

# EFFECT OF MEMORIAL UNIVERSITY'S ENVIRONMENT & SUPPORT SYSTEM IN SHAPING ENTREPRENEURIAL INTENTION OF STUDENTS

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## ABSTRACT

*The traditional way in which universities may influence the entrepreneurial intention of students is through the offering of entrepreneurship education programs. Researchers have been studying the impact of entrepreneurship education programs on entrepreneurial intention of students for several years. There is also evidence in the literature that the university's environment and support system are additional ways of motivating students to consider an entrepreneurial career after graduation.*

*The aim of this study is to understand the influence of the university's environment and support system on the precursors of entrepreneurial intention of students at Memorial University. Situational and contextual variables typically have an indirect effect on entrepreneurial intention by influencing key attitudes and general motivation to behave. This study applies a customized entrepreneurial intention model based on the Theory of Planned Behavior to understand the precursors of intention to start a new business. Another goal of the study is to develop a methodology to study the evolution of the motivational factors related to university's ecosystem that may shape entrepreneurial intention of students over time. The proposed methodology is also relevant to other aspiring entrepreneurial universities hoping to play a more prominent role in the economic development of their communities.*

*Findings of the study agree with those reported by previous authors in that, Memorial University's ecosystem has a significant positive relation with students' perceived behavioral control. However, findings of the study also suggest that Memorial University's ecosystem has a positive but not significant influence on students' attitude towards the behavior of starting a new business. The outcomes of the study will help Memorial University to assess the efficacy of its innovation and entrepreneurship initiatives in promoting entrepreneurial activities. By understanding its entrepreneurial efficacy, the university will be better equipped to raise the perceptions of venture feasibility and desirability, thus increasing students' perceptions of opportunity.*

**Keywords:** Entrepreneurial Intention, University Environment and Support System, Theory of Planned Behavior, Student Entrepreneurs, Regional Development.

## INTRODUCTION

The traditional way in which a university may influence the Entrepreneurial Intention (EI) of students is through the offering of an entrepreneurship education program. Researchers have been studying the impact of entrepreneurship education programs on the antecedents (precursors) of the EI of students for several years (Fayolle et al., 2006; Rae & Woodier-Harris, 2013; Rauch & Hulsink, 2015; Sánchez, 2011; Souitaris et al., 2007). There is also evidence in the literature that the university's Environment and Support System (ESS) can motivate students to consider an entrepreneurial career (Ajzen, 1987; Boyd & Vozikis, 1994; Krueger & Carsrud, 1993; Lee & Wong, 2004; Tubbs & Ekeberg, 1991). In this context, the ESS represents the entire entrepreneurial ecosystem in the university. For example, entrepreneurial universities have been playing an active role in the development of regional entrepreneurial activities via the commercialization of university knowledge through spin-off companies founded by student entrepreneurs (Bray & Lee, 2000; Etzkowitz, 2003; Poole & Robertson, 2003; Steffensen et al., 2000; Wright et al., 2006). The entrepreneurial university is a global phenomenon spurred by numerous intrinsic and extrinsic factors including the need for diversifying the university's funding sources and the incorporation of the university in local, regional and national economic and social development strategies (Bradley et al., 2013; Etzkowitz, 1998; Etzkowitz et al., 2000; Feller, 1990; Stehr, 2003, 2007). Many authors argue that the phenomenon is part of a "*second academic revolution*" in which the university takes on a third mission of economic development (knowledge capitalization) in addition to research (knowledge extension) and teaching (knowledge preservation) (Etzkowitz, 1998; Gür et al., 2017; Kirby, 2006a: 2006b; O'Shea et al., 2007; Zaharia & Gibert, 2005).

Over the years, Memorial University (MUN) has implemented a number of initiatives to promote innovation and entrepreneurship among undergraduate and graduate students (Bazan, 2016; Memorial University, 2013: 2015: 2016b: 2016a; Mills & Brown, 2016). Consequently, there is a need for systematic approaches to evaluate the impact of these initiatives at the student level. The authors are interested in understanding the various motivational factors related to MUN's entrepreneurial ecosystem that may shape the EI of students. That is, they want to understand the situational and contextual elements that may influence entrepreneurial activity among students at MUN (Tolentino et al., 2014). The authors argue that MUN plays a key role in the EI of students by providing support mechanisms to help them in translating their ideas into viable business models that may further expand into successful ventures (Trivedi, 2016). The authors are also interested in developing a methodology to study the evolution of these motivational factors over time. The outcomes of the study will help MUN to assess the efficacy of its innovation and entrepreneurship initiatives in promoting entrepreneurial activities on campus (Varamäki et al., 2013). By understanding its entrepreneurial efficacy, MUN will be better equipped to raise the perceptions of venture feasibility and desirability, thus increasing students' perceptions of opportunity (Krueger et al., 2000).

Based on works by Liñan and Chen (2009) and Trivedi (2016: 2017) the authors designed a study to understand the influence of MUN's ESS on the precursors of the EI of students (Liñan & Chen, 2009; Trivedi, 2016: 2017). It has been argued in the literature that entrepreneurial behavior, e.g., starting a new business, is intentional and thus best predicted by the intention towards the behavior, not by attitudes, beliefs, personality or demographics (Ajzen, 1991: 2001; Delmar & Davidsson, 2000; Fayolle et al., 2006; Kolvereid, 1996b; Krueger & Carsrud, 1993; Krueger et al., 2000). Researchers have proposed several models for understanding the EI of students. Among those models are: the Entrepreneurial Event Model (Shapero & Sokol, 1982);

the Entrepreneurial Support Model (Turker & Selcuk, 2009); the Intentional Basic Model (Krueger & Carsrud, 1993); the Lüthje & Franke Model (Lüthje & Franke, 2003); the Entrepreneurial Potential Model (Krueger & Brazeal, 1994); the Individual Entrepreneurial Orientation Model (Langkamp Bolton & Lane, 2012); the Davidsson Model (Davidsson, 1995); and the Entrepreneurial Intention-Constraint Model (Trivedi, 2017).

The study follows a cognitive approach (Baron, 1998: 2004; Shaver & Scott, 1991) by applying a customized EI model based on the Theory of Planned Behavior (TPB) (Ajzen, 1991) to understand the precursors of intention, i.e., Attitude Towards Behavior (ATB), Subjective Social Norm (SSN) and Perceived Behavioral Control (PBC) (Bird, 1988; Katz & Gartner, 1988; Krueger et al., 2000; Macmillan & Katz, 1992). Two of the major strengths of the TPB are its applicability to a variety of behaviors and in a variety of contexts, and that an elicitation study forms the basis for developing questions to assess the theory's variables (Knabe, 2009). The TPB predicts that the more favorable the ATB and SSN, and the greater the PBC, the stronger the person's intention to perform the behavior (Kolvereid, 1996b). There is also evidence in the literature that contextual and situational factors, e.g., the university's ESS, affect EI by influencing the precursors of intention such as ATB and PBC (Ajzen, 1987; Boyd & Vozikis, 1994; Krueger & Carsrud, 1993; Lee & Wong, 2004; Tubbs & Ekeberg, 1991). The Entrepreneurial Intention Questionnaire (EIQ) developed by Liñán and Chen (2009) is becoming increasingly popular for analyzing entrepreneurial perception and intention (Liñán & Chen, 2009). The EIQ has been the subject of reliability and validity analyses and applicability, and tested in multicultural settings by its original authors and others. The EIQ has shown to provide a measure that is both theoretically sound and statistically robust.

Situational variables typically have an indirect influence on EI by influencing key attitudes and general motivation to behave (Krueger et al., 2000). Trivedi (2016) has identified three motivational factors of the university's ESS that might influence the precursors of EI. He suggests that targeted cognitive and non-cognitive supports, and to a lesser extent the general educational support, seemed to have a positive correlation with the precursors of EI. Trivedi (2016) also argued that a well-crafted entrepreneurship education curriculum could significantly improve students' entrepreneurial competencies and raise their enthusiasm to become entrepreneurs (Trivedi, 2016). MUN does not have an entrepreneurship education program per se but rather offers a limited number of courses and training programs for interested students. As an aspiring entrepreneurial university, MUN does provide other support mechanisms (MUN's ESS) such as intellectual property protection, technology transfer, start-up business coaching and business incubation services that are necessary for entrepreneurial activity (Audretsch, 2014; Etzkowitz, 2003: 2014; Kraaijenbrink et al., 2010; McGowan et al., 2008; Tijssen, 2006; Urbano & Guerrero, 2013). The main goal of the study is to understand the influence of MUN's ESS on the EI of undergraduate and graduate students as a whole.

The authors divided the remainder of the paper in six sections as follows. Literature Review describes the systematic literature review and narrative synthesis conducted for answering two research questions. Conceptual Model and Proposed Hypotheses illustrates the theory-based conceptual model designed and proposed hypotheses that were tested through structural equation modelling. Methodological Design explains the instrument designed to gather the data. Data Analysis describes the curation and analysis of the collected data and verification of the applicability of the overall study approach. Results and Discussion examines the implications of the data analysis for Memorial University and provides recommendations for further consideration. The paper ends with the Conclusion and possible future work.

## LITERATURE REVIEW

Based on a systematic literature review and narrative synthesis of the effect of the university's ESS in shaping the EI of students, the authors designed the study as a way to understand the motivational factors related to MUN's entrepreneurial ecosystem that may shape the EI of students (Popay et al., 2006). There were two research questions guiding the literature review.

1. Does a university's ESS affect the precursors of EI of students?
2. How did previous studies measure the effect of the university's ESS in the precursors of EI of students?

To answer these questions, the authors searched the SCOPUS electronic database platform from inception until November 2017. They used several systematic and serendipitous methods to identify relevant publications describing the studies of interest. The authors provide the key terms, keywords and Boolean expressions used to query the literature in Appendix A.

