

# SMEs and Open Innovation: Global Cases and Initiatives

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## Chapter 5

# A Research Model for Open Innovation: Synthesizing Opportunities and Challenges Surrounding SMEs

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### **ABSTRACT**

*With the advent of innovative technologies and long the setting of entrepreneurship development philosophy, context and business handling have been transformed from being traditional to innovative. Depending on diversity and nature of the transformation, innovation has been shifted from closed peripheries to open dimension. Looking at the immense benefits, ranging from small entrepreneurs to corporate to multinational, business houses are adopting various innovation techniques. However, the road to innovation, despite being a paradigm shift is not smooth and ready for many, particularly the small and medium enterprises (SMEs) who mainly deal with the clients at the outer peripheries of the social circle. Moreover, there is a research gap within the context of SME development through open innovation strategies. This chapter intends to initiate a research model for carrying out research on the development of SMEs through utilization of open innovation strategies. Along these contexts it has tried to synthesize aspects of opportunities and challenges surrounding SMEs development utilizing open and collaborative approaches. To set the research model, the paper has developed an innovation opportunity framework, both at the policy level and at the entrepreneur level. To validate the research hypothesis, the chapter hints at carrying out a three phase survey comprising selected SMEs.*

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## **INTRODUCTION**

Business establishments have come to realize the importance of innovation for survival in a world of global competition (Hage, 1999; Sullivan, 1998). Furthermore, it has long been recognized that small and micro businesses have a vital role to play in the economy (Stanworth & Gray, 1991) with small business accounting for 99.6% of all businesses in the UK and an estimated 3.7 million active businesses in 1998. Collectively, small and medium enterprises (SMEs) are responsible for 65% of employment and 57% of Gross Domestic Product within the UK (Madsing, 1997; Tonge, 2001). (There is no single agreed definition of a SME. A variety of definitions are applied among OECD and APEC economies, and employee number is not the sole defined criterion. SMEs are considered to be non-subsidary, independent firms which employ less than a given number of employees.) The scenario is the same in other European countries. SMEs account for over 99.8% (the EU-26 average, first 26 countries under the European Union) of all firms in Cyprus, Greece, Italy, Portugal, and Spain (European Commission, 2008; Keupp, Lhuillery, Garcia-Torres, & Raffo, 2009).

SMEs in Europe accumulates to 23M€ (23 million Euros) investment market that account for 99% of all businesses and represent 2/3 of the total employment (Renaud, 2008). But, in spite of being key contributor to the global economy accounting for approximately 50% of local and national GDP (Gross Domestic product), 30% of export, and 10% of FDI (Foreign Direct Investment) most of the SME communities are lagging behind promoting their products at the national level and at the global level (OECD, 2006). A number of publications have highlighted these situations (De Jong, Vanhaverbeke, Kalvet, Chesbrough, 2008; European Commission, 2008; MacGregor, Bianchi, Hernandez, & Mendibil, 2007; Maes, 2009; Moore, 2006; Van de Vrande, de Jong, Vanhaverbeke, & de Rochemont, 2009)

and numerous cases can be cited (Landabaso, 2010; Lemola, & Lievonen, 2008; Lindermann, Valcárcel, Schaarschmidt, & von Kortzfleisch, 2009; OECD, 2008a, 2008c) to support them.

The burgeoning nature of global competition and the rising trend in research and development (R&D) expenditures lead entrepreneurs, especially SMEs, to embrace open innovation strategies collaborating with external partners, such as suppliers, customers, consumers, supply chain partners, universities, researchers, other companies, and individuals. In a complex and highly competitive global market, entrepreneurs have to innovate to survive and grow. To innovate and develop commercially viable products and services, SMEs need to explore issues of opportunities and challenges in this open paradigm of innovation (Herstad, Bloch, Ebersberger, & van de Velde, 2008; OECD, 2008a). This paper looks into the opportunities and challenges that SMEs are facing for their growth, operation, and development surrounding open innovation strategies.

To set the theory, before going to the background, this section discusses on concepts of innovation and open innovation, where relationships of SMEs with these two parameters are being focused. As the main thrust of this chapter, later on, it looks into various opportunities and challenges in relation to open innovation and they have been categorized through a vertical literature review. Intention is there to emphasize on the most influential and original works in this field.

## **Conceptualizing Innovation**

The term innovation means a novel way of doing something (McKeown, 2008). It may refer to incremental, radical, and revolutionary changes in thinking, products, processes, or organizations (Schumpeter, 1934). Innovation then could be defined as the creation, development, and implementation of a new product, process, or service, aiming at improving efficiency, effectiveness, or competitive advantage (Chesbrough, 2003a; 2006;

EIRMA, 2004). The term may apply to products, services, manufacturing processes, managerial processes, or the design of an organization. It is most often viewed at a product or process level, where product innovation satisfies a customer's needs and process innovation improves efficiency and effectiveness of the organization. Innovation links to creativity and the creation of new ideas, and involves taking those new ideas and turning them into reality through invention, research and new product development (Govt. of New Zealand, 2007). Furthermore, innovation can be seen as the process that translates knowledge into economic growth and social well-being. It encompasses a series of scientific, technological, organizational, economic and commercial activities. Research in the context of innovation is targeted towards one of these activities and may be carried out at different phases of the innovative process (Chesbrough, Vanhaverbeke, & West, 2006; Govt. of Australia, 2010).

