Open Innovation in SMEs: Prospects and Challenges

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1 Introduction

Innovation refers to transformation of products, processes, services or organizational management (White 2006; Chason 2008; Rahman 2010) for value addition (Beacham 2006; Vaitheeswaran 2007; Barker 2008) leading to benefits of the community (Cox 2008). However, the real importance of innovation activities has been linked with several simultaneously affecting societal phenomena, such as having easier familiarization with the globalization, obtaining benefits from deregulation and liberalization of markets, utilizing benefits from the ICT revolution, and adopting the dynamic changes in the market demand patterns (Schienstock and Hämäläinen 2001). Along the roadmap of innovation, inclusion of open contexts is becoming popular day by day. Success stories such as those of Open Source, Google, Skype or Microsoft (though they are not particularly, SMEs) teach us at least one lesson—no one could ever know where the next big idea will be coming from! (Oxford Business School 2008).

Innovation has various effects on SMEs within various schools of thoughts in terms of economics. It leads them to evolutionary economics, institutional economics, new regional economics, the economics of learning and the economics of innovation (Lundvall 1999). But, successful innovation is crucial for business success and SMEs growth that underpins any region's long term economic achievement (Roper and Hewitt-Dundas 2004). In general, innovation in SMEs may lead to product innovation, as well as process innovation including providing impact in employment. However, this proxy 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, such as turn-over, economic growth, sustainability, etc. (Nählinder 2005).

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Table 1 Search counts with citation rates and selected literatures

Search engine	Search string	Hit counts	Citation counts	Observations
Google scholar	'open innovation' + smes + prospects	161	10 selected with citation counts above 20	Articles included books, book chapters, journal papers, conference proceedings
Google scholar	'open innovation' + smes + challenges	450	15 selected with citation counts above 20	

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 their overall share of GDP, but is also believed that many smaller firms lack both managerial and technical skills, which inhibit their effectiveness. Therefore, improving the competitive advantage of SMEs is important to individual firms and to the national economy as a whole (Tilley and Tonge 2003). This study remains confined within the context of prospects and challenges of innovation for SMEs to growth effectively for providing better products, processes or services. The study is an outcome of a progressive research on the influence of open innovation in entrepreneurship development. As a longitudinal literature review[1] (see Hsu and Lin 2006; Weerakkody et al. 2009), the study searched literatures through search engines like; Google scholar, Scopus, ScienceDirect and the university digital library using specific search strings ('open innovation'.AND.'SMEs'.AND.'prospects'), and ('open innovation'.AND. 'SMEs'.AND.'challenges'), and selected literatures with higher citation rates (Google Scholar) and relevance ratios (generic search engines, like Google and Bing) as the search criteria or methodology.

The search criterion for citation index is listed in Table 1 below:

The second search was conducted on ScienceDirect with the university's integrated digital library service. The hit counts and selection criteria is listed in Table 2.

Further to these, after a thorough review of classical concept papers, research articles, including contemporary literatures on open innovation and SMEs development, the themes were chosen among the prospects and challenges by looking into an iterative count from those selected literatures. Citation index, literature review and search criteria were adopted from Kitchenham 2004; Cochrane Collaboration 2004, 2006, 2008; and Cowan and Daim 2011.

The chapter has been segmented into six parts. After providing the introduction and background literature review in the first two, it has tried to provide synthesized arguments on issues of prospects and challenges of open innovation in entrepreneurships, emphasizing SMEs, in the third and fourth parts. The last two segments comprise of research recommendations and conclusion. However, as an important

[1] http://www.experiment-resources.com/longitudinal-study.html

Table 2 Literature review from ScienceDirect and Digital Library

Search engine	Search string	Hit counts	Limited to 2006–2013	Limited to topics
ScienceDirect + b-on + digital library	'open innovation' AND smes AND prospects for all sources and all fields since 1993	739	116	20 articles selected[a]
	'open innovation' AND smes AND challenges for all sources and all fields since 1993	1,826	1,283	30 articles selected[b]

