

## **Committee on Development and Intellectual Property (CDIP)**

**Fourteenth Session**  
**Geneva, November 10 to 14, 2014**

### **IN-DEPTH EVALUATION STUDY FOR THE PROJECT ON OPEN COLLABORATIVE PROJECTS AND IP-BASED MODELS**

*commissioned by the Secretariat*

1. The Annex to this document contains the Study entitled “In-Depth Evaluation Study for the Project on Open Collaborative Projects and IP-Based Models”, prepared by Prof. Ellen Enkel, Head of the Dr. Manfred Bischoff Institute of Innovation Management of the Airbus Group, Chair of Innovation Management, Zeppelin University, Friedrichshafen, Germany, as one of the deliverables of the “Project on Open Collaborative Projects and IP-Based Models”.

2. *The CDIP is invited to take note of the information contained in the Annexes to this document.*

[Annex follows]

**Note: The views expressed in this study are those of the author and do not necessarily reflect those of the WIPO Secretariat or any of the Organization’s Member States.**

IN-DEPTH EVALUATION STUDY FOR THE PROJECT ON OPEN COLLABORATIVE  
PROJECTS AND IP-BASED MODELS

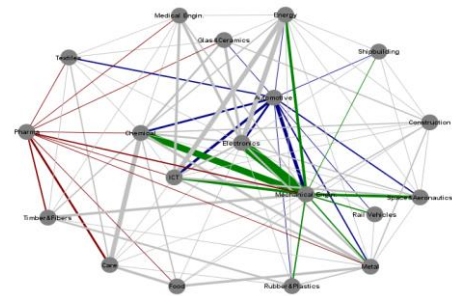
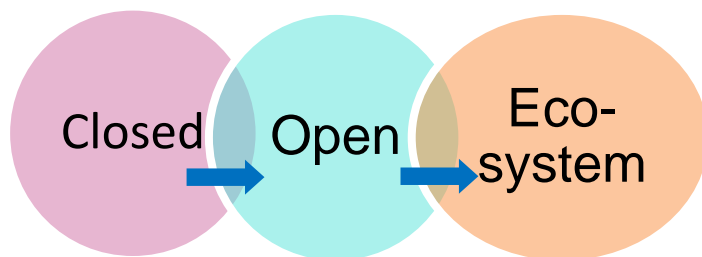
Study by Prof. Ellen Enkel, Head of the Dr. Manfred Bischoff Institute of Innovation  
Management of the Airbus Group, Chair of Innovation Management, Zeppelin University,  
Friedrichshafen, Germany

## EXECUTIVE SUMMARY

1. Although academic as well as practitioners' papers are mostly based on open innovation examples from the developed world such as Procter and Gamble, Philips, or IBM, this reports illustrates with seven examples that open innovation is already very advanced in the developing world. All projects use multiple collaborations and a wide range of different and flexible agreements to expand their scarce resources. All projects have built an ecosystem of supporting partners around them to expand their sphere of influence and reach social goals they could never reach as a single organization.
2. By analyzing the projects Ushahidi, iHub, Eclipse, the Human Genome Project, Desertec, Cambia, and Algeria's Cyberpark based on a well-researched taxonomy, we were able to derive three main success factors of all projects. To enlarge their ecosystem quickly and maintain innovation by reducing knowledge asymmetry between partners and users, all projects use open-source software and specific rules for contribution and commercialization. Scarce resources and a lack of access and understanding of the patent system are further drivers of the use of open-source agreements. Additionally, all projects use a variety of formal agreements and approaches to openness to meet the needs of big enterprises from developed countries, entrepreneurs or nonprofit partners.
3. Consequently, WIPO could broaden its service for organizations in developing countries based on their need for a wide range of different agreements, patent pools, and translations into national languages and more understandable text documents. WIPO should especially bear in mind that the development of an innovation ecosystem and the use of open-source software could create major advantages when accelerating innovation in developing countries.

## CONTENT

EXECUTIVE SUMMARY .....	2
OVERVIEW ON THE EVOLUTION OF CONCEPTS OF OPEN COLLABORATIONS .....	4
HISTORY OF OPEN COLLABORATIONS .....	4
OPEN COLLABORATION IN INNOVATION ECOSYSTEMS .....	7
IP MANAGEMENT IN OPEN COLLABORATION .....	7
HOW AN INNOVATION ECOSYSTEM WORKS - EXAMPLE .....	8
BENEFITS OF, CHALLENGES OF, AND LESSONS LEARNED FROM EXISTING PROJECTS .....	8
MAPPING OPEN INNOVATION ACTIVITIES THROUGH PROCESS PERSPECTIVE .....	8
USHAHIDI .....	11
IHUB .....	11
ECLIPSE AND ECLIPSE FOUNDATION .....	12
THE HUMAN GENOME PROJECT .....	12
DESERTEC .....	13
CAMBIA AND THE LENS PROJECT .....	13
ALGERIA'S CYBERPARK PROJECT: SIDI ABDELLAH .....	13
COMPARATIVE STUDY OF IP MODELS .....	14
WHAT MAKES AN OPEN INNOVATION INITIATIVE SUCCESSFUL .....	16
USE OF OPEN-SOURCE SOFTWARE .....	16
SCARCITY OF RESOURCES TO ENFORCE IP .....	16
VARIETY OF FORMAL AGREEMENTS AND APPROACHES TO OPENNESS .....	16
CONCLUSIONS AND RECOMMENDATIONS .....	16
BIBLIOGRAPHY .....	18



## OVERVIEW ON THE EVOLUTION OF CONCEPTS OF OPEN COLLABORATIONS

1. Originally, *open innovation* was considered the purposeful outflow and inflow of knowledge into the innovation process (Chesbrough 2003). This includes the search for new technologies outside a firm's R&D department, the integration of customers' ideas, the co-development with suppliers and the spin-off of new businesses not fitting to the core strategy.

Open innovation is the osmosis and reverse osmosis of knowledge across the porous interface between an organization and its environment (CDIP/6/6 rev).

2. Open innovation is here a strategic decision of the company to increase and accelerate innovation and efficiency using external resources. This approach is widespread in Europe and can be seen as a dominant design in innovation management although the degree of openness varies in companies of different strategic approaches and sizes (Bader and Enkel, 2014). Open innovation 1.0 is based on transferring knowledge, expertise and even resources from one company or research institution to another. Open innovation is not the cure for every problem and there are still good reasons to balance it with other approaches (confidentiality, lack of expertise outside the company, weak collaboration culture within the company or within an industry, more focus on incremental innovation).

