The Seybold Report

ISSN 1533-9211

DOI: 10.5281/zenodo.8366176

TECHNOLOGICAL ENTREPRENEURSHIP INTENTION AMONG UNIVERSITY STUDENTS IN AN EMERGING COUNTRY CONTEXT: EXTENDING THE THEORY OF PLANNED BEHAVIOUR

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Abstract

Purpose – The current study aims to investigate the provocation of the intention to take the initiative in technopreneurship with the theory of planned behavior (TPB). **Design/methodology/approach** – A conceptual framework premeditated for the current work extending the TPB with factors of entrepreneurial education, intrinsic motivation, and technological self-efficacy. The quantitative research design was assumed for the current work and the cross-sectional data collected from Jordanian university graduates. Four hundred fifty valid samples data were utilized to test the study hypotheses using partial least square structural equation modeling (PLS-SEM). **Findings** – the analysis of the PLS-SEM confirms a positive and significant effect of entrepreneurial education, intrinsic motivation, and technological self-efficacy on the attitude, subjective norms, and perceived behavioral control. The attitude, subjective norms, and perception of behavioral control play a significant role in advancing the intention to engage in technopreneurship. The study analysis confirmed that entrepreneurial education is the most significant predictor of technopreneurs' intention, followed by attitude. **Practical implications** – The study offers important implications for academics and technology managers to incorporate entrepreneurial education in technology programs. The students need support to transform their ideas into reality. Close working of technology firms with the university can bring positive change and instigates the intention among the students to engage in entrepreneurial behaviors. The literature of entrepreneurship and technopreneurship further enhanced with the current empirical work. **Originality/Value** – the present work extends the TPB and the promotion of intention to engage in entrepreneurial actions among the technology students.

Keywords: Technology, Entrepreneurship, Education, Motivation, Self-efficacy, Intention.

Paper Type: Research paper

INTRODUCTION

Entrepreneurship is regarded as the lever of economic development in developed and developing economies, as large corporations lack employment and have contributed to the global GDP decline in recent times (Turner & Gianiodis, 2018). The technological advancement of the last two decades has brought social and economic changes, and today's

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ISSN 1533-9211
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youth cannot find employment opportunities (Soomro & Shah, 2021). Global and local economies are looking toward entrepreneurs to develop the required technologies and facilitate economic development by generating employment (Boldnureanu, Ionescu, Bercu, Berdule-Grigoruta & Boldureanu, 2020; Potishuk & Kratzer, 2017).

Making entrepreneurial training and education a part of the traditional university system nurtures the necessary knowledge, skills, and attitude among young university students and graduates (Roy, Akhtar & Das, 2017). University graduates embarking on entrepreneurial ventures help create and offer significant economic growth to nations (Mirjana, Ana & Marjana, 2018). Most business students and graduates are taught about entrepreneurship as a course and show interest in opting for entrepreneurship as a career choice (Esfandiar, Sharifi-Tehrani, Pratt & Altinay, 2019; Ridha, Burhanuddin & Wahyu, 2016). The current trend highlights that technology students are less inclined to choose entrepreneurship as a career choice (Ikhtiagung & Aji, 2019).

Technology entrepreneurship or technopreneurship is the branch of entrepreneurship where entrepreneurs are sincerely interested in building enterprises and developing technology or technology-based enterprises (Lingappa, Shah & Mathew, 2020). The last decade marks the rise of technopreneurship and describes the differences between nations, culture, and economic development (Bomani, Gamariel & Juana, 2021). Small enterprises build the necessary technology to facilitate users' use of the technology for everyday activities, entertainment, business, education, and other allied pleasure activities (Amenah, 2017; Koe, Mahphoth, Alias, Krishnan & Arham, 2021). These technologies are coming in the shape of mobile applications; technology brings comfort to life, reduces electricity use, and devises a way to conserve ecology (Lingappa et al., 2020; Utami, 2019).

Technopreneurs are the protagonists of technological transformation and the enhanced use of information communication technology (ICT), which paves the way for the digital economy (Soomro & Shah, 2021). The current COVID-19 pandemic also generates multiple technology entrepreneurship opportunities to overcome the challenges of the pandemic and reduce individuals' movement. Universities can play a significant role by providing entrepreneurial education to facilitate the entrepreneurial mindset and encourage young graduates to attract entrepreneurial ventures (Zulfiqar, Sawar, Aziz, Chandia & Khan, 2019). Technology-driven economies are the source of job creation and bring the necessary efficiency and effectiveness to achieve social and economic success (Zaremohzzabieh, Samah, Muhammad, Omar, Bolong, Hassan & Shaffril, 2016).

Jordan is an emerging economy, and technology-based enterprises are the future of the nation. Low awareness and lack of support from peers and the government are the major obstacles to developing technopreneurship among Jordanian youth. Moreover, technology firms enable the country to generate jobs and play a substantial part in the economic progress of Jordan. Young graduates across the globe are also concerned about independence and self-awareness and are looking for self-generated employment that can offer prosperity based on academic achievements in science and technology-related subjects (Boldnureanu et al., 2020; Garaika & Margahana, 2019).

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The current study investigates the formation of the intention among university students to opt for technopreneurship as a profession choice based on the theory of planned behavior (TPB). We extend the TPB with entrepreneurial education, intrinsic motivation, and technological self-efficacy. The current work is composed as follows: the following section offers the research literature review with hypothesis development. The section after the literature review discusses the methods utilized for the current study, followed by analyzing the data and reporting the results. The latter section offers a discussion and conclusion.

