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Entrepreneurial university ecosystems and graduates' career patterns: Do entrepreneurship education programs and university business incubators matter?

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ABSTRACT

Purpose: This paper provides insights about how graduates' career patterns (i.e., academic entrepreneur, self-employed, or paid employed) are influenced by entrepreneurial university ecosystems (i.e., incubators and entrepreneurship education programs)

Methodology: By adopting Douglas and Shepherd's utility-maximising function, the influence of one entrepreneurial university ecosystem on graduates' career choices was tested using a sample of 11512 graduates from the Monterrey Institute of Technology and Higher Education (ITESM) in Mexico.

Results: Our results show the critical role of entrepreneurial universities ecosystems in facilitating employability options as academic entrepreneurship for ITESM's graduates. The study shows some insights about how graduates' risk aversion and graduates' work effort are positively influenced by the university business incubator and entrepreneurship education programs, respectively.

Implications: Diverse implications for stakeholders have emerged from our results. These implications are associated with potential benefits of implementing programs oriented to engage academic entrepreneurship within Latin American universities.

Originality: Entrepreneurial universities provide a range of employability alternatives for their students, such as to be self-employed, academic entrepreneurs, or paid employees. In this scenario, entrepreneurial universities have configured entrepreneurial ecosystems (educational programmes, business incubators, and other infrastructures) to support potential entrepreneurs (students, academics, staff, and alumni). Despite the relevance of the environmental conditions on individuals' occupational choices, few studies have explored the role of the entrepreneurial university ecosystems on graduates' employability. In this vein, our study contributes to some academic discussions: (a) the role of context on career choice models (Ilouga et al., 2014; Sieger and Monsen, 2015); (b) the role of incubators and entrepreneurship education on fostering academic entrepreneurship on the graduates' community (Nabi et al., 2017; Good et al., 2019; Guerrero and Urbano, 2019a); and the effectiveness of the entrepreneurial university ecosystems on graduates' employability (Herrera et al., 2018; Wright et al., 2017).

Keywords:

Graduates' career choice; university business incubation; academic entrepreneurship; entrepreneurial university; entrepreneurial and innovation ecosystems; emerging economies

1. Introduction

Prior empirical research into individuals' career choices has investigated primarily macro-economic and demographic conditions with a minor emphasis on individual motivations (Douglas and Shepherd, 2000; Feldman and Bolino, 2000). Entrepreneurship literature has attributed occupational choices to heterogeneous individuals' characteristics (Carter et al., 2003; Feldman and Bolino, 2000) and individuals' expectations (Douglas and Shepherd, 2000 and 2002; Martiarena, 2013). However, even though the environmental conditions constrain individuals' occupational decisions (Baumol, 1990), the occupation choice literature has underexplored the role of context on individuals' occupational choices (Ilouga et al., 2014; Sieger and Monsen, 2015; Kuechle et al., 2018). This academic discussion has taken relevance given the most recent worldwide economic downturn and current socio-economic events (e.g., Brexit, US elections, Migration/Refugees, Digitalization) that have represented a strategic game-changer for any organisation (Guerrero et al., 2016b; Klofsten et al., 2019). In this vein, universities have faced several changes like higher rates of unemployment in university graduates, the reduction of public budgets, reduction in the demand of higher education studies (Guerrero and Urbano, 2019a). Traditionally, universities have provided a range of employability opportunities for students, including the enlargement of skills, knowledge, and the willingness/awareness of the need to continue learning via teaching (Harvey 2001). Over the past few decades, universities have been transformed their core activities (teaching, research and knowledge transfer/commercialisation) to configure entrepreneurial ecosystems for providing multiple employability alternatives such as self-employment, academic entrepreneurship or entrepreneurial employees (intrapreneurs) (Audretsch, 2014; Guerrero et al., 2015; Guerrero and Urbano, 2019a).

By exploring this academic discussion, the literature has recognised that entrepreneurial universities invest resources and capabilities to generate adequate infrastructures, mechanisms, and educational programs to support the university community's (students, academics, graduates) exploration and exploitation of entrepreneurial ideas (Grandi and Grimaldi, 2005; Guerrero and Urbano, 2012; Shane, 2004; Wright, 2007, 2017). In this vein, previous studies have explored why some universities create more start-ups than others located in developed countries (Di Gregorio and Shane, 2003; O'Shea et al., 2008; Shane, 2004; Wright et al., 2004; Guerrero et al., 2014; Guerrero and Urbano, 2017; Guerrero et al., 2017; Guerrero et al., 2018). In particular, previous studies provide insights about the enabling factors for creating university business incubators (McAdam and McAdam, 2008; Sternberg, 2014), the evolution of university business incubators (Miller et al., 2014), the influence of university business incubators on students' entrepreneurial intentions (Saeed et al., 2014; Guerrero et al., 2017), and the influence of university business incubators on knowledge transfer and commercialisation (Scillitoe and Chakrabarti, 2010; Ebbers, 2014; Lundqvist, 2014). However, a few studies have explored the influence of university business incubators and entrepreneurship education on the graduates' career choice decisions of becoming an academic entrepreneur (Al-Dajani et al., 2014; Guerrero and Urbano, 2017; Guerrero et al., 2017; Good et al., 2019). In this vein, the influence of incubators and entrepreneurship education on graduates' occupational choices have not been explored in-depth (Peters et al., 2004; Nabi and Holden, 2008; Nabi and Liñán, 2011; Guerrero and Urbano, 2015; Guerrero et al., 2016; Nabi et al., 2017). This phenomenon is attracting the attention of academics and policymakers given the significant socio-economic changes that have negatively influencing job market conditions (González-Pernía et al., 2018) and the current higher education challenges (Guerrero and Urbano, 2019a).

This paper analyses how the graduates' career patterns (i.e., academic entrepreneur, self-employed, or paid employed) are influenced by entrepreneurial university ecosystems (i.e., incubators and entrepreneurship education programs). By adopting the Douglas and Shepherd's utility-maximising

function[1], a proposed conceptual model was tested with a sample of 11512 graduates from a private multi-campus entrepreneurial university (Monterrey Institute of Technology and Higher Education, ITESM) located in an emerging economy (Guerrero et al., 2017 and 2018). Regarding the research setting, we selected Mexico as an emerging country characterised by investment in its productive/innovative/entrepreneurial capacity in order to achieve a better economy and level of well-being for its population (Wright et al., 2005; Guerrero and Urbano, 2017). Mexico's economy, politics, and society have rapidly transformed from an efficiency-driven economy towards an innovation-driven economy (Guerrero and Urbano, 2017). As any emerging economies, universities play an important role in entrepreneurial innovation ecosystems reinforcing a political strategy of stimulating economic development via innovation and entrepreneurship initiatives (Hoskisson et al., 2000; Herrera et al., 2018). Our results show the role of entrepreneurial universities ecosystems in facilitating employability options as academic entrepreneurship for ITESM's graduates. The study highlights some insights about the effectiveness of university business incubator by reducing graduates' risk aversion, as well as the positive effect of entrepreneurship education programs by reinforcing graduates' work effort. In this vein, our study contributes to some academic discussions: (a) the role of context on career choice models (Ilouga et al., 2014; Sieger and Monsen, 2015); (b) the role of incubators and entrepreneurship education on fostering academic entrepreneurship on the graduates' community (Nabi et al., 2017; Good et al., 2019; Guerrero and Urbano, 2019a); and the effectiveness of the entrepreneurial university ecosystems on graduates' employability (Grimaldi et al., 2011; Autio et al., 2014; Herrera et al., 2018; Wright et al., 2017).

