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Open Innovation a New Paradigm in Innovation Landscape: An Analytical Overview

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Abstract:

How to innovate and how the innovation process can be managed has been a topic of immense curiosity, lately. In 2003, Chesbrough came up with the concept of “open innovation” which has been positively embraced by large number of organizations in the world. This conceptual paper presents an overview of open innovation in the massive landscape of innovation and advocates open-innovation modalities based on fundamental requirements, modes of open innovation and outcome of open innovation for firms. The findings reveal that firms can prepare themselves for open innovation by developing fundamental requirements which are the first step for infusing open innovation in an organization to shift from a closed to an open innovation system which are organizational transformation, cultural change, building absorptive capability, and complimentary assets. The findings also reveal that firms could practice open innovation in their business domain via technology transfers, accessing funding, accessing suppliers supports, user supports and institutional supports which make them to benefit in form of more access to resources, exploring hidden potentials, developing new skills set for employees, lower project cost, new innovative products, and growth and development.

Keywords: Open innovation, fundamental requirements, perspectives, outcome, open innovation

1. Introduction/Origin of Open Innovation

Henry Chesbrough has contributed the concept of open innovation in 2003. Since then, the concept has been embraced by an increasing number of academics and practitioners who regard “open innovation” model as a far superior techniques of innovation, if not the only way for firms to achieve long-term success in today’s fast moving market environment (Chesbrough, 2003, 2004, 2006; Huston & Sakkab, 2006; Rivette & Kline, 2000; Van de Vrande et al. 2009). Open innovation literature has its roots in several well established concepts and theories of alliance and networks and the most notable one was put forward by Teece (1986), Cohen and Levinthal (1990) and March (1991), which have stressed the importance of relying on external actors in the innovation process right before Chesbrough’s work of 2003. Open innovation paradigm describes a new cognitive framework for a firm’s strategy to leverage more innovation system for more profit from innovation (Brunswick and Ehrenmann, 2013). Chesbrough and subsequent researchers have successfully picked up untouched concepts in innovation studies and by synthesizing separate bodies of literature and ideas developed the concept of open innovation which has attracted fresh attention from managers, researchers, policy-makers and the like.

Open innovation is defined as the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation (Chesbrough, 2003). Open innovation is a paradigm which assumes that the firms can and should use external as well as internal ideas to market. Open Innovation is a new approach of the 21st century by which companies go beyond their internal boundaries to achieve innovative capabilities. The basic premise of the open innovation model is a direct opposite of traditional closed innovation system where the firm generates its own ideas from research and development internally in closed doors. According to Chesbrough (2003) several factors like increased availability and mobility of skilled workers, the growth of the venture capitalists; external ideas sitting on the shelf, the increasing capability of external suppliers have all outdated traditional closed innovation system. He further explained that knowledge is not anymore proprietary to the firm and it resides in employees, suppliers, customers, competitors, and universities and the firm owners have to introduce changes in their working to tap it and innovatively use it. Where firms do not use the knowledge they have inside, someone else will and this is where the open innovation entrepreneur excel over the others. Chesbrough also emphasized that by expanding your “research organization” outside you may be

able to tap into a much better pool of ideas and find such ideas faster than what you may have done in traditional, closed innovation model.

Nowadays, dynamic firms do not isolate themselves; they are open to share ideas, knowledge and resources with a number of collaborating partners such as consumers, users, employees, other firms, technology centres or research institutions, universities, polytechnics etc. Moreover, open innovation implies an extensive use of relationships, seeking knowledge and technology from external environment and commercializing the synergized knowledge and technology. Not all the firms are dynamic and open to soliciting advice, knowledge and ideas from others for self emancipation. Some of the researchers who enriched the research of open innovation after Chesbrough’s work of 2003 are Van de Vrande et al. (2009) who distinguished between purposive outflows and inflows of knowledge and technology to speed up the internal innovation process in order to benefit more from synergized innovative efforts. The outflows are generally referred as “technology exploitation” and inflows are referred to “technology exploration”. Dahalander and Gann (2010) suggested four main types of openness or search channels a firm could adopt in collaborating with external parties namely; revealing, selling, sourcing and acquiring. Lee et al. (2010) worked on sourcing the inputs of intermediaries as an important component of the networking of a firm. Gassmann et al. (2010) worked on the ‘process perspective’ by analyzing the practices in terms of inbound, outbound open innovation processes. Katila and Ahuja (2002); Laursen and Salter (2006) worked on search strategies and many more.

