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Exploring entrepreneurial intentions and motivations: a comparative analysis of opportunity-driven and necessity-driven entrepreneurs

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Abstract

This study investigates the impact of entrepreneurial attitudes, subjective norms, and perceived behavioral controls on entrepreneurial intention among two distinct groups of entrepreneurs: opportunity-driven and necessity-driven. It also explores the relationship between entrepreneurial motivations, intentions, and the number of ventures undertaken by entrepreneurs. Structural equation modeling and survey data from 201 necessity-driven entrepreneurs and 204 opportunity-driven entrepreneurs were utilized. Drawing on the Theory of Planned Behavior, the findings indicate that attitudes do not positively correlate with entrepreneurial intention for both types of entrepreneurs. Subjective norms significantly influence entrepreneurial intention among entrepreneurs by necessity but not among entrepreneurs by opportunity. Perceived behavioral controls exhibit a partial correlation with entrepreneurial intention, which is not significant for entrepreneurs by opportunity. Both motivations and entrepreneurial intention positively relate to the number of ventures undertaken by entrepreneurs by necessity, whereas motivations alone determine venture creation among entrepreneurs by opportunity. Furthermore, a significant correlation exists between being a female entrepreneur by necessity and entrepreneurial intention, while this relationship is not significant for women entrepreneurs by opportunity. These insights contribute to the literature on entrepreneurial intention and carry important policy and managerial implications in developing countries.

Keywords: Entrepreneurial intention, Motivation, Attitudes, Necessity-driven entrepreneurship, Opportunity-driven entrepreneurship, Immigrants, Informality, Gender

Introduction

The influence of entrepreneurial attitudes, subjective norms, and perceived behavioral controls on entrepreneurial intention and development[1] has been extensively studied, mostly on students (Hassan et al., 2020; Maussa Pérez et al., 2020; Moriano et al., 2012), formal workers (Bergner et al., 2021; Ma & Huang, 2020) and Entrepreneurs (Bouarir et al., 2023).

This suggests that the exploration of entrepreneurial intention involves delving into both ex-ante and ex-post samples. In this case, 'ex-ante' entails studying the entrepreneurial intentions of individuals who have not yet ventured into business, while 'ex-post' studies focus on those who currently operate or have previously owned a business.

Numerous studies have predominantly assessed entrepreneurial intention ex-ante, often utilizing samples comprising students and non-entrepreneurs. This approach has yielded insights into the perception of entrepreneurs within student populations (Maussa Pérez et al., 2020; Van Auken et al., 2006; Veciana et al., 2005). Research suggests that students' inclination towards entrepreneurship is positively associated with their attitudes towards entrepreneurship, subjective norms, and perceived control over planned behaviors (Moriano et al., 2012). Furthermore, students residing in environments that foster entrepreneurial activities exhibit a heightened aspiration to engage in entrepreneurship (Teixeira & Davey, 2010). However, low rates of entrepreneurial intention are frequently attributed to barriers such as limited access to financing and insufficient network support (Achchuthan & Balasundaram, 2014). It is important to note that when comparing entrepreneurial intentions across different countries, developing nations tend to exhibit higher levels of entrepreneurial inclination (Davey et al., 2011; Veciana et al., 2005).

Yet, there is a relatively limited scope in ex-post analysis centered predominantly on entrepreneurs. Within this domain, researchers have pinpointed several pivotal drivers of entrepreneurship. These encompass creativity, autonomy, the pursuit of social status, responsiveness to market opportunities, financial incentives, and the readiness to invest personal savings into a business endeavor (Volery et al., 1997). Moreover, analyses have focused on determining the factors that influence the success of startups. Ullah et al. (2016) underscore that thriving entrepreneurs commonly exhibit a positive mindset, self-efficacy, unwavering determination, an understanding of the market and local business dynamics, and adept financial management skills. Moreover, in the realm of ex-post analysis, it is significant to note that specific researchers have meticulously factored in variables, such as: (1) migration patterns, (2) gender disparities, or (3) intra-entrepreneurial dynamics. Knight's (2015) findings shed light on the multifaceted motivations propelling migrants towards entrepreneurship, blurring the traditional distinctions separating cultural and economic drivers, as well as the lines between necessity-based and opportunity-driven entrepreneurial pursuits. In the realm of gender dynamics, women commonly face obstacles, ranging from apprehension and limited financial expertise to

[1] According to Ajzen (1991), entrepreneurial attitudes refer to the evaluation of an individual over a certain behavior; subjective norms reflect an individual's perception of social pressures to perform or not to perform the behavior; perceived behavioral controls refer to people's perception of the ease or difficulty of performing the behavior of interest (Ajzen, 1991). Entrepreneurial intention is the formation of a desire or motivation to develop a venture (Bird, 1988; Krueger & Carsrud, 1993).

the complexities of choosing viable business locations, all compounded by the pervasive challenge of discrimination (Cho et al., 2019). Innovation-driven organizations incentivize employees to brainstorm ideas and identify opportunities, yet this stimulation does not automatically ignite an urge for entrepreneurial pursuits among them. Furthermore, on an organizational level, an excess of identified opportunities might exceed the firm's capacity, willingness to fully capitalize on them (Ma & Huang, 2020) or in some cases lead to 'poverty of attention' (Simon et al., 1971).

Existing research has delved into various facets of entrepreneurial intention and motivation. Yet, these studies tend to be qualitative, primarily focused on developed nations, and often lack a holistic exploration of attitudes and motivations. Despite the abundance of literature on this subject, our comprehensive Scopus review unveiled a critical gap in integrative studies. There is a notable absence of comparative analyses that scrutinize entrepreneurial intentions, motivations, and venture creation, particularly between necessity-driven and opportunity-driven entrepreneurs—crucial aspects intertwined with the creation of ventures and wealth. Closing this gap could significantly enrich our understanding of entrepreneurial dynamics and their impact on wealth creation (Maleki et al., 2023).

Hence, this study investigates the impact of entrepreneurial attitudes, subjective norms, and perceived behavioral controls on entrepreneurial intention among two distinct groups of entrepreneurs: opportunity-driven and necessity-driven. The former, exemplified by individuals, such as immigrants striving for economic stability (Chrysostome & Arcand, 2009), typically embark on new ventures as a means of subsistence and fundamental income generation. Conversely, the latter group, as observed in studies like Block and Wagner (2010), engages in entrepreneurial activities with the goal of attaining financial independence. This research also examines the incidence of entrepreneurial motivations and intentions on venture creation within these delineated populations. By conducting a comparative analysis between necessity-driven and opportunity-driven entrepreneurs, the aim is to gain a more comprehensive understanding of the disparities in their attitudes, intentions, and motivations towards entrepreneurship. This comparative approach intends to unearth contrasting elements, allowing for a nuanced exploration that can inform more targeted research, policy initiatives, and managerial insights in this domain.

Drawing on the Theory of Planned Behavior (Ajzen, 1991; Armitage & Conner, 2001) we constructed hypotheses and a comprehensive framework that underwent empirical testing using survey data collected from 201 necessity-driven and 204 opportunity-driven entrepreneurs. The analysis employed Structural Equation Modeling (SEM) as the methodological approach. This study offers substantive contributions to the realm of entrepreneurship, particularly in the nuanced understanding of immigrant entrepreneurial attitudes, intentions, and motivations (Chen & Fan, 2022; Mago, 2023; Ullah et al., 2016), delineating its impact in three pivotal dimensions. Primarily, our study extends the scope of prior research by delving into the determinants influencing entrepreneurial intention and the establishment of ventures within immigrant communities, an under-represented area in existing literature.