The remainder of the paper is organised as follows: Section two develops the conceptual framework, particularly the factors involved in the graduate students' occupational choice to become an entrepreneur or self-employed or paid employee. Section three describes the methodology applied in this study. Section four addresses the results obtained. Finally, section five presents the main conclusions of the study, the implications for decision-makers, and future research lines.

2. Theoretical foundations

2.1. Entrepreneurial universities ecosystems

Since the publication of the Clarks' book (1998), the research about the phenomena of "entrepreneurial universities" and their core activities - teaching, research, technology transfer and entrepreneurship- has increased significantly (Guerrero and Urbano, 2019). An entrepreneurial university is understood as a university which simultaneously fulfils three core activities—teaching, research, and entrepreneurship—while providing an adequate atmosphere in which the university community can explore/exploit ideas (Guerrero, 2008; Guerrero and Urbano, 2012) for contributing into the socio-economic transformation of cities/regions/countries (Grimaldi et al., 2011; Urbano and Guerrero, 2013; Guerrero et al., 2015; Klofsten et al., 2019; Audretsch et al., 2019). The entrepreneurial university core activities (teaching, research and knowledge transfer/commercialisation) are oriented to transform the mindsets, intentions and actions of the community (students and academics). The revised literature highlighted the main characteristics of students' start-ups and graduates/academics entrepreneurship across multiple higher education systems (Guerrero and Urbano, 2019a). Regarding students' start-ups, the literature delighted the design of entrepreneurship programmes to influence on entrepreneurial mindsets/intentions/actions of university

[1] Douglas and Shepherd (2000 and 2002) model the individual's choice of career path out to the individual's time horizon by defining a career path as one or more jobs over that same planning period. Thus they state: Uij = F (Yij, Wij, Rij, Iij, Oij) where Uij represents the utility anticipated in the ith period from the jth job; Yij represents the income anticipated in the ith period from the jth job; Wij represents the work effort anticipated in the ith period from the jth job; Rij represents the risk anticipated in the ith period from the jth job; Iij represents the independence anticipated in the ith period from the jth job; Oij represents the net perquisites anticipated in the ith period from the jth job; i = 1, 2, 3, ….n represents the different periods out to the time horizon (n), and j = 1, 2, 3, …m represents the different jobs available in any period.

students (Pittaway and Cope, 2007; Nabi et al., 2017). In this vein, previous studies have explored the influence of entrepreneurship education on entrepreneurial intentions and few studies on career choices (Ilouga et al., 2014; Sieger and Monsen, 2015) as well as the effect of specific university support mechanisms like business incubators (Guerrero et al., 2017, 2018). Regarding graduates/academics entrepreneurship, the literature provides insights about the relevance of entrepreneurial university supporting knowledge generation/commercialisation via technology-based firms or spin-offs (Grimaldi et al., 2011; Autio et al., 2014; Guerrero and Urbano, 2014; Herrera et al., 2018). As a result, a dichotomous role of entrepreneurial universities emerged in the literature to legitimise their contribution to economic growth and competitiveness via entrepreneurial and innovative initiatives (Wright, 2007; Urbano and Guerrero, 2013; Guerrero et al., 2015; Guerrero et al., 2016a, 2016b; Klofsten et al., 2019). The intersection of entrepreneurial universities also legitimised their critical role in entrepreneurship and innovation ecosystems (Autio et al., 2014; Herrera et al., 2018), as well as their critical contribution into the predominant production factors that contribute to social and economic development, which are: human capital, knowledge capital, and entrepreneurship capital (Urbano and Guerrero, 2013; Guerrero et al., 2015; Guerrero et al., 2016b).

Despite than in practice there is an inexistent division line between entrepreneurship and innovation, the existent literature confirms that entrepreneurial and innovative ecosystems continuing to be analysed as an independent phenomenon and with a few emphases on the higher education context (Guerrero and Urbano, 2019a). Conceptually, ecosystems involve a set of individuals, organisations, industries and environmental elements such as leadership, dynamic capabilities, culture, capital markets, networks, and open-minded customers that combine in complex ways (Acs et al., 2018; Audretsch et al., 2019). In the university context, entrepreneurial innovation university ecosystems are integrated by educational programmes, infrastructures (incubators, research parks, technology transfer offices, business creation offices, employment offices), university regulations (business creation normative, property rights), university culture (role models, attitudes towards entrepreneurship) as well as relationships with government, investors, industry, and other socio-economic agents (Guerrero and Urbano, 2012; Herrera et al., 2018; Guerrero and Urbano, 2019a, 2019b; Nicholls-Nixon et al., 2020; van Rijnsoever, 2020). This ecosystem supports the university community (students, alumni, academics, staff) in the identification, development and commercialisation of innovative and entrepreneurial initiatives (Grimaldi et al., 2011; Guerrero et al., 2017, 2018). The analysis of these inter-connections is relevant because both ecosystems regulate the nature and the quality of entrepreneurial activity by shaping rewards linked to opportunity identification/generation, pursuit organisational forms/strategies (Wright et al., 2017). In this assumption, the following section explores the influence of the element of entrepreneurial universities ecosystems on graduates' career choices.

2.2. The influence of entrepreneurial universities ecosystem on graduates' career choices

Influence on tolerate work effort via entrepreneurial university's educational programs

Entrepreneurial universities play an essential role in the graduates' decision process to enter an occupation as a wage or salaried individual or as entrepreneur/self-employment status. Entrepreneurial university' managers are interested in providing skills/abilities that reinforced the academic entrepreneurial lifestyle of their students (Guerrero et al., 2015). In this sense, these universities have introduced transversal entrepreneurship programmes oriented to generate certain students/graduates' benefits in terms of learning, inspiration and incubation that have changed their attitudes/motivations towards academic entrepreneurship (Souitaris et al., 2007; Nabi et al., 2017). In this line, Blanchflower and Meyer (1994) identified a relationship between young self-employed and specific university qualifications. Linked to the concept of *work effort* introduced in the utility-maximizing Douglas and Shepherd's function, if a graduate acquired skills/capabilities that facilitate her/his professional activities, he/she will have a higher tolerance for work effort by the relatively little marginal disutility from additional hours and intensity of their job

activities. In this sense, this tolerance for work effort will reflect the different utilities of graduates that have been derived from their remuneration (Douglas and Shepherd, 2002). In this assumption, graduates that possess skills/abilities such as the identification of opportunities and work under uncertainty will be more tolerant to the intensive work effort that demands an academic entrepreneurship career in comparison to others occupational choices (Arenius and Minnitti, 2005; Martiarena, 2013; Parker, 2004; Guerrero and Urbano, 2014; Guerrero et al., 2018). The utility gained by graduates' oriented towards academic entrepreneurial will be higher when the marginal rates of substitution between income and work hours are lower in absolute terms (Douglas and Shepherd, 2000). Therefore, we tested the following hypothesis:

> *H1: Graduates that tolerate intensive work effort (e.g., recognise opportunities and work under stress, skills achieved during entrepreneurship education programs) are more likely to be self-employed lower than academic entrepreneurs but higher than paid employees*

Influence on tolerate risk via entrepreneurial university's incubators

Career options vary according to their level of risk. Kihlstrom and Laffont (1979) suggested that more *risk-averse* individuals become employees and more-risk tolerance individuals become an academic entrepreneur. In this assumption, while an employee typically receives a salary/wage, self-employment typically represents a riskier endeavour (Knight, 1921). Positive tolerance for risk may expand the effort and variance of earnings (Douglas and Shepherd, 2000). In the context of the entrepreneurial university, an increased number of studies have identified that incubators are adequate university supports across the entrepreneurial and innovation process (Barbero et al., 2014; McAdam and McAdam, 2008). A university incubator provides the availability to access to invaluable resources/networks (Aaboen, 2009; Ebbers, 2014) and knowledge/technology from university (Rothaermel and Thursby, 2005a, 2005b; Good et al., 2019). Therefore, students/graduates can benefit from a pool of resources that help them explore business ideas and exploit these ideas into ventures (Souitaris et al., 2007). The impact of incubation services (e.g., infrastructures, coaching and networking) has been explored in the graduation rates of tenants in the incubation centres (Peters et al., 2004; Wright et al., 2017). In this level of analysis, these empirical studies have evidenced the significant impact on academic entrepreneurship rates based on the quality of services offered by the incubators (Nicholls-Nixon et al., 2020; van Rijnsoever, 2020). Therefore, under the incubators' umbrella, the perception of students/graduates about risk considerably varies in comparison with the perception of those graduates that have not received this support (Di Gregorio and Shane, 2003; O'Shea et al., 2008; Grimaldi et al., 2011). Based on graduates' experience, the relationship between academic entrepreneurship graduates and incubators will be across the progression of the start-up's lifecycle and will face the challenges in management, innovation and survival (McAdam and McAdam, 2008; Good et al., 2019). Graduates who have received support from the university incubator will be more tolerant of risk than other graduates (Douglas and Shepherd, 2000; Levesque et al., 2002). In our assumption, graduates who decide to become paid employees in an aligned occupation where apply the knowledge acquired in their bachelor's degree will be less tolerant of risk (Al-Dajani et al., 2014; Blume-Kohout, 2014; Guerrero et al., 2018). Therefore, we tested the following hypothesis:

> *H2: Graduates that tolerate risk (e.g., supported by an entrepreneurial university incubator) are more likely to be self-employed lower than academic entrepreneurs but higher than paid employees*

2.3. The influence of graduates' motivations on their career choices

Influence on independence via graduates' motivations

Carter et al. (2003) explored several reasons that individuals give for starting a business-like innovation, independence, recognition, roles, financial success and self-realisation. They evidenced that, in comparison with no entrepreneurs, nascent entrepreneurs have a similar impact on the majority of those reason but a few differences associated with roles, recognition, and gender perspectives. However, these differences/similitudes will be noted when is introduced the utility-maximising function. According to Douglas and Shepherd (2000 and 2002), the preference for decision-making control will determinate individuals' occupational choice. This fact is linked with the degree of independence/autonomy desired by the individual. Although academic entrepreneurs or self-employed are answerable to stakeholders such as financiers, and their level of independence varies, independence is typically higher in the self-employment career option. In the case of graduates, prior experiences will evidence their decision-making control based on their occupational patterns (Shane et al., 2003; Segal et al., 2005). Typically, individuals that have lived an engaging entrepreneurial experience had also experimented higher levels of independence and income will be interested in continuing in this pattern (Levesque et al., 2002). In our assumption, by nature, individuals with prior experience as employees in public/private sectors are highly averse to independence. Therefore, we tested the following hypothesis:

> *H3: Graduates oriented to have levels of independence (e.g., who experimented prior entrepreneurial experience) are more likely to be self-employed and academic entrepreneurs than paid employees.*

Influence on economic expectancy via graduates' motivations

According to Gatewood et al. (2002), the central premise of the expectancy theory is that behaviours are a function of individuals' expectations based on the perceived value of their achievements (e.g., if their set of skills/abilities are adequate or not), of the particular level of performance (e.g., if their outcomes are motivated to their performance), and the attractiveness of the reward (e.g., if the valence and personal goals relationship). Under this perspective, individuals seek to maximise their utility from their job choices (Douglas and Shepherd, 2002), and it will be influenced by their perceived desirability (Krueger et al., 2000). It follows that the utility incentive to become self-employed is higher for the person who is more tolerant of decision-making autonomy (Douglas and Shepherd, 2000). Therefore, we tested the following hypothesis:

> *H4: Graduates' academic entrepreneurs are more likely to demand higher income lower than self-employed but higher than paid employees*

2.4. Proposed conceptual model

By adopting the utility-maximising function (Douglas and Shepherd, 2000 and 2002), we proposed a conceptual model to explore the role of the entrepreneurial university ecosystem on graduates' occupational choice; particularly, the influence of entrepreneurship education programs and university business incubators. Figure 1 shows the proposed dimensions of this function linked to the influence of entrepreneurial university (H1 and H2) and individual motivations (H3 and H4).

--- Insert Figure 1 here---

3. Methodology

3.1. A multi-campus entrepreneurial university

Based on the objective of this study and adopting the theoretical criteria to identify entrepreneurial universities,[2] the Monterrey Institute of Technology and Higher Education (Instituto Technologic y de Estudios Superiores de Monterrey, ITESM) was identified such as one of the most entrepreneurial university in Latin-America (Guerrero et al., 2014, 2017, 2018). Since its foundation by a group of businessman, the ITESM has responded to the educational demands that emerge from social, economic, scientific, labour and technological changes, and to the challenges that the country development faces (Guerrero et al., 2018). The ITESM's aim is "to offer an education that transforms lives through educative experience. We develop persons who become change-makers, willing to be even more competitive on everybody's benefit". As a result, the ITESM's vision is oriented to develop entrepreneurial leaders, with human sense and internationally competitive. The ITESM's Directive Board is integrated by twenty members that represent civil society and business sector with the CEOs of well-recognised Mexican enterprises. The ITESM has adopted an organisational structure of a multi-campus university distributed by 31campuses located in different cities[3] across Mexico. In this sense, the ITESM also faces the influence of regional characteristics at the economic, social, political, and geographical level. Also, the ITESM has an international presence in 15 other countries through 22 international liaisons offices.

