






Article

The Impact of Entrepreneurial Education on Technology-Based Enterprises Development: The Mediating Role of Motivation

Leo-Paul Dana ^{1,*}, Mehdi Tajpour ², Aidin Salamzadeh ^{3,*}, Elahe Hosseini ⁴ and Mahnaz Zolfaghari ⁵¹ Rowe School of Business, Dalhousie University, Halifax, NS B3H 4R2, Canada² Department of Corporate Entrepreneurship, Faculty of Entrepreneurship, University of Tehran, Tehran 1439813141, Iran; Tajpour@ut.ac.ir³ Department of Business Management, Faculty of Management, University of Tehran, Tehran 141556311, Iran⁴ Department of Business Administration, Faculty of Economics, Management & Accounting, Yazd University, Yazd 8915818411, Iran; elahe.hosseini@stu.yazd.ac.ir⁵ Department of Educational Administration and Planning, Faculty of Psychology and Education, University of Tehran, Tehran 141556311, Iran; mahnaz.zolfaghari@ut.ac.ir

* Correspondence: lp762359@dal.ca (L.-P.D.); Salamzadeh@ut.ac.ir (A.S.)

Abstract: Technology-based enterprises play a paramount role in blooming a country economically. Nevertheless, according to a society's capacity to launch such enterprises in various eras, their volume is less than expected in many economies. Therefore, establishing such enterprises is necessary for developing any country, although its innovation system contributes to establishing them. This paper considers the impact of entrepreneurial education on technology-based enterprise development, including motivation as a mediator variable, in Esfahan Scientific and Industrial Town. Despite much research investigating the correlation between entrepreneurial education and technology-based enterprises' progress, it seems that no study has already considered this correlation with remarking the motivation as a mediator variable. This applied research follows a quantitative research design. The statistical population includes 500 enterprises in the Esfahan Scientific and Industrial Town, and for sampling, Cochran's formula was applied ($n = 217$). Additionally, the researcher-made questionnaire and PLS3 software were used for data gathering and analysis. The results demonstrated that entrepreneurial education elements (including entrepreneurial skill, entrepreneurial learning, and entrepreneurial intention) positively affect technology-based enterprises' development, considering motivation as a mediator variable. However, the impact of entrepreneurial intention on technology-based enterprises was not supported. It reveals that the entrepreneurial intention of motivated individuals could have a meaningful effect on the development of technology-based enterprises. Therefore, motivation is a critical issue to be considered by managers and policymakers while considering entrepreneurial education-related policies and initiatives.

Keywords: entrepreneurial education; entrepreneurial intention; motivation; development of technology-based enterprises



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1. Introduction

In today's hectic life, changes in enterprises' environment cause a change in their attitudes (Tajpour et al. 2021a). Furthermore, entrepreneurship is one of the essential elements in economic development, and it has a significant effect on raising job opportunities, efficiency improvement, and enhancing the welfare in the scale of the economy and society (Hosseini et al. 2020a). Besides, the government should dedicate its resources to growing entrepreneurial education and consequently develop its potential to improve entrepreneurial activities (Karimi et al. 2010). Based on the entrepreneurship literature review, entrepreneurial education can improve entrepreneurs' ability (Fayolle 2018; Tajpour et al. 2020a). Educational activities positively affect individuals and teams, mainly through providing incentives and attitudes (Aguinis and Kraiger 2009). Additionally,

entrepreneurial education is crucial for solving the unemployment problems among youth and adults (Sondari 2014). Students might tend to initiate new business models, based on this approach (Jaafar and Abdul Aziz 2008). Hence, one of the most vital aims in entrepreneurial education is to facilitate the path and motivate the target population to make them confident to start a business (Karhunen et al. 2008). One of the critical points is that the universities have a paramount role in improving entrepreneurship since they can boost incentives and competition among their graduate students and turn them into solid assets to increase entrepreneurial activities (Askun and Yildirim 2011). Entrepreneurial motivation results from the consensus of positive intuition in entrepreneurs, making them accomplish the entrepreneurial process and create worth by establishing a new product or service (Murnieks et al. 2020). Recently, developing technology-based enterprises has led to a variety of innovative products. In that case, by eliminating the barriers and extending corporations, enterprises' activities could be developed.

Increased foreign investments, active supporting associations, and preparing the context for pioneer businesses led to the launching of technology-based enterprises in Iran (Salamzadeh and Kesim 2017). In light of the importance of entrepreneurship, different countries, including Iran, aim to constitute and expand entrepreneurial institutions, which helps them identify and train entrepreneurial persons in various fields (Rezaei et al. 2017). Thus, this research investigates the impact of entrepreneurial education on technology-based enterprises considering motivation as a mediator variable in Esfahan Scientific and Industrial Town. The central premise of this topic is that entrepreneurial education affects technology-based enterprise development and, consequently, our propensity to start a business. The article fills the research gap in the broadly defined entrepreneurial education, derived from technology-based enterprises development, which is currently one of the most dynamically developing research areas. Unfortunately, relatively few researchers have investigated the relationship between entrepreneurial education on technology-based enterprises development. The article enhances our understanding of entrepreneurial education on technology-based enterprises development. Thus, we expect to provide a new perspective on entrepreneurial education. Therefore, we set the article's aim to empirically examine the impact of entrepreneurial education on technology-based enterprises development.

