

# Editorial:

## Building Entrepreneurial Ecosystems: Exploring Ambidexterity in Technology and Engineering Management

An intense competition and a dynamic environment are posing new opportunities and challenges for technology and engineering management within organizations striving to be innovative. In this respect, organizations that aim to apply technological competencies to business management processes to reach the strategic objectives of the enterprises, cannot rely only on internal resources [1], [3].

A growing interest of managers and policymakers is the promotion of entrepreneurial ecosystems (EE) as an interconnected system of forces that generate and sustain regional entrepreneurship [6].

Despite intense attention in entrepreneurial ecosystems antecedents and consequences, the topic is still under development hence, the timeliness and value of this IEEE TEM Special Issue.

Vibrant EEs show a wide range of support services aimed at helping entrepreneurs to found and grow their ventures (Roundy and Fayard [8]). These services include support organizations, such as incubators, accelerators, and business development centers. By interacting with support organization staff, mentors and investors, entrepreneurs could gain the human capital and knowledge needed to create and scale new ventures. The creation and promotion of EEs, across contexts, is often driven by the goal of achieving the entrepreneurial intensity of ecosystems ([11]; Carayannis *et al.* [1]).

Understanding how to promote and foster EEs has become a widely debated issue in the managerial and engineering scientific literature [5]. Global ecosystems request organizations to engage in entrepreneurial activities of high intensity by introducing many new processes, products, or services which can appear as extremely innovative, even risky, thus showing their proactive behavior ([4], [9]; [12]). In this vein, enterprises are required to develop a strong balance between knowledge management orientation and organizational ambidexterity, in order to support their entrepreneurial intensity (EI) and innovation performances [1], [10].

However, while there are many studies on the positive effect of ambidexterity on innovation performance studies about the concrete mechanisms through which EEs and their components influence the activities of ecosystem participants are relatively scarce. Therefore, we still know very little about the relationship

between entrepreneurs' capabilities to seize opportunities and entrepreneurial intensity.

Based on the discussion thus far, the aim of the present special issue is primarily to discover *how external knowledge management and organizational ambidexterity are changing the way of managing technology and engineering processes in entrepreneurial ecosystems*, with specific attention to technology commercialization, technology management, technology acquisition, R&D management, technology conservation, technology transfer, technological planning and forecasting, technology strategy, technology evaluation, and technology foresight.

We collected nine innovative papers that in different ways contribute to this increasingly interesting topic.

Castellano *et al.* (this issue) study the wine industry analyzing how firms manage multiple institutional rules and orientations. In this vein, authors deserve specific attention to the impact of institutional ambidexterity on entrepreneurial intensity and its moderating effect on the relationship between entrepreneurial intensity and firm performance. The objective of this article is twofold: on one side, it aims to study how entrepreneurial intensity enables firms to buffer the tensions between institutionalized rules and efficiency conditions; on another side, it aims to stimulate the attention among entrepreneurs and managers on the understanding of the most suitable institutional knowledge exploration and exploitation processes they can develop to achieve financial performances.

Similarly, the work of Dezi *et al.* (this issue) explore the role of external embeddedness and knowledge management as antecedents of ambidexterity and performances in Italian SMEs. The objective of this research paper is to strengthen the state of the art in the field of external embeddedness and knowledge management (KM) research empirically evaluating their effects on the ambidexterity and firm's performances. The conceptual framework developed by the authors suggest that KM allows and facilitates knowledge sharing, continual learning, and improvement capitalizing on the external knowledge accessed through embedded ties and firms' involvement and position within the external network. This, in turn, brings several benefits to the ambidextrous orientation of the firm, and particularly, to the integration of both internal and external knowledge, thus making it more available and accessible for both exploration and exploitation activities.

In line with the prior researches, Ardito *et al.* (this issue) analyze the influence of alliance ambidexterity on innovation performance of biotechnology firms. More specifically, authors investigate the moderating effect of firm age on the relationship between ambidexterity via function exploration–exploitation and a focal firm's innovation performance. From a practical perspective, the paper suggests that managers are required to design the alliance strategies by including partners lying at both the upstream and downstream position in the innovation value chain. In this way, firms are more likely to improve their innovation performance since explorative and exploitative learning-related activities may be better managed and reconciled through domain separation.