Second, our analysis undertakes a comparative exploration between two discrete entrepreneurial cohorts, illuminating their distinct intentions and motivational factors,

providing a nuanced understanding of their differing approaches towards entrepreneurship. Finally, our research attends to critical aspects, such as gender dynamics, informality in business, and the dynamics of venture creation, necessitating re-evaluation in the wake of the disruptive effects of the COVID-19 pandemic.

Literature review

Entrepreneurial intention

Achchuthan and Balasundaram (2014) have identified two key areas in the existing literature on entrepreneurial intention: (1) the process of company creation, and (2) the role of the entrepreneur in evaluating and identifying business opportunities. Furthermore, McStay (2008) recognizes three primary approaches to study the entrepreneur as an individual:

- *Trait orientations* seek to distinguish entrepreneurs from non-entrepreneurs and the specific traits of the first ones.
- *Behavioral perspectives*, where the entrepreneur is understood as an individual with abilities to recognize and exploit profit opportunities that are not identified by others.
- The *cognitive process* approach seeks to comprehend the way in which entrepreneurs think, and how they process information.

These theoretical frameworks are instrumental in revealing the core motivations and intentions that drive an individual's choice to embark on a new business venture. Predominantly, these investigations are rooted in Ajzen's Theory of Planned Behavior (TPB) (1991), which constitutes a foundational framework in this domain. As articulated by Ajzen (1991, p. 4), a pivotal component of this theory revolves around the individual's intention to actively participate in a specific behavior:

> *Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, to perform the behavior. As a rule, the stronger the intention to engage in a behavior, the more likely it should be its performance. It should be clear, however, that a behavioral intention can find expression in behavior only if the behavior in question is under volitional control.*

From this perspective, intentionality is conceptualized as the anticipation of a deliberate action in the future (Moriano et al., 2012). Accordingly, entrepreneurial intention refers to the development of motivation or aspiration to initiate a business prior to its actual establishment (Bird, 1988; Krueger & Carsrud, 1993). Within the entrepreneurship literature, entrepreneurial intention is recognized as the precursor to company creation.

According to TPB, there are three components that allow the prediction of entrepreneurial intention:

- Attitude towards a behavior: Refers to a general evaluation of an individual's behavior.

- Subjective norms: Refers to the perception of the subject regarding the social pressure to engage (or not) in a behavior or activity.
- Perceived Behavioral Control: Refers a person's perception of its ability to perform a specific behavior.

A comprehensive review of existing research on entrepreneurial intention revealed a predominant focus on Asia, Europe, Australia, the United States, and Africa, with comparatively fewer studies dedicated to Latin American countries (Table 1). Most of these studies have relied on samples consisting primarily of university students, with a lesser emphasis on entrepreneurs. Moreover, investigations encompassing migrant populations in developing countries are notably scarce.

The reviewed studies encompass a range of research objectives, including the examination of key triggers and barriers during venture initiation (Shahid, 2022); exploration of factors driving entrepreneurial intentions among university students (Raza et al., 2018); analysis of the influence of family business experience on individuals' inclination to start a firm (Singh, 2016); and investigation of the predictive role of education in entrepreneurial intention among university students (Hou et al., 2022).

The main findings of these studies highlight the positive impact of entrepreneurial education programs on students' ability to identify business opportunities and develop entrepreneurial intention (Hou et al., 2022). In addition, the identification of opportunities and self-efficacy are identified as factors that positively influence students' entrepreneurial intentions (Hassan et al., 2020). In this sense, Ma and Huang (2020) emphasize that opportunity identification mediates the relationship between technical and market knowledge and employees' entrepreneurial intention.

Entrepreneurial motivation

A scanning of the literature on entrepreneurial motivation (Table 2) reveals that the main samples are made up of entrepreneurs belonging to consolidated companies and people who are not entrepreneurs yet. Furthermore, most research has focused on analyzing the variables significantly correlated with entrepreneurial motivations (Arenius & Minniti, 2005); the relationships between entrepreneurial motivation and entrepreneurial behavior (Collins et al., 2004); and the effects of the gender stereotypes and their implications in entrepreneurial motivation and intention (Bouarir et al., 2023).

Overall, studies about entrepreneurial motivation conclude that it can predict entrepreneurial activity (Arenius & Minniti, 2005). In addition, other authors have found that entrepreneurial motivation drives essential behaviors related to entrepreneurial intention (Murnieks et al., 2020). In this sense, Cardon and Kirk (2015) conclude that entrepreneurial passion has a mediating role in the relationship between self-efficacy and persistency, suggesting that there is an important role of affective processes in entrepreneurship. Finally, Rajabi et al. (2014) suggest that entrepreneurial motivation relates directly and positively to effort: salespeople with a greater entrepreneurial motivation exert more effort to perform their sales-related tasks, for example, in addition, competitiveness and self-efficacy are two antecedents of entrepreneurial motivation in a sales context.

Table 1 Studies measuring entrepreneurial intention

Author	Research question, objective, or hypothesis	Sample	Main conclusions	Population
(Volery et al., 1997)	What are the triggers and barriers at the start of ventures?	93 entrepreneurs, 48 of them initiating their business y 45 who have not started up their business yet in Western Australia	Several triggers—possibly a combination of triggers—appeared to be at the root of startups. These triggers were the level of creativity, the need for autonomy, the achievement of social status, the response to a market opportunity, and the drive for money and the will to invest savings in a business venture	Both
(Veciana et al., 2005)	1. Do university students have a serious intention to create their own firm? 2. Does there exist a relationship between gender and the variables of desirability, feasibility, and intention to create a new firm? 3. Does there exist a relationship between entrepreneurs among relatives and the variables of desirability, feasibility, and intention to create a new firm?	15.000 university students from Puerto Rico and 18.641 students from Cataluña	- The survey reveals that the university students both in Puerto Rico and in Catalonia have a positive perception of new venture desirability - A high percentage of the students in both samples has vaguely (40.3% in Puerto Rico and 51% in Catalonia) or seriously (28.7% in Puerto Rico and 12.1% in Catalonia) considered to create a new firm as a career path, but only a small percentage has the firm intention - There exists a positive image of the entrepreneur among the students both in Puerto Rico and in Catalonia	Students
(Van Auken et al., 2006)	Compare the influence of "role models" on entrepreneurial intentions in Mexico and the United States	Students from 1 Mexican university and two United States Universities. 87 answers were received from Mexico and 213 from de United States	- Role models were found to have a greater influence on career thinking among US than Mexican respondents - Role models who owned a business had a significantly greater influence on the career intentions of US respondents than role models that did not own a business	Students
(Teixeira & Davey, 2010)	Investigate the attitudes of Portuguese higher education students in relation to business creation	Portugal's students enrolled in higher education institutions, private and public in all scientific areas	Students that live in environments that encourages entrepreneurship tend to have a greater desire to become an entrepreneur	Students

Table 1 (continued)