LITERATURE REVIEW

Theoretical Foundation

The theory of planned behavior (TPB) is a famous theoretical framework to evaluate human action and behaviors concerning attitudes, subjective norms, and perceptions of behavioral control. The explanatory power of the TPB can significantly predict 25%-30% of human actions. However, many efforts have been made to enhance the explanatory power of the TPB. Attitude is the consistency of behaving in a specific manner and shows a significant perception of engaging in subject behavior (Esfandiar et al., 2019). Subjective norms depict the availability of social backing to engage in subject behavior and perceive more assistance as available to participate in a specific action. The perception of behavior control illustrates the availability of resources to facilitate specific activities.

Entrepreneurial education must be incorporated into the university curriculum, as 21st-century universities have become technology firm hubs and proactive engines to economic development and technological advancements (Koe et al., 2020). The students' knowledge about forming business firms, managing, and development was improved (Khuong & An, 2016). Universities offer incubation centers to provide the necessary support services to conceive business ideas and develop business solutions to effectively meet market demands (Boldureanu et al., 2020; Soomro & Lakhan, 2019). Universities provide the seed money to facilitate the students' technology projects and offer necessary supervision and monitoring (Mei, Lee & Xiang, 2020). Entrepreneurial education at the university level nurtures students' positive attitudes, and it helps generate self-employment and the development and growth of overall technology, thus helping national growth (Roy et al., 2017).

Entrepreneurs are well known for having the intrinsic motivation to take higher risks and proactively deal with challenging business environments (Antonioli, Nicolli, Ramaciotti & Rizzo, 2016). Technology students feel unsatisfied with the current technologies and see possibilities to improve human life with technology development (Ikhtiagung & Aji, 2019). Developing technology is risky and requires the personal inclination to take higher risks to seize opportunities to develop a novel technology solution (Koe et al., 2020). Personal intrinsic motivation provides the necessary resilience to deal with failure and overcome emergencies and critical situations (Jordaan, 2014).

Self-efficacy builds the necessary conditions to engage in entrepreneurial ventures among technology students. Self-efficacy refers to the personal belief that the necessary capacity and

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ISSN 1533-9211
DOI: 10.5281/zenodo.8366176

personal attributes exist to help individuals engage in problem-solving (Bandura, 2000). General self-efficacy influences people to engage in venture development and innovation (Liang, Lee & Liang, 2015). Technology self-efficacy nurtures the attitude to be positively inclined toward developing an organization (Oyugi, 2015). Personal capacity and willingness instigate engagement in entrepreneurial ventures; individuals with self-efficacy are less inclined to seek social support and perceive resourcefulness as a quality necessary for starting business ventures (Ozaralli & Rivenburgh, 2016).

HYPOTHESIS DEVELOPMENT

Entrepreneurship Education

Entrepreneurship education imparts the necessary knowledge and skills to understand and explore business opportunities to form sound business judgments (Galvao, Ferreria & Marques, 2017). Formal entrepreneurship education significantly influences attitudes toward entrepreneurship (Kabir, Haque & Sarwar, 2017). The provision of entrepreneurial education in the USA, European countries, and the Middle East helps students engage with entrepreneurship and opt for a career as entrepreneurs (Koe et al., 2020). Entrepreneurship education also enables positive thinking about entrepreneurship and helps perceive social influence to start a business venture (Utami, 2019). Encouraging a social environment can be built by delivering entrepreneurship education (Mei et al., 2020). The provision of entrepreneurial education and knowledge builds the necessary personal skills and instigates perceived behavioral control to uptake the entrepreneurship venture (Herdjiono, Puspa, Maulany & Aldy, 2017; Roy et al., 2017). Learnings from the above evidence, the subsequent hypotheses are proposed:

Hypothesis (H_{1a}): *Entrepreneurship education positively impacts attitudes toward entrepreneurship in the sample of Jordanians.*

Hypothesis (H_{1b}): *Entrepreneurship education positively affects the subjective norms among Jordanians' sample.*

Hypothesis (H_{1c}): *Entrepreneurship education positively affects perceived behavioral control for the sampled Jordanians.*

Intrinsic Motivation

Motivation is demarcated as the internal drive that leads to the achievement of personal goals. Intrinsic motivation is an innate self-defined impulse that triggers interest, self-determination, reciprocity, and achievement orientation to achieve personally developed objectives (Antonioli et al., 2016). Personal intrinsic motivation helps formulate attitudes toward developing enterprises to achieve personal goals (Jordaan, 2014). Intrinsic motivation as an internal feeling requires less social approval to pursue personal goals (Antonioli et al., 2016). The subjective norms are based on the notion that peers, friends, and family generate social pressure to behave socially acceptable (Lingappa et al., 2020). However, approval from subjective norms became insignificant for individuals with the right intrinsic motivation (Roy et al., 2017).

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ISSN 1533-9211
DOI: 10.5281/zenodo.8366176

The perception of behavioral control addresses the availability of the right resources, support, and processes to facilitate individual actions. The right intrinsic motivation facilitates the individual to develop the way to reach the objective and turn the unavailability of the resources, support, and process to their favor (Utami, 2019). Therefore, intrinsic motivation positively impacts the perception of behavioral control and establishes a favorable work condition for their objective (Jordaan, 2014). Therefore, for the current study, we propose the subsequent hypothesis:

Hypothesis (H_{2a}): *Intrinsic motivation positively influences the attitudes toward entrepreneurship in the sample of Jordanians.*

Hypothesis (H_{2b}): *Intrinsic motivation positively affects the subjective norms among Jordanians' sample.*

Hypothesis (H_{2c}): *Intrinsic motivation positively affects perceived behavioral control among sampled Jordanians.*

Technological Self-Efficacy

A personal inclination toward technology, or technology enthusiasm, plays a significant role in adopting technology and technology development (Ozaralli & Rivenburgh, 2016). Personal innovativeness drives technology's interest and generates self-efficacy toward technology development (Ikhiagung & Aji, 2019; Wilson, Kickul & Marlino, 2007). Personal willingness to participate in technology, innovative thinking, and innovative technological solutions depicts personal technological self-efficacy (Soomro & Shah, 2021).