3. On the other hand, only if the knowledge can be absorbed from the desired company or research institution can it increase innovation or efficiency. Certain problems can arise, for example, related to collaborative capabilities of employees, lack of search abilities, and cognitive distance from the source. Successful knowledge transfer also requires the willingness and ability of involved actors to understand and communicate complex, technical ideas, sometimes within very diverse cross-disciplinary and cross-cultural university and business environments.

## HISTORY OF OPEN COLLABORATIONS

4. The increasing globalization of research, technology, and innovation; new information and communication technologies; and new organizational forms and business models' potential, reinforce the importance of finding new ways to innovate. Before the 1980s, organizational structure changed into developing independent units which could take care of their own knowledge demands. These drivers resulted in a huge growth of collaboration and the opening up of the innovation process to integrate external knowledge.

5. In the last decade, stronger global competition has led to sharing of labor and cooperation in innovation. Most industries now regard agility, flexibility, and concentration on core competencies as competitive advantages. The “do-it-yourself” mentality has become outdated in technology and R&D management. As the focus shifted from purely internal R&D activities, the academic community started emphasizing that a firm’s boundaries should be opened to outside innovation.

“Technology partnerships between (and in some cases, among) organizations have been rising rapidly since the 1970s. From 1976 to 1987, the annual number of new joint ventures rose six-fold; by 1987, three-quarters of these were in high technology industries [...]. As the costs (including risk associated with R&D efforts) continued to increase, no company could remain a ‘technology island’ and stay competitive” (Trott and Hartmann, 2009, p. 719).

6. Successful small, medium-sized, and big enterprises have developed a network of bilateral and multilateral relationships to the external environment to gain the knowledge or skills needed or to learn from their partners. Multiple partners in innovation can be found along and outside the value chain, as well as on different horizontal levels and from other industries (Laurson and Salter, 2006). Those relationships form a network of knowledge flows the company is embedded in and needs to manage successfully to increase benefit.

7. There are many motives for single cooperative arrangements, such as risk reduction, economies of scale, rationalization, technology exchange, enabling organizational learning, coopting or blocking competition, overcoming government-mandated trade or investment barriers, facilitating initial international expansion of inexperienced firms, and vertical quasi-integration: linking the complementary contributions of the partners in a value chain. External drivers as well as internal needs require companies to cooperate in many different forms and with a variety of partners. Yet those demands still offer a wide range of cooperative agreements and forms to be fulfilled: integrating existing technologies by licensing from a partner, co-creating certain products or services with partners, or learning from other industries and copying their principles.

8. As Paul Trott and Dap Hartmann (2009) illustrate, a purposeful outflow and inflow of knowledge has been targeted for most companies decades ago.

“So, the available literature informs us that R&D managers have recognized for over 100 years that not all knowledge and expertise resides within their firm. Moreover, for the past fifty years, R&D managers have been exploring how best to exploit knowledge beyond the firm.” (Trott and Hartmann, 2009, p. 719)

9. But while these authors primarily argue that open innovation is nothing new as coined by Henry Chesbrough (2003), they recognize that collaborative activities have huge advantages and might not have been done strategically. The value of the open innovation paradigm is in the attention it draws to the appropriate balance between open and closed innovation as well as its support of purposeful inflow and outflow of knowledge through activities like networking, idea competitions, and crowdsourcing. Additionally, as the concept of open innovation (1.0) developed from focusing on a single organization and its relationships towards a more ecosystem-based view (open innovation 2.0), influencing many stakeholders, partners, goods, consumers, users and governments, we can see an evolution of the concept.

10. Rightly, Dahlander, Gann, and George (2011) pointed out in their taxonomy on open collaborative projects that there are different forms of openness in inflows as well as outflows and different means of appropriability (see table 1).

**Table 1: Different types of openness**

	<b>Inbound innovation</b>	<b>Outbound innovation</b>
<b>Pecuniary</b>	<b>Acquiring</b> Acquiring inventions and input to the innovative process through informal and formal relationships [...]	<b>Selling/Licensing</b> Out-licensing or selling products in the marketplace [...]
<b>Non-pecuniary</b>	<b>Sourcing</b> Sourcing external ideas and knowledge from suppliers, customers, competitors, consultants, universities, public research organizations, etc. [...]	<b>Revealing</b> Revealing internal resources to the external environment [...]

Source: based on Dahlander and Gann (2010), p.706.

11. Although knowledge is not reduced by sharing, it cannot be made unusable to others. This could demotivate collaborative innovation. “An appropriability regime affects an innovator’s ability to generate rents from innovation and therefore influences the incentive to innovate” (Dahlander, Gann and George, 2011, p. 6). Whereas formal appropriability or intellectual property rights are patents, trademarks, or copyrights, informal forms are complementary assets, first-mover advantages, or secrecy.

“With weak appropriability regimes, the profit margin will be driven to zero [...], and in the absence of appropriability, firms have to rely on speed to market, timing and pure luck [...]. Strong appropriability regimes provide incentives to invest in innovative activities, but can endanger the cumulative advance by limiting the use of the underlying knowledge. Weak appropriability regimes, in contrast, often result in knowledge becoming widely distributed, and this can create disincentives to innovate” (Dahlander, Gann and George, 2011, p. 6).

12. As a key insight, the above-mentioned authors conclude that the relative inefficiency of one mean of appropriability is typically compensated by a greater reliance on another (Dahlander, Gann and George, 2011, p. 8). Therefore, organizations consider various means of appropriability by working with different partners and different knowledge goods in a dense net of relationships. While open innovation 1.0 refers to the perspective of one organization, open innovation 2.0 takes into account this broader perspective.

Open Innovation 2.0 means on the one hand side that a specific innovation cannot be seen as an isolated activity without considering their consequences for its entire economic and social environment. On the other hand close collaboration, interaction and exchange among all stakeholders in an innovation ecosystem addressing business and social opportunities or challenges can lead to higher impact of innovations (European Commission, 2014, p. 5).

13. For instance, the invention and extended use of smartphones have significantly changed customers’ behavior, created new markets and fostered new opportunities for further innovation in this and other markets, including mobile payment, online shopping or information search. This new perspective towards open innovation 2.0 incorporates the development of new products, services, and business models to address relevant socioeconomic issues such as green growth,

health care, nutrition, sustainable energy, and the digital economy. As the majority of literature on open innovation is based on cases in developed countries (see e.g. Enkel et al. 2009; Dahlander and Gann 2010; Lichtenthaler 2011; Huizingh 2011; Jazairy 2010; Schroll and Mild 2012) the wider perspective of open innovation 2.0 might offer crucial potential for developing countries. It yields more opportunities to target bigger challenges in health, food, and poverty because it enables organizations to link up with companies, communities, and support and build an ecosystem of exchanging and creating knowledge and resources.

