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Entrepreneurial implementation intention as a tool to moderate the stability of entrepreneurial goal intention: A sensemaking approach

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Entrepreneurial implementation intention as a tool to moderate the stability of entrepreneurial goal intention: A sensemaking approach

Abstract

This study evaluates how entrepreneurial implementation intention (EII) influences the stability of entrepreneurial goal intention (EGI). Two waves of data collection were conducted during and after entrepreneurship education (EE). The moderating role of EII on EGI after a period of approximately one year was tested. The results indicate significant variation between 412 participants of high and low EII during EE. The findings contribute to furthering the understanding of the factors that maintain EGI over time. They highlight the unconscious aspects of students' behavioral processing that potentially cause controversial results regarding the impact of EE on EGI.

Keywords:

Entrepreneurship education

Intention stability

Sensemaking approach

Entrepreneurial goal intention

Entrepreneurial implementation intention

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1. Introduction

Insight into entrepreneurship as a process (Bakker & Shepherd, 2017; McMullen & Dimov, 2013) suggests that actions by prospective entrepreneurs are fundamental in shaping entrepreneurial opportunity (Dimov, 2007). In the words of Gartner et al. (2003, p. 144), "without action, there is no insight." In this study, entrepreneurship is proposed as a process that emerges through the iterative stages of entrepreneurial intention(s), cognitive processing of opportunity-related information, and implementation of multiple behaviors. Throughout this process, an entrepreneurial opportunity is moved forward (Corbett, 2005; Kolb, 1984; Shane, 2003), while one intention can act as a moderator of the next intention. Entrepreneurial intention (EI) as an area of academic investigation has gained traction in the entrepreneurial behavior literature (Bird, 1988; Krueger & Carsrud, 1993; Liñán & Rodríguez-Cohard, 2015). However, the literature has identified issues of concern relating to the effectiveness of EI in driving action (Nabi et al., 2018). An improved understanding of the consistency of the impact of EI on behavior therefore requires examination of the two related underlying structures of EI: entrepreneurial goal intention (EGI) and entrepreneurial implementation intention (EII; Botsaris & Vamvaka, 2016; Esfandiar et al., 2019; Fayolle & Liñán, 2014). Previous studies have measured EGI using Liñán and Chen's (2009) EI questionnaire, which embraces intention at the level of strategy (Adam & Fayolle, 2016). EII, by contrast, refers to the process of plan-making (Martijn et al., 2008) and illuminates an increased likelihood of performing actions (Fayolle & Liñán, 2014).

The literature in this area focuses on student intentions to start a business and explores different country settings (Ahmed et al., 2017; Karimi et. al., 2016; Pfeifer et. al., 2016; Piperopoulos & Dimov, 2015). In these studies, EI is predominantly considered an outcome of entrepreneurship education (EE), indicating students' increased propensity to perform entrepreneurial behaviors or actions (Fayolle & Liñán, 2014; Moriano et al., 2012). Mixed findings have emerged because forming an intention during an EE program is only a preliminary stage. Retaining an intention after EE requires further motivational factors to overcome barriers. In this case, the student profile is considered, and barriers include limited elaboration, insufficient excitement, and competing goals" (Gollwitzer, 1990; Van Gelderen et al., 2015). Similarly, several studies suggest that for EII to foster action effectively, a moderate level of EGI is required, with opportunity development seen as an experimental process spanning multiple actions (Gollwitzer & Sheeran, 2006; Prestwich et al., 2015; Van Gelderen et al., 2018). EII is considered part of the motivation–opportunity nexus (Elfving et al., 2019), which has similar effects to motivational actions for sustaining opportunity development over time (Gielnik et al., 2015). Therefore, investigating both EGI and EII under the view of entrepreneurship as a process allows this study to explore how EI can be maintained over time.

