Open Innovation in an Intermediate City of Colombia

Jhon W. Zartha1, Bibiana Arango Alzate2, Monica L. Tobon3, Jonathan Gomez4, Julio Gonzalez5 and Carlos Marquerie6

1Universidad Pontificia Bolivariana; jhon.zartha@upb.edu.co
2Facultad de Ingenieria Industrial, Medellin, Colombia; bibiana.arango@upb.edu.co
3Universidad del Quindio, Facultad de Ingenieria, Armenia, Colombia; mltobon@uniquindio.edu.co
4Camara de Comercio de Armenia Quindio, Armenia, Colombia; jonathan@camaraarmenia.org.co
5Universidad Santiago de Chile, Facultad Tecnologica, Santiago de Chile, Chile; julio.gonzales@usach.cl
6Universidad Catolica de Lisboa, Executive Master in Management with a specialization in Digital Innovation; cmarquerie@moonshot.ceo

**Abstract**

**Objectives:** This article describes the process of introduction of an open innovation strategy in an intermediate city of Colombia. Methods/Analysis: A questionnaire to 460 companies in the region was applied, some important findings were detected: 74% of the companies have not participated in open innovation processes and 71% of these companies do not count with an innovation model, innovation management model, or innovation management system. To face these findings, some criteria for the selection of the platform to be implemented were identified; ten platforms were established and analyzed. Findings: After analyzing ten open innovation platforms and according to the criteria established at the beginning, SUNN platform was selected as the platform to be implemented as part of the open innovation strategy in the region. Some of most important achieve got during the implementation of the open innovation strategy were: lot of companies in the region produce new technologies or innovative solutions for solving internal problems, but they did not realize the value of the knowledge they generated until they started to use the open innovation platform. Through an open innovation paradigm supported by a platform such as SUNN, this project achieved to generate an innovation culture in the region. The SUNN platform allowed connecting companies, research groups, and startups of Quindio, with accessible costs. Novelty /Improvement: The implementation of an Open Innovation strategic in a small city of Colombia, the new ecosystem is composed by micro and small enterprises connected with the world by a technology platform.

**Keywords:** Case Study, Open Innovation; Open Innovation Strategy

1. **Introduction**

In the dynamics of the current globalized world, knowledge, information, scientific and technological development set the course for the effective transformation of production models for overcoming social gaps. The access to tools of Information and Communication Technology (ICT) and the media, allowed access to information in an increasingly and easy way, which makes it indispensable to carry out increasingly assertive processes to optimize the opportunities for achieving progress towards prosperity in the Department of Quindio.

Without a doubt, innovation is one of the keys for a growing economy. In particular, the maintenance a sustainable growth can only be achieved through innovation. It is necessary to move from an entrepreneurial ecosystem to an innovation ecosystem. The incorporation of innovation into processes, technologies or new business models is expanding the competitive capacity of companies becoming highly dynamic (upstream strategies) and helping to grow in an environment where access to innovation is the source of key competitive advantages.

From the extraction and transformation of natural resources alone, a long-term sustainable economic
growth path cannot be built. Moreover, innovation has the characteristic of generating greater added value and, therefore, wealth, through increasing companies’ revenues or reducing their costs. That is why thoroughly the world seeks to maximize the effectiveness of innovation processes. Colombia is not alien to this process that, in addition, faces major challenges.

Previously in we reported the results of a survey that was made to 460 companies of the Quindío region, from which a diagnostic about innovation capabilities was generated. The survey evaluated six innovation factors: Innovation Strategy, Deployment of the Innovation Strategy, Culture of Innovation, Innovation in the Value Chain, Innovation Results, and one factor with other additional questions that allowed to establish elements of control, verification and validation of the test results, alignment of future studies, innovation strategy and innovation management models. Found results were the following:

- The first five factors that show an innovation capability between excellent and good; 52%.
- However, companies in the region scored negatively, totally or partially, in aspects related to the control factor, which concluded that 72% of the companies in the region do not ensure surveillance studies.
- 74% of the companies have not participated in open innovation processes.
- 80% do not count with an R+D+I unit
- 71% of the same have not done foresight studies
- 59% have nor formulated or implemented an innovation strategy.
- And 71% of these companies do not count with an innovation model, innovation management model, or innovation management system.