Based on this multi-campus system, the ITESM promotes teaching, research and entrepreneurial activities. Concerning to *teaching activities*, the ITESM has implemented a novel educational system with transversal entrepreneurship training. Nowadays, the ITESM has a strong mandatory curricular of entrepreneurship courses/programs across disciplines/campuses. Regarding *research activities*, ITESM's researchers are organised in over 41 research groups that conduct basic/applied research in strategical public areas[4]. Concerning to *entrepreneurial activities*, the ITESM has created the Eugenio Garza Lagüera Entrepreneurship Institute that enhances students' entrepreneurial spirit in order to propose/implement solutions for social, economic and environmental development. With this aim, the ITEMS has celebrated strategic alliances with other universities such as the Babson College, Stanford, UC Berkeley, and among others.

Based on these experiences, the ITESM has implemented a business incubator model integrated by a platform that comprising three subnetworks: (1) a technology-based incubator network that drives the transformation of ideas and innovative projects in advance sectors into high value-added businesses; (ii) an intermediate technology-based incubator network that supports the creation, development, and consolidation of new businesses that incorporates some elements of innovation; and (iii) a social incubator network that promotes the creation and strengthening of micro-enterprises. All the entrepreneurship initiatives contribute to the generation of jobs and to strengthening the national economy using knowledge transfer to develop and grow companies.

3.2. Data collection and description of variables

[2] The criteria used in exant studies (Audretsch and Lehmann 2005; Clark 1998; Di Gregorio and Shane 2003; Guerrero and Urbano 2012; Guerrero et al., 2015; Guerrero and Urbano, 2019; O'Shea et al. 2008; Shane 2004; Wright et al. 2007) to identify entrepreneurial universities consider: the promotion of an entrepreneurial culture across the university community; (ii) making self-instituting efforts to develop an entrepreneurial ecosystem and fostering innovative/entrepreneurial initiatives; (iii) socioeonomic impact on the regions/countries; (iv) continued and sustained transformation process, and (iv) involvement of several socioeconomic actors in the decisions, activities and objectives.

[3] Aguascalientes, Central de Veracruz, Chiapas, Chihuahua, Ciudad de México, Ciudad Juárez, Ciudad Obregón, Cuernavaca, Estado de México, Guadalajara, Hidalgo, Irapuato, Laguna, León, Mazatlán, Monterrey, Morelia, Puebla, Querétaro, Saltillo, San Luis Potosí, Santa Fe, Sinaloa, Sonora Norte, Tampico, Toluca, Zacatecas

[4] Biotechnology and food, social sciences, regional development, social development, sustainable development, education, entrepreneurship, government, humanities, manufacturing and design, mechatronics, nanotechnology, business, health, and information and communications technologies.

Based on previous studies[5], this research uses the database from the ITESM's 2011-2013 Professional Trajectory of ITESM Graduates Survey[6]. The population size of graduates associated with a generational cohort between five to fifteen years was 50301 ITESM's graduates. Our database includes 11512 graduates from different campuses/knowledge areas. This sample represents a response rate of 23% with a margin of error of 0.80% at 95% confidence level. Nevertheless, after missing values, our final sample was integrated by 8948 ITESM's graduates with a margin of error of 0.94% at 95% confidence level.

The *dependent variable* was measured with a categorical that captures the current career choices of ITESM's graduates: (1) *academic entrepreneur* who has created, organised, and operated an entrepreneurial initiative like a spin-off or technological-based venture taking higher risks in order to do so; (2) *self-employed* who has worked for oneself as a freelancer; and (3) *paid employee* who has been employed by an employer to develop specific tasks in an established organisation. We were interested in distinguishing entrepreneurs and self-employed in order to explore similitudes or differences in an emerging economy (Parker, 2004; Sieger and Monsen, 2015; Guerrero et al., 2018). Also, this paper does not open to exploring for the possibility that graduates can choose to be unemployed or unemployable even than database provides the information (Kolvereid and Isaksen, 2006).

We included a set of *independent variables* associated with the university influence on work effort and risk aversion, as well as individuals' motivations of independence and income expectations. Regarding the *entrepreneurial university influence*, we introduced *work effort* associated with the skills and capabilities acquired by the graduates during their studies at the university. Based on extant studies (Arenius and Minnitti, 2005; Davidsson and Honig, 2003; Martiarena, 2013; Parker, 2004; Nabi et al., 2017), we selected the skills/abilities associated to the generation of ideas, work under uncertainty, auto-learning, and ethics. Based on the ITEMS' survey, these perceptual variables were measured with a 1-4 Likert scale. Linked to *risk aversion*, we use the variable that capture if graduates have or have not used the *assistance*/*support of university incubator* (Di Gregorio and Shane 2003; Clarysse et al. 2005; O'Shea et al. 2008; Powers and McDougall 2005); concretely, it is a dichotomous variable that takes value 1 when the graduates mentioned that received support from the university incubators, and 0 otherwise; and *the applicability of their bachelor degree* in their occupation measured with a 1-4 Likert scale (Al-Dajani et al., 2014).

Concerning the *individuals' motivation*, linked to *independence*, we introduced *prior experience* measured by three dummy variables that capture if the graduate has experienced such as entrepreneur or employee in public and private sectors (Davidsson and Honig, 2003; Feldman and Bolino, 2000; Tkachev and Kolvereid, 1999); and (ii) *graduates' aspirations* measured by their level of income (Autio and Acs, 2010; Gatewood et al., 2002; Hessels et al. 2008). As the survey asked the income using a categorical variable, we include a set of eight dummy variables taking such a reference to the lower category (less than 10,000 Mexican pesos).

Regarding *control variables*, we controlled by specific individual/university characteristics: (a) *gender* that is a binary variable that takes value 1 when is a male and 0 female. Extant studies have evidenced the significant gender differences in the career choices (Carter et al., 2003; Wilson et al., 2007); (b) years after *graduation* that is a continuing variable that capture the number of years after the graduation (Davidsson and Honig, 2003); (c) *knowledge area* measured with a categorical variable that allows us control the knowledge area where the graduate developed their bachelor degree and taking such as reference business studies (Douglas and Shepherd, 2002; Levesque et al., 2002); (d) the *generational cohorts* (Pekala, 2001);

[5] Douglas and Shepherd (2002) used a sample of 300 graduates from one university between two to ten years after graduation from business degree. They applied a survey and the response rate was around 31%. In addition, Guerrero et al. (2018) used a alumni survey from diverse generational cohorts.

[6] By confidential agreements, we are not able to include a copy of the questionnaire.

and (d) dummy variables to control by the effect of *each university campus* where the graduates studied their bachelor (Heriot and Simpson, 2007).

