Strategic Knowledge Management Models and Tools for Entrepreneurial Universities

Guest Editorial

Giustina Secundo, University of Salento, Lecce, Italy
Giovanni Schiuma, University of Basilicata, Potenza, Italy
Paul Jones, Swansea University, Swansea UK

Abstract

Purpose: This editorial outlines the contributions collected in this special issue on Strategic Knowledge Management (KM) Models and Tools for the Entrepreneurial Universities and identify future topics for KM in the evolving context of universities.

Methodology: The reasoning and motivation behind the special issue are outlined, and then we present a discussion linking the different papers and themes found in the special issue papers.

Findings: The Editorial presents an overview of the papers gathered in the special issue and provides future directions for research lying at the intersection of KM and Entrepreneurial University fields.

Implications for research: The editorial aims to identify insights that can inspire future research about KM models and tools in the Entrepreneurial Universities. To remain relevant KM in Entrepreneurial Universities research should be revamped by addressing the implications for policymakers, to avoid the risks of relegating the KM in Entrepreneurial Universities research to irrelevance.

1. Introduction

In the last decades, universities have moved from focusing exclusively on their primary two missions of education providers and scientific knowledge creators, to be considered as key actors of economic and cultural growth, transforming themselves into engaged institutions with industry and society at large (Etzkowitz, 2000; Vorley and Nelles, 2008). This movement has been frequently described as "third mission" focusing on knowledge transfer, commercialisation and innovation as third pillar of au niversity (Lambert, 2003; Laredo, 2007; Zomer and Benneworth, 2011; Secundo et al., 2017).

Although there is no general definition, third mission activities comprise three dimensions performed by universities about external environments: technology transfer and innovation, continuing education and social engagement (E3M, 2010). In this perspective, the term "entrepreneurial university" (Clark, 1998; Philpott et al., 2011; Etzkowitz, 2016) has been adopted by academics and policymakers to describe universities that effectively deliver on their "third mission" contributing to the regional economy simultaneously (Clark, 1998; Van Vught, 1999; Lambert, 2003).

The recognition that in today's economic landscape Entrepreneurial Universities can play the fundamental role of key enablers in the areas of technology, innovation and economic development, points out their role as knowledge-based agents for local value creation dynamics. Indeed, an Entrepreneurial University can be seen as an entrepreneurial hub with multiple and integrated knowledge-based functions ranging from the traditional pure knowledge and technology development to innovation ecosystems development as well as social innovation and community engagement catalyzer (Margherita and Secundo, 2011; Philpott et al., 2011; Etzkowitz, 2016; Maas and Jones, 2017). Knowledge Management (KM) in academia is any systematic activity related to support and enhancement of the creation of scientific knowledge and achievement of research goals, including both social process and relevant KM technology tools (Tian et al., 2009).

Therefore, the understanding the knowledge models, processes and tools that can support the entrepreneurial universities as entrepreneurial hubs or knowledge agents, is of fundamental importance. The way Entrepreneurial Universities act strategically as creators and disseminators of new knowledge, organisers of multidisciplinary and boundary-spanning knowledge application activities as well as facilitator of university-industry links represent a critical area of research investigation. Entrepreneurial Universities as belonging to the public sector have specific labour divisions that are a disincentive to knowledge sharing and "this situation makes knowledge delivery in the public sector more difficult than that in the private sector" (Gau, 2011, p. 2).

To date, most of the studies on entrepreneurial university and academic entrepreneurship have focused the attention on technology transfer offices (TTOs), incubators and science parks, stakeholder collaboration, innovation support, entrepreneurial training of highly skilled individuals and the development of new spin-off firms as tools used to achieve their entrepreneurial aspirations (Voisey, Jones and Thomas, 2013; Somsuk and Laosirihongthong, 2014; Elia, Secundo and Passiante, 2017). In all these processes, a reconceptualization of knowledge production called the "Mode 3" Knowledge Production System (expanding and extending the "Mode 1" and "Mode 2" knowledge production systems) (Carayannis and Campbell, 2012) has been defined. The Mode 3 Knowledge Production System architecture focuses on and leverages higher-order learning processes and dynamics that allow for both top-down government, university, and industry policies and practices and bottom-up civil society initiatives and priorities to interact and engage with each other toward a more intelligent, effective, and efficient synthesis. This means that the entrepreneurial university implements several strategies and new institutional configuration such as Entrepreneurship centres (Cassia et al., 2014; Maas and Jones, 2017) to work together with the government, industries and society to facilitate the diffusion the production, the application and the exploitation of knowledge and technology (Leydesdorff and Meyer, 2006).