This study adopts a sensemaking approach (variation-selection-retention or VSR) to analyze the interaction between EGI and EII among students during and after EE. Students starting with an initial belief of a successful venture or an EGI must act, reflect upon the impact of this belief through the environment, and then adjust their internal mental structure post hoc to shape new courses of intention and action (Alvarez et al., 2013; Festinger, 1957; Weick et al., 2005). During EE, EGI can be substantially boosted by confirmatory bias, although this intention may diminish over time (Wason, 1960). This phenomenon is demonstrated as a cognitive heuristic that allows (1) readily available (either complete or incomplete) knowledge and (2) recent

knowledge gained from the EE course to dominate the decision making or thoughts of the individual. Under this condition, the cognitive force pushes students toward actions rather than other alternatives or procedures (Schwarz et al., 1991). When pushed in this way, students deliberately or unconsciously overcome the conflict between their internal mental structure (i.e., what they anticipate) and what is happening in the external world (i.e., what the environment currently offers), showing a higher level of EGI during EE. The question is whether students will continue to maintain their level of EGI after EE. This research provides evidence that EGI, coupled with a high tendency to act during EE or high EII (Klapper & Neergaard, 2017), can contribute to sustained EGI following the program.

Data were collected at two time points—during an EE course (time 1) and one year after its completion (time 2)—for a sample of 412 participants from Vietnam. Partial least squares path modeling (PLS-SEM) was then used to evaluate the differences in path estimators of EGI_1 to EGI_2 between two groups (low EII_1 and high EII_1). The context of this research is Vietnam, which has a nascent entrepreneurship education system. Students are not encouraged to take an active learning approach or adopt critical thinking. The Vietnamese culture appreciates stability and embraces conflict avoidance. In the case of education, students passively follow what is taught in their university classes (Benzing et al., 2005; Politis & Gabrielsson, 2009; Ulrich & Cole, 1987). This context arguably makes Vietnamese students increasingly vulnerable to the contingent effects of confirmation bias on EGI because internal mental conflicts are more likely to be ignored (Schwarz & Vaughn, 2002).

This study contributes to the literature on entrepreneurship as a process and entrepreneurship education in several ways. Because entrepreneurship is a process in which entrepreneurs continually test their ideas and turn them into opportunities through intentions, actions, and

reflection (Corbett, 2005; Kolb, 1984; Shane, 2003), research on intentions considering a single time substantially reduces the potential to observe the process of opportunity development (Wood, 2017). This study highlights the moderating role of EII and paves the way for a non-linear assessment of EGI over time. In terms of contributions to research on entrepreneurship education, the contingent effects of EE on EGI in the context of nascent entrepreneurs are highlighted, adding to the theoretical grounding of the link between EE, EI, and subsequent behaviors (Henry et al., 2004; Shepherd, 2015). In addition, the study enhances both the rigor and relevance of entrepreneurship research through the exogenous umbrella factor of opportunity, thus indicating that time is required for opportunities to further develop (Wood, 2017). The findings also have practical implications for EII as a potential driver of long-term entrepreneurship under the view of decision making (Welter et al., 2017; Ferreira & Kraus, 2019), identifying how students' decision-making logics can be leveraged during educational intervention (Ilonen et al., 2018). Finally, this research increases the generalization of sensemaking research through the use of a quantitative approach with a difficult-to-access group of students in the Global South.

2. Literature review

2.1. Entrepreneurial intentions and a sensemaking epistemology

EI is accepted as the commitment to performing a behavior that drives the physical business startup process (Krueger & Carsrud, 1993; Palmer et al., 2019). Two key models shaping the EI literature are Ajzen's (1991) theory of planned behavior (TPB) and Shapero and Sokol's (1982) entrepreneurial event (SEE) model. The entrepreneurship literature focuses on EI with starting a business as the goal and the individual's conscious processing preceding the action (Shook et al., 2003). The EI literature also explores entrepreneurial intention within an

organizational setting. For example, Werner et al. (2014) suggest that employees who perceive their wages as unfair and simultaneously prefer different work hours have the strongest entrepreneurial intentions. However, there is insufficient evidence confirming the association between intentions and behaviors (Kautonen et al., 2015). Because beliefs are prior to motivational antecedents, which in turn are prior to intention (Ajzen, 1991), historic beliefs may remain the dominant influential force behind intentions. Beliefs remain effective unless environmental feedback is perceived, processed, and understood as a form of motivational antecedent (Gavetti & Rivkin, 2005). This view highlights the potential developments of various forms of intention before a behavior, which may consciously or unconsciously combine to affect entrepreneurship as well as innovation (Breslin, 2011; Dobson et al., 2013). Gollwitzer (1993) and Gollwitzer and Sheeran (2006) expand on this idea, identifying both goal and implementation intention. Goal intention acts at the level of strategy, while implementation intention refers to the process of plan-making (Martijn et al., 2008). As implementation intention involves thinking about performing a behavior, the term "entrepreneurial intentions" typically accounts for the first phase of goal intention (Adam & Fayolle, 2016, p. 81).