3.3. Data analysis

Given the nature of our dependent variable, a multinomial logistic regression was used with a categorical dependent variable that has three collaboration categories to predict the likelihood of an individual choosing a career (academic entrepreneurs or self-employed or employed) followed by a set of control variables denoted by Z. Adopting the utility-maximizing function (Douglas and Shepherd, 2000 and 2002), we estimate that the occupational choice as follows:

$U_i = \propto + \beta_o \text{ work tolerance} + \beta_1 \text{ risk tolerance} + \beta_2 \text{ independence} + \beta_3 \text{ expectatives} + \beta_4' Z_{ij} + \varepsilon_i$
$U_i = \propto + \beta_o \text{ skills\&abilities} + \beta_1 \text{ incubation support} + \beta_2 \text{ prior experience} + \beta_3 \text{ income} + \beta_4' Z_{ij} + \varepsilon_i$

Using STATA 13.0, we estimate the multinomial logistic model as follows (Greene, 2003):

$$\Pr(y = k) = \frac{\exp(\propto + \beta' X_{ij})}{\sum_{J=1}^{3} \exp(\propto + \beta' X_{ij})} \quad k = 1,2,3.$$

The categorical dependent variable is defined so that it takes on three levels (1 for academic entrepreneurs, 2 for self-employed, and 3 for employed). Multinomial logistic regression does necessitate careful consideration of the sample size and examination for outlying cases.

4. Results and discussion

4.1 Descriptive statistics

Table 1 reports the descriptive analysis of all the variables and the correlation matrix. Two thousand one hundred twenty-seven graduates' academic entrepreneurs, six hundred ninety-eight graduates' self-employed, and seven thousand and seventy fifty graduates' paid-employee integrated our sample. On average, the ITESM's graduates profile is male (60%), graduated eight years ago, and who has been working in the public sector (22%). Almost all graduates evidenced a positive perception of the contribution of university entrepreneurship education programs on their skills/capabilities for opportunity generation, work under uncertainty, working by themselves, and ethics. The correlation matrix reveals that most of the explanatory variables are not highly correlated (Table 1). The mean-variance inflation factor also indicates that the entire model is moderately correlated.

--- Insert Table 1 here---

Table 2 shows the results of our multinomial logistic regression. The model achieves the statistical specifications for this type of models [Chi2 = 1954.74; Prob > Chi2 = 0.001; Pseudo R2= 0.2519].

--- Insert Table 2 here---

4.2 Influence of the ITESM' ecosystem on their graduates' career choices

Concerning the influence of entrepreneurial university ecosystem, results show the influence of entrepreneurship education and business incubators on graduates' job alternatives.

Our first assumption was that graduates who choose paid employment are less tolerant of intensive *work effort* than who choose to become self-employed and academic entrepreneurs. On the one hand, taking as the reference academic entrepreneurs, Model 1 and Model 2 shows that the probability of becoming a paid employee (-0.392; $p<0.001$) as well as to become self-employed (-0.290; $p<0.001$) decrease for ITESM's graduates who identify ideas/opportunities. Given the nature of the graduates' occupational choice, the intensive/exploitation of skills such as the identification of ideas/opportunities will be different. A general assumption is that paid employee does not necessarily exploit the skills of identification/generation of business opportunities as part of their paid employment -except for intrapreneurs who were not considered in this study (Guerrero et al., 2019a). Self-employees tend to use these skills but with lower intensity than graduates who decided to become academic entrepreneurs (Wright et al., 2017). A plausible explanation is that academic entrepreneurs should exploit these skills during the identification/generation of unique technologies/knowledge that will be commercialised within a very competitive market (Guerrero and Urbano, 2014). In this vein, the acquired skill of identification of ideas/opportunities will reduce the initial graduates' filters/barriers for choosing an academic entrepreneur as an occupational alternative. Model 1 and Model 3 show that ITESM' graduates who work under uncertainty are more likely to become academic entrepreneurs (0.094; $p<0.100$) and self-employed (0.161; $p<0.050$) than paid employees (who showed a negative signal). A paid employee is looking for economic stability and reducing uncertainty in the long-term following a routine and knowing the required effort (Arenius and Minnitti, 2005; Martiarena, 2013). Given the quality/nature of the professional activity, an academic entrepreneur should operate under uncertainty as well as investing time for achieving business/market expectations (Guerrero and Urbano, 2014). Therefore, the work effort of an academic entrepreneur should be higher than the work effort of a self-employee and paid-employee (Sieger and Monsen, 2015). Besides, ITESM's graduates who possess other skills/abilities acquired during their university studies such as learning by themselves or ethics are more likely to be paid-employees than academic entrepreneurs. These findings about the role of entrepreneurial university educational programs are consistent to previous studies that recognised how skills/abilities acquired in entrepreneurship educational such as the identification of opportunities as well as working under stress will be very useful for being more tolerant to intensive work effort that is crucial for the persistence and the achievement of the expectations/demands of an academic entrepreneurship career in comparison to other occupational choices (Arenius and Minnitti, 2005; Douglas and Shepherd, 2000; Martiarena, 2013; Parker, 2004; Sieger and Monsen, 2015; Guerrero and Urbano, 2014; Guerrero et al., 2018). In this vein, the results support H1 that states that graduates that tolerate intensive work effort (e.g., recognise opportunities and work under stress) are more likely to be self-employed lower than academic entrepreneurs but higher than paid employees.

Our second assumption was that graduates who choose paid employment are less tolerant of risk than who choose to become self-employed and academic entrepreneurs. On the one hand, all models support that graduates who received the support from the ITESM's incubators are more likely to become an academic entrepreneur (1.966; $p<0.001$) than self-employed (0.914; $p<0.001$) and paid employees. A plausible explanation is that the complexity of academic entrepreneurship initiatives demands multiple resources, specialised knowledge, and diverse contacts with agents involved in the regional entrepreneurial and innovation ecosystem (Autio et al., 2014; Guerrero and Urbano, 2019a). In this vein, the support provided by entrepreneurial universities infrastructures (incubators) reduces market filters/barriers (i.e., entry barriers, innovation/technology protections) as well as financial risks across the initial stages of the entrepreneurial process (Guerrero and Urbano, 2014; Good et al., 2019). Similarly, graduates who are applying their bachelor in their occupation are more likely to become an academic entrepreneur (0.113; $p<0.001$) but not self-employed (-0.115; $p<0.050$). It mainly happens when the graduates are from Science, Technology, Engineering and Mathematics (STEM) fields because facilitating the generation of entrepreneurial innovations (Blume-Kohout, 2014; Guerrero and Urbano, 2017). Similar than the phenomenon of corporate entrepreneurship, the entrepreneurial university incubator acts like an umbrella where graduates have access to unique resources, university capabilities, and networks that transform their academic entrepreneurs' behaviours, risks, perceptions, and expectations (Aaboen, 2009; Barbero et al.,

2014; Ebbers, 2014; McAdam and McAdam, 2008; Rothaermel and Thursby, 2005a, 2005b). In this vein, the results support our H2 that states that graduates that tolerate risk (e.g., supported by university incubator) are more likely to be self-employed lower than academic entrepreneurs but higher than paid employees.