[a] Sorted by relevance and topics, such as absorptive capacity, firm, innovation, high-tech, intellectual property, international relationship, product innovation, public research, outward FDI, and patent, with hit count over 20 from the journal list shown in Table 3

[b] Sorted by relevance and topics, such as firm, innovation, innovation system, product development, business model, and open innovation, with hit count over 20 from the journal list shown in Table 4

Table 3 List of journals with hit counts over 20

Journals	Hit counts
Research policy	62
Technovation	39
Technological forecasting and social change	30
Journal of business venturing	22

Table 4 List of journals with hit counts over 20

Journals	Hit counts
Technovation	158
Research policy	135
Technological forecasting and social change	58
Industrial marketing management	50
European management journal	49
International business review	48
Journal of business venturing	43
International journal of production economics	38
International journal of information management	31
Journal of world business	29
Journal of business research	26
World patent information	25

element, this study develops an innovation opportunity framework for researchers, academics and practitioners.

2 Background

The term innovation refers to incremental, radical, and revolutionary changes in thinking, products, processes, services or organizations for a novelty.[2] Innovation then could be defined as the creation, improvement and implementation of a new product, process, service, or organizational change aiming to increase efficiency, effectiveness or competitive advantage (Chesbrough 2003b, 2006; EIRMA 2004). Innovation links to the creativity and the creation of unique ideas, and involves processes for taking those innovative ideas and turning them into reality through invention, research and new product development.[3] 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. Researches in the context of innovation are targeted towards one of these activities and may be carried out at different phases of the process[4] (Chesbrough et al. 2006).

Innovation tends to be a major source of economic performance and social welfare of a country (Hamalainen and Heiskala 2007; Ghili and Tavana 2011; Abreu et al. 2011). It directly affects productivity, efficiency and job creation in firms; citizens' welfare in society and assists to address global challenges such as the economic crisis, health, education and environment (OECD 2009). Furthermore, innovation no longer depends solely on how firms, universities, and research institutes perform independently, but, progressively more and more, on how they collaborate (OECD 1999).

On the other hand, open innovation (OI),[5] a term recently supplemented to the industries and organizations to promote open ended ideas, thoughts, processes, and researches to improve product development, provide better services, increase efficiency and enhance value-addition. In terms of process dynamics, it incorporates accumulation of ideas, knowledge, licenses, intellectual properties, patents, copy rights and inventions (through licensing, joint ventures, spin-offs, and start-ups); and in terms of concept dynamics, it incorporates user innovation, market innovation, cumulative innovation, collaborative innovation and distributed innovation. Further, open innovation emerges on issues like, the widely distributed

[2] http://www.merriam-webster.com/dictionary/innovation; http://dictionary.reference.com/browse/innovation; http://en.wikipedia.org/wiki/Innovation

[3] http://www.digitalstrategy.govt.nz/Resources/Glossary-of-Key-Terms/

[4] http://www.arc.gov.au/general/glossary.htm

[5] a term promoted by Henry Chesbrough, a professor and executive director at the Center for Open Innovation at Berkeley.

knowledge that are available in the diverse world of the Internet, which solitary enterprises cannot afford (economically and organizationally) and 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 2003a, 2006; Chesbrough et al. 2006). Currently, many companies are promoting open innovation and among them IBM, IdeaConnetion, InnoCentive, InnovationXchange, Nerac, NineSigma, Nokia, Procter and Gamble, and Yet2.com[6] are widely recognized. These names actually do not represent the SMEs community, but they are the forerunners in utilizing open innovation strategies since many years, and this research observes that these emerging concepts are yet to be matured among SMEs. This research argues further; learning from these forerunners would provide in-depth knowledge about various stages of open innovation, from which the SMEs community can piggy-back, their learning curves.

It has been observed that companies recognize open innovation as a strategic tool to explore new growth opportunities and at the same time to lower risks. However, the most important benefit they see 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, suppliers, competitors, researchers or other individuals that may have an input to the future development of their company. The main motives for joining forces is to seize new business opportunities, share risks, pool complementary resources and realize synergies (OECD 2008; 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". This research, however, limits the literature review to prospects and challenges related to SMEs context in establishing an open innovation opportunities framework, and looks into possible discourse of enhanced inclusion of SMEs within the innovation process. Various prospects and challenges of open innovation in SMEs are being discussed next.

