

Can Universities Foster Students' Intent to Become Entrepreneurs ?

A Survey of Recent Research ⁱ

Researchers:

Prof. Shlomo Maital

Ella Barzani

August, 2019

Technion, Haifa 3200003 Tel. 04-8292329 Fax. 04-8231889 info@neaman.org.il

No part of this publication may be reproduced without prior written permission from the Samuel Neaman Institute except for the purpose of quoting short passages in review articles and similar publications, with an explicit indication of the source. The opinions and conclusions expressed in this publication are in the opinion of the author(s) and do not necessarily reflect the opinion of the Samuel Neaman Institute.

This essay surveys research published in the past four years or so, on how universities can foster the intention of students to launch entrepreneurial startups

Culture: A common theme connects this research – the concept of the ‘entrepreneurial culture’. Edgar Schein, the pioneer of organizational culture, wrote insightfully on how culture -- the pattern of shared values and beliefs -- drives and defines individuals’ goals, norms and ultimately, their behavior ^{1, 2}.

Today, universities worldwide have added a third dimension to their traditional ones of research and teaching – entrepreneurship. Their success in fostering startup entrepreneurship among graduates builds on the creation of an entrepreneurial culture. In a famous article, Schein² showed the contrast, and at times clash, among the three organizational cultures: those held by executives, engineers and workers. Similarly, the culture of universities is three-fold: that of researchers, teachers, and, in part, future entrepreneurs, and these three cultures are both strongly complementary and at times, fiercely contradictory (as, for instance, when brilliant graduate students embrace a career in startups, rather than becoming scholars and teachers, as their advisors may have preferred).

Every culture has ‘artifacts’ – symbols, signs, and stories – that convey to newcomers the core values of the culture. Much of the research surveyed below relates to creation of such artifacts and their impact, in the context of fostering entrepreneurship in universities.

Intention vs. Activation: There is a crucial distinction between intention and activation – the intent and/or desire to launch a startup, one day, and the actual launch itself.

In Buchnik et al.³, a survey of Technion-Israel Institute of Technology graduates determined who among them had actually launched startups, and the antecedents of such actions. The goal was to find which experiences students had, during their studies, that created value for them as startup entrepreneurs. The main finding was that experiential, action-based activities (3 Day Startups, Hackathon, BizTech competition, etc.) were most effective, by providing students with real-life simulations of the startup experience. (Lee⁴, in a useful survey of various pedagogical approaches to entrepreneurship, notes a strong recent trend toward experiential learning.)We also found that the 30-year-old ‘tell your story’ general studies course, in which startup entrepreneurs recount their experiences, helped foster awareness of entrepreneurship among many students.

¹ Schein, E. H. (1990). Organizational culture (Vol. 45, No. 2, p. 109). American Psychological Association

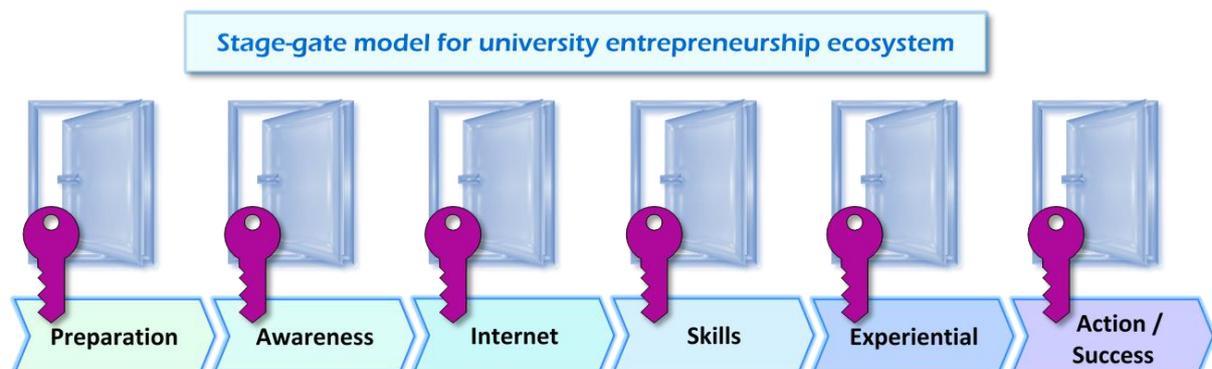
² Schein, E. H. (1996). Three cultures of management: The key to organizational learning. Sloan management review, 38(1), 9-20