The convergence of these perspectives requires new updated models, strategies tools for the strategic knowledge management in the entrepreneurial universities. The growing relevance of this new archetype of university calls for a more in-depth investigation of the strategic approaches, models, processes and tools supporting the creation, transfer, development, valorisation, exchange and integration of new knowledge at the core of their missions and strategic actions. Thus, the goal of this special issue is to provide a knowledge-based analysis of entrepreneurial universities investigating the strategic knowledge management models and tools at the basis of the management, creation and diffusion of knowledge, research and innovation.

In this special issue we present a variety of international studies at the forefront of strategic KM in Entrepreneurial Universities. Overall 13 papers have been selected to accomplish the above rationale and to illustrate the premsies and future potential for such interdisciplinary and and cross-level research agenda on the knowledge stratgeis and processes for universities. In the following sections we highlight the contents of the selected papers. Finally a discussion of the overall contributions is provided and the future researche venues are outlined.

2. Identifying Strategic KM research in Entrepreneurial University

The first paper of the special issue presents a literature review to define the state-of-the-art.

Secundo et al. (2019) in "*Knowledge Management in Entrepreneurial Universities: A Structured Literature Review and Avenue for future Research Agenda"* provide a review and critique about the Knowledge Management (KM) literature within Entrepreneurial universities. A systematic literature review was conducted, in which 1106 articles indexed at Scopus were initially submitted to bibliometric analysis. Finally, 150 papers published in a variety of academic journals specialising in the field of Entrepreneurship, KM and Higher Education have been analyzed through content and a bibliometric analysis. Findings reveal that literature on KM models and tools in the Entrepreneurial University is fragmented and dominated by unrelated research. The content analysis identifies four major research streams: 1) Knowledge transfer in University-Industry collaboration; 2) Knowledge creation in Entrepreneurship Education; 3) KM processes for University's spin-offs; 4) Entrepreneurial University to support Knowledge-based regional development. Findings show a failure to address the implications of findings for policymakers, which risks relegating the KM in Entrepreneurial Universities research to irrelevance. Finally authors outline a future research agenda.

Four main research areas are covered by the other papers gathered in this special issue.

Research area: Knowledge creation in University-Industry collaboration

Giones (2019) in the paper *"University-Industry Collaborations: An Industry Perspective*" explores the university-industry collaboration (UIC) drivers from the industry side as a key element in the transition towards an entrepreneurial university model. The paper analyses how, and to what extent, policy interventions could increase the engagement of industry actors in UICs. Starting from a pilot study with 36 firms with a satellite university campus, findings reveal that Firms involved in universities students (academic forms of UICs) might not necessarily consider the university as a research partner, even in a geographic proximity setting. Besides, there is a potential dark side to proximity when industry participants build their perceptions using second-hand experiences or indirect information. The pilot study provides valuable insights for researchers interested in a larger randomised control trial. It also provides insights for university managers that want to understand the motivations of industry participants in UICs. The experimental approach of the research generates evidence on the feasibility to intervene in the activation of UICs from an industry perspective, a central aspect in a transition towards an entrepreneurial university model.

The paper of Guerrero et al. (2019*) "Strategic knowledge management within subsidised entrepreneurial university-industry partnerships"* provides a contribution to the academic debate about how entrepreneurial universities and industrial organisations are strategically managing their knowledge when participating in subsidised partnerships in emerging economies. The proposed conceptual model was analysed with a retrospective multiple case study approach integrated by four subsidised entrepreneurial universities-industry partnerships of the Incentive Programme for Innovation from 2009 to 2014 in Mexico. Entrepreneurial universities and industrial organisations confirm insights about dual collaborative opportunistic behaviour within subsidised partnerships. The ex-ante collaboration agreement anticipated and protected intellectual capabilities. The originality of the paper resides in the discussion about public administrations opportunistic behaviours in emerging economies.

Centobelli et al. (2019) with the "*Managing the mediating role of knowledge exploration and exploitation for the development of an entrepreneurial university" focus on* the modern knowledge-based economy. The authors acknowledge the role of the third mission of universities related to the process of knowledge transfer as a driving force to face sustainability issues, in addition to the two traditional missions focusing on research and teaching. This paper aims to investigate the relationships between internal environment, external environment, knowledge exploitation, knowledge exploration, and university performance. The study applies confirmatory factor analysis (CFA) and structural equation modelling (SEM) to test the conceptual model in the Chinese education system. The findings confirm the higher impact of internal environment on both knowledge exploitation and knowledge exploration as compared to external environment. Knowledge exploitation is more strongly related to university performance than knowledge exploration. These results highlight the imperative role of internal university stakeholders in fostering knowledge management strategies. In addition, they encourage academicians, practitioners, and policy-makers to focus their attention on the impact of knowledge management models, tools and practices in universities to achieve the entrepreneurial development that in turn has a positive impact on individual graduates and innovation ecosystems.