The query returned 273 publications that met the search criteria of which 246 documents appear in scientific or professional journals (articles and reviews), 12 documents are parts of book publications, and 15 documents are included in conference proceedings. The authors assumed that journal articles were the only documents validated by peer review, thus these were the only documents included in the literature review (Jones et al., 2011). As a starting point, the authors conducted a citation analysis to identify the most influential articles within the 246 returned documents. The frequency of citation reflects the importance and quality of the publication as determined by other researchers (Xi et al., 2013). It is also an indication that the scientific knowledge conveyed in these articles are the foundation of foreground knowledge of more recent articles (Acedo & Casillas, 2005; Casillas & Acedo, 2007; Liñán & Fayolle, 2015). The citation analysis produced a ranking of articles sorted from the most cited to the least cited articles. The authors read the abstracts of the ranked publications for the relevance of the contents and their potential for answering the two research questions. This screening produced 96 documents that the authors retrieved for further scrutiny. The full text documents were scrutinized for whether those authors purposely posited a hypothesis or research question regarding the influence of the university's ESS on the EI of students. In total, 21 documents met the inclusion criteria and were examined in extensor. The authors also searched the reference lists of these documents ("*snowballing*") for additional documents that might meet the inclusion criteria. Five additional documents were retrieved this way. The authors used tabulation to develop a preliminary synthesis in the literature review process. Tabulation is a common approach used in all types of systematic review to represent both quantitative and qualitative data visually (Popay et al., 2006). Tabulation was useful to develop the initial description of the included studies and to begin to identify patterns across studies. Table 1 provides the preliminary synthesis of results across studies (Forbes & Griffiths, 2002; Fulop, 2001; Jensen & Allen, 1996; Jones, 2004) followed by a narrative synthesis describing the evolution of the knowledge on the influence of the university's ESS.

**Table 1**  
**SYNTHESIS OF RESULTS ACROSS STUDIES**

<b>Article</b>	<b>Hypothesis or research question</b>	<b>Supported?</b>
(Souitaris et al., 2007)	<i>“The greater the utilization of incubation resources offered during an entrepreneurship program, the higher the student’s ‘post-program’ increase in attitude towards self-employment, subjective norm, perceived behavioral control and intention to become self-employed.”</i>	No
(Turker & Selcuk, 2009)	<i>“Entrepreneurial intention of university students positively relates with perceived educational support.”</i>	Yes
	<i>“The strength of the relationship between entrepreneurial intention and perceived educational support is affected by the level of self-confidence.”</i>	No
	<i>“Entrepreneurial intention relates with perceived structural support.”</i>	Yes
	<i>“The strength of the relationship between entrepreneurial intention and perceived structural support is affected by the level of self-confidence.”</i>	Yes
(Schwarz et al., 2009)	<i>“Students who perceive university environment as entrepreneurship supportive are more likely to have a stronger intention to become entrepreneurs.”</i>	Yes
(Walter et al., 2013)	<i>“The more active entrepreneurship support programs at a university department, the stronger the students’ self-employment intention.”</i>	No
(Sesen, 2013a)	<i>“The entrepreneurial environment of a school is positively related to the entrepreneurial intentions of students.”</i>	No
(Saeed et al., 2015)	<i>“Perceived educational support positively influences entrepreneurial self-efficacy.”</i>	Yes
	<i>“Perceived concept development support positively influences entrepreneurial self-efficacy.”</i>	Yes
	<i>“Perceived business development support positively influences entrepreneurial self-efficacy.”</i>	Yes
(Shirokova et al., 2016)	<i>“The relationship between entrepreneurial intentions and the scope of start-up activities will be positively moderated by the favorable university entrepreneurial environment.”</i>	Yes
(Trivedi, 2016)	<i>“University environment and support are positively related to ATB.”</i>	No
	<i>“University environment and support are positively related to PBC.”</i>	Yes
(Mustafa et al., 2016)	<i>“Students’ perceptions of educational support offered by the university are positively related to their EIs.”</i>	No
	<i>“Students’ perceptions of concept development support offered by the university are positively related to their EIs.”</i>	Yes
	<i>“Students’ perceptions of business development support offered by their university are positively related to their EIs.”</i>	No
(Pihie & Bagheri, 2013)	<i>“...university environment highly influence the development of entrepreneurial regulation, self-efficacy and intention in students.”</i>	Yes
(Mohammad et al., 2012)	<i>“...(a) supportive environment of (an) educational institution increase[s] students self-efficacy perceptions and their participation in entrepreneurial activities.”</i>	Yes
(Karimi et al., 2017)	<i>“Perceived contextual support will positively relate to (a) ATE, (b) PBC and (c) EIs.”</i>	Yes
	<i>“Perceived contextual barriers will negatively relate to (a) ATE, (b) PBC and (c) EIs.”</i>	Yes

(Gelaidan & Abdullateef, 2017)	<i>“Educational support positively relates with the perceived level of confidence to nurture entrepreneurial intention among university students.”</i>	Yes
(Zollo et al., 2017)	<i>“The university environment has a positive impact on students’ entrepreneurial attitude.”</i>	Yes
	<i>“The university environment has a positive impact on students’ entrepreneurial intent.”</i>	Yes
(Nasiru et al., 2015)	<i>“Perception of university support has a positive influence on entrepreneurial intention.”</i>	Yes
(Trivedi, 2017)	<i>“University environment and support are positively related to entrepreneurial attitude.”</i>	No
	<i>“University environment and support are positively related to perceived behavioral control.”</i>	Yes
(García-Rodríguez et al., 2017)	<i>“The university context of students positively influences (a) personal attitude, (b) perceived subjective norms, (c) perceived control of their behavior, (d) their professional motivations and (e) the intention to create a business as a professional path following the completion of studies.”</i>	Yes
(Soria-Barreto et al., 2017)	<i>“Attitude towards entrepreneurship mediates the impact of University environment through EI.”</i>	Yes
(Tognazzo et al., 2017)	<i>“The university climate moderates the relationship between the cognitive antecedents of intentions (i.e. attitude towards entrepreneurship, subjective norms and perceived behavioral control) and entrepreneurial intentions.”</i>	No
(Han et al., 2015)	<i>“[The perceived educational support has an impact] on the entrepreneurial intention in the integrating model of entrepreneurial intention with a mediating influence.”</i>	Yes
(Akinbola et al., 2013)	<i>“There is no significant relationship between entrepreneurial intention of university students and perceived educational support.”</i> (Null hypothesis.)	No

### **Influence of Contextual Factors**

Lüthje and Franke (2003) were among the first authors to integrate both individual traits and contextual factors into a structural model of EI (Lüthje & Franke, 2003). Their model proposes a direct impact of the perceptions of contextual factors (supports and barriers) on EI. Although they did not discuss the influence of the university’s environment per se, several of the authors cited on this paper refer to this seminal work when developing their models of EI with a university environment construct. Franke and Lüthje (2004) examined the influence of the university’s environment on EI (Franke & Lüthje, 2004). They compared the EI of students at two universities in German-speaking countries against the entrepreneurship status of a leading U.S. academic institution. The aim was to try to understand the processes of initiation, development, and support of entrepreneurship among students. Results of that study suggest that a negative appraisal of the university’s activities to provide students with the knowledge required for starting a business and active support for the process of new venture creation significantly lowers the level of EI of students. Findings of that study also indicate that the EI of students may be enhanced since they are associated with factors that are, at least partly, under the university’s control. Souitaris et al. (2007) tested the effect of benefits derived from entrepreneurship programs on the entrepreneurial attitudes and intentions of science and engineering students in

the U.K. and France (Souitaris et al., 2007). Among the program-derived benefits for students, they tested the effects of the utilization of incubation resources offered during the entrepreneurship program. Results of that study showed no significant correlation between the utilization of these resources and the tested attitudes and intentions variables.

On subsequent studies, Turker and Selcuk (2009) proposed and empirically tested a model to analyze the impacts of some contextual factors on the EI of university students in Turkey (Turker & Selcuk, 2009). Their model considers the effect of contextual factors on EI, e.g. EI as a function of educational and structural supports. Results of that study showed that educational support factors affect the EI of students. Furthermore, despite its weak explanatory power, that study also showed that structural support-including the university's ESS-might affect the EI of students. Schwarz et al. (2009) developed a model of EI that incorporates environment-related factors (Schwarz et al., 2009). Their model focuses on the university setting as one of the constructs for predicting the EI of students in Austria. Results of that study found that external factors could significantly predict EI. Although, only the university's environment emerged as a clear predictor of the EI of students. Those results confirmed that a positive perception of university's actions to foster entrepreneurship leads to a stronger willingness to start a new business in the future. Mohammad et al. (2012) explored the effects of college entrepreneurial orientation on forming EI among students in Iran. They argued that three factors can measure the entrepreneurial orientation of the school: innovativeness, proactiveness and risk-taking. Results of that study found that the school's entrepreneurial orientation has positive and significant relation with the EI of students (Mohammad et al., 2012).

Afterwards, Walter et al. (2013) examined how characteristics of university departments in Germany impact students' self-employment intentions (Walter et al., 2013). They argued that students at universities with more active entrepreneurship support programs are more likely to pursue entrepreneurial careers. Their study suggests that some aspects of the organizational context play an important but gender-specific role in shaping future entrepreneurs. Nonetheless, they could not find any significant link between entrepreneurship support programs and self-employment intentions. Sesen (2013) described and empirically tested a comprehensive model of the EI of students in Turkey (Sesen, 2013a). In that study, Sesen included some environmental factors related to the university. Sesen (2013) argued that a supportive environment for entrepreneurship in the university should correlate positively to the EI of students. That is, a supportive, informative and entrepreneurship-driven university environment could strengthen EI. Results of that study suggest that the university environment does not have any significant impact on the EI of students. Pihie and Bagheri (2013) measured self-regulation (promotion focus), entrepreneurial self-efficacy, and intention to become an entrepreneur among students from both public and private universities in Malaysia (Pihie & Bagheri, 2013). Results of that study showed that students from public universities had significantly higher entrepreneurial regulation and intentions than their counterparts from private universities. Akinbola et al. (2013) tried to ascertain whether there is significant relation between perceived educational supports and the EI of students in Nigeria (Akinbola et al., 2013). Their study found that entrepreneurial educational support at the university has significant relation with the EI of students.

### **Influence of University Support**

Saeed et al. (2015) proposed and tested an integrative, multi-perspective framework to study the three dimensions of university support that may shape entrepreneurial self-efficacy of students in Pakistan (Saeed et al., 2015). They tested the effect of the overall institutional support

along with the following three dimensions of university support: perceived educational support, concept development support, and business development support. Findings of that study showed that perceived educational support exerted the highest influence on entrepreneurial self-efficacy, followed by concept development support, business development support and the overall institutional support. Nasiru et al. (2015) modelled the relation between EI and five other variables including perceived university support in Nigeria (Nasiru et al., 2015). That study found a significant positive relation between the perception of university support and the EI of students. Han et al. (2015) looked for the determinants of EI throughout contextual factors in Vietnam (Han et al., 2015). Their findings show that the contextual factors (perceived educational and structural supports) have a significant effect on the EI of students.