Author	Research question, objective, or hypothesis	Sample	Main conclusions	Population
(Davey et al., 2011)	What is the difference in entrepreneurial intentions between individuals who have participated in entrepreneurship programs at universities and those who have not?	A university per country was selected (Finland, Germany, Ireland, Portugal, Kenya, and Uganda. Total sample: 2295 people	- There was a significant difference in the entrepreneurial intentions result. In African countries it was higher - African student´s think entrepreneurship has a great impact on society	Students
(Moriano et al., 2012)	What is the applicability of the TPB system in six Asian and European countries, and are its components invariable in different cultures?	Students from Iran, Poland, Germany India, Spain, and Holland	Entrepreneurial Intentions are related to positive attitudes towards entrepreneurship, subjective norm, and planned behavioral control	Students
(Achchuthan & Balasundaram, 2014)	To what extent does entrepreneurial motivation influence self-employment intention among management undergraduate students at Jaffna University?	Students from business faculty in Jaffna University, Sri Lanka. The initial sample consists of $n = 130$ questionnaires, and the final sample was 117 of them	- There is a low entrepreneurial intention among students - Low entrepreneurial intention is due to factors, such as financing and network support	Students
(Knight, 2015)	Analyze the motivations and dynamics of Polish small business owners who are living and working in the United Kingdom several years after Poland's enlargement to the European Union	Semi-structured interviews with 39 Polish migrants, residing in the Cardiff area, in 2008 and 2011	- Migrants become entrepreneurs for a variety of reasons, blurring the lines between cultural and economic entrepreneurship as well as between necessity and opportunity entrepreneurship - Changing motivations of the ethnic entrepreneurs over time, particularly when the demand for their product is unsustainable	Both
(Ullah et al., 2016)	Explore the key factors that influences ethnic entrepreneur's decision in starting-up a new business in Aberdeen, Scotland	In-depth face-to-face interviews with 25 ethnic entrepreneurs from a variety of nationalities and cultures originating India, Bangladesh, Pakistan, Sri Lanka	The authors found that positive mindset, self-efficacy, strong determination, knowing of the market and local business culture and good financial management influence a successful startup	Both
(Singh, 2016)	Evaluate the influence of families with business experience and the influence ofsalaried parents on the entrepreneurial intentions of students	130 students randomly selected from a business school in Mumbai	Results showed that there is no significant difference in entrepreneurial intentions between student´s with employed families and students with entrepreneurial families	Students

Table 1 (continued)

Author	Research question, objective, or hypothesis	Sample	Main conclusions	Population
(Cho et al., 2019)	Explore the motivators and barriers in business venture creation among potential Latina entrepreneurs	10 Latinas ages 20–30	-Findings revealed major themes based around four dimensions of cultural heritage, motivators, barriers, and preferred resources -The barriers include fear, lack of financial management knowledge, business location selection and discrimination	Both
(Ma & Huang, 2020)	Examine how the knowledge acquisition of global sourcing providers in China, influences the entrepreneurial intent of their employees by identifying opportunities	The study analyzed data from 144 Global Sourcing companies in China	If too many opportunities are identified, it may outpace the ability or desire of a firm to exploit them, which may create challenges in retaining talent. Promising opportunities identified can turn the entrepreneurial career more desirable and incumbent firms' strategic orientation will make the new venture idea more or less feasible given how aggressively incumbent firms pursue the opportunities	Opportunity-driven
(Hassan et al., 2020)	Investigate the impact of opportunity recognition and entrepreneurial self-efficacy on the entrepreneurial intention of Indian students. It also examines the moderating role of entrepreneurship education and gender in the recognition of opportunities—relationships between intention and self-efficacy	334 students from India	- Opportunity recognition and self-efficacy both show a significant positive impact on the entrepreneurial intention of students - Education positively moderates "self-efficacy–intention relationship" - Gender negatively moderates "opportunity recognition–intention" and "self-efficacy–intention" relationship-	Students
(Hou et al., 2022)	Examine the effects of entrepreneurial education in predicting the entrepreneurial intention of college students. The study also investigates the mediating role of opportunity recognition and the moderating role of entrepreneurial learning in this process	1,150 university students from 55 universities in Guangdong-Hong Kong-Macao Greater Bay Area of China	- Entrepreneurship education can promote the entrepreneurial intention of students through opportunity recognition - Entrepreneurial learning plays a moderating role in the link between entrepreneurship education and opportunity recognition	Students

Table 2 Studies measuring entrepreneurial motivation

Author	Research question, objective, or hypothesis	Sample	Main conclusions	Opportunity or necessity-driven
(Collins et al., 2004)	Develop a meta-analysis to explore the relationship between achievement motivation and variables associated with entrepreneurial behavior	Initial 47 literature studies, 6 finally remaining literature studies for further analysis	Achievement motivation does significantly predict entrepreneurial activity (both choice of an entrepreneurial occupation and performance in that role) across the studies that were included in this meta-analysis	Opportunity-driven
(Baum & Locke, 2004)	What is the relationship of entrepreneurial traits and skill (passion, tenacity, and new resource skill) and situationally specific motivation (communicated vision, self-efficacy, and goals) to subsequent venture growth?	Data from 229 entrepreneur—chief executive officers and 106 associates in a single industry were obtained in a 6-year longitudinal study	- Specific component variables of entrepreneurs' traits, skill, and motivation categories are significant direct or indirect predictors of venture growth for a period of 6 years following initial measurement - Vision had an indirect effect on growth through specific goals but also a direct effect - Passion and tenacity had no direct effect on venture performance suggests that the weak results of previous studies of entrepreneurial traits may not have been caused by studying the wrong traits, but rather by the fact that traits have indirect rather than direct effects	Opportunity-driven
(Arenius & Minniti, 2005)	What variables are significantly correlated with an individual's decision to become an entrepreneur?	972 individuals in Mexico and 12,837 in the UK	Across all countries and across genders, perceptual variables, and the perception that individuals have of their own entrepreneurial abilities are very important	Necessity-driven
(Cardon & Kirk, 2015)	Examine the possibility that the long-standing relationship between self-efficacy and persistence might be mediated by entrepreneurial passion	129 entrepreneurs that belonged to firms from 10 years of age	- There is a mediating impact of entrepreneurial passion in the relationship between self-efficacy and persistence, suggesting an important role for affective processes in entrepreneurship - Passion for inventing and founding were important mediators of the self-efficacy to persistence relationship, while passion for developing was not	Opportunity-driven
(Lu et al., 2023)	Identify motivation profiles of university business students, to determine how profile membership predicts students' entrepreneurial intention and interest to study entrepreneurship	Business students at a Canadian university via a self-administered survey in several classes. 409 usable questionnaires	The authors find out that students in the different groups differ regarding their interest to study entrepreneurship and their intention to be entrepreneurs	Opportunity-driven

Table 2 (continued)

Author	Research question, objective, or hypothesis	Sample	Main conclusions	Opportunity or necessity-driven
(Laguía et al., 2022)	This study adapts the "think manager–think male" leadership perspective to the entrepreneurship context and explores gender stereotype's implications for both entrepreneurial intention and motivation to become an entrepreneur	902 Spanish male and female non-entrepreneurs	- Younger participants exhibited higher entrepreneurial intentions and opportunity motivation more positive attitudes towards entrepreneurship and higher scores in subjective - Woman entrepreneur seems to be less accessible to male participants than to female participants. reducing negative stereotype threat for women in entrepreneurship may increase women's entrepreneurial career aspiration	Both
(Shymko & Khoury, 2023)	Study the development of entrepreneurial motivation of participants in an Ecuadorian incubator	41 interviews	Employing narrative interview methodologies, the authors found out how different modes of rootedness in distinct communities, shape entrepreneurial dispositions and shed light on the intermediation of a temporary community of practice to facilitate the development and transformation of these dispositions into individuated motivations	Opportunity-driven

Conceptual framework and hypothesis development

The influence of attitudes, subjective norms, and perceived behavioral control on entrepreneurial intention

Moriano et al. (2012) assert a direct correlation between favorable attitudes towards entrepreneurship and heightened levels of entrepreneurial intentions. Similarly, Osorio and Roldán (2015) propose that prior exposure to entrepreneurial activities significantly bolsters the factors influencing entrepreneurial intention. Furthermore, Hassan et al. (2020) establish a positive association between entrepreneurial intention, the recognition of opportunities, and self-efficacy. They also emphasize that education plays a pivotal role in moderating the relationship between self-efficacy and entrepreneurial intention. Meanwhile, Bai et al. (2022) conduct a comprehensive analysis, identifying 16 distinct factors that significantly impact entrepreneurial intention. Among these, the expectation surrounding entrepreneurship and the ability to discern and evaluate opportunities emerge as the most influential determinants. Hence, we hypothesize:

H1. *The attitudes of entrepreneurs by necessity and by opportunity are positively correlated with their entrepreneurial intention.*

According to Yean et al. (2015) the opinions of parents, friends, relatives, and experts shape the belief of engaging in a particular behavior, playing a significant role, and pressuring a person to perform it. In a Vietnamese study Khuong and An (2016) found that the subjective norms do not influence entrepreneurial intention. Omidi Najafabadi et al. (2016) also found similar results in Iran. Conversely, Hossain et al. (2023) found that subjective entrepreneurial norms have a positive and significant association with entrepreneurial intention. This relationship was also found by Moriano et al. (2012) and by Bai et al. (2022) who argue that demographic and environmental conditions influence entrepreneurial intention through emotional perception and motivational factors. Since entrepreneurs by necessity may have a higher chance of being marginalized, vulnerable or part of a minority (Cho et al., 2019), the emotional support from others may have a bigger impact on their entrepreneurial intention, compared with entrepreneurs by opportunity. Hence, we propose the following hypothesis:

H2. *Subjective norms have a stronger correlation with entrepreneurial intention between entrepreneurs by necessity than between entrepreneurs by opportunity.*

Entrepreneurial perceived behavioral control (PBC), defined as the entrepreneur's belief in their capabilities to perform certain behaviors (Brouwer et al., 2009) can serve as indicator of behavioral accomplishment. Some authors have found that PBC and entrepreneurial intention are not correlated. Mohammed et al. (2017) for example, found an insignificant relationship between entrepreneurial PCB and entrepreneurial intention. Conversely, Hossain et al. (2023) uncovered that entrepreneurial PCB is positively correlated with entrepreneurial intention. Similar outcomes were also found by Moriano et al. (2012). Therefore, we hypothesize:

H3. *The perceived behavioral control of entrepreneurs by necessity and by opportunity is positively correlated with their entrepreneurial intention.*

The influence of entrepreneurial motivation on venture creation

By means of a meta-analysis Collins et al. (2004) found that the motivation that comes because of previous achievements significantly predicts venture creation. According to Bergner et al. (2021) specific traits, such as recognizing opportunities and taking risks, are factors that trigger a person's new business development. Moreover, Adelowo and Henrico (2023) suggest that entrepreneurial education and motivation have a significant role in venture creation. Contrarily, Yin and Wu (2023) suggest that without the influence of external factors, individuals would consider business risk as a threat that reduces their business opportunity and motivation. Hence, the following hypothesis is proposed:

H4. *The motivations of entrepreneurs by necessity and by opportunity are positively correlated with venture creation.*

Shook and Bratinau (2010) argue that the motivations for being an entrepreneur can vary depending on the cultural milieu and the circumstances. Some entrepreneurs by necessity may have stronger motivations to create ventures due to their urgency to make a living, impossibility to find a job, and because entrepreneurship—formal or informal—is the only choice (Minniti et al., 2006). There is an association between motivation and intention (Amofah & Saladrigues, 2022). However, "Motivation drives us into action" (Hossain et al., 2023, p. 9). Ryan and Deci (2000) argue that motivation is key for creating new businesses, it encompasses energy, orientation, determination, and intention and is the cornerstone of biological, psychological, and social modulation. These elements are fundamental for entrepreneurs by necessity, since they often function in an adverse environment, with major restrictions, and fewer opportunities. Accordingly, we hypothesize:

H5. *Motivations have a stronger correlation with venture creation by entrepreneurs by necessity and by opportunity than intention.*

Drawing on the Theory of Planned Behavior, this study explores the research framework illustrated in Fig. 1.

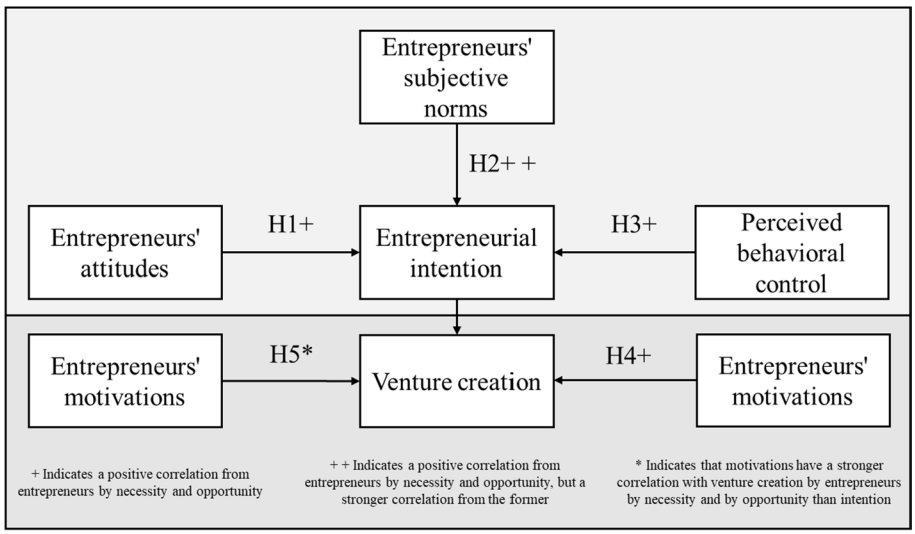

Fig. 1 Research framework

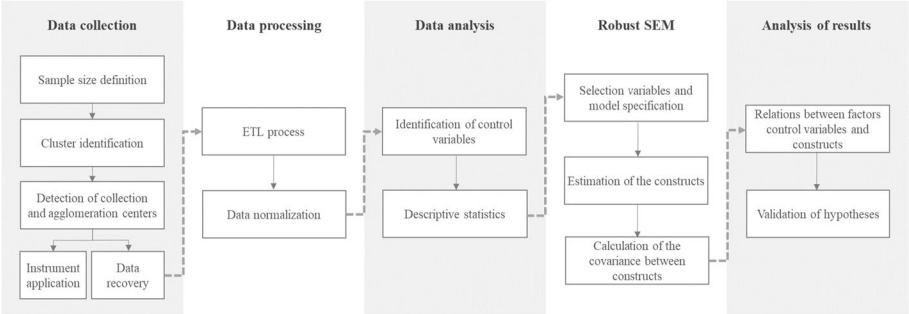

Fig. 2 Methodological approach

Methodology

The methodological approach for the development of this document can be summarized in the collection, processing, and analysis of the data, followed by the construction of the models and analysis of the results for the validation of the hypotheses (see Fig. 2). Each of these stages will be described below:

Data collection

We conducted a guided survey involving Colombian entrepreneurs, categorizing them into two distinct groups: entrepreneurs driven by necessity ($N=201$) and those propelled by opportunity ($N=204$). Our data collection from necessity-driven entrepreneurs was sourced from regional entrepreneurship events and enterprises established along the Colombia–Venezuela border. Over a span of 3 months, we actively engaged with and established connections at entrepreneurial events organized by universities, chambers of commerce, and non-governmental organizations orchestrating such gatherings. In addition, those who could not assist to the gatherings were visited by the research assistant in situ to perform the survey. Our active involvement in these fairs facilitated the collection of data from entrepreneurs situated along the Colombian–Venezuelan border.

