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The Effect of Sustainability Orientation and Prior Sustainability Knowledge on Agriculture Students' Sustainable Entrepreneurial Intentions

Saeid Karimi [a,*] *and Fatemeh Sepahvand* [b]

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Abstract

The purpose of the present study was to examine an extended theory of planned behaviour (TPB) model within the domain of sustainable entrepreneurship and identified the most important factors impacting on sustainable entrepreneurial intentions in sustainable entrepreneurship. In particular, the study aimed to extend the TPB model to include sustainability orientation and prior sustainability knowledge. Data were collected from 211 Iranian agriculture students. The results of structural equation modelling showed that sustainable entrepreneurial intentions were determined by attitudes toward sustainable entrepreneurship and perceived behavioural control (PBC) but not subjective norms. The analysis also revealed that sustainability orientation and prior sustainability knowledge influenced sustainable entrepreneurial intentions indirectly through their effects on attitudes toward sustainable entrepreneurship and PBC. As a practical implication, educators who want to stimulate the creation of new sustainable businesses could consider the pivotal role not only of attitudes toward sustainable entrepreneurship and PBC but also of sustainability orientation and prior sustainability knowledge.

Keywords:
Sustainable entrepreneurship, entrepreneurial intentions, theory of planned behaviour, sustainability orientation

[a] *Associate Professor, Department of Agricultural Education and Extension, Faculty of Agriculture, Bu-Ali Sina University, Hamedan, Iran*
[b] *PhD Student, Department of Agricultural Extension and Education, Bu-Ali Sina University, Hamedan, Iran*

** Corresponding author's email: skarimi@basu.ac.ir*

INTRODUCTION

The entrepreneurship literature has emphasized the role that entrepreneurship can play in enhancing productivity, promoting innovation, creating employment opportunities, and generating economic and social wealth in the economic context of any country (Karimi et al., 2017; Wong, Ho, & Autio, 2005). Along with the increased need for reaching sustainability, entrepreneurship is considered "the engine of sustainable development" and opens a new horizon to reach a more sustainable community (Pacheco, Dean, & Payne, 2010). As a matter of fact, many experts argue that entrepreneurship can be of great help to preserve ecosystems, combat climatic changes, prevent deforestation and environmental degradation, improve practices in agriculture and freshwater supply, and preserve biodiversity (Cohen & Winn, 2007; Dean & McMullen, 2007; Patzelt & Shepherd, 2011).

Entrepreneurship scholars have focused most of their efforts on the interrelation between the environment and businesses and especially on the role which entrepreneurs and their firms can play in achieving a more sustainable economic and commercial system (Silajdžić, Kurtagić, & Vučijak, 2015). Sustainable entrepreneurship seems to lead to something more than economic success. From scholars' viewpoint, the entrepreneurship innovative process can act as the main factor in developing a socially and ecologically sustainable economy (Dean & McMullen, 2007; Pacheco et al., 2010; Schaper, 2002). Through their entrepreneurial behaviours, sustainable entrepreneurs try to implement the "triple bottom line" (Elkington, 1997), i.e. balancing economic health, social equity, and environmental resilience (Kuckertz & Wagner, 2010; Thelken & de Jong, 2020). However, empirical and theoretical studies are well behind the entrepreneurial activities, as well as the prevailing interest in this phenomenon (Pacheco et al., 2010). Since "entrepreneurship is mainly about people" (Alonso, Sanchez, & Maditinos, 2016), it is important to examine the individual factors that drive potential entrepreneurs to engage in sustainable businesses (Arru, 2020). However, research on sustainable entrepreneurial intention is still emerging (Muñoz & Dimov, 2015; Shepherd & Patzelt, 2011), and the study of sustainable business intentions is an incipient area of research in the literature on entrepreneurial intentions (Liñán & Fayolle, 2015). Generally, the two main explanatory variables in sustainable entrepreneurship are prior knowledge and orientation (Ardichvili, Cardozo, & Ray, 2003; Muñoz & Cohen, 2017). Although some empirical studies have analysed the association between entrepreneurial intentions and the sustainability orientation (e.g., Kuckertz & Wagner, 2010) and the prior sustainability knowledge (Muñoz & Dimov, 2015), no empirical research has studied this relationship within a reliable framework yet, especially in developing countries.

This study seeks to fill this gap in the literature. Especially, we corporate prior sustainability knowledge and sustainability orientation into the Theory of Planned Behaviour (TPB; Ajzen, 1991) to develop a model of sustainable entrepreneurial intentions. Namely, we want to demonstrate the interrelation of prior sustainability knowledge, sustainability orientation and sustainable entrepreneurial intentions within the TPB. Also, we aim to answer the question as to "whether sustainability orientation and the prior sustainability knowledge can increase our understanding of sustainable entrepreneurial intentions and if so, what the implications would be for entrepreneurship education and policy." Thus, we investigate the linkages between sustainability orientation and prior sustainability knowledge among university students and their respective sustainable entrepreneurial intentions because educators find considerable potential in this special group of people to educate future entrepreneurs within environmentally and socially more sustainable fields of enterprise.

