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Perceived behavioural control and entrepreneurial intention: the mediating role of effectuation

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Abstract: The focus of entrepreneurship study has been on entrepreneurial intention since it determines entrepreneurial activities as well as the number of new ventures. Although the concept of entrepreneurial intention has been extensively investigated, the literature lacks the potential links from other theoretical perspectives or explanations that may be crucial to entrepreneurial intention. Drawing from the combined logic of theory of planned behaviour and effectuation theory, this study proposed and investigated that perceived behavioural control is positively associated with entrepreneurial intention through effectuation dimensions. The results from 175 potential entrepreneurs in Thailand reveal that perceived behavioural control of TPB positively affects entrepreneurial intention. Also, the effectual dimensions – experimentation and pre-commitment – were found to mediate this relationship. This study advances the theory of planned behaviour (TPB) and effectuation, arguing that TPB's control logic is the significant determinant of entrepreneurial intention and that it performs through the effectual dimensions of experimentation and pre-commitment.

Keywords: perceived behavioural control; entrepreneurial intention; effectuation; theory of planned behaviour; TPB; experimentation; affordable loss; flexibility; pre-commitment.

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1 Introduction

Many crucial entrepreneurial activities, such as launching a new venture, are thought to stem from entrepreneurial intention (Bird, 1988; Kautonen et al., 2015). Prior research, especially in the field of entrepreneurship, has highlighted a variety of phenomena that can contribute to the formation of entrepreneurial intention (Liñán and Fayolle, 2015; Liñán et al., 2011). For example, a study by Liñán et al. (2011) has highlighted the importance of education as a key factor in fostering entrepreneurial intention. Moreover, a recent article on entrepreneurial intention has demonstrated the thematic factors that impact entrepreneurial intention, including personality and psychological factors, as well as background and demographic factors (Liñán and Fayolle, 2015). Donaldson (2019) expanded upon the research conducted by Liñán and Fayolle (2015) by emphasising the importance of examining the means-ends relationship in the investigation of entrepreneurial intention. This includes analysing factors such as content, context, and demand. Despite the extensive research on the notion of entrepreneurial intention, the factors influencing the decision to initiate a business venture remain inadequately understood (Liñán et al., 2011). In addition, the literature lacks the potential connections from other theoretical understanding or perceptions that may be crucial to the entrepreneurial intention (Donaldson, 2019), especially in the entrepreneurial process under an uncertain environment (Krueger, 2017).

This study, therefore, attempts to investigate the relationships of integrated knowledge that contribute to entrepreneurial intention by discussing the stream of research that emphasises the entrepreneurial process under uncertainty, known as the effectuation (Sarasvathy, 2001) together with the theory of planned behaviour (TPB) (Ajzen, 1991; Krueger et al., 2000) that impact the variation of entrepreneurial intention. This study respond to the call for more research that rejuvenate the entrepreneurial intention explained by the combined aspects through other theoretical foundations (Donaldson, 2019; Fayolle and Liñán, 2014). In the existing literature, the TPB is widely employed to examine the determinants of entrepreneurial intention. The TPB emphasises that entrepreneurial intention emerged from attitude, social norms, and perceived behavioural control as the significant influential factors that enhance entrepreneurial actions (Ajzen, 1991). With a large number of studies relying on the TPB to explain the relationship between entrepreneurial intention and behaviour, the TPB has developed its consistency and model specification, which generalise the results and contribute to a greater understanding of entrepreneurial intention.

In addition, the effectuation theory has been taken into account in this investigation to emphasise the effects of control in the entrepreneurial process (Anandan and Gupta, 2022; Perry et al., 2012; Sarasvathy, 2001). Entrepreneurs tend to acquire a certain level of control before developing the entrepreneurial-related intention and decision (Krueger et al., 2000). It was argued that various effectual decisions derived from the locus of control imposed by entrepreneurs (Werhahn et al., 2015). Consequently, it is possible that the control behaviour could influence the level of entrepreneurial intention through effectual logic. To extend the prior literature and emphasise the entrepreneurial process, it is believed that the TPB and effectuation are the essential frameworks that can shed light on an improved understanding of entrepreneurial intention. This study thus aims to address the research questions.