The manuscript is structured as follows. First, in the literature review, the related hypotheses are defined, and based on them, the conceptual framework is extracted. Secondly, by the exploitation of an applied research method, data analysis is done. Finally, the paper concludes with some remarks and directions for future research.

2. Literature Review

By creating new opportunities, entrepreneurship has a fundamental role in societies' economic and livelihood development (Chitsaz et al. 2019). Above all, most countries attempt to improve the entrepreneurial education rate accordingly (Raposo and Paço 2011). Entrepreneurial education is short-term training that includes required skills for initiating and establishing an enterprise so that its value will be created after a short time (Järvi 2012; Shinato et al. 2013; Tajpour et al. 2020b). Additionally, entrepreneurial education aims to provide (potential) entrepreneurs with the required knowledge, skills, and motivations and, consequently, enhance entrepreneurs' possibility of success. Researchers present entrepreneurial education through an active approach, and within this, they focus on different criteria like educational standards, teaching methods, educator's capability, courses and labs, and in the end, the educational resources (Valerio et al. 2014). Based on the previous research, entrepreneurial education positively affects individuals' intention to be entrepreneurs in the future, and as soon as there would be possibilities for self-employment, they select their career path as entrepreneurs (Axelsson et al. 2015). Traditional entrepreneurship approaches neglect the uncertainty and ambiguity processes; therefore, there is a necessity to propound the entrepreneurial activities (Higgins et al. 2013). Additionally, using novel educational attitudes can transfer entrepreneurial content to individuals' mindsets in different environments (Tajpour et al. 2018a). Fayolle et al. (2021)

emphasized the role of entrepreneurship education as a focal point in promoting entrepreneurship awareness and entrepreneurial behavior, which he asserts plays an essential role in shaping entrepreneurial intentions and increases the potential to undertake startups to plan their growth strategies. Therefore, entrepreneurship education is not simply a means to empower individuals to engage in risk-taking, but is also a way to foster a culture of risk-taking and even policy environments that reward or support risk-taking. By pouring over the previous researches, many experts and practitioners have reached consensus on the methods of entrepreneurial teaching, including group discussions, lecturing, preparing an action plan for the enterprising, case studies, mentoring by a genuine entrepreneur, scientific visit methods, educational workshops, storytelling for entrepreneurial experiences, and role-playing method (Lonappan and Devaraj 2011). Despite remarking massive research in entrepreneurship, there is not a vast compromise related to the essential enterprise's elements already; thus, many experts assume this field as an overlooked domain (Lee 2010). Indeed, entrepreneurial education does not mean creating new tools or starting new businesses, but it includes each attempt to eliminate the barriers that might affect the entrepreneur's motivation (Otuya et al. 2013).

Therefore, one of the most significant aims for entrepreneurial education is developing the motivational stimulus to make individuals start enterprises (Karhunen et al. 2008; Tajpour et al. 2021b). Many researchers believe that self-motivation is an essential (if not the most important) factor resulting in higher entrepreneurial intentions (Bigos and Michalik 2020). Intrinsic and extrinsic motivations are also affected by the context in which the individuals are entered. Although poorly explaining entrepreneurial intention, social norms are found to either hinder or enhance an individual's intrinsic or extrinsic motivations in undertaking a task, and this reasoning also applies to entrepreneurial motivations (Antonioli et al. 2016). Entrepreneurial motivation is associated with innovation, a passion for establishing, and a desire to develop (Cardon et al. 2009). From the vantage point of some researchers, the most critical factors in raising motivation are a desire for success, a passion for being autonomous, and an intention to achieve high socio-economic levels (Acs and Terjesen 2013; Hosseini et al. 2020b). In particular, motivations may play a role in explaining how entrepreneurial intentions are formed. Thus, it has been suggested that different motivations may lead to varying levels of personal attitude, subjective norm and perceived behavioral control and, through them, to distinct entrepreneurial intentions (Fayolle et al. 2014). Some experts have investigated the essential practical agents for developing an innovative technology-based enterprise (Tajpour and Hosseini 2020). They claim these enterprises' success factors are their awareness of employing innovation, their unique organizational atmosphere, and the entrepreneur's role as a leader (Groenewegen and Langen 2012). A successful technology-based enterprise has the potential for growing itself; that is to say, it can develop itself even with few human resources or even in an inappropriate context and have more opportunities compared to traditional companies (Blank 2012; Tajpour et al. 2019). Hence, more practical experiences for many years, scanning the business strategy analytics of serious competitors, following an active marketing approach, having a business model, using innovation as an idea for developing the enterprise, and risk-taking are essential elements for the prosperity of an enterprise (Brem 2011).

