Article

Digital Explosion and Entrepreneurship Education: Impact on Promoting Entrepreneurial Intention for Business Students

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Abstract: This study aims to examine the effect of entrepreneurship education and artificial intelligence (AI) development on entrepreneurial intentions while investigating the mediating role of perceived behavioral control. The proposed model also accounts for individual and contextual socioeconomic factors. This study tries to fill the gap in the entrepreneurship literature, which is still lacking with respect to the impact of new technologies on entrepreneurship intentions and shows conflicting results regarding the influence of entrepreneurship education. Our study surveyed 223 business students in Lebanon. The context of this study is of high importance, particularly since the country is currently facing a deep, multifaced political, economic, and financial crisis, and entrepreneurship might be considered an important channel for generating basic sources of income, steering the recovery process, and increasing Lebanese resilience against this highly unstable economy. The structural equation modeling technique (SEM) was conducted to validate the hypotheses. The results show that perceived behavioral control fully mediates the relations between performance expectancy of AI solutions, entrepreneurship education, and entrepreneurial intention. Risk aversion and social support exert a direct impact on entrepreneurial intentions. The findings highlight the need to account for entrepreneurship education and AI development when analyzing entrepreneurial intentions.

Keywords: artificial intelligence; entrepreneurship education; risk aversion; entrepreneurial intentions; mediation

JEL Classification: M13; I2; O3

1. Introduction

Entrepreneurship represents an essential component of the economic development of a country and plays a major role as a driver of innovation and job creation (Vodă and Florea 2019). It is considered an efficient factor to counteract several problems that youth face because it is directly associated with self-employment (Al-Mamary et al. 2020). Therefore, exploring entrepreneurial intentions has received increasing attention across various fields of research and practice. For instance, several works have investigated entrepreneurial intentions among business students (Anjum et al. 2019; Luc 2018). However, even though the literature tackling the aspects of entrepreneurial intention is substantial, there is still much to be analyzed, concerning how entrepreneurship intentions are conceived (Salam et al. 2017), particularly within this digital era of artificial intelligence. Furthermore, as argued by Zhang and Fu (2021), with the fast development of artificial intelligence technologies, the investigation of both entrepreneurship education and innovation is now an unavoidable trend.

The role of entrepreneurial education in driving entrepreneurship intentions received large interest among scholars, particularly since research tackling the effect of

education on entrepreneurial behavior shows quite contradictory results. While some scholars posit that an individual's entrepreneurship intention increases with education (Ahmed et al. 2020; Rodrigues Brás and Soukiazis 2019), others claim that education dampens the entrepreneurial inclination of the person (Laukkanen 2000). Some studies even find a negative or an insignificant relationship between the two variables (Karimi et al. 2016; Oosterbeek et al. 2010). However, even though education can have an essential role in driving entrepreneurial intentions (Anwar et al. 2020; Anwar and Saleem 2018), consensus has not yet been reached in the literature, and the authors did not particularly specify which type of program was evaluated and if the programs are optional or mandatory (Asimakopoulos et al. 2019). Therefore, understanding the influence of entrepreneurial education on the willingness to become an entrepreneur across business students requires deeper investigation. By exploring this relationship, this study attempts to fill a void in the entrepreneurial intention literature regarding the inconsistencies of the results explaining the association between entrepreneurship education and entrepreneurial intentions.

Furthermore, according to von Briel et al. (2018), digital technologies are changing the nature of entrepreneurship activities. Mitchell et al. (2017) advocate that the fast emergence of artificial intelligence is believed to be changing entrepreneurship theory. The incredible speed at which AI is entering every sector is therefore driving businesses, strategists, and entrepreneurs to use AI to make new strategies and generate new sources of business value (Soni et al. 2019). Technological innovations such as AI and big data are redesigning current traditional business models, management strategies and operational activities (Bag et al. 2021; Balakrishnan and Dwivedi 2021; Dubey et al. 2021). In the entrepreneurship field, entrepreneurial actions and decision-making under uncertainty represent the central aspects of entrepreneurship theory (Foss and Klein 2012). Most importantly, artificial intelligence systems considered in this context can present transformative technological solutions that offer the possibility to alleviate major uncertainties that are essential to new entrepreneurial activities. While this disruptive potential of artificial intelligence has been subject to growing attention in several research areas related to entrepreneurship—including industry, innovation, and business management (Cockburn et al. 2018)—it has not obtained much attention in contemporaneous entrepreneurship research (Obschonka and Audretsch 2020; Townsend and Hunt 2019). According to Obschonka and Audretsch (2020), the era of artificial intelligence in entrepreneurship has inevitably started and this holds for both entrepreneurship research and practice. Moreover, as noted by Chalmers et al. (2020), it is far from obvious how artificial intelligence technology can transform research and development activities for new ventures. Finally, even though scholars and practitioners consider AI as a novel technology that will reshape and alter business activities, venture performance, competition, and markets (Dwivedi et al. 2021), entrepreneurship studies have only focused on investigating and understanding entrepreneur intentions to use this technology (Upadhyay et al. 2022), such as by exploring if the performance expectancy of artificial intelligence solutions can initially drive entrepreneurial intentions this work advances AI theoretical development literature (Dwivedi et al. 2021; Duan et al. 2019), specifically in the field of exploring the factors influencing entrepreneurship intentions.

This study builds on the TPB model and previous works established in the literature and aims to propose and empirically assess a model that investigates the effect of two major variables—entrepreneurial education and performance expectancy of artificial intelligence solutions—on the intention to become an entrepreneur among business students in Lebanon. The model also accounts for both individual factors such as personality traits in terms of risk aversion considered a factor affecting entrepreneurial intentions (Segal et al. 2005), and contextual socioeconomic factors such as business climate and social support that are widely recognized to influence entrepreneurial intentions (Audretsch 2012; Farooq et al. 2017). Moreover, the model assesses the mediating role played by perceived behavioral control.