1 How can perceived behavioural control as part of the TPB influence entrepreneurial intention.

2 Whether perceived behavioural control can influence entrepreneurial intention via the effectual dimensions.

Based on the sample of 175 students in a large research university in Thailand, we found that the perceived behavioural control significantly influences entrepreneurial intention. In addition, it was found that the relationship is mediated by effectual dimensions – experimentation and pre-commitment. The results support the argument that bridges the TPB and effectuation theory in explaining entrepreneurial intention. As consequence, this study extends both theories by providing empirical evidence explaining how TPB and effectuation theory together could influence entrepreneurial intention. Also, this study contributes to the effectuation theory in the context of entrepreneurship education. According to this study, students may be motivated to become entrepreneurs more by pursuing the control factors through the effectual logic.

The subsequent section delves into the theoretical underpinnings and formulation of hypotheses, which is succeeded by a segment dedicated to the methodology and results. The concluding section of the paper addresses the limitations of the study, its theoretical and managerial implications, future research direction, and conclusions.

2 Theory and hypotheses

2.1 Theory of planned behaviour

The TPB was originally from the social cognitive theory that emphasises the intention as the determination of human behaviour (Ajzen, 1991). More specifically, intention signals and leads to the extent of effort someone plan to take action or pursue that behaviour (Entrialgo and Iglesias, 2016). In deciding to engage in the undertaken actions, people tend to plan based on the initiated intention (Ajzen, 2002). The existing literature widely utilises TPB as one of the main theories in explaining human behaviour through the intention (Fayolle et al., 2014; Liñán and Fayolle, 2015). The TPB is a theoretical construct that aims to elucidate human behaviour, particularly in relation to intentional behaviours. The understanding of psychological processes that underlie human behaviour provides significant insights into the prediction and manipulation of behavioural intentions across different domains. In addition, the TPB provides the crucial framework that enhances the better understanding and antecedences of entrepreneurial intention (Krueger et al., 2000).

Drawing from the TPB, the behavioural intention is determined by three different but interrelated factors, namely attitudes toward the behaviour, subjective norms, and perceived behaviour control (PBC). Attitudes toward behaviour refer to people's overall perception and assessment both positive and negative as well as the appraisal of the interested behaviour (Ajzen, 1991). Moreover, in deriving with intention, people seem to evaluate in favour of or against a behaviour. A positive and favourable attitude toward behaviour, such as investing in a new venture, is formed when the individual is perceived as having future advantages or expected consequences. Prior research has shown that attitude toward behaviour influences entrepreneurial intention in various settings (Almobaireek and Manolova, 2012; Douglas and Fitzsimmons, 2013; Fitzsimmons and

Douglas, 2011; Liñán and Chen, 2009). In addition, subjective norms have also been argued to influence behavioural intention. Subjective norms refer to the individuals' perceptions of how the influential people in their lives decide to engage in a particular behaviour (Ajzen, 1991). Subjective norms were also found to influence intention (Iakovleva and Kickul, 2011; Kautonen et al., 2013).

As the main focus of this study, perceived behavioural control refers to the perception of the level of difficulty in the activities such as starting a business and the level of control they have over it (Ajzen, 1991). The premise of perceived behavioural control has been argued to be closely related to self-efficacy (Bandura, 1977, 1982) and perceived feasibility (Shapero and Sokol, 1982) as showing the level of confidence to achieve the outcome (Ajzen, 2002; Chell et al., 2008; Liñán and Chen, 2009). However, PBC includes not only a feeling of high confidence in achieving something, but also the perception of controllability regarding that action and shows a strong influence on entrepreneurial intention (Almobaireek and Manolova, 2012; Hessels et al., 2008; Iakovleva and Kickul, 2011; Moriano et al., 2012). If a person has a high level of perceived behavioural control, he or she may overcome the difficulties associated with launching a new venture. A person's motivation and determination to pursue entrepreneurial objectives are enhanced by a belief in self-control. This study places particular emphasis on one key element of the TPB, namely the perceived behavioural control. This is due to the contingent concepts of control towards consequent effectual dimensions that are present within this dimension of the theory. Consequently, the first hypothesis can be stated as follows:

H1 The perceived behavioural control is positively related to entrepreneurial intention.

2.2 Effectuation theory

The emphasis of entrepreneurship study has been on how businesses are formed using various frameworks and understandings, particularly the neoclassical economics perspective. For example, prior research has concluded that firms are created as the result of different competencies related to finding and exploiting opportunities and resources (Chandler and Jansen, 1992; Cooper et al., 1994). Consistent with Drucker (1985) who stated that opportunities are discoverable by the searching process, the entrepreneurship literature strongly emphasises the rational decision-making model and goal-driven behaviours in identifying opportunities (e.g., Bird, 1989). However, an emerging stream of research also supports the opinion that individuals may not depend on goal-driven decision-making when it comes to entrepreneurial opportunities (Dew et al., 2009a; Sarasvathy et al., 1998; Sarasvathy, 2001). Specifically, Sarasvathy (2001) proposes that entrepreneurs instead begin with their general aspiration and pursue the aspiration by using the resources currently available to them, a process called effectuation.