Ecosystems as the “fifth generation of network innovation” (Ritala et al., 2013) provide a framework for the description of networks of collaboration and competition that goes beyond the firm as focal actor. It allows one to consider the entirety of commercial and noncommercial actors directly or indirectly involved with an innovation (Palo & Tähtinen, 2013).

14. Stakeholders and participants in such an ecosystem can include business entities, universities, intermediate public and private research organizations, but also governmental organizations and agencies as well as citizens, societal interest groups, and financial entities. Within such an ecosystem, relevant participants engage with each other through multiple channels, even by pooling their internal resources: equipment, knowledge, technology, finance, people, markets, and data.

#### OPEN COLLABORATION IN INNOVATION ECOSYSTEMS

15. This co-creative approach to open innovation is more than simply sharing resources, risk and reward. It envelops the integration of the entire innovation ecosystem and thereby is about creating new markets, more effective business models, and integrated supply chains, which would not exist otherwise. A precondition for this co-creative approach is that all parts of the innovation ecosystem are engaged in developing also “exchange” and especially “absorptive capacity” to take part of it and benefit from it. While co-creation formerly meant cooperation between (mainly) complementary partners through alliances, cooperation, and joint ventures during which give and take are crucial for success (Gassmann and Enkel, 2004, p. 20), in an ecosystem co-creation works on different levels. Organizations can, for example, integrate external ideas from customers or users, can co-create platforms based on those ideas with a university or another company, and can distribute certain value creation to other individuals or groups. Tools used for co-creation can be workshops, meetings and projects or online tools like platforms, social networks, virtual working spaces or chat rooms.

“Co-creation refers to the joint development of knowledge through relationships with specific partners. Examples of relationships are consortia of competitors, suppliers and customers, joint ventures and alliances, as well as with universities and research institutes. Co-operation is usually characterized by a profound interaction between parties over a longer period of time” (Gassmann and Enkel, 2004, p. 21).

#### IP Management in Open Collaboration

16. As the expert report of the European Commission (2014, p. 28ff) pointed out, the increasing importance of open innovation and new technologies — where innovative business models are created from combining information spheres — is placing new, more sophisticated demands on our intellectual property (IP) system. Every great inventor today acknowledges that his or her achievement is built on those of others, and recognizes that quite often, similar breakthroughs could have happened elsewhere because science has an ineluctable logic of peer competition and problem choice. This logic has indeed since long been recognized in science and technology. The recent trend towards scientific and technological specialization has led to the increasing need for different inventions to be combined to generate bundles of exploitable IP. Hence, IP needs more sophisticated management.



17. We therefore need to value the social benefits of IP to articulate better corporate management among future innovators and entrepreneurs, so they can best generate value from ideas and enter new markets. Such IP will include not only patents and copyright, but also trademarks, design rights, open source, creative commons, privacy commons, publications, secrecy, and non-disclosure agreements. It also includes more informal forms of IP such as restricted access to information, the role of fast innovation cycles (primarily first-mover advantage before others catch up or technology moves on) complex product design, commitment, trust, and loyalty.

18. We should also note the different international rules, under which our competitors, for example in the United States, operate with “user rights” (as opposed to exclusive rights to owners) to IP to enable users of IP to innovate in an innovation ecosystem. In Europe, we generally leave the enforcement of exclusive rights to owners, holding back new business models and leaving European entrepreneurs less competitive internationally.

19. Although value-driven IP has created and still creates many opportunities for businesses in the age of knowledge-sharing, institutional factors affect how intellectual asset markets work. The increasing number of court cases illustrates how the IPR system can become a drag on growth and progress. Furthermore, courtrooms calculate losses for firms and society under the illusion that knowledge does not have a social origin and is solely the result of individual effort, contrary to all we know about science and technology, especially in innovation ecosystems.

20. Additionally, in developing countries, asymmetry of knowledge between partners, such as a big international cooperation and a small African entrepreneur, hinders innovation and collaboration, because of protection mechanisms normal to the big cooperation and not affordable for the entrepreneur.

## **HOW AN INNOVATION ECOSYSTEM WORKS – EXAMPLE**

21. To exemplify this new way of innovating in ecosystems, consider the open photonics project of Jason Eichenholz. Open Photonics Inc. helps its clients speed up their product development from early stages on. They specialize in solutions based on photonics and use a crowd-sourcing grant program called “Photonic Horizons.” With this program they join the photonic-based ideas of private innovators, small companies, and university staff to established companies that want to make these ideas ready for the market. The companies gain access to outside ideas without having to pay the whole workforce of inventors. The idea behind Open Photonics came from a company called Ocean Optics, which was based in the U.S. and had about 200 employees. When its long-term R&D strategy started to produce only incremental, instead of radical, innovations, Eichenholz, its CTO, implemented an open innovation strategy. They established a crowdsourcing program available over the Internet called “Blue Ocean Grant.” Split into two phases, the company asked a global audience to submit ideas to receive funding of \$10,000, with which roughly 10 teams could then work on a proof of concept. The next step would be that one project would receive funding of \$100 000. The overwhelming response and success of the project is said to have quadrupled the company’s R&D capacity in

its first year, increased its brand value and driven internal change. Out of this success, Eichenholz created Open Photonics, the successor to the original crowdfunding project (see <http://www.open-photonics.com/Team/jason-eichenholz> for more information).

## **BENEFITS OF, CHALLENGES OF, AND LESSONS LEARNED FROM EXISTING PROJECTS**

### **MAPPING OPEN INNOVATION ACTIVITIES THROUGH PROCESS PERSPECTIVE**

22. To map open innovation activities, we use the widely known concept of core process types (Gassmann and Enkel, 2004), easily applicable to every member of an innovation

ecosystem. There are three main processes in open innovation: outside-in, inside-out and coupled.

23. Outside-in refers to accessing external knowledge to enrich the company's own knowledge base through the integration of suppliers, customers, and other external knowledge sources. This process can increase a company's innovation and reflects the fact that the locus of knowledge creation is not necessarily the locus of innovation. Activities like customer or supplier integration through Web platforms or workshops, crowdsourcing through intermediaries like Innocentive or NineSigma (solution sourcing), yet2com (technology sourcing) or Atizo (idea sourcing) as well as university contract research or licensing are important. This process reflects increasing awareness of the importance of innovation networks to matching and unique sources of knowledge.