Innovation relates to transformation of processes, products, or services (BlessingWhite, 2006; Chason, 2008) to create additional value and wealth (Barker, 2008; Beacham, 2006; Vaitheeswaran, 2007) leading to the benefit of community (Cox, 2008). In this aspect, the real growth of the importance of innovation activities has been linked with several simultaneously affecting societal phenomena, such as easier familiarization with the globalization, obtaining benefits from deregulation and liberalization of markets, utilizing the benefits from the ICT revolution, and adopting themselves with the dynamic changes in the demand patterns (Schienstock, & Hämäläinen, 2001).

### **Conceptualizing Open Innovation**

Open Innovation, a term recently evolved and being used by industries and organizations to promote open ended (flexible and collaborative) ideas, thoughts, processes, and researches to improve the product development, provide better services

to the clients, increase efficiency and enhance value-addition. In terms of process dynamics, it incorporates accumulation of ideas, knowledge, licenses, intellectual properties, patents, and inventions (through licensing, joint ventures, spin-offs); and in terms of concept dynamics, it incorporates user innovation, market innovation, cumulative innovation, collaborative innovation and distributed innovation. While developing new ideas for better product, process and service development, open innovation emerges, in the diverse world of widely distributed knowledge, and solitary enterprises cannot afford (economically and organizationally) to rely entirely on their own research and resources, but may instead collaborate, buy, lease-out or license processes or inventions (patents, intellectual properties) from other companies, organizations or institutions (Chesbrough 2003b; 2006; Chesbrough, Vanhaverbeke, & West, 2006). Currently, many companies are promoting open innovation and among them IBM, Nokia, ORACLE and Procter & Gamble are widely renowned, though hardly they can be categorized as SMEs. Among SMEs, to name a few, Modelon in Germany, Helphone in Spain, Peira BVBA in Belgium, Nowatec Technology in Poland, and Delta R&S in Italy has been highlighted as success cases in a study conducted by European Union (Landabaso, 2010).

Along the road of open innovation, inclusion of open ended (flexible, demand driven and collaborative) contexts are becoming popular day by day. Success stories such as those of Google, Skype and Microsoft teach us at least one lesson – no one could ever know where the next big idea will be coming from! Experience shows that innovative ideas thrive when different disciplines or mindsets come together (Oxford Business School, 2008). Moreover, the contribution of the innovation systems approach with the open ended perspectives are emphasizing the importance of external linkages for innovative success and the importance of innovation diffusion together with innovation creation. Studies on service innova-

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tions have confirmed the versatility of innovation sources. These studies have also brought up the significance of new patterns of thought and models of operation, in addition to technological innovations (Toivonen, 2004; Van der Walt, Buitendag, Zaaiman, & van Vuuren, 2009).

This chapter limits the scope of research within the context of opportunities and challenges of innovation for SMEs for providing better products and services through better processes. The paper is the outcome of a progressive research on influence of open innovation for SMEs development based on extensive literature review. This paper makes a qualitative synthesis of the parameters related to opportunities aspects of open innovation in terms of SMEs advancement. Next, it carries out a qualitative synthesis on parameters related to challenges. This research has constructed an innovation opportunities framework synthesizing the opportunities and challenges, which lead the survey work to be carried out in three phases (generic development of the benchmark, specific entrepreneurs under the first phase, and focused entrepreneurs under controlled environment) to validate the research hypotheses and continue future research.

Next, the theoretical arguments are being discussed in relation to open innovation and particularly, open innovation within the context of SMEs development focusing opportunities and challenges. One may argue further elaboration on theories. This chapter to be specifically focused to the research theme, such as the synthesis of opportunities and challenges related to SMEs, has tried to set a boundary to the literature review on generic concepts and theoretical aspects of innovation and open innovation.

## **BACKGROUND**

### **SMEs and Innovation**

Learning from various school of thoughts innovation has many effects on SMEs in terms of

economics. It leads the SMEs to reach out for evolutionary economics, institutional economics, new regional economics, the economics of learning and knowledge, and the economics of innovation (Lundvall, 1999). Successful innovation is crucial for business accomplishment, and growth through innovation underpins any region's long term economic prosperity (Roper & Hewitt-Dundas, 2004). Innovation in SMEs leads to product innovation, as well as process innovation including employment generation (Lindermann, Valcárcel, Schaarschmidt, & von Kortzfleisch, 2009). However, this window of opening is relatively challenging, since the importance of innovations is not only due to the impact they have on employment, but also depend on other variables. Moreover, innovations have effects on other variables, such as turn-over, economic growth, etc. and firms may also have made more than one innovation where the innovation-induced employment changes are counteractive (Nählinder, 2005).

