Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

From Discovery to Exploitation: Evidence on Entrepreneurial Action Among Latin American University Students

Marisleidy Alba
Fundación Universitaria Konrad Lorenz
Boris Cendales
cendales.boris@javeriana.edu.co

Pontificia Universidad Javeriana
Angélica Garzón
Fundación Universitaria Konrad Lorenz
Juan Carlos Espinosa
Universidad del Rosario
Janitza Ariza
Fundación Universitaria Konrad Lorenz

Article

Keywords: Entrepreneurship education, Opportunity creation, Opportunity exploitation, Environment perception, Individual Profile

Posted Date: July 15th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9903274/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License

Additional Declarations: No competing interests reported.

Abstract

Entrepreneurial action among university students in Latin America is key to the region's economic development, yet it often fails to materialize. This study analyzes how entrepreneurial initiatives emerge in educational contexts, aiming to guide entrepreneurship education. Using a quantitative, cross-sectional design, data from 477 students at ACBSP-accredited business schools in Mexico, Peru, Ecuador, and Paraguay were analyzed through structural equation modeling (SEM). To address potential temporal bias in cross-sectional mediation, a sensitivity analysis following Georgeson et al. (2025) was also conducted. Results show that discovery significantly mediates the relationship between entrepreneurial profile and exploitation, supporting the opportunity creation theory. Moreover, the indirect effect remained robust across 97.8% of admissible longitudinal sensitivity scenarios. Environmental perception directly influences exploitation, but not through discovery. These findings contribute to the ongoing debate between discovery and creation theories by supporting the relevance of discovery in the transition toward entrepreneurial action. At a practical level, the study provides guidance for designing entrepreneurship curricula that strengthen self-efficacy, entrepreneurial attitude, and financial knowledge, while fostering experiential and iterative learning environments that enable students to progress from discovery to exploitation.

Introduction

Entrepreneurial action has gained prominence as a driver of economic and social development, particularly in low- and middle-income countries, characterized by their need to revitalize productive ecosystems and generate youth employment. In this context, understanding what drives entrepreneurs, to transform business ideas into new ventures becomes a priority for both economic and educational policy, especially given that several studies have shown that many initiatives do not progress from exploratory actions to exploitation (Liñán & Fayolle, 2015).

Traditionally, the literature has addressed entrepreneurial action from two opposing perspectives: the discovery theory, which assumes the objective existence of opportunities that must be identified by individuals with specific capabilities (Shane, 2003), and the creation theory, which posits that opportunities emerge through the process of acting and making sense of uncertainty (Alvarez & Barney, 2007). However, there is still debate over which approach best describes entrepreneurial behavior in real-world contexts, especially in initial or formative stages such as educational settings (Davidsson, 2021).

Despite the growing body of literature on entrepreneurship, there remains a gap in the empirical understanding of how both personal attributes or profile of entrepreneurs and their perception of business environment predict the interrelated phases of entrepreneurial action (discovery and exploitation). Particularly, it is still unclear to what extent the entrepreneurial profile and individual appraisal of the economic environment explain the discovery of opportunities, their subsequent exploitation, or both. Additionally, Lins & Doktor (2014) emphasize that there is no clear empirical or theoretical consensus on how key elements of entrepreneurial behavior—such as self-efficacy, entrepreneurial attitude, financial knowledge, and perception of the institutional and social environment—are interrelated. Previous studies have explored this issue from the perspective of innovation (Jones & Barnir, 2019). However, the debate remains unresolved about how these factors interact across the different stages of the entrepreneurial process and what role they play in the transition from intention to action. This lack of theoretical and empirical clarity justifies the need for studies that integrate approaches and validate models to explain how opportunities emerge and evolve in real contexts, especially during formative stages such as the university environment. Addressing this gap in the entrepreneurship literature, this study investigates the following research questions:

- What is the relationship between the entrepreneurial profile of university students and their entrepreneurial behavior, in terms of discovery and exploitation actions?
- How does the perception of the entrepreneurial environment influence these actions?
- Is discovery a mediator in the relationship between the entrepreneurial profile and exploitation?
- Does the perception of the environment drive entrepreneurial exploitation through discovery?

Considering the contextual dependence of entrepreneurial action, our study provides evidence from four Latin American countries: Peru, Mexico, Ecuador, and Paraguay. At a practical level, its findings provide valuable input for the curricular design of entrepreneurship programs that promote entrepreneurial action, as well as for the formulation of institutional strategies that recognize the importance of discovery as a preliminary phase of entrepreneurship, foster more accessible educational environments, and develop effective mechanisms for monitoring and supporting students' entrepreneurial profiles.

Literature Review and Hypothesis Development

Theoretical Approaches to Entrepreneurial Action

Entrepreneurial action has been explained through two complementary yet divergent theoretical approaches: the discovery theory and the creation theory of opportunities.

According to the discovery theory, business opportunities objectively preexist in the environment and can be identified by individuals with certain cognitive abilities, knowledge, and heightened alertness (Ricketts & Kirzner, 1992; Shane, 2003). This approach posits that external factors such as market conditions, access to financing, and institutional support facilitate the identification of these opportunities. Shane (2003) acknowledges that entrepreneurs may innovate by exploiting opportunities, but his approach denies that opportunities are subjectively created from the entrepreneurs' knowledge and decisions.

In contrast, the creation theory argues that opportunities are not given in advance but emerge from an active construction process by the entrepreneur, especially in highly uncertain economic environments (Alvarez & Barney, 2007). This perspective suggests that entrepreneurial action arises from the interaction between the individual's personal attributes and their ability to act, learn, and adapt decisions based on experience (Sarasvathy, 2001). Accordingly, Sarasvathy (2001) defines the entrepreneur as an active agent who co-creates opportunities and adjusts their course based on experience and interactions with the environment. She also distinguishes between two decision-making logics in the entrepreneurship process: causation and effectuation. Unlike the logic of causation, which is based on prediction, the logic of effectuation begins with the entrepreneur's existing resources and capabilities (personal profile), and from there they act, learn, and adapt their decisions in an iterative and contingent process rather than following a rigid pre-existing plan. This logic emphasizes the ability to control the future through action rather than prediction and acknowledges the inherent uncertainty of the entrepreneurial process.

Entrepreneurial action is generally understood as the set of behaviors through which individuals move from ideas to the creation of businesses. This transition occurs between two interrelated phases: discovery and exploitation. Discovery refers to the exploration of ideas, the identification of needs, and the validation of potential opportunities, while exploitation involves the implementation, investment, and consolidation of those opportunities into concrete entrepreneurial initiatives (Shane & Venkataraman, 2000; Corbett, 2005; Dimov, 2007). This distinction is fundamental to our study, as it allows us to analyze how students progress from exploration to execution.

This theoretical framework highlights the role of entrepreneurial profile in the new business creation, and the discovery phase of entrepreneurial action as a prerequisite to exploitation behaviors. The entrepreneurs' individual profile has been widely recognized as predictor of entrepreneurial action. This profile consists of a set of personal, cognitive, and motivational attributes that directly influence both the generation and implementation of business initiatives (McMullen & Shepherd, 2006). For instance, Rauch & Frese (2007) found that the need for achievement and self-efficacy are positively related to both the decision to start a new business and success in its management, thus confirming that the entrepreneur's profile directly influences both phases of the entrepreneurial process.

Among the most relevant components of entrepreneurial profile are entrepreneurial self-efficacy, entrepreneurial attitude, and financial knowledge —variables that have been associated with both entrepreneurial intention and concrete entrepreneurial action (Liñán et al., 2011; Newman et al., 2019). In this regard, there is evidence that a stronger belief in one's own abilities (self-efficacy), a favorable attitude toward entrepreneurship, and solid knowledge of financial aspects are all factors that influence not only the intention to start a business but also the execution of concrete actions to create one. Recent comparative evidence in Latin America confirms that entrepreneurial attitude, self-efficacy, and financial knowledge are strong predictors of entrepreneurial intention and action in both discovery and exploitation phases (Alba et al., 2025).