Ozaralli and Rivenburgh (2016) documented that personal technological inclination helps build the intent to pursue a career in technology and enthusiastically develop technology and innovation. Technology and innovation help the human race solve multiple everyday issues and challenges (Soomro & Shah, 2021). A personal inclination toward technology also causes the individual to seriously think about developing technology firms or engage in technopreneurship (Roy et al., 2017). Therefore, for the current study, we propose the subsequent hypotheses:

Hypothesis (H_{3a}): Personal technological inclination *positively affects attitudes toward entrepreneurship in the sample of Jordanians.*

Hypothesis (H_{3b}): Personal technological inclination *positively affects the subjective norms among sampled Jordanians.*

Hypothesis (H_{3c}): Personal technological inclination *positively affects perceived behavioral control in the Jordanian sample.*

All hypothesized and tested relationships are presented in Figure 1 underneath.

ISSN 1533-9211

DOI: 10.5281/zenodo.8366176

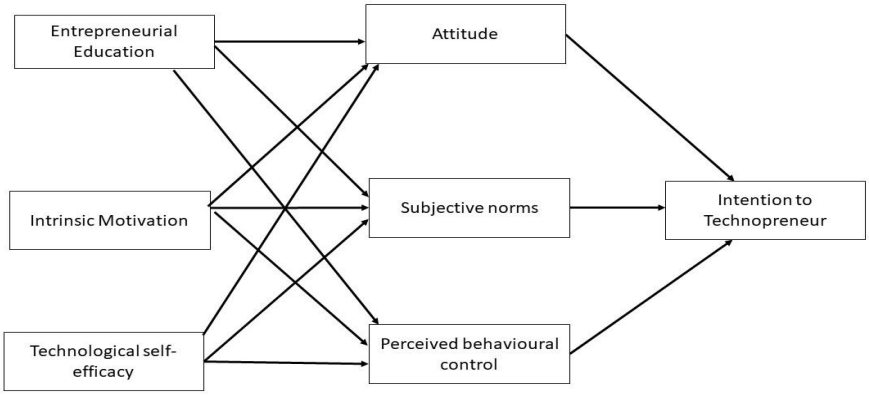

Figure 1: Research Model

Intention to become Technological Entrepreneurs

Young people are more likely to achieve independence and show interest in the technology-driven business profession. Attitude toward behavior significantly predicts the intention to act in a specific way (Zaremohzzabieh et al., 2016). Social pressure was significantly related to behaving in a socially acceptable way. Youth show a more significant intention to adopt a socially acceptable profession, such as agro-entrepreneurship and technology-related businesses (Roy et al., 2017). Young people show a more favorable inclination toward entering a technology-related profession if social approval is available from peers and family. Awareness and availability of required resources promote positive behavior or help to perform specific actions. Technical, financial, and methodological support empowers youth to pursue a career in technology. A higher perception of resources and support shows a greater inclination to become a technological entrepreneur. Urban and Chantson (2017) articulated that attitude has a positive significant bearing on the intent to have an academic entrepreneurial intention among South African research students. Roy et al. (2017) support that subjective norms strongly influence the intention to pursue entrepreneurial ventures among Indian university-level students. Mirjana et al. (2018) postulate that perceived behavioral control significantly influences the intention to pursue an entrepreneurial career among Slovenian students. We suggest the next hypotheses:

Hypothesis (H_4): *Attitude toward entrepreneurship positively affects the intention to become a technological entrepreneur in the Jordanian sample.*

Hypothesis (H_5): *Social influence positively infulence the intention to become a technological entrepreneur in the sample of Jordanians.*

Hypothesis (H_6): *Perceived behavioral control positively affects the intention to become a technological entrepreneur in the* sample of Jordanians.

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RESEARCH METHODOLOGY

Research Design

For the current study, the quantitative method was employed to explore the factors impacting the formation of an intention to become a technopreneur among the respondents from Jordan. The data collected for this explanatory research were cross-sectional. The causal prediction data analysis technique PLS-SEM and SmartPLS 3.1 were employed to test the proposed propositions.

Population and Sample

The target populace of the current study was Jordanian universities undergraduates. The sample size estimation was executed with G-Power 3.1 using the power = 0.95, an effect size = 0.15, and seven predictors. The essential sample size requirement was to have 84 samples (Faul, Erdfelder, Lang & Buchner, 2007). Moreover, at least 200 samples were suggested for PLS-SEM analysis (Hair, Risher, Sarstedt & Ringle, 2019). The study intends to employ the 2nd generation statistical analysis technique of structural equation modeling; we decided to contact approximately 400 respondents. The convenience sampling technique utilized a few qualifying questions added to the survey by asking the respondents' consent to participate in the study. Data collection was executed online by posting the survey on social media among the Jordanian communities from October 2020 to November 2020.

Survey Instrument

The survey scale utilized in work was a structured questionnaire. All question items were espoused from previous literature with slight alterations. To address the issue of common method bias at the research design stage, technopreneurship intention was assessed on a seven-point Likert scale, and all exogenous constructs were evaluated using the five-point Likert scales (Podsakoof, Mackenzie & Podsakoff, 2012). The survey items taken from the established scales and modifications were made to suit our study. Entrepreneurial education items were taken from the work of Kabir et al. (2017). Intrinsic motivation was assessed with the items borrowed from Solevik (2013) to evaluate the technological self-efficacy items taken from Wilson et al. (2007). Attitude and the subjective norms scale were borrowed from Esfandiar et al. (2019). Perceived behavioral control items were borrowed from Mirjana et al. (2018). The technological intention scale was borrowed from Esfandiar et al. (2019) and Turner and Gianiodis (2018).