Conversely, data pertaining to opportunity-driven entrepreneurs was extracted from a repository encompassing university incubators and local Chambers of Commerce. Initially, entrepreneurs were contacted via email and subsequently subjected to personal interviews. Consequently, both groups were recruited via convenience sampling methodology (Etikan et al., 2016). Notably, both sample collections were carried out during the period spanning January to March 2023 and both required the guidance of the evaluator throughout the survey.

Data processing

The data collected was normalized by applying scores according to the amount of response options presented and compiled through the Likert scale. Other questions of binary response were generated as dummy variables and are a part of the control variables established on the different analyzes addressed in this study. Table 3 presents the Likert scores and categories assigned to each section of the analysis.

Table 3 Variables, descriptions, and measurements

Cluster	Variable	Description	Label
Attitudes	SS1	Creativity—originality	1—I have not questioned myself about this ability 2—I am aware that I do not master, and I need to strengthen this capacity 3—I know how to do it but I still need concentration and effort to achieve it 4—I master the ability and can do it "automatically" or "intuitively"
	SS2	Leadership	
	SS3	Communication skills	
	SS4	Generation of alliances and contacts	
	SS5	Problem solving	
	SS6	Critical thinking and analysis:	
	SS7	Continuous Learning	
	SS8	Resilience	
	SS9	Flexibility	
	SS10	Continuous technological updating	
	HS1	Finance	1—Low 2—Medium low 3—Medium high 4—High
	HS2	Statistics	
	HS3	Marketing	
	HS4	Social Media	
	HS5	Logistics	
	HS6	Business model	
	HS7	Programming languages	
	HS8	Innovation	
	HS9	English	
Subjective norms	AF1	The country's culture facilitates entrepreneurial activity:	1—Strongly disagree 2—Disagreement 3—Agree 4—Strongly agree
	AF2	Being an entrepreneur is valued positively in the country:	
	AF3	In the country it is worth taking the risk of undertaking:	
	AF4	Entrepreneurs in the country generate ventures with social impact:	
	AF5	Entrepreneurs in the country generate enterprises with environmental impact:	
	AF6	Entrepreneurship is aimed at contributing to the solution of the country's most critical problems:	
	AF7	The country has the necessary conditions to facilitate entrepreneurship:	
	AF8*	The contribution of the entrepreneur to the economy of the country, where I live is high:	

Table 3 (continued)

Cluster	Variable	Description	Label
Perceived behavioral control	BA1	I have a hard time taking risks	1—Strongly agree 2—Agree 3—Disagreement 4—Strongly disagree
	BA2	My family does not support me to undertake	
	BA3	I have poor leadership skills	
	BA4	I do not have adequate training to undertake	
	BA5	I do not have enough confidence to take my venture forward	
	BA6	I do not know how to control the risks associated with undertaking	
	BA7	I am afraid of failing in my business	
	BA8	I do not have enough contacts to help me start	
	BA9	I do not know entities that can support my venture	
	BA10	I do not have close examples of friends or family that serve as a model to undertake	
	BA11	It is hard to balance my family life with the demands of entrepreneurship	
	BA12	I have little knowledge of technologies that can support entrepreneurship	
	BA13	I have little experience to undertake	
	BA14	I have little ability to communicate my ideas	
	BA15	Because I belong to an ethnic group, I have less access to financing	
	BA16	Because of my gender I have less access to financing	
	BA17	I do not have the time my business requires to be successful	
	BA18	I have few training opportunities that allow me to strengthen my business	

Table 3 (continued)

Cluster	Variable	Description	Label
Entrepreneurial intention	EI1	I am willing to do whatever it takes to be an entrepreneur	1—Strongly disagree 2—Disagreement 3—Agree 4—Strongly agree
	EI2	My career goal is to become an entrepreneur	
	EI3	I will strive to create and run my own business	
	EI4	I am determined to create a business in the future	
	EI5	I have seriously thought about starting a business	
	EI6	I have the firm intention of starting a business 1 day	
Motivations	MOT1	Advance professionally and not work for others	1—It did not influence my decision to undertake 2—It had something to do with my decision to undertake 3—It was important in my decision to undertake 4—It was the most important thing in my decision to undertake
	MOT2	Develop my skills in business and entrepreneurship	
	MOT3	Take risks and challenges	
	MOT4	Contribute usefully to society	
	MOT5	Achieve a higher level of prestige and social recognition	
	MOT6	Balancing my family life and work life	
	MOT7	Have my own business so my children can inherit it	
	MOT8	Get a higher level of income	
	MOT9	Entrepreneurship is my only option	
	MOT10	I need financial stability	
	MOT11	I cannot get a job	
	MOT12	I was not happy in my previous job	
	MOT13	I undertake because of the responsibilities I have with my child(ren)	
Entrepreneurship stage		What stage is your business at? Likert scale of 6 points	0—None; 1—Idea; 2—Concept/prototype; 3—Implementation; 4—Growth; 5—Scaling
Number ventures		Before your current venture, how many have you undertaken?	Numeric variable
Characteristics of entrepreneurs	Female	Dummy variable	1—Female; 0—Other
	Migrant	Dummy variable	1—Migrant; 0—Local
	Informal	Dummy variable	1—Informal; 0—Formal

*Applies only for the instrument of entrepreneurs by necessity

Data analysis and robust SEM

We carried out a confirmatory factor analysis (Bouarir et al., 2023) schematized through structural equation models (SEM) (Byrne, 2016) is applied under the robust (variance–covariance matrix of the estimators -vce-) standard error method that allow the measurement of constructs for each one of the groups of questions associated with attitude, subjective norms, and perceived behavioral control (see Appendix Fig. 3a, b).

These constructs are employed in the analysis of the different hypotheses addressed in this study as explanatory variables via several ordinary least squares (OLS). We used the statistical software Stata (Verardi & Croux, 2009) to measure the relationship between these variables and the distinct measures of entrepreneurial intention. In the same way, a construct of entrepreneurial intention is estimated (see Appendix Fig. 4a, b) with all the constructs previously developed (attitudes, subjective norms, and perceived behavioral control), and other construct of motivations (see Appendix Fig. 5a, b) associated with the entrepreneurial activity. All above, with the purpose of observing the effects of these constructs on the number of previous ventures undertaken. These analyzes are run independently for necessity-driven entrepreneurs and opportunity-driven entrepreneurs.

The validity of these constructs and regression models were evaluated using statistical indicators, such as the t-statistic of the coefficients (OLS), z-statistic of the coefficients of the factors and covariance of the constructs, the standardized root mean square residual (SRMR), and the coefficient of determination (OLS and SEM)—due the SEM was fit with vce(robust); only stats(residuals) valid—all of them under a confidence level of 0.90.

Methodological limitations

We acknowledge certain limitations stemming from our methodology and data collection process. First, a potential representativeness bias arises due to the absence of gender controls during data collection, resulting in a higher prevalence of male individuals (75%) within the opportunity-driven entrepreneurship sample and a higher frequency of females (65%) within the necessity-driven segment. This lack of distinction regarding gender in relation to the respective entrepreneurial groups signifies a representativeness bias, impacting the analysis of results by gender. Second, the utilization of convenience sampling, necessitated by the challenges in accessing data from the targeted entrepreneurial population, introduces potential limitations. Our varied contact strategies, including visits to entrepreneurship fairs, engaging entrepreneurs from incubation programs, and sourcing data from university entrepreneur databases, may inherently bias our sample selection. Finally, the occurrence of missing values within our data set poses another limitation. Errors during the data collection process, leading to omissions or skipped responses, were observed. Notably, these instances were retained without any attempts to rectify or substitute the missing values, potentially influencing the robustness of our analysis.