The context of this study is considered of high importance, given the multifaced crisis that Lebanon has been facing since the year 2019. In fact, over the past three years, the national currency has lost 80 percent of its value, local banks have executed unofficial capital controls, capped cash withdrawals, and stopped transfers and international spending. This has led to a major political, financial, and economic crisis. Given Lebanon's reputation for entrepreneurship with small and medium enterprises constituting 90% of the businesses, entrepreneurs can play a major role in alleviating the negative impacts of the current crisis. In fact, according to Grube and Storr (2018) entrepreneurs can decrease the negative influence of crises since they are embedded in their respective communities and can therefore address their needs. This includes providing the necessary resources in the aftermath of a crisis in the form of donations, money, and goods and services (Grube and Storr 2018; Linnenluecke 2017). Entrepreneurs were also shown to fill institutional gaps where crisis recovery systems fail and to increase resilience (Williams and Shepherd 2016; Linnenluecke 2017). This motivates our study, particularly that entrepreneurship can play a role in the recovery process in the aftermath of this current crisis and might increase Lebanese resilience against this highly unstable economy.

This study provides several contributions. Firstly, it adds to the entrepreneurship research by enhancing the understanding of how entrepreneurship education, personal traits (risk aversion), and socioeconomic contextual factors influence intentions to become an entrepreneur in a developing country. Secondly, to the best of the authors' knowledge, how artificial intelligence—considered an enabler for entrepreneurial activity (Davidsson et al. 2018)—impacts entrepreneurial intention is not yet explored. With this area being under-researched, this study fills a gap in the literature by investigating whether artificial intelligence can contribute to fostering entrepreneurship intentions as it explores the influence of performance expectancy of this new technology on entrepreneurial intentions. Thirdly, the proposed conceptual model also assesses the mediating effect of perceived behavioral control within this proposed framework. Finally, the results of this work show policymakers how they can promote entrepreneurship in Lebanon given the importance of new venture creations to alleviate the current crisis the country is facing.

The rest of the article is designed as follows: Section 2 presents the theoretical background and hypotheses development. Section 3 discusses the research methodology. Section 4 displays the data analysis. Section 5 shows the empirical findings. Section 6 presents the discussion and implications of the results. Finally, the study conclusion, limitations, and recommendations for future research venues are presented in Sections 7 and 8.

2. Theoretical Background

Entrepreneurial intention refers to the will to establish and own a new business. Entrepreneurial activity is considered a planned behavior influenced by various factors such as cognitive and behavioral factors, personal background, knowledge, and technology skills, and socioeconomic settings, regulatory and technological changes (Davidsson et al. 2018; Mourmant et al. 2009).

Prior works present several theories and a wide range of variables that are most likely relevant to the determination of entrepreneurial intention: demographic characteristics, personal traits, the existence of entrepreneurial tradition in the family, social support, experiences and education, political, and economic conditions, and perceived motivations and obstacles (Ozaralli and Rivenburgh 2016; Vodă and Florea 2019). For instance, the theory of planned behavior (TPB) of Ajzen (1991) advocates that the motivation behind human behavior depends on three beliefs: behavioral, normative, and control beliefs. The behavioral belief is represented by the perceived behavioral control; the normative belief leads to the subjective norms, which reflect the social pressure to accomplish a certain behavior; and the control belief develops the attitude towards a certain behavior. Furthermore, several studies have examined the effect of perceived risk

on entrepreneurship behavior (Nabi and Liñán 2013), and others revealed that intention to become an entrepreneur relies on individuals' attitudes towards entrepreneurship, perceived behavioral control, and subjective norms (Farooq et al. 2018; Heuer and Kolvereid 2014). In addition, Chen (2014) argued that technical factors in information technology usage and adoption can affect entrepreneurial behavior.

This study builds on the TPB model and previous works established in the literature to propose a theoretical framework that investigates the effects of four potential factors on entrepreneurship intentions among business students: personal factors (risk aversion, entrepreneurship education), performance expectancy of artificial intelligence solutions, contextual socioeconomic factors (business climate and social support), and the confidence in individuals' abilities to start a new business represented by perceived behavior control.

2.1. Entrepreneurial Intentions and Role of Perceived Behavior Control as Mediator

Intentionality expresses a mental state that can transform actions into real behaviors. Scholars have highlighted the necessity of studying entrepreneurship intention when forecasting individuals' actual entrepreneurship behavior in different countries and settings (Pejic Bach et al. 2018; Rajh et al. 2016).

Previous studies established the importance of accounting for the mediating role of perceived behavioral control when exploring entrepreneurial intentions. For instance, Krueger et al. (2000) state that predicting entrepreneurial activities by accounting for personal factors usually has small explanatory power and is characterized by smaller predictive validity. Personality traits and personal factors may influence entrepreneurship intention, but probably first through related individual attitudes. Yurtkoru et al. (2014) proposed a model where attitude and perceived behavioral control mediate the relationships between contextual support factors and entrepreneurial intention. Furthermore, prior research initiated the debate that the prediction of entrepreneurial intention through personality traits is subject to some mediating factors such as perceptional or motivational factors (Baum et al. 2001).

Perceived behavioral control, introduced by Ajzen (1991) as an antecedent to entrepreneurial intentions, is considered one of the key predictors for those intentions (Liñán and Chen 2009) and is closely associated with the perceived feasibility of Shapero (1982). Khuong and An (2016) argue that the perceived desirability of the Shapero's (1982) entrepreneurial event model can replace attitude and subjective norms of the theory of planned behavior model while perceived behavioral control is similar to Shapero's model of perceived feasibility. However, they add that desire to act is important but does not represent the only requirement for transforming motivations into intentions. This research follows Khuong and An (2016) and accounts only for the mediating role of perceived behavioral control.