³ Buchnik, T., Gilad, V., & Maital, S. (2018). Universities' influence on student decisions to become entrepreneurs: theory and evidence. Journal of Entrepreneurship Education, 21(3), 1-19

⁴ Lee, K. (2015, August). How students are taught entrepreneurship in universities. In ECIE2015-10th European Conference on Innovation and Entrepreneurship: ECIE 2015(p. 415). Academic Conferences and publishing limited 415-522

Similar studies of students' startups have been done, through alumni/ae surveys, at MIT⁵ and Stanford⁶, as well as at Technion⁷. Those studies reveal enormous impact of even small universities, on job creation, wealth creation, and economic growth. Silicon Valley (Stanford), Route 128 (MIT) and what has been called Silicon Wadi (Technion) are three instances of the central role relatively small, excellent science and technology universities play as engines of economic growth.

From awareness to action: In Buchnik et al.³, a stage-gate model is presented, in which students evolve to become entrepreneurs, through preparation, awareness, intent, skill development, experiential activities and finally – action. (See Figure 1). The focus of this survey is on one of those stage-gates, intention.



Source: Buchnik et al. , p. 8.

The role of stories: Awareness, by definition, precedes intent.

Organizational psychologists Lounsbury and Glynn⁸, in a new and recent book, return to their earlier seminal work⁹ on cultural entrepreneurship, which they define as:

.... the process of storytelling that mediates between extant stocks of entrepreneurial resources and subsequent capital acquisition and wealth creation.... . entrepreneurial stories facilitate the crafting of a new venture identity that serves as a touchstone upon which legitimacy may be conferred by investors, competitors and consumers, opening up access to new capital and market opportunities. (p. 545)

Stories, and storytelling, about entrepreneurs are part of the entrepreneurial culture, and *strongly shape awareness* among students of the possibility of launching startups. In Buchnik et al.³, the impact of a longstanding Technion course that brings entrepreneurs to campus to

⁵ Roberts, E. B., Murray, F., & Kim, J. D. (2019). Entrepreneurship and Innovation at MIT: Continuing Global Growth and Impact—An Updated Report. Foundations and Trends® in Entrepreneurship, 15(1), 1-55

⁶ Eesley, C. E., & Miller, W. F. (2018). Impact: Stanford University's economic impact via innovation and entrepreneurship. Foundations and Trends® in Entrepreneurship, 14(2), 130-278.

⁷ Frenkel, A. & Maital, S. Technion's Contribution to Israel and the World through Its Graduates. S. Neaman Institute, Technion, 2012, 45 pp

⁸ Lounsbury, M., & Glynn, M. A. (2019). Cultural entrepreneurship: A new agenda for the study of entrepreneurial processes and possibilities. Cambridge University Press

⁹ Lounsbury, M., & Glynn, M. A. (2001). Cultural entrepreneurship: Stories, legitimacy, and the acquisition of resources. Strategic management journal, 22(6-7), 545-564

tell their stories is studied. The prevalence of startup stories in the media, on-line, and in print is a source of 'startup culture capital', as Lounsbury and Glynn observed nearly two decades ago, and creates strong awareness of the startup option among students. Lounsbury and Glynn observe, rightly, that

“entrepreneurial research rooted in the discipline of economics has ignored the study of culture, while that grounded in psychology and sociology has theorized about culture in a very limited way – typically as a set of abstracted beliefs that motivate entrepreneurial actions” (p. 548-549).

Cultural values are socialized and transmitted through stories; strongly entrepreneurial nations, like Israel, have pervasive startup stories that are widely known, publicized, told and retold, and become part of the country's lore and mythology. At Technion, a small volume of startup stories focused on its graduates has sought to reinforce the entrepreneurial culture¹⁰.

Language: The 28 nations of the European Union have, through its European Commission, invested heavily in fostering entrepreneurship within its universities. Laalo et al.¹¹ explain how the Commission, in its policy directives, “redefines the values of European university education” to foster entrepreneurship skills, partly through redefining standards of education. In high technology, standards determine the direction of future technology; as part of efforts to shape an entrepreneurial culture, educational standards may have similar impact.