Our study assumes a sequential logic in entrepreneurial action, in which the discovery phase is defined as the process of exploring ideas, identifying needs, and validating opportunities, and serves as a necessary precursor to the exploitation phase, which involves the actual implementation of a business idea (Shane & Venkataraman, 2000; Corbett, 2005). Consequently, although the entrepreneurial profile may exert some direct influence on exploitation, its strongest impact is expected to occur through its effect on discovery. From this perspective, entrepreneurial behavior unfolds progressively: individuals first engage in opportunity discovery and only then move on to exploitation. This sequential approach is consistent with creation theory (Alvarez & Barney, 2007), in which opportunities are not simply identified, but are actively constructed by the entrepreneur through interaction with their environment and personal attributes. Recent reviews (Schlichte & Junge, 2024) underscore persistent ambiguities between discovery and creation perspectives. Similarly, Álvarez et al. (2024) reapply creation logic in lean startup contexts.

In the field of higher education, this sequential logic can be understood by considering the components of the entrepreneurial profile (self-efficacy, entrepreneurial attitude, and financial knowledge), attributes that have been identified as determinants of both entrepreneurial

intention and action (discovery and exploitation) (Liñán et al., 2011; Newman et al., 2019). Studies such as Corbett (2005) show that experiential learning fosters the discovery of opportunities as a necessary step toward exploitation, while Fernández-Pérez et al. (2019) demonstrate that self-efficacy and attitude are strengthened through structured courses and university support, thereby fostering initial exploratory behaviors.

Neck and Greene (2011) highlight that entrepreneurship education should create iterative and action-oriented environments where students can validate ideas and progress from discovery to exploitation. However, an unresolved debate persists about how these factors of the entrepreneurial profile interact with each other and whether they influence exploitation directly or indirectly through discovery (Lins & Doktor, 2014; Davidsson, 2021). Mehrabi (2024) identifies over 40 distinct definitions of entrepreneurial opportunity in recent literature, highlighting the need for clear operationalization in empirical work. These elements justify the application of the sequential framework in university ecosystems.

From this perspective, the following hypothesis is proposed:

H1. There is a positive and direct association between the entrepreneurial profile and entrepreneurial action (H1a: discovery and H1b: exploitation).

This hypothesis aligns with the opportunity creation theory (Alvarez & Barney, 2007), which posits that entrepreneurial action emerges from the interaction between the individual capabilities of the entrepreneur and the environment, with the entrepreneur actively constructing the opportunity through decisions and actions.

Regarding the variables that define the entrepreneurial profile (financial knowledge, self-efficacy, and entrepreneurial attitude), financial knowledge provides individuals with the cognitive tools needed to evaluate the economic viability of various business ideas. The literature emphasizes that higher financial literacy is associated with more strategic decisions, lower risk aversion, and a heightened perception of control over resources (Lusardi & Mitchell, 2014; Grohmann, 2018). This contributes to the identification of opportunities and efficient planning—key elements in the discovery phase.

On the other hand, entrepreneurial self-efficacy—understood as the belief in one's own ability to initiate and manage a business—has been established as one of the strongest predictors of entrepreneurial behavior (Bandura, 1997; Boyd & Vozikis, 1994; McGee et al., 2009). This implies that the greater an individual's confidence in their entrepreneurial skills, the more likely they are to have the intention and willingness to start a business. This attribute enhances action in contexts of high uncertainty, facilitating persistence, creativity, and tolerance for failure (Sarasvathy, 2001). Self-efficacy not only drives the intention to undertake but also strengthens behavioral commitment toward project execution.

Finally, entrepreneurial attitude is understood as a favorable psychological disposition toward entrepreneurship that influences both intention and action (Ajzen, 1991; Liñán & Chen, 2009). This attitude is reflected in key traits such as achievement orientation, autonomy, resilience, and risk tolerance—all of which have been identified as determinants of an individual's predisposition to initiate and sustain entrepreneurial activity (Moriano et al., 2011; Rauch & Frese, 2007). This attitude serves as an internal driver that predisposes individuals to actively engage in processes of opportunity exploration and exploitation.

In other words, the personal attributes of entrepreneurs not only directly drive action but also foster the development of discovery processes that, in turn, lead to exploitation-oriented behaviors. This sequence is consistent with sequential approaches to entrepreneurship (Shane & Venkataraman, 2000; Corbett, 2005), where the initial phase of cognitive and contextual exploration is an essential prerequisite for turning an idea into concrete action.

Based on these arguments, the following hypothesis is proposed:

H2. The relationship between the entrepreneurial profile and exploitation is positively mediated by discovery actions.

Hypothesis 2

is also supported by several studies, such as Shane & Venkataraman (2000), Corbett (2005), and Fernandez et al. (2019), who have identified discovery as a mediator of exploitation. They have also proposed that entrepreneurial action can be divided into two interrelated phases: discovery and exploitation. Discovery represents the stage in which ideas are explored, needs are identified, and an opportunity is validated, while exploitation involves its effective implementation. Therefore, in this study, entrepreneurial action is conceptualized as comprising these two phases.

The Entrepreneurial Environment and Its Influence on Action

Specialized literature has consistently recognized the role of the environment as a determining factor in the development of entrepreneurial initiatives. Empirical studies show that variables such as access to financing, support services, public policies, and the social perception of entrepreneurship significantly shape entrepreneurial behavior (Autio & Acs, 2010; Franke & Lüthje, 2004; Welter, 2011; Spigel, 2017; Fuentelsaz et al., 2019).

In higher education contexts, these dimensions are often reflected in incubators, mentoring programs, and institutional networks that foster or restrict entrepreneurial action among students. These elements shape what is known as the entrepreneurial ecosystem, defined as an interrelated set of social, political, economic, and cultural contextual factors within a region that can facilitate or restrict entrepreneurial action (Spigel, 2017; Welter & Baker, 2020). Huang (2023) further found that national-level variables moderate the relationship between individual attributes and entrepreneurial behavior, suggesting that context matters in different economies.

From the perspective of the opportunity discovery theory (Shane & Venkataraman, 2000), it is assumed that opportunities objectively exist in the environment and that entrepreneurs must be capable of identifying and exploiting them. In this sense, a dynamic, transparent environment with favorable conditions becomes fertile ground for individuals with the appropriate capabilities to detect these opportunities and act accordingly.

In this study, the *assessment of the entrepreneurial environment* refers to students' perceptions of contextual dimensions such as access to financing, market, government policies, societal attitudes, and the role of the university. Rather than an objective measurement of the environment, this construct captures the subjective evaluation of the entrepreneurial ecosystem by the individual (Spigel, 2017; Welter & Baker, 2020; Autio & Acs, 2010).

While this perspective highlights the relevance of context, in higher education there remains an unresolved debate about whether such perceptions primarily stimulate exploratory behaviors (discovery) or instead act mainly as enablers of exploitation once a concrete business idea has emerged.

Recent evidence suggests that contextual factors may play a stronger role in enabling implementation rather than early exploration (Fuentelsaz et al., 2019), while other studies show that national-level variables moderate the relationship between individual attributes and entrepreneurial behavior, reinforcing that context matters differently across economies (Huang, 2023). For this reason, we propose to test whether environmental appraisal relates not only to exploitation but also to discovery. Hence, the third hypothesis of this study is proposed:

H3. There is a positive and direct association between the assessment of the entrepreneurial environment and entrepreneurial action (H3a: discovery and H3b: exploitation).

