible to present the mechanisms to manage the IP in the context of collaborative innovation projects that use co-creation techniques for the development of goods and services in the following table:

Table 1: Mechanisms of Intellectual Property

Stage	Mechanism	Description of the mechanism	Target of intellectual property rights
1. Exploration	Intellectual property agreement	<ul style="list-style-type: none"> - Contributions from each participant (form and value) - Statement of prior knowledge, technologies and knowhow to its value and property rights it confers. - Indemnity clauses - Confidentiality clauses 	Technology and knowhow that belonging to: The own organization, your allies and other organizations
	Proceedings	<ul style="list-style-type: none"> - Participants - Entry or exit of participants - Key considerations - Decisions - Intellectual property implications 	
	Tracking records	<ul style="list-style-type: none"> - Any product that can be protected by intellectual property rights - Contributions in prior knowledge, knowhow, methodologies, financial resources, human, etc. - Generation of new knowledge and creations - Participation of natural persons or companies at each stage of the project - Any measure to ensure the protection of intellectual property of intangible assets arising in the project 	
2. Development	Agreements and / or confidentiality statements	Generally, all aspects of product development, their potential uses, impacts, scope and users could be protected by way of confidentiality agreements	Design testing feedback
	Cession of property rights	By developers and participants of the entity that will commercialize the technology or that will make the transfer process or that continue the development	
	Authorization for use of data	Personal data that can be used as inputs in the creative process	
	Authorization for use of photographic records, video and audio	They can be used as inputs in the creative process	
3. Implementation	Business models supported by IP. structuring technology packages	<ul style="list-style-type: none"> - Patents - Utility models - Industrial designs, - Knowhow protected by trade secret, - Distinctive signs (brands, quality certificates, among others - Copyright 	Commercialization transfer follow-up to the IP licensed or operated by self-employed
<i>Policies And Strategies</i>			

Source: Authors' elaboration

Stage 1: Exploration

It seeks to identify opportunities to add value to goods and/or existing services or consider the design of new ones. To achieve this, it is necessary to use specific co-creation techniques, technological monitoring studies, resource analysis and organizational capabilities, feasibility studies (if any), market analysis, among others, to identify both the IPR holders and users, customers and partners that will use the knowledge (Al-Aali and Teece, 2013; Loiola and Mascarenhas, 2011; Orozco, 2010). At this stage, the IP agreements are made to regulate the form and the value of the participants' contributions, as well as the IP rights conferred to them; in a document the statements of technology and knowhow are included, along with the indemnity clauses, minutes of each meeting, logs and other records to be carried out under the project, bearing in mind three centers where you can manage IP.

- The own IP including all IPR as well as the *knowhow* belonging to the organization. Hence, it is recommended to identify and make inventories about existing technologies, emphasizing the elements of the technology knowledge chain (Paasi *et alii* 2010a; Salazar and Silva, 2010; Van Triest and Vis 2007).
- The IP of allies including all IPR as well as the *knowhow* belonging to the organizations partnered with the collaborative innovation project. In this component, it is important to consider the agreements reached, the way in which technology is planned to be incorporated, and if there are licenses or usage restrictions about it (Al-Aali and Teece, 2013).
- In third party IP, that is to say IPR from organizations that are not part of the collaborative innovation project, it is decisive to have licenses for the use and incorporation of protected technologies in the project (Al-Aali and Teece, 2013).

Stage 2: Development

At this stage, leaders should monitor the signing of non-disclosure agreements and confidentiality statements, transfer of property rights, data using authorizations, authorization to use photographic records, video and audio, etc., since it is possible to have concepts, prototypes and evaluated escalations to propose business models for the goods and services being developed (Kaiser, 2010). The IPM at this stage focuses on the design, testing and feedback processes of the co-creation project.

- ✦ The IPM in design: It is related to the proper use of prior knowledge and to the respect for third party IPR (Conley *et alii*, 2013.).
- ✦ The IPM in testing: It is important to keep model agreements or to sign non-disclosure agreements with specialized institutions or experts that will support the testing in order to safeguard the relevant information which, if disclosed, could affect the future protection of the developments. It is also necessary for the characteristics of the co-creation that the customers or end-users authorize the use of photographic records, video and audio, as well as personal data since these are inputs to the creative process (Rivette and Kline, 2000).
- ✦ The IPM in the feedback: In this phase, it is expected that experts, customers, the research and development team or any agent of the alliance provide feedback of the results so decisions can be made about the course of the project and the developments obtained, as well as the technologies that have been incorporated in it. (Xiaoyi and Chaoming, 2014). At this stage, it is possible to make decisions that involve:
 - starting the protection process under any IP mechanism;
 - abandoning, in the process, incorporated technologies, which, if they have some protection, require a renegotiation of licenses;
 - incorporating other IPR protected technologies, which will involve the negotiation of licensing or its acquisition;
 - developing new technologies to make viable the implementation or functionality of the developments achieved so far.