The situation complicates further. An earlier survey reveals that, when innovation is reported by SMEs themselves, and defined more widely in terms of service as well as manufacturing innovations, including process as well as product innovations, the frequency of product innovations seem lowest among peripheral SMEs (SMEs who work at the lowest level of the marketing chain), either in aggregate form or even for both manufacturing and services treated separately (Keeble, 1997). But, there is another window of opening is that despite being in a continuing debate about the role of SMEs in introducing fundamentally novel innovation than the large firms (Storey & Sykes, 1996), they do have a greater ability to take incremental role in open innovation to niche themselves in better ambiance (Storey, 1994). Furthermore, SMEs can be a starting place of important innovations, which would then be commercialized by large firms, rendering to increased employment generation (Smallbone, North & Vickers, 2003).

In recent years, the contribution of SMEs to economic growth, job creation, innovation and promotion of enterprise has been widely

recognized. While SMEs are important in terms of contributing their overall share on GDP, but at the same time it is also believed that many smaller firms lack both managerial and technical skills, which inhibit their business effectiveness (Newton, 2001; Papulová & Mokroš, 2007; Tilley & Tonge, 2003). Therefore, improving the competitive advantage of SMEs is imperative to individual firms and at the same time essential for improvement of the national economy as a whole (Tilley & Tonge, 2003).

### **SMEs and Open Innovation**

The most important benefit of open innovation to companies or business entities is that it provides an extended base of ideas and technologies. Companies look at open innovation as a close collaboration with external partners, such as customers, consumers, researchers or other people that may have an input to the future development of their company. The main motives for joining forces is to seize new business opportunities, to share risks, to pool complementary resources and to realize synergies. Companies recognize open innovation as a strategic tool to explore new growth opportunities at a lower risk. In this aspect, open technology sourcing offers companies higher flexibility and responsiveness without necessarily incurring huge costs (OECD, 2008b; Sousa, 2008). Referring to the importance of innovation in SMEs, Davenport (2006:3) stated that, "Innovation is important for SMEs - a massive 60% of innovations come from the small and medium enterprise sector, and it is crucial that this total must not diminish against competing pressures in the modern market".

The open innovation approach assumes that innovating enterprise is no longer the sole locus of innovation, nor it is the only means for reaping the benefits of research, development and innovation (RDI). In comparison to a closed innovation model, where external actors are viewed with suspicion, who could take away useful knowledge to other competitors; an open innovation environment sets

a common platform to its users, customers, suppliers, public knowledge institutions, individual inventors and even competitors and each and every partners are being regarded as potential contributors of crucial pieces of information. In addition to this, through open ended collaboration, innovating partners can enhance their own technologies or reduce RDI costs, which are essentially important drivers of open innovation (Lemola & Lievonen, 2008).

In SMEs innovation collaboration or activities of open innovation is a long lasting tradition, despite their lack in resources in terms of finance and human skills, which restricts them not to maintain large innovation portfolios (De Jong, Vanhaverbeke, Kalvet, & Chesbrough, 2008), but larger enterprises are more comfortable in this case to make themselves available for external collaboration or other strategies of open innovation (Chesbrough, 2003a; De Jong, 2006; De Jong, Vanhaverbeke, Kalvet, & Chesbrough, 2008; OECD, 2008b). For sake of this chapter, literature review will be limited to opportunities and challenges that are being faced by SMEs on the way of establishing an innovation opportunity framework utilizing open innovation strategies.

### **Opportunities**

Open innovation targeting the SMEs development revolves around various issues and perspectives, in terms of product, process and service innovation (De Jong & von Hippel, 2005; 2009; IBM, 2007; Hass & Hochrinner, 2008; Maes, 2009; OECD, 2000a; Van de Vrande, de Jong, Vanhaverbeke, & de Rochemont, 2009) leading to increased competition, demanding customers, increased knowledge acquisition, and better positioning in the market (De Jong, 2006; Lemola & Lievonen, 2008; NOUS, 2007; Storey, 1994). It has been observed that open innovation has created various opportunities for SMEs in terms of their overall business development, and a few are being categorized in Table 1. This chapter is trying to make

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a qualitative synthesis of those parameters. The opportunity parameters were selected as per the research emphasis by contemporary researchers through an extensive literature review, which are mostly affecting SMEs development in the open innovation paradigm.

As methodology of search, search keys has been applied to various search engines, like Scopus, ScienceDirect, Elsevier, and others with search string, for example, ['open innovation'+SMEs], [opportunities+'open innovation'+SMEs], [challenges+'open innovation'+SMEs].

As mentioned earlier, Table 1 shows the focused categories of opportunities that this research has apprehended mostly from the search and then after several iterations, each of them has been discussed

further based on the searched literatures, inclusive of these researchers' understanding.