4.3 Influence of the ITESM' graduates motivations on their career choices

Concerning the influence of graduates' motivations, we explored how the motivation for being independent, as well as the income expectations, influenced their occupational decision. First, based on prior experience, we explored the *level of independence* associated with their prior occupational choices. The results show that graduates who have prior entrepreneurial experience are less likely to become a paid employee (-3.399; $p<0.001$) and self-employed (-2.750; $p<0.001$). By analysing academic entrepreneurs and self-employed profiles, it is essential to understand that a self-employed try to do everything themselves for security while an academic entrepreneur knows that he/she cannot do or control everything, therefore, delegate responsibilities. However, those profiles could have a similar level of independence because both are their bosses (Ilouga et al., 2014; Sieger and Monsen, 2015; Guerrero et al., 2019a). Our findings are aligned to extant studies that showed the preferences of occupational decision-making based on the degree of independence/autonomy (Douglas and Shepherd, 2000 and 2002; Shane et al., 2003; Segal et al., 2005; Ilouga et al., 2014; Sieger and Monsen, 2015). These insights are also linked to higher tolerance to risk, work effort and higher-income expectative (Levesque et al., 2002). ITESM's graduates with prior experience such as paid employees in public or private organisations are more likely to continue being paid employees than academic entrepreneurs (3.659; $p<0.001$) but they are opened to become self-employed (-1.257; $p<0.050$). In this vein, results support our H3 that states that graduates oriented to have levels of independence (e.g., who experimented prior entrepreneurial experience) are more likely to be self-employed and academic entrepreneurs than paid employees. Second, considering the *graduates' income expectations*, that taking such a reference the lower category of income that is lower than 10,000 Mexican pesos, our results show that paid employees prefer to receive a wage a salary than become an academic entrepreneur or self-employed. These results confirm the premise of the expectancy theory where individuals' expectations are based on the perceived value of their achievements, of the particular level of performance, and the attractiveness of the reward (Gatewood et al., 2002; Guerrero et al., 2018). Consequently, ITESM's graduates are seeking to maximise their utility from their work choices. In this vein, the results support our H4 that states that graduate' academic entrepreneurs are more likely to demand higher income lower than self-employed but higher than paid employees. Finally, our models evidence the vital role of gender, knowledge areas and campuses (Carter et al., 2003; Davidsson and Honig, 2003; Douglas and Shepherd, 2002; Heriot and Simpson, 2007; Levesque et al., 2002; Guerrero et al., 2018).

5. Conclusions

5.1. General conclusions and contributions

The objective of this paper was to provide insights into how the graduates' career choices (i.e., academic entrepreneur, self-employed, or paid employed) are influenced by the entrepreneurial university ecosystem (i.e., incubators and entrepreneurship education programs). Conducting an exploratory study, we developed hypotheses about the effects of entrepreneurial university educational programs (H1), the entrepreneurial university business incubators (H2), and the individual motivations (H3 and H4) on the graduates' career choices (i.e., academic entrepreneur, self-employed, or paid employed) determinants. By adopting Douglas and Shepherd's utility-maximising function in a sample of 11512 graduates from a Mexican and private entrepreneurial university (ITESM), Table 3 summarises the tested hypotheses. In this regard, this paper contributes to at least three contributions to the ongoing academic debate.

--- Insert Table 2 here---

The first contribution relates to the effects of entrepreneurial university ecosystem on the graduates' career choices. Our results showed the role of educational programmes on the acquisition of specific skills/abilities (i.e., the identification of business opportunities and work under uncertainties) that are essential for achieving the highest level of work effort tolerance required to becoming an academic entrepreneur. In this regard, these results provide particular insights about the effectiveness of educational programmes on entrepreneurial action of graduates from an entrepreneurial university. A research gap highlighted in the academic discussion on entrepreneurial education literature has been the concentration of investigations about the effect of entrepreneurial education on students' intentions instead of graduates' entrepreneurial actions (Nabi et al., 2017; Guerrero et al., 2018; Guerrero and Urbano, 2019a). Our results showed insights on how the entrepreneurial university infrastructure (business incubators) reinforced the risk tolerance during the graduates' career decisions. In this vein, the result contributes to the academic discussion on the emergence of university technology transfer ecosystem which fostering students'/graduates' academic entrepreneurship (Herrera et al., 2018; Wright et al., 2017; Good et al., 2019). Therefore, these entrepreneurial university conditions are needed to establish an academic entrepreneurship spirit across graduates communities, as well as reducing failure at micro-level of academic entrepreneurship.

The second contribution relates to the role of micro-environmental conditions (entrepreneurial university ecosystem) on individuals' occupational choices models. Although our findings have been obtained from a sample of alumni from one entrepreneurial university, our insights contribute to the academic discussion on how micro-environmental conditions are constraints of individuals' occupational decisions. These insights are crucial by the following two reflections. On the one hand, the extant studies have primarily explored the macro-economic and demographic conditions with an unrepresentative discussion on individual motivations (Douglas and Shepherd, 2000 and 2002; Martiarena, 2013) and micro-environmental conditions (Ilouga et al., 2014; Sieger and Monsen, 2015). On the other hand, the current worldwide socio-economic events demand evidence about the contribution of entrepreneurial universities into the societal problematics (Al-Dajani et al., 2014; Guerrero et al., 2015; Guerrero et al., 2016b; Klofsten et al., 2019; Guerrero and Urbano, 2019a, 2019b).

The third contribution relates to academic entrepreneurship literature. Our findings show how a supportive entrepreneurial university ecosystem and individuals' motivations (independence and income aspirations) determine the involvement of graduates on academic entrepreneurship. In the light of knowledge spillover of entrepreneurship approaches, these levels of analysis have been part of the ongoing academic discussion about the elements that reducing academic entrepreneurs' filters/barriers (Guerrero and Urbano, 2014). However, there are still gaps regarding the direct/moderation/mediation effect of multiple contexts on academic entrepreneurship (Autio et al., 2014; Herrera et al., 2018; Good et al., 2019). Besides, the academic debate about the strategic management of entrepreneurial universities (Guerrero et al., 2019b and Secundo et al., 2019).

5.2. Limitations and research agenda

We acknowledge that this study has several limitations:

First, similar than previous studies, the critical challenge is the access to longitudinal information (i.e., Douglas and Shepherd, 2002 used a sample of 300 graduates of one university between two to ten years after graduation from the business degree). In this study, we explored the occupational patterns of different graduates (from diverse bachelor's degrees) of a multi-campus entrepreneurial university located in diverse regions of Mexico. Although our insights are only applicable within our research setting, this paper should explore in-depth the influence on graduates' occupational decisions of diversity in terms of

multiple generational cohorts (Guerrero et al., 2019a) and multiple regional contexts (Guerrero and Urbano, 2019a). Each generation has particularities in terms of their backgrounds, skills and attitudes that should be revised, as well as, each university's campus has particularities in terms of leadership, resources/capabilities, regional regulations and cultural backgrounds towards academic entrepreneurship.

Second, although our proxies have been used in extant studies, it is essential to explore new dimensions to measure the graduates' determinants of academic entrepreneurship. Given the nature of the dataset, we applied multinomial regression analysis. The complexity behind the determinants of graduates' occupational choices demands the use of robust variables and longitudinal datasets to understand this phenomenon (Guerrero et al., 2018) as well as the dynamism of the ecosystems' lifecycle (Cantner et al., 2020). It also implies the improvement of the statistical analysis by implementing other techniques (i.e., panel data, structural equation modelling, experiments) as well as complementing the utility-maximising model with other theoretical frameworks (e.g., institutional economic theory, stakeholder theory, generational cohorts approach, spillover theory).