However, authors such as Alvarez and Barney (2007) have argued that even within structured environments, opportunities are not always evidently available and may require a prior process of discovery or construction. In this regard, it is suggested that environmental conditions may not directly influence the exploitation of opportunities but may instead act indirectly by promoting discovery-oriented behaviors. Welter (2011) states that "context can influence entrepreneurship both directly and indirectly by affecting individuals' perceptions and motivations to engage in entrepreneurial activity" (p. 172). This mediation reflects an integrative approach, in which the interaction between individual and contextual factors shapes entrepreneurial action (Acs et al., 2014).

Furthermore, studies suggest that contextual conditions indirectly influence entrepreneurship through the activation of cognitive or behavioral processes such as discovery (Welter, 2011; Bruton et al., 2010). However, this mechanism has not been empirically validated in university ecosystems. This motivates our research question 4: Does environmental assessment indirectly influence exploitation through discovery?

Therefore, the following hypothesis is proposed:

H4. The association between environmental assessment and exploitation is positively mediated by discovery actions.

This proposition aligns with studies that emphasize the indirect influence of the environment through prior cognitive or behavioral processes (Fuentelsaz et al., 2019). Bruton et al. (2010) establish that the institutional environment influences entrepreneurship not only directly (via rules and laws), but also indirectly through the shaping of entrepreneurs' beliefs, values, and norms (prior cognitive and behavioral processes) that mediate entrepreneurial action. In this sense, the perception of opportunities in the environment can activate

mechanisms such as information seeking, idea validation, and team formation in the entrepreneurial process, all of which are part of the discovery phase that precedes effective exploitation.

Similarly, authors such as Welter & Baker (2020) acknowledge that the environment can both facilitate and constrain entrepreneurship, depending on how individuals and groups perceive, interpret, and act within that environment. This implies that the way social actors construct and narrate their environment influences whether it fosters or hinders entrepreneurial activity, highlighting the importance of narratives, memories, and social interactions in shaping the entrepreneurial space. Therefore, this study's examination of these relationships seeks to understand the extent to which the environment contributes either directly or indirectly to the different phases of entrepreneurial behavior.

Figure 1 provides a graphical summary of the study hypotheses.

"Insert Fig. 1 **here"**

Method

Participants and data collection procedures

The study employed a correlational, cross-sectional, and non-experimental design. The sample consisted of undergraduate students enrolled in business schools accredited by the Accreditation Council for Business Schools and Programs (ACBSP) in four Latin American countries: Mexico (n = 163), Peru (n = 98), Ecuador (n = 134), and Paraguay (n = 88). A voluntary, non-probability sampling strategy was used, with inclusion criteria requiring participants to be at least 18 years old and to have completed at least one entrepreneurship-related course at their educational institution. A total of 477 valid responses were collected.

Most respondents were enrolled in intermediate or advanced academic semesters, with average academic progression ranging between the sixth and seventh semester depending on the country. The age distribution was concentrated between 18 and 24 years, and a high prevalence of entrepreneurial experience was observed, with more than 80% of participants reporting previous entrepreneurial activities. Because participation was voluntary and the sample was non-probabilistic, the findings should be interpreted as illustrative rather than representative of the broader student population.

The study was coordinated and administered by the research team based at Fundación Universitaria Konrad Lorenz (Bogotá, Colombia). Participants were recruited through institutional email invitations distributed by program directors in participating business schools. Data were collected in Mexico, Peru, Ecuador, and Paraguay through a self-administered electronic questionnaire (Google Forms) between August 2024 and May 2025.

Measures

The following latent variables were included in the model and were measured using a 5-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Each variable is described in detail below:

Within the latent variable "Environment perception", the variables measured included financial knowledge, entrepreneurial attitude, and entrepreneurial self-efficacy.

Financial Literacy

To assess the construct of financial literacy, seven items were adapted from the scale originally developed by Chen and Volpe (1998). These items were selected because they reflect fundamental domains of personal finance, including asset liquidity, personal financial planning, spending and saving patterns, compound interest, certificate of deposit terms, reasons for acquiring insurance, and investment diversification. The internal consistency of the scale was excellent, with a Cronbach's alpha of .94.

Entrepreneurial Self-Efficacy

The measurement of entrepreneurial self-efficacy is based on Fernández-Pérez et al. (2019), who propose five items that assess individuals' perceptions of their abilities to start and manage a business, as well as their capacity to define a business idea and strategy,

develop a business plan, negotiate with investors and banks, identify market opportunities, and establish key relationships to obtain funding. The internal consistency of the scale was excellent, with a Cronbach's alpha of .95.

Entrepreneurial Attitude

The variable Entrepreneurial Attitude is used to assess the disposition and entrepreneurial mindset of university students. This measure is based on a study by Song et al. (2021). It consists of eight items that address aspects such as willingness to seize opportunities, being a change agent, seeking recognition and respect, leadership, preference for a balanced and flexible work schedule, passion for learning, aiming for high employment rates, and aspiring to high positions in the workplace. The internal consistency of the scale was excellent, with a Cronbach's alpha of .92.

Entrepreneurial Action

Entrepreneurial action was assessed using the 16-item scale developed by Botha and Pieterson (2022), which captures a variety of activities associated with both the discovery and exploitation phases in the process of launching a new venture. These activities include identifying market opportunities, preparing a business plan, developing models or procedures for a product or service, choosing a business name, dedicating oneself full-time to the venture, organizing a startup team, establishing a legal entity, registering the business with tax authorities, investing personal funds, obtaining external financial support, securing a physical location and equipment, acquiring or leasing infrastructure, purchasing supplies and raw materials, initiating marketing and promotional activities, applying for licenses or patents, and hiring staff. The full scale was used without modifications, as the participants senior-year marketing students with prior entrepreneurship training, were considered to have the knowledge and judgment necessary to understand and respond accurately to each item. The internal consistency of the scale was excellent, with a Cronbach's alpha of .89 for discovery and .96 for exploitation.

Environment Perception

External factors were incorporated into the model as part of the individual profile (Individual Profile), following the instrument developed by Franke and Lüthje (2004). This measure evaluates the perception of the entrepreneurial environment through 16 items related to a) market conditions (2 items), b) access to financing (2 items), c) government policies (4 items), d) availability of support services (7), and e) societal perception of entrepreneurship (1). The instrument was used in its entirety without modifications, preserving the original wording and structure of the items. The internal consistency of the scale was .72 for market conditions, .51 for access to financing, .80 for government policies, and .92 for the availability of university support services. Societal perception of entrepreneurship was measured using a single item.

Statistical analysis

The study hypotheses were tested using SEM-based path analyses with robust maximum likelihood estimations. Considering the cross-sectional design of this research, it is worth mentioning that testing mediation hypotheses with data collected at one point in time is possible when there are strong theoretical reasons to assume a priori the temporal ordering in the examined associations (Fairchild & McDaniel, 2017; Shrout, 2011). However, estimates from cross-sectional mediations are at risk of being biased (Maxwell & Cole, 2007) and therefore, the statistical models reported in this study should be interpreted with caution.

The scores for entrepreneurs' perceptions on market, financing, government, society, and university were calculated by averaging the items from the respective subscales. These observed variables were then combined to form the latent variable named "environment perception". Similarly, the scores for financial literacy, entrepreneurial self-efficacy, and entrepreneurial attitude were calculated by averaging the items from the respective scales, and these observed variables were subsequently combined to form the latent variable named entrepreneurs' "individual profile". The scores for discovery and exploitation behaviors were calculated by averaging the items from the corresponding subscales. These scores were used as observed variables in the path model.