Effectuation receives considerable attention because of its opposition to the rational decision-making model using a goal-driven process, which Sarasvathy calls 'causation' (Stevenson and Gumpert, 1985). The difference between effectuation and causation can be explained through the story of a chef in the kitchen (Sarasvathy, 2001). Two types of methods can be used to prepare a meal. In the first method, a chef is given a specific menu in advance and needs to acquire the necessary ingredients to prepare that meal; this method, according to Sarasvathy (2001), is the causation approach. The other method begins with having the ingredients but with no specific dish given, the chef utilises the

available ingredients and selects an effective way to prepare the best possible meal. This method is, therefore, the effectuation approach. Based on prior literature, the effectuation approach can be found through the behaviour of experimentation, affordable loss, flexibility, and pre-commitment (Chandler et al., 2011; Mumi, 2020).

Experimentation is the iterative manner of evaluating and refining ideas and opportunities where they engage in a series of trial and error changes and test different approaches in the marketplace before finalising a business concept (Chandler et al., 2011; Sarasvathy, 2001). Effectual entrepreneurs do not rely on extensive planning or analysis to predict or control outcomes. They adopt an experimental mindset instead. In addition, perceived behavioural control encourages experimentation by strengthening individuals' confidence in their ability to successfully conduct and transverse the experimental process, which results in a greater entrepreneurial intention. When individuals perceive that they have a high degree of behavioural control, they are more likely to have a strong entrepreneurial intention through experimentation. Therefore, we propose the next hypothesis as follows:

H2 Experimentation mediates the relationship between perceived behavioural control and the entrepreneurial intention.

In the context of effectuation, the concept of affordable loss pertains to a strategic emphasis on ascertaining the highest degree of potential loss that an entrepreneur can withstand, rather than exclusively taking into account anticipated gains (Dew et al., 2009a; Sarasvathy, 2001). The decision-making process of entrepreneurs is influenced by the principle of affordable loss. This principle entails that experiments that surpass the entrepreneur's threshold for bearing losses are dismissed in favour of those that are within their affordable range (Chandler et al., 2011). The influence of perceived behavioural control on the perception of risks associated with entrepreneurial intention is important. Individuals with higher levels of perceived behavioural control tend to perceive risks as more manageable and exhibit greater confidence in their capacity to cope with potential losses. The notion that risk can be controlled and managed diminishes the perceived severity of potential losses, thereby increasing the propensity to engage in entrepreneurial activities. The following hypothesis, therefore, illustrates our argument.

H3 Affordable loss mediates the relationship between perceived behavioural control and the entrepreneurial intention.

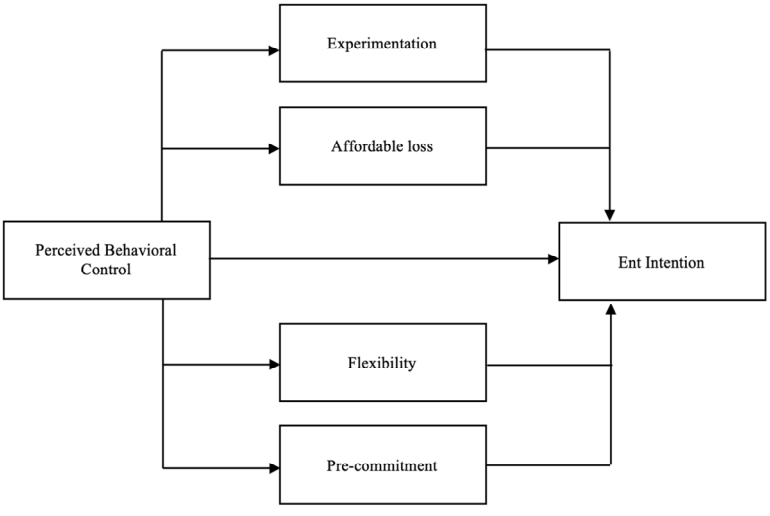
Moreover, flexibility pertains to the ability of entrepreneurs to maintain adaptability and responsiveness toward unforeseen opportunities and investments made by stakeholders. The concept involves a decreased dependence on anticipated planning and the capacity to adapt tactics and behaviours in response to evolving situations (Sarasvathy, 2001). The attribute of flexibility is frequently perceived as a favourable characteristic of start-up companies in contrast to well-established firms (Chandler et al., 2011). The role of perceived behavioural control is significant in a person's ability to adjust to varying situations. The sense of confidence in managing situations empowers individuals to maintain a receptive and adaptable mindset toward entrepreneurship. We argue that perceived behavioural control influences entrepreneurial intention by influencing an individual's flexibility – confidence in navigating uncertainty, and openness to change. Therefore, we propose the next hypothesis as follows:

H4 Flexibility mediates the relationship between perceived behavioural control and the entrepreneurial intention.

Finally, pre-commitment is a strategic approach utilised by effectual entrepreneurs, which involves the establishment of commitments and relationships with key stakeholders, including strategic partners, suppliers, and customers (Sarasvathy, 2001). The approach entails prioritising the establishment of alliances and obtaining pre-commitments, as opposed to solely depending on competitive analysis or predictive planning (Alloush and Al-Haddad, 2022). The act of distributing risk with strategic partners could make potential losses easier to manage and controllable, thereby enhancing the feasibility and durability of the entrepreneurial activity (Chandler et al., 2011). We argue that pre-commitment mediates the relationship between perceived behavioural control and entrepreneurial intention as individuals with a high level of perceived behavioural control exhibit a strong belief in their own capacity and possess a sense of assurance in their aptitude to exercise sound judgment. Entrepreneurs' confidence enables them to actively pursue and establish pre-commitments with strategic partners, as they have faith in their capacity to effectively negotiate and sustain these relationships. The confidence associated with perceived behavioural control increases the likelihood of pre-commitment practices and pursuing entrepreneurial intentions.

H5 Pre-commitment mediates the relationship between perceived behavioural control and the entrepreneurial intention.

Figure 1 The conceptual framework proposed in this study



3 Research methodology

3.1 Data collection

The data for this study was obtained from a sample of undergraduate students enrolled in a major research university located in Thailand. The student sample satisfies this study's

design as the study of entrepreneurial intention is a prospective rather than retrospective (Krueger and Carsrud, 1993). The sample also requires individuals who may or may not intend to start a business (Krueger et al., 2000; Zapkau et al., 2015). The questionnaires were distributed to 467 undergraduate students majoring in business in their senior year. A total of 223 responses were obtained from the distributed questionnaires, yielding a response rate of 47.75%. Upon careful review, a total of 39 responses were deemed ineligible for analysis as the participants did not meet the criteria of the attention check (Kung et al., 2018). Additionally, nine responses were excluded from the dataset due to incomplete questionnaires. The total of 175 sample were included in the analyses of this study.

Among the 175 participants who were considered for this study, 36.57% were identified as male, whereas 63.43% were identified as female. Within the cohort of individuals under study, a majority comprising 57.7% attained a cumulative grade point average (GPAX) exceeding 3.00 on a 4.00 scale. Regarding the measure of family income, it was found that 64.57% of the sample originated from households with a monthly income of less than THB30,000, which is equivalent to approximately USD900. Furthermore, it was found that 19.43% of the sample originated from households with a monthly income ranging from THB30,000 to 50,000 (equivalent to approximately USD900–1,500), whereas 16% of the participants belonged to families with a monthly income exceeding THB50,000 (approximately USD1,500).

3.2 The operationalisation of constructs

The dependent variable, entrepreneurial intention, was assessed by a six-item scale using a six-point Likert-type response scale based on the study by Liñán and Chen (2009). The reliability coefficient (Cronbach's alpha) for entrepreneurial intention from this sample is 0.93. The independent variable, perceived behavioural control, was operationalised by using a six-item measure from the existing literature (Kolvereid, 1996; Liñán and Chen, 2009) revealed the reliability coefficient of 0.91. The validated measures of various dimensions of effectuation – experimentation ($\alpha = 0.73$), affordable loss ($\alpha = 0.95$), flexibility ($\alpha = 0.89$), and pre-commitment ($\alpha = 0.79$) – were gauged from a study by Chandler et al. (2011). Moreover, the study emphasised various control variables in deviating the effects that potentially influence the dependent variable – entrepreneurial intention in the analyses including gender, GPA, and family wealth. The selection of gender as a control variable was based on its established influence on entrepreneurial intention in previous scholarly works (Ndjambou and Mario, 2014; Westhead and Solesvik, 2016). In accordance with the research conducted by Li and Wu (2019), we utilised GPA as a proxy for academic accomplishment. The study incorporated family wealth, which was determined by the monthly income of the household, as a control variable. This was done based on the previous research that established the effect on entrepreneurial intention (Gujrati et al., 2019).