2. Fundamentals, Perspectives and Outcomes of Open Innovation

To analyze fundamentals, perspectives and expected outcomes of open innovation, the following questions have been developed to be answered through this research.

- 1) How do firms prepare themselves for open innovation?
- 2) What perspectives of open innovation are adopted by firms nowadays?
- 3) What is the outcome of open innovation to the firm?

Following framework is developed to analyze and answered the above questions on how firms can make use of open innovation to achieve better performance.

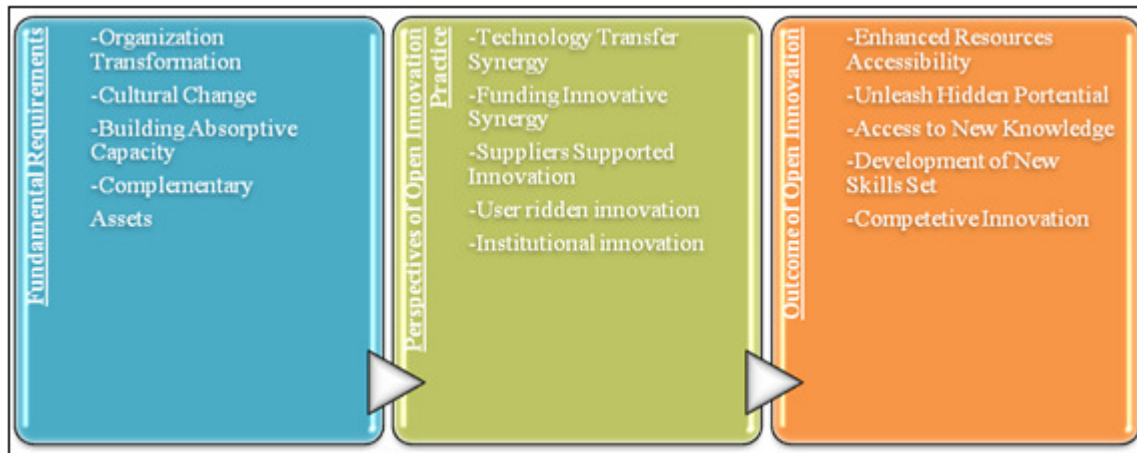


Figure 1: Fundamentals, Perspectives and Outcomes of Open Innovation Conceptual Framework
Source: Model developed by Authors

2.1. Step I: Fundamental Requirements of Open Innovation

To answer the first question, how do firms prepare themselves for open innovation? Figure I above reveals that firms could prepare themselves for open innovation by developing fundamental requirements which are the first step for infusing open innovation in an organization to shift from a closed to an open innovation system which are organizational transformation, cultural change, building absorptive capability, and complimentary assets. In short, these fundamental requirements are internal organizational processes and systems which represent important antecedents of a firm’s ability to “absorb” external knowledge and resources which are in details below:

2.1.1. Organizational Transformation

Is about transformation towards open innovation management which requires fundamental change from closed innovation to open innovation. This can be evident from the work of Brunswicker and Ehrenmann (2013) in context of a German software firm which highlights key factors instrumental in successful transformation from closed innovation to open innovation organization namely: trust, common experiences, and step-by-step procedures. The results also suggest that successful change management leads to holistic thinking and rational problem solving for open innovation model.

2.1.2. Cultural Change

Culture in this perspective is the firm's collective attitude towards using external resources. This involves preparing the employees for captivating innovation along with external partners (European Union, 2011). This cultural change makes the employees understand the legal implications of partnership agreement, joint venture, strategic partnership, intellectual property etc. It also helps employees to understand project decision criteria, incentive systems, management information systems, communication platforms, supplier evaluation and handling systems (Gassmann et al, 2010). This is one of the most important aspects as collaboration and co-creation can mean a certain loss of control because all the decisions are agreed on by all the agents.