Successively, Shirokova et al. (2016) used the data from the 2013/2014 Global University Entrepreneurial Spirit Students' Survey (GUESSS) to scrutinize the moderators of intention-action translation among student entrepreneurs (Shirokova et al., 2016). They looked for EI attributed to contextual factors including university entrepreneurial environment. They argued that the day-to-day exposure of students to the university milieu and its peculiarities might shape their attitudes towards an entrepreneurial career and their entrepreneurial behavior. Results of that study suggest that the effect of intentions on the scope of start-up activities is contingent on the university milieu. Trivedi (2016) closely examined the role played by universities in fostering EI among students in India, Malaysia, and Singapore (Trivedi, 2016). That study found that the university's environment and support has significant positive relation with PBC. However, the study found no significant relation between the university's environment and support, and ATB. Mustafa et al. (2016) developed an empirical model to examine whether the university's support environment (education support, concept development support, and business development support) affects the EI of students in Malaysia (Mustafa et al., 2016). Results of that study indicate that concept development support has significant impact on the EI of students.

### **More Recent Findings**

More recently, Karimi et al. (2017) developed and tested a conceptual model that integrates external contextual factors (i.e., perceived barriers and support including those related to the university) to determine their associations with motivational factors and the EI of students in Iran (Karimi et al., 2017). Results of that study showed that perceived contextual support and barriers relate indirectly to EI via proximal PBC. Gelaidan and Abdullateef (2017) examined the effect of educational supports on the EI of students in Malaysia (Gelaidan & Abdullateef, 2017). Findings of that study showed that the educational support significantly influence the EI of business students. Zollo et al. (2017) investigated the contextual factors affecting entrepreneurial universities' ability to influence entrepreneurship and the EI of students in Italy (Zollo et al., 2017). From their study, it emerged how students' perceptions of the university's environment significantly influences their entrepreneurial attitude and intent. Trivedi (2017) developed and tested a new conceptual model to understand the influence of the university's environment and support on the EI among students in India, Singapore and Malaysia (Trivedi, 2017). Results of that study indicate that the university's environment has an indirect but significant impact on shaping EI among students but only through the relation with PBC. García-Rodríguez et al. (2017) analyzed the role that the university's environment plays in the EI of young people in a peripheral and less innovative region in Spain (García-Rodríguez et al., 2017). Result of their study show that the university's environment directly influences attitude, self-confidence and motivation, and indirectly and moderately influences the EI of students. Soria-Barreto et al.



(2017) studied the influence of the university's environment on the EI of students in Chile and Colombia (Soria-Barreto et al., 2017). They found that the university's environment affects the EI of students through ATB. Tognazzo et al. (2017) investigated whether the perception that the university favors and supports entrepreneurship influences the relation between cognitive antecedents of intentions (i.e., attitudes, norms and control) and the EI of students in Italy (Tognazzo et al., 2017). Their study found that the feeling that the university is practically helping students to develop the conditions for becoming an entrepreneur is not directly relevant for fostering EI. Interestingly, the perception of the university climate as one that favors entrepreneurship directly has a weak positive effect on EI.

### **Strengths and Weaknesses of Systematic Literature Review**

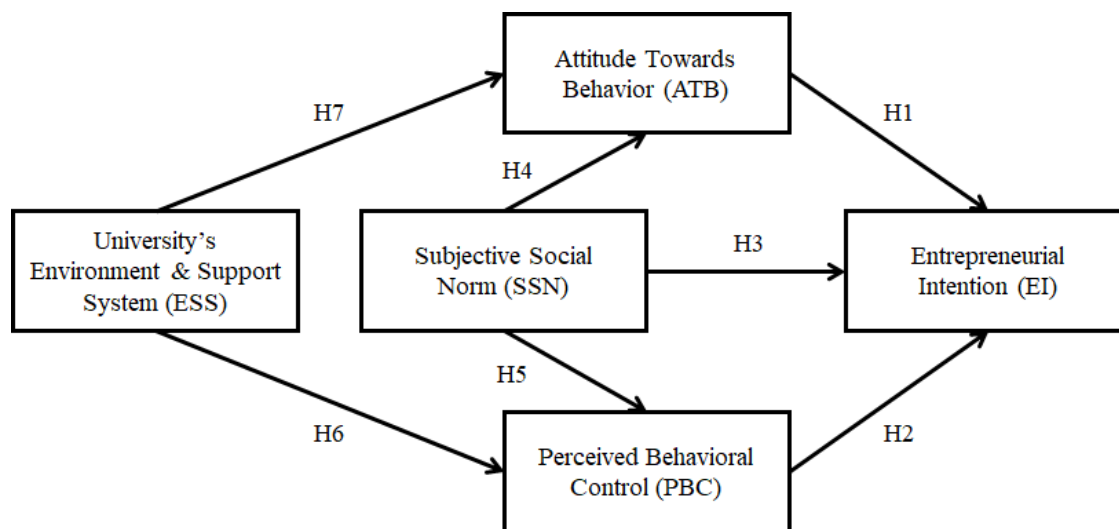
The methodology employed in this literature review has strengths and limitations. The strength of the literature review is the use of systematic methods for searching and synthesizing the current literature to answer the research questions. However, the literature review is limited by the key terms and keywords used to retrieve the desired information. Consequently, the authors acknowledge that there might exist very good sources that were not included in the synthesis. The rationale for choosing the key terms and keywords in the search was to identify a deliberate intent on the part of previous authors. That is, the authors wanted to learn from other authors who deliberately intended to communicate about the influence of the university's ESS on the EI of students. Another limitation of the study is that the search strategy was restricted to English language publications. This might have introduced a bias in favor of studies conducted in English-speaking countries and institutions.

### **CONCEPTUAL MODEL AND PROPOSED HYPOTHESES**

Choosing a career is a decision that requires certain degree of cognitive processing and some amount of planning (Kautonen et al., 2013; Krueger, 2005). Becoming self-employed or starting a new business represents a career choice and thus falls under the category of planned behavior, which is best described and predicted by intention rather than by responses to external stimuli (Davidsson, 1991; Katz, 1994; Krueger et al., 2000; Lent et al., 1994; Thompson, 2009). Intention is the single best predictor of the person's behavior and as such, it is a significant and unbiased predictor of career choice (Fishbein & Ajzen, 1975; Lent et al., 1994). In order to understand behavior, e.g., starting a new venture, it is essential to understand intention. In turn, in order to understand intention, it is necessary to understand the precursors of intention. For this, the authors adapted the model of intention proposed by Ajzen, namely the Theory of Planned Behavior (Ajzen, 1987; 1991). The TPB is a robust and parsimonious model of behavioral intention with proven power in predicting entrepreneurial behavior (Kautonen et al., 2015; Kautonen et al., 2013; Moriano et al., 2012). Intention models based on TPB offer a sound theoretical framework that can specifically map out the nature of processes underlying intentional entrepreneurial behavior (Kim & Hunter, 1993; Krueger et al., 2000). Great amount of cross-disciplinary research has been devoted to testing, advancing and criticizing these models (Armitage & Conner, 2001; Sheeran, 2005). The main hypothesis behind the TPB relies on the idea that intention has three conceptually different precursors, i.e., attitude towards behavior, subjective social norm, and perceived behavioral control (Ajzen, 1991; Varamäki et al., 2013). In principle, understanding the three precursors of intention should be sufficient to predict behavior (Ajzen & Fishbein, 2004). However, the TPB does allow for the three theoretical precursors to

vary greatly in intensity and for them to exert certain degree of influence on each other depending on context (Varamäki et al., 2013). In addition, demographics and other characteristics related to the person's background are not specifically included in the TPB. The TPB expects these factors to have only indirect impact on intention through their influence on the three precursors of intention (Boyd & Vozikis, 1994; Kolvereid, 1996b; Krueger & Carsrud, 1993; Lee & Wong, 2004; Tubbs & Ekeberg, 1991).

The TPB has become one of the most widely used psychological theories for explaining and predicting human behavior in general (Kolvereid, 1996b; Tkachev & Kolvereid, 1999; Varamäki et al., 2013). The models based on this theory have been successfully used in the entrepreneurial context to predict the specific behavior of starting a new business (Kautonen et al., 2015: 2013; Kolvereid, 1996b: 1996a; Krueger & Carsrud, 1993). Also, it has been successfully used to assess the EI of students in very different cultural settings (Autio et al., 2001; Devonish et al., 2010; Fayolle et al., 2006; Iakovleva et al., 2011; Kolvereid, 1996b; Krueger & Carsrud, 1993; Krueger et al., 2000; Tkachev & Kolvereid, 1999). Findings by others support the claim that all three precursors of intention are important, but not in every situation and not to the same degree (Ajzen, 1991; Varamäki et al., 2013). Nonetheless, the TPB captures the three precursors of EI which would indicate the amount of effort that the person will make to carry out the behavior (Ajzen, 1991; Liñán, 2004; Liñán & Chen, 2009). In the study, the authors are interested in exploring the relative importance of the three precursors of intention as influenced by MUN's ESS, i.e., entrepreneurial ecosystem. The authors adopted and adapted the model of intention by Trivedi (2016: 2017) depicted in Figure 1 (Trivedi, 2016: 2017). This model specifies and describes the governing rules and measurement properties of the observed variables. The authors discuss these further in the methodology section of this paper.