Engineering vs. Management: Maresch et al.¹², in part reflecting Shein's three-culture paper, examine whether there are differences among business students vs. engineering students, in the impact of entrepreneurship education. Their research examines the impact on these two groups of an identical entrepreneurship course. As we might expect, they do find that engineering students respond differently. This suggests that within universities, efforts to foster entrepreneurship should be contextual, and should be personalized and tailored according, even, to individual faculties.

Galikhanov et al.¹³, in contrast, stresses the synergies between engineering and management, noting that the ‘synergistic effect appears only when engineers' talents meet those of managers”.

Competition: Startup entrepreneurship is highly competitive. Rubin et al.¹⁴ argue that developing competitive skills as an “essential part of professional entrepreneurship activity” is crucial. Their paper describes and defines categories of competition competencies and urges that such competencies be measured as part of learning outcomes.

¹⁰ Frenkel, A., Maital, S., & DeBare, I. (2012). Technion Nation: Technion's Contribution to Israel and the World. Technion--Israel Institute of Technology. [Second edition: 2018]. [Mandarin edition: Hangzhu Publishing Co., 2018]

¹¹ Laalo, H., Kinnari, H., & Silvennoinen, H. (2019). Setting new standards for homo academicus: Entrepreneurial university graduates on the EU agenda. *European Education*, 51(2), 93-110

¹² Maresch, D., Harms, R., Kailer, N., & Wimmer-Wurm, B. (2016). The impact of entrepreneurship education on the entrepreneurial intention of students in science and engineering versus business studies university programs. *Technological forecasting and social change*, 104, 172-179

¹³ Galikhanov, M., Yushko, S., Shageeva, F. T., & Guzhova, A. (2018, September). Entrepreneurial Competency Development of the Engineering Students at the Research University. In *International Conference on Interactive Collaborative Learning* (pp. 493-501). Springer, Cham

¹⁴ Rubin, Y. B., Lednev, M. V., & Mozhzhukhin, D. P. (2019) Competition Studies: Structuring Competencies in University Entrepreneurship Programs. *Higher Education in Russia*, vol. 28 (1), 21-33

Measured Impact: In emerging market countries, job creation is an explicit goal of universities' entrepreneurship programs. Premand et al.¹⁵ find that an entrepreneurship track, as part of a Tunisian education reform in universities, led to a small increase in self-employment but left no change in overall employment. While graduates' entrepreneurial aspirations improved, it is clear that unless a strong startup ecosystem exists, including finance, resources, capital, skills, etc. , universities alone cannot have much impact.

In Guerrero et al.¹⁶, a study of 147 UK universities' economic impact found that the entrepreneurial universities (the so-called Russell IGroup) had stronger economic impact than the control group, through the numerous entrepreneurial spin-offs they created. The control group's impact, while also considerable, expressed itself mainly through creation of knowledge capital (knowledge transfer).

Predicting Intention: Which variables correlate most strongly with students' intention to launch startups? Bell¹⁷ finds that "attitude toward risk" was consistently the strongest predictor. This result is found, too, in Iglesias-Sanchez et al.¹⁸, which also found that "ideas about [students'] abilities" were important. Self-efficacy, clearly, is related to perceived risk. Similarly, Saeed et al.¹⁹, in a study of 805 university students, find that "entrepreneurial self-efficacy and individual motivation constitute the fundamental elements of the intention to start a business."

It is likely that social attitudes toward failure, in turn, affect perceived risk. Startups are inherently risky; if failure is perceived as shameful and forever taints the failed entrepreneur, the perceived cost of risk and failure damages even early-stage intent.

Some universities are known for their 'entrepreneurial orientation', partly through widespread stories about graduates' successful startups. Krabel²⁰ studies German universities, which have a ranking system for entrepreneurial orientation, and finds that "the likelihood of entering self-employment" is significantly positively correlated with entrepreneurial orientation, as is previous work experience (prior to college studies) of graduates. Bergmann et al.²¹, in contrast, finds that "people's individual characteristics are most important" in influencing students' propensity to start a business, based on studies of 41

¹⁵ Premand, P., Brodmann, S., Almeida, R., Grun, R., & Barouni, M. (2016). Entrepreneurship education and entry into self-employment among university graduates. *World Development*, 77, 311-327

¹⁶ Guerrero, M., Cunningham, J. A., & Urbano, D. (2015). Economic impact of entrepreneurial universities' activities: An exploratory study of the United Kingdom. *Research Policy*, 44(3), 748-764