2.2. Performance Expectancy of Artificial Intelligence Solutions

Artificial intelligence (AI) is broadly defined as intelligent systems characterized by the capability to think and learn (Russell and Norvig 2016). AI has been supporting business activities for a long time (Rajab and Sharma 2018). Obschonka and Audretsch (2020) concluded that this phenomenon could apply to entrepreneurs as well. Artificial intelligence technologies are transforming the practice of entrepreneurship (Townsend et al. 2018), which raises questions regarding entrepreneurial theories. However, while the disruptive potential of artificial intelligence has been receiving growing attention in various research areas over the last years, it was not analyzed in-depth in contemporary entrepreneurship research (Obschonka and Audretsch 2020). This study, therefore, advocates that AI is a major factor to consider when analyzing entrepreneurial intentions, particularly since the use of AI technologies is expected to generate a large wave of innovation, which will create great entrepreneurial potential and will eventually lead to favorable social and economic changes (Kabir 2018). Wang et al. (2022) consider that

business innovation that is based on AI and block chain technology reinforces and improves business practices. Their experimental and numerical results indicated that these technologies can yield major improvement in the following activities: "demand prediction ratio (97.1%), product quality ratio (98.3%), business development ratio (98.9%), customer behavior analysis ratio (96.3%), and customer satisfaction ratio (97.2%)" (Wang et al. 2022). According to Campbell et al. (2020) companies acknowledged the importance of AI in increasing the level of competitiveness, reshaping business strategies, and redesigning products or services. Wilson and Daugherty (2018) showed five components of business process enhancement where AI and humans cooperate: decision-making speed, flexibility, scale, and personalization. AI solutions help entrepreneurs to scale their businesses through the adoption of supply chain automation. In addition, the use of machine learning, chatbots, and virtual assistants helps entrepreneurs to expand their marketing initiatives. AI solutions can also reduce costs and help in automating data collection and data analysis processes. Entrepreneurs will have all the information they need to make the best decisions at a lower cost. Since AI solutions can help businesses to solve various problems, increase their financial benefits, reduce their costs, and enhance their efficiency, they can be considered a potential driver for entrepreneurial intentions.

Performance expectancy refers to "the degree to which an individual believes that using the system will help him or her attain gains in job performance" (Venkatesh et al. 2003). This study defines performance expectancy as the perception individuals have of how artificial intelligence solutions can help them to perform their business tasks in better, faster, and more efficient ways. Figueiredo (2019), showed that the biggest influencer of using artificial intelligence is performance expectancy. According to Venkatesh et al. (2003), this factor also has an impact on behavioral intention. Davidsson et al. (2018) added that the technological change driven by artificial intelligence can act as an external driver for new entrepreneurship activity. The following hypotheses are therefore proposed:

H1a. *Performance expectancy of AI solutions positively influences perceived behavioral control.*

H1b. *Performance expectancy of AI solutions positively influences entrepreneurial intention.*

H1c. *Perceived behavioral control acts as a mediator in the relation between performance expectancy of AI solutions and entrepreneurial intention.*

2.3. Entrepreneurship Education

Various studies have examined the affiliation between entrepreneurial education and career choice. The findings of Choi et al. (2017) indicate that the level of university investment in entrepreneurship positively influences the number of student founders. Ahmed et al. (2020) posit that students' experiences across different components of entrepreneurship programs positively influence their intentions to start their new ventures. Ndofirepi (2020) showed that entrepreneurship education had a positive significant impact on entrepreneurial intentions. Rodrigues Brás and Soukiazis (2019) showed that a direct relation exists between entrepreneurship education and total entrepreneurial activity rate. Pandit et al. (2018) concluded that college students in India pursuing education in entrepreneurship are more likely to exhibit higher entrepreneurial intentions. Hattab (2014) found a positive relationship between entrepreneurship education and entrepreneurial intentions among university students in Egypt. Mukesh et al. (2018) highlighted the need to focus on entrepreneurship education to enhance the entrepreneurial potential in higher education in India. In addition, Saeed et al. (2014) showed that educational interventions increase entrepreneurship for Pakistani university students.

However, the results in the literature are still inconsistent; while many studies established the presence of a positive relationship between entrepreneurship education and entrepreneurial intentions, others found an insignificant or sometimes a negative one

(Oosterbeek et al. 2010; Von Graevenitz et al. 2010). Furthermore, the effect of education on entrepreneurship also varies across countries. For instance, in Europe, this relationship is negative, while it is positive for the United States of America (Blanchflower 2004). This study, therefore, accounts for entrepreneurship education and posits the following hypotheses:

H2a. *Entrepreneurial education positively influences perceived behavioral control.*

H2b. *Entrepreneurial education positively influences entrepreneurial intention.*

H2c. *Perceived behavioral control acts as a mediator in the relation between entrepreneurial education and entrepreneurial intention.*

2.4. Risk Aversion

Risk has been recognized in the literature as a factor that hinders entrepreneurship and that negatively influences entrepreneurship intentions (Laforet 2013). Previous studies have established that an individual's risk-taking attitude has a direct and significant explanatory power when exploring entrepreneurship intention (Segal et al. 2005; Zhao et al. 2010).

However, the impact of risk aversion on entrepreneurial intentions varies, while some studies established that a direct relationship exists between the two variables, others found an indirect one (Zhao et al. 2005). Moreover, Martínez et al. (2017) showed that perceived risk exerts a positive effect on entrepreneurial intention, which contradicts the conventional conception that risk has a negative impact on this intention. This study, therefore, accounts for risk aversion and proposes the following hypotheses:

H3a. *Risk aversion negatively influences perceived behavioral control.*

H3b. *Risk aversion has a negative influence on entrepreneurial intention.*

H3c. *Perceived behavioral control acts as a mediator in the relation between risk aversion and entrepreneurial intention.*

2.5. Social Support

Social support refers to the extent to which persons think they are supported, sustained, and encouraged by friends and family when attempting to start a new business and become entrepreneurs (Carr and Sequeira 2007). It is therefore a similar concept to subjective norms, as it reflects the support of family and friends (Yurtkoru et al. 2014). However, one of the major concerns in the entrepreneurship literature is the weak role of subjective norms (Liñán and Chen 2009). Some studies have omitted this factor (Peterman and Kennedy 2003; Veciana et al. 2005), while others advocate that it did not have a significant impact on entrepreneurial intention (Krueger et al. 2000). Hence this study only accounts for the influence of social support on entrepreneurial intention.