In this sense, the local government of Quindío, aware that the incorporation of information technologies, decided to face new challenges brought by modernization and globalization, recognizes that it is a priority to continue strengthening innovation processes with the aim of generating greater capacity in the regions, increasing its productivity not only because of the direct effect of any innovation, but above all because it will be better prepared to face the uncertainties generated by the current global competition environment and to adapt to the changing conditions of its environment.

2. Reference Framework

2.1 What is Open Innovation?

Open Innovation (OI) is not a clear or concrete concept. In the following, we describe some of definitions for this concept that were found in the literature.

Open Innovation is the set of processes and practices that allow companies to identify and integrate external knowledge to solve their innovation challenges. Service companies and platforms that are dedicated to such search and integration in the company of innovation are called OIAs (Open Innovation Accelerators).

The Open Innovation concept means that companies can (and should) use external ideas as well as internal ideas and follow internal and external paths to the market, as they seek to advance their innovations. In Open Innovation processes, internal and external ideas are combined in platforms, architectures and systems. Open Innovation processes use business models to define the requirements for these architectures and systems, these business models have access to both external and internal ideas to create value, while defining internal mechanisms to claim a share of that value.

Open innovation allows improving the management of both uncertainty and risk. Incorporating external players can reduce the uncertainty associated with ignorance of a market or technology. In addition, risk (financial, reputational, etc.) can be shared among the different players involved in innovation.

In the literature, commonly is reported the use of the metaphor of dichotomies for defining the Open Innovation paradigm. In performed an exhaustive study about the open innovation concept. From this study, they concluded that open innovation is not a new and neither exclusive concept w.r.t. the close innovation paradigm as is frequently presented. However, the mediatic successful of the open innovation is based on its simplicity and attractiveness (i.e., it is appealing because it is simple and retains the linear notion of science to marketplace).

In performed a comparison of the close/open innovation. Principles of open innovation contrast with closed innovation as follows:

- Not all of the smart people work for us so we must find and tap into the knowledge and expertise of bright individuals outside our company.
Table 1. Success cases in the implementation of Open Innovation

| Company                      | Description                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Facebook, United States      | Many Facebook products, services and tools are developed by internal crowdsourcing (open collaboration, distributed) initiatives, known as Hackathons. Facebook is an excellent example of how to harness the intelligence of an internal audience. Through its hackathons, Facebook takes advantage of the talent and ideas of its engineers, so that together they build what they want. In the past, these meetings have proven to be the starting point for many of Facebook's most popular features, such as the LIKE button, Facebook Chat and timeline, as well as other internal tools. |
| BBVA (Banco Bilbao Vizcaya Argentaria), Spain | Innova Challenge is an open innovation contest and Big Data organized by the bank BBVA. One of these contests, generated a number of new banking applications, including an application that can help users avoid long bank lines. In 2014, BBVA launched its second Innova Challenge, an open innovation contest that allowed the bank to work together with the developer community to innovate with block data. |
| AppLovin Corporation, United States | Novel Apple TV is an app award competition that could help change the face of television. Apple TV App Challenge was a big global crowdsourcing contest for marketing AppLovin, a platform to help design and build the future of television. The organizers believe that the future of TV is going to be about applications, the mission was to build the newest (out of the ordinary) and quirky applications possible. |
| Mercedes-Benz Financial Services, United States | Mercedes-Benz Financial Services achieved this with the crowdsourcing contest «Drive Our Future,» an initiative that was suggested by employees during the company's annual global innovation competition. The intention was to collect ideas from car buying and leasing cars, on how the experience of vehicle financing of the future should be. |
| NASA, United States | A SmartWatch application design that could help save the lives of astronauts wins a challenge for NASA. For many years, NASA has been approaching the crowds to help reach out to innovative designs and technologies. The space agency recognizes the power to hire a group of people with interests to help the challenges of space exploration, cosmological research and solve the problems faced by astronauts. Your public contests are also a way to promote greater interest in what you do. |

- External Research Development can create significant value; internal Research and Development is needed to claim some portion of that value.
- We don't have to originate the research to profit from it.
- Building a better business model is better than getting to market first.
- If we make the best use of internal and external ideas, we will win.
- We should profit from others’ use of our IP, and we should buy others’ IP whenever it advances our own business model.