**FIGURE 1**  
**CONCEPTUAL MODEL OF ENTREPRENEURIAL INTENTION**

Source: Trivedi, 2016: 2017

In Figure 1, ATB refers to the degree to which the person has a favorable (or unfavorable) assessment of the behavior (desirability). A positive attitude towards the behavior of starting a new business should lead to a stronger intention to go ahead and start a new business (Ajzen, 2001; Autio et al., 2001; Kolvereid, 1996b; Krueger et al., 2000; Pruett et al., 2009;

Segal et al., 2005; Shapero & Sokol, 1982; van Gelderen & Jansen, 2006; Varamäki et al., 2013). Recent literature has established ATB to be significant and among the most influential constructs in explaining the intention to start a new venture (Harris & Gibson, 2008; Liñán & Chen, 2006; Watchravesringkan et al., 2013). Thus, the authors formulate the following hypothesis:

*H1: Attitude towards behavior positively influences entrepreneurial intention.*

PBC refers to the perceived level of ease (or difficulty) of performing the behavior (feasibility). It is somewhat related to self-efficacy although PBC is conceptually broader as it is concerned with the presence (or absence) of requisite resources and opportunities for performing the behavior, and how these are perceived to be under the person's control (Bandura, 1977; Bandura et al., 1980; Dutton, 1993; Krueger & Dickson, 1994; Swann et al., 2007). PBC also connects conceptually and empirically to attribution theory, which was already successfully applied to the study of new venture creation (Krueger et al., 2000; Zacharakis et al., 1999). A strong PBC regarding starting a new business will generally lead to a strong intention to perform the behavior. PBC normally reflects the person's competencies and past experience as well as the anticipated impediments and obstacles (Ajzen, 1991; Chandler & Jansen, 1992). Some researchers have found PBC to be the most important factor in shaping EI (Arenius & Kovalainen, 2006; Souitaris et al., 2007; van Gelderen et al., 2008). Thus, the authors formulate the following hypothesis:

*H2: Perceived behavioral control positively influences entrepreneurial intention.*

SSN refers to the perceived social pressure to perform (or not to perform) the behavior (compliance). Particularly, it is concerned with whether important reference people (family, friends, role models, etc.) approve or disapprove of the person's starting a new business. It is also concerned with the extent that the opinion of reference people matters to the person (Ajzen, 1991: 2001). When the opinion of important reference of people matters to the person, the intention to start a new business would be stronger when they seemed to encourage the behavior (Cialdini & Trost, 1998; Pruett et al., 2009). Results in the literature regarding the importance of SSN as an influencer of EI have been inconsistent (Armitage & Conner, 2001; Conner & Armitage, 1998; Kautonen et al., 2013; Kolvereid & Isaksen, 2006; Krueger et al., 2000; Lüthje & Franke, 2003). Although, it is believed to exert an influence on both ATP and PBC as it was originally eluded in Ajzen's TPB (Ajzen, 1991; Matthews & Moser, 1996). Several authors have corroborated this argument from the point of view of social capital (Cooper, 1993; Liñán & Santos, 2007; Matthews & Moser, 1995; Scherer et al., 1991). Thus, the authors formulate the following hypotheses:

*H3: Subjective social norm positively influences entrepreneurial intention.*

*H4: Subjective social norm positively influences attitude towards behavior.*

*H5: Subjective social norm positively influences perceived behavioral control.*

*Hypotheses 1 to 3* correspond to the traditional intention model based on the TPB. Furthermore, *hypotheses 4 and 5* would explain the internal configuration of the precursors of intention as proposed by other authors. Numerous authors have given strong arguments for positing the influences of ATB, SSN, and PBC on the EI of students and the influence of SSN on

ATB and PBC. The authors refer the reader to the appropriate references for further arguments (Autio et al., 2001; Kautonen et al., 2015; 2013; Souitaris et al., 2007).

The study focuses on the influence of ESS on ATB and PBC. The university's ESS correspond to contextual conditions-exogenous influences or more distal factors-that can affect EI indirectly via their influences on more proximal, motivational factors such as ATB and PBC (Fishbein & Ajzen, 2010). This argument is not new. In the past, several authors have conjectured that universities as stakeholders can be one of the most influential factors in encouraging new entrepreneurs (Debackere & Veugelers, 2005; Di Gregorio & Shane, 2003; Henderson & Robertson, 1999; Peterman & Kennedy, 2003; Robinson et al., 1991; Shane, 2004; Souitaris et al., 2007; Trivedi, 2016; Dyer, 2017; Zhao et al., 2005). However, empirical studies linking external conditions for entrepreneurship and people's career choices also provided inconsistent results (Schwarz et al., 2009). One explanation for this inconsistency could be that although structural conditions are similar for everyone living in the same context, e.g., the university's ESS are similar for students attending the same school, the perceptions, attitudes, and behaviors might vary from student to student (Turker & Selcuk, 2009). Nonetheless, it is reasonable to focus on the entrepreneurial process for students as an embedded process in the university context and thus, the university's ESS could provide an explanation as to why the relation between personal-related factors and EI is not always deterministic in nature (Lüthje & Franke, 2003; Schwarz et al., 2009).

As the literature review suggests, there is growing evidence that the university context has some influence on the EI of students (Bae et al., 2014; Kraaijenbrink et al., 2010; Kraaijenbrink & Wijnhoven, 2008; Liñán et al., 2011; Sesen, 2013b; Shirokova et al., 2016; Trivedi, 2016; Turker & Selcuk, 2009; Zhang et al., 2014). Entrepreneurial universities have been playing an active role in the development of regional entrepreneurial activities through the commercialization of university knowledge for many years (Grandi & Grimaldi, 2005; Jacob et al., 2003; Link & Scott, 2005; Politis et al., 2012; Rothaermel et al., 2007; Tijssen, 2006). Although, the traditional way in which universities may affect the EI of students is through the offering of entrepreneurship education programs. The impact of entrepreneurship education programs on the precursors of the EI of students has been extensively studied over the years with mixed results (Albornoz & Rocco, 2009; Autio et al., 2001; Degroof & Roberts, 2004; Ekpoh & Edet, 2011; Fayolle, 2013; Fayolle & Gailly, 2015; Fayolle et al., 2006; Gorman et al., 1997; Hartshorn & Hannon, 2005; Henderson & Robertson, 1999; Hynes & Richardson, 2007; Karimi et al., 2016; Klofsten, 2000; Packham et al., 2010; Peterman & Kennedy, 2003; Saeed et al., 2015; Souitaris et al., 2007; Walter & Block, 2016; Wilson, et al., 2007; Yu Cheng et al., 2009; Zhao et al., 2005). It has been argued that for entrepreneurship education programs to be effective, they must enable students to develop higher capacities for imagination, creativity, and flexibility as well as the ability to think conceptually and perceive change as opportunity (Timmons & Spinelli, 2007). The investigation of other aspects of the university's ESS such as business incubation and spin-offs (Chiesa & Piccaluga, 2000; Hughes et al., 2007; Markuerkiaga et al., 2016; Mian, 1997; Mian, 1996), technology transfer mechanisms (Bray & Lee, 2000; Etzkowitz, 2003; Poole & Robertson, 2003), university venture funds (Lerner, 2004), and mentoring and networking (Nielsen & Lassen, 2012) are less common in the literature to date. The study attempts to fill that gap by providing evidence for the specific case of MUN's students. It is clear that the university's ESS is efficient ways of creating entrepreneurial competencies of students and motivating them to consider an entrepreneurial career (Franke & Lüthje, 2004; Henderson & Robertson, 1999; Kraaijenbrink et al., 2010; Peterman & Kennedy,

2003). Among the three precursors of intention, ATB and PBC seem to be the ones that could be affected the most by the university's ESS (Shirokova et al., 2016). Thus, the authors formulate the following hypotheses:

*H6: MUN's ESS positively influence attitude towards behavior.*

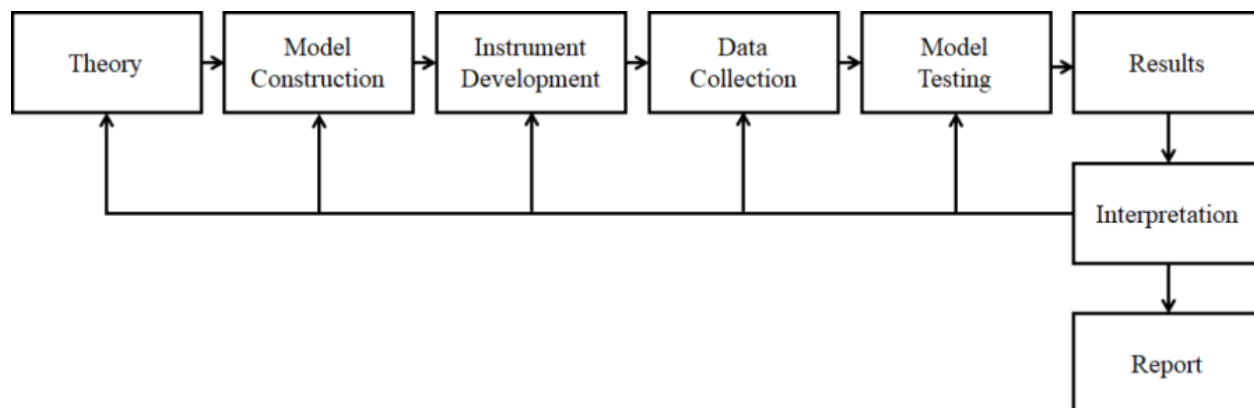
*H7: MUN's ESS positively influences perceived behavioral control.*

To test the formulated hypotheses, the study uses structural equation modelling (Liñán & Chen, 2009). The authors summarized the hypothesized connections among the constructs of the model in Table 2. The arrows represent a direct, positive influence of one variable on another variable.

<b>Hypothesis</b>	<b>Influence</b>
<i>H1: Attitude towards behavior positively influences entrepreneurial intention.</i>	ATB → EI
<i>H2: Perceived behavioral control positively influences entrepreneurial intention.</i>	PBC → EI
<i>H3: Subjective social norm positively influences entrepreneurial intention.</i>	SSN → EI
<i>H4: Subjective social norm positively influences attitude towards behavior.</i>	SSN → ATB
<i>H5: Subjective social norm positively influences perceived behavioral control.</i>	SSN → PBC
<i>H6: MUN's ESS positively influence attitude towards behavior.</i>	ESS → ATB
<i>H7: MUN's ESS positively influence perceived behavioral control.</i>	ESS → PBC

## METHODOLOGICAL DESIGN

The authors followed the overall approach shown in Figure 2 to design the study. In essence, the authors specified the model in Figure 1 based on the TPB, determined how to measure constructs, collect the data, and analyze and interpret the data. To collect the data, they designed a structured non-disguised questionnaire shown in the Appendix B. The authors employed validated survey elements and scales used in previous studies to measure the constructs analyzed in the study (Liñán & Chen, 2009; Trivedi, 2016: 2017; Zampetakis et al., 2015; Zollo et al., 2017). In other words, they based the questionnaire on reliable and internationally applicable instruments. Prior to administering the survey to the target population, the authors conducted a pilot study where the preliminary version of the structured questionnaire was administered to a random sample of 20 students to check for precision of vocabulary, ease of completion, and possible ambiguity (Trivedi, 2016; Zollo et al., 2017). The authors employed the convenience sampling method to collect the data from undergraduate and graduate students at MUN (there were 17,338 students enrolled for the 2017-18 academic year). They based the sample size on requirements for analyzing the predictive model using structural equation modelling. There exist accepted rules of thumb to determine generalizable sample sizes when performing this type of analysis. Since higher level of power for the study may be gained by increasing number of respondents, the authors chose to use the recommendations by Krejcie and Morgan (1970) and set the target for the sample population to 380 students (Krejcie & Morgan, 1970).