Entrepreneurs' environment perception and individual profile were introduced in the model as predictors of discovery and exploitation behaviors. In turn, discovery was used as a predictor of exploitation behavior. Estimators were calculated controlling for Entrepreneurs' age and sex. The path models fit was evaluated by using Chi-square [χ^2], minimum discrepancy ratio [CMIN/df], Normed Fit Index [NFI], Tucker-Lewis Index [TLI], Incremental Fit Index [IFI] and Root Mean Square Error of Approximation [RMSEA]. A CFI/NFI/TLI/IFI ≥ .90, an RMSEA ≤ .08 (better if ≤ .05), and CMIN/df ≤ 5.0 were used as thresholds of acceptable fit to the data (Marsh et al., 2004; Schreiber et al., 2006). The model fit was improved considering modification indexes. Following the bootstrap method (MacKinnon et al., 2004), the model's indirect (or mediated) effects, their bias-corrected confidence intervals (95% CI) and significance were calculated by randomly extracting 2000 bootstrap samples.

Because mediation models estimated from cross-sectional data may be affected by temporal bias (Maxwell & Cole, 2007), a sensitivity analysis was conducted following the procedure proposed by Georgeson et al. (2025). This approach uses phantom variables to reconstruct alternative longitudinal data-generating processes that are consistent with the observed cross-sectional correlation matrix. The procedure evaluates how estimated indirect effects would change under different assumptions regarding omitted autoregressive and cross-lagged relations. A total of 208 sensitivity scenarios were generated by systematically varying temporal stability parameters from .05 to .80 and cross-lagged effects from .00 to .60. Scenarios resulting in inadmissible covariance structures were excluded, yielding 135 admissible models for interpretation. For each admissible scenario, adjusted indirect effects were estimated and compared with the original cross-sectional mediation effect. Because reporting all admissible scenarios would be impractical, ten representative scenarios were selected for presentation. These scenarios were chosen to span the range of autoregressive stability and omitted cross-lagged parameters examined in the sensitivity analysis, including highly favorable, intermediate, and conservative conditions, as well as the worst-case admissible scenario corresponding to the smallest positive indirect effect observed across all admissible models. The analysis was used to evaluate the robustness of the mediation findings to potential temporal misspecification and omitted longitudinal dynamics. Consistent with the recommendations of Georgeson et al. (2025), the results were interpreted as evidence regarding the sensitivity of the indirect effects to temporal bias rather than as evidence of causal ordering.

Statistical analyses were performed using IBM SPSS Statistics (Version 26.0) and IBM SPSS AMOS (Version 26.0). Descriptive statistics, reliability analyses, and structural equation modeling were conducted in SPSS and AMOS. Sensitivity analyses for temporal bias in cross-sectional mediation were conducted in R (Version 4.x) following the procedure proposed by Georgeson et al. (2025). The analyses were implemented using the packages *psych*, *lavaan*, *MASS*, and *Matrix*, which were used to reconstruct admissible covariance structures, estimate adjusted indirect effects, and evaluate the robustness of mediation estimates across alternative longitudinal scenarios.

Results

Descriptive statistics

Table 1 summarizes the descriptive statistics of the study variables. Regarding entrepreneurial action, discovery behaviors were found to have a higher average than exploitation behaviors. The means for financial literacy, entrepreneurial self-efficacy, and entrepreneurial attitude were relatively high (considering the scale range, i.e., 1–5). Likewise, participants reported positive perceptions of market, financing, government, society and university.

All associations among the study variables were positive and statistically significant, except for the association between exploitation and market perception, which was not significant. The variables most strongly related to discovery were entrepreneurial self-efficacy, financial literacy, and perceptions of the university, society, government, financing, and the market. In contrast, the variables most strongly related to exploitation were perceptions of the government, society, and university, followed by entrepreneurial self-efficacy, financial literacy, entrepreneurial attitude, and the perception of financing opportunities.

Table 1
Descriptive statistics of the study variables.

	M	SD	2	3	4	5	6	7	8	9	10	11	12
1. Age[b]	**85.3%**	**0,36**	**-,116***	**0,069**	**0,010**	**0,036**	**0,006**	**-0,011**	**0,011**	**-0,068**	**-,112***	**-,107***	**-0,054**
2. Gender[a]	54%			-0,057	-,111*	-0,036	0,033	,096*	0,077	0,012	-0,031	-0,035	,091*
3. Discovery	3,33	0,95			,668**	,453**	,564**	,474**	,249**	,283**	,349**	,359**	,361**
4. Exploitation	2,69	1,13				,299**	,322**	,269**	0,074	,257**	,341**	,310**	,294**
5. Financial literacy	3,67	0,93					,559**	,489**	,384**	,297**	,351**	,344**	,404**
6. Self-efficacy	3,82	0,87						,599**	,339**	,297**	,298**	,352**	,378**
7. Attitude	4,04	0,82							,530**	,403**	,326**	,398**	,400**
8. Market	3,89	0,86								,381**	,322**	,367**	,271**
9. Financing	3,19	0,83									,480**	,381**	,382**
10. Government	3,15	0,82										,433**	,378**
11. Society	3,30	1,07											,378**
12. University	3,42	1,10											

Note: * p. < .05; p. ** < .01; [a]% male; [b]% 18-24 years (vs 25-39).

"Insert Table 1 **here"**

Structural Equation Modeling

The path model for predicting discovering and exploitation behaviors through the entrepreneurs' individual profile and environment perceptions fitted acceptably the data (χ^2= 139.153 p = .000 df = 40; CFI = .943; NFI = .923; TLI = .906; IFI = .944; RMSEA = .072 [0.059; 0.080]; CMIN/df = 3.479). Figure 2 summarizes the model estimators. Detailed model diagnostics, including error terms (Supplementary Table 4), covariances (Supplementary Table 5), and squared multiple correlations (Supplementary Table 6), are provided in Appendix 1 (Supplementary Material). Overall, the model's predictors explained 46% of the variance of discovery and 48% of the variance of exploitation (see all squared multiple correlations in appendix 1). The direct associations of entrepreneurs' individual profile with discovery and exploitation behaviors were respectively significantly positive, and significantly negative. Meanwhile, the direct associations of entrepreneurs' environment perception with discovery and exploitation behavior were respectively non-significant, and significantly positive. The indirect effect of entrepreneurs' individual profile on exploitation through discovery behavior was significantly positive (unstandardized estimate = 0.991 p = .001 Bias corrected 95% CI [0.669; 1.535]). On the contrary, the indirect effect of entrepreneurs' environment perception on exploitation through discovery behavior was non-significant (unstandardized estimate = − 0.014 p = .508 Bias corrected 95% CI [-0.713; 0.195]).

Table 2
Direct effects of entrepreneur's individual profile and environment perception on discovery and exploitation behavior.

Path			Standardized	Bias corrected		*p*
			Estimate	95% CI		
				Lower	Upper	
Environment perception	→	Market	0,614	0,498	0,701	0,001
Environment perception	→	Financing	0,59	0,513	0,656	0,001
Environment perception	→	Government	0,564	0,467	0,637	0,002
Environment perception	→	Society	0,61	0,54	0,67	0,001
Environment perception	→	University	0,647	0,581	0,701	0,001
Individual profile	→	Financial literacy	0,685	0,615	0,747	0,001
Individual profile	→	Self-efficacy	0,774	0,701	0,825	0,002
Individual profile	→	Attitude	0,768	0,697	0,822	0,001
Age	→	Discovery	0,044	-0,023	0,098	0,262
Age	→	Exploitation	-0,022	-0,086	0,043	0,545
Gender	→	Discovery	-0,085	-0,154	-0,023	0,035
Gender	→	Exploitation	-0,071	-0,136	-0,01	0,055
Individual profile	→	Discovery	0,746	0,547	1,046	0,001
Individual profile	→	Exploitation	-0,323	-0,698	-0,106	0,015
Environment perception	→	Discovery	-0,087	-0,436	0,123	0,502
Environment perception	→	Exploitation	0,276	0,074	0,623	0,02
Discovery	→	Exploitation	0,739	0,644	0,837	0,002

"Insert Table 2 **here"**

"Insert Fig. 2 **here"**

Sensitivity analyses were conducted only for the indirect effect of entrepreneurial profile on exploitation through discovery, as this was the only statistically significant mediation identified in the primary structural model. The indirect effect linking environmental perception to exploitation through discovery was not significant and was therefore not subjected to further sensitivity testing. As shown in Table 3, the adjusted indirect effect remained positive across a wide range of assumptions regarding omitted autoregressive and cross-lagged effects. Among the 135 admissible longitudinal scenarios evaluated, the indirect effect remained positive and statistically significant in 97.8% of cases, with a median adjusted effect of .430. Importantly, even under the worst-case admissible scenario, corresponding to the smallest positive indirect effect obtained across all tested models, the mediation effect remained positive (ab = .113). Taken together, these findings suggest that the indirect association between entrepreneurial profile and exploitation through discovery is highly robust to alternative assumptions regarding temporal ordering and omitted longitudinal dynamics, reducing the likelihood that the observed mediation can be attributed solely to temporal bias in the cross-sectional design.