Previous works have examined the impact of social network support (Kristiansen and Indarti 2004) and prior family business experience (Zellweger et al. 2011) on entrepreneurial intentions. Pruett et al. (2009) found a statistically significant relationship between family support and intention to become an entrepreneur. Farooq et al. (2018) highlighted the fact that a more supportive social environment toward entrepreneurship increases the probability of individuals choosing self-employment options for their careers. In addition, Yurtkoru et al. (2014) found that relational support is significant in explaining perceived behavioral control. Moreover, Shiri et al. (2012) claim that social support has an indirect impact on the intention to become an entrepreneur. Finally, some scholars argue that the nonsignificant influence of subjective norms on entrepreneurship could be explained by the fact that it might have an indirect effect on this variable

through influencing personal attitudes and perceived behavioral control and that this possibility should be investigated further (Liñán and Chen 2009). This study, therefore, explores the role of social support in influencing individuals' entrepreneurial intentions. The following hypotheses are proposed:

H4a. *Social Support positively influences perceived behavioral control.*

H4b. *Social Support positively influences entrepreneurial intention.*

H4c. *Perceived behavioral control acts as a mediator in the relation between social support and entrepreneurial intention.*

2.6. Business Climate

The literature advocates that the assessment of the business climate or the presence of adequate support mechanisms represents a key factor when determining entrepreneurial intentions among graduates. Previous studies have established that individuals will likely choose an entrepreneurial career if they are more knowledgeable regarding its different support mechanisms (Sieger et al. 2011). In addition, a more enhanced structural support is proven to generate higher entrepreneurial intent (Türker and Selcuk 2009). Furthermore, previous works show that there is a solid correlation between the environment and entrepreneurship intention and that this relationship is worth investigating (Lucky and Minai 2011; Uddin and Bose 2012). This study considers that the business climate refers to the availability of financial resources, the legal and tax system, the economic and the political situation, and the appropriate infrastructure that could influence the intentions to become an entrepreneur.

In addition, Middermann et al. (2020) showed that the relation between perceived behavioral control and the intention to initiate a sustainable business is influenced by environmental risk exposure. Mahmood et al. (2019) established that there is a positive relationship between a supportive entrepreneurial environment and perceived behavioral control. However, Yurtkoru et al. (2014) showed that structural support did not have a significant impact on perceived behavioral control. Hence, this study assesses whether business climate influences the intentions to become an entrepreneur. The following hypotheses are therefore proposed:

H5a. *Business climate positively influences perceived behavioral control.*

H5b. *Business climate has a positive influence on entrepreneurial intention.*

H5c. *Perceived behavioral control acts as a mediator in the relation between business climate and entrepreneurial intention.*

2.7. Perceived Behavioral Control

This study refers to perceived behavioral control as the perceived ease of conducting a particular behavior (Ajzen 2002), in this case starting a new business. Entrepreneurial perceived behavioral control, therefore, denotes the individual belief in his own ability to successfully accomplish entrepreneurial tasks (Zhao et al. 2005). The previous literature presents empirical evidence on the relationship between entrepreneurial intention and perceived behavioral control (Van Gelderen et al. 2008; Wilson et al. 2007). Therefore, this study hypothesizes the following:

H6. *Perceived behavioral control has a positive influence on entrepreneurial intention.*

2.8. Entrepreneurial Intentions

In general, intentionality expresses a state of mind that can transform actions into actual behaviors.

Researchers have highlighted the importance of studying entrepreneurial intention when predicting individuals' actual entrepreneurship behavior in different countries and settings (Pejic Bach et al. 2018; Rajh et al. 2016).

2.9. Conceptual Framework

This study, therefore, proposes the following conceptual framework, presented in Figure 1.
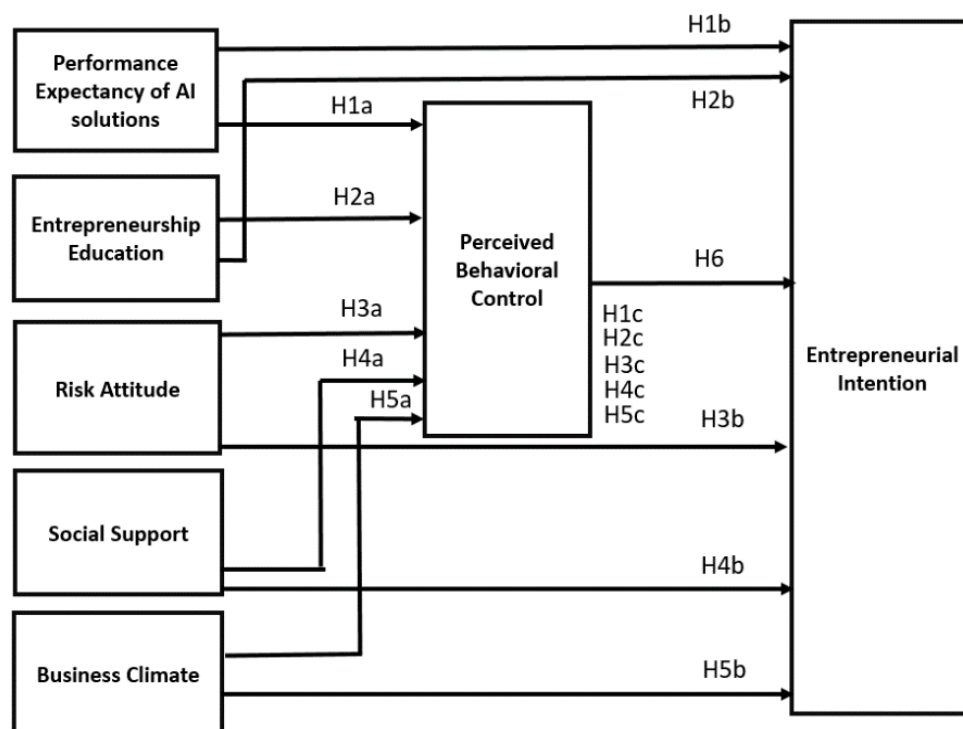
Figure 1. Proposed conceptual framework.