Moreover, human resources are becoming more significant in an enterprise's success, and motivation became the essential element for entrepreneurs (Menkveld 2012). Therefore, the initial idea, strategy, motivation, team members' commitment, specialty, and marketing are the vital agents for expanding the technology-based enterprises (Chorev and Anderson 2006). According to this, the primary hypothesis of this study is:

Hypothesis 1 (H1). *Entrepreneurial education has a meaningful effect on technology-based enterprises' development, considering motivation as a mediator variable.*

One of the key elements for an entrepreneur's failure is lacking the basic skills for accomplishing their tasks and following their path (Sabokro et al. 2018). Thus, entrepreneurial skills training is essential for beginning and continuing entrepreneurial activities (Turker and Sonmez Selcuk 2009). If the entrepreneurial substances are taught

truly, it could make a country bloom in the international arena (Daniel and Almeida 2020). In other words, they can face new problems, make new strategies, and be up to date with this kind of education (Hosseini et al. 2020a). Additionally, individuals' capabilities are the best predictors for progressing enterprises (Al Mamun et al. 2019). Therefore, entrepreneurs' initial power for beginning enterprises correlates with education related to launching a business (Wajdi et al. 2019). Fundamental knowledge and entrepreneurship capabilities directly affect starting a new business, economic improvement, and the development of qualified enterprises (Vučeković et al. 2020; Bordbar et al. 2021). Regarding these issues, the first sub-hypothesis of this research is:

Hypothesis 2a (H2a). *Entrepreneurial skill has a meaningful effect on technology-based enterprises' development.*

Hypothesis 2b (H2b). *Entrepreneurial skill has a meaningful effect on technology-based enterprises' development, considering motivation as a mediator variable.*

Based on social learning theory principles for entrepreneurial behavior patterns, those who associate with real entrepreneurs tend to be entrepreneurs in the future (Guerrero and Espinoza-Benavides 2020). Thus, learning ability is necessary for improving entrepreneurial capacity (Tajpour et al. 2018b). Learning the entrepreneurship concept allows identifying new opportunities and overcoming traditional barriers (Ceptureanu et al. 2020). Entrepreneurial learning is an empirical process, in which during this process, the entrepreneur's experiences convert to knowledge; but, these experiences do not transform to knowledge directly (Salamzadeh et al. 2021; Trabskaia and Mets 2021). In other words, learning new experiences is described as a concept that can be explored empirically (Pittaway et al. 2015). Therefore, on the one hand, entrepreneurship begins with an opportunity, and, on the other hand, detecting this opportunity depends on enterprises' capability and capacity to learn from their environment (Lattacher and Wdowiak 2020; Saeeda et al. 2020). While entrepreneurial learning positively affects finding new opportunities, these opportunities are a major advantage for enterprises' achievement (Tajpour et al. 2018b). Above all, the second sub-hypotheses are:

Hypothesis 3a (H3a). *Entrepreneurial learning has a meaningful effect on technology-based enterprises' development.*

Hypothesis 3b (H3b). *Entrepreneurial learning has a meaningful effect on technology-based enterprises' development, considering motivation as a mediator variable.*

Entrepreneurial education has a significant role in improving entrepreneurial intention and leads to the success of a business (Vega-Gómez et al. 2020). From the vantage point of some researchers, entrepreneurship is a plan to achieve a specific purpose (Autio and Acs 2010). Based on the Theory of Planned Behavior (TPB), each behavior needs to be planned, which can be predicted deliberately (Engle et al. 2010). Mental maps and cognitive features can pave the path of entrepreneurial intention and turn it into a process based on how the roles, models, and patterns are evaluated. Additionally, it clarifies how decision-making turns into an automated process (Salamzadeh et al. 2014). Psychological studies often refer to intention as the best behavioral predictor (Ajzen 1991). Intention illustrates an individual's motivation for putting through a specific plan or purpose (Conner and Armitage 1998). Entrepreneurial intention is a mental status, which drives launching an enterprise (Bird 1988).

Furthermore, the entrepreneurial intention is shaped to prepare a fundamental mindset for entrepreneurship (Krueger 2007). In other words, an individual's consciousness for establishing a novel business and the desire for planning to get the result is entrepreneurial intention (Nabi et al. 2010). Another definition of entrepreneurial intention is investing in an enterprise for progressing in the future (Yu and Wang 2019). Therefore, enterprises with an entrepreneurial approach are always ready for facing environmental changes

and can adjust to new challenges (Tajpour et al. 2015; Tanha et al. 2011). In this case, the entrepreneurial intention has a significant contribution to comprehend entrepreneurial behavior. Overall, the third sub-hypotheses are:

Hypothesis 4a (H4a). *Entrepreneurial intention has a meaningful effect on technology-based enterprises' development.*

Hypothesis 4b(H4b). *Entrepreneurial intention has a meaningful effect on technology-based enterprises' development, considering motivation as a mediator variable.*

Motivations for technology-based enterprises' development are important for entrepreneurial activities in a country (Ismail et al. 2018). People need the motivation to continue an action, which is true for everybody, even entrepreneurs. Therefore, some researchers are trying to analyzing and perceive the relationship between motivations and entrepreneurs (Ward et al. 2019). Entrepreneurship motivation encourages entrepreneurial skills. We can analyze them in three aspects: first, invention motivation, second motivation for opening, third motivation for development. The motivations point to start a process, orienting, energize others (Munro et al. 2014). Motivation has a close relationship to rewards and encouragement of employees. Additionally, these sorts of motivations have relations with opportunity discoveries (Dimitratos et al. 2012). It reveals the feedback that individuals might receive regarding the organization's support from motivational and creative behaviors. These include organizational support mechanisms that motivate creative employees to use their capabilities and talents creatively to act entrepreneurially and stimulate employees' motivation to use their best capabilities and become more productive in terms of entrepreneurial education. Chandra (2017) believes that the decision-making roles that are used by entrepreneurs are very important, and they experience global markets based on this role (Chandra 2017).

