Moving Products Out of the Lab! An Examination of Lean Startup for Science-based New Ventures

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Abstract:

Introduction / Objectives: Customer Development Model or Lean start-up (Ries, 2011; Blank & Dorf, 2012) emerges as the most popular methodology for entrepreneurship worldwide (Blank, 2013), becoming the framework for entrepreneurship education (Blank & Engel, 2013). This approach is based on the principle that assumptions about the business model hypotheses must be validated iteratively through customer feedback, matching product to customer problems as much as possible (Heitmann, 2014). These explicit assumptions can be put to empirical tests in the "real world" (Harms, 2015: 22). Though the methodology has been criticized as being informal, intuitive and prone to biases and heuristics (York & Danes, 2014), lean startup offers a unique set of tools and techniques for scientific entrepreneurs that potentially help them find a market for their inventions in relatively less time and cost-effectively, in contrast to the traditional paths followed by many academic entrepreneurs. Our research is one of the first attempts to systemize the knowledge about this interaction between the customer development model and science-based entrepreneurship in the context of an emerging economy.

Literature review: In the last decade, research on "academic entrepreneurship" has increased dramatically. Many of these research activities have been based on the role of technology transfer offices, science parks or business incubators. Additionally, there are research that put focus on teaching, training, stakeholder collaboration, innovation support, or how academics develop new spin-off firms (Steffensen, Rogers & Speakman, 2000; Gilsing, Van Burg & Romme, 2010; Soetanto & Jack, 2016). From this variety of approaches, science- based new ventures (Autio, 1997), have peculiarities that may set them apart from (other) academic entrepreneurship activities. As Miozzo and DiVito (2016) indicate, some of these characteristics are related with (1) how the academic/scientific inventors (presumably, the founders) could facilitate knowledge transfer interactions, (2) science-based firms that engage in the advancement of science and (3) projects that need a long-term strategy and R&D funding (for example 10-15 years in the case of the biopharmaceutical industry).

Methodology: Our empirical approach is based on a novel program adopted from the Innovation Corps (ICorps™) that was created by the United States' National Science Foundation in 2011. In 2016 the NSF and Mexican Council of Science and Technology (CONACYT) signed an agreement

to transfer I- Corps to México, under the name of Binational Innovation Nodes or NoBI. In 2017, 24 institutions involved in R&D activities participated in 5 NoBI nodes, being able to put together 117 teams, which together carried out more than 10,000 validation interviews. Teams were typically composed of a principal investigator (inventor of the technology), an entrepreneurial leader (usually a student) and a mentor (normally provided by the institutions that manage the node).

We setup a quasi-experimental cohort longitudinal design, making a survey pre-test to all participants in three of the five national nodes and post-test to two nodes. Surveys evaluated self-efficacy, entrepreneurial intention, business model canvas learning and wishful thinking bias. We applied an "entry" survey, which was responded by 180 participants in 45 teams in two nodes. After the intervention (the 7-week program) we re- evaluate the participants with other survey in order to capture the changes in their evaluations and perceptions about their projects. The third node only received a post-test survey. A combined methodology has been used to increase internal validity of the quasi- experiment.

Results and Contributions: The initial evaluation (pre-test) shows that scientific has high evaluation of their project but no many acknowledgements about a business model. They perceive their project as feasible and scalable, but they recognized a lack of business skills. They also have relative low entrepreneurial orientation. We expect that they will increase their entrepreneurial selfrecognition but decrease the initial evaluation of their technology after they design their business models with more clear market orientation "out of the lab". Preliminary results suggest significant change of perception of business model canvas learning, mainly costs and key resources.

Implications and Value: This research could have important implications for theory and practice. First science-based new ventures can develop a business model that reach quickly the market implementing novelty lean start-up approach. Our results complement and give insights to traditional frameworks in order to re-discuss the particularities of science-based new ventures. Additionally, because our research is based in a developing country institutional set-up, the implication for policy is very relevant. In many develop countries the invest in science is very

relevant, but also face challenges in the ability to commercialize and benefit from the economic impact of science (Miozzo & DiVito; 2016). This is more critical in developing economies that necessary need to “invest” in more pro-market initiatives.

Keywords: Lean Startup, Science based firms, entrepreneurship.