Open Innovation is a process that is based on new forms of collaboration and transparency. It is a way of thinking, not an innovation category. However, it represents a challenge for common sense, especially since it involves articulating with others. Open innovation has the following characteristics:

- Costs can be reduced. It is a perfect choice for small and medium enterprises that do not have an innovation and development department, because the platform allows them to search and take ideas from the outside.
- Innovation is up to date.
- New sources of income can be generated. If a company for some reason cannot develop its idea, it can sell it.
- It allows accelerating the process of innovation.
- Everyone can contribute. Implementing it involves generating a culture of change. Many times, big companies are not able to see their competitors as potential allies. It is necessary to change that perspective and to see, others, as collaborators.

2.2 Success cases in the Implementation of Open Innovation

Table 1 summarizes some successful cases in the world related to the implementation of open innovation strategies. It is essential to ensure agility in the processes of management and transfer of innovation and communication.
Table 2. Open Innovation Platforms

| Platform         | Description                                                                                                                                                                                                 | Allies/Partners                                                                                                                                         | Services                                                                                       | Directed to                                      |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------|
| PLATFORM INNOCENTIVE  | It is an online platform based on open innovation oriented to encourage the exchange of ideas and technological solutions between organizations and researchers based on the idea of crowdsourcing. | Nosco, Strategos, Booz Allen Hamilton, Nature.com, Scientific American, The Economist                                                                  | InnoCentive@Work Premium Challenges Custom Challenge Programs Grandes Desafíos Desafios Showcase InnoCentive Idea Management | Organizations Government Non-profit entities     |
| PLATFORM NINESIGMA  | It is an online marketplace specialized in open innovation services for organizations with international reach. Through its virtual platform offers a complete range of products and services that involve organizations and global community of innovation, and allows to take advantage of these connections to value products and technologies offered. | Caliper, Nottingham Spirk EEUU-UE, Fareimpresa Ibis, Innoco S.A, INVENTTA, Research Institute for Innovation and Sustainability (RIIS), Edison Awards | NineSigma Grand Challenge Innovation Contest Technology Search The Managed Innovation Gallery Technology Landscaping Expert Advisory Services Workshops & training Leadership Summit Economic Development Programs NineSights | Organizations with international reach          |
| PLATFORM INNOVERSIA  | INNOVERSIA, is a portal specially created for companies from all over the world to publish their needs for technological development and innovation, and scientists and researchers to propose possible solutions, receiving compensation if their proposals are accepted. | This platform is presented by the Universia University network, which has: 1401 Ibero-American universities, 19.2 million teachers and university students | Researchers and companies register to view and publish needs and solutions. Researchers can consult and apply for research claims The companies will select the solution most suitable to your requirements After this exchange, companies develop more and better products, patent the solution found and generate new revenues | Companies/ Universities (researchers)            |
| PLATFORM MIMEDELLIN  | MiMedellin is the first platform of its kind in the country and through it, the digital environment and the application of ICTs are used to contribute and disseminate ideas that contribute to the transformation and development of the city of Medellin. | Mayor’s office of Medellin and Medellin intelligent City | Develop and apply new ideas of citizens contributing to the transformation and co-creation of the city. | City of Medellin                               |
| PLATFORM OCEANO  | It is the first Open Innovation Platform in the south end of the continent that links SMEs with so-called developers, academics, researchers or specialized consultants. | The Cloud Coworking and Los Ríos Innova. Regional Innovation and Competitiveness Regional Fund (FIC) | Connect SMEs with experts from universities and research centers. | SMEs                                           |
between the actors of the system: Companies, Investors, Startups, Spin offs and Research Groups of Universities and technological centers. It is key that these actors are integrated and cohesive to produce the levels of competitiveness and differentiation that is required to generate added value.

Hence the need to have expert system that allows and facilitates the interrelation of innovation actors of