2.1.3. Building Absorptive Capability

The firm's ability to absorb and make use of external ideas, knowledge and information helps it to innovate openly (Cohen and Levinthal, 1990). This can be evident from the work of Brunswicker and Ehrenmann (2013) on 'managing open innovation in SMEs: a good practice' based on a German software firm which revealed that 'internal organizational processes and systems' represent important antecedents of a firm's ability to "absorb" external knowledge. Since open innovation implies interactions between internal and external actors for information and knowledge sharing firms need new capabilities such as a "connective capacity" to retain external knowledge and manage knowledge within partnerships and alliances. The results from their case study also highlights that managing open innovation implies the design of an 'integrated managerial system' in order to support both inbound and outbound innovation.

2.1.4. Complementary Assets

Complementary assets consist of things like complementary knowledge (kept in proprietary), brand names, distribution or service networks, or manufacturing capabilities can be used to leverage external knowledge in a way that would be more beneficial to the firm. Therefore, establishing systems to monitor and absorb useful external resources will make a firm to achieve a lot while opening up for innovation. Nevertheless, according to OECD, (2000) open innovation can help firms to innovate in the areas in which they do not have internal expertise (OECD, 2000). This can also be evident from Knudsen (2005) who suggested that in order to commercialize their innovations; firms may try to source complementary assets externally by collaborating with other companies.

2.2. Step II: Perspectives of Open Innovation Practices

To answer the second question, what perspectives of open innovation are adopted by them nowadays? Figure 1 above reveal that after the firms successfully developed the fundamentals of open innovation analyzed above, they must engage in external collaborations in practical terms to benefit from open innovation. These are called perspectives of open innovation which are the modes through which a firm can engage in open innovation with outsiders and this can be in the form of technology transfers, funding, supplier perspective, user perspective and institutional perspective. Below table shade more light on their objectives:

Perspectives	Objectives
Technology transfer	Exploitation and exploration of new technology
Funding	Accessing financial resources outside the firm
Supplier	Involving ancillary suppliers in new product development
User	Getting more ideas to enhance product or a create new one
Institutional	Utilize business development services provided by government

Table 1: Perspectives of Open Innovation Practice and their Objectives

Source: Developed by Authors

2.2.1. Technology Transfer

Open innovation can come from the perspective of technology movement. This can be in two platforms: First being inside-out movement (or technology exploitation) in which existing technological capabilities are leveraged outside the boundaries of the firm and the second being outside-in movement (or technology exploration) in which external sources of innovation are used to enhance current technological developments. Mobilizing various elements of a new technology from research institutes, universities, research laboratories, polytechnics, colleges, specialized research institutes may help to create a better product. Nintendo in HBS case study by Coughlan, (2001) relied on a large network of software manufacturers to create the largest videogame library which finally led to the purchase of its own game base-stations. Thus, in a comprehensive open innovation setting firms should combine both inside-out and outside-in knowledge transfer to create maximum value from their technological capabilities.

2.2.2. Funding

Open innovation may have funding perspective; the dynamic entrepreneur(s) tactfully find ways of using valuable resources outside their firms without owning them. Firms find it difficult to acquire everything thus it must be resourceful in obtaining basic resources and for the other resources they may use collaborative resources.

2.2.3. Suppliers' Perspective

Ancillary suppliers who comprise an important part of backward linkage of a firm's value chain are a good source of open innovation. The ancillaries are getting more involved in the innovative products and services and they often do their own R&D which their clients can benefit from. Innovative ancillary products sourced from innovative supplier infuse innovation in the value chain process and recapitulates what has been stated by Hagedoorn (1993, 2002) that early integration to innovation can significantly increase innovative performance in most industries.

2.2.4. The Users' Perspective

This involves innovation with the support from customers and distributors. Customer's feedback is one of the most important sources of information for better innovative products. They at times provide ideas on how to improve existing products (incremental innovation) or create entirely new products or services (radical innovation). Distributors being the middle men between the firms and final users provide insights to innovation which is a good source of innovation. Von- Hippel (1986) has rightly stated that users are integrated into the innovation process in order to understand potential customers' latent requirements and to integrate users' hidden application knowledge.