24. One of the best-practice examples for this process is the High-Tech Campus Eindhoven initiated by Philips. Built upon the former Philips "NatLab" founded in 1914, it was transformed into an open campus in 1999, and was opened up to other high tech companies that innovate with similar technologies. Today, roughly 125 companies collaborate on campus, thanks to effective clustering of knowledge and a beneficial interaction among a workforce of 10,000 researchers and developers. In addition to corporate research, the campus attracts publicly funded institutions. Together the different organizations on campus are responsible for nearly 50% of the patent applications in the Netherlands. In 2012, Philips sold the campus to a consortium of private investors, while staying on campus as one of the many participating companies to gain new knowledge and get inspired by the research of other companies and organizations.

25. The inside-out process refers to earning profits by bringing ideas to market, selling IP, and multiplying technology by transferring ideas to the outside environment. Companies focus on externalizing their knowledge and innovation to bring ideas to market faster than they could through internal development. Shifting the locus of exploitation outside the company's boundaries means generating profits by licensing IP and/or multiplying technology, thus transferring ideas to other companies. The firm no longer restricts itself to the markets it serves directly. Instead, it participates in other segments using licensing fees, joint ventures, and spin-offs. These different streams of income create more overall revenue from innovation. Yet, only a relative few companies out-license their technologies. This process shows increasing awareness of corporate venturing activities, new business models, such as new ventures and spin-offs, and the commercialization of one's own technologies in new markets, known as cross-industry innovation.

26. Philips uses licensing to create and support its own business opportunities. It enters cross-license deals with third parties to get access to external IP and reduce licensing costs for its own products while also reducing the risk of litigation. This strategy is used when there are limited competitors in the market. When facing many competitors and established standards, it licenses its IP to profit from royalties.

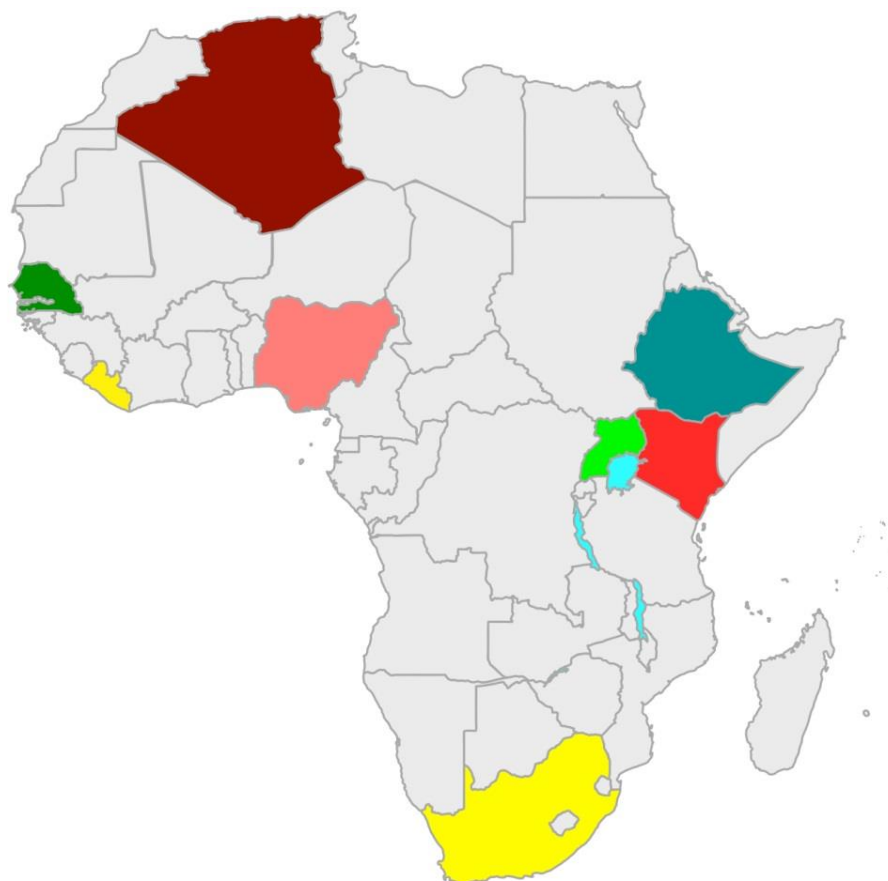
27. The coupled process refers to co-creation with (mainly) complementary partners through alliances, cooperation, and joint ventures during which give and take are crucial for success. This combines the outside-in process (to gain external knowledge) with the inside-out process (to bring ideas to market) to jointly develop and commercialize innovation. New forms of co-creation focus on peer production through communities, consumers, lead users, universities or research organizations, and partners from other industries.

A prominent example of this strategy is "Connect + Develop" from Procter and Gamble, initiated around 2001 when its growth was declining. To circumvent the "not invented here" syndrome, it set itself the goal that 50% of its innovation should be rooted in the collaboration with external partners. That goal was reached in 2005. That was made possible by a global team with an external network that provides solutions to various business needs. It has six main hubs all over

the world as well as an innovation portal online in five languages. Due to the program's success, Procter and Gamble has set the bar even higher, intending to triple the amount of innovation that stems from C+D as well as become a sought-after partner for other innovators.

28. Organizations use a broad variety of different activities in all three processes to build up their network for innovation. As already demonstrated in Silicon Valley's gaming industry, collaborative innovation activities have a broader sphere of influence than only partners and customers. And as we have said before, there is little research about collaborative project-setting in the developing world. Therefore, we will address whether innovation ecosystems in developing countries can be explained using the theories developed mainly for European companies.

29. As illustrated in the map of Africa below, developing countries already use a broad variety of open innovation activities and networks. In order to understand how they collaborate we identified via web search 35 open innovation 2.0 projects in developing countries (mainly Africa) which we ask for collaboration in our study. Seven projects agreed to send us further information and give us the opportunity to dive deeper in their ecosystems.



Algeria: Algeria CyberPark,  
Ethiopia: iceaddis,  
Kenya: Ushahidi, iHub, Nailab, mLab  
Liberia: iLab Liberia  
Nigeria: Co-Creation Hub, Wennovation Hub,  
Senegal: Bantalabs,  
South Africa: rLabs,  
Uganda: Hive Colab,

Figure 1: Exemplifying some of Africa's open innovation 2.0 projects

30. As illustrated in the following cases, innovation ecosystems in developing countries require different forms of appropriability. The cases were selected as already existing for more than three years, long enough to build up and maintain an ecosystem. Each had formal agreements with partners from developing and developed countries. Finally, they target social problems.

31. We start with a short description of every case, analyzed by means of semi-structured interviews with key informants, mostly the CEO, founder and/or financial officer of the project, in all projects; additional internal and publicly available data from reports and presentations; and a survey filled out by key informants. After the description, we analyze the challenges and threats of each case with special regard to the management of collaboration in their ecosystems and compare the findings of each case with the others in a cross-case analysis illustrated in several spider webs.