**FIGURE 2**  
**EXPERIMENTAL DESIGN APPROACH OF THE STUDY**

### Data Analysis

There are three fundamental considerations for data interpretation of a study of this nature:

1. Relevance of intentions in predicting and explaining behavior.
2. Overall fit of the model relevant to entrepreneurial activity.
3. Relative strengths of significant EI and activity antecedents (Trivedi, 2016).

In the study, the authors analyzed the data using Structural Equation Modelling (SEM) in SPSS® 25 and AMOS® 25. SEM is a multivariate technique that combines both factor analysis and path analysis. This statistical technique allows for the examination of a series of dependence relations between exogenous variables and endogenous variables simultaneously. Causes outside the causal model under consideration determine the variability of exogenous (predictor) variables. Exogenous and other endogenous variables in the causal model explain the variations of endogenous (dependent) variables (Ho, 2014). To allow for meaningful comparisons with other studies, the authors tried to employ data analysis techniques previously reported by other researchers whose works were adapted for this study (Liñán & Chen, 2009; Trivedi, 2016; 2017). A graphical depiction of the structural model is presented in Figure 1 in Appendix C.

### Data Screening

The authors collected 479 responses with an average completion rate of 95%. They curated the data by performing the following steps.

1. Removal of rows (individual responses) that were missing more than one value (>5%) and keeping those missing one value (<5%) for possible imputation.
2. Removal of rows from “*unengaged*” respondents based on the standard deviation of responses and the time that it took respondents to complete the survey-much less than the average time.
3. Performance of Little’s Missing Completely at Random (MCAR) test to determine whether the missing values in responses (one value per row) were missing completely at random.
4. Imputation of the missing values by using the Expectation Maximization (EM) algorithm for each category of measurement variables separately (Gaskin, 2017).

5. Test the data for normality and outliers by calculating skewness and kurtosis, i.e., check whether values for skewness and kurtosis fell between the  $-2$  and  $+2$  threshold (Cohen et al., 2003; George & Mallery, 2010).
6. Identification of influential multivariate outliers by using the Mahalanobis distance, e.g., respondents who completed the entire survey but whose responses followed odd patterns that previous techniques were unable to capture (Aguinis et al., 2013).

After curation, the final dataset consisted of 403 rows (individual responses) and 36 columns (individual measurement variables), plus nine columns of demographics data.

## Reliability and Validity

Others have successfully validated similar scale items before, thus the authors performed reliability assessment to confirm the overall reliability and adequacy of each scale item (Liñán & Chen, 2009; Trivedi, 2016: 2017). To assess reliability of measures in the study, the authors employed item-to-total correlations and Cronbach's Alpha statistics. They used the following criteria for reliability and adequacy of each scale item: item-to-total correlation of at least 0.35 and Cronbach's Alpha of at least 0.70 (Hair et al., 2010; Nunnally, 1978). All of the item-to-total correlations are above the 0.35 threshold-the minimum item-to-total correlation of 0.379 corresponds to scale item SSN3. The overall Cronbach's Alpha is 0.960 and deleting any of the scale items will result in no increase in this measure, e.g., deleting scale item SSN3 with the lowest item-to-total correlation will keep the Cronbach's Alpha at 0.960. Therefore, the overall reliability and adequacy of each scale item are satisfactory and the authors kept all the scale items in the instrument. Furthermore, Cronbach's Alpha for ATB, SSN, PBC and ESS are 0.922, 0.801, 0.922, and 0.971, respectively.

In order for the authors to use summated scales later in the discussion, they used component analysis to test the dimensionality of the scale items measuring different constructs, i.e., ATB, SSN, PBC and ESS. The main criteria for scale items to be considered unidimensional (measuring the same concept) are:

1. The first (unrotated) component should account for a large share of the total variance in the data.
2. Each of the following components should account for roughly the same variance (Blunch, 2013).

For ATB, the first component extracts 76.8% of the variance, the minimum rescaled loading is 0.802 for ATB2 ( $>0.40$ ) and the component score coefficients are located in the interval 0.176 for ATB2 and 0.276 for ATB1. For SSN, the first component extracts 50.3% of the variance, the minimum rescaled loading is 0.684 for SSN3 ( $>0.40$ ) and the component score coefficients are located in the interval 0.199 for SSN6 and 0.288 for SSN1. For PBC, the first component extracts 76.7% of the variance, the minimum rescaled loading is 0.864 for PBC4 ( $>0.40$ ) and the component score coefficients are located in the interval 0.183 for PBC5 and 0.290 for PBC1. For ESS, the first component extracts 71.7% of the variance, the minimum rescaled loading is 0.779 for ESS15 ( $>0.40$ ) and the component score coefficients are located in the interval 0.063 for ESS1 and 0.085 for ESS15. Therefore, the sets of items are considered unidimensional and measuring the same concepts, respectively.

## Confirmatory Factor Analysis

The model in the study assumes that relations exist between the EI of students at MUN and each of the precursors of intention, i.e., ATB, SSN and PBC. Furthermore, the model also suggests that relations exist between the university's ESS and both ATB and PBC. The study

expressed these relations in the model in terms of *hypotheses H1-H7* in Table 1. Before testing these hypotheses with SEM, the authors defined the measurement model to verify that the 36 measurement variables reflect the five unobserved constructs (APB, SSN, PBC, EI and ESS) reliably. To construct the measurement model, all factor loadings are freed (i.e., estimated), items are allowed to load on only one construct (i.e., no cross-loadings), and latent variables are allowed to correlate-equivalent to oblique rotation in exploratory factor analysis (Ho, 2014). The study used Confirmatory Factor Analysis (CFA) employing maximum likelihood fitting functions to determine the overall fit of the measurement model. CFA was used to determine the degree of model fit, the adequacy of the factor loadings, and the standardized residuals and explained variances for the measurement variables. The parameter summary and nodes for the model show that the input covariance matrix generated from the 36 measurement variables in the model contains 666 sample moments. For the measurement model, there are 31 regression weights, 10 covariances and 41 variances for a total of 82 parameters to estimate. Therefore, the model has 584 degrees of freedom (666–82).

<b>Measure</b>	<b>Threshold</b>	<b>Iteration 1</b>	<b>Iteration 2</b>
Chi-square/df	<3: good; <5: permissible	3.772	3.055
p-value (model)	>0.05	<0.05	<0.05
CFI	>0.95: great; >0.90: traditional; 0.80: permissible	0.887	0.921
GFI	>0.95	0.744	0.809
AGFI	>0.80	0.708	0.770
TLI	>0.90	0.878	0.910
PNFI	>0.50	0.791	0.778
RMSEA	<0.05: good; 0.05-0.10: moderate; >0.10: bad	0.083	0.072

Given the lack of consensus regarding the appropriate metric for goodness of fit, the authors report multiple indexes of overall fit used in the literature (Bollen, 1989; Solymossy & Hisrich, 2000; Tanaka, 1993). Table 3 shows the list of indicators along with their acceptable thresholds (Byrne, 2001; Hair et al., 2010). Note that there is an inverse relation between goodness of fit and the sample size and number of variables in the model. The overall fit of the CFA model was good but not excellent (Iteration 1):  $\chi^2=2202.841$  with 584 degrees of freedom, CMIN/DF=3.772,  $p<0.05$ , CFI (Comparative Fit Index)=0.887, GFI (goodness of fit index)=0.744, AGFI (adjusted goodness of fit index)=0.708, TLI (Tucker-Lewis index)=0.878, PNFI (parsimonious normed fit index)=0.791 and RMSEA (root mean square error of approximation)=0.083. The unstandardized regression weights are all significant by the critical ratio test ( $>1.96$ ,  $p<0.001$ ) and the standardized regression weights range from 0.506 to 0.942. These values indicate that the 36 measurement variables are significantly represented by their respective latent constructs. Furthermore, the explained variances for the 36 measurement variables range from 0.256 or 25.6% (SSN2) to 0.887 or 88.7% (EI4). Thus, the residual (unexplained) variances range from 11.3% to 74.4%.

By examining the modification indices, the authors realized that the fit of the model could be improved by allowing certain error terms to correlate. For example, by allowing SSN6's and SSN3's error terms to correlate with SSN5's and SSN2's error terms, respectively, the chi-square value of the modified model would be reduced by 186.282. There is a strong theoretical justification for letting these error terms to correlate. For example, the two measurement values



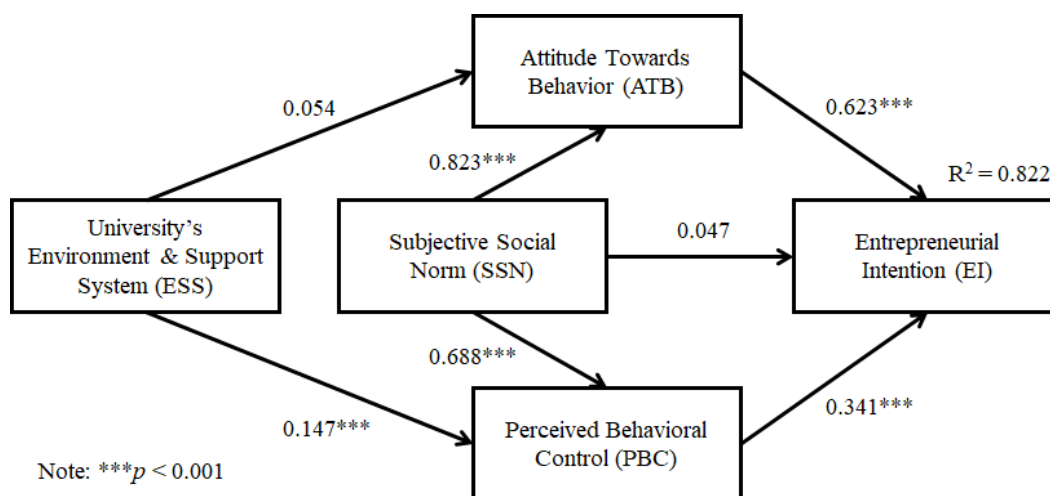
SSN5 (“*My friends would approve of my decision to start a business*”) and SSN6 (“*My classmates would approve of my decision to start a business*”), ask the same question related to the opinions of important reference people: friends and classmates. We can argue that for university students, these reference people would most likely be the same people. We can make the same argument for measurement values SSN2 and SSN3. Furthermore, if we measure the amount of information in the data by the variances of the variables, then measurement variables SSN2 (VAR=2.189) and SSN3 (VAR=2.029) and measurement variables SSN5 (VAR=2.880) and SSN6 (VAR=2.890) carry very similar amount of information, respectively. The authors decided to let the above-mentioned error terms to correlate. Furthermore, the modification indices also indicate that error terms associated with the university’s ESS could correlate within the three dimensions measuring the ESS concept, namely Entrepreneurship Training (ET), Start-up Support (SS) and Entrepreneurial Milieu (EM). After running CFA one more time, the authors obtained the metrics in Table 3 (Iteration 2).