Table 3

Sensitivity analysis of the indirect effect of entrepreneurial profile on exploitation through discovery

Scenario (AR | CL)	**a**	**b**	**Indirect Effect (a*b)**
AR = .80 | CL = .00	.593	.879	.521
AR = .80 | CL = .10	.593	.806	.478
AR = .80 | CL = .20	.593	.731	.434
AR = .60 | CL = .10	.593	.744	.441
AR = .60 | CL = .30	.593	.625	.371
AR = .40 | CL = .10	.593	.688	.408
AR = .40 | CL = .30	.593	.572	.339
AR = .20 | CL = .40	.593	.509	.302
AR = .10 | CL = .50	.593	.457	.271
AR = .80 | CL = .60	.593	.191	.113

Note. AR = autoregressive stability coefficient; CL = omitted cross-lagged effect. Parameter *a* represents the association between entrepreneurial profile and discovery, whereas parameter *b* represents the association between discovery and exploitation after accounting for the temporal-bias assumptions specified in each scenario. The indirect effect corresponds to the product (*a*b*). The original cross-sectional indirect effect was β = .418. Across the 135 admissible scenarios, the indirect effect remained positive in 97.8% of cases and statistically significant in 97.8% of them, with a median adjusted indirect effect of .430. Worst-case admissible scenario, corresponding to the smallest positive indirect effect obtained among all admissible sensitivity-analysis models.

"Insert Table 3 **here"**

Discussion

The objective of this study was to examine how entrepreneurial profile and environmental perceptions are related to entrepreneurial action, considering the mediating role of discovery in the exploitation phase. The findings provide preliminary evidence in favor of the opportunity creation theory (Alvarez & Barney, 2007) over the opportunity discovery theory (Shane, 2003), by showing that entrepreneurial behavior in the four countries studied aligns more closely with a logic of active construction than with a passive identification of opportunities.

Regarding Hypothesis 3, which proposed a direct and positive relationship between the perception of the entrepreneurial environment and entrepreneurial action (discovery and exploitation), the results were only partially consistent. The environment showed a significant positive effect on exploitation but no significant effect on discovery. Thus, H3 is only partially supported: while the environment directly facilitates exploitation, it does not foster discovery. This finding challenges a central assumption of discovery theory (Shane & Venkataraman, 2000) and raises the need to explore why, in Latin American university contexts, environmental perception does not translate into exploratory behaviors.

One possible explanation is that students may perceive external conditions (financing opportunities or institutional support) as more relevant once they already have a concrete business idea to exploit, but not as triggers for initial exploratory behaviors.

In line with Welter and Baker (2020), the context often acts as an enabler or constraint depending on how it is interpreted, and in the university setting this interpretation may be conditioned by limited exposure to entrepreneurial ecosystems. Another explanation may be that the measurement of discovery does not fully capture informal or early-stage behaviors, such as ideas or peer discussions, which are less influenced by perceptions of the external environment. These considerations highlight the need for more precise indicators and suggest that discovery may depend more on individual-level attributes (self-efficacy, attitude) than on contextual perceptions in the early university stages.

As for Hypothesis 1, which anticipated a direct and positive association between entrepreneurial profile and entrepreneurial action (discovery and exploitation), the findings partially support this hypothesis. The entrepreneurial profile positively predicts discovery but shows a negative relationship with direct exploitation. This result suggests that personal attributes do not always directly drive exploitation but rather do so through discovery as a preliminary step. Although the entrepreneurial profile is a valuable resource, it is not sufficient on its own to execute a business idea. Thus, a possible sequential process may be operating, whereby opportunities are first explored, identified, and validated (discovery), and subsequently acted upon (exploitation). The findings align with the opportunity creation

theory, which suggests that entrepreneurs do not operate with a fully defined plan from the outset, but instead build the opportunity along the way, based on their personal capabilities—consistent with Fernández et al. (2019), Corbett (2005), and Shane & Venkataraman (2000), who conceptualize entrepreneurial action as comprising interrelated phases, with discovery preceding exploitation. This also coincides with Alvarez and Barney (2007), who argue that opportunities are not pre-given but emerge from the interaction between personal attributes and action.

Hypothesis 4, which proposed a positive mediation of discovery between the perception of the environment and exploitation, was not supported. The indirect effect was not significant (β = − 0.085, 95% CI = [−0.480; 0.208]), indicating that the environment does not influence exploitation through discovery. This finding partially contradicts the sequential approach of discovery theory (Corbett, 2005) and reinforces the idea that the environment may act directly on exploitation or even have no effect at all. Similar results have been observed in recent studies on uncertain environments and early-stage entrepreneurs, where the influence of the environment can be limited or variable (Welter & Baker, 2020; Fuentelsaz et al., 2019).

Finally, Hypothesis 2, which proposed that discovery positively mediates the relationship between entrepreneurial profile and exploitation, was supported. The indirect effect was positive, significant, and substantial, indicating that entrepreneurial profile promotes exploitation primarily through its influence on discovery behaviors. Importantly, this mediation occurred alongside a significant negative direct effect of entrepreneurial profile on exploitation, revealing a pattern of inconsistent mediation (MacKinnon et al., 2000), also referred to as suppressor mediation. In this type of model, the direct and indirect effects operate in opposite directions, suggesting that entrepreneurial profile does not automatically translate into exploitation activities. Rather, its positive influence emerges only when personal resources such as entrepreneurial self-efficacy, attitude, and financial knowledge are transformed into opportunity-discovery behaviors.

This finding has important theoretical implications. If entrepreneurial profile exerted a uniformly positive direct effect on exploitation, the results could be interpreted as evidence that individuals possessing favorable entrepreneurial characteristics simply move more quickly toward implementation. Instead, the observed suppressor pattern suggests that discovery constitutes a critical developmental mechanism through which personal resources are converted into entrepreneurial action. In other words, entrepreneurial profile alone may foster reflection, evaluation, or opportunity scanning, but exploitation appears to depend on whether these resources are effectively channeled into discovery activities. This interpretation is highly consistent with opportunity creation theory (Alvarez & Barney, 2007), which conceptualizes entrepreneurial opportunities as emerging through action and interaction rather than existing independently of the entrepreneur.

Moreover, the sensitivity analysis strengthens confidence in this interpretation. Although mediation models estimated from cross-sectional data are potentially vulnerable to temporal bias (Maxwell & Cole, 2007), the indirect effect of entrepreneurial profile on exploitation through discovery remained positive and statistically significant across 97.8% of the admissible longitudinal scenarios examined. Even under the most conservative admissible scenario, the adjusted indirect effect remained positive. These findings suggest that the observed mediation is unlikely to be solely attributable to omitted longitudinal dynamics and provide additional support for the robustness of the discovery → exploitation sequence.