### Ushahidi

32. Ushahidi, which is Swahili for “testimony,” is a nonprofit technology company that focuses on the development of free and open-source software, especially in the collection, visualization, and interactive mapping of information. It originated out of a single website that reported violence in the post-election fallout in Kenya early 2008. That site, accessed through the Web and mobile phones, had 45,000 users. That sparked the idea of a global platform. Today, the company has developers in Africa and South America as well as in Europe and the USA.

33. The different projects that today use the platform often lean on local organizations and use multimedia strategies. Information is provided in the local mother tongue and English. The projects have clear goals and timelines and freely do customizations to the software to make it meet their needs.

34. Every contributor has to sign the Contributor License Agreement (CLA) or Corporate CLA (CCLA) in the case of membership, before he or she can contribute to the project. These agreements make the terms under which intellectual property is contributed transparent. After signing the agreement, the contributor grant Ushahidi the copyright and patent license to his/her work, but still has the right to use his/her contributions for other purposes as well. Ushahidi promises to use the contributions for the public benefit and nonprofit causes.

### iHub

35. In 2010, Erik Hersman founded the iHub project as part of the Ushahidi strategy. It was made possible by a group of young developers, technology-driven journalists, and volunteers. The idea manifested when the team members had to meet in coffee shops and restaurants to work and have Internet access. They wanted to establish a real and virtual space where the technologists of Nairobi could meet, work, and thrive. Today, iHub accommodates roughly 14,000 members labeled into different categories: virtual white members, green members that can access the physical space, red members who have their own semi-permanent desk space and the iHub management team itself, the black members. Today, iHub is partially an open community workspace and partially an incubator and vector for investors and venture capitalists. It has established an ecosystem to support Kenyan technology entrepreneurs including research, consulting, a supercomputing cluster and the iHub User Experience lab.

36. While it is a fairly young initiative, the project already has some success stories. It has spawned more than 50 company spin-offs. The iHub team sees its core service as connecting people, be it by funding several start-ups or providing a community where many start-ups found key staff members. iHub was essential in the creation of many of those start-ups, and its relationship to them is seen as symbiotic. However, it made no formal agreements with them like licenses, co-patents, or equity purchased, making its relationship with them hard to track.

An exception to the rule is m:labs, where iHub employs formal agreements for the training and access it provides.

37. For a project like iHub, funding is always a key challenge. iHub is mostly grand-funded, but also has corporate partners. Those partnerships have structured, mutually beneficial, formal agreements. But there are no “exclusivity” clauses which would hinder the diversity of tools young entrepreneurs can use. The corporate partners frequently view the partnership as a good entry or expansion into the Kenyan technology market.

38. iHub tries to move towards sustainability. Therefore, its research, consulting, cluster, and lab are profit-oriented to support the co-working space. It also contributes to the AfriLabs network, a gathering of technology hubs across Africa.

### Eclipse and Eclipse Foundation

39. Founded by IBM in late 2001 and backed by a consortium of software vendors, the Eclipse Project corresponds to a community for the collaborative development of open-source software. It targets both individuals and organizations. The focus of the different projects under the Eclipse umbrella is an open development platform that supports software’s development but also its lifecycle management. The foundation is not-for-profit and member-supported. It accommodates an ecosystem of products and services that complement the open-source community. It is independent and acts as a neutral vendor and transparent entity that provides IT infrastructure, supports development processes, develops the ecosystem, and provides necessary management of intellectual property.

40. The latter is especially important to the continuous development and use of Eclipse software. To facilitate the software’s commercial use by vendors, all Eclipse projects are licensed under the Eclipse Public License (EPL) which the projects consider “commercial friendly” and is approved by the Open Source Initiative. Furthermore, the projects do due diligence and only let the committing party contribute if this party is the rightful holder of the copyright of the material. If something is contributed by a member organization, that organization signs the committing agreement to ensure its IPR is contributed under the EPL. The actual code committed is screened for EPL compatibility and rejected if already under an incompatible license.

41. The aforementioned services and the fact that the foundation serves as an independent and not-for-profit facilitator of the community ensures a unique model for open-source development. By doing so, the Eclipse project focuses makes the inside-out process its core process of open innovation.

### The Human Genome Project

42. The project was initiated in 1990 to discover and map all the genes in human DNA to make them accessible for future research. It was successfully concluded in 2003. While it was based in the USA, it quickly became an international collaboration spanning most developed countries. At a time when such research faced ethical and social challenges, the project aimed to share the knowledge it discovered with the wider scientific community to spur research in adjacent fields of interest. Over the project’s lifespan, different research institutes worldwide contributed data or sequencing techniques to its knowledge base. This accelerated it. To maximize the results’ diffusion, they were made available via an open-source agreement. The agreement stipulated that in six months after the discovery of new material or data, the knowledge had to be made available for the public, or, rather, the scientific community, as it was stored in public repositories and databases. Additionally, the Project licensed technologies to the private, for-profit, sector and funded additional research as a nexus between science and business. The Human Genome Project, like Eclipse, had an inside-out focus.

### Desertec

43. Originating out of a global network of economists, scientists, and politicians, the Desertec Foundation was established in early 2009 to promote and implement a network of concentrated solar power plants in North Africa. The foundation had the goal of renewable energy for Europe and the local African regions. Surprisingly, even oil-rich countries were interested, as the concepts could also be used in Arabic countries. Unlike other projects where individuals or organizations worked together, entire member countries collaborated within Desertec. The energy policy of a country and its relation to foreign sources of energy were never as important as today. Therefore, one big challenge that the project still has to face is the licensing of technology which must be transparent and unbiased. The Foundation also has its own ideas competition, with the Desertec Award granted annually to innovators that come up with technology that brings the concept closer to reality. Desertec is a good example of a project focusing on the coupled process.

### Cambia and The Lens Project

44. In the early days of the patent system, a single patent had much more value because it granted a monopoly on a product. This fact could be used to charge higher prices and therefore reap the benefits of the innovation. But today, a high-tech product such as a smartphone has 2,000 to 3,000 patents. Today, many people think of a patent not as right to a monopoly, but rather as a right to sue others who infringe on the patent with their own patents or products. The problem that results is that innovating companies do not know all patents currently in use or which they might infringe upon. An information asymmetry is created where not all market participants possess the necessary information to decide whether to invest in innovation.

45. Thus, Cambia started the Patent Lens project as a tiny social enterprise 25 years ago. In 2013, it was re-launched as "The Lens." It gathers the patent information from 90 different patent jurisdictions worldwide. The team behind the project is eight software engineers, backed by the Gates and Moore foundations.