3 Prospects of Open Innovation in SMES

In spite of their diversified characteristics, SMEs have been found to be more adaptable to open innovation with a significant contribution on targeting issues and perspectives in relation to their development, such as product, process and service innovation (OECD 2000a; De Jong and von Hippel 2005, 2009; IBM 2007; Hass and Hochrinner 2008; Maes 2009; Van de Vrande et al. 2009) leading to increased

[6] http://en.wikipedia.org/wiki/Open_Innovation

competition, demanding customers, knowledge acquisition, and better positioning in the market (De Jong 2006; NOUS 2007; Lemola and Lievonen 2008).

It has been observed that open innovation has created various prospects or opportunities for SMEs in terms of their development. SMEs play an important role in the open innovation world. They can explore smaller markets that are of less importance to large firms, provide specialized technological support to others including large companies, easily enter into a growing market with innovative business model, partner with other dominant businesses and platforms of large companies, and remain in a niche where large firms have lesser interest (Chesbrough 2010).

Thus, ranging from benefits like gaining knowledge from external sources, or adopting OI strategies for internal development, or creating new business opportunities, or improving access to markets, business skills and information SMEs can take the advantage from being exposed to open innovation. However, varying in terms of acceptability or satisfactoriness, there are arguments on specific parameters of open innovation processes, whether they are beneficial or challenging to SMEs.

As mentioned in the methodology, this research has selected the following prospects (shown in Table 5) and challenges (shown in Table 6), and then some important aspects from them (both prospects and challenges) are being discussed using exploratory literature review. Later on a framework on innovation prospects has been devised for the benefit of the SMEs communities and at the same time to instigate a background for further research.

3.1 Earlier Adapter of New Products, Platforms and Markets

Stiglitz (1998) argued that SMEs are not able to produce radical innovations due to their limited size and thus fail to create innovative market, but Parrilli (2006) mentioned that, due to their small size and taking it as an advantage, 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 (2005) survey found the evidence of this fact that, SMEs could be easily adapted to new products due to their rather flexible nature. Chesbrough (2010) supported the idea of SMEs being in advantageous position to easily adapt new platform or market as explorer, specialist, or forerunner in unexplored areas of less importance to large firms.

3.2 Easier Adoption of Open Innovation Strategies and Policies

With certain technological capacities at hand in order to imitate the innovation, SMEs are in a better position to adopt technological new products, though the imitator's major task is to overcome the barriers (Schewe 2001). Furthermore, in the open innovation paradigm, in addition to in-house resources, firms' external relations are performed as assets, which contribute to their overall performance (Zaheer and Bell 2005; Smed et al. 2012). Firms cannot rely solely on the in-house resources, but also need to explore, adopt and tag pool of external resources as an integral element in the development of unique products for the market (Smed et al. 2012).

The diffusion of open innovation strategies has been largely acknowledged within SMEs (Lazzarotti et al. 2008) through collaborative and open business model (Sautter and Clar 2008). SMEs are more adaptable to embrace open innovation strategies, such as inward and outward licensing, cross-regional R&D collaboration, regional innovation and joint ventures (Asheim 2003; Asheim et al. 2003; Scherngell and Barber 2009) due to their flexibility in accelerating innovation, especially in terms of radical innovation and manage themselves within the innovation process and influence others (Edwards et al. 2005). Furthermore, Van

