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A case study on technology entrepreneurship education at a Taiwanese research university

Tommy Shih^{a,*}, Yen-Yu Huang^b^a Department of Business Administration, Lund University, P.O. Box 7080, SE-220 07 Lund, Sweden^b Institute of Technology Management, National Tsing Hua University, 101, Sec. 2, Kuang-Fu Road, Hsinchu 30013, Taiwan

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1. Introduction

Over recent decades there has been an increased policy emphasis on establishing a knowledge-based society where universities play an important role in forming both the present and next generations of innovators and entrepreneurs (Etzkowitz, Webster, Gebhardt, & Terra, 2000; Vanevenhoven, 2013). As Schumpeter (1934) stated over 80 years ago, entrepreneurs are critical agents of societal change and integral to innovation. Hence, entrepreneurship in particular has been seen as a major driving force behind economic growth, embedded in a broader political agenda of value creation (Gilbert, McDougall, & Audretsch, 2006). In this vein, entrepreneurship has increasingly been seen as an important component of university curricula all over the world. Not only is the subject taught at business schools, but natural science and technology students alike are also being offered elective courses in entrepreneurship as part of their educational programs. In the United States, entrepreneurship education was popularized at higher education institutions during the 1970s (Kuratko, 2005). In Asia, it has been a more recent phenomenon, increasingly promoted particularly in East Asia (Mok, 2013).

This study looks at entrepreneurship education in Taiwan. As one of the Asian Tigers, Taiwan is facing problems similar to other

advanced countries such as a changing demographic structure and a need for industrial transformation through the utilization of advanced knowledge. Entrepreneurs are therefore integral to the process of achieving change on both economic and societal levels. Consequently, education focusing on forming science based/high-tech entrepreneurs is also on the rise in Taiwan. Between 2005 and 2007, the number of entrepreneurship courses grew from 102 to 145 (Chen et al., 2015). In 2013, 70 universities in Taiwan offered entrepreneurship related courses (MOE UCOURSE, 2013). However, as the teaching tradition of entrepreneurship is lacking and the established East Asian education and research systems are fairly disassociated from industry, Taiwan is in need of finding educational practices that are contextually suitable (cf. Wen & Liu, 2010). In order for this to improve, it is necessary to understand *why* and *how* entrepreneurship education matters (cf. Fayolle, 2013). Furthermore, Thomas and Kelley (2011) note that entrepreneurship education models cannot just be imported and used without modification. Similarly, Nabi, Linan, Fayolle, Krueger, and Walmsley (2017) identify that educational initiatives need to be understood in their contextual settings. Against this background, the present study follows a high-tech entrepreneurship course at a major Taiwanese research university.

This paper presents the course and investigates how its design aligns with the students' learning experiences. From this research, we aim to derive some implications for technology-based entrepreneurship education. The contribution of this study is twofold. Firstly, it reports on the practice of entrepreneurial education in Taiwan which has not yet received much attention within international academic literature.¹ Secondly, the study offers insights into the complicated relationship, common in entrepreneurship education, between developing venture managers and fostering entrepreneurial mindsets in the long-term. The study does not strive to offer a representative picture of how entrepreneurship education is conducted in Taiwan, but seeks from the case to describe in detail the challenges and benefits of the educational initiative. Hence, the value of this study relates to the in-depth

* Corresponding author.

E-mail addresses: tommy.shih@fek.lu.se (T. Shih), hyy6273@gmail.com (Y.-Y. Huang).

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¹ Only a handful of relevant hits came up on the search combination, "Entrepreneurship education" and "Taiwan", in the EconLit database and on Google scholar.

picture of the challenges and the impact of entrepreneurship education in the very specific context which it is taught. Conceptually, the study draws influence from literature describing a general problem in entrepreneurship education, namely the ambiguity of what is to be taught and the role that this kind of education plays in forming students and their societal roles (Hoppe, 2016; Ronstadt, 1987; Vanevenhoven, 2013).

The paper is organized as follows. In the next section, a literature review describes the entrepreneurship policy and its links to education and entrepreneurship education practices. Thereafter, the method based on a qualitative research design is discussed. This follows with the description of the entrepreneurial course and the students' learning experiences. The paper ends with a discussion and conclusions.

2. Literature review

2.1. *Entrepreneurship policy and links to entrepreneurship education at universities*

Governments consistently emphasize that small businesses, and in particular new science or technology based firms, contribute significantly to innovation, job creation, and economic growth (Gilbert et al., 2006; Nallari et al., 2011; Oakey, Groen, Cook, & Van Der Sijde, 2013). This has resulted in the systemic support of innovation and entrepreneurial activities (Audretsch, 2004). Nonetheless, while policymakers envision that more start-up firms will transform struggling economic regions, generate innovation, and/or create more jobs, the typical start-up is not innovative, creates few jobs, and generates little wealth (Shane, 2009). As Shane (2009) acknowledges, enabling economic growth and job creation by promoting entrepreneurship is not a numbers game, instead it is about creating viable businesses. Against this understanding, Bennet (2014) confers that public policy needs to play an active role in stimulating entrepreneurship on different levels, including resource provision as well as education. The evidence though, as Minniti (2008) argues, is inconclusive with regards to how entrepreneurial policy is either productive or actually hampers entrepreneurship. Dawson and Henley (2012) note that there are both pull and push factors behind the formation of new ventures. And, according to Kirkwood (2009), entrepreneurs are equally motivated by both. The push factors relate to reasons such as necessity (e.g., unemployment), while pull factors relate to perceived opportunities such as resource provisions and education (Williams, 2009).