46. The goal is not only to make all available patent information public by granting full-text search ability, but to make it understandable for the general public. Cambia facilitates the latter goal by explaining in human language patent claims which are otherwise written in scientific and legal expert language.

47. Its open-platform approach is unique among closed platforms with monetary interests. Its "wiki-like" approach relies on the participation of its users to create collections of patents, annotate patents, and create and share analysis and tools. Additionally, the service creates so-called landscapes of innovation by analyzing how patents link to each other through citations. This project uses both outside-in and inside-out approaches.

### Algeria's CyberPark Project: Sidi abdellah

48. Built in the newly formed town of Sidi Abdellah in the West of Algiers, Algeria, the state-owned Cyberpark functions as an incubator for start-ups and a joint space for research and development for private and state-owned companies in the ICT sector. The cooperation of several ministries, like environment, culture and higher education enabled the large-scale development and implementation of different projects and programs to establish this new technology hub.

49. Since 2010, twenty companies have been founded in the ICT sector that stem from the Cyberpark, and 65 spin-offs are in the early stages. One of the key challenges for the incubator is that roughly 20-30% of the firms it accelerates will not complete the transition. This is chiefly due to the unreliability of the young entrepreneurs who often quit to take other opportunities.

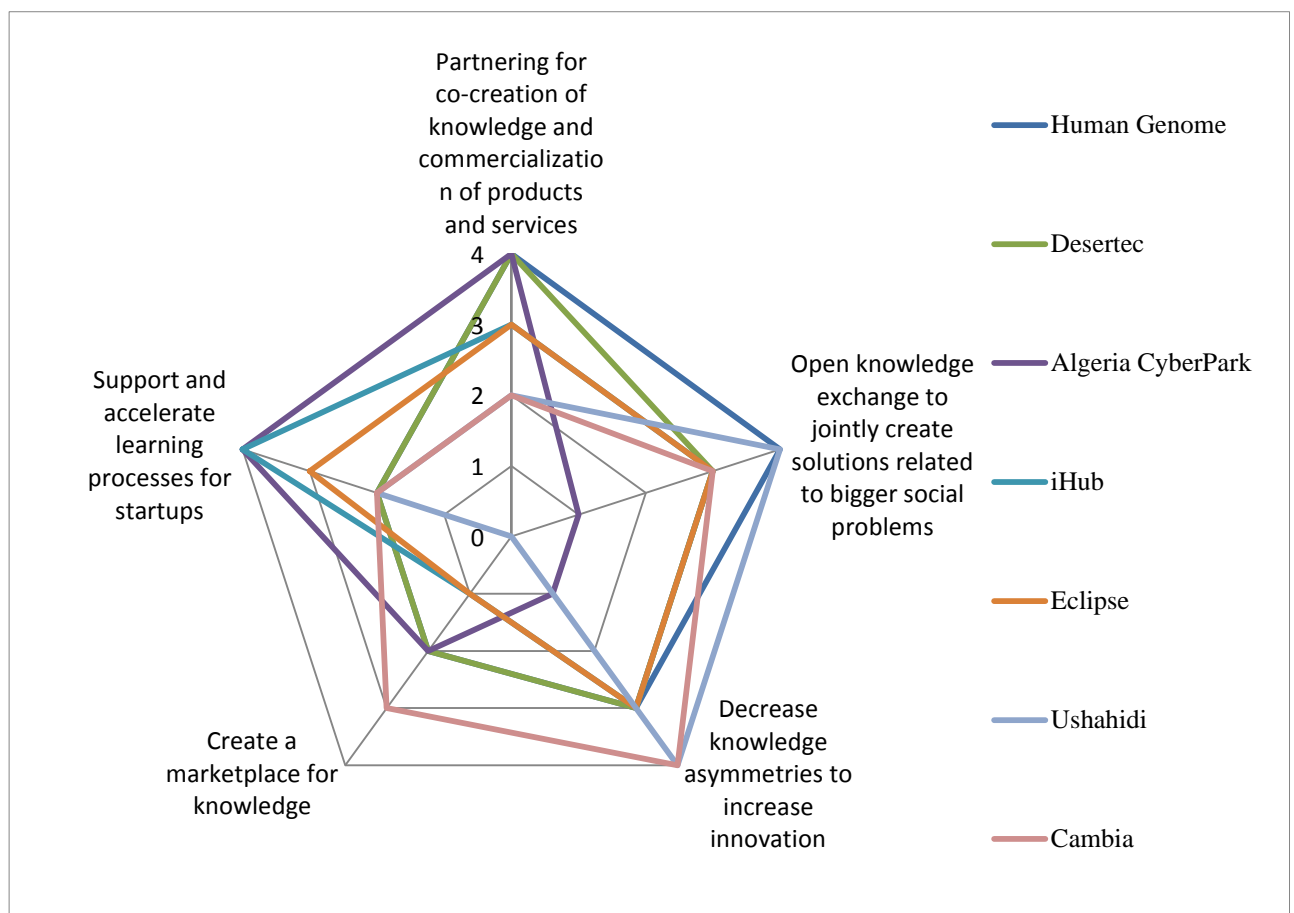
COMPARATIVE STUDY OF IP MODELS

50. As many of the interviewees of the above projects stated, the knowledge and information asymmetry between partners is a major impediment to innovation, especially between developing and developed countries. These projects apply different collaborative agreements to overcome knowledge and information asymmetry, at least within their ecosystems. Thus, they use their innovations responsibly to break ground for new market access and new forms of collaboration fostering innovation.

51. A common goal of the projects in this study is an open knowledge exchange to create solutions to bigger social problems. Ushahidi creates open-source software to collect, visualize, and interactively map information to make life safer, iHub and the Cyberpark are part open-community workspace, part incubator and vector for investors and venture capitalists for young technology entrepreneurs. The Human Genome Project created an open-source database to map the genome, Desertec, with its solar power plants in North Africa, produces renewable energy for Europe. The Lens tries to make all patent information public, searchable, and understandable.

52. All the projects use open-source software to decrease knowledge asymmetries in their ecosystem, so innovations can thrive. A subset of projects includes focal actors in their respective ecosystems which strive to strengthen the capabilities of other actors and intend to accelerate learning processes for different start-up firms. Rather uncommon for projects in the developing world seems to be the mission to create a marketplace for knowledge, as they currently rely heavily on open source. The different goals of every project investigated and their importance are color-coded and illustrated in Table 1.