The authors tested for convergent validity and discriminant validity by using the results obtained through the CFA analysis. For convergent validity, the authors calculated the Composite Relativity (CR) of the factors and compared them to the recommended threshold >0.70. All of the CR values were higher than the threshold (the minimum related to SSN). The authors compared the factor loadings with the recommended threshold >0.60. All of the factor loadings were higher than the threshold except for some related to SSN that were a fraction lower. The authors compared the Average Variance Extracted (AVE) for each dimension with the recommended threshold >0.50. All of the AVE values were higher than the threshold except for the one related to SSN that was a fraction lower. For discriminant validity, the authors verified that the factor loadings were higher than the recommended threshold >0.50 and higher than all the other items (again the minimum related to SSN).

### **Structural Equation Modelling**

Results of the data analysis reported above suggest that the model is appropriate to measure the relation between the four independent variables (ATB, SSN, PBC and ESS) and entrepreneurial intention of students at MUN represented by the sample of 403 respondents. The authors used structural equation modelling with maximum likelihood estimation to test the seven hypotheses on Table 1. The overall fit of the model is acceptable ( $\chi^2=1790.071$ ,  $df=555$ ,  $p<0.05$ , CFI=0.914, GFI=0.805, AGFI=0.766, TLI=0.902, PNFI=0.776 and RMSEA=0.074) and the major findings are shown in Table 4 and Figure 3. Table 5 reports the regression weights resulted from the SEM path analysis. The relations *hypothesized by H1, H2, H4-H6* are significant at  $p<0.001$  level. The relations *hypothesized by H3 and H7* are not significant. These results are consistent with the ones reported by Trivedi (2016: 2017) before (Trivedi, 2016: 2017).

			<b>Estimate</b>
ATB	←	ESS	0.054
PBC	←	ESS	0.147
ATB	←	SSN	0.823
PBC	←	SSN	0.688
EI	←	ATB	0.623
EI	←	PBC	0.341
EI	←	SSN	0.047



**FIGURE 3**  
**STRUCTURAL EQUATION MODELLING RESULTS**

The authors found that the hypothesized model has an explanatory power of 82% for entrepreneurial intention of students at MUN. Attitude towards behavior ( $H1$ ,  $\beta=0.623^{***}$ ) and perceived behavioral control ( $H2$ ,  $\beta=0.341^{***}$ ) have a positive influence on entrepreneurial intention of students at MUN, but no relation seems to exist between subjective social norm ( $H3$ ,  $\beta=0.047$ ) and entrepreneurial intention of the same students. On the other hand, subjective social norm seems to have a positive influence on both attitude towards behavior ( $H4$ ,  $\beta=0.823^{***}$ ) and perceived behavioral control ( $H5$ ,  $\beta=0.688^{***}$ ). The university's environment and support system seems to have no influence on attitude towards behavior ( $H6$ ,  $\beta=0.054$ ) while it seems to exert a positive influence on perceived behavioral control ( $H7$ ,  $\beta=0.147^{***}$ ) of students at MUN. Together, these results are consistent with those of others reported in the literature. This allows the authors to draw conclusions and recommendations that are specific to the efficacy of Memorial University's innovation and entrepreneurship initiatives in promoting entrepreneurial activities on campus (Bazan, 2016; Memorial University, 2013: 2015: 2016b: 2016a; Mills & Brown, 2016).

<b>Hypothesis</b>	<b>Relation</b>	<b>Estimate</b>	<b>S.E.</b>	<b>C.R.</b>	<b>P-value</b>	<b>Supported</b>
H1	EI ← ATB	0.910	.100	9.125	***	Yes
H2	EI ← PBC	0.398	.051	7.749	***	Yes
H3	EI ← SSN	0.144	.250	0.576	0.565	No
H4	ATB ← SSN	1.720	.216	7.968	***	Yes
H5	PBC ← SSN	1.801	.236	7.639	***	Yes
H6	PBC ← ESS	0.197	.058	3.378	***	Yes
H7	ATB ← ESS	0.058	.041	1.403	0.161	No

Note: \*\*\*p<0.001.

## RESULTS AND DISCUSSION

Memorial University is Newfoundland and Labrador's only university and as such, it has a special obligation to the people of the province. Since founded in 1925, MUN has played an integral role in the cultural, social, health, and economic development of the province. It has educated the vast majority of its business people, civil servants, educators, engineers, scientists, health professionals, cultural workers, artists, and leaders. Lately, MUN has been transforming itself to become an entrepreneurial university in order to play an even more prominent role in the economic and social development strategies of the province. MUN's innovation and entrepreneurship initiatives are part of these efforts (Bazan, 2016; Memorial University, 2013, 2015; 2016b; 2016a; Mills & Brown, 2016).

There is evidence in the literature that psychological, situational, and contextual factors can influence entrepreneurial intention (Tolentino et al., 2014). In the study, the authors tried to understand the influence of MUN's environment and support system on the precursors of entrepreneurial intention of its students. Many researchers have devoted extensive work to developing appropriate methodologies to identify the different elements that influence the intention to start a new business. The study was not interested in developing new theories or models but to aggregate the existing knowledge and apply it for the specific case of students at MUN. For this, the authors collected a sample of 403 usable responses from undergraduate and graduate students from 60 out of 121 different study programs representing the 17,338 students registered for the 2017-18 academic year. The average age of respondents was 24.7 years and they were, on an average, 2.5 years into their programs.

Table 6 shows the demographics of the sample and students' interest in more formal entrepreneurship education programs. As mentioned before, MUN does not have an entrepreneurship education program per se but rather offers a limited number of courses and training programs for interested students. The authors wanted to know whether there was interest among students in several types of programs ranging from certificate to graduate program in entrepreneurship. There seems to be more interest in the shorter, more practical entrepreneurship education programs such as certificate (67%) or minor (56%) as opposed to major (28%) or graduate program (38%). This appears to agree with reports by others whose conclusions on the

influence of entrepreneurship education programs on the EI of students were somewhat inconclusive (Fayolle et al., 2006; Rae & Woodier-Harris, 2013; Rauch & Hulsink, 2015; Sánchez, 2011; Souitaris et al., 2007). These results have important implications for future efforts of the university in trying to shape the intentions of students to become entrepreneurs. The results are in agreement with those depicted in Table 8 and Figure 4 where students at MUN seem to neither agree nor disagree with the intention to start a new business (EI: mean=4.252, 25<sup>th</sup> percentile=2.600). Although, the results are somewhat in disagreement with the perception of their capacity to start a new business (PBC: mean=3.739, 25<sup>th</sup> percentile=2.600). This could mean that students at MUN do not see a major or a graduate program in entrepreneurship as the right vehicle for improving their entrepreneurial competences. Students at MUN seem to prefer the shorter and more expeditious certificate or minor program in entrepreneurship as possible ways of filling their knowledge gaps.

<b>Gender</b>	<b>Male</b>	<b>Female</b>
Study	53%	47%
University as a whole	43%	57%
<b>Program of study</b>	<b>Undergraduate</b>	<b>Graduate</b>
Study	67%	33%
University as a whole	78%	22%
<b>Interest in programs</b>	<b>Yes</b>	<b>No</b>
Certificate	67%	33%
Minor	56%	44%
Major	28%	72%
Graduate	38%	62%

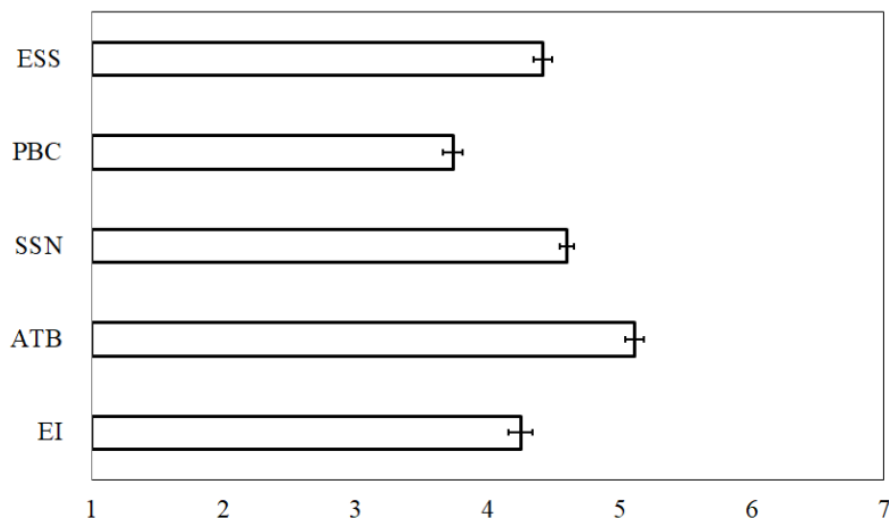
Results from the SEM suggest that the four precursors of EI, i.e., ATB, SSN, PBC and indirectly ESS, can explain 82% of the variation in entrepreneurial intention of students at MUN. Of the three paths influencing the EI of students at MUN, only two are statistically significant, i.e., ATB and PBC, where ATB seems the most influential ( $\beta=0.623^{***}$ ). Of the two influencers of ATB, i.e., SSN and ESS, SSN is the one that shows statistically significant influence ( $\beta=0.823^{***}$ ). This means that, as of today, the university's ESS is not producing significant results in influencing the students' attitudes towards entrepreneurship. Given that ATB has such a high influence on the EI of students at MUN, the university could use this lever by designing the university's ESS to play a bigger role on the ATB of students. Of the two influencers of PBC of students, both are statistically significant but only SSN has a strong influence ( $\beta=0.688^{***}$ ) as compared to that of the university's ESS ( $\beta=0.147^{***}$ ). Given that the influence of ESS on the PCB of students at MUN is significant but not very strong, there is room for improving the university's ESS that might strengthen this relation. SSN does not have statistically significant influence on the EI of students at MUN ( $\beta=0.047$ ). Although, it has a strong statistically significant influence on both ATB and PCB (Table 7). This poses an interesting question: given that, by assumption, the university's ESS does not influence SSN per se, how can the university tap into this strong influencer of ATB and PBC? Furthermore, given the aforementioned strong

influence exerted by SNN on ATB and PBC of students at MUN, researchers interested in the study of family businesses may pose interesting questions regarding students' intention to start a new family business (Arregle et al., 2007; Charbel et al., 2013; Samara & Berbegal-Mirabent, 2018).