Table 5 Prospects associated to open innovation affecting SMEs development

Prospects	**Sources**
Ability to adopt quickly with new products, platforms and markets	Cooke 1996; Stiglitz 1998; Cooke and Wills 1999; Design Council 2005; Parrilli 2006; Avlonitis and Salavou 2007; García-Moralesa et al. 2007; Chesbrough 2010
Easily adopt open innovation strategies such as inward and outward licensing, R&D collaboration and joint ventures, and policies	Schewe 2001; Havas 2002; Bougrain and Haudeville 2002; Asheim et al. 2003; Edwards et al. 2005; Lazzarotti et al. 2008; Sautter and Clar 2008; Batterlink 2009; Cervantes 2009; Van de Vrande et al. 2009; Scherngell and Barber 2009; Smed et al. 2012
Adaptability to technological, product, process or service innovation	Evangelista 2000; OECD 2000a; Bougrain and Haudeville 2002; Tilley and Tonge 2003; Asheim et al. 2003; Gassmann and Enkel 2004; Toivonen 2004; Cosh et al. 2005; Nählinder 2005; Salavou 2006; Avlonitis and Salavou 2007; Dargan and Shucksmith 2008; Lichtenthaler 2007, 2010; Maes 2009; Van de Vrande et al. 2009; Commonwealth of Australia 2009
Enabler of employment generation	Smallbone et al. Smallbone et al. 2003; European Commission 1997, 2000
Adoptive to the abundance of knowledge, opportunities and interactions as knowledge acquisition enabler	European Commission 2003a; 2003b; Cosh et al. 2005; Lemola and Lievonen 2008

Table 6 Challenges associated to Open Innovation affecting SMEs development

Challenges	Sources
Lack of managerial and technical skills, lack of scarce resources (finance, government policy)	Hadjimanolis 1999; Van Hemel and Cramer, 2002; Nauwelaers and Wintjes 2002; Tilley and Tonge 2003; Del Brío and Junquera 2003; Hayton 2004; McAdam and Gibson 2004; García-Moralesa et al. 2007; Van de Vrande et al. 2008; Massa and Testa 2008; Rahman and Ramos 2010; Hotho and Champion 2011; Woerter 2012
Inconsistency in turn-over, pattern of economic growth, relationship among partners, development patterns (product, process, service, managerial aspect)	O'Sullivan 2000; European Commission 2002; Havas 2002; Nählinder 2005; Edwards et al. 2005; NOUS 2007; OECD 2007; Government of UK 2008; Herstad et al. 2008; Woerter 2012
Multiple innovation channels are counterproductive	Carlsson and Eliasson 2002; Chesbrough 2003b; Interact 2004; Nählinder 2005; Parrilli 2006; Lazonick 2007; De Jong et al 2008
Differences in organization and culture between the individual partners	Wei and Morgan 2004; Callegati and Grandi 2005; De Jong 2006; Lichtenthaler and Ernst 2006; Barba-Sánchez et al. 2007; Government of UK 2008; TIEKE 2009; Van de Vrande et al. 2009; Herzog and Leker 2010; Chesbrough 2010
Incompetency in handling knowledge issues	OECD 2008; Vanhaverbeke 2010; Ann and Minshall 2012
Increased globalization	Nauwelaers and Wintjes 2000; Spanos et al. 2001; Dhungana 2003

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 are increasingly adopted in SMEs due to their other inherited natures, such as flexible to transformations or changes, receptive to open calls, and adaptive to new environment. Batterlink (2009) supported the same through a study of the decade 1994–2004 and mentions that SMEs are catching up in recent years in adopting open innovation strategies.

This study has find that local and national policies play important role in the early stage of the adoption process among SMEs for appropriate market placement (Havas 2002; Bougrain and Haudeville 2002; Dargan and Shucksmith 2008).

3.3 Adoptive to Technological, Product, Process or Service Innovation

Technological changes play important role in service sectors, particularly. In this aspect, process innovation among other innovation investments, including

acquisition and internal development represent the most effective channels for service innovation (Evangelista 2000). Along this route, SMEs are found to be more flexible in adapting to new customers' requirements by making necessary work force changes and adapting to new equipment and techniques (OECD 2000a). Moreover, their dynamic capabilities enable them to address rapidly changing environments for the development through integration and reconfiguration of external and internal competencies (Maes 2009). One of the major advantages of SMEs is their ability to respond more rapidly to changing signals from the market. Thus, concentrating on a range of incremental innovations based on ideas adopted from clients, competitors and suppliers to improve both products and processes is likely to be more effective way of improving their overall competitiveness (Tilley and Tonge 2003).