3.3 Statistical analyses

The data were analysed using ordinary least square (OLS) regression analyses through the mediation testing approach by Baron and Kenny (1986). The primary statistical method employed in this research was OLS regression, as it is considered to be relatively uncomplicated and less ambiguous in comparison to structural equation modelling (SEM)

(Nunkoo and Ramkissoon, 2012). Nunkoo and Ramkissoon (2012) and Li (2011) have suggested that the OLSs regression is an effective statistical technique for examining relationships and producing reliable outcomes, comparable to other statistical methods. In addition, the mediation testing approach suggested by Baron and Kenny (1986) was used to investigate the proposed relationships. In accordance with Tan et al.'s (2021) methodology, we utilised the Baron and Kenny's mediation method, a four-step procedure, to examine the presence of mediating effects. The procedural sequence of this approach involves the subsequent actions:

$$Y = \beta_0 + \beta_1 X + \varepsilon \text{ (step 1)} \quad (1)$$

In step 1, a basic regression analysis is performed, wherein the independent variable is utilised to predict the outcome variable (see Table 2: models 1–2). This initial step serves to establish the relationship between the independent variable and the outcome variable.

$$M = \beta_0 + \beta_2 X + \varepsilon \text{ (step 2)} \quad (2)$$

In step 2, a regression analysis is conducted to examine the relationship between the independent variable and the mediator variable (see Table 2: models 3–10). In this stage, the mediator is regarded as an outcome variable.

$$Y = \beta_0 + \beta_4 X + \beta_3 M + \varepsilon \text{ (steps 3 and 4)} \quad (3)$$

In step 3, the present study provides evidence that the mediator variable displays a significant influence on the outcome variable (see Table 3). A regression analysis is performed, utilising the mediator's effects to predict the dependent variable.

In step 4, In order to achieve full mediation, it is necessary for the impact of the independent variable on the outcome variable to be nullified when the mediator is taken into account. Partial mediation can be established when both the independent variable and mediators are significant predictors of the outcome variable.

3.4 Common method variance

Within this study, the data collection was done through questionnaires that were distributed to the students. Following Podsakoff et al. (2003), we carried out the data collecting while taking into account the potential common method bias issue caused by a single respondent. For example, our respondents received explicit communication that their survey replies would be kept completely with the utmost confidentiality. Also, by establishing that the information from respondents was the same as that from non-respondents, this study carried out the procedure for evaluating non-response bias (Rogelberg and Stanton, 2007). In order to test for non-response bias, we compared the responses from early and late respondents, taking into account that late responders are similar to non-respondents, as suggested by a previous study (Lindner et al., 2001). Two groups of respondents were compared using a t-test for investigating any significant differences. The results from the t-test manifested that there were no differences between early and late responses for all targeted variables.

Table 1 Pearson's correlation matrix

	Ent_intention	*Male*	*Family wealth*	*GPA*	*Control*	*Experiment*	*Aloss*	*Flexibility*	*Pre-commit*
Ent_intention	1								
Male	–0.138	1							
Family wealth	0.0328	0.132	1						
GPA	–0.111	0.00943	0.156*	1					
Control	0.606***	–0.0448	0.0337	–0.206**	1				
Experiment	0.271***	–0.0614	0.155*	0.262***	0.0820	1			
Aloss	0.252***	–0.0635	0.0222	–0.0228	0.323***	0.214**	1		
Flexibility	0.367***	–0.0732	0.0980	0.0621	0.359***	0.432***	0.565***	1	
Pre-commit	0.417***	0.0370	0.0783	0.0483	0.386***	0.335***	0.484***	0.656***	1

Notes: *p < 0.05, **p < 0.01, and ***p < 0.001. Control = perceived behavioural control, Aloss = affordable loss, pre-commit = pre-commitment, and Ent_intention = entrepreneurial intention.