The three major contributions of our study to the entrepreneurship and sustainability

literature are as follows. Firstly, we investigate to find out if prior sustainability knowledge and sustainability orientation are the constituent parts of a single factor influencing sustainable entrepreneurial intentions. In spite of the interest in entrepreneurial intentions, there is not much evidence about entrepreneurial intentions in various entrepreneurship contexts. Compared to the previous generations, young people seem to be more entrepreneurial and environmentally conscious, as well as more socially aware, today (Hewlett, Sherbin, & Sumberg, 2009). This leads to some questions about the drivers of entrepreneurial intentions in sustainable entrepreneurship (Vuorio, Puumalainen, & Fellnhofer, 2018). Secondly, this research contributes to the literature on the TPB. The TPB has been a prominent trend in recent studies on the enterprising individual (Goethner, Obschonka, Silbereisen, & Cantner, 2012; Karimi et al., 2017; Kautonen, Van Gelderen, & Fink, 2015; Kolvereid & Isaksen, 2006; Obschonka, Silbereisen, Cantner, & Goethner, 2015) and also within the entrepreneurship practice sphere (for example, as a key for educational and interventional programs and for the evaluation of these programs) (Karimi, Biemans, Lans, Chizari, & Mulder, 2016; Souitaris, Zerbinati, & Al-Laham, 2007; Von Graevenitz, Harhoff, & Weber, 2010). Unfortunately, in TPB research and particularly in the entrepreneurship field, sustainability constructs have not received much attention, and despite the increasing emphasis of current entrepreneurship literature on sustainability, the entrepreneurship research field has remained rather indifferent to the inclusion of sustainability into the TPB–entrepreneurship procedure empirically and conceptually. Thirdly, the mediating role of entrepreneurial motivations antecedents in the TPB is investigated to enhance our understanding of the effects of mediation (Fayolle & Liñán, 2014), which has been ignored in the context of entrepreneurial intentions.

THEORETICAL BACKGROUND

Sustainable entrepreneurship

In recent years, the concept of sustainable entrepreneurship has received much attention (Schaltegger & Wagner, 2011) and sustainability has turned into a major stream strategy in businesses so that entrepreneurship is regarded as a major channel for developing a more sustainable community (Hall, Daneke, & Lenox, 2010). Recently, sustainable entrepreneurship has gained momentum as a general movement aiming at encouraging businesses to get more focused on their environmental and social influence (Zu, 2014). Sustainable entrepreneurship can be defined as a constituent part of entrepreneurship (Koe & Majid, 2014). Cohen and Winn (2007) state that sustainable entrepreneurship involves considering the economic, environmental and social benefits resulting from entrepreneurial activities. ''Sustainability-driven entrepreneurs' are those individuals expressing entrepreneurship to improve ecological and social well-being (Cohen & Winn, 2007; Tilley & Young, 2009). In the same vein, Majid and Koe (2012) suggest that sustainable entrepreneurship is a process by which entrepreneurs take the opportunities innovatively to win economic gains, environmental quality, cultural preservation and social equity, equally. Recently, Hummels and Argyrou, (2021) defined sustainable entrepreneurship as "*the process of discovering, evaluating, and exploiting opportunities, which are economically, environmentally, planetary, and socially relevant and present themselves in market failures which detract from sustainability in general and the planetary boundaries in particular*."

The review of current literature indicates that entrepreneurship studies on sustainable development have increased over time. Despite the more frequent publication in mainstream business bulletins, it has not been completely integrated into the vast majority of the literature on traditional entrepreneurship. Especially, there is a large volume of con-

ceptual, empirical and theoretical studies on the agents determining entrepreneurial motivations and behaviour, including attitudes and situational or educational facets. Also, in the following text, we associate this literature to entrepreneurship for sustainable development (Kuckertz & Wagner, 2010).

Theory of planned behaviour

When dealing with motivation for starting a business, previous studies have used various theoretical aspects such as learning theory (Dimov, 2007), social and human capital theory (Davidsson & Honig, 2003; Langowitz & Minniti, 2007) and adaption innovation theory (Stewart Jr, Watson, Carland, & Carland, 1999). Contemporary scholars (Haus, Steinmetz, Isidor, & Kabst, 2013; Karimi, Biemans, Lans, & Mulder, 2021; Karimi & Makreet, 2020; Kautonen et al., 2015) are inclined to apply Ajzen's (1991) theory of planned behaviour (TPB) as a means to estimate entrepreneurial intentions. The theory was particularly founded to define non-spontaneous behaviour (see Armitage & Conner, 2001 for a meta-analysis and review). Since starting a business may be deemed as the outcome of a non-spontaneous decision-making procedure, this theory provides a useful framework for studies on entrepreneurial intentions (Karimi, 2020; Liñán & Chen, 2009). This framework has been successfully applied to the study of not only entrepreneurial intentions but also entrepreneurial activity (Kautonen et al., 2015; Kolvereid & Isaksen, 2006) or both (Verheul, Thurik, Grilo, & Van der Zwan, 2012). Moreover, the TPB is a leading approach in the world of entrepreneurship practice (e.g., as a guideline for intervention and education programs and for the evaluation of these programs (Karimi et al., 2016). Finally, it provides a defined set of criteria and instruments (Rauch & Hulsink, 2015).