3. Research Methodology

3.1. Context of the Research

The context of this study is of particular importance as it is conducted in Lebanon, which is considered one of the world's most entrepreneurial countries, with a level of total early-stage entrepreneurial activity (TEA) that ranked 4th of the 48 countries included in the Global Entrepreneurship Monitor (GEM) Adult Population Survey (APS) conducted in 2018. Furthermore, of the eight MENA countries considered in the GEM 2018 report, Lebanon ranked first for new business ownership, first for total early-stage entrepreneurial activity (TEA), and first for established business ownership (Global Entrepreneurship Monitor (GEM) 2018). On the educational side, Lebanese universities are offering a wide range of high-quality educational programs, which provide the necessary tools and expertise for future entrepreneurs. As for the infrastructure in Lebanon, it is considered the weakest factor. Basic services such as high-speed Internet, uninterrupted electrical power, and efficient road networks represent eminent needs.

The Lebanese Government and private institutions in Lebanon had undertaken several measures to promote entrepreneurial activities. On the legislative part, the Lebanese Central Bank (BDL) has issued several laws and circulars that aim to promote entrepreneurial activities. In 2014, BDL issued "*Circular 331*", which aims to encourage startups by assuring that commercial banks' investments in these startups are guaranteed

by BDL. The circular provides incentives for commercial banks to make equity loans to new technology start-ups by guaranteeing 75% to 100% of the value of such loans, in exchange for a share in any eventual profits from the future sale of equity. To date, at least USD 650 million has been granted via *Circular 331*.

Furthermore, the Lebanese context is considered of high importance given the multifaced crisis that the country has been facing since the year 2019. Through their new venture creations, entrepreneurs can generate money, offer job opportunities for people, provide goods and services, and attract funds from investors, therefore helping to alleviate the economic, social, and financial problems the country is facing. Thus, entrepreneurs can highly contribute to fostering the recovery process.

Finally, the context of this research offers valuable insights, especially since artificial intelligence is still at a nascent stage in this country, and studies assessing the impact of entrepreneurial education on the intention to become an entrepreneur among business students are very scarce. Furthermore, except for the Global Entrepreneurship Monitor research that included Lebanon, and to the best of the authors' knowledge, there is hardly any empirical study investigating entrepreneurial intentions in Lebanon.

3.2. Sample and Data Collection

A survey consisting of seven scale constructs was developed. The list of all measurement items as well as their sources is detailed in Table A1 in Appendix A. The scales were adapted from prior studies and minor changes were made to ensure that the used constructs are valid within the context of this study. A five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree was used. A total of 350 questionnaires were sent by email to a dataset of students that acquired a business education in a very well-known higher education university in Lebanon. The choice of this sample is similar to several previous works tackling entrepreneurial intention among business graduates (Anjum et al. 2019; Luc 2018). Of the total, 223 surveys were included in the sample after removing unengaged respondents and questionnaires with missing values.

To make sure that the sample size used satisfies the needed requirement, Soper (2019) software was adopted. Using 7 latent constructs and 24 items, with 0.8 statistical power and a significance level of 5 percent, the required sample size for the model was 145 observations. Thus, the sample used, which consisted of 223 respondents, meets the requirements for sampling adequacy. The final sample consisted of 41.3% males and 58.7% females. All the respondents were holders of a bachelor's degree in business administration and aged 21 years and above.

3.3. Methodological Steps and Model Construction

This study uses structural equation modeling (SEM) to test the relations between the factors of the proposed conceptual model (Hair et al. 2016). IBM SPSS 20 and IBM Amos 23 statistical packages are used to perform the analysis.

The normality of the data is initially checked. All the values for skewness and kurtosis fall within −2 and +2, therefore normality is not an issue (Byrne 2010). Moreover, multicollinearity is also checked, the variance inflation factors (VIF) for all the factors were below the cutoff value of 5 (Hair et al. 2012), hence multicollinearity is not a problem.

In addition, data were screened to check the existence of possible common method bias. The reliability and validity of all constructs used were tested by conducting exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

To investigate the relevance of adding perceived behavioral control as a mediator, this study follows Hair et al. (2016) and uses the incremental model-building approach. The model is first tested without mediation. The second step consists of testing the model while accounting for the role of perceived behavioral control as a mediator. The two models are compared to investigate if the addition of the mediator enhances the model fit and raises the percentage of the variance explained for entrepreneurial intentions. The

findings indicate that the fit of the second model is better with a significant difference in χ^2 values and the degrees of freedom and that it explains 44.3% of the variance of entrepreneurial intention while the model without mediation only explains 21.7% of the same variance. Finally, Cohen's f2 effect size is calculated and is equal to 0.288. This result implies that adding perceived behavioral control as a mediator has a moderate effect (Cohen 1988). Therefore, the model including mediation is used.

Finally, this research uses the bootstrapping technique with 95% bias-corrected confidence intervals (Preacher and Hayes 2008) to test for the mediating effect of perceived behavioral control.

4. Findings

4.1. Common Method Bias and Multicollinearity

This study uses a two-step approach to test for multicollinearity. The values for the average extracted variance (AVE) were first checked and were all above 0.5 as shown in Table 1. In addition, the VIF values were all below the cutoff value of 0.5 (Hair et al. 2012). Further, this study uses two techniques to account for any possible common method variance as suggested by Reio (2010). First, during the procedural design phase, it ensured balance for the order of the questions. In addition, it adopts clear scale items to avoid any bias. Second, Harman's single factor test (Harman 1976) is conducted. The test is based on EFA forcing all the items to load into one construct. The single factor explained 18.253% of the variance, which is less than 50%. Common method bias is therefore not a problem.

Table 1. Results for convergent validity and reliability.

Factor	Indicators	Loadings	Cronbach's α	CR	AVE
Performance expectancy of artificial intelligence solutions (PEAI)	PEAI1	0.724	0.855	0.856	0.599
	PEAI2	0.838			
	PEAI3	0.765			
	PEAI4	0.764			
Entrepreneurial education (EE)	EE1	0.751	0.873	0.875	0.638
	EE2	0.736			
	EE3	0.883			
	EE4	0.816			
Risk aversion (RA)	RA1	0.714	0.775	0.776	0.537
	RA2	0.725			
	RA3	0.758			
Social support (SS)	SS1	0.627	0.748	0.753	0.506
	SS2	0.748			
	SS3	0.752			
Business climate (BC)	BC1	0.569	0.749	0.759	0.519
	BC2	0.847			
	BC3	0.718			
Perceived behavioral control (PBC)	PBC1	0.701	0.746	0.753	0.505
	PBC2	0.668			
	PBC3	0.760			
Entrepreneurial intentions (EI)	EI1	0.765	0.900	0.901	0.695
	EI2	0.879			
	EI3	0.844			
	EI4	0.843			

4.2. Exploratory Factor Analysis

Exploratory factor analysis (EFA) is conducted to ensure that the items used in the proposed conceptual model load correctly to their corresponding factors (Hair et al. 2016). The results support the proposed structure for the model. The KMO measure for sampling adequacy is equal to 0.808 and the Barlett's test of sphericity for the correlation matrix indicates that χ^2 = 2525.483 with *df* = 276, and *p* = 0.000. EFA results show the presence of seven distinct constructs explaining 60.386% of the variance.

