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## Editorial

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In increasingly dynamic and demanding environments, firms need to develop innovative behaviour in order to successfully compete and create value both for them and for the economic system as a whole. Technology and innovation management plays a vital role in the development of both for large firms as well as for small ones.

Open innovation (OI) has been a topic of growing interest in practice and academia for a decade. From a practice perspective, the OI phenomenon was developed from a small group of innovation practitioners (Gassmann et al., 2010); from the theoretical scope, was Chesbrough (2003a, 2003b) who defined the OI concept and opened the debate. In the following years, the scenario has presented an important evolution. While at the beginning the phenomenon was focused on large and high-tech industries firms, nowadays OI appear on other industries and size firms.

Simultaneously, the importance of the OI paradigm has led to the coming of new articles and literature in areas such as innovation policies, entrepreneurship, knowledge management, networks, technology transfer, interorganisational relationships, and advantages of the location. This is reflected in several special issues that have come arisen in last years on this topic. Specific journals focused in the scope of innovation management such as *R&D Management* (2006, 2010), *International Journal of Technology Management* (2010), *International Journal of Entrepreneurship and Innovation Management* (2010), *European Journal of Innovation Management* (2011), *Technovation* (2011), *International Journal of Technological Learning, Innovation and Development* (forthcoming 2012), *International Small Business Journal* (forthcoming 2014) have published special issues on this topic<sup>1</sup>.

The basic premise of OI is opening up the innovation process. One of its most often used definition is: 'the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation, respectively' (Chesbrough, 2006). The OI paradigm emphasises the importance of a wide

range of external actors and sources to achieving and sustaining innovation. Rather than relying on internal R&D, organisations are increasingly engaging in OI. This means that they have exchanged the do-it-yourself option in the innovation process with a rich dialogue of different partners working together.

In this scenario and in order to promote the OI process, organisations need to strengthen the link between institutions that generate new knowledge, and search for new possibilities to share and distribute knowledge. As they cannot support their research and development purely through their internal capabilities, they interact with other firms in order to access new products, processes, patents and licenses. They should therefore improve their relationships with suppliers, clients and other organisations providing resources, such as universities and government authorities.

There is no doubt that OI has become one of the hottest topics in the innovation management literature. When a field grows rapidly, there is a risk that it may become a short-term and out of fashion. So, previous studies such as Gassmann et al. (2010) state the importance to develop OI theory more fully. Huizingh et al. (2011) affirm that there is a need and benefit to extend this field with new perspectives. Huizingh (2011) explores the limits in the understanding of the OI concept.

Although much has been written on the important role of innovation, new ideas and point of views open the mind for new ways of being innovative. The objective of this special issue is to provide theoretical and empirical evidence on the effect of OI on the boundaries of organisations. The importance of this topic, together with the scarcity of empirical studies has led us to take a more in-depth look at the question in this issue. Therefore, a significant challenge exists for researchers seeking to draw conclusions from this research. Recommended topics included: OI policies; OI as a model of innovative practices and creation of knowledge; entrepreneurship and OI; technology transfer and OI; OI in transition economies; value creation, performance and open OI; advantages of location: science and technological parks, industrial clusters; university-industry relationships; intermediaries in R&D cooperative agreements; and the boundaries of the organisations in a OI networking. We were opened to imaginative and interesting ideas that may not fit neatly within any of the above listed areas but that did fit within the spirit of this topic. After a double-blind review process, five papers have been selected to be included in this special issue.

The paper aim of the paper entitled 'Enhancing success with open innovation: an investigation of connective capabilities and network characteristics', by Sanjay R. Sisodiya was to investigate factors that led to increased success with OI. In particular, author explored two firm capabilities – relational proclivity and proactive market orientation – as connective capabilities that improved OI performance. Relational proclivity is the tendency for a firm to seek out, engage in, and make close partner-like inter-firm relationships. Proactive market orientation is the discovery of latent customer needs. Important to these capabilities and OI, is the environment that firms operate within. Social network theory as it applies to inter-firm relationships comes into play as firms today are not isolated entities, but part of a network of businesses. Network centrality is the extent to which an actor is connected to all other entities within a network, while network density is the strength of these relationships. Based upon these defined terms eight hypotheses were posited. These were tested via surveys which were mailed to 532 firms selected from the CorpTech Directory of Technology Companies. After removing responses with missing data, 199 completed surveys resulted in a response rate of 37.4%. Six hypotheses were supported, while two were not. The study

found that these connective capabilities improved OI performance and the moderation due to network characteristics was complex and could lead to improved performance. Relational proclivity did enhance the degree to which firms followed OI and that the greater the firm's proactive market orientation, the greater the level of OI. Further, firms with a proactive market orientation and low network density outperformed those with proactive market orientation and high network density.

