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Session 4.2 – Chair: Shiri Breznitz
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Title: Funding emerging ecosystems

Authors: Paige Clayton, Maryann Feldman, Benjamin Montmartin

Presenter: Paige Clayton

Abstract:

Surprisingly little research examines how financing that supports entrepreneurial businesses promotes regional growth and influences industry emergence. Studies tend to examine one program in isolation. Yet the combined impact on a regional economy—the sum of effects on individual firms—remains unexplored. This paper extends the literatures on entrepreneurial ecosystem building and industry emergence, as well as public-private funding interactions and R&D funding policy. We analyze the development of one industry in one region over a long-time horizon, focusing on the interacting roles of state and federal public funding and private funding of new firms. Specifically, we ask how the interplay of these three sources influenced the emergence of North Carolina's Research Triangle region's life sciences industry. We use data from the PLACE: Research Triangle database on the universe of 670 entrepreneurial life sciences firms founded in the region between 1983 and 2012.

The Research Triangle's life sciences cluster is one of the largest in the country, anchored by the three research universities, a long history of pharmaceutical branch plant location and a large number of entrepreneurial startups. Its origins can be traced to Research Triangle Park's 1958 establishment—the result of a collaborative effort involving politicians, academics, and financiers. Over time, the region slowly nurtured an entrepreneurial ecosystem, thanks to mergers and layoffs from high-profile multinational firms, a more aggressive technology transfer stance from the region's research universities, and the development of a plethora of support institutions.

The paper employs mixed methods to examine industry emergence, beginning with an historical analysis of the cluster's development. To examine the interplay between public and private funding of startups, we first apply Granger causality tests. We find varying relationships based on the life sciences sub-sector. For human therapeutics, federal and state funding evolve together, while federal funding predicts private funding. For medical devices, state funding predicts federal funding, while the state-to-private relationship is mutually predictive and federal funding predicts private. We next use discrete event history analysis to investigate how the variety of multi-level public and private funding influences ecosystem emergence through firm survival. We find private and federal funding decreases the probability of firm failure, while state funding likely goes to more high-risk firms. Finally, preliminary threshold regression results indicate three statistically significant structural breaks in regional industry dynamics occurred during the time period of study when the industry can be seen to move from a period of emergence to take-off, then to a period of expansion, and most recently to a period of maturity, based on the number of firms founded annually.

Ultimately, our results demonstrate how the actions of multi-level public and private actors coalesced to support the emergence and development of an entrepreneurial ecosystem. This paper contributes to the literatures on entrepreneurial ecosystems, funding of innovation, and regional development, highlighting

the roles of universities, incumbents, policy makers, and other ecosystem stakeholders. Furthermore, findings offer practical insights for policy makers and business strategists.

Title: Does university entrepreneurship ecosystem engage technology commercialization in emerging economies?

Authors: Matías Lira, Maribel Guerrero, Julio de Castro

Presenter: Maribel Guerrero

Abstract:

Since the publication of Clarks' book (1998), research about the entrepreneurial universities has increased significantly. Traditionally, several studies tend to take a narrow view of universities and ignoring the impacts generated by graduate entrepreneurs (Wright et al., 2017; Guerrero et al., 2018), academic entrepreneurs (Hayter et al., 2016), and technology transfer/commercialization (Fini et al. 2018) on regional development (Guerrero et al., 2017). However, the debate about how university entrepreneurship ecosystems are configured still needs an in-depth discussion. Based on this academic debate, this paper explores the configuration and impacts of university entrepreneurship ecosystems in emerging economies. We first address which environmental conditions determine the configuration of university entrepreneurship ecosystem' across countries (Acs et al., 2017; Wright et al., 2017). In a context with institutional voids, entrepreneurial universities should assume the responsibility for reducing them to enhance the quality/quantity of universities' endeavours. It could explain why entrepreneurship ecosystems have become a popular topic of discussion among scholars and policy makers, specially, in emerging economies (Guerrero and Urbano, 2017). Then, we address which types of impacts are generated by university entrepreneurship ecosystems in emerging economies. Very few studies have explored the outcomes/impacts generated by university entrepreneurship ecosystems (Guerrero et al., 2015; Fini et al. 2018). Focusing in an emerging economy, the most effective pillar in the ecosystem will be the entrepreneurship education instead of technology commercialization infrastructures (Guerrero and Urbano, 2017). In this assumption, it is expected that impacts should be reflected in graduate entrepreneurship instead of academic entrepreneurship (Nabi et al. 2016).