Results

Table 4 synthesizes the effects of the constructs of attitudes, subjective norms, and perceived behavioral control on the entrepreneurial intention of entrepreneurs by necessity and by opportunity, controlling for gender, type of entrepreneur (native/local or migrant) and business status (formal or informal).

The analysis suggests that, first, *H1*—the attitudes of entrepreneurs by necessity and by opportunity are positively correlated with their entrepreneurial intention—is not supported. Contrary to expectations, in general, the attitudes (measured by soft and hard skills) of entrepreneurs—both by necessity and by opportunity—are not positively correlated with their predisposition to start a commercial venture; excluding E1 and E4, all the items evaluated are not significant. However, while a greater

Table 4 Effects of attitudes, subjective norms, and perceived behavioral control on entrepreneurial intention

	E1	*E2*	*E3*	*E4*	*E5*	*E6*
Entrepreneurs by necessity						
Soft skills [Attitudes]	0.08	0.15	0.22	0.23	0.17	0.06
Hard skills [Attitudes]	0.41**	0.17	0.08	− 0.06	− 0.01	0.09
Affirmations [Subjective norms]	0.54***	0.50***	0.52***	0.54***	0.47***	0.56***
Barriers [Perceived Behavioral Control]	− 0.21***	− 0.16**	− 0.12	− 0.14	− 0.09	− 0.17*
Female	0.07**	0.05	0.06*	0.08*	0.07	0.07*
Migrant	0.02	− 0.03	− 0.09	− 0.11	− 0.17*	− 0.19**
Informal	0.05	0.03	0.02	− 0.01	0.01	− 0.01
n	178	159	145	142	136	141
R^2	0.54	0.41	0.39	0.34	0.24	0.32
Entrepreneurs by opportunity						
Soft skills [Attitudes]	0.37**	0.16	0.11	0.04	0.11	0.16
Hard skills [Attitudes]	− 0.15	0.07	0.25	0.29*	0.20	0.21
Affirmations [Subjective norms]	0.24**	0.15	0.15	0.06	0.03	0.13
Barriers [Perceived Behavioral Control]	0.21	0.16	0.05	0.08	0.05	− 0.08
Female	− 0.02	− 0.05	0.01	− 0.07	− 0.07	− 0.07
Migrant	0.06	0.10***	0.05	0.05	0.03	0.10***
Informal	− 0.01	− 0.01	− 0.02	0.01	0.03	0.05
n	204	204	203	199	204	202
R^2	0.16	0.10	0.13	0.11	0.08	0.08

Significance: ***0.01 **0.05 *0.1

endowment of hard skills positively and significantly determines the willingness to develop a new business in entrepreneurs by need (E1; 0.41**), increased soft (E1; 0.37**) and hard skills (E4; 0.29*) exert a significant effect on the inclination of entrepreneurs by opportunity to start a firm.

Second, *H2*—subjective norms have a stronger correlation with entrepreneurial intention between entrepreneurs by necessity than between entrepreneurs by opportunity—is supported. While for entrepreneurs by need, subjective norms significantly and positively influence their entrepreneurial intention—the values are significant for all the items evaluated (E1 to E6), for entrepreneurs by opportunity subjective norms only influence one of the items (E1; 0.24**). Regarding entrepreneurs by necessity, subjective norms have the most positive effect on entrepreneurial intention. Third, *H3*—the perceived behavioral control of entrepreneurs by necessity and by opportunity is positively correlated with their entrepreneurial intention—is not supported conclusively. There is not a statistically significant relationship between the PBC of both types of entrepreneurs and their entrepreneurial intention. The relationship is present in entrepreneurs by necessity—only in three of the items evaluated (E1, E2 and E6)—but not in entrepreneurs by opportunity.

Regarding gender, the analysis also shows that, while there is a significant correlation between being a female entrepreneur by necessity and entrepreneurial intention—most of the elements assessed (E1, E3, E4 and E6) are significant—this relationship is not significant for women entrepreneurs by opportunity.

Table 5 Influence of entrepreneurial motivation and intention on venture creation

	Number of ventures	Entrepreneurship stage
Entrepreneurs by necessity		
EI1	− 0.72***	− 0.19
EI2	0.48*	0.34**
EI3	0.26	0.02
EI4	− 0.20	0.22
EI5	0.18*	− 0.21*
EI6	− 0.12	− 0.08
Estimated entrepreneurial intention	0.06	0.13
Motivations	0.29**	− 0.04
Female	− 0.03	0.05
Migrant	0.13	0.13
Informal	0.02	− 0.06**
n	90	127
R^2	0.21	0.15
Entrepreneurs by opportunity		
EI1	0.10	− 0.08
EI2	− 0.30*	− 0.05
EI3	0.17	− 0.06
EI4	0.25	0.10
EI5	− 0.26	0.04
EI6	0.00	− 0.11*
Estimated entrepreneurial intention	0.28*	0.27**
Motivations	0.37*	0.02
Female	− 0.02	0.07*
Migrant	0.03	0.09
Informal	− 0.03	− 0.19***
n	146	191
R^2	0.12	0.21

Significance: ***0.01 **0.05 *0.1

The analysis by type of entrepreneur shows that migrants have a negative and significant correlation with entrepreneurial intention (EI5 and EI6) among necessity entrepreneurs, the opposite for opportunity entrepreneurs (EI2 and EI6). The status of the company (formal or informal) has no effect on entrepreneurial intention.

Table 5 consolidates the relationships between entrepreneurial motivation, estimated entrepreneurial intention, and venture creation and entrepreneurship stage, controlling for gender, type of entrepreneur (native/local or migrant) and entrepreneurship status (formal or informal).

The analysis indicates that, first, H4—the motivations of entrepreneurs by necessity and by opportunity are positively correlated with venture creation—is supported. The relationship between the motivations and the number of ventures developed by entrepreneurs by necessity and by opportunity is positive and significant (0.29** and 0.37*). Second, H5—the motivations have a stronger correlation with the number of ventures undertaken by entrepreneurs by necessity and by opportunity than intention—is supported. While there is a positive and significant association between the motivations and the number of ventures undertake by both types of entrepreneurs, there is only a

significant relationship between the estimated entrepreneurial intention and number of ventures among entrepreneurs by opportunity (0.28*), but this ratio is lower.

The findings indicate that entrepreneurial intention exhibits a positive and significant correlation with more advanced phases of entrepreneurship for entrepreneurs by opportunity, unlike motivations. Although the results for entrepreneurs driven by necessity are similar, they are not conclusive.

Furthermore, the results indicate a significant association between belonging to informal populations and the early stages of enterprise development for both necessity-driven and opportunity-driven entrepreneurs (− 0.06** and − 0.19***, respectively). When considering gender, the analysis reveals a significant correlation between being a female opportunity entrepreneur and reaching a more advanced stage of entrepreneurship (0.07*). However, this relationship is not significant for necessity entrepreneurs. In contrast, the type of entrepreneur, whether native/local or immigrant, has no discernible effect on the development of entrepreneurship.

Conclusion and discussion

Drawing from the Theory of Planned Behavior, the key objective of this research was to investigate the effect of entrepreneurial attitudes, subjective norms, and perceived behavioral controls on the intention of entrepreneurs by opportunity and by necessity to start a business. This paper also examined the incidence of entrepreneurial motivations on the number of ventures undertaken by these two types of founders. Three (H2, H4 and H5) of the five hypotheses were supported, generating key unexpected results that contradict and expand extant literature on immigrant entrepreneurial motivations and intentions.