This theory suggests that the most decisive factor in personal behaviours is intention, which is determined by three motivational constructs: perceived behavioural control (PBC), subjective norms, and attitudes toward the behaviour. Sustainable entrepreneurial intentions when used in the sustainable entrepreneurship context indicate the personal tendency to be a sustainability-driven entrepreneur and one's decision to launch a business that involves environmental and sustainability matters. Namely, one can describe sustainable entrepreneurial intention as "the intention to contribute to solving societal and environmental problems through entrepreneurial means" (Muñoz & Dimov, 2015). Therefore, the quest for finding sustainability ideals by using entrepreneurial solutions is dependent on the determination of one's intent to participate in dealing with environmental and social issues by the implementation of a fruitful business (Muñoz & Dimov, 2015; Schaltegger & Wagner, 2011). Attitudes toward behaviour show that if one sees starting a sustainable business as to be negative or positive. The subjective norms reflect one's perception toward the social pressure caused by close relatives, friends or other people who seem to be important to the individual. Finally, PBC reflects the observed difficulty/easiness of starting a sustainable business. Thus, this theory suggests that entrepreneurial intentions are resultants of positive attitude, the others' positive perceived prospects, and control over the creation process.

To evaluate the entrepreneurial intentions of college students, scholars have implemented the TPB empirically and approved the fact that all the three motivational antecedents play a key role (e.g., Entrialgo & Iglesias, 2018; Karimi, 2020; Karimi et al., 2017; Moriano, Gorgievski, Laguna, Stephan, & Zarafshani, 2012). This is in line with Ajzen's (1991) claim that the three motivational antecedents are all significant for evaluating entrepreneurial intentions. However, the significance of their effects and their associated importance across all countries and conditions may not be the same. Some studies have been conducted on sustainable en-

trepreneurship. A recent study conducted by Sher, Abbas, Mazhar, Azadi, & Lin (2020) among university students in Pakistan reported that attitude towards sustainable entrepreneurship was positively related to the students' sustainability-driven entrepreneurial intentions. In addition, another recent study by Thelken and de Jong (2020) among students from two European countries indicated that attitude towards sustainable entrepreneurship and PBC positively influenced intentions to become a sustainable entrepreneur. It can, therefore, be expected that when individuals have positive attitudes towards sustainable entrepreneurship and experience strong subjective norms and high PBC towards sustainable entrepreneurship, they are more likely to develop intentions to start a sustainable business. Therefore, the following hypotheses are proposed:

H1: There is a positive relationship between attitudes toward sustainable entrepreneurship and sustainable entrepreneurial intentions.

H2: There is a positive relationship between subjective norms and sustainable entrepreneurial intentions.

H3: There is a positive relationship between perceived behavioural control and sustainable entrepreneurial intentions.

Sustainable entrepreneurial motivations and sustainability orientation

When a newer crucial aspect of the specialized context is included, the TPB can present a better comprehension (Ajzen, 1991). According to Ajzen (1991), the TPB welcomes the other predictors encompassing the situations that greatly enhance the behavioural explanations or its intention. As Fig. 1 illustrates, based on this argument, this research tried to investigate sustainability orientation as a recent crucial construct of the TPB to effectively explain sustainable entrepreneurial intentions. A question remains unanswered as stated in Kuckertz and Wagner (2010): "Do the individuals concerned by sustainability issues show higher entrepreneurial intentions?" Given the fact that current shortcomings of the market generate various opportunities for sustainable development-driven entrepreneurship, integration of individual sustainability orientation into entrepreneurial intention models can improve their explanatory power (Kuckertz & Wagner, 2010).

Sustainability orientation means an individual's level of social responsibility and environmental protection and consists of the items measuring the fundamental perceptions and personal characteristics on social responsibility and environmental protection (Kuckertz & Wagner, 2010; Sung & Park, 2018). Also, it has been shown that the concept of sustainability orientation is the product of the sustainable entrepreneurship viewpoint (Dean & McMullen, 2007). Sustainability orientation refers to one's attitudes and perceptions on sustainable entrepreneurship, the association of which with entrepreneurial intentions remains under debate yet (Sung & Park, 2018).

On the association between entrepreneurial intention and sustainability orientation, there is a study in the literature indicating that a sustainability-driven person would be strongly inclined toward sustainable entrepreneurship (Sung & Park, 2018). Another study shows there is a positive relationship between entrepreneurial intentions and sustainability orientation amongst university students (Kuckertz & Wagner, 2010). According to this study, sustainability-oriented students (a) identify more sustainability opportunities and (b) demonstrate a more durable intention to operate based on such opportunities, given the fact that these are related to not only entrepreneurial but also societal and/or environmental rents. The research by Dean and McMullen (2007) also approves that sustainability orientation is a prerequisite to entrepreneurial intention, where discovery and exploitation of opportunities is the consequence of market and environmental deficiencies. The hypothesis below was raised according to these theoret-

ical and empirical discussions:

H4: There is a positive relationship between students' sustainability orientation and their sustainable entrepreneurial intentions.

