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# Model of Innovation through Information Network Sharing

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**Abstract:** Nowadays the extinction of financial, economic and scientific globalization urges the companies to come up with new methods of accessing information in order to have adequate management which properly meets the market request. This article aims to discuss how innovation influences the firms' profitability while protecting the environment. It also analyses how widely innovation and eco-innovation will contribute to the improvement of the global economy as well as to the environment protection. This should be an aim for every person who wants to breathe clean air, to drink clean water, to spend leisure time in an unpolluted environment, to preserve the nature for future generations. The authors propose a model of innovation through information network sharing.

**Keywords:** open innovation, environmental innovation, model of innovation, network business ecosystem

**JEL classification:** O3

## 1. Introduction

The firms have to take into account a sustainable development plan. The profit on short term at any price, affecting the environment is considered a trap because it implies investments, technologies and methodologies that do not support a safe economic development, turning against the company as a boomerang. When the boomerang returns the company will either fail or will have the option to invest in safe technologies

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and methodologies, providing eco-friendly products and services. On long term, the firms will be the beneficiary of a positive impact and of reducing productivity costs, fulfilling the requirements of global legislation in the field.

In this article we discuss the opportunity for firms to adopt open innovation, eco-innovation in their development process. Firstly, we initiate a literature review and then we propose a model of innovation.

The companies tend to involve both customers and employees in the supply chain and product/service management. The companies open their gates to the environment through blogs, focus groups and markets surveys. Even large companies have understood that innovation does not mean only investing in technology or in very complex laboratory or hiring the best specialists in the field and then waiting for the innovation to emerge. Nowadays innovation should be open and assume inter-firm cooperation in R&D.

## 2. Methodology

The research in this paper is founded on a literature review and journal articles regarding open innovation, eco-innovation and social-innovation. The authors choose to find out information in a Science Direct database (http://www.sciencedirect.com) that contains a large number of studies on innovation. Our empirical research is improved with an innovation model.

### 2.1. Open Innovation

"Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology"[ Chesbrough, 2003]

The software interface for open innovation is very similar with a social network (like Facebook) or with a hub, where the users talk about professional themes. The users can ask for information regarding their objective of interest, can comment on a post or find an expert in the field. This interface allows users to form clusters depending on interest and to vote interesting ideas that might be classified by an algorithm (that most voted an idea the most useful or interesting).

In this respect a very good example of network is related to the applied research in the German Fraunhofer model **(**www.fraunhofer.de), that shortens the ties between academic institutions, research institutions and industry, facilitating the materialization through innovation of the inventions - as finished product of the research and materialization of entrepreneurs innovative ideas, giving them the chance to become more competitive in the global market. Fraunhofer is the largest European organization for applied research, for transfer of technology and information in natural sciences and engineering. Fraunhofer contributes substantially to the transfer of academic depth research results to the industries, thus contributing to the implementation of innovations from industry and technology. Fraunhofer is accepted in the international labor market as a high performer in terms of practical use of research due to the large number of patent applications (such as mp3 format, the air bag, etc.). Fraunhofer's work extends internationally through representative offices and affiliated research centres, and through the collaborative activities of its specialists who provide access to current information, with reference to the stage of technical innovations which contribute to the development of scientific and technical progress. Most staff consists of specialists and scientists, especially engineers,

highly qualified. Two-thirds of organization revenues come from contract research paid by industry and publicly funded projects, and a third of organization revenues comes from government funds or in the form of institutional funding.

The innovative ideas of the entrepreneurs can become reality with the know-how accumulated in these non-profit entities, such as the Fraunhofer.

### *2.1.1. How does open innovation work?*

Here we go back to the nature, to the logarithmic spiral, described by Jacob Bernoulli, in which the distances between the arms of a logarithmic spiral increase in geometric progression in open innovation. These distances are factors of External Technology Insourcing, Intellectual property Acquisition, Licensing, Internal and External Technology. As the ancient Greeks found the nature lesson is the best, using the π and ϕ numbers in architecture, so the open innovation process is following the same spiral.