Taken together, these results contribute to the ongoing debate between opportunity discovery and opportunity creation perspectives by suggesting that, within Latin American university contexts, discovery functions not merely as a preliminary activity but as a fundamental mechanism linking entrepreneurial resources to entrepreneurial action. Rather than directly identifying and exploiting objectively existing opportunities, students appear to mobilize their knowledge, attitudes, and self-efficacy through discovery processes that subsequently enable exploitation. This interpretation complements recent efforts to move beyond the traditional discovery-versus-creation dichotomy (Davidsson, 2023; Álvarez et al., 2024; Schlichte & Junge, 2024) by highlighting the central role of discovery as a behavioral pathway through which entrepreneurial opportunities are actively constructed and enacted.

The findings of this study provide exploratory insights that may inform the design of entrepreneurship training programs and institutional strategies, particularly within the universities analyzed.

The finding that discovery mediates the relationship between the entrepreneurial profile and exploitation suggests that educational programs should emphasize activities focused on exploration, identification, and validation of opportunities before addressing the execution phase. This implies using methodologies that promote active search, experimentation, and iterative learning beyond the traditional approach commonly used in business schools (business plan design).

Likewise, the entrepreneurial profile must be strengthened, as our study found that self-efficacy, entrepreneurial attitude, and financial knowledge have significant effects on discovery. To this end, the use of practical workshops, business simulations, and personalized mentoring are key to strengthening students' confidence and decision-making under uncertainty.

On the other hand, although the environment directly influences exploitation, it does not do so for discovery. This suggests that policies focused exclusively on improving external conditions, such as access to financing or the availability of incubators, may not be sufficient to trigger discovery behaviors. National policies must go beyond the provision of incubators, promoting networks between universities and industry, incentives for early innovation, seed funding programs, and spaces for iterative experimentation (Welter and Baker, 2020). Instead, they must be combined with educational strategies that reinforce individual attributes such as self-efficacy and entrepreneurial attitude. This dual approach, which reinforces both the environment and personal capabilities, could better foster the transition from the intention to seize opportunities to entrepreneurial action. This implies that university ecosystems should become more visible and accessible to students by facilitating access to networks, resources, and support mechanisms such as incubators, mentors, and partnerships with the productive sector.

After implementing these actions, institutions should integrate formative assessment mechanisms to monitor the development of students' entrepreneurial profiles. Through self-assessment of rubrics and structured feedback, institutions can identify barriers that hinder the transition from intention to entrepreneurial action.

These findings may provide initial clues for policies promoting entrepreneurship. Although our research is exploratory, it provides empirical evidence from Latin America that ministries and innovation agencies can use to design specific strategies in university contexts. However, these policies must be approached with caution, because entrepreneurs do not always respond to existing opportunities in the environment, but often build them based on their experience. Therefore, institutional strategies should focus on creating environments that stimulate creativity, encourage social interaction, and strengthen autonomy in decision-making.

An important limitation of this study is the lack of a significant relationship between the evaluation of the entrepreneurial environment and discovery actions. Although it was expected that a favorable environment would foster exploration, results did not support this. Possible explanations include a mismatch between institutional perception and student experience, or limitations in how discovery was measured. Additionally, the model may have omitted factors like classroom climate, mentorship, or curricular autonomy.

This suggests the need to refine the measures and broaden the contextual scope in future research by integrating more direct connections with the entrepreneurial ecosystem.

The study focused on students from business schools in Peru, Mexico, Ecuador, and Paraguay, all of whom had received prior entrepreneurship training. This background may have influenced the observed relationships and limits the generalizability of the findings to broader student populations. Furthermore, reliance on self-report measures may introduce bias or inaccuracies in the assessment of perceptions and behaviors.

Although the findings are consistent with a mediation model, the cross-sectional design restricts causal inference. Mediation assumes a temporal ordering among the independent variable, mediator, and dependent variable, which cannot be directly verified when all variables are measured at a single point in time. Authors such as Maxwell and Cole (2007), Hayes (2022), and Jose (2016) caution that cross-sectional mediation models should be interpreted as evidence of structural consistency rather than definitive causal processes. To address this limitation, the present study incorporated a sensitivity analysis for temporal bias following Georgeson et al. (2025). Results indicated that the indirect effect of entrepreneurial profile on exploitation through discovery remained positive and statistically significant across 97.8% of the admissible longitudinal scenarios examined, including highly conservative assumptions regarding omitted autoregressive and cross-lagged effects. While these findings do not establish causality and do not eliminate the need for longitudinal or experimental research, they suggest that the observed mediation is unlikely to be solely attributable to temporal misspecification or omitted longitudinal dynamics. Future studies should employ prospective longitudinal and experimental designs to confirm the temporal mechanisms proposed here. Theoretically, this study also contributes by operationalizing discovery and exploitation as distinct but interconnected phases of entrepreneurial action in a university student sample, an area that remains comparatively underdeveloped in the literature (Mehrabi, 2024).

Although the model in this study was based on the duality between opportunity discovery and creation (Alvarez & Barney, 2007; Shane, 2003), this distinction has been questioned by authors such as Davidsson (2023) and Foss & Klein (2016). Therefore, further research is needed to determine whether the mediation of discovery between the entrepreneurial profile and exploitation reflects the logic of progressive creation, where opportunity identification is part of an iterative process rather than the detection of a pre-existing objective phenomenon.

The study did not address cross-country differences or student subgroups, which could have revealed relevant contextual variations. Including multigroup analyses in future research would allow for comparisons of how these mechanisms function across different entrepreneurial ecosystems.

The findings have pedagogical implications for entrepreneurship education, as they integrate cognitive, affective, and attitudinal dimensions. As noted by Lackéus (2015), it is essential to consider the role of emotions, non-cognitive skills, and formative assessment to enhance educational outcomes. In this regard, promoting opportunity discovery as a preliminary phase before idea execution may be crucial. Neck and Greene (2011) argue that teaching entrepreneurship involves teaching students to act like entrepreneurs, emphasizing search, validation, and opportunity construction rather than focusing solely on exploitation or fixed plans.

It is also recommended to strengthen entrepreneurial self-efficacy through training in decision-making under uncertainty, and to use experiential methodologies, open innovation challenges, and learn from failure. As for financial knowledge, it should be taught through simulators, case analysis, and practical budget scenarios. Finally, future research could explore how to foster entrepreneurial attitude through pedagogical strategies that promote autonomy and achievement orientation, aligned with students' personal values.

Conclusions

A first result from the model suggests that the entrepreneurial profile comprising financial knowledge, self-efficacy, and entrepreneurial attitude significantly influences the activation of entrepreneurial action, particularly in the discovery phase. The association between entrepreneurial profile and exploitation appears to operate indirectly through discovery. In other words, individual characteristics (entrepreneurial profile) do not necessarily lead directly to an entrepreneurial initiative; rather, the entrepreneurial profile exerts its influence through the generation or discovery of opportunities.

The empirical result obtained from this mediation provides evidence supporting the opportunity creation theory (Alvarez & Barney, 2007), as this theory assumes that opportunities arise from the entrepreneur's capabilities, beliefs, and experiences, rather than from the context or environmental conditions (Shane, 2003). From a theoretical standpoint, the model's direct and indirect relationships do not support the notion that the entrepreneurial profile directly leads to entrepreneurial action. On the contrary, it can be posited that discovery may represent an important intermediate mechanism for the effective exploitation of entrepreneurial ideas.

A second result from the model is that the perception of the entrepreneurial environment has a direct and significant impact on the exploitation phase, but not on the discovery phase. This dissociation also supports the opportunity creation perspective (Alvarez & Barney, 2007), which argues that opportunities do not derive directly from the environment but are constructed or emerge through the entrepreneur's ability to act, create opportunities, or make decisions in uncertain, changing, or incomplete-information contexts.