Hypothesis 5 (H5). *Motivation has a meaningful effect on technology-based enterprises' development.*

Additionally, according to the literature review, the conceptual framework (Figure 1) of this research is:

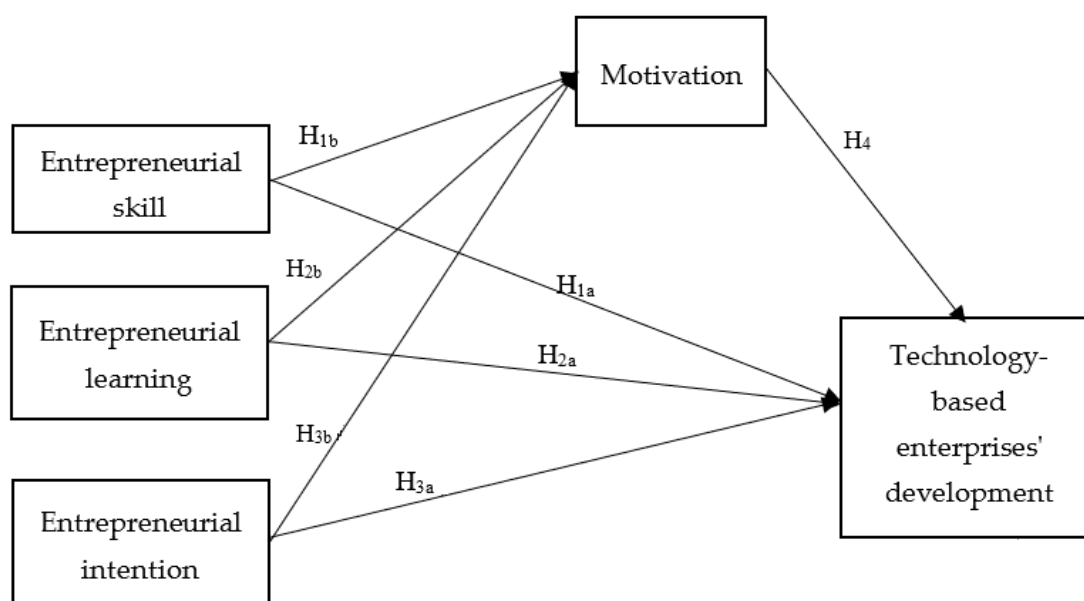


Figure 1. Conceptual framework (source: self-elaborated by the authors).

3. Materials and Methods

The purpose of this research is practical, and its method is quantitative. This study's statistical population included 500 enterprises in the Esfahan Scientific and Industrial Town in 2020. The Esfahan scientific and industrial town publishes a list of active companies on its website annually. Then, we have obtained the number of active companies accordingly, and sampling was performed based on that number. The reason for selecting these companies in Esfahan Scientific and Industrial Town was that it was the first organization to establish incubators and science and technology parks in Iran in 2001. This center was established to support knowledge-based companies' creation and development and create wealth from science. It has also played a role as an intermediary between government, industry and academia in developing a knowledge-based economy and ultimately turning science into wealth in Iran. Additionally, the criteria for selecting the final companies to settle in the Esfahan Scientific and Industrial Town is decided and in these companies, workshops related to entrepreneurship are permanently held, all of which had participated in some courses. Cochran's formula was applied, and 217 individuals were determined as our sample ($n = 217$). According to Structural Equation Modeling, which was applied in this research, the sample size should be 5 to 10 times the number of the questionnaire's questions (Ishtiaq 2019). For data gathering, a researcher-made questionnaire included 29 questions, which the Likert scale was applied to for conceptual model variables measurement (1—absolutely disagree, 2—disagree, 3—no idea, 4—agree, 5—absolutely agree). Likert scale is a tool for measuring people's attitudes and is used to prepare attitude questionnaires in management and humanities. In general, three standard scales have been introduced by Rennes Likert, known as the five-degree, seven-degree, and nine-degree scales. These scales can be used to express agreement or determine the importance of items. The most common form of the Likert spectrum is 5 degrees. This scale can also be used to express agreement or assess importance or status. In this study, a 5-point Likert scale has been used. This scale measures only the subject and issue under study and not another irrelevant issue. It also expresses a more or less positive or negative tendency and not an indifferent tendency. The researcher-made questionnaire includes six entrepreneurial skill scales (Smith et al. 2007), six scales for entrepreneurial learning (Jerez-Gomez et al. 2005), six scales for entrepreneurial intention (Liñán et al. 2011), six scales for motivation (Hermans 1987), and five scales for enterprise development (Sohn et al. 2007). The final questionnaires were distributed virtually and by interview method with Persian language, and eventually, 213 fully answered questionnaires were gathered and analyzed (See Appendix A). Entrepreneurship education is considered as a creative and innovative concept for companies. When employees have entrepreneurial training in the company, this activity leads to technology-based enterprises' development.