As a general framework, it may be considered that entrepreneurial individuals form a belief of an opportunity prior to the conceptualization of intentions (Alvarez et al., 2013). When conceptualizing a solution to such a belief, individuals engage in the process of sensemaking, which evolves through the interaction between "the self" and the external environment (Weick, 1979; Weick et al., 2005). This idea integrates Campbell's (1965) application of evolutionary epistemology with social life. The stages include enactment (or "variation"), selection, and retention (VSR). This epistemology suggests that "sensemaking can be treated as reciprocal exchanges between actors [Enactment] and their environments [Ecological Change], which provide system variation, which are subsequently made meaningful [Selection] and preserved

[Retention]" (Weick et al., 2005, p. 409). The sensemaking meanings inform and constrain identity and action. Several studies advocate the view that entrepreneurs and managers reject signals that falsify their pre-existing assumptions while searching for information (Gavetti & Rivkin, 2005; Kunda, 1987). Fitting into the concept of sensemaking, Wason (1960) labels such a phenomenon as confirmation bias in the psychology literature, where cases in which an outcome is said to occur or to be known to have occurred constrain the direction of the test results (Peterson & Wong-On-Wing, 2000). Here, entrepreneurs form hypotheses (negative/neutral/positive) regarding opportunities and seek evidence to test the veracity of these hypotheses (Shepherd et al., 2012). This process is iterative, and hypotheses are revised when inadequacy is discovered (Klayman & Ha, 1989). The existing research describes the problematic effects caused by confirmation bias. These effects include increasing the chance of employing cognitive and attitudinal heuristics in decision making, thus leading to overconfidence, illusion of control, and a misguided belief in the law of small numbers (Mitchell et al., 2000; Shepherd et al., 2015).

The reason for highlighting confirmation bias in assessing EI among students is twofold. First, research has revealed contradictory results regarding the effects of experience on EI (Emami & Dimov, 2017; Miralles et al., 2016) where students have been identified as having little entrepreneurial experience (Shepherd et al., 2012). In the absence of direct entrepreneurial experience, other everyday experiences such as EE serve as cognitive frameworks or prototypes that define acceptability and plausibility in sensemaking (Baron, 2006), driving entrepreneurial intention (Ribeiro-Soriano & Kraus, 2018). Second, individuals often exert limited information gathering to reduce cognitive effort under conditions of bounded rationality (Tversky & Kahneman, 1975). For example, Elston and Weidinger (2019) observed that individuals in locations in China with higher degrees of internationalization and more professional job

opportunities often experience lower levels of entrepreneurial intention. Similarly, this study advocates EE where students are offered new skills that enhance their bias toward success by overlooking the gap between the right conditions for a successful venture/entrepreneur and their view of appropriate entrepreneurial capabilities. Thus, limited experience increases the likelihood that students allocate attention to cues that lead them toward entrepreneurial attitudes while EE is provided (Fitzsimons et al., 2008).

Variation in these cognitive frameworks or prototypes occurs when new opportunities are generated (Breslin, 2017; Kaish & Gilad, 1991). These new concepts are then transferred into selection (and retention) as the entrepreneur examines their strategic value logic and novelty (Hill & Birkinshaw, 2010), while considering business model components such as distribution channels, marketing or sales approaches, and technologies (Kim & Mauborgne, 2004; Markides, 2000). Individuals who form an EII detailing a specific plan of where, when, and how the desired behavior will be performed are more likely to act on their intentions than on entrepreneurial goal intention (Fayolle & Liñán, 2014). Thus, it is suggested that EGI and EII actively evolve during variation and selection/retention of sensemaking, respectively. The literature suggests that EII, as the motivational antecedent and proxy of entrepreneurial behavior (Esfandiar et al., 2019), increases the chance of moving to a retention decision of whether or not an idea will be further exploited (Shane & Venkataraman, 2000). EE research has found that decision-making logics are transformed during educational intervention in such a way that pure causal and effectual approaches are replaced by the hybrid or coping strategy (stagnation) upon completion of the course (Ilonen et al., 2018). Thus, due to the scarce opportunity to execute their ideas during EE (Klapper & Neergaard, 2017), students tend to circulate within variation and selection of sensemaking. EGI may temporarily be heightened