Theoretical implications

This study expands our understanding on entrepreneurial intention by revealing that contrary to what extant literature suggests (Hou et al., 2022; Ma & Huang, 2020), the attitudes of entrepreneurs by necessity and by opportunity are not, in general, positively correlated with their entrepreneurial intention. However, while for entrepreneurs by necessity the hard skills influence a positive disposition towards entrepreneurship (E1; 0.41**), for entrepreneurs by opportunity soft skills (E1; 0.37**) affect this disposition, unveiling an important difference between these two types of entrepreneurs. While for some individuals, namely, university students, the attitudes are key to stimulate the intention to develop a venture (Hou et al., 2022; Ma & Huang, 2020), for others, such as members of incubation programs and immigrants, the attitudes may not drive entrepreneurial intention. Aspects like subjective norms have a stronger influence on intention, at least in entrepreneurs by necessity.

This research extends previous investigations by showing that the degree of influence that subjective norms exert on entrepreneurial intention varies according to the type of population. Although for entrepreneurs by necessity subjective norms significantly and positively influence their entrepreneurial intention, for entrepreneurs by opportunity this is not the case; for the latter, subjective norms only affect the willingness to undertake the necessary steps to create a new business (E1; 0.24**). Many extant studies in different contexts have suggested that, overall, subjective norms are positively correlated

with entrepreneurial intention (Moriano et al., 2012); we found that opportunity-entrepreneurs' subjective norms are not associated with entrepreneurial intention. Since immigrants tend to face more conditions of adversity and discrimination than non-immigrants (Chen & Fan, 2022), immigrants' perceptions of others' attitudes towards entrepreneurship (subjective norms) becomes crucial to foster the intention to create a new venture. Moreover, contrary to previous studies, we did not find a substantial and conclusive correlation between PBC of entrepreneurs—by necessity and by opportunity—and their drive to start a business. Meaning that how entrepreneurs perceive themselves as adequate for developing new firms does not always influence their resolve to create them. The association between PBC and entrepreneurial intention is marginally present in entrepreneurs by need (although it exhibits an inverse relationship) but not in entrepreneurs by opportunity.

Our analysis broadens the empirical work on entrepreneurial intention and gender by revealing that being a female entrepreneur by necessity is correlated with the resolve of creating ventures; however, this relationship is not significant for women entrepreneurs by opportunity. Women entrepreneurs by necessity may have a stronger pressure to create their own business to provide resources for their children, while having the flexibility to take care of them, especially when they are undocumented and cannot obtain a job easily (Laguía et al., 2022). Women may have a better entrepreneurial intention justified by the gender stereotypes (Bouarir et al., 2023), exclusion, discrimination and stigmatization of the labor market and unpaid work (homework), resorting to entrepreneurship due to the need for livelihoods, and promoting the empowerment of women.

This study also contributes to the entrepreneurial intention field by highlighting the important and positive role that motivation plays on individual's recurrence of entrepreneurship. Extant research centers on the pivotal role of entrepreneurial intention on new venture creation (Arenius & Minniti, 2005; Dheer & Castrogiovanni, 2023), our findings, however, uncover that motivation plays a greater incidence on the development of new businesses. Although there is a positive and significant association between the motivations and the number of ventures initiated by both types of founders, there is only a significant relationship between the estimated entrepreneurial intention and number of ventures among entrepreneurs by opportunity, but not among entrepreneurs by necessity.

Practical implications for managers and policy makers

It is crucial for both managers and policy makers to discern the inherent disparities between entrepreneurs driven by necessity and those propelled by opportunity. Tailoring solutions to align with their distinct needs is imperative. Our study revealed that subjective norms exert a significant influence on entrepreneurs compelled by necessity, driving them to embark on new business ventures. This impetus arises from the critical need for swift and efficient income generation, bolstering their entrepreneurial ambitions. Consequently, it becomes imperative for both corporate and government leaders to not only devise enduring strategies for nurturing entrepreneurship among immigrant entrepreneurs driven by necessity but also to recognize the effectiveness of immediate, short-term interventions. These interventions encompass provisions, such as small loans, equipment, and technological assistance.

Moreover, technological assistance should encompass a comprehensive understanding of both the business as a value chain (Ataei et al., 2020; Contreras et al., 2012) and the geographical location. The choice of location significantly influences business success (Espitia-Escuer et al., 2015; Ferreira et al., 2016), particularly in cases where entrepreneurs have the flexibility to choose their location. However, for necessity-driven entrepreneurs, this flexibility might not be viable in most instances. Hence, technological assistance must be tailored to aid these entrepreneurs in devising alternative strategies that compensate for location-related deficiencies. Implementing such tailored strategies is pivotal in enabling these entrepreneurs to overcome location barriers. These pragmatic measures hold the potential to yield enduring and positive outcomes for entrepreneurial endeavors.

Furthermore, when formulating policies and programs, corporate and government officials should meticulously consider the divergent motivations that prompt entrepreneurs to embark on new business ventures. Anticipating these motivations beforehand can pave the way for more targeted, relevant, and efficacious solutions to amplify both the inception and sustainability of ventures. Entrepreneurs driven by necessity might be compelled to launch a business due to job unavailability or as their sole recourse (e.g., undocumented immigrants, individuals with criminal records), while entrepreneurs driven by opportunity might seek enterprise establishment to enhance their earnings, pursue personal or professional growth, or attain societal recognition. Policies and programs tailored for these two distinct demographics, each driven by their respective catalysts, necessitate nuanced approaches, encompassing varied content and scope.

Further research

The data analyzed was gathered in Colombia. Hence, to increase generalizability further studies should expand to other countries. Moreover, many of the immigrants who participated in this inquiry are from Venezuela. Therefore, future research should explore immigrants from different nationalities. Likewise, delving deeper into the motivations and barriers faced by migrant versus national entrepreneurs presents an intriguing avenue for exploration. Immigrant entrepreneurs often encounter heightened adversity and discriminatory conditions compared to their non-immigrant counterparts (Chen & Fan, 2022). Despite this, studies probing into the entrepreneurial intentions and motivations, particularly within samples reflecting necessity-driven entrepreneurship among migrants, remain limited. Such exploration would significantly contribute to expanding our comprehension of migrant integration into economies.

Furthermore, three out of six relationships hypothesized contradict extant literature, which may be a theoretical strength by itself; however, additional research could replicate this study with distinct methods and in other contexts to strengthen the validity of the findings.

Appendix

See Figs. 3, 4, and 5.

