Entrepreneurial intention among university students in Malaysia: Integrating Self-determination theory and the theory of planned behavior

ABSTRACT

The present study endeavors to develop a deeper understanding of the motivational processes involved in intentional entrepreneurial behavior. For this purpose, it integrates the social cognitive approach of the theory of planned behavior (TPB) and the organismic theory of motivation of self-determination theory (SDT). More specifically, it tests the role of basic psychological needs of autonomy, competence and relatedness as defined in SDT in shaping university students' attitudes and intentions toward entrepreneurship. The sample of this study consisted of 438 (Males = 166, Females =272) 3rd and 4th year university students from four Malaysian Public Universities. The results of the study show that the model strongly explains about 71% of the variance in entrepreneurial intention. Basic psychological needs of autonomy, competence and relatedness have a strong indirect impact on entrepreneurial intention via their attitudinal antecedents: attitude, subjective norm, and perceived behavioral control. This indicates a full-mediational model, where the attitudinal factors operated as transmitters of effects from the distal constructs of SDT on entrepreneurial intention. These findings confirm that both SDT and the TPB provide complementary explanations of the motivational processes of entrepreneurial behavior. The study contributes to the existing knowledge by providing a theory-based understanding of the role of motivations in the formation of entrepreneurial intentions. It opens the way for future research to analyze how alternative motivations may affect new venture creation, survival and success.

INTRODUCTION

Entrepreneurial intention plays a key role in subsequent entrepreneurial behavior (Carsrud and Brännback 2011). As a result, understanding the formation of entrepreneurial intention is essential (Bird and Jelinek 1988; Boyd and Vozikis 1994; Krueger et al. 2000; Krueger and Day 2010). According to Krueger (2009, p. 53), "the construct of intentions appears to be deeply fundamental to human decision making". Entrepreneurship is, therefore, an intentional process and a planned behavior (Bird and Jelinek 1988; Krueger et al. 2000; Krueger and Carsrud 1993). That is, starting a new business requires and involves planning as one of the first steps in this process (Iakovleva et al. 2011).

Many researchers have confirmed that intention is the best predictor of voluntary behaviors. More specifically, entrepreneurial intention is considered a proximal and immediate predictor of entrepreneurial behavior (Bird and Jelinek 1988; Krueger et al. 2000). For that reason, to understand and promote entrepreneurship, it is important to understand entrepreneurial cognition (Krueger and Day 2010). However, in Krueger's (2009) view, entrepreneurial intention is considered to be dead, calling for a deep rethinking on how it is researched (Fayolle and Liñán 2014). Accordingly, Fayolle, Liñán and Moriano (2014) and Fayolle and Liñán (2014) were among those who took the lead on identifying possible research directions and new perspectives on entrepreneurial intention to bring it to life again. They suggest that entrepreneurial decision-making processes may be better understood if entrepreneurial intention models are integrated with other theories and/or with methodological improvements such as mediation effects.

According to the Theory of Planned Behavior (TPB), entrepreneurial intention is influenced through attitudinal factors that comprise beliefs about an outcome (Ajzen 1991). Yet, the TPB does not explicitly indicate the reasons why entrepreneurial behavior is pursued (Deci and Ryan 1985). This is because the TPB does not distinguish between beliefs about outcomes that people choose to pursue out of volition and true self, and beliefs about outcomes that people are compelled to accomplish out of obligation. While there have been a number of valuable studies on entrepreneurial intention that applied the TPB to university students (Almobaireek and Manolova 2012; Autio et al. 2001; T Kautonen et al. 2013; Liñán and Chen 2009; Moriano et al. 2012; Siu and Lo 2011; Tkachev and Kolvereid 1999), none of them has clearly shown whether people choose to pursue entrepreneurial activity because they are intrinsically or extrinsically motivated.

In this sense, self-determination theory (SDT) posits that people have tendencies to grow and function and, thus, move toward activities that satisfy their inner resources of development and optimal functioning. SDT could provide an explanation about the origins of the TPB constructs (Andersen et al. 2000). This is because it considers individuals with satisfied psychological needs as intrinsically motivated and more likely to persist at completing a task (Deci and Ryan 2000). Motivation could play a key role in the formation of entrepreneurial intention and varying levels of attitudes. Subjective norms (SNs) and perceived behavioral control (PBC) may result from different types of motivations (Fayolle et al. 2014).

Thus, people can be intrinsically or extrinsically motivated, or both, to engage in entrepreneurial activity (Naffziger et al. 1994). Several studies have analyzed internal and external motivations (Carsrud et al. 2009; DeTienne et al. 2008; Fayolle et al. 2014). Both types of motivations may have positive effect on the entrepreneurial intention under specific circumstances (Antonioli et al. 2016). All the same, their effects on the decision to act are probably different (Carsrud and Brannback 2011) as are those on entrepreneurial persistence (DeTienne et al., 2008). Similarly, the creation of social ventures, for instance, may be more clearly driven by intrinsic motivations (Carsrud and Brannback 2011). Nevertheless, a general integration of SDT and the TPB has, to the best of our knowledge, not yet been carried out in earlier entrepreneurship research.

Overall, then, given the ability of the TPB in predicting various human behaviors including entrepreneurship, and knowing that motivation is crucial in shaping people's attitudes and intention toward actions, a deeper understanding of how motivations contribute to the formation of intention is necessary. To fill this void in the literature, this study utilized SDT of motivation to provide a greater insight on the issue. Specifically, this study attempts to shed light on how the basic psychological needs of SDT could explain the formation of attitudes toward entrepreneurship as well as perceptions of self-capabilities, thus influencing the intention to act entrepreneurially. Hence, the current study had two specific objectives:

1. To examine the role that the basic psychological needs, as conceptualized in self-determination theory (SDT), play in enhancing the entrepreneurial attitudes and intentions.
2. To examine the mediating effect of the three attitudinal factors of the theory of planned behavior (TPB) on the relationship between entrepreneurial intention and basic psychological needs.