Table 2 The results from regression analyses of dependent variables and mediators

	Ent_intention[1]		*Experimentation*[2]		*Affordable loss*[2]		*Flexibility*[2]		*Pre-commitment*[2]	
	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*	*Model 8*	*Model 9*	*Model 10*
Male	–0.389*	–0.305*	–0.146	–0.134	–0.137	–0.102	–0.134	–0.103	0.046	0.082
	(0.201)	(0.162)	(0.134)	(0.133)	(0.156)	(0.148)	(0.117)	(0.109)	(0.128)	(0.117)
Family wealth	0.066	0.024	0.082*	0.076	0.025	0.008	0.055	0.040	0.040	0.022
	(0.072)	(0.058)	(0.048)	(0.048)	(0.056)	(0.053)	(0.042)	(0.039)	(0.046)	(0.042)
GPA	–0.120	0.010	0.166***	0.185***	–0.021	0.033	0.027	0.075*	0.023	0.079*
	(0.076)	(0.063)	(0.051)	(0.051)	(0.059)	(0.057)	(0.044)	(0.042)	(0.048)	(0.045)
Control		0.675***		0.100*		0.281***		0.247***		0.290***
		(0.069)		(0.057)		(0.063)		(0.047)		(0.050)
Constant	5.039***	2.438***	3.033***	2.648***	4.065***	2.981***	3.987***	3.037***	3.886***	2.770***
	(0.311)	(0.366)	(0.207)	(0.301)	(0.241)	(0.335)	(0.181)	(0.247)	(0.197)	(0.265)
Observations	175	175	175	175	175	175	175	175	175	175
R-squared	0.036	0.381	0.088	0.104	0.006	0.109	0.019	0.157	0.008	0.170

Notes: Standard errors in parentheses, ***p < 0.01, **p < 0.05, and *p < 0.1.
Control = perceived behavioural control, and Ent_intention = entrepreneurial intention.
[1]regressing outcome variable in the step 1.
[2]regressing mediating variables in the step 2.

To evaluate the construct validity, a confirmatory factor analysis (CFA) was conducted as per Brown's (2015) suggestion to determine the factor loadings of each construct. The results of our analyses indicate that all measures have met the acceptable threshold of factor loadings greater than 0.5, as stated by Hair et al. (2009). To be more precise, the items assessing perceived behavioural control exhibit factor loading scores ranging from 0.70 to 0.94. The range of item indicators for entrepreneurial intention is between 0.68 and 0.95. The results indicate that the factor loadings for each dimension of effectuation, namely experimentation (0.71–0.88), affordable loss (0.67–0.78), flexibility (0.62–0.79), and pre-commitment (0.66–0.84), are acceptable.

4 Results

We ran Pearson's correlation table as shown in Table 1 to reveal the associations among variables included in this study. Although the correlation coefficients lack predictability as well as causality, the figures manifest the initial analyses describing the characteristics of the data. A correlation table can also signal the tendency that led to the support of hypotheses. More specifically, Table 1 shows the significant results between the main variables. As expected, perceived behavioural control is significantly correlated with entrepreneurial intention ($r = 0.606$, p-value < 0.001). The effectuation's dimensions namely experiment, affordable loss, flexibility, and pre-commitment also positively correlated with the dependent variables (p-value < 0.001) with the value of $r = 0.271$ for experimentation, $r = 0.252$ for affordable loss, $r = 0.367$ for flexibility, and $r = 0.417$ for pre-commitment. Furthermore, each construct representing effectuation significantly correlates with one another ranging from 0.214 to 0.656 of correlation coefficient with a p-value < 0.001. Regarding the correlation results of the control variables, we found no evidence supporting the correlations between control variables and entrepreneurial intention (p-value > 0.05) with the correlation coefficient of –0.138 for male, 0.0328 for family wealth, and –0.111 for GPA.

In addition, the regression analyses of the independent variable – perceived behavioural control – towards both the dependent variable and mediators are exhibited in Table 2 (steps 1 and 2). Based on the data from 175 respondents, we found support for Hypothesis 1 showing that the perceived behavioural control is positively related to entrepreneurial intention ($\beta = 0.675$, p-value < 0.01). The results for regressing the mediators with the perceived behavioural control are also displayed in Table 2. The perceived behavioural control was found to influence the mediators – effectuation dimensions. More specifically, the perceived behavioural control is positively related to experimentation with $\beta = 0.100$, p-value < 0.10, to affordable loss with $\beta = 0.281$, p-value < 0.01, to flexibility with $\beta = 0.247$, p-value < 0.01, and to pre-commitment with $\beta = 0.290$, p-value < 0.01. Also, we found a significant relationship of gender (male) toward entrepreneurial intention with $\beta = –0.389$, p-value < 0.1 showing that female students in this dataset have higher entrepreneurial intention than their male counterparts.