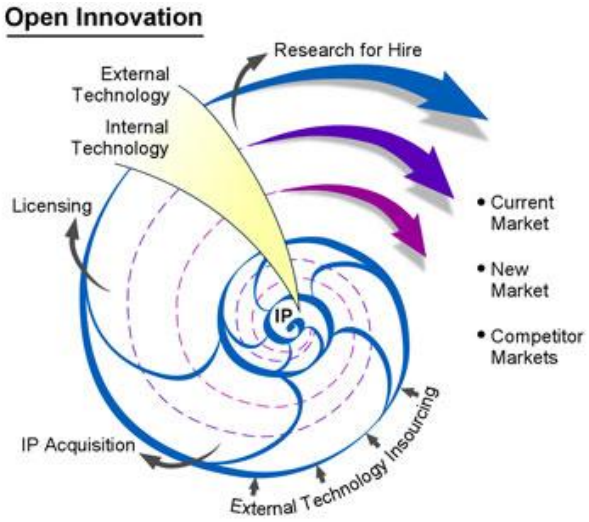



*Figure 1: Open Innovation Spiral (*Source: www1)

Open Innovation has a lot of advantages such as reducing costs in R&D. As the specialty literature reveals, the advantages of open innovation are [www2]: reduced costs of conducting research and development, potential for improvement in development productivity, incorporation of customers early in the development process, increase in accuracy for market research and customer targeting, potential for synergism between internal and external innovations, potential for viral marketing [Schutte, 2010]

The disadvantages are: possibility of revealing information not intended for sharing, potential for the hosting organization to lose their competitive advantage as a consequence of revealing intellectual property, increased complexity of controlling innovation and regulating how contributors affect a project, devising a means to properly identify and incorporate external innovation, realigning innovation strategies to extend beyond the firm in order to maximize the return from external innovation. [West, 2006] [Schutte, 2010]

The pillars of the open innovations are:

1. Launching a product in an open platform in order to become a tool-kit for everyone that accesses the platform and to be developed further more with new functionality, such as software development kit (SDK), or application programming interface (API) are common examples of product platforms. [Schutte, 2010]

2. The most competitive ideas are rewarded during strong competitions.
3. Involving customers in the product development cycle, in the design process, in the product management cycle, through interaction with the firms' employees
4. Very similar with the first pillar is the model of developing and designing the product in a collaborative way. The difference is made by the control that is still maintained by the hosting organization. Thus the product is developed faster, more correct and with reduced costs. Dr. Henry Chesbrough based his research in the optics and photonics industry on this model for open innovation. [Chesbrough, 2013]
5. In the innovation networks, the competitive ideas are rewarded in the form of an incentive.

Open source appropriate technologies are coming to sustain open innovation assisting poverty reduction or sustainable development. [Pearce, 2012] Big companies can put in a common pool their patents, or grant unlimited license use to anybody. Such an example is IBM with its Eclipse platform, where companies are invited to cooperate inside an open-innovation network. [IBM, 2007]. Both the experts meant to design and develop software and the open-source adepts need one-another.

**2.2. Eco-Innovation**

Eco-innovation is a class of manufacturing practices that include source reduction, pollution prevention, and the adoption of an environmental management system [Eiadat, 2008]. Some benefits of eco-innovation are presented in the figure below.