## Competition

In Joseph Schumpeter's (Tidd, Bessant & Pavitt, 2005:7) view competition in the domain of innovation is, "competition from the new commodity, the new technology, the new source of supply, the new type of organization. .. competition which ... strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives". Grama & Fotache (2007) emphasized on utilization of ICT to enhance the competition within the innovation processes. IFAD (2007), however, pointed out that SMEs often compete with protected public enterprises, which is a fact in many countries. But, in the realm

Table 1. Opportunities associated to open innovation affecting SMEs development

Opportunities	Literatures reviewed
Intense competition	Barnes, et al., 2001; Kaplinsky, et al., 2003; De Jong, 2006; NOUS, 2007; Grama & Fotache, 2007; IFAD, 2007; Tidd, Bessant & Pavitt, 2005; BERR, 2008
More demanding customers	Von Hippel, 1998; 2005; Olson & Bakke, 2001; Lilien et al., 2002; Brockhoff, 2003; Bonner & Walker, 2004; Enkel, et al., 2005; FFG, 2006; Gassmann, 2006; De Jong, 2006; BERR, 2007
Abundance of knowledge, opportunities and interactions	European Commission, 2003a; 2003b; Napier et al., 2004; Cosh, Fu & Hughes, 2005; Lemola & Lievonen, 2008; Commonwealth of Australia, 2009
Easily adopt OI strategies such as inward and outward licensing and joint ventures	Fischer, 1978; Gold, 1987; Lazzarotti et al., 2008; Sautter & Clar, 2008; Cervantes, 2009
Product innovation	Crawford, 1983; Hiebing Jr. & Cooper, 2003; OECD, 2000a; Nählinder, 2005; Salavou, 2006; Maria & Micelli, 2008; De Jong et al., 2008; Lee et al., 2010; Maes, 2009; Van de Vrande et al., 2009
Process innovation	Zuboff, 1988; Walton, 1989; Davenport, 1993; OECD, 2000a; Nählinder, 2005; Maes, 2009
Service innovation	Van Ark et al., 2003; Miles, 2005; IfM & IBM, 2008
Technological innovations	Evangelista, 2000; Telemetia Institute, 2008; Conceição & Heitor, 2000; Tilley & Tonge, 2003; Toivonen, 2004
Better positioning in the market	Storey, 1994; Grant, Laney & Pickett, 2002; Van de Vrande et al., 2008
Act as starter or catalyst	Mueller & Goic, 2003; Smallbone, North & Vickers, 2003; Telemetia Institute, 2008; Hagen, 2008; Brouwers et al., 2009
Enabler of employment generation	Sengenberger et al., 1990; Smallbone, North & Vickers, 2003; EIM, 1997; European Communities, 2000
Ability to adopt quickly with new products	Stiglitz, 1998; Cooke, 1996; Cooke & Wills, 1999; Design Council, 2005; Parrilli, 2006



of open innovation, the basis of competition has been shifted from price of product to price and quality, or price, quality, choice, and others. The field has now become mature with much of the competition shifting to marginal issues like relative interest rates (Tidd, Bessant & Pavitt, 2005). Furthermore, free trade/globalization has resulted to adapt the ways of thinking to dismantle protective tariff and other barriers and, therefore, new basis of competition emerges (Barnes, Bessant, Dunne, & Morris, 2001; Kaplinsky, Morris & Readman, 2003).

### **Increased Customer Demand**

Researchers on open innovation recognize increased customer involvement as an essential element to expedite internal innovation process (Gassmann, 2006). Apart from Von Hippel's (2005) initiating work, this has been supported by many other researchers (Olson & Bakke, 2001; Lilien, Morrison, Searls, Sonnack, & von Hippel, 2002; Bonner & Walker, 2004). Moreover, emphasis has been given to increased involvement of the customers at the beginning of the innovation process (Brockhoff, 2003; Von Hippel, 1998; 2005; Enkel, Kausch, & Gassmann, 2005). By observing positive sales and R&D picture in various services, which reflects robust demand from key customers in diverse forms, and to cope with the situation it is essential to build a global, flexible, cost effective network and service infrastructure that can support the dynamic needs of the future customers (BERR, 2007). Furthermore, the innovation opportunity framework should have a representation through clearly defined and focused services, in a cost-optimized structure and with a customer-oriented approach (FFG, 2006).

### **Knowledge Acquisition**

Innovation involves generating, disseminating and applying knowledge. It is not a linear process. It involves an originator at one end and a receiver

at the other. In this process, many players are involved, and they interact and influence each other in multifaceted ways. Ideas can come from anywhere and may lead to unexpected directions (Commonwealth of Australia, 2009). In this aspect, external linkages, both public (including higher education institutions) and private, benefit SME innovation. These linkages can be important sources of knowledge that directly strengthen the technological competences of the SMEs and their competitive advantage. Furthermore, collaboration with customers, suppliers, higher education institutions, even competitors, allows entrepreneurs to expand their range of expertise, develop specialize products, and achieve various other corporate advantages (Cosh, Fu & Hughes, 2005). In addition to these, the growing weight of, and policy emphasis on, innovation and knowledge as drivers of competitiveness and growth, which brings major opportunities for countries that are generally not considered to be at the forefront of knowledge creation or innovative capacity (Napier, Serger & Hansson, 2004).

### **Adoption of Open Innovation Strategies**

The diffusion of open innovation strategies has been largely recognized within SMEs (Lazzarotti, Manzini, & Pizzurno, 2008) through collaborative and open business model (Sautter and Clar, 2008). SMEs are more adaptable to embrace open innovation strategies due to their flexibility in accelerating innovation, especially in terms of radical innovation and manage themselves within the innovation process and encourage others (Edwards, Delbridge, & Munday, 2005). Furthermore, Van de Vrande et al. (2009) argued that, even with the lack of financial resources, scant opportunities to recruit specialized personnel and small innovation portfolio, open innovation practices will be increasingly adopted in SMEs. Batterlink (2009) supported the same through a study of the decade 1994-2004 and mentions that

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SMEs are catching up in recent years in adopting open innovation strategies.