4.3. Measurement Model: Reliability and Validity

This study uses two criteria to test the reliability of the model, Cronbach's alpha, and composite reliability (CR). The Cronbach's alpha and CR values for all the items are greater than the threshold value of 0.7. Internal consistency is therefore ensured. Convergent and discriminant validities were also checked using confirmatory factor analysis (CFA). The model demonstrates a very good fit using Hu and Bentler cutoff criteria (Hu and Bentler 1999). χ^2 = 359.236, *df* = 231, *p* = 0.000, χ^2/df = 1.555, *CFI* = 0.946, *SRMR* = 0.056, *RMSEA* = 0.050, and *PClose* = 0.489.

This study uses three criteria to assess convergent validity. First, the CR value should be higher than 0.7 for all items, the AVE values should be above 0.5 (Hair et al. 2016), and the factor loadings should exceed 0.7 (Fornell and Larcker 1981). The results presented in Table 1 indicate that convergent validity can be assumed for this model. The constructs demonstrate sufficient reliability and validity. The CR values are above 0.7; the AVE for all the factors is higher than 0.5. Furthermore, the indicators present sufficient loadings on their respective factors. Finally, discriminant validity is considered adequate when the square root of the AVE for a factor is above its correlations with all the remaining factors included in the model (Fornell and Larcker 1981). The results presented in Table 2 show that discriminant validity for the proposed framework is sufficient.

Table 2. Discriminant validity results.

	PBC	EI	EE	PEAI	RA	BC	SS
PBC	0.711						
EI	0.556	0.834					
EE	0.251	0.187	0.799				
PEAI	0.220	0.310	0.174	0.774			
RA	0.059	−0.017	0.382	0.409	0.733		
BC	0.127	0.019	0.388	0.070	0.141	0.720	
SS	0.103	0.364	0.336	0.482	0.319	0.097	0.711

5. Results

5.1. Structural Model Results

The structural model was tested by adopting two criteria: the squared multiple correlations (R^2) and the path coefficients. The factors explained 44.3% of the variance of entrepreneurial intention which demonstrates that the proposed model presents a good explanatory power. In addition, the model demonstrates very good predictive power as evidenced by χ^2 = 359.236, *df* = 231, *p* = 0.000, χ^2/df = 1.555, *CFI* = 0.946, *SRMR* = 0.056, *RMSEA* = 0.050, and *PClose* = 0.489 using Hu and Bentler cutoff criteria (Hu and Bentler 1999).

The estimation results for the path coefficients are shown in Table 3-part A. The findings indicate that performance expectancy of artificial intelligence solutions and entrepreneurial education both have a significant positive impact on perceived behavioral control (β = 0.260, *p* < 0.05 versus β = 0.269, *p* < 0.05), which provides support for hypotheses H1a and H2a. In addition, these two variables do not have a direct influence on entrepreneurial intention (β = 0.132, *p* > 0.05 versus β = 0.039, *p* > 0.05); hypotheses H1b

and H2b are rejected. These results highlight the fact that the performance expectancy of AI solutions and entrepreneurial education affect entrepreneurial intention indirectly through their positive impact on perceived behavioral control. Therefore, hypotheses H1c and H2c will be checked for mediation.

Table 3. Estimation results.

Part A: Model Estimation Results						
Relationships	**Hypothesis**	**Estimate**	**SE**	**CR**	**p Value**	**Hypothesis Verification**
(PEAI) → (PBC)	H1a	0.260	0.116	2.420	0.016 *	Supported
(PEAI) → (EI)	H1b	0.132	0.104	1.511	0.131	Not supported
(EE) → (PBC)	H2a	0.269	0.092	2.564	0.010 *	Supported
(EE) → (EI)	H2b	0.039	0.082	0.459	0.646	Not supported
(RA) → (PBC)	H3a	−0.131	0.102	−1.247	0.212	Not supported
(RA) → (EI)	H3b	−0.203	0.092	−2.345	0.019	Supported
(SS) → (PBC)	H4a	−0.074	0.167	−0.671	0.502	Not supported
(SS) → (EI)	H4b	0.307	0.158	3.263	0.001 **	Supported
(BC) → (PBC)	H5a	0.031	0.104	0.329	0.742	Not supported
(BC) → (EI)	H5b	−0.071	0.092	−0.954	0.340	Not supported
(PBC) → (EI)	H6	0.506	0.098	5.679	***	Supported
Part B: Mediation Analysis Results Using Bootstrapping Technique						
Path	**Hypothesis**	**Estimate**	**Lower Bounds**	**Upper Bounds**	**p Value**	**Results**
PEAI → PBC → EI	H1c	0.157	0.020	0.362	0.019 *	Full mediation
EE → PBC → EI	H2c	0.131	0.008	0.305	0.034 *	Full mediation

Column 3 shows the estimated coefficients β's. (SE) and (CR) denote standard errors and critical ratios. *** designates that the coefficient is significant with $p < 0.001$, ** means significance at the 1% significance level with $p < 0.01$, and * indicates significance at the 5% significance level with $p < 0.05$.

Moreover, the findings show that risk aversion only has a negative significant impact on entrepreneurial intention ($\beta = -0.203$, $p < 0.05$); hypothesis H3b is supported. However, risk aversion does not influence perceived behavioral control ($\beta = -0.131$, $p > 0.05$); hypothesis H3a is not supported and hypothesis H3c will not be assessed for mediation. Hence, risk aversion is an important factor to consider when exploring entrepreneurial intention, as it directly affects the intention to become an entrepreneur and it is not mediated by perceived behavioral control.