| Platform                      | Description                                                                 | Allies/Partners                                                                 | Services                                                                 | Directed to                        |
|-------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------|
| PLATFORM TEAM INGENIERIA DE CONOCIMIENTO | The Open platform is an open innovation platform developed by the company Team Ingeniería, founded in 2008, is a technology-based company that focuses on consulting and training on topics related to knowledge management, technology management and innovation and technology-based entrepreneurship. | Spinoff of the Universidad Distrital Francisco Jose de Caldas, Executor of projects financed by Colciencias, | Consultancy and training on topics related to knowledge management, technology management and innovation and technology-based entrepreneurship. | Companies                           |
| PLATFORM COLOMBIA CO4          | It is the national program of collaborative innovation of iNNpulsa Colombia. | Aldor, Bancóldex, Belcorp, Concreto, Cotecmar Emcali, FCV, Finagro, Haceb, Levapan, Servientrega | Collaborative network to generate solutions. | Colombian Companies                |
| PIACE                         | PIACE is the new Platform for Open Innovation for Business creation that we have promoted from the Institute of Secondary Education (IES) Campanillas de Málaga, along with other partners, to improve the relations between educational institutes and companies through the promotion of The practical experiences linked to innovation and entrepreneurship of our students. | IES Campanillas, IES Mare Nostrum, Politécnico Jesús Marín, Portada Alta de Málaga y el Rosalía de Castro de Santiago de Compostela, Globalia y FUNDEFOP BIC Euronova, Novasoft en el PTA. | Foster practical experiences related to innovation and entrepreneurship of our vocational students. | Educational institutes and companies |
| PLATFORM SUNN SUNN             | SUNN (StartUp Neural Network) is a SW platform that allows the connection between the 4 main agents in the context of open innovation: startups, research groups, industries and investors. Its mission is to provide breakthrough technologies to industrial corporations. | Ministry of Economy and Competitiveness Madrid Network | Bring together in a single network startups, investors, companies and research and development groups. | New companies Business and Industrial Corporations, Research Groups, Technology Centers, Universities, Venture Funds and Capital Investors |
| Yet2                          | Yet2 takes advantage of its open innovation experience to generate a technological strategy in accordance with the flow of its customers. | SMEs | Increase their internal technology research or corporate venture capital functions | SMEs |
national and international scope and that facilitates access to information of the innovation system of the different regions.

Table 2 presents some cases of open innovation platforms implemented in the world and some particularly in Colombia.

3. Methodology

In the following we show the stages that were carried out in order to facilitate an interaction between the different actors of the regional innovation system through open innovation:

- Stage 1. Contextualization and conceptualization about open innovation
- Stage 2. Establishment of requirements and criteria for the selection of the platform to be implemented in the region.
- Step 3. Determine the benefits of the selected platform for the study region.
- Stage 4. Structure the implementation of the platform in the state of Quindío
- Stage 5. Implementation results.

Application of the methodological guide

3.1 Stage 1

The stage 1 of conceptualization and contextualization in issues related to Open Innovation (IA) was presented in Section II-A, as a reference framework with basic concepts of Open Innovation, trends, the implementation of this in Colombia and the world and the main platforms being used.

3.2 Stage 2

The following requirements were established for the selection of the platform, which should enable:

- The creation of an Innovation community in which Research and Development groups, Start Ups, Spin Offs, Companies and Investors participate; in which they can interact in a dynamic and efficient way.
- The management of innovation offers a simple way, as well as collaborates more effectively in the development of competitive solutions.
- The publication of research and / or innovation technologies, processes and products of R & D, Startups and Spin Offs Groups, among other stakeholders.
- The execution of processes of collaboration, projects, product development, generation of patents, records of use and licenses with companies.
- An easy and effective access of users to relevant information in the innovation ecosystem in a way that allows them to make timely and objective decisions.
- The creation of collaborative networks, where companies seeking innovation (Seekers), have developed and implemented Research and Development + i teams, large companies, small and micro enterprises in the state of Quindío, have generated innovation capabilities, offer rewards to people (solvers) who are able to solve problems or challenges that are published.
- The platform must have a previous base knowledge with Startups, Research Groups and Investors worldwide, that allows the communities of innovation of the state of Quindío to interact immediately.

Based on the previous study carried out on other platforms, the following initial selection criteria was established in order to identify the platforms that best fit the needs of the region:

- Cost of the implementation of the entire ecosystem. This criteria not only refers to the software application, but also to the business ecosystem, that is, the connection with research groups, the approach of challenges, the accompaniment to the entrepreneurs, the selection of solvers, amongst other aspects of relevance to achieve the objectives raised by the use of the open innovation platform.
- Transfer of capacities for the management of the platform
- Previous use in the Colombian context
- Success rate
- Number of solvers
- Possibility of operation in Spanish
- Possibility of application in the private sector
Possibility of application in MISMEs

Some of the open innovation platforms studied correspond to university spin-offs or web pages where open information is shared by anyone who is interested in a specific theme or challenge. However, they do not really correspond to platforms with an adequate number of solvers and seekers, with a special support when the winning options are chosen and where it is necessary to enter to review everything concerning intellectual property between the searcher and the solver.