### **Product Innovation**

Product innovation is linked to the analysis of changes and innovations within the product category. Product innovation allows one to map out changes in one's enterprise's product. It compels to determine how a product should evolve to meet needs of the client and be competitive in the future (Crawford, 1983; Hiebing Jr. & Cooper, 2003). Despite some researchers have made a tiny boundary between 'major product innovation' and 'minor product innovation' (Lee, Park, Yoon, & Park, 2010), product innovation in an open innovation paradigm has opportunity factors like, cost reduction (Maria & Micelli, 2008), improved performance against an existing product (Hiebing Jr. & Cooper, 2003), or value addition (De Jong, Vanhaverbeke, Kalvet & Chesbrough, 2008).

### **Process Innovation**

Process innovation combines the adoption of a new view of the business process with the application of innovation into the key processes. The novel and distinctive feature of this combination is its enormous potential to assist an organization in achieving major reductions in process cost or process time, or major improvements in quality, flexibility, and service levels. In this perspective, the business must be viewed not only in terms of functions, divisions, or products, but also of key processes. These processes may include redesigning them from the beginning to the end and employing whatever innovative technologies and organizational resources are available at hand (Davenport, 1993; Walton, 1989; Zuboff, 1988). However, a major challenge in process innovation is to make a successful transition to a continuous improvement in the environment. Referring to Davenport (1993), this research purview that, if a company that does not institute continuous im-

provement after implementing process innovation is likely to revert to the old ways of doing business.

### **Service Innovation**

Service innovation systems are dynamic configurations of people, technologies, organizations and shared information that create and deliver value to customers, providers and partners through services. They are forming a growing proportion of the world economy and are becoming central activity for the businesses, governments, families and individuals. Nowadays, firms do not consider themselves to be 'services' or 'manufacturing', but providing solutions for customers that involve a combination of products and services. Preferably, service innovation can happen across all service sectors and one should look at all possible service activities rather than looking at any specific service sectors (IfM & IBM, 2008; Miles, 2005; Van Ark, Broersma & Den Hertog, 2003).

### **Technological Innovation**

This manuscript has touched issues like product, process and service innovation during the earlier portion, and therefore, would like to emphasize on technological innovation in terms of SME development that enclaves all the product, process and service innovations. A report of Telemetia Institute (2008) supports that, technological innovations trigger new services, better care for clients, new ways of working, and new means of exchange of ideas. Hence, understanding technological trends allows one to anticipate better on near-future possibilities for tangible problems for consumers and organizations, and in this aspect SMEs act as a catalyst of innovation promotion (Telemetia Institute, 2008). However, Conceição and Heitor (2000) have indicated that, the direct implication for innovation policies is important, but sometimes, limited role of demand at the firm level in assessing the amount of incentives

for firms to introduce technological innovations hinders development of SMEs.

### **Better Positioning in the Market**

Companies consider innovation as a key component to enhance their performance and to strengthen their competitive position in the market. As SMEs grow and reach a critical size, they start organizing the company in a more formal way, hire specialists for a broad range of specialized job functions and formalize the firm's strategy in order to ensure better market positions against large(r) and international competitors. In many SMEs when they reach that critical size, formal R&D and innovation practices start to play crucial roles in developing and sustaining competitive advantages (Van de Vrande, de Jong, Vanhaverbeke, & de Rochemont, 2008) for better positioning in the market.

### **Acting as Starter or Catalyst**

If entrepreneurs can genuinely be developed through skilled human resources, or at least be developed, at university (or a research house, or an entrepreneur), they will ultimately act as starters of a market economy, including social enterprises (Mueller & Goic, 2003). The ventures they create will serve as catalysts for technological progress (Hagen, 2008; Brouwers, Van Duivenboden, & Thaens, 2009).

### **Enabling Employment Generation**

In the 1970s the World saw the reversal trend towards increasing size of enterprises and business establishments, and the share of small enterprises started to grow, especially in terms of employment (Sengenberger, Loveman, & Piore, 1990). During the 1980s, at a time when large firms were cutting down their labor, the apparent ability of small firms to create jobs attracted the attention of policy-makers in many countries (Smallbone,

North, & Vickers, 2003). A survey conducted by EIM (1997) found that in UK and the Netherlands, SMEs represent a smaller share of total employment than the European Union average, which is 66% (see Renaud, 2008), while in Italy, Spain, Norway and Denmark SMEs make an above-average contribution. In Spain and Italy, about 80% of total employment is represented by small enterprises.

### **Earlier Adapter of New Products**

Stiglitz (1998) argued that SMEs are not able to produce radical innovations due to their limited size and thus fail to create innovative market (there are counter arguments about this), but Parrilli (2006) mentioned that, due to their small size, they may rather benefit from being part of an innovation system. Cooke (1996) and Cooke and Wills (1999) supported the idea of incorporating SMEs in an innovation system comprising public and private institutions and other firms to promote innovation via collective effort. Design Council's survey (2005) found the evidence of this fact that, SMEs could be easily adapted to new products due to their flexible nature.