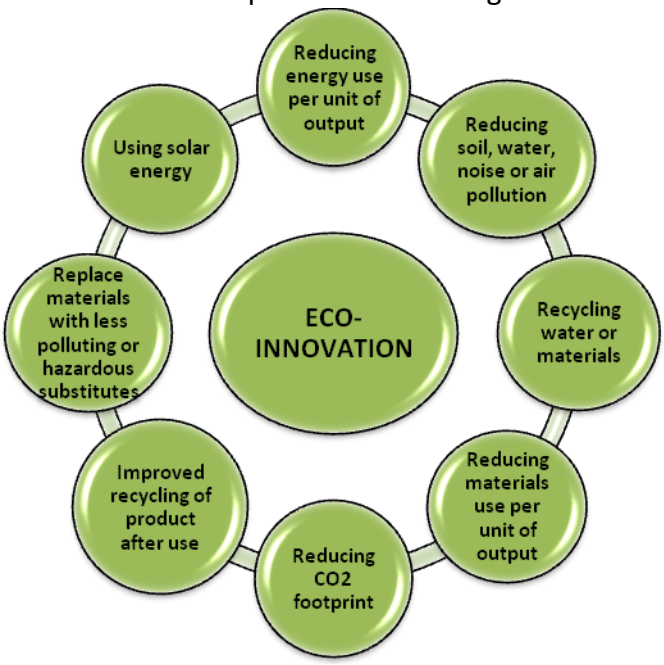



*Figure 2: Eco-Innovation benefits*

Through eco-innovation firms can improve their profitability reducing waste disposal and raw materials cost and increase product value due to enhanced reputation of the company. Customers demand for environmental-friendly products or services is increasing and answers to regulations that help protect the environment. [Yang, 2011] Eco-innovation improves competitiveness and overall business success and brings the sense of feeling good when protecting the environment. (Day 2011; Gibbs, 2009; Millard, 2011; von Weltzien Høivik, 2010).

Eco-innovation is easier to be implemented in the network than open innovation is. One example of platform designed for facilitating innovation in SMEs activity is Ecosmes.net. This platform can facilitate the start-up of the product eco-innovation process, but with the time revels that not all the potentialities have been fully exploited. Ecosmes.net is an example of how ICT tools and online services can support SMEs by disseminating a structured approach for the implementation of all phases of the process and by supplying services that can facilitate eco-innovation. [Buttol, 2012] This process should be continuously upgraded by involving new sectors and exploiting the positive results of the numerous projects and studies promoted through network, funded by the Horizon 2020 Programme. In the network, case studies and a guide of good practices should be shared. The companies may take into account the European Ecolabel criteria, Energy Using and Related Products implementing measures and environmental policies. The platform may be a beneficiary of semantic web services and tools that support users with machine readable information. [Khilwani 2009].

For SMEs development, open innovation is vital. Because they don't have the resources, the expertise and the management experience like old and large companies they have to get together, to develop a business environment network in order to access the latest key information and ideas, to share and test new ideas. In his article [Petra 2013] it is shown that the effect of eco-innovation on firm performance will decrease with firm size. His statements are based on annual account data and survey data applied on 1712 Flemish firms. Although SMEs' managers consider that it is very important to innovate in network and protect the environment at the same time, they are often overwhelmed by current activities and financial problems. But some of SMEs created a competitive advantage providing consumers with eco-friendly products, and improving their image/brand.

In the 90's, the SMEs were considered much less likely than large firms to engage in environmental actions [Merrit, 1998], but recent studies have shown the opposite. [Darnell, 2010]. SMEs are said to be the beneficiary of the solar energy, reducing the cost of the power energy, are said to be implied in producing bio-aliments (like honey, cheese, jam, fruit compote, bio- fruits and vegetable, etc) or developing open source products using open source technology. However, SMEs reap fewer benefits of innovation than the large enterprises.
Because 99% of firms in the European Union are SMEs and provide two-thirds of all private sector jobs [Buttol, 2012], it is very important for the entire economy to help SMEs to respect the eco policy and to become environmentally friendly. [Robinson, 2013] The environmental regulations that have a positive impact on the performance of large firms may be detrimental for small firms. Therefore policy makers should consider adapting the stringency of regulations to firm size.