A report of Telemetica Institute (2008) mentions that technological innovations trigger new services, better care for clients, new ways of working, and new means of exchange of ideas. This study argues that technological innovation acknowledging product, process, service and organizational management creates opportunities or scopes of improvements to firms belonging to the small and medium business sector. If entrepreneurs can genuinely be developed through skilled human resources, or at least be developed, at university or research house, they will ultimately act as starters of a market economy, including social enterprises (Mueller and Goic 2003). Hence, understanding technological trends allows one to anticipate better on near-future possibilities for tangible problems for consumers and organizations through exploitation of technologies (Avlonitis and Salavou 2007), and in this aspect SMEs act as a catalyst of innovation promotion (Telemetica Institute 2008; Hagen 2008; Brouwers et al. 2009).

3.4 Enabler of Employment Generation

Since the publication of the Bolton Report in 1971, the contribution of SMEs to economic growth, job creation, innovation and promotion of enterprises has been largely recognized (Tilley and Tonge 2003). Innovations generate economic growth, but also induce employment generation. However, in terms of employment generation, the impact of product innovation seems to be more catalytic than the impact of process innovation (Nählinder 2005).

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 generation (Sengenberger et al. 1990). During the 1980s, at a time when corporate enterprises were cutting down their labor, the apparent ability of small firms to create jobs attracted the attention of policy-makers in many countries (Smallbone et al. 2003).

3.5 *Adoptive to the Abundance of Knowledge, Opportunities and Interactions as Knowledge Acquisition Enabler*

Innovation involves generating, disseminating and applying of knowledge. It is not a linear process, and involves an originator at one end and a receiver at the other. There are many players 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 research houses) and private (intermediaries and knowledge brokers), benefit SMEs innovations. 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 specialist products, and achieve various other corporate objectives (Cosh et al. 2005).

External knowledge utilization refers to commercializing knowledge exclusively or in addition to its application in a firm's own products and services (for example, out-licensing or out-sourcing) (Lichtenthaler 2007). Firms' transfer of knowledge to recipients outside their organization has recently become wider, and they may gain access to new markets or establish their own technologies as industry standards (Lichtenthaler 2010). Furthermore, opening up the internal innovation process by integrating suppliers and/or customers is not new. Supplier involvement can provide buying firms with substantial benefits that range from more "operational" benefits, such as the earlier identification of technical problems, fewer re-engineering issues, or readymade availability of prototypes, to more "strategic" benefits, such as enhanced utilization of internal resources, access to new or supplementary product and process technologies, reduced technical and financial risks, improved product features, or relatively shorter time-to-market for new products. The benefits of outsourcing includes gaining access to new areas of knowledge (complementary knowledge), managing capacity problems (more flexibility), concentration of core competencies, speed (reducing time-to-market), and the sharing of costs (Toivonen 2004; Gassmann and Enkel 2004).

4 Challenges of Open Innovation in SMES

Abulrub and Lee (2011) referred to the contemporary studies that have investigated differences in the degree of open innovation depending on four environmental factors, such as the industry type (manufacturing industry, or service industry), the company size (large company, or SMEs), the technology intensity (high-tech industry, or low-tech industry), and the market type (foreign markets, or domestic markets). However, when one searches about specific challenges

associated to SMEs development utilizing open innovation, investigations are rare and lead to scarce human resources, misaligned consistency in the information about open innovation strategies, unawareness among SMEs about the actual benefit of open innovation, and foremost, incompetency in handling intricate knowledge resources that are being treated as open innovation tools in the current information era. Furthermore, working with new technologies, radical innovation is considered to involve greater interdependence and information interexchange and thereby a greater need for control and more costs that can be a problem for SMEs because of resource scarcity (Tijsterman 2010). Also, as a new concept, open innovation in SMEs are yet to be treated in the experimental or observational state, and thus may lead to be a costly and risky process (Rahman and Ramos 2010).