Research area: Entrepreneurial orientation in the University's context

Rybnicek et al. (2019) in the paper " *Industry and leadership experiences of the heads of departments and their impact on the performance of public universities"* identifies whether the prior industry experience (IE) or industry leadership experience (ILE) of the head might influence the departments publication output, the ability to acquire external research funds or its entrepreneurial activities (e.g. the commercialization of research results through patents). Moving from data of 208 Austrian university departments results show a positive relationship between ILE and the patent output of the departments as one indicator for the commercialisation of research activities. Furthermore the scientific ability of researchers should be key when selecting the head of a department, because scientific performance is still essential for most of these units. However, when universities seek to focus more strongly on other entrepreneurial activities, then additional competencies come into play. As the actual focus of universities is currently subject to change, former IE and ILE will become increasingly more important, and the heads of departments will play a decisive role in the transition towards becoming an entrepreneurial university.

The paper "*Entrepreneurial academics: a taxonomy with latent profiling analysis"* of Rodrigues et al. (2019) aims to develop a taxonomy of academics from Higher Education institutions (HEI), based on their entrepreneurial orientation. The population in the study was composed of teachers and researchers from

worldwide HEI. The data collection was conducted through a questionnaire sent by e-mail, and using the I-ENTRE-U scale to identify entrepreneurial oriented teachers and researchers from HEI. A Latent Profile Analysis (LPA) was conducted to identify profiles of researchers with similar values in the four entrepreneurial orientation dimensions. The study allowed to identify five profiles of researchers: i) downers; ii) achievers; iii) followers; iv) defenders; and v) rebels. Findings allow the evaluation of the academics entrepreneurial orientation in a higher education sector. Few studies have yet focused on individual entrepreneurial orientation of scientists/academics, considering different national and regional contexts.

Alvarez-Torres, et al. (2019) in "*Linking Entrepreneurial Orientation to SMEs' Performance: Implications for Entrepreneurship Universities" analyses* the relationship between Entrepreneurial Orientation (EO) and Performance of Small and Medium-sized Enterprises (SMEs). The final aim is to contribute to the extant literature about the role of EO for SMEs development, and more specifically to identify implications that can inform knowledge-based initiatives of entrepreneurship. A quantitative approach is adopted moving from the hypothesis that EO positively affects Performance of SMEs. This hypothesis has been tested by using a system of partial least squares (PLS-SEM) of structural equations modelling in 170 SMEs operating in the Bajio Region (Mexico). The results provides three main contributions. Firstly, it proposes a working definition of EO. Secondly, the empirical research findings support an understanding of the relationship between EO and Mexican SMEs Performance and propose a multiple and reflective dimension of EO's model. Moreover, finally, this research provides some implications for entrepreneurship universities aiming to create and diffuse an entrepreneurial culture and capabilities by fostering the development of the EO. Accordingly, entrepreneurial universities should be engaged in the development of EO of students, academic staff and companies by focusing on knowledge-based actions that can foster the improvement of some specific features of the EO.

Research area: Knowledge Strategies and Models for the Entrepreneurial University

Lombardi et al. (2019) in the paper *"Entrepreneurial universities and strategy. The case of the University of Bari"* investigate the reasons behind the choice of the entrepreneurial universities for a particular business strategy focusing on diversification and multinationalization. In doing this the Intellectual Capital (IC) lens as part of knowledge assets is taken for supporting suchstrategies. An exploratory case study of the University of Bari, Italy is chosen and analysed using Secundo et al. (2016) collective intelligence framework. Specific contingency factors, such as economic and historical reasons, justify both the diversification and internationalisation strategies and how they both rely on IC. The results of this study can be used by managers to support the development of entrepreneurial university strategies. Findings contribute to demonstrate how IC can be used to support diversification and internationalisation in a university and to support third mission goals.