In sum, this study addresses the call to integrate entrepreneurial intention models with other theories with methodological improvements (Fayolle et al. 2014; Liñán and Fayolle 2015). It makes two important

contributions. First, theoretically it integrates SDT with the TPB in one comprehensive model to better understand the link from motivation to intention to be entrepreneurs. It supports the applicability of the TPB and the notion that intention can only be better predicted by its proximal attitudinal factors, attitude, SNs and PBC (Ajzen 2011). Further, SDT motivational factors have shown a strong influence on the attitudinal factors, indicating that they are distal factors on intention. This confirms that both theories provide complementary explanations of the motivational processes, suggesting a motivational sequence from SDT constructs to intention through the attitudinal factors (Hagger and Chatzisarantis 2009). Second, methodologically, the study employed a robust analytical approach using structural equation modeling to test the study hypotheses and to validate the model.

The remaining of this paper is organized as follows: first, the theoretical background comprising both the TPB and SDT as underpinning theories of this study is discussed. This is then followed by a theoretical justification of the integration of both theories and the construction of the study framework. Thereafter, the details about sample, measurement, data collection and method are presented. Following that, the results are described and discussed in the subsequent section. The paper ends with a conclusion section.

THEORETICAL BACKGROUND

Theory of Planned Behavior

Based on the social cognitive approach, the TPB postulates that intention predicts human behavior (Ajzen, 1991), where intention indicates the extent of effort a person plans to make to carry out that behavior (Entrialgo and Iglesias 2016). That is, when deciding on engaging or not engaging in performing an action, people tend to have prior planning and intention (Ajzen 2002). Explaining and predicting human behavior is the central purpose for the development of the TPB as it is to the other intention models including the Entrepreneurial event model (Shapero and Sokol 1982), the entrepreneurial potential model (Krueger and Brazeal 1994), and Davidsson's (1995) model. Notwithstanding, the TPB is regarded as superior and more influential than other intention models (Fayolle et al. 2014; Liñán and Fayolle 2015). The TPB offers a coherent framework that enables a better understanding and prediction of entrepreneurial intention (Krueger et al., 2000). Its applicability to various domains including entrepreneurship is well-documented (Carr and Sequeira 2007; Krueger and Carsrud 1993; Tkachev and Kolvereid 1999).

According to the TPB, the behavioral intention is determined by three conceptually independent antecedents, namely attitudes toward the behavior, SNs and PBC. Attitudes toward behavior refer to people's overall evaluation (positive or negative) or appraisal of the behavior in question (Ajzen, 1991). Prior to forming intention, people seem to make assessments in favor of or against a behavior. A favorable attitude toward a behavior, such as starting a business, is formed when it is perceived as having advantageous and desirable consequences. An attitude toward entrepreneurship has shown a consistent and strong impact on entrepreneurial intention in most of the research in various cultural settings (Almobaireek and Manolova 2012; Douglas and Fitzsimmons 2013; Fitzsimmons and Douglas 2011; Gelderen et al. 2008; Iakovleva et al. 2011; Kolvereid, 1996b; Liñán and Chen 2009; Liñán, Urbano, et al. 2011; Moriano et al. 2012; Tkachev and Kolvereid 1999; Wu and Wu 2008). Nonetheless, it has been found that attitude could not predict entrepreneurial intention in a collectivist context, perhaps due to cultural differences (Siu and Lo 2011).

SNs refer to the sum of individuals' perceptions about how influential people in their lives think about their engaging or not in a particular behavior, such as starting a business. It has been found to be the weakest predictor of entrepreneurial intention in some studies (Almobaireek and Manolova 2012; Autio et al. 2001; Krueger et al. 2000; Liñán and Chen 2009). However, a number of other studies have found that SNs influenced intention (Iakovleva et al. 2011; Kautonen et al. 2013; Kolvereid 1996; Siu and Lo 2011; Tkachev and Kolvereid 1999).

PBC refers to people's perception of how easy or difficult a behavior (for instance, starting a business) is, and how much volitional control they have over it (Ajzen 1991). The constructs of PBC, self-efficacy (Bandura 1977 1982) and perceived feasibility (Shapero and Sokol 1982) are considered very close and similar to each other (Ajzen 2002; Chell 2008; Liñán and Chen 2009). Yet, Ajzen (2002) argues that there are some differences between PBC and self-efficacy. For instance, PBC includes not only the feeling of being capable but also the perception of controllability of the behavior. It has been attested that PBC relative to feasibility and self-efficacy exerts a stronger influence on entrepreneurial intention (Almobaireek and Manolova 2012; Hessels et al. 2008b; Iakovleva et al. 2011; Kautonen et al. 2013; Krueger et al. 2000; Liñán and Chen 2009; Moriano et al., 2012).

Thus, given the well-established applicability of the TPB in entrepreneurship, we propose the following hypothesis:

H1: Intention antecedents are positively associated with the entrepreneurial intention, including the attitude toward entrepreneurship (H1a); subjective norms (H1b) and perceived behavioral control (H1c).

Self-Determination Theory

Despite the wide empirical support found in entrepreneurship research (Almobaireek and Manolova 2012; Autio et al. 2001; Evan J. Douglas 2013; Iakovleva et al. 2011; Kautonen et al. 2013; Krueger et al. 2000; Liñán and Chen 2009), the TPB does not distinguish between the beliefs and the evaluation of the behavioral outcomes (Hagger and Chatzisarantis 2009). That is, do people engage in entrepreneurial behavior because they choose to or because they are compelled to? Consequently, the self-determination theory of motivation could offer an explanation of the origins of the TPB constructs (Andersen et al. 2000).