Antti Peltomäki, the Deputy Director General of European Commission (European Communities 2008) mentions that, innovation is a costly process. He reiterated further, that only one out of 3000 product ideas makes it on 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 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 users' needs. OECD (2000b) finds that, most of the obstacles to growth and innovation in services are the same as in manufacturing. Insufficient access to finance and risk capital, lack of internal capacity to innovate, insufficient expertise in applying appropriate knowledge and high risk are characteristically the main barriers to innovation in all sectors.

Hence, it is relevant that, 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 other forms of validation. However, during the early process of this research, this manuscript likes to carry out qualitative discussion based on a few challenge parameters (as depicted in Table 2). It is expected that as the research grows, it will be able to provide some more in-depth parameters related to challenges associated to open innovation affecting SMEs development.

4.1 Lack of Human Skills, Scarce Resources and Policy Constraints

While SMEs are important in terms of their overall contribution to GDP, it is also believed that smaller firms lack both managerial and technical skills that inhibit their growth (Tilley and Tonge 2003, Hayton 2004). There are typical management challenges for SME managers (mostly, owner-managers), which are quite different than those of managers of large firms that want to expedite the organic growth

engine in their company, and this is an interesting uncharted area for future research (Chesbrough et al. 2006; Van de Vrande et al. 2008; Rahman and Ramos 2010; Hotho and Champion 2011).

In an earlier study, Hadjimanolis (1999) found that in addition to other barriers (external and internal) in the open innovation process, the lack of skilled labor is an important one, which is also common among 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 Gerstenfield and Roberts (2000) added that those could be due to lack of training and awareness. Moreover, many smaller firms lack both managerial and technical skills (focused training or short-term orientation) that inhibit their effectiveness in innovation (Del Brío and Junquera 2003; Tilley and Tonge 2003; García-Moralesa et al. 2007).

Nauwelaers and Wintjes (2000, 2002) argue that with limited resource base, SMEs need external orientation to understand and proactively adapt to the new environment, so that they engage in innovation on an informal mode. The main role for innovation policy, which aims to increase the capabilities of its SMEs to innovate, and the overall capacity of a region, should be to foster interactive learning within the companies and within the region. They further argue that this calls for an interactive mode of policy intervention, which is a challenge to the SMEs. Massa and Testa (2008) adds to this that the ability of regional human resources to realize innovation objectives and to contribute to the growth of the targeted regions face challenges due to proper knowledge. Furthermore, inconsistency in the development process model, and weak relationship among stakeholders, like weak supplier relation can present significant challenges for SMEs when attempting to integrate and operate supplier dependent development process models (Edwards et al. 2005).

4.2 Inconsistency in Turn-Over, Pattern of Economic Growth, and Collaboration

Innovation is explicitly characterized as a process that is cumulative, collective, and uncertain. Along this route, apart from resource allocations, organizational restructuring, or strategic positioning, it may have effects on other variables as well, such as inconsistency in turn-over, pattern of economic growth, collaboration and cooperation, etc. Though they be seen as minor from outside or for the time being, but these parameters affect innovation channels in the longer run (O'Sullivan 2000; Havas 2002; Nählinder 2005). Turn over data effects critical benchmarking indices of SMEs (European Commission 2002), that reflects input on development contexts, such as human development (NOUS 2007; OECD 2007), and thus excessive external turn-over of personnel seems to be a challenge at the end (Herstad et al.

2008). Furthermore, Woerter (2012) mentions that collaboration potential or knowledge and technology transfer potential between the private and the public research sector face challenges due to many factors, such as technology proximity, lack of information, lack of transfer ability, secrecy, and technology oriented policy initiatives.

4.3 Multiple Innovation Channels

The Open Innovation model entails that enterprises can use internal and external ideas, technologies and knowledge to advance their innovation processes, and internal ideas can be taken to the market through external channels (for example, spin-offs, external licensing of intellectual property, etc.) to generate additional value (Nählinder 2005). 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 et al. 2008). In this context, utilization of new innovation channels for business cooperation are imperative (Interact 2004), and in doing so, smaller equity companies experimenting with alternative technologies create 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 (Parrilli 2006; Lazonick 2007). In this aspect, multiple innovation channels in SMEs are found to be counterproductive[7] (Interact 2004).