The paper of Dolan et al. (2019) "*The Role and Function of Cooperative Research Centers in Entrepreneurial Universities: A Micro Level Perspective*" presents a micro-level examination of the role and function of cooperative research centres (CRCs) in entrepreneurial universities assuming the principal investigator (PI) perspective. The case of Centre for Research in Medical Device-based in Ireland whose multiple mission

focus of supporting scientific excellence, industry engagement, educational and public engagement is studied. Findings reveal that from the micro level PI perspective, the role and function of CRCs focus on (1) research quality enhancement, (2) brokerage, networks and collaborations, (3) addressing research impact and (4) resource enhancement and appropriation. The research emphasises the strategic relevance for the creation of CRCs as part of the entrepreneurial architecture of entrepreneurial universities that provide the necessary appropriate local environmental conditions and enhanced supports to enable micro-level actors to fulfil multiple mission objectives to research excellence, industry, educational and public engagement and impact.

The *paper "Entrepreneurial university strategies in the UK context: Towards a research agenda*" of Pickernell et al. (2019) contributes to the Entrepreneurial University literature by providing a clearer understanding of Knowledge Exchange (KE) strategy of UK universities in specific relation to their portfolio of KE activities with small and medium-sized enterprises. Based on the 2015-2016 Higher Education Business and Community Interaction Survey (HE-BCI) data set, this study employs the Preference Ranking Organization METHod for the Enrichment of Evaluations (PROMETHEE) to assess the KE activities from 162 UK higher education institutions. The study reveals that entrepreneurial universities valorise university knowledge assets through five SME-focused KE activities most beneficial to measuring the entrepreneurial university. It also uncovers four different archetypal categories (groupings) of universities based on their strategic focus of KE activities.

Ricci et al. (2019) in the paper "*Entrepreneurial activities and models of advanced European science and technology universities"* aim at identifying: (1) a broad set of entrepreneurial activities, (2) different university entrepreneurial models and (3) the entrepreneurial best practices of advanced European S&T universities.The empirical analysis has combined both quantitative and qualitative approaches mainly relying on primary data, collected through questionnaires and interviews with those in charge of the Technology Transfer Offices (TTO) of 20universities belonging to the CESAER association. Findings identified three main entrepreneurial university models: (1) an"engage" model, which focuses on local economic development (2) a "formal" model, which focuses on the financial advantage of universities and their faculties and (3) a "comprehensive" model, which focuses on the local economic development and the financial advantage of universities and their faculties.Limitations regard the focus of the European area.

Research area: KM processes for University's Business Incubators and Technology Transfer Offices (TTOs)

The paper "Analyzing technology transfer offices' influence for entrepreneurial universities in Portugal " by Mascarenhas et al. (2019) examines how important technology transfer offices (TTOs) – which in Portuguese are called "industrial property support offices" or GAPIs – are in terms of fostering patent applications and technology transfer. Data have been collected from eight GAPIs among the existing 23 Portuguese GAPIs,. Content analysis was performed on the data collected using NVivo software. The results show that GAPIs play an important role in the innovation life-cycle, speeding up the transfer of knowledge and technology to society. The major contribution is represented by the regulation of intellectual property ownership and royalty sharing with inventors, reinforcing the entrepreneurial universities' role. The study's results offer new insights into how GAPIs contribute to socio-economic growth by fostering more entrepreneurial universities and increasing the transfer of technology to society. Besides, these offices

promote the creation of networks between GAPIs, enabling them to leverage universities' potential for participation in socio-economic development.

The paper titled "Ranking Factors Influencing Strategic Management of University Business Incubators with ANP " of Kiani Mavi et al. (2019*)* provides a novel analysis and contribution to the literature related to the ranking university business incubators with a multi-criteria decision-making (MCDM) technique. Actual research prioritises the factors influencing strategic management of incubators using analytic network process (ANP). Data from University-Business Incubators (UBIs) affiliated with science and technology park of Guilan, located in city of Rasht (Iran), using the ANP questionnaire have been collected. Findings identify the most relevant factors influencing strategic management of incubators comprised of 4 main criteria and 14 sub-criteria. "Talented managers" criteria has the highest importance for strategic management of university business incubators. Moreover, University managers and incubator directors can utilise the findings for better resource allocation and aligning the strategies of incubators with macro strategies of the country.

3. Conclusions and avenues for future research agenda

To conclude this special issue on strategic KM in entrepreneurial Universities, the Editors want to encourage a further expansion of KM research in the novel context of Entrepreneurial University so engaged into teaching, research and academic entrepreneurship. The special issue presents the first attempt to provide a comprehensive review and holistic overview of the current debate dealing with Models and Processes of KM in the Entrepreneurial University.