under the effects of EE, although the retention of this intention after EE requires a high level of EII as an antecedent.

Building on the philosophy and psychology of the entrepreneurial process, sensemaking, and confirmation bias (Klayman & Ha, 1989; McMullen & Dimov, 2013; Weick et al., 2005), this study offers a cognitive framework of EI in relation to confirmation bias.

[Figure 1 Here]

2.2. Hypothesis development

EII is considered as the proxy of behavior (Esfandiar et al., 2017). Zajonc's (1968) study on the mere-exposure paradigm showed that the more frequently an individual is exposed to an object, especially in a group context, the greater the likelihood will be that they will perceive it as desirable, respond positively to it, and actively engage with it. This phenomenon has been demonstrated to be robust across cultures and across different forms of objects, such as words, sounds, paintings, geometric figures, faces, and persons (for a meta-analysis, see Bornstein, 1989), even when the stimuli are not accessible to the participants' awareness, or even prenatally (Zajonc, 2001). During EE, high-EII students often engage in entrepreneurial tasks that provide them with a higher likelihood of perceiving several experiences as small wins. Metaphorically, this situation has a similar effect to motivating constructive actions (Gielnik et al., 2015) within the motivation–opportunity nexus (Elfving et al., 2019), moving students toward retention (or idea execution). These positive impressions of entrepreneurial behavior increase the chance of employing a favorable bias over time, encouraging students to retain the skills and decision policies to test their assumptions (Haynie et al., 2009) or to follow effectuation where they perceive losses as inevitable yet affordable costs of doing business

(Goel & Karri, 2006). Alternatively, students with low EII may suffer from inaction decisions, lowering the odds of acting on future business ideas and potentially leading to "a trajectory of continued dismissal of positive value opportunities" (Wood et al., 2017, p. 123). Therefore, the following hypothesis is proposed:

Hypothesis: *Entrepreneurial implementation intention (EII_1) moderates the stability of entrepreneurial goal intentions (EGI_1 and EGI_2).*

3. Method

3.1. Survey design and administration

By examining the curricula of universities in Vietnam, 16 undergraduate programs (14 Business Management and 2 Engineering) were identified. All programs offered one module/course on EE conducted in English and lasting at least three months (or 48 contact hours) before students started their final year. The common objectives of the EE module/course in these programs were to introduce fundamental theories of entrepreneurship and provide students with tools that would assist in devising a business plan such as the Business Model Canvas (Osterwalder & Pigneur, 2010). To minimize the chances of common method variance, duplicate paper and online questionnaires were employed, available in either English or Vietnamese. The questionnaire was designed using measurement items grounded in the literature (Chen et al., 1998; Liñán & Chen, 2009). The measures employed here were adopted from existing scales (Appendix 1), but modifications were made to adapt to the case of students. All items (unless otherwise indicated) were measured on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Through convenience sampling, students were asked to complete the questionnaire at two times: during the compulsory entrepreneurship course and approximately one year after the course.

A compulsory entrepreneurship course eliminates the possibility of students' self-selection of entrepreneurship, reducing excessive subjective assessment of the effects of EE on EI (Henry et al., 2005; Oosterbeek et al., 2010; Von Graevenitz et al., 2010). The majority of students (74%) in the sample were based in Southern Vietnam, where the development of private enterprises is concentrated (Baughn et al., 2006). The sample was divided into men (57%) and women (43%). In terms of the degree course, 88% of participants studied Business Management and 12% Engineering. The age of students in the sample ranged from 18 to 25 years (100%). This age range was appropriate for this study because at this age, individuals actively develop occupational aspirations by considering either seeking employment opportunities or starting a business (Nabi et al., 2006). Data on the experience of all students were: (time 1) mean = 0.264 (max = 1), SD = 0.184; and (time 2) mean = 0.266 (max = 1), SD = 0.186. This calculation was based on Davidsson and Honig's (2003) four-item scale (Yes = 0.25/No = 0), indicating access to social and human capital.