The paper “Do knowledge management and dynamic capabilities affect ambidextrous entrepreneurial intensity and firms' performance?” written by Santoro *et al.* (this issue) is a good attempt in uncovering the elusive relationship among KM orientation, dynamic capabilities, and ambidextrous entrepreneurial intensity (EI). The concept of ambidextrous EI reflects the ability of a firm to introduce both incremental and radical products, as well as to handle new markets. The results indicated that KM is particularly linked to exploitation and that dynamic capabilities foster exploration and, thus, help in achieving higher ambidextrous EI. Finally, ambidextrous EI allows firms to create new sources of income, improve market share and increase profits, thus improving a firm's performance. Thus, this article theoretically contributes to the streams of literature that related to KM and ambidexterity clarifying whether and under which circumstances ambidextrous entrepreneurship achieves better performance through innovative approaches.

The paper by Vicentini *et al.* (this issue) is a further attempt to unveil the relevance of entrepreneurial intensity and individual ambidexterity and this is done in the specific context of small project-based enterprises. Findings allow to add insights to the entrepreneurship research and individual level ambidexterity theory analyzing how the diversity of work experiences affects project performance. In doing so, the study overcome the prior literature, which has limited analysis only to the project portfolio level. The main contribution resides in the developed framework that investigates the argument regarding whether and under what circumstances does individual level ambidexterity improve project performance.

Similarly, Silva *et al.* (this issue) focus the attention on measuring SMEs' propensity for open innovation (OI) combining cognitive mapping and the Choquet integral (CI) (a nonadditive measure and information aggregator) to measure SMEs' propensity for OI. This article sought to integrate two operational research/management science techniques—cognitive mapping and the CI—to identify and prioritize relevant criteria for evaluating SMEs' propensity for OI, and improving their organizational ambidexterity. The findings show that cognitive mapping facilitates the identification and understanding of cause-and-effect relationships between the determinants of OI in SMEs. The CI, in turn, introduces realism into the construction of value functions and the respective assessments of SMEs. The main contribution of this article is directed towards the

stimulation of an ongoing debate on SMEs' propensity for OI. From a methodological perspective, the contribution is two-fold: it comes both from the integration of the techniques used, and from the description of the process followed, which can allow for replications in other contexts and/or with different groups of experts, due to the process-oriented nature of the framework.

On a similar topic, the paper authored by Cegarra-Navarro *et al.* (this issue) analyze Spanish banking sector addressing the relationship between the performance and a learning culture that is supported by knowledge processes within the organization. The results of the data analysis show that in addition to maximizing on what is already known about the customer base, employees' learning about the potential new stakeholders and also about the internal strategies, tools, and techniques is directly related to the bank's performance, which, in turn, influences the economic recovery and socio-economic development. Results show that an active pursuit of learning within the context of the organization is required for banks to remain competitive in the dynamic, global business ecosystem, where international, national, and local banking sectors operate. This research also raised an opportunity for a new line of inquiry related to the importance of the existing and emerging technologies, which had the potential to further influence how management is practiced within and between the organizations.

The work of Lo and Theodoraki (this issue) examines the mechanisms through which corporations can achieve ambidexterity based on entrepreneurial ecosystems by connecting the interorganizational ambidexterity literature with the emerging concept of entrepreneurial ecosystems through a case study. To address research question, authors conduct an embedded case study in a space dedicated to collaboration with external actors called *Le Square*. Thus, the main contribution of this article is related to how large corporations can configure and manage entrepreneurial ecosystems to foster ambidexterity. This article also provides managerial insights for large companies that are interested in spanning their boundaries for innovation and for all ecosystem members to gain collective benefits. According to results, large corporations should favor the deliberate management of the entrepreneurial ecosystem based on *spatio-material* and *socio-cultural* attributes to create and capture value through innovative projects and experimentation. In this vein, large corporations must engage in balanced governance by promoting and implementing democracy values to develop the level of engagement of NEE members while assuming a leadership role to ensure their interest in the emergent innovative projects.