Despite the increasing literature, this research area is still fragmented and undertheorized, thus requiring further systematic studies, considering both the managerial, economic and the social aspects of KM within universities thus offering insights into future research avenues. It is important to recall the initial motivation of this special issue was based on the argument that the Entrepreneurial University represents a particular research context because of different levels of representativeness, accountability and responsiveness of different stakeholders, requiring focused studies about KM studies in a University that for its threefold missions is involved into the creation, sharing, diffusion and commericlisation of knowledge and research.

Universities are now viewed as key social and economic actors within regions and are central actors in shaping and influencing entrepreneurial ecosystems. This has meant that universities now have to become more entrepreneurial in offerings, outlook and culture (Miller et al., 2018) thus requiring novel approchaes ad modalities to manage their knowledge assets. Universities develop strategies to fulfil their historic mission of teaching and research and they also undertake a significant role in producing, creating, and diffusing new knowledge in today's ever-changing world (Olcay & Bulu, 2017). Moreover, KM processes adopted in universities to facilitate the diffusion of their knowledge and technology act as another channel to offer the research knowledge exploitable by external stakeholders (i.e. industry, government and society).

The debate on KM and the entrepreneurial university has received during the last 18 years growing attention. Although the two topics have been largely investigated, their intersection discloses several areas

of deepening by highlighting a still fragmented debate and so requiring holistic and integrated frameworks aimed to comprehend the relevance and implications of KM in the context of entrepreneurial universities.

Despite the number of papers published on KM in Entrepreneurial University in the period 2001-2019 has reached a consistent volume, the analysis of their meaning, dynamics and specific requirement of KM in a public context s still dominated by unrelated research. Trends observed in terms of contents and resercah aim depict a profile of a community of scholars and researchers still dispersed; despite this, the positive trends of growth registered in 2018 and 2019 is promising. In the same direction, the analysis revealed that the need of consolidating the relevance of the issues of KM and Entrepreneurial Universities has been found in terms of new empirical contexts of explorations (Secundo et al., 2019).

Four main research areas of specialisation within the scientific debate have been identified in the papers of our special issue; we categorize the main areas in 1) Knowledge creation in University-Industry collaboration, 2) Knowledge Strategies and Models for the Entrepreneurial University, 3) Entrepreneurial orientation in the University's context , and 4) KM processes for University's Business Incubators and Technology Transfer Offices (TTOs). The analysis of papers included in these areas allowed to derive a more robust awareness on state of the art on KM and Entrepreneurial University in terms of more conscious entrepreneurial orientation of the people, faculty and students, manager of the Entrepreneuril University, KM processes at the basis of the organisational models of the Entrepreneurial University and finally KM processe for the valorization of the knowledge processes with the University's incubators and Technology Transfer Offices (TTOs). Avenues for future research are identified moving from the above research area and can be expressed in terms of following issues:

- What are the most relevant knowledge changes in the universities that can accelerate their transition towards entrepreneurial universities?
- How do entrepreneurial universities integrate their knowledge strategies to reach university goals in teaching, research, and outreach?
- What are the new entrepreneurial university models/archetypes, and how is it possible to classify their external and internal knowledge assets?
- What is the role of knowledge-based systems and new social media for the entrepreneurial university?
- How to sustain the Entrepreneurial Orientation within the Universities?
- Which knowledge outcomes of an entrepreneurial university affect regional development and social engagement?
- How do entrepreneurial universities make use of knowledge exchange and transfer with stakeholders to shape society?
- What is the role of knowledge management to support university-industry-society interactions?
- How do entrepreneurial universities valorise university knowledge assets?
- What are the most relevant knowledge processes supporting the development of an entrepreneurship ecosystem shaped by an entrepreneurial university?
- What is the role and function of entrepreneurial centres to drive the development of entrepreneurial universities?

All findings confirm the vision that conceptualise Entrepreneurial Universities as Stakeholders Universities, knowledge hubs and strategic orchestrators of processes of knowledge creation, absorption, transfer and dissemination as knowledge and research. The KM processes within the Entrepreneurial Universities are

the result of a complex management of several knowledge assets (scientific output, publixations, competence, research , technologies) coming from a distributed network of public-private stakeholders (Margherita and Secundo, 2011; Philpott et al., 2011; Romano et al, 2014; Etzkowitz, 2016; Maas and Jones, 2017) including faculty, staff, students, alumni, industries, managers, but also citizens and entrepreneurs all involved in the knowledge creating and disseminating processes typical of the innovation mission of the University so resulting in new regional innovative capabilities (Benneworth et al. , 2009).

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