¹⁷ Bell, R. (2019). Predicting entrepreneurial intention across the university. *Education+ Training*

¹⁸ Iglesias-Sánchez, P. P., Jambrino-Maldonado, C., Velasco, A. P., & Kokash, H. (2016). Impact of entrepreneurship programmes on university students. *Education+ Training*, 58(2), 209-228

¹⁹ Saeed, S., Yousafzai, S. Y., Yani-De-Soriano, M., & Muffatto, M. (2015). The role of perceived university support in the formation of students' entrepreneurial intention. *Journal of small business management*, 53(4), 1127-1145

²⁰ Krabel, S. (2018). Are entrepreneurs made on campus? The impact of entrepreneurial universities and graduates' human capital on graduates' occupational choice. *Journal of International Entrepreneurship*, 16(4), 456-485

²¹ Bergmann, H., Hundt, C., & Sternberg, R. (2016). What makes student entrepreneurs? On the relevance (and irrelevance) of the university and the regional context for student start-ups. *Small Business Economics*, 47(1), 53-76

European universities. Boh et al.²² stress the key role that graduate and post-doctoral students play in university spinoffs, and describe four 'pathways' to such spinoffs.

Abreu et al.²³ compare, in a very large database, research-intensive vs. teaching universities, and find that research-intensive universities "have distinctively higher rates of licensing and spin-out activities" than teaching universities, but both types of universities have similar forms of entrepreneurial engagement described as "problem solving activities".

Jansen et al.²⁴ compare three known entrepreneurial universities: MIT (US), International Institute of Information Technology (India) and Utrecht (Netherlands). Using a case study approach, they categorize startup-fostering qualities under three rubrics: Educate, Stimulate and Incubate. Factors that are common across the three, which in other ways differ widely, are: "meet and work with other entrepreneurs", "provide office space" (Incubate); support founding team formation, enable prototype development (Stimulate); and provide supportive staff and facilities (Educate).

Another case-based study of MIT (Hayter et al.²⁵) examines the key role of graduate students. They find that "graduate students play roles similar to that of individual faculty entrepreneurs in university spinoffs", in two ways: in the initial startup decision, and in preparing the technology for market. They also note, however, conflicts with advisors and other students.

Rasmussen et al.²⁶ adopt an "entrepreneurial competency" approach. They note that 'providing ...an environment [for encouraging spin-offs] may, however, be challenging... for many universities because it requires different capabilities than the traditional tasks of teaching and research.' Specifically, they note that initiatives and policies that promote spin-offs require actions and policies at many levels of the university – spinoffs need to be "prioritized at all levels of the university", not just, say, by the technology transfer office.

Collaboration with Real Entrepreneurs: Many universities employ past and present entrepreneurs, as part of their efforts to foster startup entrepreneurship among students. Secundo et al.²⁷ study the Italian "Mimprendo" system, a structured framework that leads communities of entrepreneurs, experts and college students through the stages of "inspiration, exploration, exploitation, acceleration and growth". Experiential and contextual learning play an important role in this system.

²² Boh, W. F., De-Haan, U., & Strom, R. (2016). University technology transfer through entrepreneurship: faculty and students in spinoffs. *The Journal of Technology Transfer*, 41(4), 661-669

²³ Abreu, M., Demirel, P., Grinevich, V., & Karataş-Özkan, M. (2016). Entrepreneurial practices in research-intensive and teaching-led universities. *Small business economics*, 47(3), 695-717

²⁴ Jansen, S., van de Zande, T., Brinkkemper, S., Stam, E., & Varma, V. (2015). How education, stimulation, and incubation encourage student entrepreneurship: Observations from MIT, IIIT, and Utrecht University. *The International Journal of Management Education*, 13(2), 170-181

²⁵ Hayter, C. S., Lubynsky, R., & Maroulis, S. (2017). Who is the academic entrepreneur? The role of graduate students in the development of university spinoffs. *The Journal of Technology Transfer*, 42(6), 1237-1254

²⁶ Rasmussen, E., & Wright, M. (2015). How can universities facilitate academic spin-offs? An entrepreneurial competency perspective. *The Journal of Technology Transfer*, 40(5), 782-799

²⁷ Secundo, G., Del Vecchio, P., Schiuma, G., & Passiante, G. (2017). Activating entrepreneurial learning processes for transforming university students' idea into entrepreneurial practices. *International Journal of Entrepreneurial Behavior & Research*, 23(3), 465-485

Design Thinking: Nielson et al.²⁸ observe that “entrepreneurship education is often criticized for being too rational, managerial-oriented and ‘mainstream’, focused on a design-then-executive didactic”. As a result, “students are receiving a too simplistic image of the entrepreneurial reality.... although entrepreneurship can be taught, it cannot be taught as a conventional academic topic”.