Common Method Vairance

Cross-sectional research work commonly accompanied common method bias; CMV was assessed using multiple methodological and statistical tools (Podsakoff et al., 2012). Harman's one-factor assessment was applied to determine CMV's effect using a diagnostic technique for the current study. The single factor described a 25.9%, which was below the recommended threshold of 40% in Harman's one-factor test, consequently approving the inconsequential influence of CMV for the current work (Podsakoff et al., 2012). Furthermore, a multivariate correlation test among the students' latent constructs was utilized to assess the presence of

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ISSN 1533-9211
DOI: 10.5281/zenodo.8366176

CMV, and a relationship of fewer than 0.90 between the constructs indicated the nonappearance of CMV among the students' constructs. The results are presented in Table 1.

Table 1

	EDU	IMT	TSF	ATT	SIN	PBC	ITE
EDU	1.000						
IMT	0.511	1.000					
TSF	0.538	0.609	1.000				
ATT	0.601	0.587	0.574	1.000			
SIN	0.353	0.441	0.427	0.468	1.000		
PBC	0.412	0.553	0.519	0.557	0.485	1.000	
ITE	0.501	0.606	0.675	0.629	0.425	0.538	1.000

Note: EDU: Entrepreneurial Education; IMT: Intrinsic motivation; TSF: Technological self-efficacy; ATT; Attitude; SIN: Subjective Norms; PBC: Perceived behavioural control; ITE: Intention to technopreneur.

Multivariate Normality

Hair et al. (2019) suggest evaluating the data's multivariate normality before using SmartPLS. Multivariate normality for the study data was assessed with the Web Power online tool (source: https://webpower.psychstat.org/wiki/tools/index). The premeditated Mardia's multivariate p-value showed that the study data had a nonnormality problem, as the *p*-values were below 0.05 (Cain, Zhang & Yuan, 2017).

Data Analysis Technique

Due to the existence of multivariate nonnormality in our dataset, the study utilized partial least square–structural equation modeling (PLS-SEM). Hair, Hult, Ringle, and Sarstedt (2014) recommended that variance-based SEM be adopted to evaluate the study's exploratory nature. PLS-SEM can work well with nonnormal data and provide an in-depth elucidation of change in the structural equation model's dependent constructs.

The Smart-PLS 3.1 program was employed to inspect the current work; PLS-SEM is a multivariate exploratory method for analyzing integrated latent constructs' path structure (Hair et al., 2019). PLS-SEM empowers the scholar to work well with a small data set with the nonnormal data set. PLS-SEM is a casual-predictive analytical tool to execute multifaceted data with composites and no specific postulation of goodness-of-fit static requirements (Hair et al., 2014).

PLS-SEM investigation was performed in two segments. The initial phase is performed for model approximation, where the models' construct's reliability and validity are evaluated (Hair et al., 2019). Phase two addresses evaluating correlations of the models and systematic testing of the study path model (Hair et al., 2014). Model quality analysis achieved with r^2, $Q^{2,}$ and effect size f^2 can explain the endogenous construct's variation caused by the exogenous constructs (Hair et al., 2019).

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ISSN 1533-9211
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Importance-performance map analysis (IPMA) describes the study input variables as comparatively high to low by importance and performance for the outcome variable (Chin, 2010). IPMA supports detecting the conceivable area of augmentations that dictate review from policymakers and researchers. IPMA analysis profiles the rescaled variables' total effect in the unstandardized technique (Ringle & Sarstedt, 2016). Rescaling helps to rearrange every latent construct score from 0 to 100. The mean value of the latent variable score indicates the performance of the latent variable; here, 0 epitomizes the minimum, and 100 signifies the most import in the performance of the outcome construct (Hair et al., 2019).

Shmueli, Sarstedt, Hair, Cheah, Ting, Vaithilingham, and Ringle (2019) recommended using the PLSpredict to authenticate the model's critical outcome construct and inspect estimation faults. Model predictive capacity was appraised by $Q^2_{predict}$ measurement for confirmation with the naïve measure premeditated by the PLSpredict technique (Shmueli et al., 2019). Naïve standard estimated from the linear regression model (LM).

The assessment of the difference between RMSE or MAE values for the LM and PLS models approves the illuminating supremacy of the two approaches. Shmueli et al. (2019) propose that a PLS-SEM model depicts low predictive power when producing more errors than the LM model. When the PLS-SEM analysis produces more moderate prediction errors than the LM standard, it portrays the PLS-SEM model's medium predictive power. If there is no PLS-SEM model indicator that has more errors than the LM yardstick, the PLS-SEM model has the highest predictive influence (Shmueli et al., 2019).

DATA ANALYSIS

Demographic Characteristics

Study respondents' profiles are offered in Table 1. A considerable portion of respondents was male, comprising 55% of the study respondents. The study respondents aged 18-30 years accounted for 28% of the total sample. Moreover, 33% of the total respondents were aged between 31-40 years; 31% were aged between 41-50 years, the remaining participants were above 50 years of age. However, many respondents had a bachelor's level education, accounting for 41.7% of the sample. 31% of respondents had a diploma-level education, and the remaining had a master's or higher level of education.

The respondents who earned less than 300JD made up 41.6% of the sample; 38% had an income between 301-500JD, and 12.9% had income between 501-800JD; the remaining respondents had an income above 801JD. Among the respondents, 39.3% had a technical specialization, and the remaining respondents had a nontechnical specialization. 36.2% of the respondents belonged to the southern region, 34.4% were from the central region, and the remaining respondents were from the northern region.