### **Challenges**

Antti Peltomäki, the Deputy Director General of European Commission (European Communities, 2008) states that, innovation is a costly process. He reiterated further, that only one out of 3000 product ideas makes it to the market, which means that there are hundreds of unsuccessful products beyond every success. Moreover, even successful products may be far from being user friendly. Surveys show that 75% of all users find their technology-based tools more stressing than relaxing. In such a context, user-centric validation can play an important role in speeding up effectively the innovation process through addressing the actual user needs. OECD (2000b) finds that, most of the obstacles to growth and innovation in

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services are the same as in manufacturing or other technologies. Insufficient access to finance and risk capital, lack of internal capacity to innovate, insufficient expertise in applying technologies and high risks are characteristically the main barriers to innovation in all sectors.

As a newly emerged field of research, open innovation for SME development deserves a prolonged and strategically developed qualitative and quantitative synthesis on literature review, including various forms of validation. However, by taking account of the contents those are available during the early process of this research; this chapter carries out qualitative discussion based on some emphasized challenge parameters which are being depicted in Table 2. Table 2 shows the categorized challenge parameters and then each of them are being discussed further.

### Organizational and Cultural Differences

Forcing of technology is one of the main reasons behind the failure of the SMEs in attempting to simply use ICTs. Initially, awareness building activities should be introduced before taking any short-term initiatives, followed by more general and long-term programs. Furthermore, by keeping in mind that the introduction of open innovation

strategies in SMEs can bring a real modification in their working environment, the introduction of open innovation strategy based processes should take into account the specific culture of the company, especially the background of the entrepreneur and/or the managers, as well as their openness to innovation orientation (Wei, & Morgan, 2004; Barba-Sánchez, Martínez-Ruiz, & Jiménez-Zarco, 2007). However, doing things collectively, collaboratively and jointly has been seen as a good culture in many countries who are forerunner in open innovation for SMEs development (Callegati & Grandi, 2005; Govt. of UK, 2008a; TIEKE, 2009).

### Inconsistent Turn-Over

Innovations have effects on other variables as well, such as turn-over, economic growth etc1, though they seem minor from outside, but these parameters affects innovation channels in the long run (Nählinger, 2005). Firms may have more than one innovation channel, which is being described next and in those situations innovation-induced employment changes are found to be counteractive. This in turn effects the turn-over of the company. Turn over data effects critical benchmarking indices of SMEs (European Commission, 2002), which reflects input on development contexts, as

Table 2. Challenges associated to open innovation affecting SMEs development

Challenges	Literatures reviewed
Differences in organization and culture between the individual partners	Wei & Morgan, 2004; Calegati & Grandi, 2005; De Jong, 2006; Barba-Sánchez et al., 2007; Govt. of UK, 2008a; TIEKE, 2009
Inconsistency in turn-over and pattern of economic growth	O'Sullivan, 2000; European Commission, 2002; Nählinger, 2005; OECD, 2007; NOUS, 2007; Govt. of UK, 2008b
Multiple innovation channels are counterproductive	Carlsson & Eliasson, 2002; Chesbrough, 2003b; Interact, 2004; Nählinger, 2005; Parrilli, 2006; Lazonick, 2007; De Jong et al., 2008
Naïve in fundamental innovation	Storey & Sykes, 1996; Napier, Serger & Hansson, 2004; Ahrweiler et al., 2005; Hölzl, 2006a; b; Telemetica Institute, 2008
Lack in managerial and technical skills (Small companies with innovative ideas have often found themselves without the capacity to develop or exploit their innovation)	Hadjimanolis, 1999; Van Hemel & Cramer, 2002; Tilley & Tonge, 2003; Del Brío & Junquera, 2003

such human development (OECD, 2007), and thus excessive external turn-over of personnel should be avoided (Govt. of UK, 2008b; Herstad, Bloch, Ebersberger & van de Velde, 2008).

### **Multiple Innovation Channels**

The Open Innovation model implies that enterprises can use both internal and external ideas, technologies and knowledge to advance their innovation processes, and internal ideas can be taken to the market through external channels (e.g. spin-offs, external licensing of intellectual property) to generate additional value. This new paradigm inspires enterprises to find the most appropriate business model to commercialize new products or services, regardless of any model that exists within the enterprise or must be sought externally (Chesbrough, 2003b; De Jong, Vanhaverbeke, Kalvet & Chesbrough, 2008). In this context, utilization of new innovation channels for business cooperation are imperative (Interact, 2004), and smaller equity companies experimenting with alternative technologies creates multiple channels of innovation (Carlsson and Eliasson 2002). Often, it eliminates the need for commitment to specific technologies or R&D projects. However, problems may arise at the point of acquisition, specifically, it is critical for the acquiring firm that it gains control over not just for a specific issue but the competencies embedded in the acquired organization and its personnel (Lazonick 2007). Moreover, multiple innovation channels in SMEs are found to be counterproductive (Interact, 2004).