Third, we intuitively captured the effectiveness of micro-level conditions at an entrepreneurial university. We are assuming the same the value-added of the entrepreneurial university ecosystem for all graduates across all campuses (Peters et al., 2004; Guerrero et al., 2018). However, given the limitations of our dataset, we did not test the effectiveness as well as the success of entrepreneurship education programs and business incubators. A natural extension of this study should measure the effectiveness and success/failure at micro-level of academic entrepreneurship. It implies a mixed longitudinal approach that allows capturing objective as well as subjective measures for a better understanding of this phenomenon. It is also aligned with the academic debate about the lack of studies concerning strategic knowledge management models for entrepreneurial universities (Guerrero et al., 2019b and Secundo et al., 2019), as well as understanding the technological, economic and societal contribution of entrepreneurial ecosystems (Audretsch et al., 2019).

Fourth, our findings explored how the university has configured its entrepreneurship ecosystem for supporting academic entrepreneurship. However, this study does not explore the influence/impacts generated by regional entrepreneurial ecosystems on the university ecosystem (Audretsch et al., 2019; Cantner et al., 2019). A future research avenue will be focused on exploring the contribution of regional entrepreneurship ecosystems to university's infrastructures like incubators (Nicholls-Nixon et al., 2020; van Rijnsoever, 2020). It requires a multilevel analysis using both university and regional data.

5.3. Implications

This study also provides some implications.

For the ITESM's students and graduates, this study shows how multiple generations have been benefited by an adequate environment for entrepreneurship and innovation. The educational programs and the university ecosystem has contributed to the highest levels of employment after graduation. Also, the recognition of the positive influence of the university culture and infrastructures may attract more students across the globe.

For the ITESM's managers, this study exhibits good practices and legitimise the role of the university on fostering academic entrepreneurship. At the same time, the study also shows the necessity to exploit further the unique resources and capabilities of the university (e.g., the dynamic capabilities distributed across the 31 campuses across Mexico and Latin America). Therefore, a strategic management reflection is needed to reinforce local/regional networks in order to extend the impact of the university entrepreneurial and innovation ecosystem across the trajectory of academic entrepreneurship initiatives.

Therefore, the implementation of strategic knowledge management models and tools for measuring the impact of entrepreneurial universities ecosystem is also required by the ITESM.

For multiple agents enrolled in the local/regional entrepreneurial and innovation ecosystem, this study shows how a multi-campus university could have an impact at the regional/country level. On the one hand, the multiple agents could increase their collaboration with the ITESM supporting diverse types of entrepreneurial initiatives. On the other hand, the co-creation of strategies and actions among them allow the reinforcement of local entrepreneurial and innovation ecosystems. Both implications are relevant considering the institutional voids produced by the lack of quality of institutions as any emerging economies.

For Latin-American decision-makers, although the generalisable restrictions, the ITESM's model may be a strategic management example of how multi-campus entrepreneurial universities are configuring a supportive entrepreneurial and innovative ecosystem. This study may apply to the benchmarking analysis by universities interested in exploring similar strategies in emerging economies with comparable characteristics. Consequently, our findings also legitimise the contribution of Latin American universities and graduate students as part of regional entrepreneurship ecosystems. This legitimisation is linked to positioning Latin American universities in the international scope.

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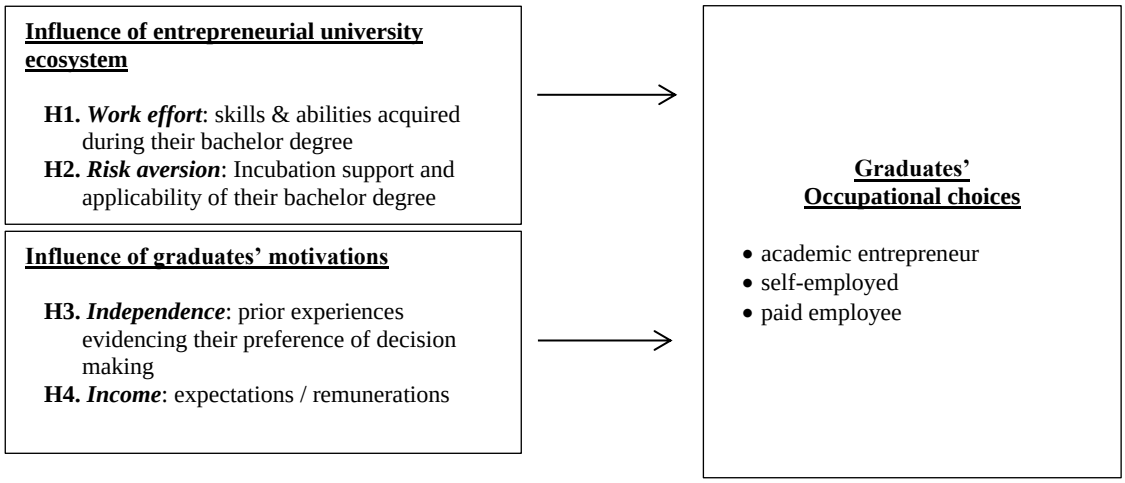
Figure 1: Understanding the role of entrepreneurial universities ecosystem on graduates' career choices



Source: Adapted from Douglas and Shepherd (2000 and 2002) and Guerrero and Urbano (2019a)

Table 1: Descriptive statistics and correlation matrix

No.	Variables	Entire sample					ITESM's Graduates														
							Academic Entrepreneurs					Self-employed					Paid employee				
		N	Mean	S.D.	Min	Max	N	Mean	S.D.	Min	Max	N	Mean	S.D.	Min	Max	N	Mean	S.D.	Min	Max
1	Career choice	11469	2.03	0.75	1	4[1]															
2	Gender [male]	11512	0.60	0.49	0	1	2127	0.73	0.44	0	1	698	0.52	0.50	0	1	7750	0.60	0.49	0	1
3	Entrepreneurial	11512	0.04	0.19	0	1	2127	0.04	0.20	0	1	698	0.13	0.33	0	1	7750	0.02	0.15	0	1
4	Public sector	11512	0.22	0.41	0	1	2127	0.04	0.20	0	1	698	0.53	0.50	0	1	7750	0.23	0.42	0	1
5	Private sector	11512	0.08	0.27	0	1	2127	0.08	0.26	0	1	698	0.16	0.37	0	1	7750	0.06	0.24	0	1
6	Income	9588	4.04	1.85	1	9	1827	4.32	2.03	1	9	626	3.13	1.70	1	9	7135	4.04	1.79	1	9
7	Applicability of their bachelor degree	10614	1.80	0.82	1	4	2119	1.84	0.82	1	4	693	1.74	0.86	1	4	7728	1.80	0.82	1	4
8	Knowledge area	11512	1.66	0.63	1	4	2127	1.58	0.60	1	4	698	1.78	0.71	1	4	7750	1.69	0.62	1	4
9	Idea/opportunity generations	10782	3.28	0.83	1	4	2007	3.40	0.81	1	4	655	3.32	0.83	1	4	7236	3.25	0.82	1	4
10	Work under uncertainty	10783	3.63	0.73	1	4	2011	3.63	0.72	1	4	655	3.66	0.70	1	4	7234	3.62	0.73	1	4
11	Learning by themselves	10778	3.42	0.81	1	4	2003	3.38	0.83	1	4	651	3.38	0.85	1	4	7240	3.44	0.80	1	4
12	Ethics	10784	3.42	0.83	1	4	2010	3.39	0.83	1	4	654	3.37	0.85	1	4	7237	3.43	0.82	1	4
13	Incubator support received	11512	0.02	0.14	0	1	2127	0.03	0.18	0	1	698	0.02	0.12	0	1	7750	0.02	0.13	0	1
14	Years after graduation	11512	8.29	4.04	5	15	894	8.52	4.17	5	15	698	8.85	4.18	5	15	7750	8.14	3.98	5	15
15	Years after graduation square	11512	85.07	78.96	25	225	894	89.90	82.04	25	225	698	95.85	82.60	25	225	7750	82.01	77.53	25	225