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Table 2: Demographic Characteristics

	N	%			N	%
Gender				***Education level***		
Female	250	55.0		Diploma or below	140	31.0
Male	200	45.0		Bachelor	188	41.7
Total	450	100.0		Master or above	122	27.0
				Total	450	100.0
Age Group						
18 – 30 years	130	28.0				
31 – 40 years	150	33.0		**Income**		
41 – 50 years	140	31.0		Less than 300 JD	187	41.6
Above 50 years	30	6.0		Between 301-500 JD	171	38.0
Total	450	100.0		Between 501-800 JD	58	12.9
				Above 801 JD	31	7.6
				Total	450	100.0
Region						
North	132	29.3		***Specialization***		
Center	155	34.4		*Technical*	177	39.3
South	163	36.2		Others	273	60.7
Total	450	100.0		Total	450	100.0

Reliability and Validity

Taking direction from Hair et al. (2019), study reliabilities for the study's latent constructs were realized and evaluated using Cronbach's alpha (CA), DG rho, and composite reliability (CR). CA values for every construct were well above the 0.65 benchmarks, and the least value of CA was 0.651 (Hair et al., 2014).

The outcomes are provided in Table 3. Additionally, all DG rho values of the study constructs were more than 0.65, where the lowest score of DG rho was 0.655 (Hair et al., 2019). Besides, CR scores met the standard of 0.70, where the last CR value was 0.811 (Hair et al., 2014). These consequences specify that the latent constructs have suitable reliabilities and performed well for the later analysis stages. The average value extracted (AVE) for every construct is essential to more than 0.50 value to establish the suitable convergent validity to sustain the unidimensionality notion for each construct (Hair et al., 2019).

Items show that constructs attain acceptable convergent legitimacy (see Table 3). All the value inflation factor (VIF) scores for each construct were well less than 3.3., revealing no multicollinearity apprehension (Hair et al., 2014). The items loading and cross-loading scores confirm each construct's discriminant validity. The analysis results are portrayed in Tables 3 and 4, correspondingly.

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Table 3: Reliability and Validity

Variables	No. Items	Mean	SD	CA	DG *rho*	CR	AVE	VIF
EDU	4	4.340	0.555	0.726	0.728	0.831	0.552	1.523
IMT	4	4.258	0.668	0.763	0.770	0.849	0.586	1.718
TSF	5	4.311	0.592	0.777	0.781	0.848	0.528	1.787
ATT	4	4.310	0.639	0.774	0.779	0.855	0.597	1.567
SIN	3	4.128	0.640	0.651	0.655	0.812	0.592	1.413
PBC	4	4.175	0.662	0.689	0.703	0.811	0.519	1.600
ITE	5	5.309	0.922	0.828	0.829	0.879	0.592	-

Note: EDU: Entrepreneurial Education; IMT: Intrinsic motivation; TSF: Technological self-efficacy; ATT; Attitude; SIN: Subjective Norms; PBC: Perceived behavioural control; ITE: Intention to technopreneur; SD: Standard Deviation; CA: Cronbach's Alpha; DG *rho* - Dillon-Goldstein's *rho*; CR - Composite Reliability; AVE - Average Variance Extracted; VIF - Variance Inflation Factors

Source: Author's data analysis

The study's constructs achieved appropriate discriminant validity (see Table 4). Fornell-Larcker criterion (1981) was utilized to attain discriminant validity. The Fornell-Larcker calculates the square root of a particular construct's AVE. The AVE's square root for the construct needed to be higher than the correlation amongst the other constructs of the study (Hair et al., 2019). Tables 4 & 5 show that the study had sufficient discriminant validity.

Table 4: Discriminant Validity - Fornell-Larcker Criterion

	EDU	IMT	TSF	ATT	SIN	PBC	ITE
EDU	***0.743***						
IMT	0.511	***0.765***					
TSF	0.538	0.609	***0.726***				
ATT	0.601	0.587	0.574	***0.773***			
SIN	0.353	0.441	0.427	0.468	***0.769***		
PBC	0.412	0.553	0.519	0.557	0.485	***0.720***	
ITE	0.501	0.606	0.675	0.629	0.425	0.538	***0.770***
EDU	-						
IMT	0.686	-					
TSF	0.713	0.780	-				
ATT	0.799	0.757	0.737	-			
SIN	0.515	0.622	0.593	0.661	-		
PBC	0.585	0.751	0.697	0.697	0.727	-	
ITE	0.646	0.755	0.839	0.783	0.579	0.707	-

Note: EDU: Entrepreneurial Education; IMT: Intrinsic motivation; TSF: Technological self-efficacy; ATT; Attitude; SIN: Subjective Norms; PBC: Perceived behavioural control; ITE: Intention to technopreneur.

Source: Author's data analysis

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Table 5: Loadings and Cross-Loading