It was of relevance for the implementation of open innovation in the region, to find a platform where it was possible the interaction for MySMEs and that in the same way, this platform allowed the connection with the world, that is to say, seekers and solvers that are not only in Colombia, but open to other countries in the world. Having said this and after the benchmarking used for the different existing platforms, it was considered that the SUNN platform is the most suitable for the region.

SUNN was selected as a government strategic tool for a national program called “Pacts for innovation - Pactos por la innovacion (in Spanish)” led by COLCIENCIAS (the public national department that leads, guides and coordinates the national policy of Science, Technology and Innovation, and the National System of Science, Technology and Innovation in Colombia). This strategy intended to mobilize and support the commitment in companies to invest in innovation as a part of its growth strategies.

An important aspect to highlight is the possibility to create innovation communities through the platform. An innovation community allows to region knowing and facilitating the innovation dynamic between its actors and offer agile and timely information about its performance. In Colombia exist 3 innovation communities: Medellin (led by the Ruta N initiative), Colombia (Led by COLCIENCIAS) and now Quindio (led by Quindio government).

Authors in highlight the support of the SUNN platform to integrate the agents of the system, i.e., enterprises, startups, universities, technological centers, and investors. Currently, this combination of agents is not explicitly covered by Open Innovation models, however, SUNN supports it. SUNN model has 5 actors: research groups, startups, enterprises and investors, and the fifth actor is represented by innovation ecosystem entities that promote Sti (science, technology and innovation) activities like Colciencias and Ruta N.

Other features of the SUNN platform that are relevant for an Open Innovation Ecosystem are the following:

- Discovering, for discovering innovation possibilities
- Scouting, creating an innovation ecosystem agent for each enterprise or startup, or research group in universities.
- Matching, addressing for each agent the deal flow, and detecting innovation sources.
- Cooperation, allowing the direct relationship between innovation applicants and suppliers.
- Contest, facilitating open calls to resolve specific challenges that affect competitiveness.

3.3 Stage 3

The following benefits of implementing this platform for the region were considered:

- A powerful tool to implement challenges that obey strategic decisions of the Science, Technology and Innovation Policy of the state to focus the use of resources and analyze their impact on society.
- The connection between companies, investors or funds, StartUps, Spin Offs and Research Groups nationally and internationally in an active community to generate business from innovation, which will result in the recognition of the state of Quindio as an active motivator for innovation.
- The Quindio Innova Project must be able to know the innovation cells most demanded in the ecosystem(s), which will allow them to have knowledge of the most common demand and innovation offerings within the interactions, to have decision elements in their strategy for each stakeholder group.
- To have a dynamic tool in which the innovations searches of companies can be reflected, so that the research groups and Spin Offs can enrich their value proposition.
- Quindio Innova must show the world in an efficient way the capacities of the R & D, Startup and Spin Offs Groups of its community, encouraging the development of its businesses globally.
- The region must have a tool that increases the effectiveness of the relationship processes between Universities, Startup, Spin Offs and
financiers of regional and global innovation; and can effectively connect with innovation agent's worldwide, allowing effective links between suppliers and demand for innovation.

Quindio Innova must be able to generate indicators of processes of collaboration between the actors of Innovation from the platform.

3.4 Stage 4

Finally, when analyzing the topic of open innovation in Colombia and in the world, and after defining the platform for the region, it was considered that the structure for the implementation of the same through:

Creation of a Community: this was the first step, for which all potential actors in the region had been taken into account. The Quindio community had 100 business users and the StartUp and Research Groups. The three sectors selected to start the process of open innovation are: Tourism, ICT and Agro-industry.

Due to the above, the users were classified by type of profile:

- **Startup**: in this type of profile can be the StartUps, Spin offs of the region and related with the sectors of interest, just as they are validated with the criteria of SUNN (technological offer with intellectual property).
- **Companies**: in this profile, companies were identified in the region, in the selected sectors.
- **Research Group**: research Groups that have to do with industries of interest.

Training for users: The Sunn team (4i Latam) trained up to 100 users in the use of the SUNN platform. They are expected to replicate training for further implementation in other sectors.