Self-determination theory (SDT) is a theory of human motivation, development and wellness. SDT views motivation as the core of biological, cognitive and social regulation and involves the energy, direction and persistence of activation and intention (Deci and Ryan 2000). It posits that human beings have an inherent motivation for growth and achievement (Stone et al. 2009) and they have natural motivational tendencies and readiness to learn, explore and assimilate knowledge and develop new skills (Ryan and Deci 2000b). These natural tendencies can, nonetheless, be either facilitated and supported or hindered by social contexts (Ryan and Deci 2000b). As it is viewed as a macro theory of human motivation, development and wellness, SDT is based on some aspects that are central to it.

First, SDT argues that people have three psychological needs, namely autonomy, competence and relatedness, that are essential nutrients for them to function optimally and grow psychologically (Deci and Ryan 2000). Second, unlike many other theories, SDT distinguishes between two types of motivation: intrinsic or extrinsic motivation. Extrinsic motivation involves expecting separable outcomes such as receiving money, pride

and prestige or even avoiding unemployment. Intrinsic motivation reflects a personal interest and the enjoyment that can be derived from that behavior. It is about engaging in activities for their inherent satisfaction capacity and their potential for excitement and challenge. Extrinsic motivation, nevertheless, can be internalized and integrated into one's value system. This integrated motivation becomes identical to intrinsic motivation and may be called autonomous motivation.

The third aspect that is essential to SDT is the social environment, which can be viewed as either supportive or not supportive. The former hinges on the assumption that needs can be satisfied and thus people will be more autonomous in their actions. Meanwhile, the latter holds that due to not getting support, people may feel they are controlled, resulting in low quality performance (Ryan and Deci, 2000a, 2011). According to Deci and Ryan (2012), "social-contextual factors that support satisfaction of the three basic psychological needs will promote autonomous functioning, persistence, effective performance (especially on heuristic tasks), and wellness. In turn, social-contextual factors that thwart satisfaction of these three basic psychological needs will result in diminished autonomy, poorer performance, less persistence, and greater ill-being" (p. 3).

Basic Psychological Needs Theory (BPNT)

The Basic psychological needs theory (BPNT) is one of the self-determination sub-theories that conceptualizes three psychological needs, that is to say, autonomy, competence and relatedness, as essential nutriments for people to function optimally and grow psychologically (Deci and Ryan 2000). These needs are thought to be universal across people and cultures and are applicable throughout all aspects of a person's life (Milyavskaya and Koestner 2011). Satisfying these needs seems to represent the underlying motivational mechanism that energizes and directs people's behavior (Broeck et al. 2010; Deci and Ryan 2000).

Autonomy refers to the perception that one's behavior is self-congruent and volitional. According to Niemiec et al. (2006, p. 763), "the need for autonomy is feeling a sense of choice, endorsement, and volition with respect to initiating, maintaining, and terminating behavioral engagement". Competence refers to the perception that one is capable of influencing the environment in desirable ways. The feeling of competence about doing a certain task is characterized by challenges but within the capabilities and abilities of an individual, so that he/she can satisfy his/her innate need of competence and thus be intrinsically motivated. Consequently, the tendency for personal growth, well-being and performance is high (Deci and Ryan 2000). Relatedness involves the feeling of meaningful closeness and connectedness with others (Weinstein and Ryan 2011). In addition to the needs for autonomy and competence, SDT posits that satisfaction of the need for relatedness facilitates the process of internalization. People tend to internalize and accept as their own the values and practices of those to whom they feel (or want to feel) connected to, as well as those from contexts in which they experience a sense of belonging.

All three innate needs are argued to have an intrinsic value for the self and are essential for well-being and behavioral persistence (Teixeira et al. 2012). Metaphorically, just as the sunlight, water and minerals are essential nutriments for plants to bloom, thrive or flourish, the three basic psychological needs are conceptualized as essential nutriments for people's growth, integrity and health as well (Broeck et al. 2010; Reis et al. 2000; Ryan and Deci 2000c).

It is stressed that the social-contextual factors that provide people with the opportunity to satisfy these needs will facilitate intrinsic motivation and integrated motivation (the fullest type of internalization of extrinsic motivation), whereas those that prevent the satisfaction of these needs will decrease intrinsic motivation and the integration of extrinsic motivation (Deci and Ryan 2000). Weinstein and Ryan (2011) describe the state of individuals whose needs are satisfied or dissatisfied by the social environment, stating that individuals move toward motivational states that are characterized as self-volitional or autonomous when their environments support their needs. But, if environmental factors do not support the basic needs, motivation is pressured or controlled. That is, intrinsically motivated individuals will likely engage in activities with more quality ideas and persistent behaviors. On the other hand, people whose social contexts do not support their psychological needs will probably be controlled in their motivation and have less quality entrepreneurial ideas and behaviors (Deci and Ryan 2000; Weinstein and Ryan 2011; Wilson et al. 2008).

So, need satisfaction generates intrinsic motivations, while need frustration generates extrinsic motivations. In either case, motivations are the source of development for attitudes, SNs and PBC (Hagger and Chatzisarantis 2009). Thus, we expect positive relationships between both types of motivations and the antecedents of entrepreneurial intention.

This reasoning leads us to propose the following hypotheses:

H2: Psychological need satisfaction is positively related to attitude (H2a), subjective norms (H2b) and perceived behavioral control (H2c).

H3: Psychological need frustration is positively related to attitude (H3a), subjective norms (H3b) and perceived behavioral control (H3c).