3.2. Measures

3.2.1. Dependent variable

Entrepreneurial goal intention (EGI). This variable was measured using a six-item scale developed by Liñán and Chen (2009). A sample item is "Have you ever seriously considered becoming an entrepreneur?"

3.2.2. Independent variable

Entrepreneurial implementation intention (EII). This variable was measured using a 22-item scale developed by Chen et al. (1998). Although the items were originally used to reflect five categories of entrepreneurial self-efficacy (ESE), the categories are suitable for assessing EII

on the grounds of planning various entrepreneurial activities in the near future. Although it may seem that self-efficacy is a different construct from EII, this paper focuses on the planning of activities, which reflects implementation intention. The ESE questionnaire covers a wider range of activities that the students think about performing and hence provides a more convincing measure of EII. The survey instructions therefore specifically asked participants to rate the importance and urgency of these tasks during the entrepreneurial process to emphasize EII (Urban, 2006). Specifically, they were asked what tasks they *will perform* or *are performing* to progress with their business idea.

3.2.3. Control variables

Consistent with prior studies (Dheer & Lenartowicz, 2016; Liñán & Rodríguez-Cohard, 2015), six control variables were considered in the analysis: gender (male; female), age (18–25 years; 26–45 years; 46–60 years; 60 years or above), study program (Business Administration; Computer Science or Engineering; Other), name of institution, entrepreneurship course availability (within one year), and entrepreneurial experience (social capital; human capital) to reduce the possibility of alternative explanations over a period.

3.3. Analytical methods

This study followed a two-step approach, including measurement of invariance and multigroup analysis, to test the hypothesized moderating effects of EII_1 on the relationship between EGI_1 and EGI_2 (Hulland, 1999). Following recent research on EI (Fretschner & Weber, 2013; Giacomin et al., 2016; Kautonen et al., 2011; Miralles et al., 2016; Shinnar et al., 2014), partial least squares path modeling (PLS-SEM) was employed. The PLS approach was appropriate because it made minimal demands concerning measurement scales, sample size, and residual distributions (Wold, 1985). Multigroup analysis (MGA) in SmartPLS enabled testing of

whether the pre-defined data groups had significant differences in their group-specific parameter estimates (e.g., outer weights, outer loadings, and path coefficients; Sarstedt et al., 2011).

4. Multigroup analysis and results

To ensure meaningful results, measurement invariance across the two groups of high EII and low EII during EE was confirmed following a test using the MICOM approach in Smart PLS (Henseler et al., 2016). The guidelines suggest that either configural invariance or compositional invariance must be established before proceeding with the PLS-MGA. Compositional invariance should confirm the similarity between the two groups of students in terms of the data treatment for the measurement, the structural model, and the algorithm settings. The purpose of this procedure was to compare the original score correlations c against the empirical distribution of the score correlations obtained through the permutation process (c_u). If c exceeded the 5% quantile of c_u, compositional invariance could be confirmed (Schlägel & Sarstedt, 2016). Once either of these two types of invariance had been confirmed, the research could proceed with a PLS-MGA test (see Table 1 for details).

[Table 1 Here]

Following the measurement of invariance, multigroup analysis (MGA) was conducted to further test the hypothesis using SmartPLS 3. The data set was divided into two subsamples characterized by high EII_1 (Group 1: n = 213) and low EII_1 (Group 2: n = 199).

Table 2 illustrates the coefficients of each hypothesized path and the corresponding path coefficient difference (PCD). The significant difference of PCD (EGI_1x$EII_1 \rightarrow EGI_2$) between the two groups of high and low EII_1 was supported, indicating that the moderating effects of EII on the transition between EGI_1 and EGI_2 were stronger for the group of high EII. Overall, these results support the hypothesis and highlight the importance of time.