Following Baron and Kenny's (1986) approach in testing mediation effects, Table 3 reveals the results of regression analyses of perceived behavioural control together with different mediators toward dependent variables – entrepreneurial intention (steps 3 and 4). We ran the series of analyses based on the different mediators (models 3–6) as well as the model with independent variable with all mediators (model 7). The results manifest that perceived behavioural control influence entrepreneurial intention through

effectuation dimension namely experimentation (β = 0.270, p-value < 0.01) and pre-commitment (β = 0.298, p-value < 0.01) supporting Hypotheses 3 and 5 respectively. While the mediators exhibit significant results, the independent variable remains significant after the inclusion of mediators, thereby supporting a partial mediation effect. Although we found the significant effect of flexibility (β = 0.285, p-value < 0.05) in the separated model (model 5) for mediating effect, the combined model of all mediators in model 7 reveals non-significant results for flexibility and therefore shows the lack of adequate evidence in supporting Hypothesis 4. Finally, we found no supporting evidence for the mediating effect of affordable loss. These analyses are the final step in the Baron and Kenny (1986) approach for regressing dependent variable with both independent and mediators. The two prior steps had been conducted and exhibited in Table 2 for the significant relationship of the independent variable toward the dependent variable as well as the significant relationship between the independent variable toward each mediator.

Table 3 The results from regression analyses of entrepreneurial intention

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*
Male	–0.389*	–0.305*	–0.260*	–0.298*	–0.276*	–0.334**	–0.300*
	(0.201)	(0.162)	(0.156)	(0.162)	(0.160)	(0.157)	(0.156)
Family wealth	0.066	0.024	–0.001	0.024	0.013	0.016	–0.003
	(0.072)	(0.058)	(0.056)	(0.058)	(0.057)	(0.056)	(0.056)
GPA	–0.120	0.010	–0.052	0.008	–0.011	–0.018	–0.062
	(0.076)	(0.063)	(0.062)	(0.063)	(0.062)	(0.061)	(0.062)
Control		0.675***	0.641***	0.654***	0.605***	0.571***	0.580***
		(0.069)	(0.067)	(0.073)	(0.074)	(0.073)	(0.074)
Experiment			0.339***				0.270***
			(0.090)				(0.097)
Aloss				0.073			–0.075
				(0.084)			(0.094)
Flexibility					0.285**		0.012
					(0.112)		(0.150)
Pre-commit						0.360***	0.298**
						(0.103)	(0.128)
Constant	5.039***	2.438***	1.541***	2.221***	1.574***	1.443***	1.086**
	(0.311)	(0.366)	(0.425)	(0.443)	(0.495)	(0.454)	(0.505)
Observations	175	175	175	175	175	175	175
R-squared	0.036	0.381	0.429	0.384	0.404	0.423	0.452

Notes: Standard errors in parentheses, ***p < 0.01, **p < 0.05, and *p < 0.1.
Control = perceived behavioural control, Aloss = affordable loss, and pre-commit = pre-commitment. Model 1: regressing outcome variable using only control variables; model 2: regressing outcome variable using main variable; models 3–6: regressing outcome variable using main variable and each mediator (steps 3 and 4); model 7: regressing outcome variable using main variable and all mediators (steps 3 and 4).

5 Discussion

The purpose of this study is to investigate the factors influencing entrepreneurial intention based on the combined theoretical lenses of the TPB and effectuation. Drawing from the prior literature in arguing that various effectual dimensions are influenced by the control aspect (Werhahn et al., 2015), this study proposed and investigated the control aspect through the perceived behavioural control from TPB (Ajzen, 1991, 2002; Kautonen et al., 2015) in impacting entrepreneurial intention through the mediating effects of effectual dimensions – experimentation, affordable loss, flexibility, and pre-commitment. As hypothesised, we found support for the direct effect of perceived behavioural control toward entrepreneurial intention which is in line with a prior study by Al-Jubari et al. (2019) that found similar evidence supporting the relationship. The results emphasise the importance of the TPB, especially the perceived behavioural control dimension that explains the intention that may lead to the behaviours regarding entrepreneurial activities. The TPB has been extensively utilised, as was previously discussed, to explain the phenomenon of human perception and behaviour. Our results add to the empirical support using the data from college students in the emerging economy context for strengthening the TPB framework.