Integration of Self-Determination Theory and the Theory of Planned Behavior

Engaging in entrepreneurial activity is intentional and volitional, as discussed earlier. In order to develop a deeper understanding of the motivational processes involved in a volitional behavior such as entrepreneurship, integrating the social cognitive approach of the TPB and an organismic theory of motivation such as SDT seems to be appropriate (Hagger and Chatzisarantis 2009). The integration of both theories has been suggested because they are thought to "provide complementary explanations of the processes that underlie motivated behaviour" (Hagger and Chatzisarantis 2009; Wilson et al. 2003).

As presented earlier, according to the TPB, there are three proximal antecedents of intention: attitude, SNs and PBC. According to Hagger and Chatzisarantis (2009), the TPB does not distinguish between the beliefs about outcomes that "people choose to seek and are related to their true sense of self (self-determined outcomes) and beliefs about outcomes that people feel compelled to engage in out of a sense of obligation or duty (controlled outcomes)" (p. 277). Wherefore, it has been proposed that SDT could potentially offer explanations for the origins of constructs in social cognitive theories such as the TPB (Andersen et al. 2000). Thus, autonomy, competence and relatedness will be used as distal predictors of intention and its proximal antecedents.

Following previous studies in the health domain (Hagger et al. 2006; Hagger and Chatzisarantis 2009), the present study proposes a motivational sequence of the SDT constructs, namely autonomy, competence and

relatedness, and entrepreneurial intentions mediated by perceptual factors of the TPB, that is to say, attitude, SNs and PBC. Integrating SDT and the TPB will help in understanding the type and quality of the behavior when deciding on starting a business.

The integration of SDT and the TPB particularly exists in health and sport studies where social psychologists have lately examined the viability of multi-theory models to explain the influences on health behavior (Hagger et al. 2006). Support for this integration is found in several studies. For instance, a recent study by (Barkoukis et al. 2010) found that basic psychological needs satisfaction variables (autonomy, competence and relatedness) uniquely predicted autonomous motivation in physical education and leisure time., It also predicted two antecedents of intention, namely attitudes and PBC. The three basic needs satisfaction variables also mediated the effects of perceived autonomy support on autonomous motivation in physical education.

Another study found as well that perceived autonomy support was a significant predictor of self-determined motivation and, in turn, self-determined motivation significantly predicted intentions to engage in health-related behavior mediated by attitudes and PBC (Hagger and Chatzisarantis 2009).

In a work setting, a study had been conducted to examine the applicability of self-determination theory to explain the role of intrinsic and extrinsic motivation in the acceptance of e-learning. The role of perceived autonomy, perceived competence and perceived relatedness in explaining the influence of intrinsic and extrinsic motivation to continue using IT in a work setting was explored. The findings show that when workers felt autonomous and competent (basic needs satisfied), they were more willing to continue using IT. The perceived usefulness and perceived playfulness mediated the relationship between perceptions of basic needs satisfaction and their intention to continue using IT. In addition, when workers felt connected and supported (perceived relatedness) by co-workers they used the system simply for the enjoyment that they obtained from it (Roca and Gagne 2008).

To summarize, the above discussion has provided basic information on the TPB and SDT and how combining them will likely help in providing a deeper understanding of the motivational factors of students as entrepreneurs in the future. As these two theories are argued to be complementary to each other (Hagger and Chatzisarantis 2009), it is expected that combining them in one study provides an excellent grounding and a comprehensive view to better understanding people's entrepreneurial motivations and intentions .

Based on the above discussion, the following hypotheses are formulated:

H4: The relationship between entrepreneurial intention and need satisfaction is mediated by the attitudes toward entrepreneurship (H4a); subjective norms (H4b) and perceived behavioral control (H4c).

H5: The relationship between entrepreneurial intention and need frustration is mediated by the attitudes toward entrepreneurship (H5a); subjective norms (H5b) and perceived behavioral control (H5c).

The Study Framework

The above review of the literature on entrepreneurial intention and motivation leads us to propose the following research model to be tested in this study (Figure 1). The integration of SDT and the TPB can explain the formation of entrepreneurial attitudes and perceptions and, through them, the intention to start one's own business.