[Table 2 Here]

5. Discussion and conclusions

Through the data analysis, this study confirms the variation in EGI reported in prior studies following EE (Souitaris et al., 2007; Weber, 2012). For example, the finding is consistent with Esfandiara et al.'s (2019) suggestion of desirability as the primary driver of EGI during EE. However, the study shows its commonality with Von Graevenitz et al.'s (2010) claim that variation in intentions after EE is unlikely for students if their perceived pre-course feasibility of starting a business is strong and consistent (e.g., consistently negative or positive). A possible explanation is that these students possess either high or low EII. For example, during the EE course, the group with high EII is more susceptible to environmental cues to retain goal intensity over sensemaking than those who have low EII. The finding provides evidence of the phenomenon that when students consider themselves part of a group having a strong fit with entrepreneurship, entrepreneurial intention can be strongly predicted by entrepreneurial self-efficacy (Hsu et al., 2019).

Prior research has occasionally suggested signs of a neutral or even negative relationship between EE and EI (Krueger & Brazeal., 1994; Oosterbeek et al., 2010; Von Graevenitz et al., 2010). The reverse causation takes its impetus from the assumption that various

factors/motivational antecedents influence the real effectiveness of EE on EI (Fayolle & Gailly, 2015; Martin et al., 2013). For example, Oosterbeek et al. (2010) report a decrease in EI after participating in EE because students potentially obtain more realistic perspectives of themselves and what it takes to be an entrepreneur. Although EE enhances EGI, it may not be positively prolonged among low-EII students because of their difficulties in moving around the loop of sensemaking to sustain intensity, which supports the hypothesis in this study. The results, however, specifically suggest that EGI remains relatively stable for the group of high EII after EE, contrasting with Oosterbeek's (2010) findings. Souitaris et al. (2007) further connected EI to the construct of emotions to show the significant positive impact of EE on EI among students. However, such an effect was only found close to the time of EE provision. Because emotions are volatile and contagious (Foo, 2011), the increase in EGI at t_1 might be accounted for by the transmission of positive emotions about entrepreneurship between both high- and low-EII students during the EE experience (Baron, 2004). Positive emotions have a positive effect on students' motivation to engage in subsequent actions (Bandura, 1997; Gielnik et al., 2015; Carver & Scheier, 1990). However, students with low EII may find themselves interacting within a local group and may become less likely to take actions after the EE is offered. Here, high EGI_1 may potentially transition into low EGI_2, which will ultimately lead to a drop in the level of positive emotions and hence a decrease in or even negative impacts on EGI over time, considered from the perspective of mere-exposure effects (Zajonc, 1968).

This research contributes to the theoretical conceptualization of the effect of EII on EGI (Bagozzi et al., 2003; Elfving et al., 2017; Esfandiara et al., 2019; Krueger, 2017) in an academic context (Henry et al., 2004; Kailer, 2005). It highlights the non-linear assessment of EI over a period, allowing behavior and variations in individual beliefs to occur through both

irrational and logical intention-behavior views. By drawing on the transition between goal intention and implementation intention, emphasizing their intertwined nature in constituting EI (Fayolle & Liñán, 2014; Gollwitzer, 1993), this study highlights the need to consider a combination of multiple anticipatory and adaptive intentions and subsequent behaviors in assessing EI during the entrepreneurial process, considered through a sensemaking lens. EII has been found to result more effectively in actions enabling the opportunity development process and is more common among students with high EII. Thus, a more comprehensive picture of the entrepreneurial process is illustrated. Moreover, the role of both time- and space-related constructs (environmental conditions, knowledge structure, individual beliefs, and time) is highlighted to raise academic awareness of this "transformative process by which desires become goals, actions, and systemic outcomes" (McMullen & Dimov, 2013, p. 1482).

At the practical level, this research confirms the positive effects of EE on EI. The result promotes confidence in investment in EE and training programs by governments, universities, and public and private organizations. Entrepreneurs' cognitions are similar across different cultures and contexts (Mitchell et al., 2000), so studying such a sample of students in Vietnam provides increased knowledge and understanding regarding the various aspects of EE, enabling global comparisons (Pham, 2018). Typically, the recent literature has promoted an experiential pedagogical design that engages students in experimentation and practice to be effective, involving starting a business, design-based thinking, and business simulations (Kriz & Auchter, 2016; Neck & Greene, 2011). However, these approaches are not widespread in either developed or developing countries, given the lack of favorable learning conditions, university support, and the local business environment (Klapper & Neergaard, 2017). Thus, under a wide range of settings, EE only temporarily permits opportunities to appear more vividly and subsides with time as non-entrepreneurial knowledge is later added to students' mental structure.