In Romania open SMEs to eco-innovation face the challenges of time and costs needed for an innovation to penetrate the market, the lack of skills and labor market rigidities, training and entrepreneurial spirit. Eco-innovation returns may be observed after long term investment. [Robescu, 2010]. The SMEs can overcome the high cost of developing an eco-innovation accessing open technology, approaches and information from a business network eco-system funded by European finance, through Horizon 2020 Program.
A research over 581 SMEs and large companies operating on the Romanian market, active in the following sectors: banking, construction, services – tourism, advertising, management, consulting, automobiles, IT, retail, energy, utilities and transportation, oil & gas and telecommunications- confirmed the importance of leadership and visionary

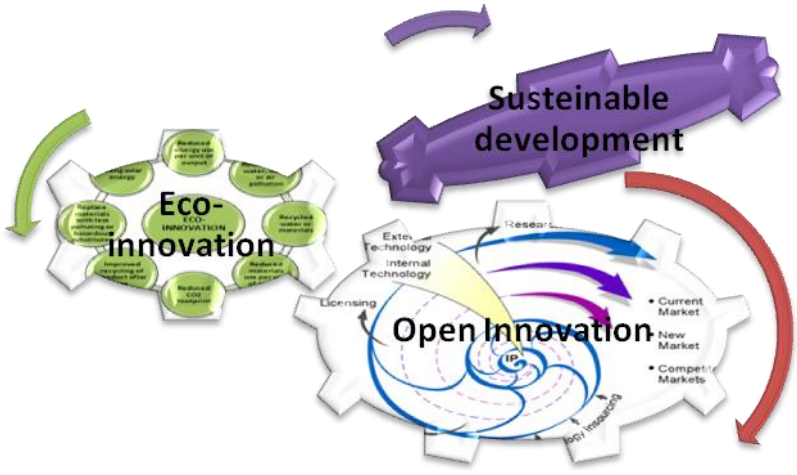
management, as well as the role of organizational culture and change management in integrating corporate sustainability. They are motivated by the moral duty and responsibility of businesses for a clean environment, the economic and financial advantages gained on the market, and sustainability as a key element of organizational culture.

The most common eco-innovation activities among responding organizations refer to reducing energy consumption, followed by selective waste collection, the use of clean technologies and the reduction of raw materials usage. On the second place, eco-innovation activities were the reduction of waste resulted in the production process, recycling of materials, optimization of production processes from a technological and organizational point of view, reducing pollutant emissions and the collection and recycling of end-of-life products.

The research highlighted that the engaged firms in eco-innovation activities, do not have a clear evidence of the costs involved, and no precise monitoring of the results. Reporting the results of the efforts to implement the sustainability principles (through eco-innovation or otherwise) is essential for investors, partners, employees and other stakeholders. [Paraschiv 2012]

## 3. Results and discussions

Companies, especially SMEs, should innovate in network of a business eco-system. They should have an open and fare communication that can be facilitated by a governmental institution and very clear policy regarding intellectual property. We imagine a model that follows the entire life cycle of a product/service (awareness and training; analysis; product (re)design; communication/certification) and supply chain. In our model, big companies and state institutions may invest in a performing open innovation platform and in licenses. We have the example of Fraunhofer and IBM, in our paper. All companies that have a new idea of product/service can become a member of eco-system. Within the network, the company will have to obtain the acceptance of an ecological agency. This agency tests how sustainable the idea is. If the idea is eco-friendly, market research is needed. This should be done by a marketing agency within the eco-system. Having in mind the market feed-back, the company tests the feasibility of the idea with a consultant agency. If the result is positive, the inventors in the network and academic researchers may come up with possible solutions of implementations. The best solution will be chosen and the company will collaborate with the inventor to implement the idea. Then the marketing agency has to commercialize the product/service. A supervisor, the governmental partner, takes care that the profit is shared and the patent is protected.