Prior sustainability knowledge and sustainable entrepreneurial intentions

The individual's knowledge on a special matter is referred to as prior knowledge that assists him/her to identify special opportunities that cannot be imagined by the individuals without this information (Shepherd & DeTienne, 2005; Tang, Kacmar, & Busenitz, 2012). Prior knowledge can help in accumulating and integrating new knowledge, thereby providing individuals with greater opportunities (Shepherd & DeTienne, 2005). Dimov and Muñoz (2015) described prior sustainability knowledge as "prior knowledge about social and ecologic environments and the threats perceived for these environments". The more the prior experience or knowledge of the individuals in the field is and the more they feel that the field is being threatened, the more likely they discover business opportunities (Patzelt & Shepherd, 2011).

Since knowledge is traditionally considered a prerequisite to volitional action, it is a key predictor (Frick, Kaiser, & Wilson, 2004). Knowledge or awareness of the natural environment is a key factor in sustainable innovation (Crals & Vereeck, 2005). It has been demonstrated that prior sustainability knowledge *per se* cannot lead to entrepreneurial behaviour towards sustainable development (Muñoz & Dimov, 2015). Under the most favourable circumstances, it is an "essential condition" that "must be supplemented by other agents to drive the entrepreneurial process ahead". Therefore, the researchers suggest that this aspect must be evaluated in line with sustainability intention and sustainability orientation when exploring entrepreneurial behaviour towards sustainable development.

Generally, higher entrepreneurial knowledge will directly lead to higher awareness about the availability of this professional career option, which makes the entrepreneurial intention more credible. Also, experimental studies have shown that there exists a direct relationship between knowledge and entrepreneurial intentions (Farani, Karimi, & Motaghed, 2017). Sommer and Haug (2011) showed that entrepreneurial knowledge was included in the TPB as a separable factor and applied a positive significant effect on entrepreneurial intentions.

According to their results, one can suppose that prior sustainability knowledge affects sustainable entrepreneurial intentions directly. Therefore, one can hypothesize that:

H5: There is a positive relationship between students' prior sustainability knowledge and their sustainable entrepreneurial intentions.

Based on the TPB, the exogenous effects or more distant agents including characteristics and contextual situations may *indirectly* pose an effect on the individuals' behavioural intentions through their impacts on more proximal, motivational agents including attitudes toward behaviour and PBC (Fishbein & Ajzen, 2011). Thus, as follows, we investigate the relations of sustainability orientation with three antecedents of sustainable entrepreneurial motivations more comprehensively.

Sustainability orientation is one's interests that seem important to figure out the organizations' emergence. As was previously said, Ajzen and Fishbein (1980) argue that characteristics such as sustainability orientation affect a particular behaviour indirectly. It is suggested that more sustainability-driven students feel more powerful support from major reference individuals (e.g. parents, family and friends) compared to less sustainability-driven students. Also, individuals who are more aware of sustainability issues will be more likely to have a favourable attitude towards starting a sustainable business.

It is assumed that an individual's sustainability orientation affects his/her PBC, subjective norms, and attitudes. Thus, we

suggested sustainability orientation as an antecedent of the TPB model components and developed the following assumptions:

H6a. Sustainability orientation is positively related to attitude towards sustainable entrepreneurship.

H6b. Sustainability orientation is positively related to subjective norms.

H6c. Environmental concerns are positively related to perceived behavioural control.

Familiarity with social and ecological environments and the recognized threats for these environments influences the manageability of starting up a sustainable business and makes individuals more self-confident about their own capability to become a sustainable entrepreneur. In the same vein, more knowledge can contribute to more accurate consciousness of and focus on the entrepreneurial professional path and increase social acceptance from significant others (because of the support systems present in the environment) (Liñán, Nabi, & Krueger, 2013). Additionally, knowledge can eliminate the psychological and cognitive obstacles to entrepreneurial predispositions and orientations, thereby enhancing positive attitudes toward entrepreneurship (Roxas, 2014). Weber (2012) states that knowledge reduces uncertainties regarding entrepreneurial endeavours and shapes beliefs, attitudes, and all the perceptions of one's capacity to launch an entrepreneurial profession. Thus, the following hypotheses were developed:

H7a. Prior sustainability knowledge is positively related to attitude towards sustainable entrepreneurship.

H7b. Prior sustainability knowledge is positively related to subjective norms.

H7c. Prior sustainability knowledge is positively related to perceived behavioural control.

The preceding discussion on the associations between prior knowledge and sustainability orientation, motivational factors and sustainable entrepreneurial intentions suggests mediated associations, i.e., prior knowledge and sustainability orientation may affect sustainable entrepreneurial intentions solely by shaping motivational factors. Based on the TPB, exogenous impacts or more distal agents such as characteristics and contextual situations may indirectly influence individuals' behavioural intentions through their impacts on more proximal, motivational agents such as attitudes and PBC (Fishbein & Ajzen, 2011). Also, this research supports the view that prior knowledge and sustainability orientation shape motivational factors that lead to sustainable entrepreneurial intentions.