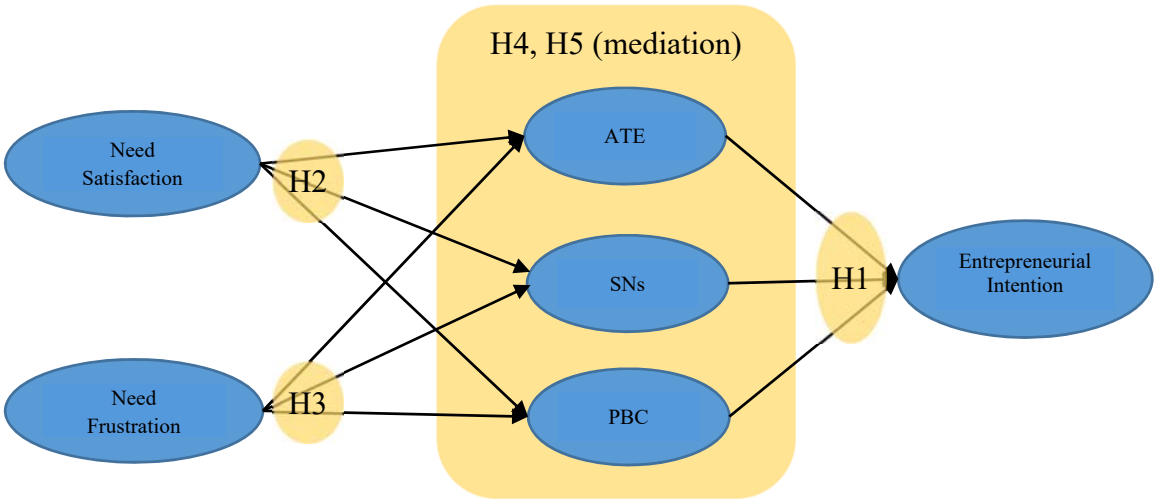

Figure 1: The study framework and research model

METHODS

Sample

Using a convenience sampling method, the sample of this study consisted of 438 (Males = 166, Females =272) 3rd and 4th year students from four Malaysian Public Universities, specifically International Islamic University Malaysia (IIUM), Universiti Teknologi MARA (UiTM), University of Malaya (UM) and Universiti Sains Islam Malaysia (USIM). Out of 600 questionnaires distributed among students in the four universities selected, 472 were received. 34 responses were disregarded due to missing data and incomplete responses, yielding a 73% response rate. The students sampled were enrolled in in various disciplines. The age distribution of the sample ranged from 19 (minimum) to 33 years old (maximum). The mean age was 22.56 (SD= 1.39). The majority of them (75%) had had some work experience and 46% of them had had the experience of starting their own business. Furthermore, 44% had taken a course in entrepreneurship and 74% of them indicated that some persons in their immediate family had their own business. Most of the respondents (83%) also agreed that their university promotes a culture of entrepreneurship.

Measures

The entrepreneurial intention questionnaire (EIQ) developed by Liñán and Chen (2009) was used to assess the students' entrepreneurial intention and its immediate antecedents: attitudes, SNs and PBC. They were assessed using 5-point Likert-type scales ranging from 1= "total disagreement" to 5= "total agreement". Sample items for the entrepreneurial intention scales are: "My professional goal is to become an entrepreneur" and "I have the firm intention to start a firm someday". Attitude toward entrepreneurship was assessed by 5 items. Sample items are "Being an entrepreneur implies more advantages than disadvantages to me" and "A career as an entrepreneur is attractive for me". SNs were assessed by a 3-item scale. A sample item is "My close family would approve of my decision to start a business". Finally, sample items for the 6-item scale measuring PBC are: "I am prepared to start

a viable firm" and "I can control the creation process of a new firm". The reliability coefficients found in the original study for all the TPB constructs ranged from .77 to .94 (Liñán and Chen 2009, p. 603). In the present study, the Cronbach's alpha ranges from .849 to .924, as shown in Table 1.

The basic psychological need satisfaction and frustration constructs were measured by a scale recently developed by Chen et al. (2015). The scale consists of 24 items measuring autonomy, competence and relatedness. Each psychological need is assessed by an 8-item scale, with response options ranging from 1= "totally false" to 5= "very true". For each need, 4 items assess its satisfaction and the other 4 assess its frustration. Sample items for the satisfaction of each of the three needs are "I feel a sense of choice and freedom in the things I undertake", "I feel connected with people who care for me, and for whom I care" and "I feel competent to achieve my goals". Sample items for the frustration of each of the three needs are "I feel pressured to do too many things", "I feel the relationships I have are just superficial" and "I feel like a failure because of the mistakes I make". All data were collected in November and December 2014. Questionnaires were administered during class sessions.

RESULTS

Table 1 displays the descriptive statistics and inter-correlations between the constructs included in the study. The mean scores indicated that all the constructs have moderate to moderately high scores. The need frustration variables got the lowest means, competence frustration being the lowest of them all (2.79). The reliability values of all the constructs were acceptable (above 0.75 in every case). The correlations between the study variables were generally significant. More specifically, the relationships between autonomy need frustration and the three need satisfaction constructs were not significant, as was the case of the correlation of SNs with the three need frustration constructs. Structural equation modeling was used for the analysis.

Before testing the whole model that integrates both the SDT and the TPB constructs, the data were analyzed using first-order and higher-order confirmatory factor analyses (CFAs) using Amos 22. To begin with, first-order CFA was conducted to assess how well observed indicators (items) reflect the presumed underlying structure of a measure (represented by its factors). Researchers using first-order CFAs specify both the number of factors comprising a measure and the items loading onto each factor. The first-order CFA, which include 6 factors of SDT (autonomy need satisfaction and frustration, relatedness need satisfaction and frustration and competence need satisfaction and frustration), yielded satisfactory fit indexes: $\chi^2 = 485.387$, df = 237, CFI = .957, RMSEA =.049, suggesting that further analysis may proceed.

Secondly, a higher order CFA was performed to evaluate the degree to which first-order constructs (factors) contribute to higher-order constructs. In higher-order CFAs, first- order factors are typically modeled as independent indicators of the higher-order construct. In the current study, we used second-order CFA in order to determine the extent to which basic psychological needs contribute to higher order need satisfaction and frustration (Litalien et al. 2017). The second order CFA yields satisfactory fit indexes: $\chi^2 = 523.830$, df = 245, CFI = .951, RMSEA =.051.

Table 1: Mean, SD, reliability and correlation between study variables

No.	Construct	Mean (SD)	Alpha	1	2	3	4	5	6	7	8	9	10
1	INT (6)	3.59 (.85)	.924	-									
2	ATE (5)	3.95 (.72)	.875	.725**	-								
3	SNs (3)	3.87 (.74)	.849	.565**	.526**	-							
4	PBC (6)	3.16 (.66)	.852	.603**	.462**	.388**	-						
	Need Satisfaction												
5	AS (4)	3.90 (.68)	.855	.292**	.283**	.280**	.174**	-					
6	RS (4)	4.03 (.72)	.866	.172**	.240**	.264**	.125**	.444**	-				
7	CS (4)	3.93 (.70)	.897	.281**	.322**	.232**	.237**	.467**	.524**	-			
	Need Frustration												
8	AF (4)	3.42 (.75)	.751	.238**	.235**	0.057	.169**	0.062	0.029	0.068	-		
9	RF (4)	2.79 (1.01)	.888	.169**	.115*	-0.012	.221**	-.104*	-.233**	-0.055	.399**	-	
10	CF (4)	3.13 (.92)	862	.171**	.183**	-0.01	.127**	-.149**	-.133**	-.128**	.358**	.507**	-

** p<.01, *p<.05; Numbers in parentheses are the number of items in the measurement scales. Note: the construct labels as follows: entrepreneurial intention (ENI), Attitudes (ATE), Subjective Norms (SNs), Perceived Behavioral Control (PBC), Autonomy Satisfaction (AS), Relatedness Satisfaction (RS), Competence Satisfaction (CS), Autonomy Frustration (AF), Relatedness Frustration (RF), and Competence Frustration (CF).