Consolidation of the Community: after the creation of the community, it is fundamental to consolidate it, through activities that stimulate the interaction of the different players in the regional innovation system in the selected sectors, some of which may be:

- Continuously maintain the search processes for new actors of innovation, the generation of collaboration processes and other activities to keep the community active, facilitating its growth and strengthening.
- Maintain the dynamics of the collaboration processes of the platform in the different stages: connection, communication and exchange of relevant information and the structuring of collaboration processes
- Accompaniment of the interactions between the actors, to motivate the different processes of collaboration
- The launching of challenges within the community that are in line with the development policies and / or needs of the country's companies
- The review of the most used innovation cells, generating relevant information for programs that encourage, promote and manage the knowledge, learning and development of these, as well as the resources that can be used.

3.5 Stage 5 – Implementation Results

The implementation plan that was agreed with the advisors of SUNN (i.e., Ruta N) included the socialization and training to users of Quindio (enterprises, research groups, and startups). This training was performed in accordance with the profile of the users, grouping them regarding their categories. Fifty-five companies, twenty-nine startups, and thirty-five research groups were trained and registered in SUNN platform.

Some of the trainings were developed at region's Universities such as Universidad Del Quindio, Universidad Gran Colombia and EAM. Others trainings were developed at the Chamber of Commerce of Armenia and Quindio. The idea of organized trainings at universities was involved the research groups and academic sector in the innovation ecosystem, and finally to achieve the integration of universities, enterprises and State in the same innovation ecosystem.

Once the process of registration and acknowledge was performed, an event called Meet up in the region was done. This event attempted to maximize the opportunities that the SUNN platform provides, through offline spaces among the actors of the platform. The goal of this event was the identification of technological capacities of research groups and entrepreneurs by the profiles of SUNN (i.e., solvers and seekers). It allows generating of rentable relationships from the technological management viewpoint, making a commitment from the universities and the active participation of the local partners.

Another performed activity for making dynamic the innovation system was the creation of innovation chal-
challenges, which allows to enterprises, startups, and research groups, to recognize their capacities and generate the required alliances for solving problems, or creating products or services in combination. To date, forty innovation challenges were proposed in the SUNN platform. In addition, alliances between research groups and companies were proposed to resolve these challenges. Finally, the Quindio community is in integration with other communities in Colombia. The next section gives more information about the obtained results of the implementation of the SUNN platform.

5. Preliminary Results and Learned Lessons

One of the most important objectives of this project was to create and mobilize an innovation ecosystem for the region, giving to the involved companies’ capabilities for being more competitive. Through an open innovation paradigm supported by a platform such as SUNN, this project achieved to generate an innovation culture in the region. Currently, entrepreneurs are starting to understand the importance of innovation and Research and Development for the growth of their companies and the importance of create alliances between research groups, startups and even with others companies.

One finding in this process was that a lot of companies in the region produce new technologies, or innovation solutions for solving internal problems, but they did not realize about the value of the knowledge they generated. In this way, the open innovation ecosystem gets the followings achievements:

- 15 new research groups inside companies, these groups are registered in SUNN platform as solvers, now they can share their knowledge and solutions for others companies.
- 30 new Research and Development teams created inside some companies in the region, some of them are registered in SUNN platform as enterprises and other as startups. Now they are scouting for new technologies and share challenges for finding technologies they need.
- To date, SUNN reported 26 innovation challenges that were published by enterprises in region which require solving technical problems and are looking for a startup or research group for creating a relation and finding solutions to their needs.
- Companies are scouting through SUNN, about research groups for creating value connections to generate innovation projects to present in public calls.
- Companies, research groups and startups are scouting and connecting through SUNN platform with other innovations communities in the country as Medellin and Colombia.

The SUNN platform allowed connecting companies, research groups, and startups of Quindío, with accessible costs. The open innovation ecosystem also allowed that actors recognize their capabilities, and therefore, to work with a different dynamic that is oriented to the competitive through innovator products and services. SUNN has a global strategy in which, through local strategies for innovation, it is possible to be connected with other nearby communities (Medellin, Quindío, Yachay etc.) and with the World.

6. Discussion

The implementation of the Open Innovation paradigm had been widely studied as we related in the initial part of this article, however some important aspects deserve to be discussed. First, implementation of the paradigm in a traditional way (without a platform and ecosystem). According to 14, external Research and Development can create considerable transaction cost for companies; one of the most important issues is related to the technological leakage or knowledge losses due to the opportunistic behavior by contracted firms or actors involved in this process. Second, the achievement of patents. In accordance with the formalization of the innovation ecosystem and the relations among the contracting companies, the generation of new patents could be successful; however, it is required the promotion of legal frameworks that protect the contractual relationships between the enterprises.