METHODOLOGY

A quantitative method using primary data gathered by a structured questionnaire was used in this research. The convenience sampling technique was used for sampling although the results would not be generalizable. Nonetheless, given the existing circumstances and subject field of the research (sustainable entrepreneurship) on the one hand and the fact that the present research tried to investigate the current circumstances concerning sustainable entrepreneurship on the other, convenience sampling seemed to be appropriate (Hooi, Ahmad, Amran, & Rahman, 2016). So, 250 agriculture students studying at Bu-Ali Sina University in Iran were selected as the data sample among which 245 returned the questionnaires. After the questionnaires with improper answers and missing data were removed, 211 were chosen to be used for the final analysis. The average age of the respondents was 23 which is in line with the average age of university students. Also, 44 percent of the respondents were female and 56 percent were male. Totally, 32 percent of the respondents had at least one entrepreneur in their friends or family circle.

Measures

The research variables were measured at the individual level. The items of the survey were chosen from prior studies and measured using Likert's five-point scale.

Kuckertz and Wagner's (2010) developed items were used to measure sustainability

orientation. These items include statements such as "I think that environmental problems are one of the biggest challenges for our society" and "I think that entrepreneurs and companies need to take on a larger social responsibility". A 6-item scale on the basis of the research by Dimov and Muñoz (2015) was used to measure prior sustainability knowledge. The respondents' understanding level of the social, environmental and economic issues of society was evaluated by items like "I can understand the economic problems we are facing as a society" and "I can understand the environmental problems we are facing as a society".

Liñán and Chen's (2009) items were adopted in this research to evaluate the TPB constructs. Then, they were modified into sustainable entrepreneurship. Six items were used to assess sustainable entrepreneurial motivations such as "My professional goal is to become a sustainable entrepreneur" and "I am ready to do anything to be a sustainable entrepreneur". Five items were used to measure the attitudes toward sustainable entrepreneurship, like "Being a sustainable entrepreneur would entail great satisfactions for me" and "If I had the opportunity and resources, I'd like to start a sustainable firm". Six items were used to assess PBC, like "I know the necessary practical details to start a sustainable firm" and "To start a sustainable firm and keep it working would be easy for me". Finally, three items were asked to evaluate subjective norms (e.g., "If I decided to create a sustainable firm, my family would approve that decision" and "If I decided to create a sustainable firm, my friends would approve that decision").

Data Analysis

To evaluate the presented model and its associated hypotheses, the Partial least squares structural equation modelling (PLS-SEM) path modelling technique was used. The PLS-SEM method presents simultaneous measurement and structural modelling to evaluate the complicated model of cause-effect relationship. Structural models and measurement are called inner and outer models in PLS-SEM, respectively (Hair Jr, Black, Babin, Anderson, & Tatham, 2010). PLS-SEM was applied to evaluate the relationships among latent underlying independent (exogenous) variables and their related latent dependent (endogenous) variables.

The measurement model is made up of the relationships between the indicators and their underlying latent variables or theoretical constructs. However, the structural model is made up of the hypothesized relationships between latent variables (theoretical constructs) (Chin, 1998). The PLS-SEM technique evaluates measurement and structural models at the same time (Chin, 1998). In this research, PLS-SEM was preferred over structural equation modelling based on covariance due to its use of the least-squares estimation process and thus, preventing various confining assumptions, including residual distributions and multivariate normality (Falk & Miller, 1992). Also, due to the relatively small size of the sample, PLS-SEM was preferable for this research (Chin, 1998; Okazaki & Taylor, 2008).

RESULTS

In two stages, the SmartPLS software outputs are analysed. By evaluating the reliability and validity of each construct, the measurement model is evaluated in the first stage. By evaluating the statistical significance of paths between the constructs by *t*-values, the structural model is evaluated in the second stage using PLS bootstrapping procedure (Hansmann & Ringle, 2004).

The evaluation of the measurement model

Validity and reliability evaluations of the instruments were carried out to validate the measurement model. Composite reliability and Cronbach's alpha (Table 1) of all the constructs in this study are higher than the cut-off value of 0.7 (Chin, 2010). Thus, the constructs are of satisfactory internal consistency. Then, by estimating the average vari-

ances extracted (AVE), the convergent validity of the instrument was evaluated for each construct (Chin, 2010; Hair, Black, Babin, Anderson, & Tatham, 2006). As Table 1 indicates, for each single construct, the AVE is close to or above the acceptability value of 0.5. Therefore, the results indicate the measurement items are convergent on their respective constructs.

Finally, by verifying that the AVE square root for each construct exceeds the squared correlation between each pair of individual constructs, discriminant validity is evaluated. According to Table 2, the AVE square roots (diagonal elements) were higher than the standardized correlations among constructs (off diagonal elements), which indicates acceptable discriminant validity (Fornell & Larcker, 1981). In summary, the measurement model showed satisfactory reliability and discriminant and convergent validity.

The proposed hypotheses were tested by calculating path coefficients (β) and evaluating the PLS structural model. Table 3 and Figure 2 summarize the analysis results. The significance levels, multiple R^2 values and path coefficients in PLS can be interpreted in the same way as significant levels, multiple R^2 values and path coefficients in a multiple regression. The statistical significance of each path coefficient was estimated by bootstrapping. The path coefficients, their *t*-values, and significance levels are shown in Table 3.