Thirdly, we tested a third CFA including 44 observed variables (indicators) reflecting the 10 unobserved latent constructs. The purpose of this procedure (incorporating all involved constructs in a single model) is to see how they interact with each other, to test model fit and to test for reliability and validity of constructs. Fit indexes were satisfactory: $\chi^2 = 1848.389$, df = 881, CFI = .917, RMSEA =.050. Table A1 in the appendix presents the standardized factor loadings, constructs reliability and convergent validity. Based on these statistics, the model can be considered reliable and valid (Hair et al. 2010). As suggested by Hair et al. (2010), reliability can be established when composite reliability (CR) is greater than 0.7, as is the case for this model. Convergent validity is established if the average variance extracted (AVE) is higher than 0.5 (which is the case here, except for PBC where it is .494).

Hypotheses Testing

Following the successful fitting of the CFA, the full research model was then conducted using Amos 22. As depicted in Figure 2, the full hypothesized structural equation model had achieved a good fit to the data observed: $\chi^2 = 1939.715$, df = 886, CFI = .910, RMSEA = .052.

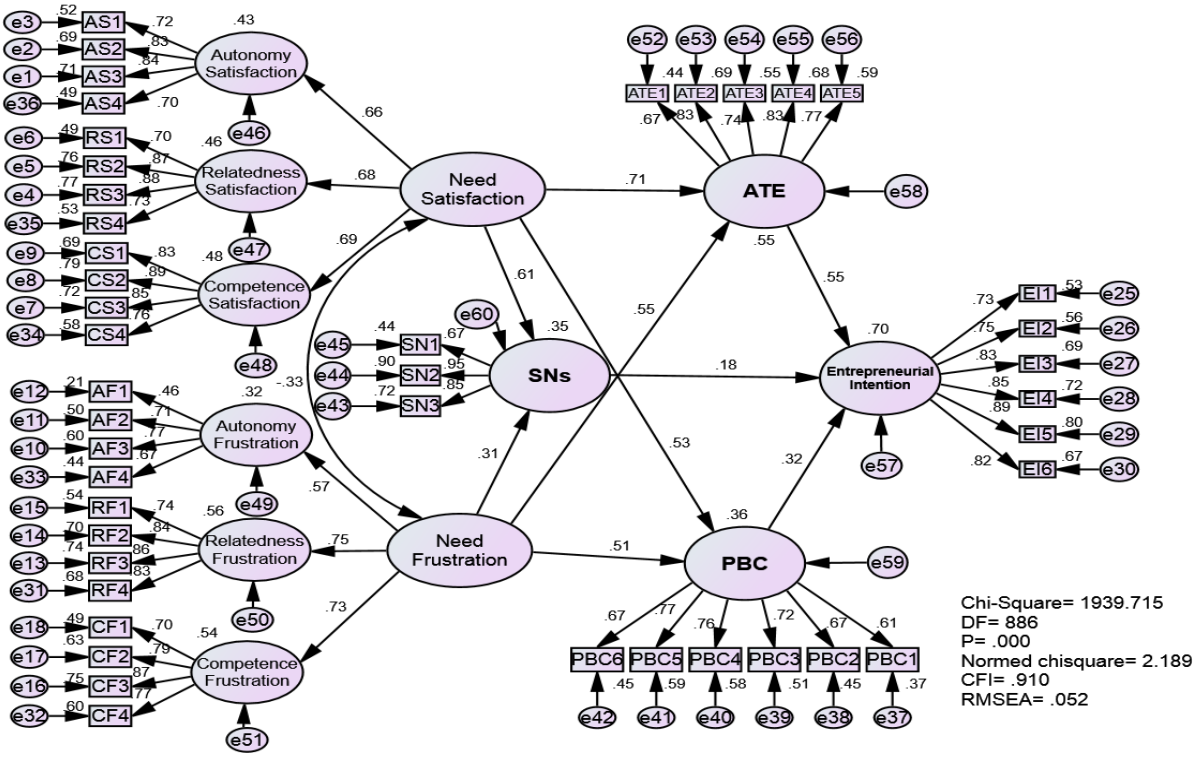

Figure 2: The Full Research Model

Table 2: Standardized Parameter Estimates for the Research Model

Path	Standardized Estimate (Est)	Critical Ratio	P-Value	Findings
Direct Effect on Entrepreneurial Intention (DV)				
Need Satisfaction → ATE	0.712	8.156	***	Supported
Need Satisfaction → SNs	0.614	8.100	***	Supported
Need Satisfaction → PBC	0.529	6.715	***	Supported
Need Frustration → ATE	0.546	6.298	***	Supported
Need Frustration → SNs	0.310	4.620	***	Supported
Need Frustration → PBC	0.506	5.840	***	Supported
Attitude → EI	0.550	9.833	***	Supported
Subjective Norms → EI	0.177	4.641	***	Supported
Perceived Behavioral Control → EI	0.385	6.842	***	Supported

The results fully support hypothesis H1, since the intention antecedents are significantly related to the entrepreneurial intention. As reported in Table 2, the path coefficients were significant and in the hypothesized direction in the case of ATE-EI (standardized coefficient β = 0.550), of SN-EI (β = 0.177) and of the PBC-EI relationship (β = 0.385).