In this research, entrepreneurial education is considered an independent variable, technology-based enterprise development as a dependent variable, and motivation as a mediator variable. The model designed in this article can be the basis of research for other countries, with the difference that it has different results depending on the conditions and situation of countries. Smart PLS3 software was used for data analysis. The reason for using this application was related to the normal distribution of the responses (Kline 2015). Various criteria were used to evaluate the validity and reliability. Like the research conducted by Kozlinska et al. (2020), structural equation modelling was applied for construct validity, convergent validity, and divergent validity measurements. Additionally, the reliability of this questionnaire was estimated by Cronbach's Alpha coefficient and composite reliability (Dana and Dana 2005). Regarding Table 1, based on the results, the research has appropriate validity and reliability. The convergent validity was determined by Average Variance Extracted (AVE). The AVE for the variables of this research was calculated higher than 0.5 and demonstrates high validity. Besides, the results show that Cronbach's Alpha coefficient and composite reliability for each construct are more than the accepted minimum, which means more than 0.7. Thus, the construct's reliability is acceptable. Regarding the results of Table 1, each criterion has acceptable validity and reliability.

Table 1. AEV, Cronbach's alpha, and composite reliability.

Constructs	Variables	Statements	Cronbach's Alpha	Combined Reliability (CR)	Communality	AVE	R ²	Q ²
Entrepreneurial education	Entrepreneurial skill	1–6	0.965	0.972	0.967	0.852	—	—
	Entrepreneurial learning	7–12	0.938	0.951	0.939	0.763	—	—
	Entrepreneurial intention	13–18	0.923	0.940	0.928	0.723	—	—
Motivation	—	19–24	0.918	0.937	0.923	0.714	0.812	0.749
Technology-based enterprises' development	—	25–29	0.916	0.942	0.921	0.802	0.821	0.756

The average variance was applied to achieve the convergent validity, and for estimating the divergent validity, the square root of variance was extracted (Sabokro et al. 2018). It is referred to in Table 2 that the square root of the variance is more than the acceptable minimum, which means more than 0.5; thus, divergent validity is ensured. Furthermore, regarding this point that the estimated square root of the variance is more than the correlation between variables, the divergent validity is acceptable in a condition that the values of fundamental diameter are more than the numbers below each item (Fornell and Larcker 1981). Therefore, the variables have validity, and their divergent validity was approved.

Table 2. Divergent validity.

Variables	Entrepreneurial Skill	Entrepreneurial Intention	Entrepreneurial Learning	Motivation	Technology-Based Enterprise Development
Entrepreneurial skill	0.923				
Entrepreneurial intention	0.837	0.850			
Entrepreneurial learning	0.885	0.845	0.901		
Motivation	0.819	0.830	0.899	0.932	
Technology-based enterprise development	0.773	0.825	0.884	0.876	0.896

According to the above and the output of the Smart PLS3 application, which is displayed in Tables 1 and 2, the evaluated validity models (convergent and divergent) and the assessed reliability (Cronbach's and composite reliability coefficient) are suited to the model.

4. Results

Based on the analysis of the quantitative data, 81% of the respondents were male, and 19% were female; additionally, 57% held a PhD degree, and 43% held a Master's degree. Moreover, 37% of the participants were single, and 63% were married. Finally, 23% of the respondents had five years of experience, 63% had between five and ten years of experience, and 14% had over ten years of experience.

The model's goodness of fit was examined in three levels: measurement model (reliability and validity), structural model (t -test, R^2 and Q^2), and general model (GOF, NFI and SRMR). For structural goodness of fit, the ordinary least squares (OLS) are considered, which is related to t -distribution (Tajpour et al. 2020a). In this method, the amount of t should be more than 1.96; in this case, it is meaningful and reliable (Thomas 2003). The results demonstrate that the outputs are more than the critical amount, which means more than 1.96, and are approved. Values greater than 0.4 for factor load coefficients, greater than 0.5 for average subscription, greater than 0.7 for combined reliability, and Cronbach's alpha indicate a good fit of the measurement models in terms of convergent reliability and

validity. As shown in Figure 2, all coefficients of factor loading of the questions except question 26 are greater than the criterion of 0.4, so by deleting question 26, re-analysis was performed.

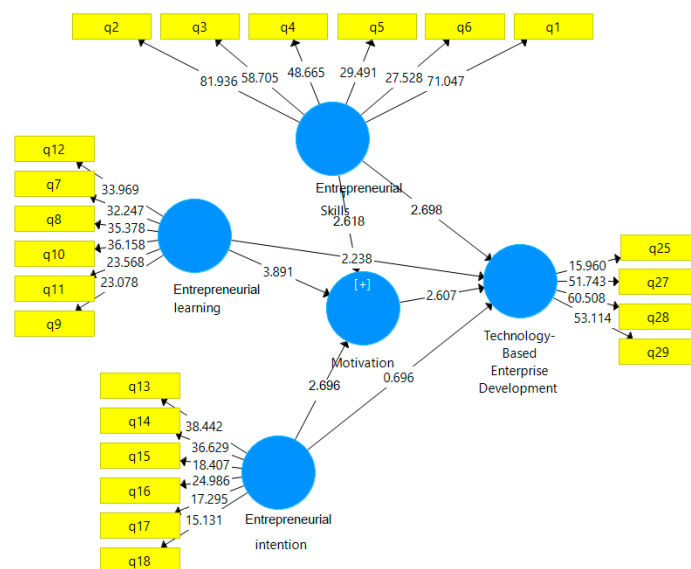


Figure 2. *t*-test results.