To improve the general level of EI, educators are advised to avoid taking a causal approach to EE. Instead, they should engage students in an experiential process over a period during which repetition and experimentation "increase an entrepreneur's confidence in certain actions and improve the content of her/his stock of knowledge" (Minniti & Bygrave, 2001, p. 7). To take advantage of students' EII, time should be given during the education process, allowing them to absorb and stabilize their propensity and take action toward starting a business. The practical experience gained from entrepreneurial activities during EE, despite only being a small approximation of the real world, may help students test the veracity of their interests, discover their true abilities in entrepreneurship, and as a result, shape their future career toward self-employment more effectively. Students may benefit from pedagogies that focus on EII to guide them through a multi-functional implementation process (Liñán, 2007), or better yet, to set up a mini-business throughout the course (Rodrigues et al., 2012). Here the emphasis is on enabling mindset development (Heinonen & Poikkijoki, 2006). For example, creative problem-solving (Camacho et al., 2016) and behavioral training games (Johnsson et al., 2016) can potentially lead to systematic improvement in positive attitudes toward entrepreneurship over time (Jones et al., 2017; Maas & Jones, 2015). Thus, developments in valid quantitative measures that are unidimensional and applicable across a broad range of contexts for traditional frameworks such as effectuation and entrepreneurial bricolage (Davidsson et al., 2017) also signal an opportunity for research advancing the promotion of an entrepreneurial mindset among students and students' engagement with a wider social context.

Like all research, this study has limitations that provide future research opportunities. Due to limited time and access, data on the treatment groups (students enrolled in a compulsory introductory EE course) were collected on only two occasions (t_1 and t_2). Thus, the study was

unable to identify the exact patterns of changes in students' EI over a period. Because the study also showed that EI is a process that unfolds over time, further research could employ time series data on various control and treatment groups to provide further evidence. Qualitative methods (e.g., interpretative phenomenological analysis; Smith & Shinebourne, 2012) focusing on the significance of individuals' lived experiences can also be combined to provide a richer description of the process through which students make sense of, form, and preserve their intentions both before and during entrepreneurial behavior.

Using a sensemaking approach to entrepreneurship, this research draws a distinction between EGI and EII and their transition, which, together, constitute entrepreneurial intentions. The results suggest that the effects of EE on EI vary over time and space depending on several contextual factors. EGI (or, in this study, individual beliefs toward an entrepreneurial goal) is a context-dependent construct affected by environmental conditions (EE) and temporality. The availability of EE has a significant positive effect on EGI. However, the intention may subside gradually if it is not nurtured, perhaps with a sufficient level of entrepreneurial behavioral engagement (or EII) or further EE over time. Such a situation provides academics with both challenges and opportunities in helping students form and develop stable EI in the long term. To nurture EI, EE educators may encourage students to engage in small everyday actions and develop an action-oriented mindset that provides them with opportunities to increase their overall confidence, leading to a more favorable level of EI in the long term. Future research might employ qualitative methods to assess the link between EE, EI, and subsequent actions. Potential approaches include investigating whether entrepreneurship courses and learning environments have varying effects on EI among students and whether the micro- and macro-environment in different country contexts significantly influences behavior.