4.4 Organizational and Cultural Differences

SMEs face structural disadvantages when it comes to open innovation. They often lack many of the capabilities necessary to ascertain, convey and realize external ideas and technologies effectively from outside into their firms (Chesbrough 2010). Furthermore, forcing of technology is one of the main reasons behind the failure of attempts of the SMEs to simply use technologies effectively. Also, there are organizational and cultural differences showing NIH (not-invented-here) syndrome, not accepting risk-taking initiatives and being non-responsive in managerial support where desired (Lichtenthaler and Ernst 2006; Herzog and Leker 2010).

[7] Firms may also have made more than one innovation channel, where the innovation-induced employment changes are counteractive, thus resulting in little visible employment change.

In addition, the introduction of new technologies in SMEs can bring a real modification in the way of their working environment, hence the introduction of technology-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 and Morgan 2004; Barba-Sánchez et al. 2007; Van de Vrande et al. 2009).

4.5 Incompetency in Handling Knowledge Issues

Studies find that open innovation offers several benefits for SMEs in low-tech industries. Even so, it also creates new challenges. One of these challenges is how to deal with the delicate and intricate intellectual property (IP) issues arising from co-created technologies (Vanhaverbeke 2010). Similar studies have revealed that the characteristics of internal members in an organization can affect the patterns of knowledge capability building (Ann and Minshall 2012). Furthermore, SMEs are usually confronted with increased risks in collaborating with larger companies due to their smaller resources and limited expertise in intellectual property rights (IPR) issues (OECD 2008). Even under certain circumstances, where SMEs operate in environments with strong IP protection, they have sufficient differentiation and negotiation leverage to access external ideas and technologies. Also in majority of the SMEs, the ability to profit from intellectual property is limited because of lack of enforcement power and their economic dependence on larger firms (Chesbrough 2010).

5 Increased Globalization

With the increased globalization, abundant resources, low labor rates and even large target markets are no longer indispensable factors for development, nor sufficient attractions for investors. To combat the situation, one needs to improve the essential infrastructure, enhanced skills, technological capability and improved management practices as major key elements of competitiveness in the emerging pattern of global competition and industrialization. While business remains the principal engine for economic growth and overall prosperity, but at the same time, due to the liberalized process, increased globalization of industry and extraordinary and rapid pace of technological innovations and adaptation, new (sometimes, unknown) challenges are being created for the industrialization (Nauwelaers and Wintjes 2000; Dhungana 2003).

Along this perspective, European firms, and especially SMEs are facing the double challenge of confronting both the global competition and factors related to the integration in the European Union (Spanos et al. 2001). Spanos et al. (2001) argue that in spite of many opportunities, SMEs are facing increased challenges

within the European economic environment. Innovation, flexibility, cost control, and organizational changes constitute as the main managerial imperatives for organizations competing in the Economic Monitoring Union (EMU) area.

6 A Framework

Based on the discussion of scopes, arguments, prospects, and challenges pertinent to the SMEs, this research has constructed an innovation opportunities framework leading to create new dimension of business opportunities through the establishment of improved business environment, by focusing improved access to market, increased access to finance, and creation of new business (see Fig. 1). The study recommends that by improving the access to markets, knowledge about business skills and knowledge of the emerging market, as well as increasing access to finance and scarce resources the overall business environment can be improved and new opportunities can be created.

7 Research Recommendations

Innovation has been treated as a key factor of economic achievement in many countries and subsequently as a prerequisite for sustainable development. Following the trend, in recent years open innovation models have become an integral part of the entrepreneurship strategies and business models. In this aspect, academics, researchers, practitioners, agencies, intermediaries, and the governments are playing active role by providing more attention to the contribution of science and innovation to economic growth and have introduced a variety of new initiatives and transformations. Several countries, including Australia, Canada, Hungary, Ireland, South Korea and Spain have introduced comprehensive policy frameworks to guide developments in science, technology and innovation.