Code	EDU	IMT	TSF	ATT	SIN	PBC	ITE
EDU1	**0.662**	0.325	0.368	0.467	0.211	0.274	0.355
EDU2	**0.785**	0.392	0.360	0.427	0.283	0.331	0.372
EDU3	**0.797**	0.365	0.441	0.423	0.308	0.287	0.346
EDU4	**0.720**	0.432	0.427	0.466	0.245	0.328	0.412
IMT1	0.455	**0.687**	0.455	0.425	0.315	0.345	0.395
IMT2	0.429	**0.780**	0.471	0.526	0.369	0.488	0.534
IMT3	0.353	**0.833**	0.467	0.437	0.328	0.431	0.476
IMT4	0.326	**0.754**	0.471	0.392	0.331	0.413	0.434
TSF1	0.411	0.570	**0.731**	0.463	0.388	0.447	0.528
TSF2	0.427	0.418	**0.755**	0.415	0.313	0.401	0.426
TSF3	0.338	0.372	**0.705**	0.396	0.228	0.352	0.462
TSF4	0.387	0.414	**0.737**	0.402	0.331	0.343	0.497
TSF5	0.384	0.406	**0.703**	0.397	0.268	0.323	0.537
ATT1	0.404	0.410	0.461	**0.721**	0.334	0.463	0.452
ATT2	0.432	0.440	0.433	**0.802**	0.307	0.438	0.512
ATT3	0.503	0.475	0.460	**0.803**	0.381	0.423	0.480
ATT4	0.511	0.484	0.421	**0.762**	0.422	0.403	0.499
SIN1	0.285	0.282	0.327	0.373	**0.692**	0.254	0.315
SIN2	0.271	0.360	0.343	0.387	**0.840**	0.438	0.327
SIN3	0.260	0.370	0.316	0.322	**0.769**	0.417	0.338
PBC1	0.266	0.480	0.410	0.414	0.350	**0.783**	0.437
PBC2	0.305	0.408	0.394	0.412	0.345	**0.779**	0.441
PBC3	0.230	0.338	0.273	0.336	0.363	**0.635**	0.332
PBC4	0.391	0.354	0.408	0.443	0.351	**0.673**	0.328
ITE1	0.363	0.480	0.584	0.494	0.330	0.429	**0.759**
ITE2	0.375	0.434	0.489	0.491	0.342	0.368	**0.785**
ITE3	0.362	0.466	0.506	0.487	0.309	0.423	**0.775**
ITE4	0.417	0.498	0.522	0.523	0.349	0.426	**0.783**
ITE5	0.413	0.450	0.491	0.420	0.304	0.425	**0.745**

Note: EDU: Entrepreneurial Education; IMT: Intrinsic motivation; TSF: Technological self-efficacy; ATT; Attitude; SIN: Subjective Norms; PBC: Perceived behavioural control; ITE: Intention to technopreneur. (2) The Italic values in the matrix above are the item loadings, and others are cross-loadings

Source: Author's data analysis

Path Analysis

Next, having suitable reliabilities and validities from the outer model calculation, the following measurement calculation was utilized to scrutinize the hypotheses. The adjusted r^2 score for the three exogenous constructs (i.e., entrepreneurial education, intrinsic motivation, and technological innovation) on the attitude toward entrepreneurship elucidates 49.1% of the variation in attitude toward entrepreneurship. The predictive relevance (Q^2) score for the model segment is 0.288, demonstrating a medium predictive relevance (Hair et al., 2014). The adjusted r^2 value for the three exogenous constructs (i.e., entrepreneurial education, intrinsic

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DOI: 10.5281/zenodo.8366176

motivation, and technological innovation) on the social influence toward entrepreneurship elucidates 23.7% of the change in the social norms for becoming an entrepreneur. The Q^2 value for the model's portion is 0.134, demonstrating a medium predictive relevance (Hair et al., 2014). The adjusted r^2 value for the three exogenous constructs (i.e., entrepreneurial education, intrinsic motivation, and technological innovation) on the perceived behavioral control toward entrepreneurship explicates the 36.1% change in behavioral control toward entrepreneurship. The Q^2 score for the model fragment is 0.182, demonstrating a medium predictive relevance (Hair et al., 2014). The adjusted r^2 score for the three exogenous constructs (i.e., attitude, subjective norms, and perceived behavioral control) on the intention to become technological entrepreneurs elucidates 45.0% of the change's intention to become a technological entrepreneur. The Q^2 value for the part of the model is 0.264, demonstrating a medium predictive significance (Hair et al., 2014).

The model standardized path values, t-values, and significance levels are demonstrated in Table 6. The path coefficient among EDU and ATT (β = 0.339, t = 6.080, p = 0.000) specifies a substantial and positive influence of entrepreneurial education on attitudes toward entrepreneurship. The consequence formulae noteworthy statistical sustenance for H1a. The path worth for EDU and SIN (β = 0.107, t = 1.817, p = 0.035) displays that the effect of entrepreneurial education on social influence is positive & substantial and bids significant statistical provision for H1b. The path among EDU and PBC (β = 0.096, t = 1.651, p = 0.050), illustrating the impact of entrepreneurial education on perceived behavioral control, becomes positive and significant; it carries the backing to admit the H1c.

The path coefficient amid IMT and ATT (β = 0.279, t = 5.239 p = 0.000) directs a significant and positive influence of intrinsic motivation on toward entrepreneurship. This outcome forms significant statistical provision for H2a. The path value for the IMT and SIN (β = 0.256, t = 4.542, p = 0.000) illustrates a positive and significant impact of intrinsic motivation on the social influence and bids significant statistical assistance for the H2b. The path IMT and PBC (β = 0.349, t = 5.551, p = 0.000), illustrating the impact of intrinsic motivation on perceived behavioral control, becomes positive and significant; the acceptance of H2c.

The path coefficient among TSF and ATT (β = 0.222, t = 3.507, p = 0.000) shows technological innovation's significant and positive influence on attitudes toward entrepreneurship. The effect forms significant statistical sustenance for H3a. The path value for TSF and SIN (β = 0.214, t = 3.651, p = 0.000) displays that the technological innovation effect on social influence is positive and significant and sustenance to admit the H3b. The path between TSF and PBC (β = 0.225, t = 4.630, p = 0.000), illustrating the effect of technological innovation on perceived behavioral control, becomes positive and substantial; it offers evidence to admit the H3c.