For the project, the use of dichotomies for describing the open innovation paradigm (Section II.A) is not a suitable approach due to the lack of a previous referent for inducing a dichotomy reasoning (i.e., if something is not true, surely it must be false; if something is not false, surely it must be true). Therefore, a replication of successful cases for open innovation in Colombia was chosen for the project.
6.1 Comparison with other Open Innovation initiatives in World

According to 25, and taking into account Section II-A, several successful cases in the world related to the implementation of open innovation strategies was found. Companies as Lego (through its initiative Lego Mind storms), Dell, Starbucks, IBM, Facebook, among others, are using open innovation for the development of new projects, products, and services.

When performing an analysis with the information obtained from the platforms, it is found that the platforms that are best suited for the project are the SUNN platform and the OCEANO platform. Both platforms provide the necessary elements to achieve the objectives of the Quindio Innova project. However, based on previous experiences in the country, and taking into account the greater connectivity with the world, the SUNN platform provides better cost-benefits.

6.2 Comparison with other Open Innovation initiatives in Colombia

In Colombia, Corona (www.corona.co) was one of the first organizations that implemented an open innovation strategy. It was performed to support the talent and the knowledge, and also, for guaranteeing the growing of companies. The strategy gives to Corona a capacity for working with external networks, which is important to consolidate an innovation capacity.

SUNN is a platform widely used in Colombia, specifically in the city of Medellin, with projects that include: Ruta N, Bancolombia, Grupo Familia, and others. The Medellin Innovation community (5000 actors) is generating collaborative and impact projects for the competitiveness of organizations and the region through SUNN. With SUNN in Massachusetts, the Innovation community is being created with Harvard University and MIT; and in Israel there are more than 2000 StartUps.

In Colombia, another two successful cases about the use of SUNN were identified: Tecnova and Semintel. These companies have achieved connections, advances and results with different actors of the Innovation System, using SUNN as its open innovation platform.

7. Conclusions and Further Works

This work reported the implementation of an Open Innovation initiative in the Quindio region of Colombia. This initiative is supported in the use of the SUNN platform for Open Innovation. We reported the methodological application in the implementation of the open innovation strategy since 2015 to date. In addition, the obtained results of the project were shown.

Currently, the innovation ecosystem is interacting we other innovation communities. Enterprises, universities and local State are committed with the innovation ecosystem and this is the first step to change the future of the productive sector in region.

With entities, such as COLCIENCIAS at the national level, Yachay in Ecuador and the Pacific Alliance at the multinational level. The processes of collaborative innovation are taking shape, SUNN is the innovation tool that will allow the actors of Innovation in our regions to communicate effectively and carry out projects that increase the competitiveness and opportunities for our regions

As future work, SUNN as a platform must improve efforts on dynamize the innovation circle to include horizontals research groups into innovation ecosystems to generate traction in the ecosystem. Also, it’s important to find a way that traditional companies collaborate with Startups, creating intellectual property strategies to protect companies but also allowing the integration between Startups and companies processes.

On the other hand, identify economy sectors in Quindio region and build and innovation map is a labor that must be realized, for example in the coffee sector or agro-industry sector, is important to identify sub process and build a map that related them with the five ecosystems and 128 cells defined in SUNN.

As further activities of the Open Innovation initiative we plan to mobilize the ecosystem through challenges, agreements and public calls to strengthen the ecosystem.

8. Acknowledgment

Authors would like thank National Planning Department, General royalty system in Colombia, the government of Quindio, Camara de Comercio de Armenia y del Quindio and Parquesoft Quindio.