Similarly, H2 and H3 are fully supported as well. As shown in Table 2, the relationships between need satisfaction (NS) and each of the intention antecedents are positive and significant: NS to ATE (β = 0.712), NS to SNs (β = 0.614) and NS to PBC (β = 0.529). Regarding need frustration (H3), again all hypotheses are supported by the significant path coefficients found in the results: NF to ATE (β = 0.546), NF to SNs (β = 0.310) and NF to PBC (β = 0.506).

Mediation effect analysis

Regarding H4 and H5, a number of methods have been suggested for testing the magnitude and statistical significance of mediation effects differing according to Type I error rates and statistical power (MacKinnon et al. 2002). The commonly used method suggested by Baron and Kenny (1986) is the lowest in statistical power, while the alternative Sobel test is also weak with respect to statistical power and Type 1 error rates (MacKinnon et al. 2004). Thus, the bootstrap procedure, suggested by Shrout and Bolger (2002), was used to conduct a mediation analysis. Given that an AMOS procedure only estimates bootstrap confidence intervals for total mediation effects, Mplus was additionally used to examine the specific mediation effects. Based on an α level of .05, a critical ratio of z-score needs to be ± 1.96 to be a significant estimate (Byrne 2012). To explore the significance of the indirect effects that emerged, the bootstrap generated bias-corrected confidence interval approach was used (Preacher and Hayes 2004; Shrout and Bolger 2002). The full mediation model demonstrates an adequate fit with the data observed (916.387, df = 884, CFI = .910, RMSEA =.052), indicating a good-fitting model, and thus the mediation hypotheses can be tested.

Table 3 presents the relationship between need satisfaction and entrepreneurial intention, which is fully mediated by the intention antecedents. This is indicated by a significant total effect, which is the sum of both the direct and indirect effects. At the same time, the specific indirect effects via each intention antecedent are also significant (standardized coefficients are 0.392 for ATE, 0.116 for SNs and 0.164 for PBC). Finally, the direct effect (-0.022) is not significant. For this reason, hypothesis H4 is fully supported.

Table 3: Standardized Total Indirect, Specific Indirect, Direct Effects of Need Satisfaction to Intention via ATE, SNs and PBC

					Bootstrapping BC 95% confidence interval	
Effects	Estimate (Est)	Standard Error (SE)	Est/SE (Z score)	P-Value	Lower	Upper
Need Satisfaction to Entrepreneurial Intention						
Total Indirect	0.672	0.107	6.310	0.000	0.464	0.881
NS → ATE → EI	0.392	0.075	5.251	0.000	0. 246	0. 539
NS → SNs → EI	0.116	0.037	3.162	0.002	0.044	0.188
NS → PBC → EI	0.164	0.046	3.590	0.000	0.074	0.253
Direct: NS → EI	-0.022			Not Significant		

In the case of H5, stating that the relationship between need frustration and entrepreneurial intention is fully mediated by the intention antecedents is fully supported by the results, as presented in Table 4. Again, the total effect (0.508) is significant while the direct effect (0.037) is not. In this situation, the indirect effects of need frustration on entrepreneurial intention via ATE (indirect effect = 0.296), via SNs (0.058) and via PBC (0.154) are all significant.

Table 4: Standardized Total Indirect, Specific Indirect, Direct Effects of Need Frustration to Intention via ATE, SNs and PBC

					Bootstrapping BC 95% confidence interval	
Effects	Estimate (Est)	Standard Error (SE)	Est/SE (Z score)	P-Value	Lower	Upper
Need Frustration to Entrepreneurial Intention						
Total Indirect	0.508	0.106	4.788	0.000	0.300	0.716
NF → ATE → EI	0.296	0.072	4.083	0.000	0.154	0.438
NF → SNs → EI	0.058	0.027	2.122	0.034	0.004	0.112
NF → PBC → EI	0.154	0.041	3.771	0.000	0.074	0.234
Direct: NF → EI	0.037			Not Significant		

DISCUSSION

Engaging in entrepreneurial activity is intentional and volitional. As a result, developing a deeper understanding of the motivational processes involved in a volitional behavior, such as entrepreneurship, is important. The integration of the TPB and SDT provide complementary explanations of the motivational processes in planned behavior. This integrated entrepreneurship research concurs with previous studies in other contexts (Chan et al. 2013; Hagger et al. 2006; Hagger and Chatzisarantis 2009; Jacobs et al. 2011; Roca and Gagne 2008). The model strongly explained about 71% of the variance in entrepreneurial intention. This opens the way for further analyses using this integration in entrepreneurship research.

The most relevant result, in our opinion, is the confirmation that both intrinsic and extrinsic motivations can lead to entrepreneurial intention and, through it, to actually starting up new ventures. However, some differences should be expected between individuals driven by each kind of motivation. In this sense, the results from other domains suggest that, indeed, the type of motivation has important consequences throughout the entrepreneurial process (Deci and Ryan, 2000). The negative correlation between need satisfaction and need frustration indicates that they are partially opposing. That is, individuals feeling high need satisfaction (and therefore intrinsic motivations toward entrepreneurship) will generally have lower need frustration (and less extrinsic motivations) and the other way round.