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Table 6: Path Coefficients

Hypo		Beta	CI - Min	CI - Max	*t*	*P*	r^2	f^2	Q^2	Decision
H_{1a}	EDU ➔ ATT	0.339	0.245	0.428	6.080	0.000		0.149		Accept
H_{1b}	EDU ➔ SIN	0.107	0.009	0.205	1.817	0.035		0.010		Accept
H_{1c}	EDU ➔ PBC	0.096	0.002	0.196	1.651	0.050		0.010		Accept
H_{2a}	IMT ➔ ATT	0.279	0.192	0.368	5.239	0.000		0.089		Accept
H_{2b}	IMT ➔ SIN	0.256	0.161	0.348	4.542	0.000		0.050		Accept
H_{2c}	IMT ➔ PBC	0.349	0.250	0.453	5.551	0.000		0.112		Accept
H_{3a}	TSF ➔ ATT	0.222	0.121	0.326	3.507	0.000	0.494	0.054	0.288	Accept
H_{3b}	TSF ➔ SIN	0.214	0.116	0.313	3.651	0.000	0.242	0.034	0.134	Accept
H_{3c}	TSF ➔ PBC	0.255	0.163	0.344	4.630	0.000	0.365	0.057	0.182	Accept
H_4	ATT ➔ ITE	0.449	0.341	0.551	7.102	0.000		0.236		Accept
H_5	SIN ➔ ITE	0.098	0.026	0.171	2.205	0.014		0.012		Accept
H_6	PBC ➔ ITE	0.241	0.124	0.365	3.260	0.001	0.454	0.236	0.264	Accept

Note: EDU: Entrepreneurial Education; IMT: Intrinsic motivation; TSF: Technological self-efficacy; ATT; Attitude; SIN: Subjective Norms; PBC: Perceived behavioural control; ITE: Intention to technopreneur.

Source: Author's data analysis

The path score for the ATT and ITE ($\beta = 0.449$, $t = 7.102$, $p = 0.000$) represents a positive but substantial effect; the hypothesis is that attitude significantly affects the intention to develop technopreneurs should not be accepted. The result offers support for accepting H4. The path value for SIN and ITE ($\beta = 0.098$, $t = 2.205$, $p = 0.014$) represents a positive and momentous consequence; it offers support for accepting the argument that subjective norms affect the intention to become technological entrepreneurs among students and offers support for accepting H5. The path from PBC to ITE ($\beta = 0.241$, $t = 3.260$, $p = 0.001$), illustrating the effect of the perceived behavioral control impact the intent to become technopreneurs, becomes positive and significant; it delivers the provision to accept H6. Table 6 illustrates the path values.

Importance-Performance Factors

Moreover, the IPMA results disclose that entrepreneurial education was the most vital factor in the intention to become technopreneurs, with a score of 83.73, followed by attitude toward entrepreneurship, with a score of 82.74. The third significant factor in becoming a technological entrepreneur was intrinsic motivation, with a score of 81.50. Social influence has the fourth most substantial impact on becoming technopreneurs, with a score of 81.20. The fifth most imperative factor for intention to become technopreneurs was perceived behavioral control, with a score of 80.69. The least essential factor was technological self-efficacy.

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DOI: 10.5281/zenodo.8366176

Table 7: Importance-Performance Matrix

Factors of ITE	Total effect	Performance
EDU	0.215	83.736
IMT	0.227	81.508
TSF	0.196	72.754
ATT	0.450	82.749
SIN	0.097	81.207
PBC	0.230	80.698

Note: EDU: Entrepreneurial Education; IMT: Intrinsic motivation; TSF: Technological self-efficacy; ATT; Attitude; SIN: Subjective Norms; PBC: Perceived behavioural control; ITE: Intention to technopreneur.

Predictive Assessment

The model predictive power was evaluated with $PLS_{Predict}$ by utilizing ten folds with ten reiterations. The calculation settles the PLS model power with more new predictive observations than the linear model LM). Only a few endogenous constructs' RMSEs for PLS-SEM indicators outclass the naïve standard (Shmueli et al., 2019). The findings suggest $Q^2_{predict}$ static above than 0. The prediction error was analyzed to appraise the pertinent prediction statistics. The assessment of predictive performed on the RMSE scores for PLS-SEM and LM models (Shmueli et al., 2019). The results show that attitudes toward entrepreneurship and social influence have high predictive power, as all LM-naïve benchmarks yield more errors than PLS-SEM. However, PBC and IET have medium predictive powers, as most PLS-SEM yield fewer error scores than the LM-naïve benchmarks. The outcomes are provided in Table7.

Table 8: Predictive Model Assessment

	$Q^2_{Predict}$	RMSE (PLS-SEM)	RMSE (LM)	Difference	Decision
ATT1	0.244	0.701	0.720	-0.019	
ATT2	0.258	0.718	0.727	-0.009	Higher Predictive Power
ATT3	0.319	0.682	0.703	-0.021	
ATT4	0.314	0.703	0.694	-0.009	
SIN1	0.112	0.767	0.786	-0.019	
SIN2	0.143	0.802	0.812	-0.010	Higher Predictive Power
SIN3	0.138	0.786	0.797	-0.011	
PBC1	0.233	0.818	0.827	-0.009	
PBC2	0.193	0.829	0.823	0.006	Medium Predictive Power
PBC3	0.111	1.012	1.036	-0.024	
PBC4	0.182	0.744	0.751	-0.007	
IET1	0.283	0.722	0.662	0.060	
IET2	0.249	0.763	0.753	0.010	
IET3	0.260	0.699	0.704	-0.035	Medium Predictive Power
IET4	0.293	0.688	0.693	-0.005	
IET5	0.260	0.693	0.695	-0.002	

Note: EDU: Entrepreneurial Education; IMT: Intrinsic motivation; TSF: Technological self-efficacy; ATT; Attitude; SIN: Subjective Norms; PBC: Perceived behavioural control; ITE: Intention to technopreneur. MAE: Mean Absolute Error; RMSE: Root Mean Squared Error; PLS-SEM: Partial Least Squares – Structural Equation Modelling; LM: Linear Regression Model
Source: Author's data analysis

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ISSN 1533-9211
DOI: 10.5281/zenodo.8366176

DISCUSSION

The current work examines the formation of an intention to engage in technopreneurs among Jordanian youth with TPB extension. The study results support the argument that entrepreneurial education, intrinsic motivation, and technological innovation significantly influence attitude, subjective norms, and perceived behavioral control. Moreover, attitude, subjective norms, and perceived behavioral control significantly instigate the intention to become technopreneurs in the study sample.