Furthermore, we found the mediating effects of effectual dimensions on the relationship between perceived behavioural control and entrepreneurial intention. Specifically, the results indicate that experimentation and pre-commitment serve the mediating role as proposed in the study's conceptual framework. Supporting the prior literature in arguing that effectual dimensions can be influenced by the control aspect (Werhahn et al., 2015), this study integrated the TPB's control dimension as the potential source of effectuation before leading to entrepreneurial intent. The behavioural control could translate to the entrepreneurial intention through experimentation as potential entrepreneurs may try new things or innovate some ideas to control the uncertainty. The prior research that suggested that the control aspect might promote innovation could be used to support this claim (Hsu and Chang, 2011). In addition, behavioural control enhances entrepreneurial intention through pre-commitment. The control aspect of entrepreneurs could be explicitly displayed through pre-commitment activities such as acquiring contracts for the solid commitment (Mumi et al., 2018). Therefore, both experimentation and pre-commitment as the effectual dimensions serve as the logic that helps explain how behavioural control could translate into entrepreneurial intention.

The results of this study contribute to the theoretical implication at least two folds. First, the study extends the concept of both TPB and the effectuation framework, especially in arguing the combined effects of both logics on entrepreneurial intention. By extending the prior effectuation study (Werhahn et al., 2015), the effectual dimensions derived from the control aspect could be the crucial determinants of entrepreneurial intention. As consequence, this study is among the limited evidence in supporting the integrative role of both theories of planned behaviour and effectuation. Second, this study extends the literature on entrepreneurial intention in the emerging economy context – Thailand. Since, Thailand has been argued as the nation with lots of entrepreneurial activities (Ackaradejruangsri et al., 2022; Mumi, 2022; Ngammoh et al., 2023), the study of entrepreneurial intention, particularly in this context, could help explain how behavioural control and effectual dimensions take the crucial role in stimulating the entrepreneurship activities.

By highlighting the importance of integrating effectual logic with control logic in fostering entrepreneurial activities, this study provides significant contributions to policymakers and educators. The findings emphasise the need for policymakers to consider effectuation-oriented policies that encourage experimentation or trial and error, as well as the establishment of pre-commitment norms. Implementing such policies can increase the number of new start-ups and small- to medium-sized enterprises (SMEs) by influencing the entrepreneurial intentions of individuals. The practical implications of this study for educators lie in the need to teach students both the control logic and the effectual logic of entrepreneurship. Educators should provide aspiring entrepreneurs with the skills necessary to navigate uncertainty and effectively manage risks. By incorporating control logic into the curriculum, students can develop strategies for overcoming obstacles and decision-making skills for mitigating the risks associated with entrepreneurial endeavours.

The limitations of this study should also be taken into consideration along with the findings. First, the study's scope is relevant to the context of an emerging economy, with potential entrepreneurs in Thailand providing the data for the research. As Thailand is considered one of the nations with larger numbers of innovative and entrepreneurial organisations (Ackaradejruangsri et al., 2022) is suitable for this study. However, depending on a region's culture and geography, different conclusions about potential entrepreneurs may be derived. Additionally, given the small sample size, the findings should be interpreted with caution. The future study could be more beneficial with relatively larger sample size. Finally, the study of integrative effects of the different frameworks in influencing entrepreneurial intention is still limited. This study provides an explanation of how TPB could influence intention through effectuation theory. There could be various mediating or moderating effects awaiting to be explored in future studies. For example, the TPB may also be combined with the predictive logic or causation (Dew et al., 2009b) which may be different in influencing entrepreneurial intention.

6 Conclusions

The entrepreneurial intention has been the centre of entrepreneurship research since it influences the number of new ventures (Bird, 1988; Kautonen et al., 2015). Despite the fact that the notion of entrepreneurial intention has been extensively investigated, the literature lacks the potential connections from other theoretical understandings or perceptions that may be essential to the entrepreneurial intention, especially in the entrepreneurial process under an uncertain environment (Krueger, 2017). Drawing from the combined logic of the TPB and effectuation theory, this study proposed and investigated that the perceived behavioural control is positively related to entrepreneurial intention through effectuation dimensions. The results from 175 students in a large research university in Thailand support the study's hypotheses. Specifically, the perceived behavioural control affects entrepreneurial intention through experimentation and pre-commitment. This study provides the initial research on how TPB and effectuation could be used to explain the entrepreneurship phenomena. The results manifest the empirical evidence extending the TPB and effectuation, particularly

suggesting that the control logic of TPB is the crucial source of entrepreneurial intention and it is effective through effectual dimensions of experimentation and pre-commitment.

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