9. References

1. Hacia los Ecosistemas de Innovacion. Date accessed: 19/03/2016: Available from: http://blogs.cincodias.com/innovacion-abierta/2016/02/hacia-los-ecosistemas-de-innovaci%C3%B3n.html.
2. La innovación abierta – Factor clave para el emprendimiento. Date accessed: 29/08/2015: Available from: http://campuse.ro/events/MachalaTech/talk/la-innovacion-abierta-factor-clave-para-el-emprendimiento/#more-information-panel.
3. Sossa JWZ, González JAR, Reveiz RE, Gomez CAG, Uribe JHD, Garces JG. Innovation capabilities. Measurement of Innovation capabilities in 460 companies of Quindio-Colombia. Colombia, Revista Espacios. 2016; 37(10):2.
4. Ruiz CF. Plan Estrategico Departamental de Ciencia, Tecnología e Innovacion. 2013; p. 1-434.
5. Cinco días-Blogs. Date accessed: 07/07/2017: Available from: http://blogs.cincodias.com/innovacion-abierta/.
6. Striving for Innovation Success in the 21st Century. Date accessed: 13/05/2016: Available from: https://www.technologyreview.com/s/601459/striving-for-innovation-success-in-the-21st-century/
7. Innovacion abierta, un ingrediente de éxito en la era digital. Date accessed: 27/11/2016: Available from: http://www.expansion.com/economia-digital/innovacion/2016/01/27/56a78e60e2704e15558b45f2.html.
8. Trott P, Hartmann D. Why ‘open innovation’ is old wine in new bottles. International Journal of Innovation Management. 2009; 13(04):715-36. Crossref
9. Chesbrough HW. The era of open innovation. Managing innovation and change. 2006; 127(3):34-41.
10. Gomez UCdIEJG. La innovacion abierta: una estrategia global. 2014.
11. Pactos por la Innovacion. Date accessed: 05/05/2017: Available from: http://www.colciencias.gov.co/portafolio/innovacion/empresarial/pactos.
12. El mercado de la innovacion abierta. Date accessed: 17/12/2013: http://blogs.cincodias.com/innovacion-abierta/2013/12/en-abril-de-este-a%C3%B3rrese-ha-publicado-un-interesante-estudio-sobre-el-mercado-para-la-innovaci%C3%B3n-abierta-o-the-2013-rwth.html.
13. Innovacion abierta: casos de exito. Date accessed: 05/08/2005: Available from: http://blogs.alianzo.com/redessociales/2008/08/08/innovacion-abierta-casos/.
14. Santamaria L, Nieto MJ, Gil AB. The Relevance of Different Open Innovation Strategies for R&D Performers. Cuadernos de Economia y Direccion de la Empresa. 2010; 13(45):93-114. Crossref
15. 500+ Open Innovation Success Stories. Date accessed: 30/11/2010: Available from: https://www.ideaconnection.com/open-innovation-success/.
16. Our Offering Move beyond the standard modes of thinking and problem solving. Date accessed: 26/06/2017: Available from: https://www.innocentive.com/offering-overview/
17. Open Innovation Services. Date accessed: 13/12/2016: Available from: http://www.ninesigma.com/open-innovation-services.
18. Que es Innoversia? Date accessed: 13/12/2016: Available from: http://www.innoversia.net/
19. Innoversia, el nuevo portal para el desarrollo tecnologico y de innovacion. Date accessed: 17/04/2009: http://www.ie.edu/es/universidad/noticias-eventos/noticias/innoversia-el-nuevo-portal-para-el-desarrollo-tecnologico-y-de-innovacion/
20. Ciudadana MC-c. Preguntas frecuentes. Date accessed: 13/12/2016: Available from: http://www.mimedellin.org/faqs
21. La innovacion como fuente de competitividad. Date accessed: 04/07/2016: Available from: http://www.innovacion.cl/2014/10/la-innovacion-como-fuente-de-competitividad/
22. Colombia Pi. Firmas consultoras. Date accessed: 13/12/2016: Available from: http://www.propiedadintelectualcolombia.com/site/Intervenci%C3%B3nEmpresarial/FirmasConsultoras/TEAMIngenier%C3%ADadeConocimientoLtda/tabid/173/Default.aspx
23. Inicio el proceso de evaluación de propuestas de solución en Colombia CO4. Date accessed: 20/06/2015: Available from: http://mprende.co/innovacion/inicio-el-proceso-de-evaluacion-de-propuestas-de-solucion-en-colombia-co4
24. Tecnología OvTTd. PIACE: Plataforma de Innovacion Abierta para Creacion de Empresas. Date accessed: 17/10/2013: Available from: http://www.ovtt.org/destacados/piace
25. Plataforma de innovacion abierta SUNN. Date accessed: 13/12/2016: Available from: http://rutanmedellin.org/es/oferta/empresarios-y-emprendedores/acceso-a-tecnologias-productos-y-soluciones/item/plataforma-de-innovacion-abierta-sunn
26. Strategic Dealflow Service. Date accessed: 13/12/2016: Available from: http://int.yet2.com/pages/sourcing-step-change