2.2.5. The Institutional Perspective

Even though globalization has reduced the extent of freedom government has in business, it can still play an important role in encouraging firms to innovate by implementing the strategies required for firms to effectively overcome their obstacles (OECD, 2000). This can be through appropriate institutional frameworks (e.g. infrastructures, regulation, incentives, and institutional learning) that allow firms to access external resources for innovation (OECD, 2000). As such, government institutions are important open innovation platforms that entrepreneur(s) should use to enhance their innovation capabilities.

2.3. Step III: Outcome of Open Innovation for Firms

To answer the third question, what is the outcome of open innovation to the firms? Figure I above reveal that after firms builds fundamental requirements and engages in open innovation with outside partners via different perspectives mentioned above, it can expect positive consequences in form of more access to resources, exploring hidden potentials, developing new skills set for employees, lower project cost, new innovative products, potentials for further growth and development which are discussed below:

2.3.1. More Resources Accessibility

Various studies indicate firms are usually in need of fund and open innovation is beneficial to them as they can develop collaborations to have access to various resources apart from their own capacity (OECD, 2010).

2.3.2. Explore Hidden Potentials

Firms should unlock their own innovation processes to implement internal ideas otherwise they will remain unexplored (OECD, 2010). Open innovation is beneficial as the access to external ideas enables better utilization of unexplored which infuses efficiency. Torckeli, Joachim and Salmi (2009) found in their research that many small/new firms reveal the engagement with Philips in the MiPlaza and expose themselves and their core technologies through direct interaction with Philips. This in turn has benefitted Philips as it has got the opportunity to learn about these core technologies and to develop absorptive capacity with respect to them. Installation of MiPlaza further suggests that Philips has benefitted from allowing the various small firms conduct their research on its premises.

2.3.3. Accessing New Knowledge

Chesbrough, suggests that openness to external sources allows firms to draw in new ideas from outside which deepen its own pool of technological opportunities to create new innovation. He further observed that firms that are too internally focused may miss opportunities, as many knowledge sources necessary to achieve innovation can only be found outside the firm. For instance, Laursen and Salter (2006) have found in their research on the role of openness in explaining innovation performance among U.K. manufacturing firms, that searching widely and deeply across a variety of search channels can provide ideas and resources that enable firms gain and exploit innovative opportunities overtime.

2.3.4. Developing New Skills Set

This often means outsourcing certain skill sets, such as skills to develop research in areas not part of one's own core competencies. Bigliardi, Dormio and Galati (2012) in their research on the adoption of open innovation within the telecommunication industry highlighted that ICT companies acquire external knowledge and skills mainly from universities and research centers, as well as from other value chain members like suppliers.

2.3.5. Lower Project Cost

Open innovation is beneficial to firms as it facilitates sourcing of resources, knowledge and capacity across the globe. It enables lowering of transaction costs and advancing new innovation projects which would be too expensive to carry out alone (OECD, 2010). Firms can be able to share costs with external partners through open innovation thus they can innovate better with lower costs.

2.3.6. New Innovative Products

Open Innovation allows employees to work with external resources which can develop their potentials to create more innovative products. Torkkeli, Joachim and Salmi (2009) found a contingency perspective that Intel maintains through its tie-ups with top schools like MIT and Berkeley which resulted in the development of a very inexpensive PC for under-developed countries.

2.3.7. New Market and Synergistic Growth

Through open innovation firms can expand their target market. One aspect of open innovation is the growing role that markets are playing in organizing and coordinating innovative activities. The growth of these innovation markets offers greater rewards to the collaborative partners since those partners can often sell their products to a wider range of customers and markets. This is evident from the cooperation between Philips and another large firm, the coffee roaster Douwe Egberts in developing a completely new type of coffee machine (called "Senseo") that uses cartridges, which was initially and exclusively manufactured by Douwe. And in reciprocation Philips allowed only Douwe coffee in its machines, and Douwe created coffee cartridges to only fit only in Philips machines (Torkkeli, Joachim and Salmi, 2009).