First, our study findings advocate that entrepreneurship education positively influences attitude, subjective norms, and perceived behavioral control to become a technopreneur among the Jordanian samples. Our study finding agrees with the result recognized by Utami (2019) that entrepreneurial education inculcates the necessary knowledge and skills among students to advance a career as technopreneurs. Moreover, Roy et al. (2017) predicted that entrepreneurial education promotes attitudes, subjective norms, and perceptions of behavioral control among Indian science and technology students to seize entrepreneurial careers.

Furthermore, the study's outcome suggests that intrinsic motivation significantly impacts attitude, subjective norms, and perceived behavioral control to become a technopreneur among the sampled Jordanians. Liang et al. (2015) recognized our study findings and proposed that intrinsic motivation facilitates convictions to build the necessary mental state to engage in entrepreneurial ventures among Taiwanese students. Intrinsic motivation builds the necessary attitude to achieve success and builds personal resources to pursue entrepreneurs' careers (Antonioli et al., 2016).

Furthermore, the findings show that technology self-efficacy innovations positively affect attitude, subjective norms, and perceived behavioral control to become a technopreneur among the sampled Jordanians. Our study results support the outcome documented by Soomro and Shah that technopreneurs' self-efficacy and related activities harness the student's attitude and perception of facilitative conditions to start a career as technology entrepreneurs among the Pakistani respondents. Garaika and Margahana (2019) postulate that self-efficacy and self-confidence promote the intention to choose an entrepreneurial career among Indonesian students.

Next, we proposed the causal link among attitude, subjective norms, and perceived behavioral control on the intent to become technopreneurs with the TPB. The study's findings confirm that attitude meaningfully impacts the intent to become a technopreneur. Our study results agree with Roy et al. (2017), who conclude that personal attitudes impact entrepreneurial intention among Indian technology students.

Subjective norms also significantly infuse the intention to become technopreneurs among the study participants. Subjective norms make it suitable to participate in a technology entrepreneurship venture. Our study findings agree with the results reported by Urban and Chantson (2019) that subjective norms help nurture the intention to engage in entrepreneurial ventures.

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DOI: 10.5281/zenodo.8366176

Subsequently, the study results show that perceived behavioral control significantly affects the intention to become a technopreneur. The results of our study agree with Mirjana et al.'s (2018) that perceived behavioral control impacts entrepreneurial intention for the Slovenian pupils.

CONCLUSIONS

The last two decades have witnessed a technological revolution through building the right educational and entrepreneurial culture to bring economic and social prosperity to developing economies. Developed and, primarily, Western countries offer skills-based education and encourage young university graduates to engage in entrepreneurial activities. Academic staff encourage students and identify them to become entrepreneurs in all major fields of life. Technology students need to take entrepreneurial ventures and participate in economic development and job creation. Demand for technology and innovation offers increasing opportunities for young technology graduates to build an intention to develop entrepreneurial ventures. The provision of entrepreneurial education, intrinsic motivation, and technology efficacy provide the necessary conditions to build attitudes, subjective norms, and then perceived behavioral controls to instigate the intent to take up technology-based entrepreneurial ventures.

The study offers policy and practice suggestions as well. Entrepreneurial education must be included in all kinds of programs and build self-efficacy, nurturing the intention to take up entrepreneurial careers. Higher innate motivation and government support can build the necessary attitude to engage in technology entrepreneurship among technology and nontechnology graduates (Urban & Chantson, 2019). Societal acceptability also needs enhancements. Educationists and entrepreneurs need to work together and develop the necessary skills and attitudes among university students and graduates to take advantage of the challenge of starting entrepreneurial ventures. The government must devise policies to offer tax holidays and seed money to support technology entrepreneurship as a worthwhile business endeavor. Additionally, graduates, specifically technology graduates, must be provided with the targeted skills to realize the opportunities to start technology-based business ventures. Nevertheless, the general high school-level curriculum must be revamped to inculcate the youth's entrepreneurial mindset to help instigate the intention to become technopreneurs.

Moreover, technology managers and technopreneurs need to engage with academia and offer opportunities to students to visit their businesses and offer first-hand experience learning the technology business from professionals (Kabir et al., 2017). These interactions allow students to develop the necessary skills, nurture their respective knowledge of current technologies, and develop novel technology into a business. Nevertheless, promoting the intention to start the technology-based business venture is a viable option to become technopreneurs'. It takes advantage of technology to fulfill consumers' needs and participate in the nation's economic development (Roy et al., 2017).

Reportedly, the current work is associated with three rampant limitations. The current work is a cross-section and has restricted generalizability. Therefore, future research needs to have a longitudinal stance to understand the effect of entrepreneurial education and environmental

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ISSN 1533-9211
DOI: 10.5281/zenodo.8366176

factors that promote the intention to update technology entrepreneurial ventures. The university students are young and technology-savvy, belong to generation Y, and look for a self-regulation business adventure to achieve financial and social independence. The study utilized intrinsic motivation and technology efficacy as personal attributes that may impact the intention to form entrepreneurial technology endeavors. The other personal attributes of mindfulness, hope, risk-taking, and enterprising skills also need to be included to discover the formation of an intention to engage with technopreneurship. This also helps to reconnoiter barriers and inclinations toward adopting technology entrepreneurship. The third constraint is related to the use of TPB to model the intention to become technopreneurs. Using other theoretical models to explore the formation of an intention to become technopreneurs also facilitates the general surrounding factors promoting an understanding of the intention to choose the profession. Moreover, reproducing the same study model with data collected from diverse geographical settings helps to recognize the global effects of starting technology business ventures among generation 'Y.'

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