This study makes three main contributions. Theoretically, it strengthens the creation perspective by suggesting that discovery and exploitation are closely connected phases of entrepreneurial action. Empirically, it provides comparative evidence from four Latin American countries, a context rarely analyzed in the discovery–creation debate, and highlights that the environment directly drives exploitation but not discovery. Methodologically, it integrates validated measures into a mediation model that advances exploratory research in entrepreneurship education. Future research should adopt longitudinal and experimental designs to confirm causality, explore cross-country and subgroup differences, and incorporate emotional and institutional variables to capture the full complexity of entrepreneurial behavior in formative contexts.

Declarations

Competing interests

The authors declare no competing interests.

Ethical statements

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and applicable Colombian regulations governing human-subject research. The study was coordinated and administered by researchers affiliated with Fundación Universitaria Konrad Lorenz (Bogotá, Colombia), where the research protocol was designed, reviewed, and approved. Ethical approval was granted by the Ethics Committee of Fundación Universitaria Konrad Lorenz through its official approval record dated August 15, 2024, prior to the initiation of data collection. The Committee does not assign IRB-style approval numbers; therefore, the date of the approval record is provided as the reference for ethical authorization.

The study was conducted through a collaborative network of business schools accredited by the Accreditation Council for Business Schools and Programs (ACBSP) in Mexico, Peru, Ecuador, and Paraguay. Following ethical approval by the coordinating institution, ACBSP facilitated communication with member institutions interested in participating in the study. Participating universities collaborated

exclusively as recruitment sites by distributing invitations to eligible students and did not design the research protocol, administer interventions, collect identifiable personal information, or act as sponsoring institutions for the project.

Data collection involved an anonymous online survey administered exclusively to adults (18 years of age or older) and was classified as minimal-risk educational research. Accordingly, ethical approval was obtained from Fundación Universitaria Konrad Lorenz as the coordinating institution responsible for the design, ethical oversight, and administration of the research protocol. No additional local ethical approvals were required by the participating institutions for this type of minimal-risk educational research.

Participation was entirely voluntary. Prior to accessing the online questionnaire, participants were presented with an electronic informed consent form describing the objectives of the study, the voluntary nature of participation, the confidentiality and anonymous treatment of the information collected, and the intended use of the data for research purposes. Only participants who electronically indicated their consent were allowed to proceed to the survey.

All data were collected anonymously and handled confidentially in accordance with Colombian data protection regulations, including Law 1581 of 2012 and Decree 1377 of 2013, as well as institutional policies on personal data protection.

Author Contribution

MA: Conceptualization, methodology, formal analysis, data curation, writing—original draft, writing—review and editing.BC: Formal analysis, methodology, writing—original draft, writing—review and editing.AG: Conceptualization, methodology, writing—review and editing.JE: Conceptualization, methodology, writing—review and editing.JA: Conceptualization, methodology, writing—review and editing.

Data Availability

The anonymized dataset generated and analyzed during the current study is publicly available in the Zenodo repository at https://doi.org/10.5281/zenodo.17702439. The repository contains the data necessary to reproduce the analyses reported in this article.

References

1. Acs ZJ, Autio E, Szerb L (2014) National systems of entrepreneurship: Measurement issues and policy implications. Res Policy 43(3):476–494. https://doi.org/10.1016/j.respol.2013.08.016
2. Ajzen I (1991) The theory of planned behavior. Organ Behav Hum Decis Process 50(2):179–211
3. Alba M, Cendales B, Garzón Umerenkova A et al (2025) Cross-national dataset on psychological, cognitive, and contextual factors of entrepreneurial behavior in business students. F1000Research 14:935. https://doi.org/10.12688/f1000research.168958.1
4. Alvarez SA, Barney JB (2007) Discovery and creation: Alternative theories of entrepreneurial action. Strateg Entrep J 1(1–2):11–26
5. Alvarez SA, Barney JB, Arikan AM, Arikan I (2024) The creation theory of entrepreneurship and lean startup frameworks: Complementary or contradictory? J Manag 50(8):3064–3079. https://doi.org/10.1177/01492063241250329
6. Autio E, Acs ZJ (2010) Intellectual property protection and the formation of entrepreneurial growth aspirations. Strateg Entrep J 4(3):234–251
7. Bandura A (1977) Self-efficacy: Toward a unifying theory of behavioral change. Psychol Rev 84(2):191–215
8. Botha M, Pietersen M (2022) Entrepreneurial action and competencies: Exploring pathways to venturing accomplishments. Entrep Res J 12(4):529–557. https://doi.org/10.1515/erj-2019-0347
9. Boyd NG, Vozikis GS (1994) The influence of self-efficacy on the development of entrepreneurial intentions and actions. Entrep Theory Pract 18(4):63–77
10. Bruton GD, Ahlstrom D, Li HL (2010) Institutional theory and entrepreneurship: Where are we now and where do we need to move in the future? Entrep Theory Pract 34(3):421–440. https://doi.org/10.1111/j.1540-6520.2010.00390.x
11. Chen H, Volpe RP (1998) An analysis of personal financial literacy among college students. Financ Serv Rev 7(2):107–128. https://doi.org/10.1016/S1057-0810(99)80006-7
12. Corbett AC (2005) Experiential learning within the process of opportunity identification and exploitation. Entrep Theory Pract 29(4):473–491. https://doi.org/10.1111/j.1540-6520.2005.00094.x
13. Davidsson P (2023) Ditching discovery–creation for unified venture creation research. Entrep Theory Pract 47(2):594–612. https://doi.org/10.1177/10422587211030870