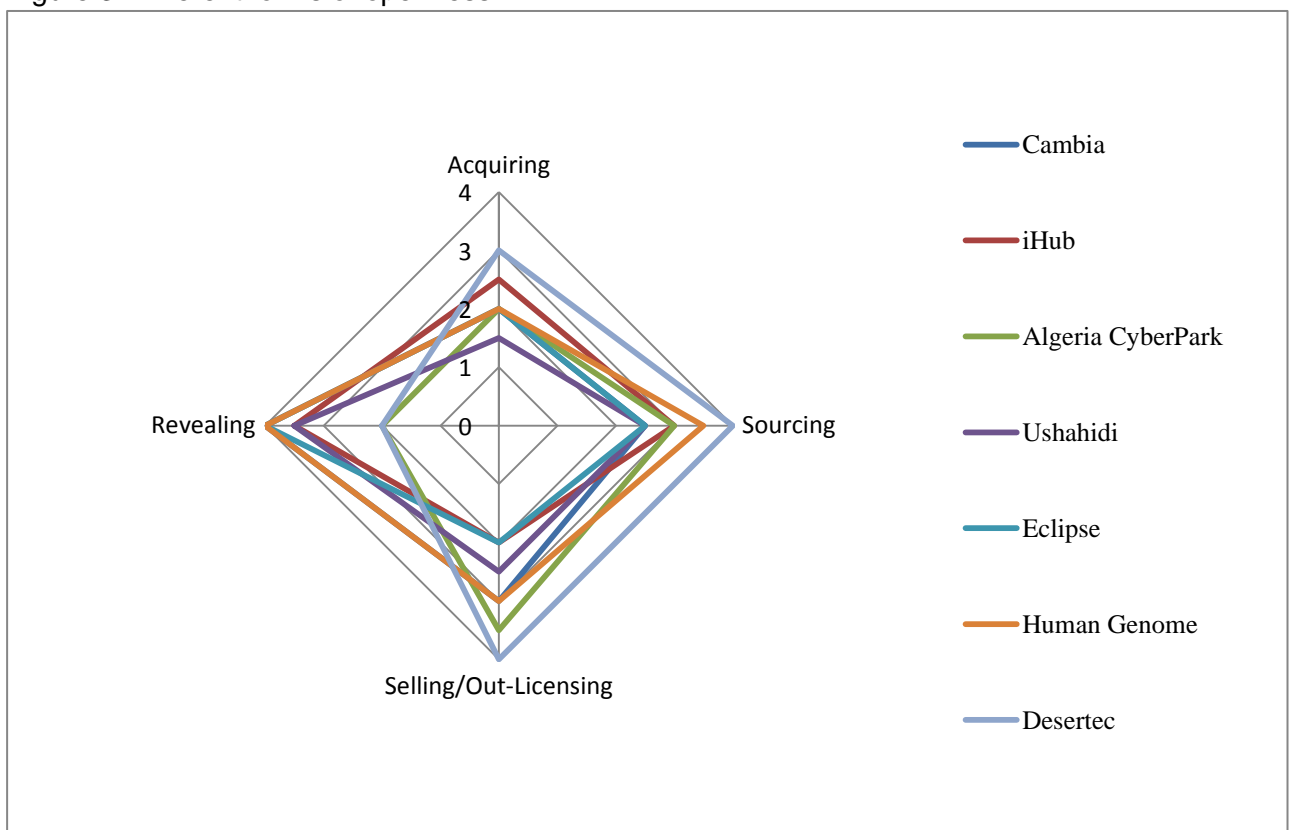
Figure 2: Mission of the organization



53. Based on the taxonomy of openness developed by Dahlander and Gann (2010), the main form of openness for projects in developing countries is sourcing, followed by revealing. The analysis was done by mapping each partner agreement within each case in the above taxonomy to find out the degree of openness of the ecosystem. Every agreement in the ecosystem was therefore classified in the taxonomy by the interviews, which resulted in two dominant approaches for every project. Despite the differences in the importance of the project's goals, the ecosystems all follow an inbound innovation strategy by sourcing external ideas and knowledge from their partners and an outbound innovation strategy by revealing internal resources to the environment, which might be characteristic of projects in the developing world targeting social innovation.

54. The two forms of openness less used, acquiring inventions and innovational input and out-licensing or selling products in the marketplace, require a closed software approach and are limited to already existing patents or money to acquire companies, resources, or products. These more commercial approaches create and commercialize knowledge asymmetries, keeping some partners uninvolved in the ecosystem. The sourcing and revealing approaches collect and reveal knowledge as a public good and try to balance knowledge asymmetry between partners in and out of the ecosystem. Social innovation especially seems to require a more open approach, as partners in developing countries have more knowledge and competency to market than patents, money, or products. Some of the cases also use the acquiring and selling/licensing approaches with commercial partners from developed countries to finance their sourcing and revealing approaches with partners from the developing world as start-ups, nonprofits or small companies.

Figure 3: Different forms of openness





## WHAT MAKES AN OPEN INNOVATION INITIATIVE SUCCESSFUL

55. Although most of the open innovation literature is based on examples from developed countries, this report illustrates examples of sophisticated open innovation 2.0 projects from developing countries. As many collaborations in developed countries are still struggling with IP agreements and a holistic view of all partners and their influence on the environment, these projects are well aware of their environment and use open innovation to achieve bigger social goals. Each has opted wisely for a degree of openness that allows it best to reach its goals with limited resources and a high degree of flexibility. Three main success factors can be derived comparing all projects:

### Use of open-source software

56. Many open innovation projects in developing countries use an open-source approach for their collaborations, as our examples do. One reason why they choose this is that it allows for quicker diffusion of their products. Additionally, it minimizes barriers for potential users, who might not be able to pay for it. The Ushahidi project uses the open-source approach in all of their projects, including their FOSS Technology, which allows it to extend and deepen the ecosystem of its technology and spread it in areas of humanitarian work and crisis management. For its platform, Ushahidi stated that “critical success [...] hinges on the integrity of this data, and the open-source framework helps to ensure this integrity via transparency and via lowering barriers to all so the collective voice can be heard.”

### Scarcity of resources to enforce IP

57. Another set of reasons is deeply rooted in the context of developing countries. Enforcement of intellectual property rights is lacking in some areas of the developing world. In such cases the innovators have less incentive to spend resources on formal means of appropriation because it is uncertain if they will be able to successfully enforce their rights should someone infringe their IP. Scarce resources and a lack of access and understanding of the patent system further drive the use of open-source agreements instead of patents and other formal means of appropriation.

### Variety of formal agreements and approaches to openness

58. Some projects use a variety of forms of appropriation in the different cooperation formats which they facilitate. The iHub project relinquishes any formal agreement with regard to start-up projects. But when dealing with partners from the developed world, iHub uses contractual agreements. While in Desertec and the Human Genome Project all agreements are pretty standardized, Ushahidi and Cyberpark use a variety of formal agreements and approaches fitting to needs of startup companies, social organizations, and commercial partners from developed countries.