Furthermore, the results indicate that social support has a significant positive direct effect on entrepreneurial intention ($\beta = 0.307$, $p < 0.001$), which provides support for hypothesis H4b. Moreover, the estimated parameters show that social support does not exert a significant influence on perceived behavioral control ($\beta = -0.074$, $p > 0.05$), which indicates that hypothesis H4a is not supported and that hypothesis H4c will not be assessed for mediation. Thus, social support plays a key role by directly influencing the intention to become an entrepreneur.

In addition, the business climate factor did not appear to have a significant impact on perceived behavioral control and entrepreneurial intention ($\beta = 0.031$, $p > 0.05$ versus $\beta = -0.071$, $p > 0.05$); hypotheses H5a and H5b are not supported and hypothesis H5c will not be tested for mediation. This result highlights the fact that among business students in Lebanon, the effect of the social support factor outweighs the impact of the business climate, as entrepreneurs established in Lebanon mostly rely on the support provided by their family and friends to operate. Finally, hypothesis H6 is supported as perceived behavioral control appears to have a strong positive impact on entrepreneurial intention ($\beta = 0.506$, $p < 0.001$).

5.2. Mediation Analysis Results

This section shows the results for the mediating role of perceived behavioral control. The findings are displayed in Table 3-part B. Mediation exists if the coefficient for the indirect effect is significant with $p < 0.05$. As shown in this table, perceived behavioral control fully mediates the effect of performance expectancy of AI solutions and entrepreneurial education on intention to become an entrepreneur. Therefore, Hypotheses H1c and H2c are supported.

6. Discussion and Implications

The results of this study present several theoretical and practical contributions.

6.1. Theoretical Implications

First, to the best of the authors' knowledge, there is little empirical evidence that proposes a conceptual framework that accounts at the same time for the impact of personal factors, socioeconomic variables, and a new technological innovation (such as AI solutions) on entrepreneurial intentions among business students, while investigating the mediating role of perceived behavioral control.

Second, although several studies investigated if entrepreneurship can be driven by educational experience, the results in the literature remain inconsistent. The model results are in line with the previous literature, which shows that entrepreneurial education has a positive impact on entrepreneurial intentions (Ahmed et al. 2020; Hattab 2014; Ndofirepi 2020; Pandit et al. 2018; Rodrigues Brás and Soukiazis 2019; Saeed et al. 2014). However, the mediation result, which indicates that the influence of entrepreneurial education in higher education on entrepreneurship intention, is fully mediated by perceived behavioral control advances prior work. It shows that if individuals acquire an entrepreneurship education, they will develop a positive perceived behavioral control which will eventually lead to a higher intention to become an entrepreneur.

Third, this study is considered among the first attempts to quantitatively test the relationship between new information technology-related factors and entrepreneurship intentions. Additionally, the findings highlight the fact that the impact of performance expectancy of artificial intelligence solutions on intention to become an entrepreneur is fully mediated by perceived behavioral control. The higher the performance expectancy of the solutions offered by artificial intelligence; the more business graduates perceive that they can start a new business. This result sets the ground for the development of research opportunities to build upon them.

Fourth, this study adds insights into addressing the influence of risk aversion on the intention to become an entrepreneur. The results show that risk aversion exerts a direct negative impact on entrepreneurial intention. It is therefore in line with the stream of literature that advocates that an individual risk-taking attitude has a direct and significant explanatory power (Segal et al. 2005) and contradicts the results of previous studies that establish an indirect impact of risk aversion on entrepreneurship intention (Zhao et al. 2005). Consequently, risk aversion is established as an important personality trait factor that should be accounted for when exploring entrepreneurial intent.

Fifth, interestingly, and unlike previous studies that claim that social support has an indirect influence on entrepreneurship intention (Shiri et al. 2012), the findings show that a direct relationship exists between social support and intention to become an entrepreneur and that this relation is not mediated by perceived behavioral control. This result is in line with Lyons et al. (2012), who argue that entrepreneurship cannot be fully explained by studying the individual and that exploring the person's interaction with the context within which he or she operates and the relation between entrepreneur and community increases the likelihood of fully understanding the entrepreneurship phenomenon.

Finally, the empirical results reveal that the business climate does not have a significant impact on the intention to become an entrepreneur among business students in Lebanon. This result is not in line with prior works that establish a link between business climate and entrepreneurial intention (Lucky and Minai 2011; Uddin and Bose 2012). The fact that business climate does not influence entrepreneurship intention could be expected for a developing economy such as Lebanon, where business climate has been considered unfavorable for a long period of time due to severe political turmoil and to the inability of the government to meet various social needs. Entrepreneurial activity in this country mainly starts as family businesses or small to medium enterprises (SME) that play a key role in the development of the Lebanese economy (El Kallab and Salloum 2019). Hence, in this country, where the business climate is not very favorable and the government helps not effective, and where founder's syndrome highly impacts, the only way for a business to succeed is to develop a wide network of relationships with family, friends, or governmental leaders (Boustani and El Boustani 2017).

6.2. Practical Implications

The outcomes of the present study offer several practical contributions.

First, new technologies have been established to foster the creation of new businesses (Field et al. 2012); however, the influence of these factors on entrepreneurial intention within this digital explosion era is still lacking. Artificial intelligence is at the forefront of these technologies that are believed to act as an enabler for new entrepreneurship activity (Davidsson et al. 2018). Therefore, investigating how the performance expectancy of artificial intelligence solutions can influence entrepreneurial intentions among business students sheds the light on important technological drivers that are needed for the entrepreneurial development process.

Second, the findings of this study regarding the influence of both entrepreneurship education and performance expectancy of artificial intelligence solutions present practical implications on how to prepare students to become future entrepreneurs for this new digital era. The results reveal that entrepreneurial education may be effective in providing higher education students with the necessary entrepreneurial skills and to enhance their perception of their ability to open a new business venture. Graduates feel comfortable, well-prepared, and ready to become entrepreneurs. Entrepreneurship education can thus inspire students by promoting their perceptions that it is possible to create their own venture and become entrepreneurs. As a result, educators at business schools have to account for both entrepreneurship education and technological factors in their courses and tailor their curriculum to satisfy the student's new digital needs, and this will promote entrepreneurial intentions. They can organize training sessions, workshops, and other activities to support entrepreneurship education and enhance the students' digital knowledge and skills within the educational system.