The results of this criterion showed that the values obtained for the path of the entrepreneurial skill have a meaningful effect on tech-based enterprises development equal to (2.698), the path of the entrepreneurial skill has a meaningful effect on tech-based enterprises development considering motivation as a mediator variable equal to (2.618), respectively. The path of Entrepreneurial learning has a meaningful effect on technology-based enterprise development equal to (2.238), the path of entrepreneurial learning has a meaningful effect on technology-based enterprise development equal to (3.891), the path of Entrepreneurial intention has a meaningful effect on technology-based enterprise development equal to (0.656) and the path of entrepreneurial intention has a meaningful effect on technology-based enterprise development equal to (2.696) where the critical value of five paths out of six paths is more than the critical value (1.96) at 95% confidence level, which indicates the significance of paths, the appropriateness of the structural model and the confirmation of the five research hypotheses. See (Figure 2).

4.1. Coefficient of Determination (R^2)

The second criterion for the goodness of fit is the coefficient of determination (R^2), which can expose the research's internal variables. R^2 was applied for determining the correlation intensity between constructs, which is related to just dependent variables. In fact, R^2 refers to the impact of exogenous variables on endogenous ones, which has three amounts of 0.19, 0.33, and 0.67 for three levels as low, intermediate, and high (Hosseini et al. 2020b). This criterion was calculated for technology-based enterprises' development, and its amount is 0.821, and for motivation, it is 0.812; thus, the structural model implies solid goodness of fit. See (Figure 3).

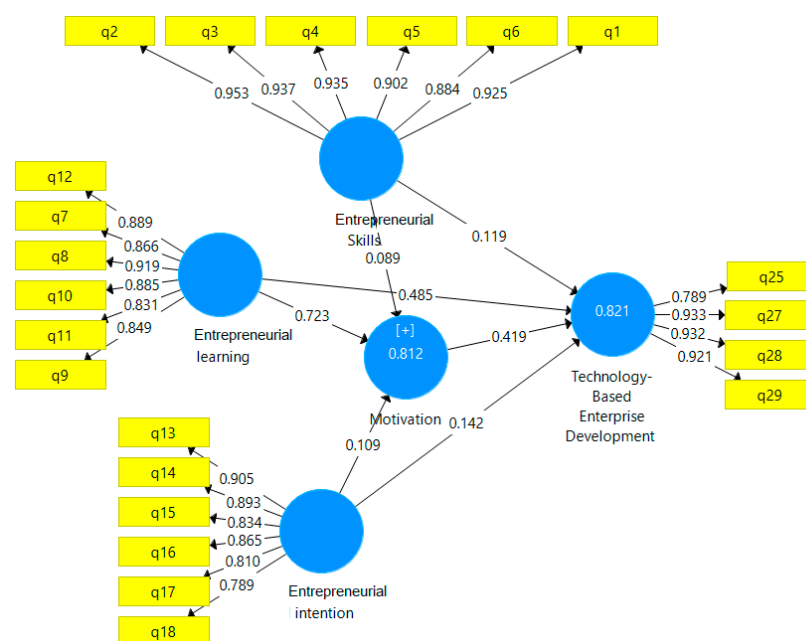


Figure 3. Standard factor loadings and R^2 .

4.2. Q^2 Criterion

The Q^2 criterion is calculated for each dependent variable, and it multiplies the compound amount of constructs with their coefficient of determination. This criterion was defined by Stone (1977), which indicates the model's strength of forecasting for the dependent variable. They believe that models with approved goodness of fit should predict the endogenous constructs indexes. In other words, if relations between constructs were depicted in a model correctly, in this way, the constructs can affect each other, and the hypotheses would be approved. The acceptable amounts of Q^2 for each endogenous construct are 0.2, 0.15, and 0.35 as low, intermediate, and high forecasting ability (Kline 2015). The evaluated amount of Q^2 for technology-based enterprises' development is estimated at 0.756 and for motivation is 0.749, which implies a high acceptance rate.

4.3. The Goodness of Fit (GOF)

In the final model, both the structural and measurement model are estimated, and then the general goodness of fit index (GOF) is considered. The accepted rate for GOF is 0.01, 0.25, and 0.36, which refer to low, intermediate, and high amounts. The total GOF is equal to 0.879, which can confirm the model.

$$GOF = \sqrt{\text{average (Commonality)} \times \text{average } (R^2)} \quad (1)$$

Another significant criterion is Standardized Root Mean Residual (SRMR). The acceptance amount of the final model's GOF, according to Bayern (2005), is 0.05, Hu and Bentler (1999) is 0.08, and based on Ringle and Sarstedt (2016), it is less than 0.10. Based on the results that are reported in Table 3, this model has a high GOF. Another applied criterion for GOF calculating is Normed Fit Index (NFI). This index's rate should be between 0 to 1, and the accepted NFI must be more than 0.9 (Kline 2015). In this research, NFI is equal to 0.963 that it is approved.

Table 3. Fitness indexes.

	SRMR	NFI
Accepted amounts	≤ 0.10	≥ 0.9
Calculated amounts	0.07	0.963

For ascertaining the role of motivation in technology-based enterprises' development, the variance accounted for (VAF) test is extracted. The amount of VAF is equal to 0.341, demonstrating the minor role of the motivation construct in this research.

$$\text{VAF} = (a \times b) / (a \times b) + c \quad (2)$$

Eventually, for considering the relations between variables, the statistical *t*-test was applied. For approving the primary hypothesis, seven sub-hypotheses were used based on the table. Six calculated *t* related to factor loadings of 7 sub-hypotheses are approved (See Table 4). How each independent variable affects the dependent variable is determined by considering each path related to the sub-hypotheses. These coefficients manifest how much the dependent variables can predict by independent variables.