The results showed a significant and positive relationship between attitudes (β=0.532, $p<0.01$) and PBC (β=0.440, $p<0.01$) and sustainable entrepreneurial intentions. Thus, hypotheses H1 and H3 are confirmed, although no direct significant relationship was found between sustainability orientation (β=-0.022), prior knowledge (β=-0.020) and subjective norms (β=0.026) and sustainable

Table 1
The Measurement Model: Reliability, Composite Reliability and Average Variance Extracted

Construct	Cronbach'salpha	Compositereliability	AVE
Intentions	0.854	0.892	0.580
Attitudes	0.822	0.883	0.655
Subjective norms	0.777	0.868	0.688
Perceived behavioural control	0.753	0.834	0.506
Sustainability orientation	0.777	0.838	0.428
Prior knowledge	0.875	0.903	0.572

Table 2
Latent Variable Correlation Matrix and Square Roots of Average Variance Extracted (AVE)

Construct	Mean	SD	1	2	3	4	5	6
1-Intentions	3.49	0.889	**0.762**					
2-Attitudes	3.69	0.928	0.742	**0.809**				
3- Subjective norms	2.30	1.040	0.392	0.352	**0.829**			
4- Perceived behavioural control	3.169	0.818	0.741	0.595	0.435	**0.711**		
5- Sustainability orientation	2.85	0.720	0.414	0.501	0.270	0.394	**0.654**	
6- Prior knowledge	2.66	0.861	0.374	0.453	0.318	0.357	0.522	**.756**

Note: Diagonal elements (bold) are the square root of the variance shared between the constructs and their measures. All of the correlations are significant at the $p<0.01$.

entrepreneurial intentions.

Also, the results revealed a direct, significant and positive relationship between attitudes (β=0.364, p<0.01), PBC (β=0.285, p<0.01), and sustainability orientation. Additionally, a direct, significant and positive relationship exists between subjective norms (β=0.244, p<0.01), PBC (β=0.208, p<0.01), attitudes (β=0.263, p<0.01) and prior knowledge. Therefore, hypotheses H6a, b, c and H7a, b, c are confirmed

The R^2 value in PLS analysis indicates the explanatory power of the endogenous variable and can evaluate the model fitness. For the sustainable entrepreneurship intentions, attitudes, subjective norms and PBC, R^2 is 0.74, 0.301, 0.116 and 0.187 respectively in this model, showing the exploratory power of 74%, 30.1%, 11.6% and 18.7% in the relationship, respectively.

The relative size for each incremental effect/link introduced in the model is presented by the f^2 value. The f^2 values of 0.02, 0.15 and 0.35 reflect a low, average or high effect size, respectively (Hair et al., 2006). The lowest value of f^2 (0.001) in this model was related to sustainability orientation and prior knowledge in relation to intention, and its highest value (0.586) was related to the association between intentions and attitudes. To assess the cross-validated redundancy index (Q^2) to examine the originally observed values prediction quality by path model, a blindfolding procedure was carried out. An acceptable Q^2 value is argued to be higher than zero (Hair et al., 2006). In all cases and for all the dependent variables used in the study, the values were higher than zero. Additionally, we esti-

Table 3

A Summary of Test Results for The Structural Model

Hypothesis	Path	Path coefficients (β)	t-values (bootstrap)	Conclusion
Direct effect				
H1	ATSE→SEI	0.532	7.969*	Supported
H2	SN→SEI	0.026	0.723	Rejected
H3	PBC→SEI	0.440	6.880*	Supported
H4	PSK→SEI	-0.020	0.460	Rejected
H5	SO→SEI	-0.022	0.476	Rejected
H6a	SO→ATSE	0.364	5.057*	Supported
H6b	SO→SN	0.142	1.865	Rejected
H6c	SO→PBC	0.285	4.115*	Supported
H7a	PSK→ATSE	0.263	3.178*	Supported
H7b	PSK→SN	0.244	3.094*	Supported
H7c	PSK→PBC	0.208	2.822*	Supported
Indirect effect			**Confidence interval**	
			Lower	Upper
	PSK→ATSE→SEI	0.140	0.10	0.23
	PSK →PBC→SEI	0.092	0.05	0.10
	SO→ATSE→SEI	0.194	0.12	0.45
	SO → PBC → SEI	0.125	0.09	0.12
Total effect				
	PSK→SEI	0.212	2.618*	
	SO→SEI	0..297	3.999*	

Note: SEI=Sustainable Entrepreneurial Intentions; ATSE=Attitudes toward Sustainable Entrepreneurship; SN=Subjective Norms; PBC=Perceived Behavioural Control; PSK= Prior Sustainability Knowledge; SO= Sustainability Orientation