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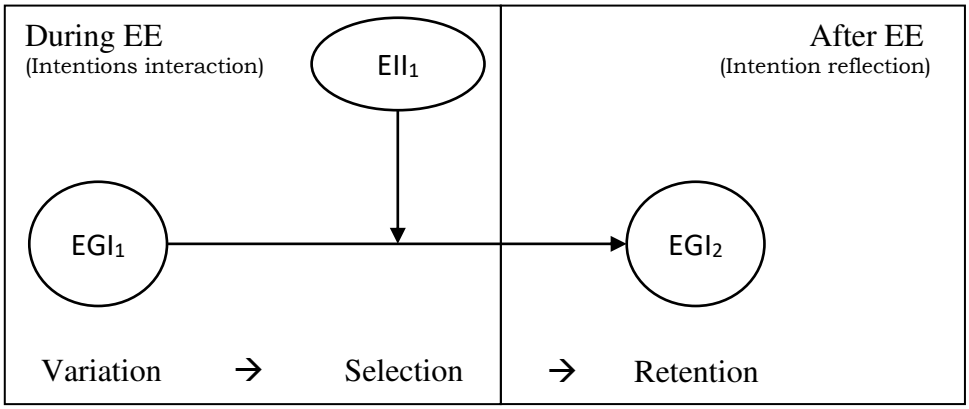

Figure 1: Integrated framework of entrepreneurial intentions informing behaviours

$EII_{1(low)}$ vs $EII_{1(high)}$				
Variables	Configurational Invariance	*c*	5% quantile of c_u	Partial measurement invariance
EGI_1	Yes	1.000	1.000	Yes
EII_1	Yes	1.000	1.000	Yes
EGI_2	Yes	1.000	1.000	Yes

Note: *Italic* values violate the assumptions of measurement invariance between the group with low EII and the group with high EII during EE

Table 1: Compositional Invariance assessment using MICOM in Smart PLS

	PCD ($\lvert H_1 - L_1 \rvert$)	**p-Value (H_1 vs L_1)**
$EGI_1 \rightarrow EGI_2$	0.018	0.441
$EGI_1 x EII_1 \rightarrow EGI_2$	0.446	0.044*
$EII_1 \rightarrow EGI_1$	0.023	0.418
$EII_1 \rightarrow EGI_2$	0.006	0.566

Note: PCD: Path coefficients difference; H_1: High score in time 1; L_1: Low score in time 2
**. PCD is significant at the 0.01 level (2-tailed). *. PCD is significant at the 0.05 level (2-tailed).

Table 2: Results of the Multigroup Analysis

Appendices

Appendix 1: Questionnaire Items

1) Entrepreneurial Goal Intentions (EGI): 6 questions by *Liñán and Chen (2009).*

1. I am ready to do anything to become an entrepreneur.
2. My professional goal is to become an entrepreneur.
3. I will make every effort to start and run my own business.
4. I am determined to create a business in the future.
5. I have thought very seriously about starting a business.
6. I firmly intend to start a business one day.

2) Entrepreneurial Implementation Intentions (EII): 22 questions by *Chen, Greene, and Crick (1998).*

Please rate your agreement with the importance and urgency of the following activities which you ***'will do'*** *or* ***'are doing'*** *to support a venture business' long-term goal.*

Marketing - new markets and geographic areas

1. Set and meet market share goals
2. Set and meet sales goals
3. Set and attain profit goals
4. Establish a position in the product market
5. Conduct market analysis
6. Expand a business

Innovation - New venturing and new ideas

1. New ventures and new ideas
2. New products and services
3. New markets and geographic territories
4. New methods of production, marketing and management

Management - new products and services

1. Reduce risk and uncertainty
2. Strategic planning and develop information systems
3. Manage time by setting goals
4. Establish and achieve goals and objectives
5. Define organisational roles, responsibilities and policies

Risk-taking

1. Take calculated risks
2. Make decisions under uncertainty and risk
3. Take responsibility for ideas and decisions
4. Work under pressure and conflict

Financial control

1. Perform financial analysis
2. Develop financial system and internal controls
3. Control cost

General Information

- My Gender is: Male/Female
- My Age is: 18-25 years; 26-45 years; 46-60 years; 60 years or above
- Your undergraduate programme
  - Business Administration
  - Computer Science or Engineering
  - Other
- Entrepreneurial experience: 4 items by Davidsson and Honig (2003) - Yes/No

Social Capital

Have your parents ever started a business?

Has anyone else you know started a business?

Human Capital

Have you ever worked for a small or new company?

Have you ever started a business?

Have you taken courses on entrepreneurship or business creation within the last one year?

Yes/No

If 'Yes', what was the level of vigorousness?

Low/Medium/High

Your details

Name/Email Address/Phone Number/University.