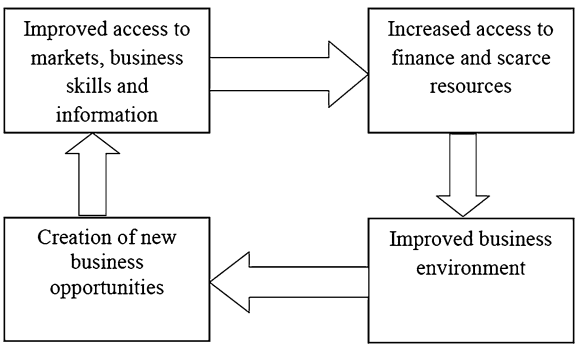

Fig. 1 Innovation opportunities framework

Similarly, in a number of countries, government institutions and development 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 innovative opportunities for researches and practitioners (OECD 2002). However, it has been observed that for successful adoption of open innovation in SMEs, extensive collaborative practices need to be encouraged, especially at the grass roots level of the entrepreneurships.

Moreover, the 'SME pact' (the main objective is to strengthen relations between innovative SMEs and large companies and/or organizations, through commercial contracts or R&D collaboration[8]) foresees the positive mobilization of larger entrepreneurs or organizations (private or public) to promote innovative ways of SME's development. Within this 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 products and services to the specific needs of the large enterprise (OECD 2007, 2008; Cervantes 2009). Thus, SMEs could find their places among and within the open innovation business chains and value addition processes, which need thorough investigation of the nature and characteristics of the partnership, and demand to be properly focused through in-depth studies.

Finally, as the outcome of this study it recommends that to reinforce the innovative SMEs action research need to be carried out, especially at the outer peripheries of the entrepreneurships where these firms actually interface with their customers. Apart from strengthening through the innovation opportunity framework, the action need to be taken under locally developed collaborative networks before bringing to the global market.

8 Conclusions

Evidently, innovation has become a potential factor for economic success in many countries; and in a complex and highly competitive global market, entrepreneurs have to innovate and develop commercially viable products and services faster than ever, not only for their economic growth, but most of the time just only to survive. To meet these new challenges, companies are increasingly adopting new approaches to their innovation strategies and processes (OECD 2008). In a world of transformation and competition, innovating is not a luxury anymore, it is essential. All businesses need to innovate, though it may take any number of forms

[8] http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/fr/supportmeasure/support_mig_0031?searchType=simple&sort=&action=search&matchesPerPage=5&orden=LastUpdate&query=&displayPages=10&reverse=true&country=fr&searchPage=5&index=Erawatch+Online+EN&tab=template

(or reforms), from the steady refinement of established products to the leap in the unknown when an untried idea is launched and exposed to the outside world. For every business, whether by introducing new technology, getting people to work in new ways, or creating new products, process, or service, or management reform one must innovate to survive (ACCA 2008), which implies to SMEs equally (De Jong 2006).

Open innovation is an emerging paradigm that assumes that enterprises can and should use both external and internal ideas and paths to the market, to discover and realize innovative opportunities thus embracing the challenges and risks. The open paradigm assumes that internal ideas can also be taken to markets through external channels, outside the current businesses of the enterprise, to generate value addition. Furthermore, future of businesses utilizing innovative ICTs that include business practice like electronic business or e-business is rising. In this aspect, e-businesses using open innovation methods will enhance value addition to the entire life cycles of businesses. Additionally, as open innovation involves open ended participation of stakeholders from all social stratus, thus forming a comprehensive format of social networks, it is assumed that inclusion of these techniques will add a newer dimension of entrepreneurship with vibrant contribution in the arena of social media (The Business Link 2010).

However, a key observation is that, the open innovation model should not completely upset traditional policymaking to legitimize policy interventions, including spillovers, system failures and market failures, which still apply equally to SMEs (De Jong et al. 2008). This research has emphasized on the adoption of knowledge acquisition processes, acting as catalyst and being earlier adapter of open innovation. However, there are challenges at the peripheries, such as organizational and cultural differences, including lack of knowledge and skills. This research concludes that by learning about the scopes, prospects and challenges in ahead, SMEs and their groups or associations will be benefited and other researchers in this field will also be able to develop a better framework for enhancing the business value following the one that has been developed here.

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