2.3.8. Enhanced Potentials for Growth

Open innovation extends firms' potential for growth via alliances and facilitates new skill development, lowering project cost, exploring hidden potentials and accessing new markets. Powell, Koput, and Smith-Doerr (1996) worked on inter-organizational collaboration in biotechnology and found the contribution of collaboration in learning and growth; the findings showed that firms embedded in knowledge networks are likely to have greater development.

Type of Partners	Forms of Collaboration	Objectives of the Firm
Academic Research	Research Programs International and European tenders Researcher Projects and PhD funding Licenses	Access to an anticipated vision of the evolution and to new technical knowledge Reduction of the risk and the cost of upstream Research
Clients/ Suppliers	Alliances (with or without capital participation) Licenses	Applied research and co-development of products Reduction of the risk and the cost of product development
Competitors	Joint ventures International and European research programs	Conception of future technologies Pre-competitive research Reduction of the risk and the cost of pre Competitive Research
Small Innovative Firms	Financing, spin-off and acquisition of start-up Cooperation agreements within clusters European and national research programmes	Access to very specialized competences Technological watch Reduction of the risk and the cost of development

Table 2: Types of Partners, forms of collaborations and objectives to firms

Source: adopted from Laperche and Lefebvre (2011).

The table above (2) reveals different types of partners a firm can have in order to engage in different forms of open innovations. The collaboration with academic institutes could be in the form of; collaboration in research project, international tenders, research mobility and licenses. These collaborations have two objectives firstly, access to an anticipated vision of the evolution and technological knowhow and secondly the reduction of risk and upstream research costs. The second type of partners is clients/suppliers with form of collaboration in Alliances (with or without capital participation) and licences. This collaboration is also having two objectives 1) applied research and co-development of products, 2) reduction of the risk and the cost of product development. The third type of partners is competitors and form of collaboration as joint venture and international research programmes. This collaboration is also having three objectives 1) conception of future technologies, 2) pre-competitive research, 3) reduction of the risk and the cost of pre-competitive research. The last type of partners as far as the framework is concerned is small innovative firms. And the forms of collaborations are financing, spin-off and acquisition of start-up; cooperation agreements within clusters; European and national research programmes. The objectives are also three: 1) access to very specialized competences 2) technological watch 3) reduction of the risk and the cost of development

3. Conclusion

Chesbrough has originated the concept of open innovation in 2003. Thereafter, open innovation, the concept received an increasing number of academics and practitioners that assimilate and touting that "open innovation" model as a superior way of firm to innovate, if not the only way for firms to achieve long-term success in today's fast moving market environment. Looking at the above

framework firms will have an innovative advantage if they adopt open innovation model. More especially if they have fundamentals of open innovation practice which are management systems and strategies required to shift from a closed to an open innovation system (i.e. organizational transformation, cultural change, building absorptive capability, and complimentary assets). Thus, after firm developed the fundamentals of open innovation practice then it can engage in various collaborations to benefit from various perspectives of open innovation (such as technology transfer, funding, suppliers' perspective, use perspective and institutional perspectives). This is because when many minds are working on the same problem, it will take less time and cost to solve it and, besides, the solutions found are better. Anyone can participate with collaborative technology and internal capability. The framework above also revealed that open innovation model can stimulates prospect of firms. When firms possess certain internal capability to collaborate with external partners then they will have access to various resources base, skills set, new market, they can explore their hidden potentials, lower project cost, new innovative products in which generally will lead to their growth and development. This is because nowadays, "*firms do not innovate alone*" but rather in collaboration with others, including with their customers and suppliers and with universities and research organizations innovation enables multiple organizations to learn, grow and gain something from external sources for their growth and development. However, the rule of the game in adopting open innovation is "*Mutual trust and respect*". Nevertheless, the framework also indicate how open innovation can help firms to build fundamentals to innovate in the areas in which they do not have internal expertise. This is because after the firm have build fundamentals to some extent and engage in some sort of collaboration and benefited in form of access to various resources base, skills set, new market, they can explore their hidden potentials, lower project cost, new innovative products in which generally will lead to their growth and development. This will help firms to build fundamentals in other areas so as to innovate in those areas in which they do not have internal expertise. It can also be evident from Knudsen (2005) who suggested that in order for firms to commercialize their innovations; they may try to source complementary assets externally by collaborating with other companies.

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