As described by Dawson and Henley (2012), entrepreneurship policy often focuses on the pull factors which aim to stimulate more individuals to become entrepreneurs. Thus, the institutions and the rules of the game dictate the effect of entrepreneurship on the economy through the allocation of entrepreneurial resources (Boettke & Coyne, 2009). Notwithstanding, as Shane et al. (2003) posits, the importance of environmental factors contra human agency needs consideration. With the latter in mind, individual action becomes central. A basic tenet is that entrepreneurial skills can be taught (cf. Bell, 2015; Burns, 2011; Kuratko, 2005). Thus, in order to foster entrepreneurship, government policies have sought to promote entrepreneurship education. Universities in particular have increasingly been regarded by governments as resources in the quest for national competitiveness (Etzkowitz et al., 2008; Slaughter & Larry, 1997). Entrepreneurship education therefore plays an integral role in entrepreneurial ecosystems (Isenberg, 2014). Gibb (2005) suggests that its role is to foster an entrepreneurial mindset among students, inform about new venture creation as a viable career choice, and enhance business skills.

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embeds in a broader policy discourse on how universities create value for the economy and society. Entrepreneurship has been popularized in management education as a result of the perception of entrepreneurs as positive for the economy (Adcroft, Willis, & Dhaliwal, 2004). Along this line, the number of programs has also dramatically increased. For example, Kuratko (2005) notes that there was only a handful of university based entrepreneurship education programs in the 1970s, but the number of institutions offering programs or courses had grown to over 1600 by 2005. While there has been a dramatic quantitative increase, the issue of what entrepreneurship education at the university level entails and how it affects economic activities remains disputed (cf. Adcroft et al., 2004). Entrepreneurship education has traditionally focused on areas such as developing business plans (Karlsson & Honig, 2009), entrepreneurial mindsets (Gibbs, 2005), or enterprising skills (Anderson & Jack, 2008). The latter can be associated with the new venture creation approach to entrepreneurship education (Burns, 2014), where attempts to combine education with tangible technology projects at the university have also been made (cf. Olilla & Williams-Middleton, 2011). As Boocook, Frank, and Graham (2009) note, technology-based entrepreneurship education supports universities' technology transfer agendas, as well as focuses on economic value creation from technological change. These educational initiatives have, however, been criticized as being myopic. For example, Nabi et al. (2017) suggest that pedagogies are often evaluated on short-term bases. Moreover, Boocook et al. (2009) argue that there is a lack of long term institutional involvement to enable technology entrepreneurship.

2.2. *Entrepreneurship education practices and effects*

While the impact of entrepreneurship education is an issue of discussion, there is also disagreement regarding what it should encompass (Vanevenhoven, 2013). There are two different views that do not need to be mutually exclusive but serves as points of departure. On the one hand, the view of entrepreneurship as a tool for management, and on the other, the view of entrepreneurship as a form of creativity (Hoppe, 2016; Johannisson, 1991, pp. 67–82). Moreover, scholars acknowledge that entrepreneurship education requires the theoretical skills and methods taught by academics (cf. Fayolle & Gailly, 2008), as well hands-on practice in order to gain entrepreneurial experience (Bell, 2015; Rasmussen & Sørheim, 2006). This has led to a symbiotic relationship between both theory and practice, which has been a challenge to combine methodologically, practically, and expectation-wise (Fayolle, 2013). For instance, entrepreneurship education frequently accentuates action, while content-wise, traditional academic programs emphasize the learning of reflective academic skills (Kuratko, 2005). Thus, the legitimacy of entrepreneurship education depends to a large extent on the ability of educators to define pedagogies, methods, and theoretical tools to perform, explain, and evaluate entrepreneurial activities (Fayolle & Gailly, 2008).

Fayolle (2013) notes that education needs to form on a conceptual domain, catering to the need of explaining the phenomenon of entrepreneurship. This includes expounding on and predicating entrepreneurial behaviors and activities. In this vein, entrepreneurship teaching should also be based on the accumulated knowledge of practices and the conceptualization of these (Kuratko, 2005). Theories, thus, form methods and pedagogies that can be applied in entrepreneurship teaching, giving the students tools to identify, evaluate, and exploit entrepreneurial opportunities and management (Fayolle & Gailly, 2008). The theoretical activities should be based on action/practice-based learning in order for students to acquire the mindsets and hands-on practice of dealing with new venture creation and development (Bell, 2015;

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