Table 4. *t*-test and influence coefficients.

Path	Influence Coefficient	<i>t</i> -Test	Result
Entrepreneurial skill has a meaningful effect on tech-based enterprises development	0.119	2.698	Supported
Entrepreneurial skill has a meaningful effect on tech-based enterprises development considering motivation as a mediator variable	0.089	2.618	Supported
Entrepreneurial learning has a meaningful effect on technology-based enterprise development	0.485	2.238	Supported
Entrepreneurial learning has a meaningful effect on technology-based enterprise development, considering motivation as a mediator variable	0.723	3.891	Supported
Entrepreneurial intention has a meaningful effect on technology-based enterprise development	0.142	0.656	Not supported
Entrepreneurial intention has a meaningful effect on technology-based enterprise development, considering motivation as a mediator variable	0.109	2.696	Supported
Motivation has a meaningful effect on technology-based enterprises' development.	0.419	2.607	Supported

5. Discussion

Regarding that hypothesis for entrepreneurial skill and learning are confirmed, that is to say, companies' managers should have a long-term perspective and take risks for creating new business models (Varblane and Mets 2010). In similar research, the impact of passion for innovation on entrepreneurial processes and performance has been investigated. The results indicate that some entrepreneurial agents like entrepreneurial education and entrepreneurial skills significantly affect business performance (Altaf et al. 2019). For marketing and cultivating the business owners' strategy, they should have the capability to communicate and cooperate with customers, suppliers, and other agents. The managers should have the ability to negotiate and be good listeners. Results are compatible with Hosseini et al. (2020a) and Wajdi et al. (2019) results. According to Tajpour and Hosseini (2021a), when people spread their knowledge, skills and expertise among members of their organization, performance improves, and companies would become more innovative. Consequently, effective and efficient knowledge management seems essential for success in this regard. In other words, not only are training and learning of new skills realized, but also attitudes are changed and, thereafter, it can expand individual self-efficacy so that individuals' behavioral, emotional, social, and cognitive skills will be coordinated and individual efficiency activate cognitive and emotional and affective currents. Additionally, Elia et al. (2011) emphasized that the development of technology entrepreneurship competencies should be based on hands-on and experiential methods, making entrepreneurship

education more like a process in which the entrepreneurial attitude is instilled in people based on critical processes capturing the essence of entrepreneurship. [Mets et al. \(2017\)](#) have also emphasized entrepreneurial competencies “as the perceived learning outcomes of entrepreneurship education”.

Considering that the second hypotheses, namely, entrepreneurial learning on technology-based enterprise development and the other, entrepreneurial learning on technology-based enterprise development, were both mediated through motivation, it can be said that learning is closely related to the presence and active participation of the individual. Additionally, by considering this point, entrepreneurial skill education positively affects reducing the unemployment rate; thus, entrepreneurial skills should be taught before and after establishing a business. According to both approved sub-hypothesis about entrepreneurial learning, entrepreneurial learning is closely related to the individuals’ tendency and participation. Employees should be aware of the organization’s strategy and mission for consistent and sustainable learning and remember that learning and education are the only way to progress and promote. This cooperation for determining the organizational aims motivates employees ([Tajpour et al. 2018a](#); [Ceptureanu et al. 2020](#); [Vučeković et al. 2020](#)). According to [Tajpour and Hosseini \(2021b\)](#), employees of such companies are their main capital and can be valuable when the individuals’ knowledge are shared with the members inside and outside the company. Such knowledge sharing leads to the interaction of experiences and perspectives, and, consequently, it triggers learning at the company and member level. Besides, the formation of new relationships becomes a resource for empowering the company and, ultimately, gaining a competitive advantage by creating knowledge and synergies in dynamic environments.

Considering that the third hypothesis, i.e., entrepreneurial intention on technology-based enterprise development, was rejected from the perspective of managers, but the third sub hypothesis, i.e., entrepreneurial intention on technology-based enterprise development, was approved through motivation, it can be said that education is first on people’s attitudes and then on entrepreneurial intention. It is effective, and the intention is to strengthen entrepreneurial behavior. Learning associations should be supported to boost the entrepreneurial environment since employees can identify the opportunities and take them to make innovation and promulgate an enterprise. Therefore, by developing the entrepreneurial education and learning skills, individuals are encouraged to pursue success, innovation, and creativity. Cultivating this atmosphere makes a company analyze the market correctly, and through this facilitation, employees collect conducive information ([Yu and Wang 2019](#); [Tanha et al. 2011](#); [Tajpour et al. 2015](#)). According to research by [Tajpour et al. \(2021c\)](#), actually, the greater the diversity of people in terms of culture, education, skills and age in social relationships, the better the results of starting an entrepreneurial business can be achieved since experiences of different people in different fields and domains are not the same. It is suggested that companies invite real entrepreneurs to reinforce entrepreneurial intention because the entrepreneur’s constructive attitude can affect employees’ intuition and boost it up.