Third, the findings will help policymakers in Lebanon to increase awareness of the key determinants of entrepreneurial activity among students in higher education and will allow them to make better decisions. Entrepreneurship education and the use of AI solutions should be promoted to boost entrepreneurial intentions among Lebanese students, particularly since entrepreneurship is considered one of the main pillars that could help alleviate the deep economic crisis that the country is currently facing. With the lack of job opportunities and the high levels of unemployment, students equipped with entrepreneurial education and digital skills can open their own ventures and become productive entrepreneurs.

7. Limitations and Future Research

This study suffers some limitations, which can open the gate to a new stream of research. First, the factors affecting entrepreneurial intention were examined at a particular moment in time using cross-sectional data; future research can address this issue by using longitudinal data to check whether the influence of these factors will change over time. Second, entrepreneurship exists in all professions. Therefore, it will be interesting to increase the sample size and include graduates from other schools to replicate the results and check for differences. Third, the sample used is restricted to business students in Lebanon, which reduces the possibility to use the results of this study to understand entrepreneurial intention in general within the digital era. Future studies can replicate this work in different geographical regions and cultural settings and use a more inclusive sample to depict possible regional and cultural differences or factors that affect entrepreneurial intention from a broader perspective. Finally, AI is still at a very nascent stage in Lebanon; this study, therefore, assessed the impact of perceived performance expectancy of AI solutions on entrepreneurial intentions. Future studies can replicate this analysis to evaluate the influence of using AI solutions on entrepreneurial intentions and entrepreneurs' venture performance.

8. Conclusions

Technological innovations particularly in artificial intelligence are rapidly evolving and transforming business environments within this digital explosion era. Furthermore, entrepreneurship education is considered a factor that affects entrepreneurial intentions, yet several studies argue this variable is considered relatively new, and to date, studies have reached contradictory results about its effectiveness and value (Nabi et al. 2018; Rauch and Hulsink 2015). Thus, despite the current heightened interest in the entrepreneurship stream of research, literature tackling the entrepreneurship process, its various aspects and the factors that influence it are not yet complete.

This study proposes a model that aims to investigate entrepreneurial intentions among business students in higher education in Lebanon. The model includes five factors that affect entrepreneurship intentions comprising entrepreneurial education, performance expectancy of AI solutions, risk aversion, social support, and business climate. Furthermore, it assesses the role of perceived behavioral control as a mediator.

The estimation results highlight the fact that the performance expectancy of artificial intelligence and entrepreneurship education can influence the intention to become an entrepreneur by enhancing the perception of the capacity to create and operate a new venture. Hence, the results establish the role of perceived behavioral control as a mediator. In addition, the findings reveal that risk aversion and social support directly influence the intention to become an entrepreneur. The business climate did not have an impact on entrepreneurial intention among business students in Lebanon.

The findings of this study are unique, as they explore the impact of entrepreneurship education, the performance expectancy of technological, personal, and socioeconomic factors on entrepreneurial intentions among business students. This study offers an important theoretical contribution by including new technological factors when investigating intentions to become an entrepreneur, which is considered a move further toward the development of new theories in the entrepreneurship development field.

Data Availability Statement: This research was implemented taking care to ensure all ethical standards and followed the guidelines of the Declaration of Helsinki. Data are available from the corresponding author upon request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Measurement scales used.

Construct	Items	Source
Performance expectancy of AI	PEAI1: AI solutions' knowledge can be used to enhance business activities. PEAI2: AI solutions can help to save time for businesses. PEAI3: AI solutions can help to improve the quality of businesses. PEAI4: AI solutions can help to store large data capacity for business planning.	Adapted from Figueiredo (2019), Davis (1989) and (2016) Zaremohzzabieh et al. (2016)
Entrepreneurial education	EE1: The educational system helped you to develop knowledge about the entrepreneurial environment. EE2: the educational system can help you to generate a new idea for business and to recognize opportunities. EE3: the educational system helped you to develop the necessary abilities to be an entrepreneur. EE4: the educational system helped you to develop the skills for succession of family business, if any.	Adapted from Misoska et al. (2016) and from Liñán and Chen (2009)
Risk aversion	RA1: I do not choose risky alternatives. RA2: I only make decisions when I think I can predict the outcomes. RA3: I avoid risky things.	Adapted from Quintal et al. (2006)
Social support	SS1: Necessary information/knowledge/skill support from social network is important to start a new business (parents, relatives, close friends, colleagues, community/government organizations…). SS2: Support your initial financial capital from social network is important to start a new business (parents, relatives, close friends, colleagues, community/government organizations…). SS3: Support in shape of additional contacts from social network is important to start a new business (parents, relatives, close friends, colleagues, community/government organizations…).	Adapted from Abebe (2012), Semrau and Werner (2014), Sequeira et al. (2007)
Business climate	BC1: The legal and tax system in my country is favorable for doing business compared to other developed countries. BC2: The economic and political situation, the innovative trends in the market are favorable for doing a business. BC3: The infrastructure in my country is conducive for doing business (roads, power, water, transport links, telecommunications, industrial land, estates, etc.).	Adapted from Misoska et al. (2016) and from Liñán and Chen (2009)
Perceived behavioral control	PBC1: To start a firm and keep it working would be easy for me. PBC2: I know the necessary practical details to start a firm and develop an entrepreneurial project. PBC3: If I tried to start a firm, I would have a high probability	Adapted from Liñán and Chen (2009)

Entrepreneurial intentions	of succeeding.	
	EI1: I am ready to do anything to be an entrepreneur.	Adapted from Liñán and Chen (2009) and Zaremohzzabieh et al. (2016)
	EI2: My professional goal is to become an entrepreneur.	
	EI3: I will make an effort to start and run my own firm.	
	EI4: I have very seriously thought of starting a firm.	

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