Meanwhile, the paper 'Innovating within the system: the simulation model of external influences on open innovation process' by Irina Savitskaya and Samuli Kortelainen introduces a conceptual system dynamics, simulation model, comprising the most important environment-originating factors distinguished throughout the research flow and supported by the theoretical background. The target of the paper is to analyse the OI success in the companies through simulation of innovation process outcomes under systemic influence of environmental factors. The simulation model follows the influence of environment on a simplified OI process measured through product output. The environment is described in terms of existence and level of development of the markets in technologies, the mechanisms for protection of intellectual property rights, the speed of user needs change (standing for market dynamics, as this factor is a view that is influenced by hostility of competition), and national culture. Based on the analysis of literature, the factor of culture included in the simulation model, is measured through collectivistic versus individualistic cultures, since these factors were earlier defined as having a major influence on knowledge sharing practices. Following the study of three countries, the simulation targeted to analyse the innovation system behaviour under approximated to certain country cultural environments, using Hofstede's cultural dimensions scores as input data. All other parameters were kept random, defined only in terms of interconnections and positive/negative impacts. The results obtained suggest, among other things, that when IPR or technological market development tends to zero, countries with higher individualistic scores start to lose the edge compared to countries with higher collectivism. Another interesting and perhaps the most important finding suggests that there exists a tipping point for the speed of users' needs change (and hence market dynamics), meaning that when change happens too quickly, the system fails. Additionally, for this effect to happen, the technology market ought to be sufficiently developed. The simulation results also confirm the positive influence of market dynamics to the innovation outcome, but again until certain level, and it requires IPR protection to be strong in order to support optimal amount of product launches. These results contribute to the growing literature on OI in several ways:

- 1 by confirming claims of market dynamism and IPR protection influences as well as technology markets development
- 2 by introducing measure of national culture as an important determinant of OI
- 3 by providing the first system dynamics simulation model to OI research.

As we stated above, innovation and R&D are important sources of productivity and the major determinants of firm's performance and competitiveness. However, even the impact of R&D, product and process innovation on productivity is significant, the OI framework still lacks empirical evidence on how the different degrees of openness in R&D and innovation influence the change in productivity. Especially companies from emerging economies need means to boost their innovation output in order to increase the competitiveness, productivity and resilience to stand the turbulent environment.

To fill in the existing research gap, the paper 'Open innovation in Russia: productivity and industry effect' by Daria Podmetina, Irina Savitskaya and Juha Väätänen addresses the following research question: how the openness in innovation strategy influences the productivity? Authors analyse survey data of 206 Russian companies and define six innovation strategies with different degree of openness: from traditional, closed approach (internal R&D only) to OI (combination of inbound and outbound OI practices, or 'coupled' OI). The objective of this paper is to study differences in productivity between groups of companies with different innovation strategies. The six studied innovation strategies are defined as follows: closed innovators: companies conduct R&D internally and do not look for external sources; inbound open innovators: companies conduct R&D internally and search for external sources of innovation and technology; outbound open innovators: companies conduct R&D internally and commercialise their innovations through the external channels; open innovators: companies conduct R&D internally, look for external sources for innovation and technology and commercialise the surplus of their innovation; innovation outsourcers: companies do not have internal R&D, but they actively use external sources of innovation and technology; and externalisation OI: companies do not conduct R&D internally, but they search and acquire external R&D, innovation and technologies, and also commercialise the excess of innovations. Coupled process innovation proved to be the winning strategy in terms of labour productivity. The companies with combination of inbound and outbound innovation on average had higher productivity, than those with only one type, however, in terms of financial performance; the inbound OI was leading among OI strategies, and with closed innovation still being very successful strategy for Russian companies. Absence of internal R&D as suggested by absorptive capacity theory returned weaker results than for the companies with in-house R&D complemented by OI processes. However, exclusively outbound OI did not demonstrate significant performance in terms of labour productivity. The results clearly showed the significant positive effect of OI on productivity.