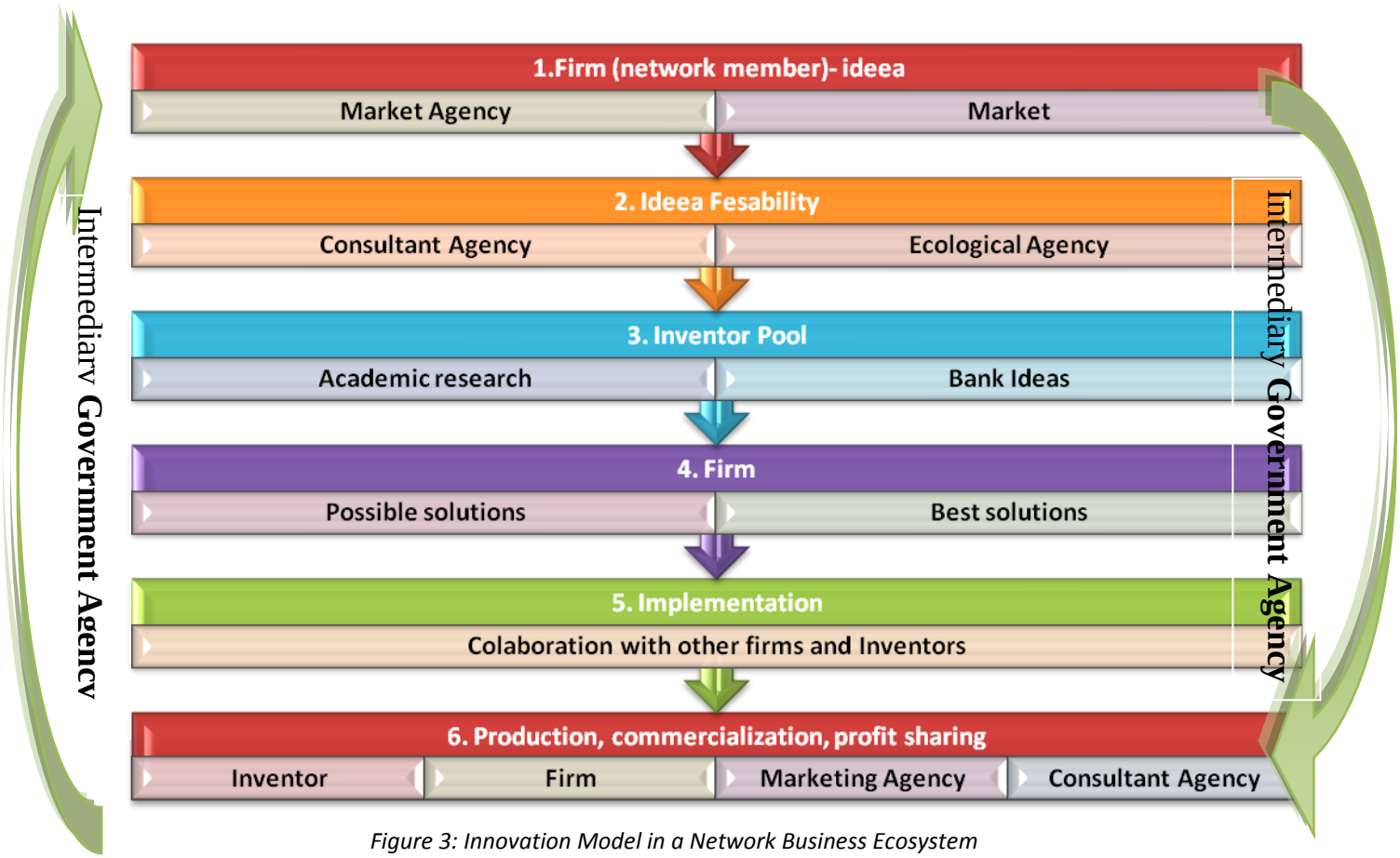



*Figure 3: Innovation Model in a Network Business Ecosystem*

## Conclusions

The article emphasizes the importance of innovation within a Network Business Ecosystem in order to get sustainable development. The eco-system offers an ICT platform and online services that are the support of business for the entire product/service life cycle. The members of the ecosystem come from different fields: research, marketing, ecology, consultancy, government, inventors and different size companies. Keeping all this in mind the authors have proposed a model of innovation.

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