14. Dimov D (2007) Beyond the single-person, single-insight attribution in understanding entrepreneurial opportunities. Entrep Theory Pract 31(5):713–731. https://doi.org/10.1111/j.1540-6520.2007.00196.x
15. Fernández-Pérez V, Montes-Merino A, Rodríguez-Ariza L, Galicia PEA (2019) Emotional competencies and cognitive antecedents in shaping students' entrepreneurial intention: The moderating role of entrepreneurship education. Int Entrep Manag J 15:281–305. https://doi.org/10.1007/s11365-017-0438-7
16. Franke N, Lüthje C (2004) Entrepreneurial intentions of business students: A benchmarking study. Int J Innov Technol Manag 1(3):269–288
17. Fuentelsaz L, González C, Maícas JP (2019) Formal institutions and opportunity entrepreneurship. J Bus Res 102:242–253. https://doi.org/10.1016/j.brq.2018.06.002
18. Georgeson AR, Alvarez-Bartolo D, MacKinnon DP (2025) A sensitivity analysis for temporal bias in cross-sectional mediation. Psychol Methods 30(6):1326–1345. https://doi.org/10.1037/met0000761
19. Grohmann A (2018) Financial literacy and financial behavior: Evidence from the emerging Asian middle class. Pac Basin Financ J 48:129–143. https://doi.org/10.1016/j.pacfin.2018.01.007
20. Hayes AF (2022) Introduction to mediation, moderation, and conditional process analysis: A regression-based approach, 3rd edn. Guilford Press, New York
21. Huang Y, Li P, Chen L, Wang J (2023) Opportunity or necessity entrepreneurship? A study based on the national system of entrepreneurship. J Innov Knowl 8(4):100448. https://doi.org/10.1016/j.jik.2023.100448
22. Jones RJ, Barnir A (2019) Properties of opportunity creation and discovery: Comparing variation in contexts of innovativeness. Technovation 79:1–10. https://doi.org/10.1016/j.technovation.2018.02.014
23. Jose PE (2016) Doing statistical mediation and moderation. Guilford Press, New York
24. Lackéus M (2015) Entrepreneurship in education: What, why, when, how. OECD Publishing, Paris. https://vcplist.com/wp-content/uploads/2014/10/Lackeus-2014_WP_Entrepreneurship-in-Education-FINAL-for-OECD-141023.pdf
25. Lins FA, Doktor R (2014) A theory of entrepreneurial opportunity discovery, knowledge creation, and decision-making. Bus Manag Res 3(1):18–30. https://doi.org/10.5430/bmr.v3n1p18
26. Liñán F, Chen YW (2009) Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. Entrep Theory Pract 33(3):593–617
27. Liñán F, Fayolle A (2015) A systematic literature review on entrepreneurial intentions: Citation, thematic analyses, and research agenda. Int Entrep Manag J 11:907–933. https://doi.org/10.1007/s11365-015-0356-5
28. Liñán F, Rodríguez-Cohard JC, Rueda-Cantuche JM (2011) Factors affecting entrepreneurial intention levels: A role for education. Int Entrep Manag J 7(2):195–218. https://doi.org/10.1007/s11365-010-0154-z
29. Lusardi A, Mitchell OS (2014) The economic importance of financial literacy: Theory and evidence. J Econ Lit 52(1):5–44. https://doi.org/10.1257/jel.52.1.5
30. MacKinnon DP, Krull JL, Lockwood CM (2000) Equivalence of the mediation, confounding and suppression effect. Prev Sci 1(4):173–181. https://doi.org/10.1023/A:1026595011371
31. MacKinnon DP, Lockwood CM, Williams J (2004) Confidence limits for the indirect effect: Distribution of the product and resampling methods. Multivar Behav Res 39(1):99–128. https://doi.org/10.1207/s15327906mbr3901_4
32. Marsh HW, Hau KT, Wen Z (2004) In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. Struct Equ Model 11(3):320–341. https://doi.org/10.1207/s15328007sem1103_2
33. Maxwell SE, Cole DA (2007) Bias in cross-sectional analyses of longitudinal mediation. Psychol Methods 12(1):23–44. https://doi.org/10.1037/1082-989X.12.1.23
34. McMullen JS, Shepherd DA (2006) Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. Acad Manag Rev 31(1):132–152. https://doi.org/10.5465/amr.2006.19379628
35. Mehrabi R (2024) Unveiling the nature of entrepreneurial opportunities: A systematic exploration through conceptual framework development. Eur J Bus Manag Res 9(3):68–79. https://doi.org/10.24018/ejbmr.2024.9.3.2345
36. Moriano JA, Gorgievski M, Laguna M, Stephan U, Zarafshani K (2012) A cross-cultural approach to understanding entrepreneurial intention. J Career Dev 39(2):162–185. https://doi.org/10.1177/0894845310384481
37. Neck HM, Greene PG (2011) Entrepreneurship education: Known worlds and new frontiers. J Small Bus Manag 49(1):55–70. https://doi.org/10.1111/j.1540-627X.2010.00314.x

38. Newman A, Obschonka M, Schwarz S, Cohen M, Nielsen I (2019) Entrepreneurial self-efficacy: A systematic review of literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research. J Vocat Behav 110:403–419. https://doi.org/10.1016/j.jvb.2018.05.012
39. Rauch A, Frese M (2007) Let's put the person back into entrepreneurship research: A meta-analysis on the relationship between business owners' personality traits, business creation, and success. Eur J Work Organ Psychol 16(4):353–385. https://doi.org/10.1080/13594320701595438
40. Ricketts M, Kirzner IM (1992) Kirzner's theory of entrepreneurship: A critique. In: Caldwell BJ, Boehm S (eds) Austrian economics: Tensions and new directions. Recent Economic Thought Series, vol 30. Springer, Dordrecht, pp 79–102. https://doi.org/10.1007/978-94-011-2186-6_3
41. Sarasvathy SD (2001) Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. Acad Manag Rev 26(2):243–263. https://doi.org/10.5465/amr.2001.4378020
42. Schlichte F, Junge S (2024) The concept of entrepreneurial opportunities: A review and directions for future research. Manag Rev Q. https://doi.org/10.1007/s11301-024-00466-5
43. Schreiber JB, Nora A, Stage FK, Barlow EA, King J (2006) Reporting structural equation modeling and confirmatory factor analysis results: A review. J Educ Res 99(6):323–338. https://doi.org/10.3200/JOER.99.6.323-338
44. Shane S (2003) A general theory of entrepreneurship: The individual-opportunity nexus. Edward Elgar, Cheltenham
45. Shane S, Venkataraman S (2000) The promise of entrepreneurship as a field of research. Acad Manag Rev 25(1):217–226. https://doi.org/10.5465/amr.2000.2791611
46. Song SI, Thominathan S, Khalid NA (2021) Entrepreneurial intention of UiTM students and the mediating role of entrepreneurship education. Asian J Univ Educ 17(2):236–251
47. Spigel B (2017) The relational organization of entrepreneurial ecosystems. Entrep Theory Pract 41(1):49–72. https://doi.org/10.1111/etap.12167
48. Welter F (2011) Contextualizing entrepreneurship: Conceptual challenges and ways forward. Entrep Theory Pract 35(1):165–184. https://doi.org/10.1111/j.1540-6520.2010.00427.x
49. Welter F, Baker T (2020) Moving contexts onto new roads: Clues from other disciplines. Entrep Theory Pract 44(6):1143–1175. https://doi.org/10.1177/1042258720930996

Figures

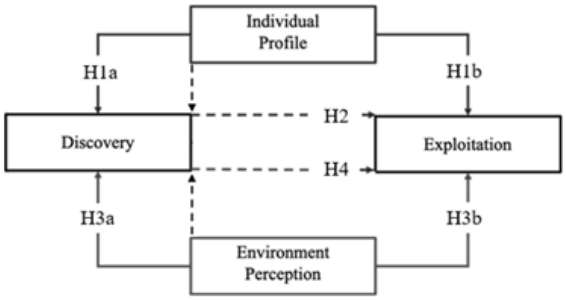


Figure 1

Research model. Note: dashed lines represent the indirect effects (or mediated paths) predicted in Hypotheses 1 and 2.

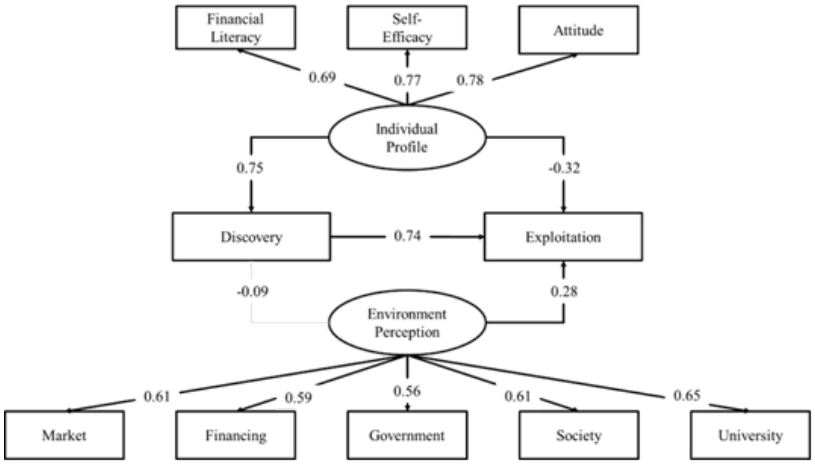


Figure 2

Structural Equation Model to predict entrepreneurs' discovery and exploitation behaviors. *Note*. Regression coefficients are represented by straight lines. All estimates listed in solid black lines are significant (as shown in Table 2). Gray lines represent non-significant paths. Covariates, correlations, squared multiple correlations and error terms are not shown, see Table 1 and Appendix 1 respectively.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryInformation.docx