Considering that the fourth hypothesis, i.e., motivation, has a meaningful effect on technology-based enterprises’ development, according to [Gegenhuber \(2021\)](#), it can be said companies’ support for people’s innovation motivates them and ultimately improves and develops performance technology-based enterprises.

6. Conclusions

According to the research’s purpose, entrepreneurial skills are primary economic development factors since they can do new business and raise their occupation rate. Entrepreneurial skills fortify an individual’s efficiency in doing tasks. Through entrepreneurial education, employees attempt to be eligible for their related domains and conveniently encounter new challenges and competitions. Technology-based enterprises have paramount importance for country growth; thus, managers have an immense responsibility in this field. Therefore, those countries, which figure out the importance of entrepreneurial education and its role in formative country development, conceive it as a worthwhile element in their

strategic perspective. However, entrepreneurial learning is more than the consciousness of opportunities; it is a tendency to collect new experiences, skills, and knowledge. Therefore, entrepreneurship is about behavior, not personality traits, and its foundation relies on entrepreneurial training. In this case, it can be said that entrepreneurship should be entered into the educational system of countries, and features that are related to entrepreneurs will be strengthened. Currently, the country needs a dynamic economy, which is innovative and necessary for those who have the necessary motives for entrepreneurship. Entrepreneurial training professionals should increase the impact of these tutorials by allocating funds and more time to research and developing comparative studies with other countries using the theory of gap analysis. In addition, the implementation of research studies in examining the impact of other propulsion variables on the development of technology businesses. The speed of action in entering the market is one of the leading causes of technology-based businesses' development; therefore, it is suggested that businesses enter the market in the shortest time and with its minimum product or service, and then develop it over time based on customer views. The choice of a working team is essential, but more important than the durability and durability of team members. Therefore, it is suggested that one needs to consider the existing weaknesses among the people in teamwork and technology-based businesses. Besides, in addition to working on ideas, one needs to educate individuals to improve their abilities and skills to motivate them to become entrepreneurs.

Considering the importance of government support policies, politicians and decision-makers in developing the country in developing supportive projects of the establishment and development of technology-based businesses, supportive policies about incentives, regulations and creating business space view, the government adopts a good strategy for supporting technological businesses, which at each stage of the development of business gives resources in time.

Limitations and Future Research

Although the present study had significant contributions, there were some shortcomings as well. Regarding the study population, a few technology-based enterprises development managers were reluctant to participate in this survey because of their partial responses or conservative nature. Furthermore, it was impossible to include all the affective factors and different characteristics of entrepreneurial education due to various cultures. These limitations may affect the generalizability of the study outcomes. Consequently, the authors would recommend that other academicians implement the same model to perform parallel studies in different cultures or companies. They can also compare the conclusions of their researches and the results of the present study that leads to the advancement of the generalizability of the outcomes.

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Appendix A. Questionnaire

1 = Strongly disagree 2 = Disagree 3 = Neither agree nor disagree 4 = Agree
5 = Strongly agree

Entrepreneurial education

Entrepreneurial skill (Based on [Smith et al. 2007](#))

1. Entrepreneurial education courses in an organization help identify the weaknesses and strengths.
2. Entrepreneurial education courses help create opportunities in dynamic circumstances.
3. Taking part in an entrepreneurial education course helps promote your career credibility.
4. After taking an entrepreneurial education course, I will be determined to continue working in the firm.
5. Entrepreneurial education courses lead to the development of problem-solving skills.
6. I will be able to help solve the firm's problems efficiently after participating in an entrepreneurial education course.

Entrepreneurial learning (Based on [Jerez-Gomez et al. 2005](#))

7. All parts that constitute this firm (departments, sections, work teams, and individuals) are well aware of how they contribute to achieving the overall objectives.
8. All parts that constitute this firm are interconnected, i.e., working together in a coordinated fashion.
9. This firm promotes experimentation and innovation as a way of improving the work processes.
10. Experiences and ideas provided by external sources (advisors, customers, training firms, etc.) are considered as a useful instrument for improving learning skills in this firm.
11. Based on this firm's culture, employees can express their opinions and make suggestions regarding the procedures and methods for carrying out tasks.
12. Errors and failures are always discussed and analyzed in this firm at all levels.

Entrepreneurial intention (Based on [Liñán et al. 2011](#))

13. I am ready to provide everything to be an entrepreneur.
14. My ultimate goal is to become an entrepreneur.
15. I will endeavor to establish and run my own firm.
16. I am determined to establish a firm in the future.
17. I have very seriously thought about starting a firm.
18. I had solid intention to establish a firm.

Motivation (Based on [Hermans 1987](#))

19. When I work hard, the demands I make upon myself are very high.
20. Working is something that I like very much.
21. People think that I work very hard.
22. The extent of preparation for accomplishing a specific task indicates the interest to the task.
23. I usually dedicate more time to do my assignments in the firm than expected.
24. If I cannot gain my goal and cannot accomplish a task well, I will still continue to do my best to attain that goal.

Technology-based enterprises (Based on [Sohn et al. 2007](#))

25. I usually concentrate on the customers and the related market in the firm.
26. We are going to be successful in the development of new technologies through entrepreneurial education.
27. We are going to be successful in the development of new process through entrepreneurial education.
28. Managing a research and development team leads to success.
29. The quality of relationship with the board members affects the firm's success.

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