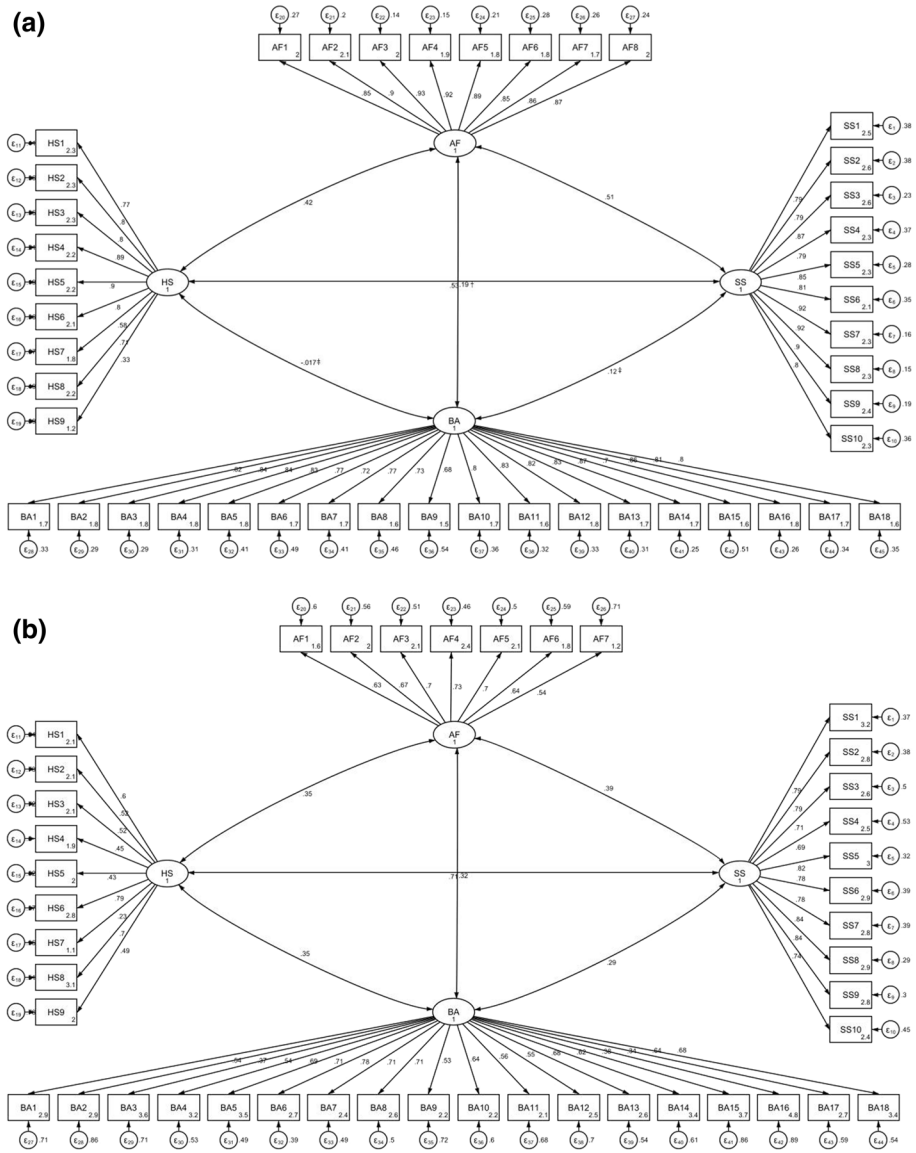

Fig. 3 **a** Estimated attitudes (SS and HS), subjective norms (AF) and perceived behavioral control (BA) for entrepreneurs by necessity (†Significance at 10%. ‡ Not significant). **b** Estimated attitudes (SS and HS), subjective norms (AF) and perceived behavioral control (BA) for entrepreneurs by opportunity

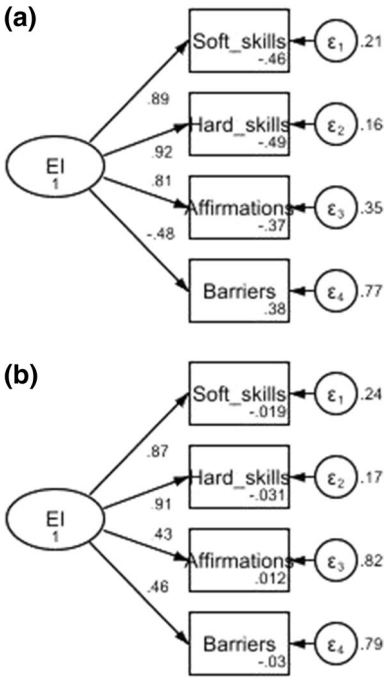

Fig. 4 **a** Estimated entrepreneurial intention for entrepreneurs by necessity. **b** Estimated entrepreneurial intention for entrepreneurs by opportunity

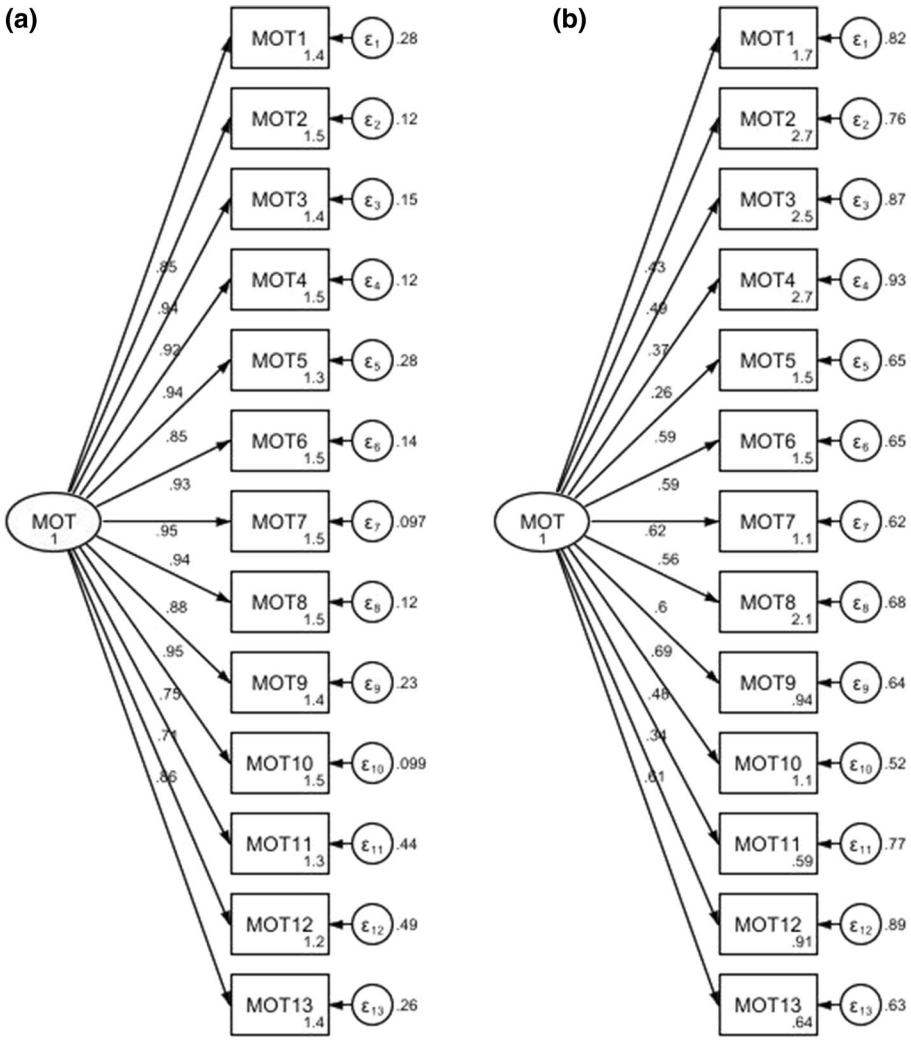

Fig. 5 **a** Estimated entrepreneurial intention for entrepreneurs by necessity. **b** Estimated entrepreneurial intention for entrepreneurs by necessity

Abbreviations

PBC	Entrepreneurial perceived behavioral control
OLS	Ordinary least squares
SRMR	Standardized root mean square residual
SEM	Structural equation models
TPB	Theory of planned behavior

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Author contributions

ABL: as project leader, I ensure that issues related to the accuracy or completeness of any part of the work are properly investigated and resolved. My role is also to design and generate the framework of analysis, i.e., to propose and structure the methodological framework. I also co-designed the instrument and facilitated its application. Finally, I revised and drafted the final version of the document and gave final approval to publish the content. JARO: as the research assistant of the project, he is responsible for the execution of the methods and writing the first draft of this paper. He also participates in the analysis of the results and the discussion of this paper. JMB: he is responsible for the co-design of

the instrument. He also participated in the interpretation of results by drafting the discussion and conclusions sections. Finally, he critically reviewed the document.

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Availability of data and materials
All materials will be made freely available to the academic community upon the publication of this manuscript.

Declarations

Competing interests
The authors declare that they do not have any competing interests.

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