Extended abstract

The role of institutional factors in the development of new technologies: An exploratory study within new and established ventures

Track: Global Entrepreneurship Monitor (GEM) Datasets

I. Research motivation and objective

During the last two decades, the phenomenon of technology entrepreneurship has attracted the interest of researchers and policy makers who recognized its positive effect on economic progress. Drawing from a rich tradition of research, several authors define technology entrepreneurship such as the interface of two well-established, but related fields—entrepreneurship and technological innovation (Beckman et al. 2012 a, b; Shane and Venkataraman 2003). As well as entrepreneurship, technology entrepreneurship is a multi-dimensional concept that involves several actors and different levels of analysis (Garud and Karnøe 2003). In this sense, technological opportunities could be recognized by individuals by their own account/risk (*entrepreneurs*) but also pursuit by individuals within existing public/private organizations (*intrapreneurs*) (Parker 2011). At organizational level, technology entrepreneurship has been analyzed in terms of organizational process/strategies to exploit innovations (Beckman et al. 2012b; Shane and Venkataraman 2003), the attraction of venture capital investments (Florida and Kenney 1988; Gaba and Bhattacharya 2012), the commercialization strategies (Gans and Stern 2003, among others. However, the current environmental conditions represent a strategic game changer for both new and existing organizations. Severe resource constraints and unpredictable market conditions create significant challenges for growth through innovation. According to Busenitz et al. (2014), the analysis of entrepreneurial opportunities requires studies oriented to understand how different organizational modes explore and value opportunities, as well as, how environmental factors influence the emergence of new opportunities through new technologies, regulatory adjustments,

and others. In this sense, it is important to understand the influence of institutional factors (government policies, support measures, innovation and entrepreneurship systems, entrepreneurs' perceptions and behaviors, etc.) on the creation of new technologies and the subsequent development of entrepreneurial initiatives. The main objective is to provide a better understanding about the role of institutional factors on the development of new technologies from new and established ventures (by individuals/existing organizations). To achieve this aim we develop an exploratory study to test a proposed theoretical model supported by the institutional economic theory and knowledge spillover theory.

II. Theoretical Framework

Audretsch and Thurik (2004) identified different economic models where the political, social, and economic response to an economy dictated by particular forces. In each economic model, institutions are created and modified to facilitate the activity that serves as the driving force underlying economic growth and prosperity. According to Baumol's (1990), while the total supply of entrepreneurs varies among countries, the productive contribution of the society to entrepreneurial activity varies much more between productive (innovation) and unproductive activities (rent seeking). Throughout economic history, institutions have established the rules of society that shape human interaction (North, 1990). Following North's basis, there are two types of institutions: formal (policies, norms, etc.) and informal (culture, behaviors, etc.). However, entrepreneurial opportunities are endogenous via knowledge spillovers identified and exploited by entrepreneurs (Acs et al., 2004). Entrepreneurial activity serves as a conduit for knowledge spillovers to be translated into economic growth and competitiveness (Audretsch and Keilbach 2007, 2009). In this sense, the transformation of ideas into new technologies depends on how knowledge diffuses through entrepreneurial activity (Guerrero and Urbano, 2013). Under this perspective, the development of new technologies from new ventures and established could be influenced by the formal and informal institutions linked to research and development in each country. The generation of new entrepreneurial and

technological initiatives involves several elements. Firstly, any new technology that is carried out in both academic and industrial scenarios (Carlsson et al., 2007) and which is the source of entrepreneurial opportunities (Mueller, 2007; Qian and Acs, 2013). In this sense, formal institutions play a relevant role to provide adequate scientific and technological scenarios where ventures could collaborate to develop/transfer/support new technologies (research centers, science parks, incubators, etc.) but also informal institutions related to the perception of opportunities, as well as, how society reinforces innovation and creativity. Secondly, appropriate mechanism are required to generate economic value of those new technologies through entrepreneurial actions where the entrepreneur is considered the missing link in converting knowledge into economically useful knowledge (Block et al., 2012). In this sense, there are some formal factors associated to adequate government programs to new and growing ventures oriented to access/acquire/afford new technology. Finally, there are some elements that prevent new technologies from becoming economically useful (Acs et al., 2004). The existence of some formal institutions associate to property rights legislation that recognizes and respects the firms/investors rights. Also, some informal factors such as the perception of market changes from year to year. Under this point of view, both formal and informal institutions could support the generation of new technologies at firm level but also could be act like a filter across the process.