In the same line, the paper entitled 'Do firm's sector and size influence on the degree of inbound open innovation?' by Marta Ortiz-de-Urbina-Criado, Ángeles Montoro-Sánchez and Eva M. Mora-Valentín faces to the gap in the existing research relates to the effect of firm size and sector on the degree of OI. The aim of this paper is to analyse whether companies have different degrees of inbound OI depending on their size and the sector in which they operate. A sample of small, medium and large-size firms from the manufacturing and service sectors have been selected. A cluster analysis has been developed to classify firms in three groups and we have analysed whether there are any differences in the degree of inbound OI on the basis of the size of the firm and the sector in which it operates. Results have found that companies in manufacturing sectors and that are small and medium sized are the most likely to have low or medium degrees of inbound OI; while companies in the service sector and that are large normally have the highest degrees of inbound OI. Secondly, the analysis carried out has demonstrated that companies with greater degrees of inbound OI are the most innovative in terms of product and process, they are the firms that buy more R&D services and usually cooperate with other organisations to develop R&D and innovation activities.

And finally, the paper 'The impact of local technology institutions and R&D investments on information and knowledge flows inside clusters', by Isabel Díez-Vial and Marta Fernández-Olmos evaluates the role of local technology institutions as an external source of ideas, information and knowledge that foster innovation and enhance the performance of firms. It is argued that firms that establish links with local technology

institutions have access to valuable external information and knowledge flows, which in turn improve their export performance. Authors also examine differences in their absorptive capacity, which is their ability to recognise and assimilate information and knowledge spillovers, which depends on their existing internal knowledge stock. Empirical evidence has been gathered from 106 exporting companies in the Iberian Ham cluster. Results confirm the importance of local technology institutions in explaining a firm's export performance: firms that establish such links have a higher probability of increasing their sales abroad. However, firms with a higher absorptive capacity, estimated using their R&D investment, seem to be reluctant to participate in information and knowledge spillovers associated with local technology institutions. It could be that firms with internal R&D investments try to protect their knowledge from being exploited by competitors. It is also possible that firms, as they increase their international presence, develop links outside the cluster that reduce the spillovers created around the technology institution's network.

These are the contributions of the studies included in this issue. However, the relevance of this topic, 'Open innovation and transitions: redefining the boundaries', clearly indicates that it is still an area where further empirical research is needed. We would not want to finish the introduction of this special issue without saying thanks to everybody who has collaborated and helped during the process. We would like to thank the reviewers for their time and effort giving interesting comments and suggestions to all papers. And finally, thank to authors for choosing this journal and send their papers to our call. We sincerely thank Editor-in-Chief Professor Marina Dabic for this support and encouragement to produce this special issue.

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## Notes

1 Special issues about open innovation:

*R&D Management* (2006) 'Opening up the innovation process: towards an agenda', Vol. 36, No. 3, Guest Editor: Oliver Gassmann.

*R&D Management* (2010) 'Special issue: the future of open innovation', Vol. 40, No. 3, Guest Editors: Ellen Enkel, Oliver Gassmann and Henry Chesbrough.

*International Journal of Technology Management* (2010) 'Special issue: broadening the scope of open innovation', Vol. 52, Nos. 3/4, Guest Editors: Vareska van de Vrande, Wim Vanhaverbeke and Oliver Gassmann.

*Technovation* (2011) 'ISPIM special issue on open innovation – selected papers from the 18th and 19th ISPIM Conferences', Vol. 31, No. 1, Guest Editors: Eelko Huizingh, Steffen Conn and Marko Torkkeli.

*International Journal of Entrepreneurship and Innovation Management* (2010) 'Special issue on open innovation: creating products and services through collaboration – selected papers from the XIX ISPIM Conference', Vol. 11, No. 4, Guest Editors: Steffen Conn and Eelko Huizingh.

*European Journal of Innovation Management* (2011) 'Special issue: open innovation', Vol. 14, No. 4, Guest Editors: Sven Carlsson and Vincenzo Corvello.

*International Journal of Technological Learning, Innovation and Development* (forthcoming 2012) 'Special issue: open innovation and technological learning with globalisation in emerging economies', Guest Editors: Jin Chen and Jun Jin.

*International Small Business Journal* (forthcoming 2014) 'Special issue on open innovation in SMEs: an international perspective on a dynamic approach to contemporary entrepreneurship', Guest Editors: Pooran Wynarczyk, Panos G. Piperopoulos and Maura McAdam.

## List of reviewers

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