Note: [1] Includes one category associated with 937 unemployed graduates that were not included in the analysis

No.	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Career choice	1														
2	Gender [male]	-0.1866*	1													
3	Entrepreneurial	0.0427*	0.0066	1												
4	Public sector	0.1837*	0.0584*	0.3267*	1											
5	Private sector	0.0740*	-0.0426*	0.6090*	0.1503*	1										
6	Income	-0.1248*	0.2907*	-0.0246	-0.0001	-0.0402*	1									
7	Applicability of their bachelor degree	-0.0189	0.0086	-0.0349*	-0.0254	-0.0269	0.0134	1								
8	Knowledge area	0.0305	0.0883*	0.0011	-0.0040	0.0023	-0.0270	0.0409*	1							
9	Idea/opportunity generations	-0.0675*	-0.0740*	0.0251	0.0423*	0.0138	-0.0578*	-0.1099*	-0.0719*	1						
10	Work under uncertainty	0.0027	-0.1075*	0.0061	0.0081	0.0038	-0.0804*	-0.0964*	0.0117	0.3926*	1					
11	Learning by themselves	-0.0135	-0.0663*	-0.0047	0.0139	-0.0134	-0.1002*	-0.1209*	0.0124	0.3897*	0.5342*	1				
12	Ethics	-0.0062	-0.0903*	-0.0086	0.0126	-0.0120	-0.0747*	-0.1137*	-0.0748*	0.3946*	0.3972*	0.4090*	1			
13	Incubator support received	-0.0345*	0.0416*	0.0361*	0.1577*	0.0063	-0.0154	-0.0143	0.0070	0.0254	-0.0038	0.0028	-0.0218	1		
14	Years after graduation	0.0023	0.0374*	0.0813*	0.1234*	0.0688*	0.3351*	-0.0219	-0.0508	0.0131	-0.0027	-0.0255	0.0348*	-0.0043	1	
15	Years after graduation square	0.0040	0.0392*	0.0804*	0.1215*	0.0676*	0.3283*	-0.0230	-0.0515	0.0112	-0.0046	-0.0303	0.0312	-0.0035	0.9915*	1

Note: Significance level * p<0.001; VIF = 1.8

Table 2: Multinomial regression analysis

Relationships	Model 1 Academic entrepreneur (base) vs Paid employees			Model 2 Academic entrepreneur (base) vs Self-employed			Model 3 Self-employed (base) vs Paid employees		
	Coef.	Std.	P>|z|	Coef.	Std.	P>|z|	Coef.	Std.	P>|z|
INFLUENCE OF ENTREPRENEURIAL UNIVERSITY ECOSYTEM									
Work effort [skills/abilities acquired via entrepreneurship educational programs]:									
Idea/opportunity generations	-0.392	0.043	***	-0.290	0.076	***	-0.102	0.067	
Work under uncertainty	-0.094	0.051	*	0.066	0.092		-0.161	0.082	**
Learning by themselves	0.147	0.044	***	-0.080	0.078		0.227	0.069	***
Ethics	0.156	0.041	***	0.037	0.075		0.119	0.067	*
Risk aversion [support via university business incubator]:									
Applicability of their bachelor degree	-0.113	0.036	***	-0.228	0.065	***	0.115	0.057	**
Support received from university incubator	-1.966	0.237	***	-2.880	0.414	***	0.914	0.362	**
INFLUENCE OF GRADUATES' MOTIVATIONS									
Independence [prior experiences]:									
Entrepreneurial	-3.399	0.284	***	-2.750	0.375	***	-0.649	0.285	**
Public sector	3.659	0.225	***	4.916	0.244	***	-1.257	0.102	**
Private sector	0.061	0.137		0.297	0.259		-0.235	0.239	
Expectative [income less than 10,000 Mexican pesos]									
10,000-19,999 Mx	0.894	0.163	***	-0.184	0.211		1.078	0.175	***
20,000-29,999 Mx	1.040	0.162	***	-0.688	0.219	***	1.728	0.185	***
30,000-39,999 Mx	1.021	0.165	***	-1.069	0.233	***	2.089	0.200	***
40,000-59,999 Mx	0.914	0.167	***	-1.302	0.242	***	2.216	0.210	***
60,000-79,999 Mx	0.863	0.181	***	-1.784	0.307	***	2.647	0.276	***
80,000-100,999 Mx	0.723	0.187	***	-2.014	0.340	***	2.737	0.310	***
110,000-139,999 Mx	0.797	0.207	***	-2.229	0.418	***	3.026	0.389	***
more than 140,000 Mx	0.143	0.246		-2.626	0.537	***	2.769	0.505	***
CONTROL VARIABLES									
Gender [male]	-0.794	0.069	***	-0.910	0.117	***	0.116	0.101	
Years after graduation	-0.142	0.147		0.133	0.243		-0.275	0.214	
Years after graduation square	0.006	0.007		-0.004	0.012		0.010	0.011	
Knowledge Area [Business]									
Enlivening	0.449	0.064	***	0.570	0.117	***	-0.121	0.104	
Social Science	0.473	0.134	***	0.792	0.196	***	-0.318	0.158	**
Health	1.936	0.662	***	3.111	0.766	***	-1.175	0.440	**
Campuses [dummies]		controlled			controlled			controlled	
Generational cohorts [dummies]		controlled			controlled			controlled	
_cons	2.740	0.726	***	0.141	1.210		2.598	1.053	**
N	8948								
chi2(68)	1954.74								
Prob > chi2	***								
Pseudo R2	0.2519								
Log-likelihood	-54573,6								

Note: Mx means Mexican pesos; Level of statistical significance: *** $p \leq 0.001$, ** $p \leq 0.05$, * $p \leq 0.10$.

Table 3: Testing Hypotheses

Main focus	Utility-Maximising determinant	Measure	H	Empirically (tested)
Entrepreneurial University Ecosystem	Work effort	Skills/Capabilities via entrepreneurial educational programs	H1	Supported
	Risk aversion	Incubation support via university business incubator	H2	Supported
Individual motivations	Independence	Prior experience	H3	Supported
	Expectative	Income	H4	Supported