Differently, Rossi *et al.* (this issue) focus the attention on corporate venture capitalists' (CVCs) ambidexterity. So, the authors aim at building a conceptual contextualization to understand how CVCs can be considered with regard to ambidexterity (ambidextrous, hybrid, or dis-ambidextrous, as proposed in this paper) and how they can manifest this capability. The main finding of this article is that the ambidexterity of CVCs is truth, and not myth, but not for all CVCs because there is more than one type of CVC (from the ambidextrous perspective). The type of CVC ambidexterity will depend on different elements:

aim, involvement, strategic connection, level of exploitation, and so on. Additionally, the level of EI could assume different types of manifestation, with different arrangements of key-driver patterns, at both exploration and exploitation levels.

Finally, we would like to thank the editor and all the authors and the valuable reviewers that support us in the development of this exciting special issue. We have the firm belief that much of these works will be highly useful and cited in the next years due to their high academic rigor, theoretical contributions, and practical impact.

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## REFERENCES

- [1] E. G. Carayannis, E. Grigoroudis, M. Del Giudice, M. R. Della Peruta, and S. Sindakis, "An exploration of contemporary organizational artifacts and routines in a sustainable excellence context," *J. Knowl. Manage.*, vol. 21, no. 1, pp. 35–56, 2017.
- [2] E. G. Carayannis, E. Grigoroudis, D. Campbell, D. Meissner, and D. Stamati, "The ecosystem as helix: An exploratory theory-building study of regional co-opetitive entrepreneurial ecosystems as Quadruple/Quintuple Helix innovation models," *R&D Manage.*, vol. 48, no. 1, pp. 148–162, 2017.
- [3] M. R. Della Peruta, F. Campanella, and M. Del Giudice, "Knowledge sharing and exchange of information within bank and firm networks: The role of the intangibles on the access to credit," *J. Knowl. Manage.*, vol. 18, no. 5, pp. 1036–1105, 2014.
- [4] M. T. Hansen, M. L. Mors, and B. Lovas, "Knowledge sharing in organizations: Multiple networks, multiple phases," *Acad. Manage. J.*, vol. 48, no. 5, pp. 776–793, 2005.
- [5] D. Isenberg, *The Entrepreneurship Ecosystem Strategy as a New Paradigm for Economic Policy: Principles for Cultivating Entrepreneurship*. Dublin, Ireland: Inst. Eur. Affairs, 2010.
- [6] M. Nicotra, M. Romano, M. Del Giudice, and C.E. Schillaci, "The causal relation between entrepreneurial ecosystem and productive entrepreneurship: A measurement framework," *J. Technol. Transfer*, vol. 43, pp. 640–673, 2018.
- [7] B. Orlando, L. V. Ballestra, V. Scuotto, M. Pironti, and M. Del Giudice, "The impact of R&D investments on eco-innovation: A cross-cultural perspective of green technology management," *IEEE Trans. Eng. Manage.*, to be published, doi: [10.1109/TEM.2020.3005525](https://doi.org/10.1109/TEM.2020.3005525).
- [8] P. T. Roundy and D. Fayard, "Dynamic Capabilities and Entrepreneurial Ecosystems: The Micro-Foundations of Regional Entrepreneurship," *J. Entrepreneurship, Entrepreneurship Develop. Inst. India*, vol. 28, no. 1, pp. 94–120, 2019.
- [9] G. Santoro, A. Thrassou, S. Bresciani, and M. Del Giudice, "Do knowledge management and dynamic capabilities affect ambidextrous entrepreneurial intensity and firms' performance?," *IEEE Trans. Eng. Manage.*, to be published, doi: [10.1109/TEM.2019.2907874](https://doi.org/10.1109/TEM.2019.2907874).
- [10] P. Soto-Acosta, S. Popa, and I. Martinez-Conesa, "Information technology, knowledge management and environmental dynamism as drivers of innovation ambidexterity: A study in SMEs," *J. Knowl. Manage.*, vol. 22, no. 4, pp. 931–948, 2018.
- [11] F. Welter, L. Trettin, and U. Neumann, "Fostering entrepreneurship in distressed urban neighbourhoods," *Int. Entrepreneurship Manage. J.*, vol. 4, no. 2, pp. 109–128, 2008.
- [12] Y. Xing, Y. Liu, S. Tarba, and G. Wood, "A cultural inquiry into ambidexterity in supervisor–subordinate relationship," *Int. J. Human Res. Manage.*, vol. 31, no. 2, pp. 203–231, 2020.