Stage 3: Implementation

At this stage, the configuration of business models supported by IPR involves structuring technology packages in which different IP mechanisms (patents, utility models, industrial designs, integrated circuits, knowledge protected by trade secrets, trademarks or copyright) may add significant value (Kaiser, 2010; Orozco, 2010; Fisher III and Oberholzer-Gee, 2013). It is important to utilize formal agreements to ensure confidentiality and other important factors in this process. The IPM, at this stage, focuses on marketing processes, monitoring and transferring of the licensed IP or exploited IP.

Marketing and transfer: It must be determined the type of license to be transferred, methods to be used, support, updates, possible future developments that licensed and licensor can make in regards to technology (Blomqvist *et alii*, 2005; Xiaoyi and Chaoming, 2014).

IPM in monitoring: It can be supported in scientometrics and patentometrics, as well as with scans that allow new projects to advance supported in existing databases and allow one to visualize the possibility of creating new business models with current developments or see the need to develop new products (Castellanos *et alii*, 2011). Besides, these studies also provide information about the use being made of technology and if third parties are taking advantage unduly.

Finally, policies and processes should be intertwined with macro and micro strategies so that they can articulate the internal capabilities and resources (specific from the organization) and external (specific from the allies and third parties) to develop high-value added products that can be protected and marketed (Wiig, 1997; Rivette and Kline, 2000; Chesbrough, 2006; Orozco, 2010; Schmal *et alii*, 2010; Alexy and Reitzig, 2012; Al-Aali and Teece, 2013; Conley *et alii*, 2013; Fisher III and Oberholzer-Gee, 2013).

Conclusions

In the literature review, we found widely documented open innovation processes. However, the techniques of co-creation are still exposed in a very generic way. Mainly, the conceptual aspects are developed, while the techniques themselves are little documented or arguably not referenced at all. It seems that these techniques remain in the field of knowhow as a competitive factor for consultants. Moreover, the literature on the importance of IP and protection mechanisms is quite large, however, the same cannot be said regarding references found on the management of IP, and even less was found on open innovation processes and the use of co-creation techniques. Management of IP in innovation processes is highly complex, given the uncertainty inherent in the innovation itself; it is even more complex in open innovation processes, in which multiple actors are involved in different phases of the creative development process, dissemination and marketing a result. Actors can be in and out at any stage of the process, making it difficult to establish the proportion of participation, quality and, therefore, the value of it. It was not found in the literature reviewed a systemic, holistic, integrated and comprehensive approach that contributes to the management of intellectual property rights in open innovation processes with the use of co-creation techniques.

Proper management of IP in open innovation projects that use co-creation techniques is essential for two reasons. First, an adequate protection of the results generates also some other added values. This protection makes marketing of the project easier while supporting the consolidation of relationships among the actors in the process, giving also more transparency at negotiations. Secondly,

proper management reduces the potential risk of claims by third parties or disagreements among the participants.

The proposed mechanisms to manage IP included in this document should be analyzed in the context of the resources and capabilities that each organization has, so that, strategically, we develop or adapt intellectual property managing practices more in line with the needs of the entity. In this regard, the management of IP in collaborative innovation projects is facilitated when there are policies, processes or clear framework agreements that guide the actions of partner organizations in these projects and facilitates them to act facing expected and unexpected results, avoiding conflicts or unnecessary and costly discussions.

It was evident that the co-creation is a complex process of collaborative innovation in the ARTICA Alliance because it constantly requires the incorporation of technologies and knowledge that, in many cases, are protected by one or more forms of IP. This means that the mechanisms proposed are feasible to use in organizations that are similar to those of a Centre of Excellence and Innovation. In other organizations, the process may be more complex, considering that the IPM strategy must change and adapt to the required context. Nevertheless, this proposal can facilitate the management of IP, protection of the obtained results, as well as valuation, negotiation, sale and transfer, since it collects scattered practices in the literature and is fed back by specialists managing innovation projects and IP. It should also be taken into account that collaborative innovation processes, and specifically those involving co-creation techniques, have a great amount of information from the environment, interaction with a large number of agents involved in one or more stages of development, and also incorporate technologies and protected knowledge by one or more forms of IP.

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