### **Fundamental Technological Innovation**

Simple as it seems, open innovation for SMEs development requires a paradigm shift from traditional processes to innovative processes, integration of skill development, knowledge development, product development to service development, system development and technology development. It requires general awareness,

diagnostics, pro-active counseling, management and monitoring, empowerment of people involved, new business models and new collaborations among public, private, academic and service providers (Telemetica Institute, 2008). However, some researches argue that, in order to foster new technological sectors a fundamental change of financial systems towards more market-based finance is necessary. Furthermore, there is evidence that financial systems are not always rigid, which effect institutional configurations over time (Hölzl 2006a). Research by Ahrweiler et al. (2005) also suggests that, while institutional heterogeneity persists at the level of institutional frameworks, the differences are of decreasing relevance in knowledge-intensive industries (Holzl, 2006a; b), creating a space for other agents to act as intermediaries. Therefore, firms who are aggressively engaging themselves in fundamental technological innovation are found to be in challenging situations.

### **Lack of Human Skills**

When one talks about competences for open innovation, it often means the so called “personal competences”, which are skills, experience and capacity that are embodied in an individual person. These competences may appear in terms of professional, methodological, social and individual skills essential to execute a specific role in the innovation process (iNNOWiSE, 2010). In an earlier study, Hadjimanolis (1999) found that in addition to other barriers in the open innovation process, the lack of skilled labor is an important one, which is also common for developed and developing nations. He emphasized that perception of top managers on innovation may seem as a barrier and that extends further due to lack of motivation. In another study, Van Hemel and Cramer (2002) observe that lack of appropriate knowledge is a barrier to specific fields of innovation, while Gerstenfeld and Roberts (2000) added that those could be due to lack of training and awareness. Moreover, despite SMEs impor-

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tance in terms of their overall share of GDP, many smaller firms lack both managerial and technical skills (focused training or short-term orientation) that inhibit their effectiveness in innovation (Del Brio & Junquera, 2003; Tilley, & Tonge, 2003). Henceforth, effort has been given to synthesize the discussed parameters above.

### Synthesis and the Innovation Opportunities Framework

This research is now constructing an innovation opportunity framework by synthesizing the illustrated parameters of challenges and opportunities. By keeping the opportunities and challenges of SMEs on open innovation in mind, a four dimensional opportunity framework has been deduced. The innovation opportunity framework can be applied in such a way, so that SMEs can find themselves comfortable within the open innovation development chain:

- By acting as a starter or catalyst of newly floated ideas from open innovation paradigms and adopting them quickly to fit into the new platform leading to improved business environment,
- By narrowing down organizational and cultural differences, removing inconsistencies in turn-over or other financial barriers,

providing necessary skills development leading to better access to market, finance, business skills and information;

- By adopting open innovation strategies in product, process, service, and technology innovation leading to creation of new opportunities; and
- By enabling to compete, catering more clients and triggering employment generation leading to increased competition and revenue generation.

At the entrepreneurship level, the framework would look like Figure 1 and in more simplified format, perhaps when glimpsed from the policy level it will look like Figure 2. This adaptable and repetitive framework can easily be applied to SMEs who are exploring open innovation strategies for their competencies, and business and economic strength.

### Research Recommendations

Innovation has become a key factor for the economic success of many countries and a prerequisite for sustainable development. Open innovation models have become an integral part of the innovation strategies and business models of companies in recent years. Innovation is increasingly based on knowledge assets beyond the boundaries of

Figure 1. Innovation opportunity framework at the entrepreneurship level

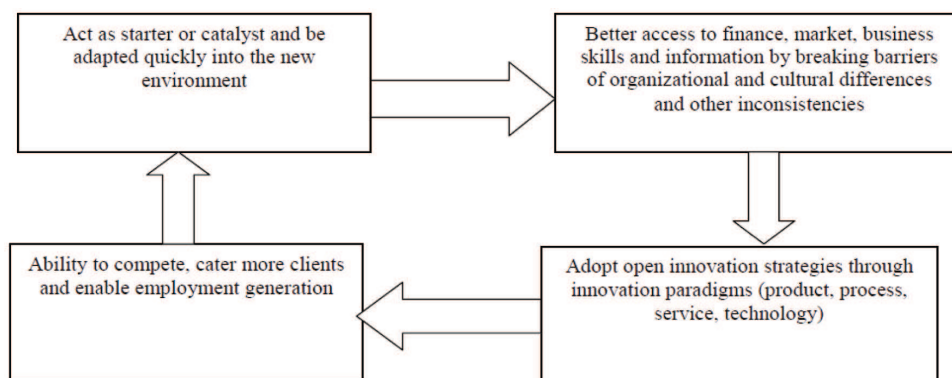
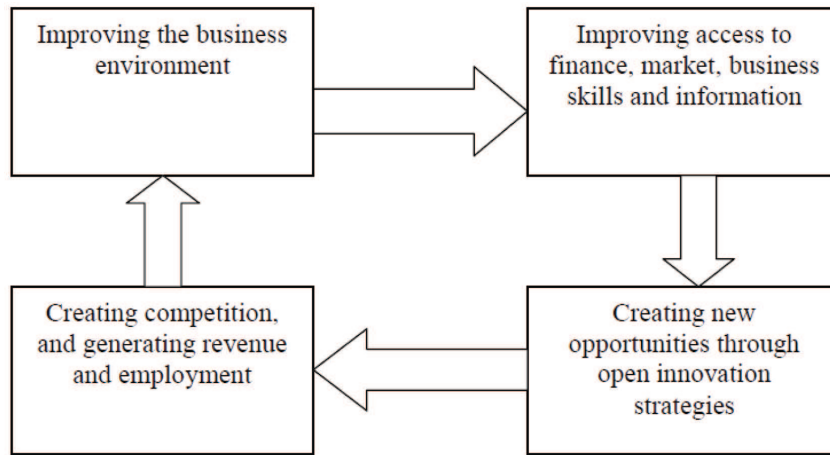