## CONCLUSIONS AND RECOMMENDATIONS

59. While WIPO already offers a set of services for developing countries, those could be improved to better fit the needs and contexts of collaborative innovation projects. One such improvement could be to tailor WIPO's PATENTSCOPE database for use in countries with lower legal and technical expertise. To increase usability, the translation of patent texts into a language understood by people unfamiliar with the specialized language of many patents would allow for a better understanding of what exactly the patent protection entails (as in the Cambia case). A further measure would be to group patents by possible interest groups, which would allow projects to find patents that similar projects already browsed.

60. As the widespread use of open source in collaborative projects indicates, the joint use of innovations is of high priority in developing countries. Especially for collaborative projects, this is due to the high interdependency within ecosystems. To ensure that innovations are properly protected, different forms of shared patent protection, like patent licensing, could be further promoted. To enable the projects to craft fair licensing terms, models could improve the legal protection of their innovations, while also allowing widespread use of their technology by different actors. But to properly use licensing agreements and guarantee the protection of the interests of the organization would require assistance from third parties. One approach would be to teach members of a focal firm of an ecosystem, who then could mentor or assist staff members of other organizations within the ecosystem. Licensing agreements would not only allow for more collaborative innovation between projects in developing countries, but also allow them to use intellectual property from firms in developed countries. Partners could license patents still relevant for organizations in developing countries that may be dormant and without use in their original context.

61. WIPO promoted recently the use of open innovation and collaborative development models for research. At the recent WIPO Conference on Open Innovation: Collaborative Projects and the Future of Knowledge (WIPO, 2014), January 22-23, 2014, in Geneva, it was especially gratifying to see expressed the virtually unanimous view that open innovation is not only consistent with intellectual property, but that most forms of open innovation in the era of Big Data depend on robust IP regimes for the protection and diffusion of innovations that are produced through global collaborations, and community-based efforts. Based on the findings from this study on the potential of open innovation 2.0 and the unique empirical evidence suggesting increasing open innovation maturity in the developing world, a final recommendation for WIPO would be to design and implement tailored capacity building for the strategic management of open innovation and collaborations in the developing world.

## BIBLIOGRAPHY

Bader, K. and Enkel, E. (2014) Understanding a Firm's Choice for Openness: Strategy as Determinant. *International Journal of Technology Management*, **66**(2/3), 156-182.

CDIP/6/6 rev (2010), WIPO Development Agenda Project Document for the Project on Open Collaborative Projects and IP-Based Models (Recommendation 36), November.  
[http://www.wipo.int/edocs/mdocs/mdocs/en/cdip\\_6/cdip\\_6\\_6\\_rev.pdf](http://www.wipo.int/edocs/mdocs/mdocs/en/cdip_6/cdip_6_6_rev.pdf)

Chesbrough, H.W. (2003) *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Cambridge, MA: Harvard Business School Publishing.

Dahlander, L. and Gann, D. M. (2010) How Open is Innovation? *Research Policy* 39: 699–709.

Dahlander, L., Gann D. M. and George, J. (2011) Taxonomy-Analytical Study for the Project on Open Collaboration Projects and IP-Based Models (Recommendation 36), November, WIPO CDIP/8/INF/7. [http://www.wipo.int/edocs/mdocs/mdocs/en/cdip\\_8/cdip\\_8\\_inf\\_7.pdf](http://www.wipo.int/edocs/mdocs/mdocs/en/cdip_8/cdip_8_inf_7.pdf)

Enkel, E., Gassmann, O. and Chesbrough, H. (2009) Open R&D and Open Innovation: Exploring the Phenomenon. *R&D Management Journal* 39 (4): 311-316.

European Commission (2014) *Boosting Open Innovation and Knowledge Transfer in the European Union. Independent Expert Group Report on Open Innovation and Knowledge Transfer*. Directorate-General for Research and Innovation  
[http://ec.europa.eu/research/innovation-union/pdf/b1\\_studies-b5\\_web-publication\\_mainreport-kt\\_oi.pdf](http://ec.europa.eu/research/innovation-union/pdf/b1_studies-b5_web-publication_mainreport-kt_oi.pdf).

Gassmann, O. and Enkel, E. (2004) Towards a Theory of Open Innovation: Three Core Process Archetypes. Proceedings of the R&D Management Conference (RADMA), Lisbon, Portugal, July 6-9, 2004.

Huizingh, E.K.R.E. (2011) Open Innovation: State of the Art and Future Perspectives. *Technovation* 31: 2–9

Jazairy, A. (2010) Open Innovation: Collective Solutions for Tomorrow. *WIPO Magazine* 3 : 4-6.  
[http://www.wipo.int/export/sites/www/wipo\\_magazine/en/pdf/2010/wipo\\_pub\\_121\\_2010\\_03.pdf](http://www.wipo.int/export/sites/www/wipo_magazine/en/pdf/2010/wipo_pub_121_2010_03.pdf)

Laursen, K. and Salter, A. (2006) Open for Innovation: The Role of Openness in Explaining Innovation Performance among U.K. Manufacturing Firms. *Strategic Management Journal*, 27(2): 131-150.

Lichtenthaler, U. (2011) Open Innovation: Past Research, Current Debates, and Future Directions. *Academy of Management Perspectives*. February: 75-93.

Palo, T., & Tähtinen, J. (2013) Networked Business Model Development for Emerging Technology-Based Services. *Industrial Marketing Management*, 42(5), 773-782. Pavitt, K. (2005). Innovation processes. *The Oxford handbook of innovation*, 18, 656.

Ritala, P., Agouridas, V., Assimakopoulos, D., & Gies, O. (2013) Value Creation and Capture Mechanisms in Innovation Ecosystems: A Comparative Case Study. *International Journal of Technology Management*, 63(3), 244-267.

Schroll, A. and Mild, A. (2012) A Critical Review of Empirical Research on Open Innovation Adoption. *Journal für Betriebswirtschaft* 62(2): 85-118.

Trott, P. and Hartmann, D. (2009) Why Open Innovation is Old Wine in New Bottles. *International Journal of Innovation Management* 13 (4): 715–736.

WIPO, 2014, WIPO Conference on Open Innovation: Collaborative Projects and the Future of Knowledge, WIPO Headquarters, Geneva, January 22-23.

[http://www.wipo.int/meetings/en/details.jsp?meeting\\_id=31762](http://www.wipo.int/meetings/en/details.jsp?meeting_id=31762)

[End of Annex and of document]