Setting the research in a Chilean entrepreneurial university, we used qualitative grounded theory methodology (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). The data collection process adopts the triangulation suggested by Yin (2014) that consists on combining multiple sources to gather data as interviews and secondary datasets provided by the Marketing Intelligence Department. Covering a longitudinal analysis (from 2015 to 2018), our preliminary findings offer interesting insights about the role of institutional voids on the evolutionary entrepreneurial stages of university ecosystems. At organizational level, we identify the nascent technological evolutionary stage of the university entrepreneurial ecosystem (Guerrero and Urbano, 2012; Start-up Genome, 2017). Even the efforts implemented by the university during the last years, the lack of strong research component also explain the premature stage of this entrepreneurial university ecosystem. Adopting an evolutionary approach at university level, we identify that the main challenge was not only defined the most appropriated elements according with potential entrepreneurs' needs but also was configuring dynamic capabilities for capturing impacts (Alvedalen and Boschma, 2017). The lack of understanding of the evolutionary nature limits strategic decisions and the

configuration of policies that are required to sustain it in time (Mack and Mayer, 2016). Moreover, immersed in a highly competitive arena, the dynamic capabilities approach also helps to understand how university managers have been transforming business models and introducing agile innovation strategies for structuring a sustainable university entrepreneurship ecosystem (Teece, 2010; Teece et al., 2016). In emerging economies, entrepreneurial universities should redirect and enhance their resources toward strategic decisions that capture sustainable outcomes (Leih and Teece, 2016). Given the qualitative studies' limitations, this phenomenon requests a better understanding of the resources/capabilities that are behind of the university ecosystem elements that generate exponential/sustainable technology commercialization outcomes in long term.

Title: Pre-competitive consortia: An underutilized technology transfer tool?

Authors: Sen Chai, Willy Shih

Presenter: Sen Chai

Abstract:

Firms who operate at the frontiers of science and technology are often faced with a dual challenge. Not only do they have to push a product through its development cycle and into the marketplace, they also often have to advance an underlying production process or key building block technology. In semiconductors or advanced materials, the high levels of investment needed to conduct basic R&D can be substantial. In drug development and bioinformatics, the scope of data collection can be inordinately large. In fields like these, scale and scope demands on R&D inputs and capabilities may be beyond the reach or justification of many companies, big or small, effectively limiting entry to all but the best funded firms or those with government sponsors.

To address this challenge, many companies establish external collaborations through alliances and joint ventures, as this is a powerful way to spawn new ideas and improve innovative performance (Gulati, 1998; Khanna, Gulati, & Nohria, 1998; Mowery, Oxley, & Silverman, 1996). A less used form of collaboration is known as a pre-competitive consortia (PCC). Pre-competitive consortia are early stage external research collaborations in which partners from different institutions, public and private, work together on a common technology platform for which they will subsequently independently develop differentiated downstream products. The industrial partners work together with other industrial partners but also academic partners on the platform technology. However, the industrial partners potentially compete with each other in downstream product markets using that shared platform. PCCs are a closed consortium model that bring many of the benefits of open innovation while maintaining options on proprietary access for consortia members to the intellectual property and learning that might result. It is a more controlled approach than open-sourcing part of one's value chain in areas that are important enablers of value delivery.

PCCs are not that commonly used. In this article, we investigate the benefits of PCCs, then discuss some of the perceived impediments to their more widespread use. Finally, we examine some structuring considerations – who to partner with and how they are managed.

We look at several cases in detail, including Biopro, a collaboration in the Danish biotech manufacturing sector, SEMATECH, a research, development and testing consortium in the semiconductor industry, some

work in advanced semiconductor chip manufacturing in Upstate New York that had its roots in what was called the Common Platform Alliance, and the TiFN food and nutrition consortium in the Netherlands. We find that while this type of collaboration poses contractual, managerial and legal challenges, we believe that more companies should push past the obstacles and engage in these partnerships. The value brought by these collaborations in enhancing the effectiveness of R&D processes or the development of foundation technologies while reducing costs and developmental risks outweighs the costs.