<b>Effect</b>	<b>ESS</b>	<b>SSN</b>	<b>PBC</b>	<b>ATB</b>
Standardized total effects	0.084	0.795	0.341	0.623
Standardized direct effects	0.000	0.047	0.341	0.623
Standardized indirect effects	0.084	0.748	0.000	0.000

As Table 8 and Figure 4 show, a career as an entrepreneur seems to be an attractive proposition for students at MUN (ATB: mean=5.113, 25<sup>th</sup> percentile=4.200) but this does not translate vis-à-vis their entrepreneurial intent (EI: mean=4.252, 25<sup>th</sup> percentile=2.600). Although attractive, the lack of perceived capacity (PCB: mean=3.739, 25<sup>th</sup> percentile=2.600) seems to be hindering students' intention to start a new business. Furthermore, should students at MUN decide to start a new business, important reference people seem to support such prospect (SSN: mean=4.600, 25<sup>th</sup> percentile=3.833). The authors' data analysis and those of others suggest that students' perception of this support is not directly relevant to their intent to start a new business (Liñán & Chen, 2009; Liñán & Fayolle, 2015; Trivedi, 2016: 2017). Also in agreement with other reports, results of the study suggest that the opinions of important reference people positively influence students' ATB and PBC for starting a business. Between the two, students' attitudes towards entrepreneurship seems to be the concept that is most influenced by reference people. In general, this seems to make sense since the opinion of others could improve students' outlook towards entrepreneurship. Correspondingly, it could only improve their perceived capacity peripherally to the extent in which these reference people can contribute to the student's capacity to start a new business (e.g., financial support, mentoring).

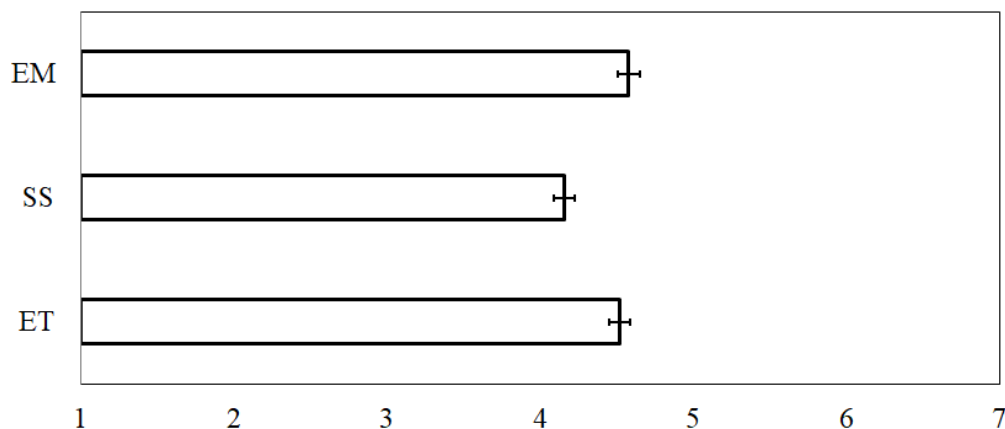
		<b>ATB</b>	<b>SSN</b>	<b>PBC</b>	<b>EI</b>	<b>ESS</b>
Mean		5.113	4.600	3.739	4.252	4.420
Std. Error of Mean		.068	.052	.076	.092	.067
Percentiles	25	4.200	3.833	2.600	2.600	3.600
	50	5.200	4.667	3.800	4.400	4.533
	75	6.200	5.333	5.000	6.000	5.400



**FIGURE 4**  
**MEAN AND STANDARD ERROR OF THE MEAN FOR THE FIVE CONCEPTS OF INTEREST**

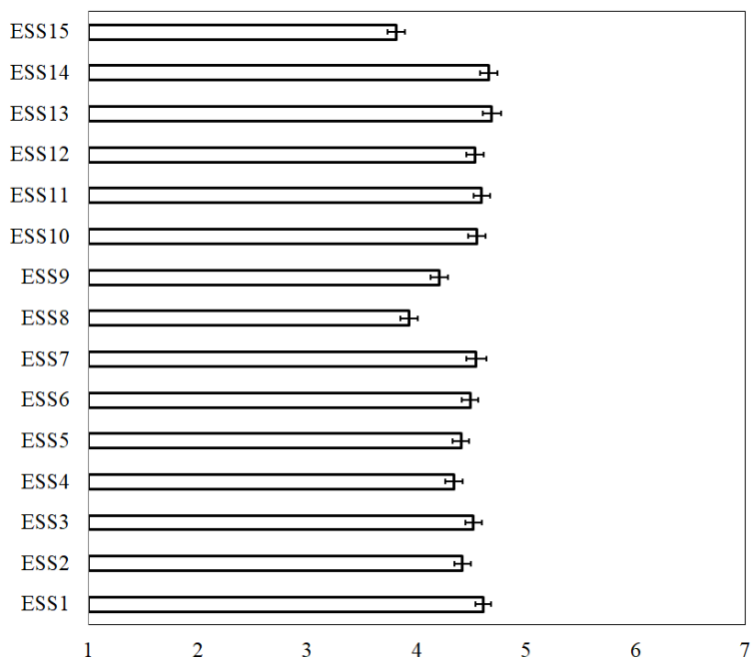
Overall, students seem to have a positive perception on the university's ability to influence their intention to start a new business (ESS: mean=4.4200, 25<sup>th</sup> percentile=3.600). By the model design, the university's ESS does not influence EI directly but rather through the more proximal antecedents ATB and PBC. The data analysis agrees with those of others in that the university's ESS has the potential to influence students' PBC more than their ATB (Trivedi, 2016: 2017). For students at MUN, the university's ESS seems positively correlated with their ATB but not to a meaningful extent ( $p>0.05$ ). These results also have important repercussions in MUN's ability to influence the EI of students by designing the different efforts aligned with its innovation and entrepreneurship initiatives (Bazan, 2016; Memorial University, 2013: 2015: 2016b: 2016a; Mills & Brown, 2016). As mentioned before, the authors divided the concept defined as the university's ESS into three different dimensions: Entrepreneurship Training (ET), Start-up Support (SS) and Entrepreneurial Milieu (EM) (Table 9 and Figure 5). Among these dimensions, ET and SS would most likely contribute to students' PBC while EM would do so to students' ATB. These results show that there is room for improvement in MUN's EM if it were to provide a stronger influence on ATB. Nonetheless, EM (mean=4.581, 25<sup>th</sup> percentile=3.800) appears to be the strongest dimension in the university's ESS despite its weak influence. On the other hand, students seem to recognize ET (mean=4.518, 25<sup>th</sup> percentile=3.600) and SS (mean=4.161, 25<sup>th</sup> percentile=3.200) of the university's ESS to have a potential positive influence in their perceived capacity to start a new business.

		<b>ET</b>	<b>SS</b>	<b>EM</b>
Mean		4.518	4.161	4.581
Std. Error of Mean		0.068	0.068	0.071
Percentiles	25	3.600	3.200	3.800
	50	4.600	4.200	4.600
	75	5.600	5.000	5.800



**FIGURE 5**  
**MEAN AND STANDARD ERROR OF THE MEAN FOR THE THREE DIMENSIONS**

As shown in Figure 6, a more detailed analysis of the measurement variables composing the ESS concept reveals that the two weakest elements of the university's ESS are ESS8 (MUN provides students with ideas to start a new business) and ESS15 (MUN provides students with the financial means needed to start a new business). This is consistent with the results of a short survey (unpublished) conducted by the Memorial Centre for Entrepreneurship (MCE) at MUN where the majority of students polled expressed that, they were not considering engaging with MCE to start a new business due to the lack of a business idea. As mentioned above, MUN seems to be doing a better job at creating the right entrepreneurial environment as recognized by students, e.g., ESS1: MUN provides creative atmosphere to develop ideas for new business start-ups (mean=4.605); ESS13: MUN creates awareness of entrepreneurship as a possible career choice (mean=4.687); ESS14: MUN brings entrepreneurial students in contact with each other (mean=4.661).



**FIGURE 6**  
**MEAN AND STANDARD ERROR OF THE MEAN FOR THE MEASUREMENT**  
**VARIABLES COMPRISING THE CONCEPT ESS**

### CONCLUSION

The study enabled the authors to develop a deeper understanding of the influence that the university's ESS have on the antecedents of the EI of students at Memorial University. The systematic literature review found that there are numerous studies previously done to measure EI, i.e., the intent to start a new business. Previous studies have revealed that the environment could significantly influence the precursors of the EI of university students. Most studies indicate that this relation is indirect, and affects EI through its influence on ATB and PBC. Other researchers have measured the effects of the environment on the EI of university students in slightly different ways, most using their own conceptual models of entrepreneurial intention. Although slightly different, most models used in previous studies are variants of intention models based on the Theory of Plan Behavior. All previous studies intended to prove that their conceptual models of EI are valid and reliable to the extent that the models apply to populations other than the ones used in the studies. The authors' approach was different. They were not interested in proposing a new model or a new theory of entrepreneurial intention. The authors aimed at adopting and adapting the most promising approaches to measure the EI of students as influenced by MUN's environment and support system. That is, the authors want to use the outcomes of the study to inform Memorial University's future innovation and entrepreneurship initiatives.