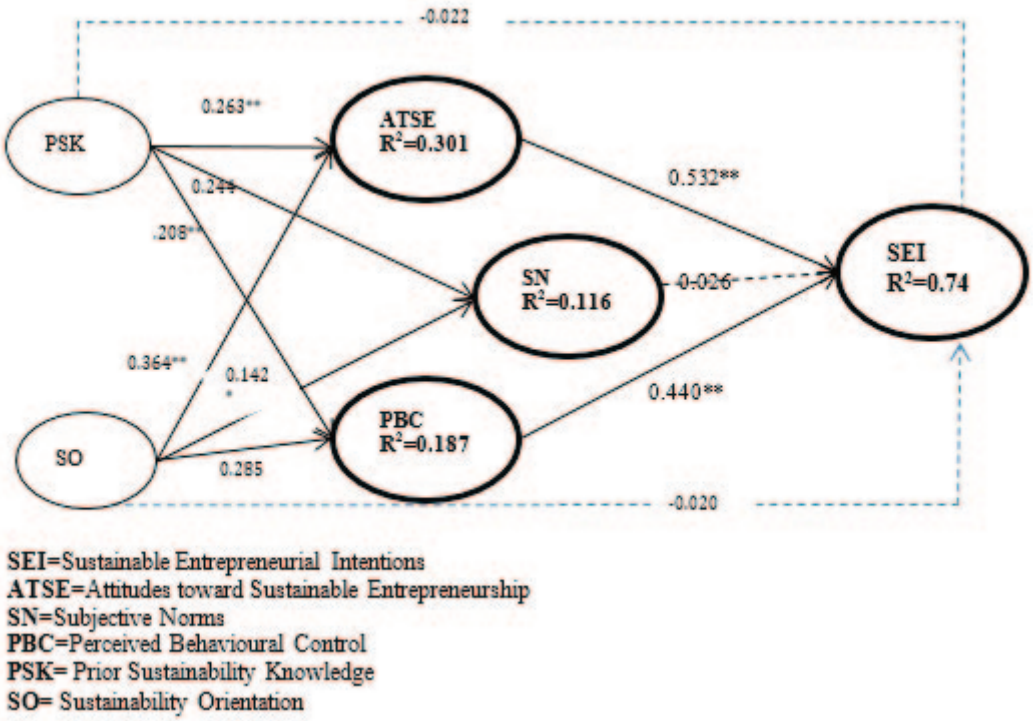

Figure 1. The Results of Structural Equation Modeling

mated the absolute measure of fit, i.e. the standardized root mean square residual (SRMR) which is defined as the standardized difference between the estimated correlation and the observed correlation. The SRMR value presented by this model is less than 0.08, reflecting an acceptable degree of fit (Henseler, Hubona, & Ray, 2016). In sum, the model shows satisfactory explanatory power and good structural features.

Then, aiming at testing the mediation hypotheses, the analytical approach developed by Preacher and Hayes (2008) was implemented. Since in any of the cases, the confidence interval does not include zero, one can see that the two antecedents are of significant indirect effect (Hayes, 2017; Preacher & Hayes, 2008). Thus, we infer that attitudes and PBC fully mediate the relationship between antecedents and entrepreneurial intentions.

DISCUSSION

The research literature on sustainable entrepreneurial intentions is still emerging and more research is needed to gain insights into the process that leads to becoming a sustainable entrepreneur and the mechanisms that make it possible (Arru, 2020). This research was aimed at examining sustainable entrepreneurial intentions through adapting and extending the TPB to sustainable entrepreneurship. Through SEM analysis in this research, the drivers of sustainable entrepreneurial intentions and also the antecedents of those drivers were determined. First, in line with the TPB, sustainable entrepreneurial intentions are affected by attitudes toward sustainable entrepreneurship and PBC, i.e., in cases where attitudes toward sustainable entrepreneurship and PBC are high, one is likely to experience higher levels of sustainable entrepreneurial intentions. Therefore, the results confirm H3 and H1. These results are partially consistent with the prior findings on social entrepreneurship (Hockerts, 2015; Urban & Kujinga, 2017) and sustainable entrepreneurship context (Vuorio et al., 2018); (Hummels & Argyrou, 2021). In contrast with the findings of earlier studies, no relationship was detected between stainable entrepreneurial intentions and sub-

jective norms. Therefore, H2 finds no support. Apparently, Iranian students' sustainable entrepreneurial intentions are more dependent on individual considerations than on normative considerations. Thus, the current results are in line with the results of prior studies indicating subjective norms as the least important factor for entrepreneurial intentions in a model based on the TPB (Hummels & Argyrou, 2021; Karimi et al., 2017; Karimi & Makreet, 2020; Liñán & Chen, 2009). Therefore, entrepreneurial career decision makings may be of such significance that young individuals may not be strongly affected by others' opinions. As Liñán and his colleagues (Liñán & Chen, 2009; Liñán et al., 2013) suggested, the findings showed that subjective norms may play an indirect role in entrepreneurial intentions through attitude towards entrepreneurship and perceived behavioural control.

The study results indicate that prior knowledge and sustainability orientation have key roles in shaping the antecedents of sustainable entrepreneurial intentions, confirming hypotheses H6 and H7. Our findings indicate that the differences found in students' sustainable entrepreneurial intentions can be justified mainly by their attitudes and PBC levels shaped by prior knowledge and sustainability orientation.

The study findings also bear some implications for both policy makers and entrepreneurship educators who wish to stimulate a change in paradigm towards sustainability and a new way of looking at businesses. The findings have shown that attitudes toward sustainable entrepreneurship and PBC are pivotal drivers of sustainable entrepreneurial intentions. These results point to the desirability of implementing public policies and incentives that make sustainable entrepreneurship attractive and that foster sustainability orientation and knowledge since these are closely linked to attitudes and PBC.