III. Methodology

Data was collected from several sources. In particular, our sample was integrated by 8.840 new ventures and 17.473 established ventures identified in 23 countries[1] according to the APS GEM Survey administrated in 2005, 2008 and 2011. The information concerning institutional factors was obtained from NES GEM Surveys taking into account the same countries and

[1] Argentina, Belgium, Brazil, Chile, Croatia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Jamaica, Japan, Latvia, Mexico, Netherlands, Norway, Slovenia, South Africa, Spain, United Kingdom, United States

period of analysis. In addition, data was complemented with some information from the World Bank Database. Concerning the ***dependent variables***, we used two dichotomous variables where 1 indicates the development of new technologies by new ventures (*new technology new firms*), and by established firms (*new technology new firms)*; 0 otherwise. At ***country level***, based on NES Survey, we introduced some informal factors (*perception of opportunities* for the creation of new firms, as well as, growth existent firms; *perception of national culture* encourages creativity and innovativeness, and there are good opportunities; and *the perception of market changes*) and formal factors (*the existence of property right; the existence of governmental programmes; and science and technology support*). These measures represent the average obtained from the opinion of 36 experts interviewed by year in each country using a likert-scale. In addition, we included two variables to control the level of investment in R& D in each country (*LnR&D Investment)* and the number of researchers involved in R&D activities in each country (*LnResearchers).* Both measures were measured using the logarithm natural of the average of percentage of GDP investment and the average of researchers during the three previous years, respectively. At ***organizational level***, we identify three proxies in the APS GEM dataset that help us to understand the strategy associated to develop new technology inside organizations: (i) *the number of owners* that measures the degree of control at the moment to take decisions (Christensen, 2002; Simons, 2013), (ii) *corporate venturing* a dichotomous variable that represents if this venture is part of another corporation (Hagedoorn and Narula, 1996; Guerrero and Peña, 2013), and (iii) *diversification strategy* a dichotomous variable that measures if this venture adopted a diversification strategy oriented to new market and new products (Li and Atuahene-Gima, 2001; Parker, 2011). Finally, we introduce some ***control variables*** per type of venture, per country and per year of analysis. *Size* measured by the number of employees. *Sector* is a categorical variable that indicates the sector where the venture develops their entrepreneurial

activity. *Year* is a proxy of external uncertainty (pre-crisis 2005, crisis 2008, and recession 2011). *Emerging economy* is a binary variable that indicates if the country is considerate such as emergent economy. In addition, per country, we controlled by *LnGINI per capita.* Regarding the data analysis, we using hierarchical linear modeling methods because we combined individual-level with country-level measures. Since our dependent variable was dichotomous, we using a random-effect logistic regression (*xtlogit* in Stata) to estimate the influence of institutional factors on the development of new technology. We tested the model per year and per type of venture.

IV. Preliminary results and conclusions

The preliminary results of this exploratory study evidenced interesting tendencies by type of venture (new and established), as well as, by each year of analysis. Concerning type of ventures, the insights evidenced that some institutional factors increase the probability to develop new technologies (e.g., property rights, government programmes, and perception of market changes) but at the same time others that reduce it (e.g., the support for science and technology, the perception of opportunities, and the national culture). However, the unique difference is associated to the perception of market changes that has a strong influence for established ventures. Taking into account the year, we observe that the effect of formal factors decrease the probability to develop new technologies during recession periods and takes strong relevance some organizational variables (be a corporate venturing and adopt a diversification strategy). Even than this study is in progress, it has some limitations associated to the measures used and the analysis; however, we believe that is a relevant and strong research opportunity area to continue explore in depth. In addition, this kind of studies provides evidence to key stakeholders (policy makers, entrepreneurs, managers, academics).

V. References

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