Intrinsically motivated entrepreneurs will likely be more persistent, exhibit more effective performance and greater autonomy and initiative (Deci and Ryan, 2012). Thus, the entrepreneurial intention that is generated by intrinsic motivations could potentially lead to more dynamic entrepreneurs. We could expect that, as a consequence of this, the advancement in the entrepreneurial process from intention to action could also be higher for these individuals. These intrinsically motivated entrepreneurs will persist when faced with adversities and difficulties during the start-up process, and will accordingly be less likely to give up. In this regard, the conversion ratio from intentional to actual entrepreneur should be higher. Similarly, performance after starting up would also be higher as a result of higher commitment and persistence. This would relate intrinsic motivation to the concept of entrepreneurial orientation (Lumpkin and Dess 1996). Some recent research on founder CEOs finds that intrinsic motivation is associated with higher entrepreneurial orientation (Deb and Wiklund 2017).

In contrast, need frustration and the associated extrinsic motivation may also lead to higher entrepreneurial intention. Yet, we could expect these intentional entrepreneurs to be less persistent in the face of obstacles and, hence, more likely to abandon their nascent behaviors. Similarly, after the venture is set up, their extrinsic motivation will make them focus attention on the external rewards received (profits, sales, company value, etc.). If these rewards are not as expected, they will probably be more likely to quit the company, either by closing it down or by selling it.

These arguments are, for the moment, only tentative. But the inclusion of SDT as a previous element in explaining the formation of entrepreneurial intentions opens the way for the future testing of these claims. In this sense, the testing of the role of motivations in the enactment of entrepreneurial intentions (into actual starting up) as well as its influence on the performance and subsistence of the newly created venture could be of high interest.

An additional line of research emerges by relating need frustration with the existence of mental disorders. Self-determination and need satisfaction has been associated with personal growth and well-being (Teixeira et al., 2012). In contrast, some mental disorders may lead to difficulties in integration and relatedness, and may limit the ability to develop autonomy and competence basic needs. In this sense, psychological well-being has been found to play a role in entrepreneurship. Some researchers have investigated the role of mental disorders in entrepreneurship (Wiklund et al. 2018). They find that people with such disorders are often successful entrepreneurs. SDT may contribute to explaining this relationship through the influence of need frustration. That is, since they tend to feel neither understood nor valued in traditional employee positions, they may very well develop a feeling of need frustration that would lead them to form an entrepreneurial intention.

Obviously, all this reasoning goes much beyond the scope of our study, but it stresses the importance of understanding the type of motivation that is fuelling the entrepreneurial intention and behavior of individuals. Future research could integrate SDT within the study of actual entrepreneurial behavior, to more fully understand the implications of each type of motivation in entrepreneurship.

CONCLUSION

To conclude, the present study provides support for the application of an integrated theoretical model consisting of the TPB and SDT (Chan et al. 2013; Hagger and Chatzisarantis 2009; Jacobs et al. 2011) in entrepreneurship research. The findings from our study corroborate evidence from previous studies that emphasizes the role of self-determination motivation and social cognitive beliefs in predicting intentions of volitional behaviors, such as entrepreneurship behaviors.

As with any research, this study suffers from a number of limitations. Firstly, the sample is made up of university students in one single country (Malaysia). Given that need satisfaction or frustration is intimately related to the social expectations of individuals, cultural characteristics are probably relevant in this process. In this sense, future research should replicate this study in different countries or, even better, in several countries simultaneously. This would allow the influence of culture to be controlled. Similarly, the study should also be replicated in other sub-samples of the general population with different characteristics (education level, age, income level, experience, etc.). Nevertheless, our results confirm that, for a given cultural context (Malaysia) and sample (university students), the model is meaningful and the results are satisfactory.

Secondly, the study is cross-sectional. As a first consequence, we cannot claim causality in any of the relationships. For this reason, we have stressed that the results support our hypotheses, but we cannot be sure that the causal relationship is as proposed until a longitudinal study is carried out. Additionally, as mentioned in the discussion, the role of SDT may be highly relevant not only in predicting intentions, but also actual behavior and performance. In this regard, longitudinal studies are needed to test these potential relationships. The authors plan to follow the students surveyed in the future to assess the influence of basic psychological needs throughout the entrepreneurial process.

Overall, much more research is needed to confirm the results obtained here. In this sense, we call for researchers to replicate and expand the present study. In particular, we request longitudinal research to fully test the model and confirm its potential implications.

APPENDIX

Table A1. Standardized Factor Loadings, Composite Reliability and Average Variance Extracted

Construct	Item	Standardized Loadings	C.R.	AVE
First-Order CFA				
Entrepreneurial Intention	EI1	0.737	0.924	0.671
	EI2	0.752		
	EI3	0.836		
	EI4	0.855		
	EI5	0.899		
	EI6	0.825		
Attitude Toward Entrepreneurship	ATE1	0.665	0.879	0.594
	ATE2	0.826		
	ATE3	0.750		
	ATE4	0.829		
	ATE5	0.772		
Subjective Norms	SNs1	0.672	0.866	0.687
	SNs2	0.942		
	SNs3	0.850		
Perceived Behavioral Control	PBC1	0.611	0.854	0.494
	PBC2	0.679		
	PBC3	0.719		
	PBC4	0.759		
	PBC5	0.764		
	PBC6	0.674		
Second-Order CFA				
Need Satisfaction			0.777	0.538
Need Frustration			0.757	0.512
Autonomy Satisfaction	AS1	0.721		
	AS2	0.828		
	AS3	0.847		
	AS4	0.699		
Relatedness Satisfaction	RS1	0.702		
	RS2	0.874		
	RS3	0.875		
	RS4	0.726		
Competence Satisfaction	CS1	0.828		
	CS2	0.890		
	CS3	0.849		
	CS4	0.760		
Autonomy Frustration	AF1	0.462		
	AF2	0.712		

	AF3	0.770	
	AF4	0.665	
Relatedness Frustration	RF1	0.738	
	RF2	0.838	
	RF3	0.857	
	RF4	0.827	
Competence Frustration	CF1	0.706	
	CF2	0.790	
	CF3	0.865	
	CF4	0.774	

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