Previous studies have shown that educating sustainability "in general" has less utility than programs that focus on the strong predictors of sustainable behaviour (Heeren et al., 2016) and that subjective perceptions are a fundamental key to new business creation (Koellinger, Minniti, & Schade, 2007). This paper suggests which factors educational institutions need to take into account in order to stimulate the creation of new sustainable businesses, highlighting the significant role of PBC and attitudes. Instituting educational programs that aim to improve these perceptions and attitudes might be a way to educate students that could become future sustainable entrepreneurs (Arru, 2020). In case the objective is to increase sustainable entrepreneurial activity level through education, one should pay attention to making sustainable entrepreneurship be understood as more desirable and improving attitudes toward sustainable entrepreneurship. Therefore, the possible methods to affect the sustainable entrepreneurial intentions level are including sustainability-oriented courses in educational programs and providing students with positive entrepreneurship-related experiences. Also, attitudes toward sustainable entrepreneurship have the largest effect on sustainable entrepreneurial intentions, and thereby, attitudes should be emphasized, and the ways to their improvement should have a major role in entrepreneurial educations. In this vein, providing positive images about sustainable entrepreneurship and using role models providing positive experiences can be considered a method to promote the sustainability-oriented entrepreneurial intentions level (Vuorio et al., 2018). Since one of the greatest advantages of entrepreneurial education is entrepreneurial inspiration (Souitaris et al., 2007), one may consider including more examples of successful sustainable entrepreneurship in courses held for experienced individuals to be essential. Additionally, presenting a platform in class for entrepreneurs devoted to seeking sustainable business models will also improve PBC and the entrepreneurial intention level

among their audience. Sustainable entrepreneurship is going to be an excellent alternative in dealing with sustainable ecosystem, market and environmental matters. Therefore, sustainability- related education and awareness are important (Kuckertz & Wagner, 2010). For researchers aiming their academic contributions, sustainability orientation is also a major aspect including models, policies and theories. Sustainability-focused entrepreneurship can be sought by values, social perceptions of sustainability and sustainability orientation (Sung & Park, 2018).

The research has some limitations, each of which creates new fields for future studies. Firstly, the proposed relationships of the research are confined to a special context of entrepreneurship- i.e., sustainable entrepreneurship. Future studies should investigate the proposed relationships for various entrepreneurial opportunities reflecting various types of entrepreneurship, to provide more support for these relationships. Secondly, the study is confined to young adults in their higher educations. Inclusion of individuals of various age ranges, non-students and those who are already entrepreneurs would provide the model with more support. Thirdly, the data sample is confined to developing countries. Therefore, more studies in developed nations and more sustainability-oriented countries are necessary to generalize the findings (Vuorio et al., 2018). Fourth, this research has cross-sectional limitations. Due to the fact that sustainability orientation is an individual's environmental and social concern, it is an essential to understand the environmental agents facing emerging entrepreneurs when interpreting the study results, due to their potential of environmental impacts. Thus, future studies will necessitate longitudinal studies and an event study on the basis of the times when environmental or social problems are raised (Sung & Park, 2018). Finally, due to the lack of stable sustainable entrepreneurial intentions and its antecedents scales, we created our own through modifications in an existing scale, which might necessitate further modifications to match the sustainable entrepreneurial field.

The mediation results emphasize the TPB limitations in explaining entrepreneurial intentions. The knowledge acquired in academic courses may also play a key role in other entrepreneurial intentions -related agents that are beyond the TPB model confines. For example, sustainability knowledge may directly affect one's proclivity in risk-taking, his/her creativity, innovativeness and pro-activeness which can potentially justify an individual's variations in entrepreneurial intentions. (Weber, 2012) referred to the TPB limitations in explicating other major determinants of entrepreneurial intentions, such as the possible confounding impacts of personal traits and emotions.

CONCLUSIONS

Sustainability is a major subject for developing and understanding our society, including businesses, government, and non-governmental organizations (NGOs). Particularly, in a modern environment where societal and environmental issues are critical, sustainable entrepreneurship is necessary to overcome them efficiently, and it seems vital to decide to launch a sustainable business in an uncertain environment and go after economic and societal wellbeing (Sung & Park, 2018). This study deals with a major gap in the literature. Scholars have referred to the need for adapting intention models and their application methods in entrepreneurship type-specific intentions (Liñán & Fayolle, 2015), particularly in a developing country (Karimi et al., 2017). This paper focused on sustainable entrepreneurship and the TPB applicability in this special type of entrepreneurship in a developing country context. Therefore, this study contributes to entrepreneurship research by presenting a model for sustainable entrepreneurial intentions and examining the factors that affect sustainable intentions.

In sum, the results reflected that attitudes toward sustainable entrepreneurship and PBC were positively correlated with sustainable entrepreneurial intentions; however, there was no significant relationship between subjective norms and sustainable entrepreneurial intentions. Additionally, PBC and attitudes toward sustainable entrepreneurial mediated the impacts of prior knowledge and sustainability orientation on the intention of engaging in a sustainable entrepreneurship venture in the near future among agriculture students in a developing country namely Iran.

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