They propose “design thinking” as a basic paradigm. Design thinking focuses on exploring alternative solutions (instead of choosing between existing alternatives)”. It asks, what might be? ,not what is? It is driven by a five-stage process: Empathize with your users; Define your users’ needs, their problem, and your insights; Ideate – by challenging assumptions and creating ideas for innovative solutions; Prototype – to start creating solutions; Test – solutions, on real people. Just as industrial designers learn their craft in studios, learning by doing, so design-oriented entrepreneurs need, perhaps, similar ‘studios’ in which to learn their craft. Studios, not classrooms, reflect design thinking.

Periphery & Entrepreneurship: Oulu is a city in Northern Finland, only 300 kms. (180 miles) from the Arctic Circle, or about two hours’ drive. Winters there are long, very cold and very dark. Oulu has an excellent science and technology university. Many of its graduates fall in love with the city, and remain there after graduation, to launch startups. So Oulu has a thriving entrepreneurial ecosystem.

Oulu University has supplied engineers for local industry for 120 years. As big companies downsize, notes Paatalo²⁹, the university has concentrated more on entrepreneurship education, with some success. A great university can generate a thriving vibrant entrepreneurial ecosystem, even in the most challenging climate and environment, as Oulu proves.

China: China is an especially fascinating case, in the study of how universities foster entrepreneurship. China is making a massive effort to shift, in the government’s own words, from “made in China” to “made and invented in China”. But the literature in English on this topic is quite sparse. Jiang et al.³⁰ offer a frank, objective diagnosis of some of the difficulties in China’s educational system, in the realm of creativity and innovation, including weak teaching staff, lack of (experiential) practice, and lack of a cultural atmosphere for entrepreneurship. They propose a multi-pronged system for constructing an educational platform for innovation and entrepreneurship, including education, training (in practice) and incubation.

This author has some personal experience in this area. He taught an intensive 36 hour course on Innovation to undergraduate students, at Shantou University, as part of the newly-founded Guangdong Technion Israel Institute of Technology in Shantou. He found levels of creativity similar to those in Israel and a high level of entrepreneurial energy and intent among the admittedly self-selected students. Culture and story-telling played a role. In the course, an enterprising student entrepreneur who introduced vending machines to campus and later to

²⁸ Nielsen, S. L., & Stovang, P. (2015). DesUni: university entrepreneurship education through design thinking. *Education+ Training*, 57(8/9), 977-991

²⁹ Päätaalo, H. Development of entrepreneurship education at universities of applied sciences. 43rd annual SEFI conference, June 29-July 2, 2015, Orleans, France

³⁰ Jiang, X. W., & Sun, Y. H. (2015). Study on constructing an education platform for innovation and entrepreneurship of university student. *Research Journal of Applied Sciences, Engineering and Technology*, 9(10), 824-829

the City of Shantou told his story to rapt students, showing them a path to success they may not have otherwise considered.

Conclusion: Perhaps the main conclusion from these 25-30 research papers is this: While universities seek to foster entrepreneurship, their dominant academic approach to teaching anything -- classrooms, textbooks, curricula, lectures and problem sets -- is inappropriate for startup entrepreneurs. Budding entrepreneurs seek first to understand what is involved in entrepreneurship, in practical terms, to learn whether they are suited for it; and for this they require hands-on, experiential, real-world 'wet' simulations and where possible, exposure to and collaboration with real entrepreneurs, with the goal of creating awareness, fostering intention and ultimately, generating action in launching new businesses.

In the three-dimensional world of modern universities – teaching, research and entrepreneurship – the former two activities can clash severely with the third, unless a new and different culture is cultivated and embraced, one that integrates these three activities in ways that are effective and achieves their goals.

ⁱ Special thanks to research assistant Ella Barzani, for help in compiling this literature search.

Contact information: smaital@tx.technion.ac.il