Based on previous research by others, the authors were able to develop a methodology to assess the influence of the university's ESS on the antecedents of the EI of students at MUN. They tested the methodology successfully on a sample of the student population. Analysis of the data suggests that the methodology is appropriate to measure the relation between the four precursors of EI and the entrepreneurial intention of students at MUN. Analysis of the data also



corroborated that the university's ESS could indirectly shape the attitudes of students and have an impact on their general motivation to behave. The results show that MUN's ESS has a significant but low influence on PBC, while its influence on ATB of students is not significant. However, ATB has a much larger influence on EI than PBC of students at MUN due to the impact of SSN. The authors hypothesize that since SSN has such a large influence on both ATB and PBC of students at MUN, finding ways to design some elements of the university's ESS such that they would positively influence SNN, might prove to be beneficial to Memorial University's efforts to support student entrepreneurs.

Furthermore, since the overall results of the study are consistent with similar research done by others, further analysis of the data can be used by Memorial University to improve the current environment and support system for student entrepreneurs. In addition, the results from the study will serve as baseline for future research and longitudinal studies. The authors will use a refined version of the study to re-assess the influence of the university's ESS on a regular basis (bi-yearly or every four years). With the evolving information, Memorial University will be able to assess the efficacy of its innovation and entrepreneurship initiatives in promoting entrepreneurial activities on campus. By understanding its entrepreneurial efficacy, the university will be better equipped to raise the perceptions of venture feasibility and desirability, thus increasing students' perceptions of opportunity. The authors hope that other aspiring entrepreneurial universities will conduct similar studies in order for them to gauge their respective entrepreneurial initiatives, and to grow the literature with specific cases that researchers and practitioners can use to build a deeper understanding of the entrepreneurial intention of university students.

### **LIMITATIONS OF THE STUDY**

The study is subject to some limitations:

1. Similar to previous studies in the literature, the present study focuses on intentionality. It is clear that intentions may not turn into actual behaviors in the future. Currently, there is no other accurate way to measure entrepreneurial intention. Thus, the authors take the statements of respondents about their entrepreneurial intention as a reliable source of information.
2. The authors base the collected data on the perceptions of the students. It is possible that a difference between "*perception*" and "*reality*" exists.

However, it is equally important to analyze how students perceive the university's environment and support system since these might shape their entrepreneurial intentions (Turker & Selcuk, 2009).

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## DECLARATION OF INTEREST STATEMENT

The authors hereby declare that they have no relevant direct or indirect interests to disclose.

### APPENDIX A

Key terms, keywords and Boolean expressions used in the search strategy:  
 TITLE-ABS-KEY (entrepreneur\*) AND  
 TITLE-ABS-KEY (intention\* OR aspiration\* OR tendenc\* OR desir\* OR motivation\*  
 OR inclination\* OR interest\* OR attitude\* OR perception\* OR feasib\*) AND  
 ALL (method OR survey OR questionnaire OR study OR research OR evaluation OR  
 assessment OR analysis) AND  
 TITLE-ABS-KEY (student\*) AND  
 ALL(universit\* OR college\* OR school\* OR institution\* OR “*higher education*” OR  
 “*post secondary*”) AND  
 ALL (environment\* OR ecosystem OR setting OR atmosphere OR contextual) AND  
 ALL (influence OR support OR assistance OR \*ffect OR inspire\* OR impact OR stimul\*  
 OR role OR factor\*) AND  
 ALL (“*theory of planned behavio\**” OR TPB) AND  
 LIMIT-TO ( LANGUAGE, English )

### APPENDIX B

#### Questionnaire Items

Students indicated their level of agreement with the below statements from 1 (total disagreement) to 7 (total agreement).

#### Attitude Towards Behavior (ATB)

ATB# (or A# in Figure 1 Appendix) refers to the degree to which the person has a favorable (or unfavorable) assessment of the behavior (desirability).

- ATB1-A career as an entrepreneur is attractive for me.
- ATB2-Being an entrepreneur implies more advantages than disadvantages to me.
- ATB3-Being an entrepreneur would give me great satisfaction.
- ATB4-Among various career options, I would rather be an entrepreneur.
- ATB5-If I had the opportunity and resources, I would like to start a business.

#### Subjective Social Norms (SSN)

SSN# (or S# in Figure 1 Appendix) refers to the perceived social pressure to perform (or not to perform) the behavior (compliance).

- SSN1-My immediate family values the entrepreneurial career more than any other careers.
- SSN2-My friends value the entrepreneurial career more than any other careers.
- SSN3-My classmates value the entrepreneurial career more than any other careers.

- SSN4-My immediate family would approve of my decision to start a business.
- SSN5-My friends would approve of my decision to start a business.
- SSN6- My classmates would approve of my decision to start a business. Perceived Behavioral Control (PBC)

### **Perceived Behavioral Control (PBC)**

PBC# (or P# in Figure 7 Appendix) refers to the perceived level of ease (or difficulty) of performing the behavior (feasibility).

- PBC1-I am prepared to start a viable business.
- PBC2-I can control the creation process of a new business.
- PBC3-Starting a business and keeping it viable would be easy for me.
- PBC4-I know the necessary practical details to start a business.
- PBC5-If I tried to start a business, I would have a high probability of success.

### **Entrepreneurial Intention (EI)**

EI# represents the intention of students to start a new business.

- EI1-I am ready to do what it takes to be an entrepreneur.
- EI2-My professional goal is to be an entrepreneur.
- EI3-I will make every effort to start and run my own business.
- EI4-I am determined to start my business in the future.
- EI5-I am seriously thinking about starting my own business.

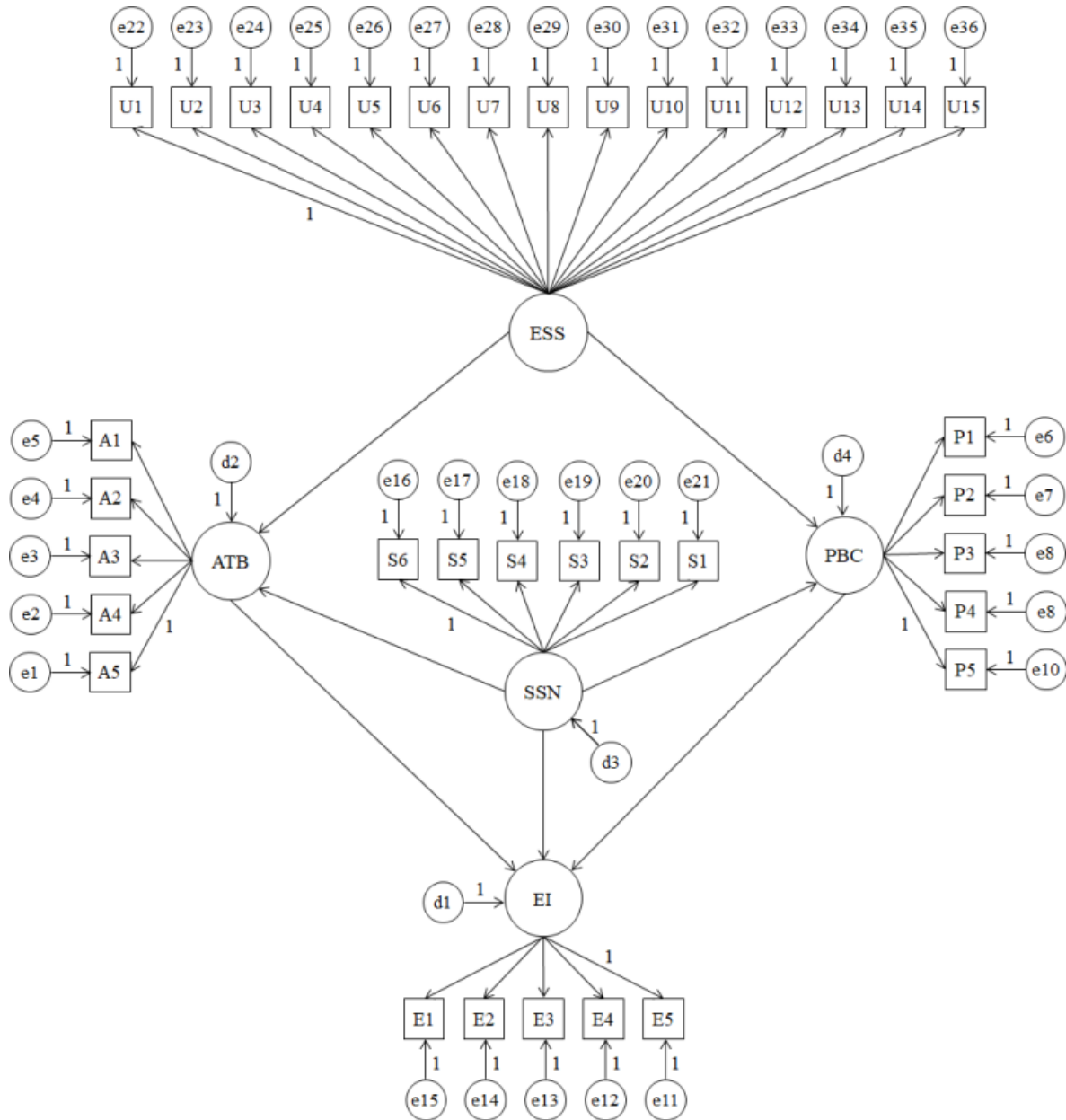
### **University Environment & Support System (ESS)**

ESS# (or U# in Figure 7 Appendix) represent the entire entrepreneurial ecosystem in the university.

- ESS1-MUN provides creative atmosphere to develop ideas for new business start-ups.
- ESS2-MUN provides students with the knowledge needed to start a new business.
- ESS3-MUN arranges meetings with successful entrepreneurs for experience-sharing.
- ESS4-MUN has many resources to support the a start-up company.
- ESS5-MUN helps students to build required network for starting a business.
- ESS6-MUN arranges for mentoring and advisory services for would-be entrepreneurs.
- ESS7-MUN motivates students to start a new business.
- ESS8-MUN provides students with ideas to start a new business.
- ESS9-MUN offers project work focused on entrepreneurship.
- ESS10-MUN offers training in entrepreneurship.
- ESS11-MUN arranges conferences and workshops on entrepreneurship.

- ESS12-MUN organizes business idea competitions.
- ESS13-MUN creates awareness of entrepreneurship as a possible career choice.
- ESS14-MUN brings entrepreneurial students in contact with each other.
- ESS15-MUN provides students with the financial means needed to start a new business.

**APPENDIX C**



**FIGURE 7**  
**GRAPHICAL REPRESENTATION OF THE STRUCTURAL MODEL**

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