Figure 2. Innovation opportunity framework at the policy level



the company and co-operation has become an important way of tapping into knowledge resources from outside in order to generate new ideas and bring them quickly to the market (the “outside-in” approach). At the same time companies may spin out technologies and intellectual properties that they have developed internally. These could be the components that fall outside of their core business and thus in this way, better be developed and commercialized by outsiders (the “inside-out” approach) (OECD, 2008a;b).

Governments are paying more attention to the contribution of science and innovation to economic growth and have introduced a variety of new initiatives and reforms in many countries. Several countries, including Australia, Canada, Hungary, Ireland, South Korea and Spain have introduced comprehensive policy frameworks to guide developments in science, technology and innovation. In a number of countries, government institutions and agencies have been restructured to improve the governance of innovation systems, and at the same time policy evaluation has become more widespread. In addition to these, public research systems are being reformed to better contribute to economic and social needs by creating opportunities for further researches (OECD, 2002).

Moreover, the ‘SME pact’ foresees the positive mobilization of larger entrepreneurs or organizations (private or public) to promote innovative SME’s development. Within this SME pact, programmes foster R&D-collaboration between innovative SMEs and large enterprises. If large enterprises are interested by SME’s innovative products or services while still needing further development, these programmes support R&D projects that facilitate the testing and adaptation of the product, process and service innovation for the specific needs of the large enterprise (Cervantes, 2009; OECD, 2007; 2008b).

This research has highlighted twelve opportunities and five challenges parameters on open innovation that are being emphasized by contemporary researches/researchers for the overall development of SMEs. They are not exhaustive, even if the research intention was to make them so. Open innovation, though not a very new field of research anymore, future research can conduct extended literature review focusing wider area of interpretation and may suggest further improvement on these parameters leading to a more improved and sustained business model. Also, it is expected that the survey work that will be carried out in several phases will provide some more deliberations in this aspect.

## CONCLUSION

Innovation is a prime factor for economic success in many countries. In a complex and highly competitive global market, entrepreneurs have to innovate and develop commercially viable products and services faster than ever for their survival. Moreover, open innovation is a new paradigm, which assumes that enterprises can and should use both external and internal ideas and paths to the market, while enterprises are looking for discovering and realizing innovative opportunities. The open innovation paradigm assumes that internal ideas can also be taken to markets through external channels, outside the current businesses of the enterprise, to generate value. However, the Open Innovation model does not completely upset traditional policymaking to legitimize policy interventions, including spillovers, system failures and market failures. Still these processes are being applied equally to SMEs despite the newly evolved challenges (De Jong, Vanhaverbeke, Kalvet & Chesbrough, 2008).

To meet these new challenges, companies are adopting new approaches to their innovation strategies and processes (OECD, 2008a). All businesses need to innovate, though it may take any number of forms, from the steady refinement of established products to the leap in the unknown when an untried idea is launched. Whether introducing new technologies and getting people to work in new ways or creating new products, one must innovate to survive, and these applies to SMEs equally. In a world of transformation and competition, innovating is not a luxury anymore, it is essential (De Jong, 2006; ACCA, 2008; Melkas, Uotila & Kallio, 2010).

This research, has tried to categorize aspects of opportunities and challenges surrounding the development of small sectors enterprises adopting open innovation. In doing so, it has clustered them, argued in favor and in places argued against for further deliberations. It argues that by knowing the scopes, opportunities and challenges small

enterprises will be benefited the most. Furthermore, instigating extended research around some of the discussed parameters will be beneficial to the research communities.

Keeping these in mind, if one would like to initiate an entrepreneurship, the finding of this research will assist in better positioning in terms of opportunities and at the same time will make the journey safe by familiarizing the challenges in ahead. Finally, future literature review, validation of hypotheses through the intended survey and analysis in these contexts would establish extended platform of research and devise necessary tools to be utilized by the entrepreneurs.

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## KEY TERMS AND DEFINITIONS

**Innovation:** Process of doing something new (never existed before, or drastically modified from the original, or modified to be accepted as new) for creating value addition.

**Open Innovation:** An innovation process, but accompanying efforts from stakeholders involved in the process, and doing it in a collaborative approach.

**Open Innovation Strategies;:** Processes or activities that are taken during the innovation adopting open innovation mode of development.

**Open Innovation Opportunity Framework:** A defined trajectory of processes leveraging the opportunities that have been created by open innovation.

**SMEs:** Firms belonging to small and medium enterprises sector of the business community, and varying in size or turn-over from country to country or region to region, they forms the largest part of the business community in any country.